



Preface

This preface describes the objectives, intended audience, organization and terminology of this *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*. The Cisco uBR7200 series CMTS and this guide support the following Cisco IOS release trains:

- 12.3 BC
- 12.2 BC
- 12.1 EC
- 12.0 SC

For additional supported Cisco IOS release trains, refer to [Cisco uBR7200 Series Software Release Notes](#) on Cisco.com.

Document Revision History

The Document Revision History table below records technical changes to this document.

Table 1 Document Revision History

Document Revision	Date	Change Summary
OL-2239-04	September 30, 2005	Incorporated new features and enhancements introduced in Cisco IOS Release 12.3(13a)BC. Added Document Revision History table.

Document Objectives

This guide describes configuring, maintaining, and troubleshooting the Cisco uBR7200 series universal broadband routers: the Cisco uBR7223, Cisco uBR7246, and Cisco uBR7246 VXR. Cisco's Cable Modem Termination System (CMTS) solutions allow cable companies, Internet service providers (ISPs), and others to allocate channel capacity for Internet access, Virtual Private Network (VPN), and Voice over IP (VoIP) services using a broadband radio frequency (RF) cable plant.

The Cisco uBR7200 series universal broadband routers sustain downstream and upstream traffic to and from two-way Data Over Cable Service Interface Specification (DOCSIS)-based cable modems (CMs) that support 6 MHz National Television Systems Committee (NTSC) operations. For NTSC cable plants not upgraded for full two-way operations, the routers also support DOCSIS-compliant telco-return CMs. For international cable companies using 8 MHz channel widths, the Cisco uBR7200 series equipment supports Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans to operate with EuroDOCSIS-based CMs and set top box (STB) units with integrated EuroDOCSIS modems.

Audience

This guide is intended for system administrators and support engineers who configure and maintain the Cisco uBR7200 series. Many different delivery models exist for Cisco uBR7200 series equipment:

- In smaller networks, a single service provider manages all equipment and infrastructure.
- In larger networks, multiple service operators (MSOs) and ISPs share responsibility for provisioning and managing the cable plant and IP network.

The MSO and ISP divide responsibilities according to the service model. In some cases, the MSO maintains and operates the cable plant and attached CMs and STBs, whereas the ISP owns, operates, and maintains the regional network and IP infrastructure beyond the cable distribution hub. In other cases, the CMTS and RF customer premises equipment (CPE) are viewed as part of the networking infrastructure, and the ISP maintains control for provisioning and managing DOCSIS functionality.



Note

This guide considers the MSO and ISP as a single service principle with responsibility to provision and manage DOCSIS-based cable modems and set-top boxes (STBs). This guide assumes that administrators are familiar with Cisco uBR7200 series hardware, DOCSIS or EuroDOCSIS requirements, and networking.

Document Organization

This guide focuses on configuration of Cisco IOS software for the Cisco uBR7200 series. [Table 2](#) summarizes the chapters and procedures in this guide.

Table 2 *Guide Contents and Organization*

Title	Description
Chapter 1, “Overview of Cisco uBR7200 Series Software”	Acquaints you with the supported Cisco IOS features and configuration.
Chapter 2, “Configuring the Cable Modem Termination System for the First Time”	Provides instructions to make basic configurations to the Cisco uBR7200 series cable modem termination system (CMTS) using AutoInstall, the Setup facility, Extended Setup, or manual configuration mode. Includes sample Cisco uBR7200 series software configurations. Note Complete the configurations in this chapter prior to attempting additional configurations later in this guide or elsewhere.
Chapter 3, “Configuring Cable Modem Interface Features”	Provides instructions for required cable modem interface configurations for upstream and downstream interfaces.
Chapter 4, “Configuring DOCSIS Baseline Privacy Interface on the Cisco uBR7200 Series”	Provides an overview of DOCSIS 1.0 Baseline Privacy Interface (BPI), instructions for enabling BPI, and an introduction to DOCSIS 1.1 BPI+ features.
Chapter 5, “Managing Cable Modems on the Hybrid Fiber-Coaxial Network”	After completing upstream and downstream cable modem interface configurations, this chapter provides a number of procedures that you can implement in order to manage operations of your cable modems in the hybrid fiber-coaxial network.
Chapter 6, “Configuring Basic Broadband Internet Access”	Provides a recommended basic configuration for high-speed Internet access and a basic Internet access sample configuration file.

Table 2 **Guide Contents and Organization (continued)**

Title	Description
Chapter 7, “Overview of the Cisco Network Registrar for the Cisco uBR7200 Series”	Supplements the Cisco Network Registrar (CNR) documentation by providing additional cable-specific instructions that are pertinent to the Cisco uBR7200 series and CMTS management.
Chapter 8, “Troubleshooting the System”	Provides troubleshooting instructions for the configuration of the Cisco uBR7200 series CMTS.
Appendix A, “Installing or Upgrading Cisco IOS Software”	Explains how to install Cisco IOS software onto "Run from RAM" Cisco routers using a TFTP server or remote copy protocol (rcp) server application.
Appendix B, “Resolving Common Image Installation Problems”	Explains the resolution to common installation problems when installing images using TFTP or an rcp server.
Appendix C, “Viewing Sample Configuration Files”	Provides examples of Cisco uBR7200 series universal broadband router configuration files.
Appendix D, “Frequency Allocation for the Cisco uBR7200 Series Universal Broadband Routers”	Provides information on NTSC 6-MHz, Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) 8-MHz channel bands.
Appendix E, “Configuration Register Information for the Cisco uBR7200 Series Universal Broadband Routers”	Provides information about the functions and configuration of bits in the Cisco IOS Software Configuration Register.

Conventions

This guide uses the following conventions for command syntax descriptions and textual emphasis:

Table 3 **Command Syntax and Emphasis Conventions**

Convention	Description
boldface font	Commands and keywords are in boldface .
<i>italic</i> font	Arguments for which you supply values are in <i>italics</i> .
[]	Elements in square brackets are optional.
{x y z}	Alternative, mutually exclusive, keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
screen font	Terminal sessions and information the system displays are in screen font.
boldface screen font	Information you must enter is in boldface screen font.
<i>italic screen</i> font	Arguments for which you supply values are in <i>italic screen</i> font.
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.

Table 3 **Command Syntax and Emphasis Conventions (continued)**

Convention	Description
< >	Nonprinting characters, such as passwords, are in angle brackets in contexts where italics are not available.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

**Note**

This symbol means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

**Tip**

This symbol means *the following are useful tips*.

**Timesaver**

This symbol means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Caution**

This symbol means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Terms and Acronyms

A complete list of terms and acronyms is available in the *Internetworking Terms and Acronyms* guide, available on the Documentation CD-ROM.

To fully understand the content of this guide, you should be familiar with the following terms and acronyms.

- A/D—analog to digital (conversion)
- ABR—available bit rate
- AAL5—ATM adaptation layer 5
- AGC—automatic gain control
- AM-VSB—Amplitude Modulation - Vestigial Side Band (Modulation scheme)
- ASIC—Application Specific Integrated Circuit
- AWG—American wire gauge
- BGP—Border Gateway Protocol
- BPI—Baseline Privacy Interface
- CATV—cable television
- CM—cable modem
- CMTS—cable modem termination system (headend)
- CoS—class of service

- CPE—customer premises equipment
- CPR—Centralized Priority Reservation
- CRC—cyclic redundancy check
- CSU—channel service unit
- CTS—Clear To Send
- D/A—digital to analog (conversion)
- DAVIC —Digital Audio-Visual Council
- DCD—Data Carrier Detect
- DCE—data communications equipment
- DDS—Direct Digital Synthesis
- DES—Data Encryption Standard
- DHCP—Dynamic Host Configuration Protocol
- DOCSIS—Data-over-Cable Service Interface Specification
- DVB—Digital Video Broadcasting
- DIMM—dual in-line memory module
- DSR—data set ready
- DSU—data service unit
- DTE—data terminal equipment
- DTR—data terminal ready
- ESP—Electronic Systems Products
- EMC—electromagnetic compliance
- EMI—electromagnetic interference
- ESD—electrostatic discharge
- EuroDOCSIS—European DOCSIS (Data-over-Cable Service Interface Specification)
- FCS—Frame Check Sequence; First Customer Shipment
- FDR—Final Design Review
- FEC—Forward Error Correction
- FRU—field-replaceable unit (router components that do not require replacement by a service provider certified by Cisco)
- FTP—foil twisted-pair
- HCCP—Hot Standby CMTS-to-CMTS Protocol
- HDLC—High-Level Data Link Control
- HEAD—Head-end Modulator and Demodulator
- HEM—Head End Modem
- HFC—Hybrid Fiber Coax
- HOME—Subscriber Unit
- HS—Head-end Shelf
- HSRP—Hot-Standby Router Protocol
- IP—Internet Protocol
- IPSec—IP Security Protocol
- ISL—Inter-Switch Link protocol
- ISS—Instruction Set Simulator
- Kbps—kilo-bits per second

