

Using Cisco IOS Software

This chapter provides helpful tips for understanding and configuring Cisco IOS software using the command-line interface (CLI).

- Getting Help
- Understanding Command Modes
- Using the No and Default Forms of Commands
- Saving Configuration Changes

For an overview of Cisco IOS software configuration, refer to the *Configuration Fundamentals Configuration Guide*.

For information on the conventions used in the Cisco IOS documentation set, refer to the “About the Cisco IOS Software Documentation” chapter located at the beginning of this book.

Getting Help

Entering a question mark (?) at the system prompt displays a list of commands available for each command mode. You can also get a list of any command’s associated keywords and arguments with the context-sensitive help feature.

To get help specific to a command mode, a command, a keyword, or an argument, use one of the following commands:

Command	Purpose
help	Obtain a brief description of the help system in any command mode.
<i>abbreviated-command-entry?</i>	Obtain a list of commands that begin with a particular character string. (No space between command and question mark.)
<i>abbreviated-command-entry</i> <Tab>	Complete a partial command name.
?	List all commands available for a particular command mode.
<i>command ?</i>	List a command’s associated keywords. (Space between command and question mark.)
<i>command keyword ?</i>	List a keyword’s associated arguments. (Space between the keyword and question mark.)

Example: How to Find Command Options

This section provides an example of how to display syntax for a command. The syntax can consist of optional or required keywords. To display keywords for a command, enter a question mark (?) at the configuration prompt, or after entering part of a command followed by a space. The Cisco IOS software displays a list of keywords available along with a brief description of the keywords. For example, if you were in global configuration mode, typed the command **arap**, and wanted to see all the keywords for that command, you would type **arap ?**.

Table 1 shows examples of how you can use the question mark (?) to assist you in entering commands. It steps you through entering the following commands:

- **controller t1 1**
- **cas-group 1 timeslots 1-24 type e&m-fgb dtmf**

Table 1 **How to Find Command Options**

Command	Comment
Router> enable Password: <password> Router#	Enter the enable command and password to access privileged EXEC commands. You have entered privileged EXEC mode when the prompt changes to Router#.
Router# config terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#	Enter global configuration mode. You have entered global configuration mode when the prompt changes to Router(config)#.
Router(config)# controller t1 ? <0-3> Controller unit number Router(config)# controller t1 1 Router(config-controller)#	Enter controller configuration mode by specifying the T1 controller that you want to configure using the controller t1 global configuration command. Enter a ? to display what you must enter next on the command line. In this example, you must enter a controller unit number from 0 to 3. You have entered controller configuration mode when the prompt changes to Router(config-controller)#.

Table 1 **How to Find Command Options (continued)**

Command	Comment
<pre>Router(config-controller)# ? Controller configuration commands: cablelength Specify the cable length for a DS1 link cas-group Configure the specified timeslots for CAS (Channel Associate Signals) channel-group Specify the timeslots to channel-group mapping for an interface clock Specify the clock source for a DS1 link default Set a command to its defaults description Controller specific description ds0 ds0 commands exit Exit from controller configuration mode fdl Specify the FDL standard for a DS1 data link framing Specify the type of Framing on a DS1 link help Description of the interactive help system linecode Specify the line encoding method for a DS1 link loopback Put the entire T1 line into loopback no Negate a command or set its defaults pri-group Configure the specified timeslots for PRI shutdown Shut down a DS1 link (send Blue Alarm) Router(config-controller)#</pre>	<p>Enter a ? to display a list of all the controller configuration commands available for the T1 controller.</p>
<pre>Router(config-controller)# cas-group ? <0-23> Channel number Router(config-controller)# cas-group</pre>	<p>Enter the command that you want to configure for the controller. In this example, the cas-group command is used.</p> <p>Enter a ? to display what you must enter next on the command line. In this example, you must enter a channel number from 0 to 23.</p> <p>Because a <cr> is not displayed, it indicates that you must enter more keywords to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 ? timeslots List of timeslots in the cas-group Router(config-controller)# cas-group 1</pre>	<p>After you enter the channel number, enter a ? to display what you must enter next on the command line. In this example, you must enter the timeslots keyword.</p> <p>Because a <cr> is not displayed, it indicates that you must enter more keywords to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 timeslots ? <1-24> List of timeslots which comprise the cas-group Router(config-controller)# cas-group 1 timeslots</pre>	<p>After you enter the timeslots keyword, enter a ? to display what you must enter next on the command line. In this example, you must enter a list of timeslots from 1 to 24.</p> <p>You can specify timeslot ranges (for example, 1-24), individual timeslots separated by commas (for example 1, 3, 5), or a combination of the two (for example 1-3, 8, 17-24). The 16th time slot is not specified in the command line, because it is reserved for transmitting the channel signaling.</p> <p>Because a <cr> is not displayed, it indicates that you must enter more keywords to complete the command.</p>

Table 1 How to Find Command Options (continued)

