



# Using the Command-Line Interface in Cisco IOS Software

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

- [Initially Configuring a Device, page 1-1](#)
- [Using the CLI, page 1-2](#)
- [Saving Changes to a Configuration, page 1-10](#)
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## 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 Support area of Cisco.com at <http://www.cisco.com/cisco/web/support/index.html>

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.

# Using the CLI

This section describes the following topics:

- [Understanding Command Modes, page 1-2](#)
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## 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 1-1](#) lists common command modes with associated CLI prompts, access and exit methods, and a brief description of how each mode is used.

**Table 1-1 CLI Command Modes**

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
User EXEC	Log in.	Router>	Issue the <b>logout</b> or <b>exit</b> command.	<ul style="list-style-type: none"> <li>• Change terminal settings.</li> <li>• Perform basic tests.</li> <li>• Display device status.</li> </ul>
Privileged EXEC	From user EXEC mode, issue the <b>enable</b> command.	Router#	Issue the <b>disable</b> command or the <b>exit</b> command to return to user EXEC mode.	<ul style="list-style-type: none"> <li>• Issue <b>show</b> and <b>debug</b> commands.</li> <li>• Copy images to the device.</li> <li>• Reload the device.</li> <li>• Manage device configuration files.</li> <li>• Manage device file systems.</li> </ul>
Global configuration	From privileged EXEC mode, issue the <b>configure terminal</b> command.	Router(config)#	Issue the <b>exit</b> command or the <b>end</b> command to return to privileged EXEC mode.	Configure the device.

**Table 1-1** CLI Command Modes (continued)

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
Interface configuration	From global configuration mode, issue the <b>interface</b> command.	Router(config-if)#	Issue the <b>exit</b> command to return to global configuration mode or the <b>end</b> command to return to privileged EXEC mode.	Configure individual interfaces.
Line configuration	From global configuration mode, issue the <b>line vty</b> or <b>line console</b> command.	Router(config-line)#	Issue the <b>exit</b> command to return to global configuration mode or the <b>end</b> command to return to privileged EXEC mode.	Configure individual terminal lines.
ROM monitor	From privileged EXEC mode, issue the <b>reload</b> command. Press the <b>Break</b> 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 <b>continue</b> command.	<ul style="list-style-type: none"> <li>Run as the default operating mode when a valid image cannot be loaded.</li> <li>Access the fall-back procedure for loading an image when the device lacks a valid image and cannot be booted.</li> <li>Perform password recovery when a Ctrl-Break sequence is issued within 60 seconds of a power-on or reload event.</li> </ul>

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
```



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

# Using the Interactive Help Feature

The CLI includes an interactive Help feature. [Table 1-2](#) describes how to use the Help feature.

**Table 1-2 CLI Interactive Help Commands**

Command	Purpose
<b>help</b>	Provides a brief description of the help feature in any command mode.
<b>?</b>	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&lt;Tab&gt;</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 1-3](#) describes these conventions.

**Table 1-3 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.

**Table 1-3 CLI Syntax Conventions (continued)**

Symbol/Text	Function	Notes
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
Router(config)# snmp-server file-transfer access-group 10 ?
protocol protocol options
<cr>
```

## 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 number. 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 number 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 [http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products\\_tech\\_note09186a00801746e6.shtml](http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_tech_note09186a00801746e6.shtml).

## Using the Command History Feature

The CLI command history feature saves the commands you enter during a session in a command history buffer. The default number of commands saved 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 CLI 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 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 1-4 shows the default command aliases.

**Table 1-4 Default Command Aliases**

Command Alias	Original Command
<b>h</b>	help
<b>lo</b>	logout
<b>p</b>	ping
<b>s</b>	show
<b>u</b> or <b>un</b>	undebug
<b>w</b>	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, issue the **show alias** command.

For more information about the **alias** command, see

[http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf\\_book.html](http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html).

## 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 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.

The **no** and **default** forms of commands are described in the command pages of command references.

## 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.

Three output modifiers are available and are described as follows:

- **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 1-5](#) shows the common CLI error messages.

**Table 1-5 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.

**Table 1-5 Common CLI Error Messages (continued)**

Error Message	Meaning	How to Get Help
% 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.

## 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](http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_cli-basics.html)
- Cisco Product Support Resources  
<http://www.cisco.com/cisco/web/support/index.html>
- Support area on Cisco.com (also search for documentation by task or product)  
<http://www.cisco.com/en/US/support/index.html>
- *White Paper: Cisco IOS Reference Guide*  
<http://www.cisco.com/web/about/security/intelligence/ios-ref.html>

- Software Download Center (downloads; tools; licensing, registration, advisory, and general information) (requires Cisco.com User ID and password)  
<http://tools.cisco.com/support/downloads/go/Redirect.x?mdfid=278875386>
- 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>