- LAN—local area network
- LCN—logical channel number
- LED—light emitting diode
- LLC—logical link control
- MAC—Media Access Control
- MB—megabyte
- Mbps—mega-bits per second
- MM—multimode
- MODEM—modulator/demodulator
- MPEG-2—Moving Picture Experts Group (Specification 2)
- MPEG-2-TS—MPEG-2 Transport Stream
- MSN—manufacturer serial number
- MSO—multiple systems operator
- NIU/STB—network interface unit/set-top box
- nrt-VBR—non-real-time variable bit rate
- NTSC—National Television Standards Committee
- NVRAM—nonvolatile random-access memory
- OAM AIS—Operation, Administration, and Maintenance alarm indication signal
- OAM&P—Operations, Administration, Maintenance and Provisioning
- OC3—Optical Carrier Level 3
- OIR—online insertion and removal
- PCI—Peripheral Component Interconnect
- PCMCIA—Personal Computer Memory Card International Association
- PDD—Project Design Document
- PHY—Physical Layer Interface
- PID—Packet Identifier
- PLL—Phase Locked Loop
- PPP—Point-to-Point Protocol
- QAM—Quadrature Amplitude Modulation
- QoS—quality of service
- QPSK—Quadrature Phase Shift Keying
- rcp—remote copy protocol
- RFI—radio frequency interference
- RIP—Routing Information Protocol
- RISC—Reduced Instruction Set Computer
- RTP—Real-Time Transport Protocol
- RTS—Request To Send
- SDRAM—synchronous dynamic random-access memory
- SIMM—single in-line memory module
- SM—Subscriber Modem or Spectrum Manager
- SMI—single-mode intermediate reach
- SNMP—Simple Network Management Protocol

- SU—Subscriber Unit
- TCP/IP—Transmission Control Protocol/Internet Protocol
- TDE/C—Transmit Data Encoder/Controller
- TDM—time-division multiplexing
- TDMA—Time Division Multiple Access
- TFTP—Trivial File Transfer Protocol
- UBR—unspecified bit rate
- UDP—User Datagram Protocol
- UNI—User-Network Interface
- UTOPIA—Universal Test and Operation Physical Interface for ATM
- UTP—unshielded twisted-pair
- VC—virtual circuit
- VCI—Virtual Channel Identifier
- VCPU—Virtual CPU
- VP—Virtual Path
- VPI—Virtual Path Identifier
- VPN—Virtual Private Network

Related Documentation

Cisco uBR7200 Series Documentation

The procedures in this guide assume that site preparation and hardware setup are complete. Refer to the documentation page for *Cisco uBR7200 Series Universal Broadband Routers* for these and additional document links:

Document Title	Online Location
<i>Release Notes for the Cisco uBR7200 Series</i> (multiple release trains)	http://www.cisco.com/univercd/cc/td/doc/product/cable/cab_rout/ub7200rn/index.htm
<i>Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide</i>	http://www.cisco.com/en/US/docs/cable/cmts/u_br7200/installation/guide/ub72khig.html
<i>Cisco uBR7200 Series Software Features</i>	http://www.cisco.com/en/US/docs/cable/cmts/u_br7200/configuration/guide/cr72scg.html

**Note**

If the hypertext link to any external document does not operate, you can access the desired document by typing or pasting the full document title in the **Search** field of the [Cisco.com](http://www.cisco.com) home page. Click **Go**.

- For information about installing and replacing field-replaceable units (FRUs), such as memory, on Cisco uBR7200 series routers, refer to the document that ships with each FRU.
- For information on the modular port adapter installed in your router (if present), refer to the individual documents that ship with each port adapter.
- For international agency compliance, safety, and statutory information for WAN interfaces for Cisco uBR7200 series routers, refer to the *Regulatory Compliance and Safety Information* document that shipped with your router.

Cisco Cable Modem Termination System Reference Documentation

Document Title	Online Location
<i>Cable DOCSIS 1.1 FAQs</i>	http://www.cisco.com/en/US/tech/tk86/tk168/technologies_q_and_a_item09186a0080174789.shtml
<i>Cisco Cable Modem Termination System Feature Guide</i>	http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/cmtsfg.html
<i>Cisco IOS CMTS Cable Command Reference Guide</i>	http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html
<i>Cisco IOS Multiservice Applications Configuration Guide:</i> • <i>Configuring Headend Broadband Access Router Features</i> • <i>Configuring Subscriber-End Broadband Access Router Features</i>	http://www.cisco.com/en/US/docs/ios/12_1/multiserv/configuration/guide/multi_c.html
<i>DOCSIS 1.1 for the Cisco uBR7200 Series Universal Broadband Routers</i>	http://www.cisco.com/en/US/docs/cable/cmts/feature/DOCSIS11.html

Related Cisco IOS Release Documentation

For detailed Cisco IOS software configuration information and support, refer to the configuration and command reference publications on these web pages:

- [Cisco IOS Release 12.1 Documentation](#)
- [Cisco IOS Release 12.2 Documentation](#)

To query Cisco IOS releases according to feature or release number, refer to the [Cisco IOS Feature Navigator](#) (Cisco.com login ID and password required).

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>

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