Command	Comment
<pre>Router(config-controller)# cas-group 1 timeslots 1-24 ? service Specify the type of service type Specify the type of signaling Router(config-controller)# cas-group 1 timeslots 1-24</pre>	<p>After you enter the timeslot ranges, enter a ? to display what you must enter next on the command line. In this example, you must enter the service or type keyword.</p> <p>Because a <cr> is not displayed, it indicates that you must enter more keywords to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 timeslots 1-24 type ? e&m-fgb E & M Type II FGB e&m-fgd E & M Type IIFGD e&m-immediate-start E & M Immediate Start fxs-ground-start FXS Ground Start fxs-loop-start FXS Loop Start sas-ground-start SAS Ground Start sas-loop-start SAS Loop Start Router(config-controller)# cas-group 1 timeslots 1-24 type</pre>	<p>In this example, the type keyword is entered. After you enter the type keyword, enter a ? to display what you must enter next on the command line. In this example, you must enter one of the signaling types.</p> <p>Because a <cr> is not displayed, it indicates that you must enter more keywords to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb ? dtmf DTMF tone signaling mf MF tone signaling service Specify the type of service <cr> Router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb</pre>	<p>In this example, the e&m-fgb keyword is entered. After you enter the e&m-fgb keyword, enter a ? to display what you must enter next on the command line. In this example, you can enter the dtmf, mf, or service keyword to indicate the type of channel-associated signaling available for the e&m-fgb signaling type.</p> <p>Because a <cr> is displayed, it indicates that you can enter more keywords or press <cr> to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb dtmf ? dnis DNIS addr info provisioned service Specify the type of service <cr> Router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb dtmf</pre>	<p>In this example, the dtmf keyword is entered. After you enter the dtmf keyword, enter a ? to display what you must enter next on the command line. In this example, you can enter the dnis or service keyword to indicate the options available for dtmf tone signaling.</p> <p>Because a <cr> is displayed, it indicates that you can enter more keywords or press <cr> to complete the command.</p>
<pre>Router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb dtmf Router(config-controller)#</pre>	<p>In this example, enter a <cr> to complete the command.</p>

Understanding Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you at any given time depend on which mode you are currently in. Entering a question mark (?) at the system prompt allows you to obtain a list of commands available for each command mode.

When you start a session on the router, you begin in user mode, often called EXEC mode. Only a limited subset of the commands are available in EXEC mode. In order to have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From privileged mode, you can enter any EXEC command or enter global

configuration mode. Most of the EXEC commands are one-time commands, such as **show** commands, which show the current status of something, and **clear** commands, which clear counters or interfaces. The EXEC commands are not saved across reboots of the router.

The configuration modes allow you to make changes to the running configuration. If you later save the configuration, these commands are stored across router reboots. In order to get to the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode, subinterface configuration mode, and a variety of protocol-specific modes.

ROM monitor mode is a separate mode used when the router cannot boot properly. If your router or access server does not find a valid system image when it is booting, or if its configuration file is corrupted at startup, the system might enter read-only memory (ROM) monitor mode.

Summary of Main Command Modes

Table 2 summarizes the main command modes of the Cisco IOS software.

Table 2 Summary of Main Command Modes

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Log in.	Router>	Use the logout command.
Privileged EXEC	From user EXEC mode, use the enable EXEC command.	Router#	To exit back to user EXEC mode, use the disable command. To enter global configuration mode, use the configure terminal privileged EXEC command.
Global configuration	From privileged EXEC mode, use the configure terminal privileged EXEC command.	Router(config)#	To exit to privileged EXEC mode, use the exit or end command or press Ctrl-Z . To enter interface configuration mode, enter an interface configuration command.
Interface configuration	From global configuration mode, enter by specifying an interface with an interface command.	Router(config-if)#	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, use the exit command or press Ctrl-Z . To enter subinterface configuration mode, specify a subinterface with the interface command.
Subinterface configuration	From interface configuration mode, specify a subinterface with an interface command.	Router(config-subif)#	To exit to global configuration mode, use the exit command. To enter privileged EXEC mode, use the end command or press Ctrl-Z .
ROM monitor	From privileged EXEC mode, use the reload EXEC command. Press the Break key during the first 60 seconds while the system is booting.	>	To exit to user EXEC mode, type continue .

For more information regarding command modes, refer to the “Using the Command Line Interface” chapter of the *Configuration Fundamentals Configuration Guide*.

Using the No and Default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a function. Use the command without the keyword **no** to reenable a disabled function or to enable a function that is disabled by default. For example, IP routing is enabled by default. To disable IP routing, specify the **no ip routing** command and specify **ip routing** to reenable it. The Cisco IOS software command references provide the complete syntax for the configuration commands and describes what the **no** form of a command does.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values. The Cisco IOS software command references describe what the **default** form of a command does if the command is not the same as the **no** form.

Saving Configuration Changes

Enter the **copy system:running-config nvram:startup-config** command to save your configuration changes to your startup configuration so that they will not be lost if there is a system reload or power outage. For example:

```
Router# copy system:running-config nvram:startup-config
Building configuration...
```

It might take a minute or two to save the configuration. After the configuration has been saved, the following output appears:

```
[OK]
Router#
```

On most platforms, this step saves the configuration to nonvolatile random-access memory (NVRAM). On the Class A Flash file system platforms, this step saves the configuration to the location specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM.