

Command-Line Interfaces

This chapter describes the command-line interfaces (CLIs) you use to configure the Catalyst 5000, 4000, 2948G, 2926G, and 2926 series switches and modules.

Note For descriptions of all switch, ATM, and ROM monitor commands, refer to the *Command Reference* for your switch. For descriptions of the commands used to configure the Route Switch Module (RSM), refer to the Cisco IOS software command reference publications.

This chapter consists of these sections:

- ROM Monitor Command-Line Interface on page 2-1
- Switch Command-Line Interface on page 2-2
- ATM Module Command-Line Interface on page 2-7
- RSM Command-Line Interface on page 2-19

ROM Monitor Command-Line Interface

The ROM monitor is a ROM-based program that executes upon platform power-up, reset, or when a fatal exception occurs. The system enters ROM monitor mode if the switch does not find a valid system image, if the nonvolatile RAM (NVRAM) configuration is corrupted, or if the configuration register is set to enter ROM monitor mode. From the ROM monitor mode, you can load a system image manually from Flash memory, from a network server file, or from bootflash.

Note The ROM monitor CLI is present on the Catalyst 4000, 2948G, and 2926G series switches, and on the Catalyst 5000 series Supervisor Engine III module (including the Supervisor Engine III FSX and FLX versions).

On the Catalyst 5000 and 2926G series switches, you can enter ROM monitor mode by restarting the switch and pressing the **Break** key during the first 60 seconds of startup. On the Catalyst 4000 and 2948G series switches, you can enter ROM monitor mode by pressing **Control-C** within the first five seconds of startup.

Note The **Break** key is always enabled for 60 seconds after rebooting the system, regardless of whether the **Break** key is configured to be off by configuration register settings.

To access the ROM monitor on the Catalyst 5000 and 2926G series switches through a terminal server, you can escape to the Telnet prompt and enter the **send break** command for your terminal emulation program to break into ROM monitor mode. To access the ROM monitor on the Catalyst 4000 and 2948G series switches through a terminal server, you can escape to the Telnet prompt and press **Control-C** to break into ROM monitor mode.

Once you are in ROM monitor mode, the prompt changes to rommon>. Use the ? command to see the available ROM monitor commands.

Switch Command-Line Interface

The switch CLI is a basic command-line interpreter, similar to the UNIX C shell.

These sections describe how to use the switch CLI:

- Accessing the Switch CLI on page 2-2
- Working With the Command-Line Interface on page 2-3

Accessing the Switch CLI

You can access the CLI through the supervisor engine console port or through a Telnet session.

These sections describe how to access the switch CLI:

- Accessing the CLI through the Console Port on page 2-2
- Accessing the CLI through Telnet on page 2-3

Accessing the CLI through the Console Port

To access the switch CLI through the console port, you must connect a console terminal to the console port through an EIA/TIA-232 (RS-232) cable.

Note For complete information on how to connect to the supervisor engine console port, refer to the hardware documentation for your switch.

To access the switch through the console port, perform this task:

Task	Command
Step 1 Initiate a connection from the terminal to the switch console prompt and press Return .	
Step 2 At the prompt, enter the system password. The Console> prompt appears, indicating that you have accessed the CLI in normal mode.	
Step 3 If necessary, enter privileged mode (you must enter privileged mode to change the switch configuration).	enable
Step 4 Enter the necessary commands to complete the desired tasks.	
Step 5 When finished, exit the session.	exit

After accessing the switch through the console port, you see this display:

```
Cisco Systems Console
Enter password:
Console>
```

Accessing the CLI through Telnet

Before you can open a Telnet session to the switch, you must first set the IP address for the switch. For information about setting the IP address, see the “Setting the In-Band (sc0) Interface IP Address” section on page 3-7 and the “Setting the Management Ethernet (me1) Interface IP Address” section on page 3-8. Up to eight simultaneous Telnet sessions are supported. Telnet sessions disconnect automatically after remaining idle for a set time period.

To access the switch CLI from a remote host using Telnet, perform this task:

Task	Command
Step 1 From the remote host, enter the telnet command and the name or IP address of the switch you want to access.	telnet {hostname ip_addr}
Step 2 At the prompt, enter the password for the CLI. If no password has been configured, press Return .	
Step 3 Enter the necessary commands to complete your desired tasks.	
Step 4 When finished, exit the Telnet session.	exit

This example shows how to open a Telnet session to the switch:

```
unix_host% telnet Catalyst_1
Trying 172.16.10.10...
Connected to Catalyst_1.
Escape character is '^]'.

Cisco Systems Console
```

```
Cisco Systems Console
```

```
Enter password:
Catalyst_1>
```

Working With the Command-Line Interface

These sections describe how to work with the switch CLI:

- Switch CLI Command Modes on page 2-4
- Designating Modules, Ports, and VLANs on the Command Line on page 2-4
- Designating MAC Addresses, IP Addresses, and IP Aliases on page 2-5
- Command Line Editing on page 2-5
- History Substitution on page 2-6

Switch CLI Command Modes

The switch CLI supports two modes of operation: normal and privileged. Both modes are password protected. Enter normal-mode commands for everyday system monitoring. Enter privileged-mode commands to configure the system and perform basic troubleshooting.

After you log in, the system enters normal mode automatically, which gives you access to normal-mode commands only. You can access privileged mode by entering the **enable** command followed by the privileged-mode password. To return to normal mode, enter the **disable** command at the prompt.

This example shows how to enter privileged mode:

```
Console> enable
Enter Password:
Console> (enable)
```

Designating Modules, Ports, and VLANs on the Command Line

Switch commands are not case sensitive. You can abbreviate commands and parameters as long as they contain enough letters to be distinguished from any other currently available commands or parameters.

The Catalyst 5000, 4000, 2948G, 2926G, and 2926 series switches are multimodule systems. Commands you enter from the CLI might apply to the entire system or to a specific module, port, or VLAN.

Modules, ports, and VLANs are numbered starting with 1. The supervisor engine module is module 1, residing in slot 1. If your Catalyst 5505, 5509, or 5500 switch has a redundant supervisor engine, the supervisor modules reside in slots 1 and 2.

To designate a specific module, use the module number. On the fixed-configuration switches, there are two logical modules. In most systems, the module number and the slot number are the same. However, on the Catalyst 2948G series switches, there are two modules but only one slot. When you enter configuration commands on the Catalyst 2948G series switches, you must refer to the module number, not the slot number.

On modules that have user-configurable ports, port 1 is always the left-most port. To designate a specific port on a specific module, the command syntax is *mod_num/port_num*. For example, **3/1** denotes module 3, port 1. In some commands, such as **set trunk** and **set port channel**, you can enter lists of ports.

Note On the Catalyst 4912G switch and the Catalyst 2948G series switches, the left-most switch port is numbered 2/1 instead of 1/1.

To specify a range of ports, use a comma-separated list (do not insert spaces) to specify individual ports or a hyphen (-) between the port numbers to specify a range of ports. Hyphens take precedence over commas.

Table 2-1 shows examples of how to designate ports and port ranges.

Table 2-1 Designating Ports and Port Ranges

Example	Function
2/1	Specifies port 1 on module 2
3/4-8	Specifies ports 4, 5, 6, 7, and 8 on module 3
5/2,5/4,6/10	Specifies ports 2 and 4 on module 5 and port 10 on module 6
3/1-2,4/8	Specifies ports 1 and 2 on module 3 and port 8 on module 4

VLANs are identified using the VLAN ID, a single number associated with the VLAN. To specify a list of VLANs, use a comma-separated list (do not insert spaces) to specify individual VLANs or a hyphen (-) between the VLAN numbers to specify a range of VLANs.

Table 2-2 shows examples of how to designate VLANs and VLAN ranges.

Table 2-2 Designating VLANs and VLAN Ranges

Example	Function
10	Specifies VLAN 10
5,10,15	Specifies VLANs 5, 10, and 15
10-50,500	Specifies VLANs 10 through 50, inclusive, and VLAN 500

Designating MAC Addresses, IP Addresses, and IP Aliases

Some commands require a Media Access Control (MAC) address, IP address, or IP alias, which must be designated in a standard format. The MAC address format must be six hexadecimal numbers separated by hyphens, as shown in the following example:

```
00-00-0c-24-d2-fe
```

The IP address format is 32 bits, written as 4 octets separated by periods (dotted decimal format) that are made up of a network section, an optional subnet section, and a host section, as shown in the following example:

```
126.2.54.1
```

If you have configured IP aliases on the switch, you can use IP aliases in place of the dotted decimal IP address. This is true for most commands that use an IP address, except for commands that define the IP address or IP alias. For information on using IP aliases, see the “Creating and Using IP Aliases” section on page 14-6.

If DNS is configured on the switch, you can use DNS host names in place of IP addresses. For information on configuring DNS, refer to Chapter 22, “Configuring DNS.”

Command Line Editing

You can scroll through the last 20 commands stored in the history buffer, and enter or edit the command at the prompt. Table 2-3 lists the keyboard shortcuts you can use when entering and editing switch commands.

Table 2-3 Command-Line Editing Keyboard Shortcuts

Keystroke	Function
Ctrl-A	Jumps to the first character of the command line.
Ctrl-B or the left arrow key ¹	Moves the cursor back one character.
Ctrl-C	Escapes and terminates prompts and lengthy tasks.
Ctrl-D	Deletes the character at the cursor.
Ctrl-E	Jumps to the end of the current command line.
Ctrl-F or the right arrow key ¹	Moves the cursor forward one character.
Ctrl-K	Deletes from the cursor to the end of the command line.
Ctrl-L; Ctrl-R	Repeats current command line on a new line.
Ctrl-N or the down arrow key ¹	Enters next command line in the history buffer.
Ctrl-P or the up arrow key ¹	Enters previous command line in the history buffer.
Ctrl-U; Ctrl-X	Deletes from the cursor to the beginning of the command line.
Ctrl-W	Deletes last word typed.
Esc B	Moves the cursor backward one word.
Esc D	Deletes from the cursor to the end of the word.
Esc F	Moves the cursor forward one word.
Delete key or Backspace key	Erases mistake when entering a command; reenter command after using this key.

¹ The arrow keys function only on ANSI-compatible terminals such as VT100s.

History Substitution

The history buffer stores the last 20 commands you entered during a terminal session. History substitution allows you to access these commands without retyping them, by using special abbreviated commands. Table 2-4 lists the history substitution commands.

Table 2-4 History Substitution Commands

Command	Function
Repeating recent commands:	
!!	Repeat the most recent command.
!-nn	Repeat the <i>nn</i> th most recent command.
!n	Repeat command <i>n</i> .
!aaa	Repeat the command beginning with string <i>aaa</i> .
!?aaa	Repeat the command containing the string <i>aaa</i> .
To modify and repeat the most recent command:	
^aaa^bbb	Replace the string <i>aaa</i> with the string <i>bbb</i> in the most recent command.
To add a string to the end of a previous command and repeat it:	
!!aaa	Add string <i>aaa</i> to the end of the most recent command.
!n aaa	Add string <i>aaa</i> to the end of command <i>n</i> .
!aaa bbb	Add string <i>bbb</i> to the end of the command beginning with string <i>aaa</i> .
!?aaa bbb	Add string <i>bbb</i> to the end of the command containing the string <i>aaa</i> .

Accessing Command Help

Enter **help** or **?** in normal or privileged mode to see the commands available in those modes. On selected commands, entering **help** or **?** after a command provides additional information, such as a command usage description. Command usage, the help menu, and when appropriate, parameter ranges are provided if you enter a command using the wrong number of arguments or inappropriate arguments. Additionally, appending **help** or **?** to a command category displays a list of commands in that category.

ATM Module Command-Line Interface

These sections describe how to use the Catalyst 5000 series ATM module CLI:

- Overview of the ATM Module CLI on page 2-7
- Accessing the ATM Module CLI on page 2-7
- Operating the ATM Module CLI on page 2-8
- Performing ATM Module Functions on page 2-12

Overview of the ATM Module CLI

The ATM modules use a subset of the Cisco IOS software. The Cisco IOS user interface provides access to several different command modes. Each command mode provides a group of related commands.

Cisco IOS software provides two command access modes: *user EXEC* and *privileged EXEC*. The user EXEC mode does not require a password and allows you direct access only to the ATM module with which you have established a session. The user EXEC mode commands are a subset of the privileged EXEC mode commands.

The privileged EXEC mode requires a password (the default password is **atm**). From the privileged level, you can access the six configuration modes: user EXEC, privileged EXEC, global configuration, interface configuration, line configuration, and LAN Emulation (LANE) database configuration. Enter a question mark (?) at the system prompt to display the available commands for the current command mode.

Almost every configuration command has a **no** form. The **no** form disables a feature or function. Enter the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default. Refer to the *Command Reference* for your switch for more information about the ATM module commands.

The user interface also provides context-sensitive help on command syntax. For information on how to use the help system, refer to the “Getting Context-Sensitive Help” section on page 2-12. The user interface also describes the command editing and command history features that allow you to recall previous command entries and easily edit command entries.

Accessing the ATM Module CLI

To access an ATM module installed in a Catalyst 5000 series switch, enter the **session mod_num** command at the Console> prompt. The switch responds with the Enter Password prompt. Enter **atm** as the default password. The ATM module responds with the ATM> prompt. At this point, you are in user EXEC command mode, and you have direct access only to the ATM module with which you have established a session.

This example shows how to open a session on an ATM module installed in slot 4:

```

Console> session 4
Enter Password:
ATM>
    
```

Operating the ATM Module CLI

This section describes the command modes and functions that allow you to access and operate the ATM module CLI. Table 2-5 lists the command modes, how to access each mode, the prompt you see while you are in that mode, the main uses for each configuration mode, and the method to exit that mode. The prompts listed assume the default name ATM.

Table 2-5 ATM Module Command Mode Summary

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Use the session command in the switch CLI.	ATM>	Enter the logout command.
Privileged EXEC	From user EXEC mode, enter the enable EXEC command. Enter the enable password at the prompt (default is atm).	ATM#	Enter the disable command.
Global configuration	From privileged EXEC mode, enter the configure privileged EXEC command.	ATM(config)#	Enter the exit or end command, or press Ctrl-Z .
Interface configuration	From global configuration mode, enter the interface <i>interface_num</i> command.	ATM (config-if)#	To exit to global configuration mode, enter the end command. To exit to privileged EXEC mode, enter the exit command, or press Ctrl-Z .
Subinterface configuration	From interface configuration mode, enter the interface <i>sub_interface_num</i> command.	ATM (config-subif)#	To exit to global configuration mode, enter the end command. To exit to privileged EXEC mode, enter the exit command, or press Ctrl-Z .
Line configuration	From global configuration mode, enter the line <i>line_number</i> command.	ATM (config-line)#	To exit to global configuration mode, enter the exit command. To exit to privileged EXEC mode, enter the end command, or press Ctrl-Z .
LANE database configuration	From global configuration mode, enter the lane database command.	ATM (config-if)#	To exit to global configuration mode, enter the exit command. To exit to privileged EXEC mode, enter the end command, or press Ctrl-Z .

Accessing User EXEC Mode

After you log in to the ATM module, you are automatically in user EXEC command mode. The user EXEC commands are a subset of the privileged EXEC commands. The user EXEC commands allow you to change terminal settings on a temporary basis, perform basic tests, and list system information.

To list the commands available in user EXEC mode, enter a question mark (?) at the ATM> prompt.

The user-level prompt is as follows:

```
ATM>
```

Accessing Privileged EXEC Mode

Because many privileged commands set operating parameters, use password protection to restrict access to privileged EXEC mode. The privileged EXEC command set includes those commands in user EXEC mode, as well as the **configure** command through which you can access the remaining command modes. Privileged EXEC mode also includes high-level testing commands, such as **debug**.

To access and list the privileged EXEC commands, perform this task:

Task	Command
Step 1 Enter privileged EXEC mode.	enable <i>password</i>
Step 2 List privileged EXEC commands.	?

If the system administrator has set a password, you are prompted to enter it before you are allowed access to privileged EXEC mode. The password is not displayed on the screen and is case sensitive. If an **enable** password has not been set, you can only access privileged EXEC mode from the console. The default password for the ATM module is **atm**.

This example shows how to access privileged EXEC mode:

```
ATM> enable
Password:
ATM#
```

From privileged EXEC mode, you can access global configuration mode. For instructions, see the “Accessing Global Configuration Mode” section on page 2-9.

To return from privileged EXEC mode to user EXEC mode, perform this task:

Task	Command
Exit privileged EXEC mode and return to user EXEC mode.	disable

Accessing Global Configuration Mode

Global configuration commands apply to features that affect the ATM module as a whole. To enter global configuration mode, enter the **configure** privileged EXEC command. When you enter this command, the privileged EXEC mode prompts you for the source of the configuration commands, as follows:

```
Configuring from terminal, memory, or network [terminal]?
```

Note Only the **write memory** and **write terminal** commands are supported. The **write network** command is not supported.

You can specify either the terminal or NVRAM as the source of configuration commands (refer to the Cisco IOS configuration guide and command reference publications for complete information on Cisco IOS commands). The default is to enter commands from the console terminal. Press **Return** to enter terminal configuration mode.

To access and list the global configuration commands, perform this task:

Task	Command
Step 1 At the console terminal, from privileged EXEC mode, enter global configuration mode.	configure
Step 2 List the global configuration commands.	?

This example shows how to access global configuration mode:

```
ATM#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ATM(config)#
```

To exit global configuration command mode and return to privileged EXEC mode, perform this task using one of these commands:

Task	Command
Exit global configuration mode.	exit end Ctrl-Z

Accessing Interface Configuration Mode

Interface configuration commands modify the operation of the ATM interface. Interface configuration commands always follow an **interface** global configuration command, which defines the interface type.

To access and list the interface configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, enter interface configuration mode.	interface atm0 ¹
Step 2 List the interface configuration commands.	?
Step 3 From interface configuration mode, enter subinterface configuration mode.	interface atm0.sub_interface_num
Step 4 List the subinterface configuration commands.	?

¹ Always specify ATM interface 0 for the Catalyst 5000 series ATM module.

This example shows how to access interface configuration mode:

```
ATM(config)#interface atm0
ATM(config-if)#
```

This example shows how to access subinterface configuration mode:

```
ATM(config-if)#interface atm0.1
ATM(config-subif)#
```

To exit interface configuration mode and return to global configuration mode, perform this task:

Task	Command
Exit interface configuration mode.	exit

To exit global configuration mode and return to privileged EXEC mode, perform this task using one of these commands:

Task	Command
Exit global configuration mode.	end Ctrl-Z

Accessing Line Configuration Mode

Line configuration commands modify the operation of a terminal line. Line configuration commands always follow a **line** command, which defines a line number. These commands change terminal parameter settings either on a line-by-line basis or for a range of lines.

To access and list the virtual terminal line configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, configure a virtual terminal line.	line [vty] line-number [ending-line-number] ¹
Step 2 List the line configuration commands.	?

¹ This command is documented in the “Terminal Lines and Modem Support Commands” chapter in the *Router Products Command Reference* publication.

This example shows how to enter line configuration mode for virtual terminal line 4:

```
ATM(config)#line 0 4
ATM(config-line)#
```

To exit line configuration mode and return to global configuration mode, perform this task:

Task	Command
Exit line configuration mode.	exit

To exit global configuration mode and return to privileged EXEC mode, perform this task using one of these commands:

Task	Command
Exit global configuration mode.	end Ctrl-Z

Performing ATM Module Functions

This section describes how to perform the following functions:

- Getting Context-Sensitive Help on page 2-12
- Checking Command Syntax on page 2-13
- Using the Command History Features on page 2-14
- Using the Editing Features on page 2-15
- Ending a Session on page 2-19

Getting Context-Sensitive Help

You can get a list of the associated keywords and arguments for any command by using the context-sensitive help feature.

To get help specific to a command mode, a command, a keyword, or arguments, perform one of these tasks:

Task	Command
• Obtain a brief description of the help system in any command mode.	help
• Configure a line or lines to receive help for the full set of user-level commands when you enter <code>?</code> .	full-help
• Configure a line to receive help for the full set of user-level commands for this EXEC session.	terminal full-help¹
• Obtain a list of commands that begin with a particular character string.	<i>abbreviated-command-entry?</i>
• Complete a partial command name.	<i>abbreviated-command-entry<Tab></i>
• List all commands available for a particular command mode.	?
• List the associated keywords for a command.	<i>command ?</i>
• List the associated arguments for a keyword.	<i>command keyword ?</i>

¹ This command is documented in the *Cisco Access Connection Guide*.

When using context-sensitive help, the space (or lack of a space) before the question mark (?) is significant.

To obtain a list of commands that begin with a particular character sequence, enter the characters immediately followed by the question mark (?). Do not include a space. This form of help completes the word for you.

To list keywords or arguments, enter command syntax help by entering a question mark (?) in place of a keyword or argument. Include a space before the ?. This form of help reminds you which keywords or arguments are applicable based on the command, keywords, and arguments you have already entered.

You can abbreviate commands and keywords by using a number of characters that allow a unique abbreviation. For example, you can abbreviate the **show** command to **sh**.

Enter the **help** command (which is available in any command mode) for a brief description of the help system:

```
ATM#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 back up 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?').
```

You can enter a partial command name and a question mark (?) to obtain a list of commands beginning with a particular character set. See the “Completing a Partial Command Name” section on page 2-16 for more details.

This example shows how context-sensitive help enables you to create an access list from configuration mode. Enter **co** at the system prompt followed by a question mark (?). Do not leave a space between the last letter and the question mark (?). The system provides the commands that begin with **co**.

```
ATM#co?
configure connect copy
```

Enter the **configure** command followed by a space and a question mark (?) to list the command’s keywords and a brief explanation:

```
ATM#configure ?
memory      Configure from NV memory
network     Configure from a TFTP network host
terminal    Configure from the terminal
<cr>
```

Checking Command Syntax

An error indicator (^) symbol appears at the point in the command string where you have entered an incorrect command, keyword, or argument. The error location indicator and interactive help system allow you to easily find and correct syntax errors.

This example shows how to use context-sensitive help to determine how to clear an ATM interface. First, check the syntax for the command:

```
ATM#clear ?
counters    Clear counters on one or all interfaces
interface   Clear the hardware logic on an interface
lane        lane
line        Reset a terminal line
logging     Clear logging buffer
tcp         Clear a TCP connection or statistics

ATM#clear
```

The help output shows that **clear interface** is the syntax for clearing an interface. Next, check the syntax for specifying the type of interface:

```
ATM#clear interface ?
      ATM          ATM interface
      Ethernet     IEEE 802.3
      Null         Null interface

ATM#clear interface
```

The help output shows that **clear interface atm** is the syntax for clearing an ATM interface. Next, check the syntax for specifying the specific ATM interface:

```
ATM#clear interface atm ?
      <0-0> ATM interface number

ATM#clear interface atm
```

The help output shows you must specify the ATM interface number. When you specify the interface correctly, the ATM interface is cleared:

```
ATM#clear interface atm 0
ATM#
```

Using the Command History Features

The command history feature keeps a record of commands you have entered and allows you to recall these commands. The functions of the command history feature are as follows:

- Setting the Command History Buffer Size on page 2-14
- Recalling Commands on page 2-15
- Disabling the Command History Feature on page 2-15

Setting the Command History Buffer Size

By default, the system records ten command lines in its history buffer. To set the number of command lines the system records during the current terminal session, perform this task in user EXEC mode:

Task	Command
Enable the command history feature for the current terminal session.	terminal history [<i>size number-of-lines</i>] ¹

¹ This command is documented in the *Cisco Access Connection Guide*.

The **terminal no history size** command resets the number of lines saved by history to the default of ten lines.

To configure the number of command lines the system records, perform this task in line configuration mode:

Task	Command
Enable the command history feature.	history [<i>size number-of-lines</i>] ¹

¹ The **no history** command turns off command history for the line.

Recalling Commands

To recall commands from the history buffer, perform one of these tasks:

Task	Key Sequence/Command
<ul style="list-style-type: none"> Recall commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands. 	Press Ctrl-P or the up arrow key ¹ .
<ul style="list-style-type: none"> Return to more recent commands in the history buffer after recalling commands with Ctrl-P or the up arrow key. Repeat the key sequence to recall successively more recent commands. 	Press Ctrl-N or the down arrow key ¹ .
<ul style="list-style-type: none"> In EXEC mode, list the last several commands you have just entered. 	show history

¹ The arrow keys function only on ANSI-compatible terminals such as VT100s.

Disabling the Command History Feature

The command history feature is enabled automatically. To disable it during the current terminal session, perform this task in user EXEC mode:

Task	Command
Disable the command history feature for the current session.	terminal no history ¹

¹ This command is documented in the *Cisco Access Connection Guide*.

To configure a specific line so that the command history feature is disabled, perform this task in line configuration mode:

Task	Command
Configure the line so that the command history feature is disabled.	no history

Using the Editing Features

Catalyst 5000 series ATM software release 2.3 and above includes an enhanced editing mode that provides a set of editing key functions similar to those of the Emacs editor. You can enter commands in uppercase, lowercase, or a mix of both. Only passwords are case sensitive. You can abbreviate commands and keywords to the number of characters that allow a unique abbreviation.

For example, you can abbreviate the **show** command to **sh**. After entering the command at the system prompt, press **Return** to execute the command.

Enabling Enhanced Editing Mode

Although enhanced editing mode is enabled automatically, you can disable it and revert to the editing mode of previous software releases. For more information, see the “Ending a Session” section on page 2-19.

To reenble the enhanced editing mode for the current terminal session, perform this task in user EXEC mode:

Task	Command
Enable the enhanced editing features for the current terminal session.	terminal editing ¹

¹ This command is documented in the *Cisco Access Connection Guide*.

To reconfigure a specific line in enhanced editing mode, perform this task in line configuration mode:

Task	Command
Enable the enhanced editing features.	editing

Moving Around on the Command Line

Perform one of these tasks to move the cursor around on the command line for corrections or changes:

Task	Keystrokes
• Move the cursor back one character.	Press Ctrl-B or press the left arrow key ¹ .
• Move the cursor forward one character.	Press Ctrl-F or press the right arrow key ¹ .
• Move the cursor to the beginning of the command line.	Press Ctrl-A .
• Move the cursor to the end of the command line.	Press Ctrl-E .
• Move the cursor back one word.	Press Esc B .
• Move the cursor forward one word.	Press Esc F .

¹ The arrow keys function only on ANSI-compatible terminals such as VT100s.

Completing a Partial Command Name

If you cannot remember a complete command name, press the **Tab** key to allow the system to complete a partial entry. To do so, perform this task:

Task	Keystrokes
Complete a command name.	Enter the first few letters, and press the Tab key.

If your keyboard does not have a Tab key, press **Ctrl-I** instead.

In the following example, when you enter the letters **conf** and press the **Tab** key, the system provides the complete command:

```
ATM#conf<Tab>
ATM#configure
```

If you enter a set of characters that could indicate more than one command, the system beeps to indicate an error. Enter a question mark (?) to obtain a list of commands that begin with that set of characters. Do not leave a space between the last letter and the question mark (?). For example, three commands in privileged mode start with **co**. To see what they are, enter **co?** at the privileged EXEC prompt. The system displays all commands that begin with **co**, as follows:

```
ATM#co?
configure connect copy
```

Pasting in Buffer Entries

The system provides a buffer that contains the last ten items you deleted. You can recall these items and paste them in the command line by performing this task:

Task	Keystrokes
Step 1 Recall the most recent entry in the buffer.	Press Ctrl-Y .
Step 2 Recall the next buffer entry.	Press Esc Y .

The buffer contains only the last ten items you have deleted or cut. If you press **Esc Y** more than ten times, you cycle back to the first buffer entry.

Editing Command Lines That Wrap

The editing command set provides a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. To scroll back, perform this task:

Task	Keystrokes
Return to the beginning of a command line to verify that you have entered a lengthy command correctly.	Press Ctrl-B or the left arrow key repeatedly until you scroll back to the beginning of the command entry, or press Ctrl-A to return directly to the beginning of the line ¹ .

¹ The arrow keys function only on ANSI-compatible terminals such as VT100s.

In this example, the **lane config-atm-address** command entry extends beyond one line. When the cursor reaches the end of the line, the line shifts ten spaces to the left and is redisplayed. The dollar sign (\$) indicates that the line scrolled to the left. Each time the cursor reaches the end of the line, the line shifts ten spaces to the left.

```
ATM(config-subif)#lane config-atm-address 39.00000000000014155551211.080020
ATM(config-subif)#$ -atm-address 39.00000000000014155551211.080020c1001.00
```

When you complete the entry, press **Ctrl-A** to check the complete syntax, and then press **Return** to execute the command. The dollar sign (\$) appears at the end of the line to indicate that the line scrolled to the right:

```
ATM(config-subif)#lane config-atm-address 39.00000000000014155551211.080020 $
```

The system assumes your terminal screen is 80 columns wide. If your screen has a different width, enter the **terminal width** command to tell the router the correct width of your screen.

Use line wrapping with the command history feature to recall and modify previous complex command entries. See the “Recalling Commands” section on page 2-15 for information about recalling previous command entries.

Deleting Entries

Perform one of these tasks to delete command entries if you make a mistake or change your mind:

Task	Keystrokes
• Erase the character to the left of the cursor.	Press the Delete or Backspace key.
• Delete the character at the cursor.	Press Ctrl-D .
• Delete from the cursor to the end of the command line.	Press Ctrl-K .
• Delete from the cursor to the beginning of the command line.	Press Ctrl-U or Ctrl-X .
• Delete the word to the left of the cursor.	Press Ctrl-W .
• Delete from the cursor to the end of the word.	Press Esc D .

Scrolling Down a Line or a Screen

When you use the help facility to list the commands in a particular mode, the list is often longer than the terminal screen can display. In such cases, a ---More--- prompt is displayed at the bottom of the screen. To view the next line or screen, perform these tasks:

Task	Keystrokes
• Scroll down one line.	Press the Return key.
• Scroll down one screen.	Press the Spacebar .

Note The ---More--- prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output.

Redisplaying the Current Command Line

If you enter a command and the system suddenly sends a message to your screen, you can recall your current command line entry. To do so, perform this task:

Task	Keystrokes
Redisplay the current command line.	Press Ctrl-L or Ctrl-R .

Transposing Mistyped Characters

If you mistype a command entry, you can transpose the mistyped characters by performing this task:

Task	Keystrokes
Transpose the character to the left of the cursor with the character located at the cursor.	Press Ctrl-T .

Controlling Capitalization

You can change words to uppercase or lowercase, or capitalize a set of letters, by performing these tasks:

Task	Keystrokes
• Capitalize at the cursor.	Press Esc C .
• Change the word at the cursor to lowercase.	Press Esc L .
• Capitalize letters from the cursor to the end of the word.	Press Esc U .

Designating a Keystroke as a Command Entry

To use a particular keystroke as an executable command, perform this task:

Task	Keystrokes
Insert a code to indicate to the system that the keystroke immediately following should be treated as a command entry, <i>not</i> an editing key.	Press Ctrl-V or Esc Q .

Ending a Session

After entering the **setup** command or other configuration commands, exit the ATM module and quit the session.

To end a session, perform this task:

Task	Command
Enter the quit EXEC command.	quit

RSM Command-Line Interface

The RSM is a full-function router running Cisco IOS software. The Cisco IOS user interface allows you to access several different command modes. Each command mode provides a group of related commands. This section describes how to access and list the commands available in each command mode.

Note For complete information about the RSM and related commands, see Chapter 40, “Maintaining and Administering the RSM,” the *Command Reference* for your switch, and the *Cisco IOS Configuration Fundamentals Command Reference* publications.

Cisco IOS software has two levels of access to commands: *user* and *privileged*. The unprivileged user mode is the user EXEC mode. The privileged mode is the privileged EXEC mode and requires a password. The commands available in user EXEC mode are a subset of the commands available in privileged EXEC mode.

From the privileged EXEC level, you can access global configuration mode and six specific configuration modes: interface, subinterface, line, router, ipx-router, and route-map configuration. Enter a question mark (?) at the system prompt to display a list of commands for each command mode.

Almost every system configuration command has a **no** form. Enter the **no** form to disable a feature or function. Enter the command without the keyword **no** to reenable a disabled feature or enable a feature that is disabled by default. For example, IP routing is enabled by default. Specify the command **no ip routing** to disable IP routing and specify **ip routing** to reenable it.

Accessing the RSM

To access an RSM installed in a Catalyst 5000 series switch, enter the **session mod_num** command at the Console> prompt. The switch responds with the Enter Password prompt. Enter the password for the RSM. The RSM responds with the Router> prompt. At this point, you are in user EXEC command mode, and you have direct access only to the RSM with which you have established a session.

The following example shows how to open a session on an RSM installed in slot 4:

```
Console> session 4  
Enter Password:  
Router>
```

Accessing the VIP2 Port Adapters

When you use the RSM with the Catalyst VIP2, the combination is a double-wide module that occupies two consecutive Catalyst 5505, Catalyst 5000, or Catalyst 5500 slots. The Catalyst VIP2 data and control interface is provided through two ribbon cables. Power to the Catalyst VIP2 is provided through the Catalyst VIP2 backplane connector.

For more information, refer to the *Route Switch Module Catalyst VIP2-15 and VIP2-40 Installation and Configuration Note*.

Note You can install the RSM/VIP2 combination in the Catalyst 5000, 5505, 5509, and 5500 chassis.

Operating the RSM CLI

This section describes the command modes and functions that allow you to access and operate the RSM CLI.

Table 2-6 lists the command modes, how to access each mode, the prompt you will see while you are in that mode, and the method to exit a mode. The prompts listed assume the default RSM name, *Router*.

Table 2-6 RSM Command Mode Summary

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Log in to RSM.	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 exit into global configuration mode, use the configure privileged EXEC command.
Global configuration	From privileged EXEC mode, use the configure privileged EXEC command.	Router (config) #	To exit to privileged EXEC mode, use the exit or end command or press Ctrl-Z . To exit to 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, press Ctrl-Z . To exit to subinterface configuration mode, specify a subinterface with the interface command.
Subinterface configuration	From global configuration mode, specify a subinterface with an interface command.	Router (config-subif) #	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, press Ctrl-Z .
Line configuration	From global configuration mode, enter by specifying a line with a line command.	Router (config-line) #	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, press Ctrl-Z .
Router configuration	From global configuration mode, enter by issuing a command that begins with router (such as router igrp).	Router (config-router) #	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, press Ctrl-Z .
IPX-router configuration	From global configuration mode, enter by issuing the ipx routing command, and then a command that begins with ipx router (such as ipx router eigrp).	Router (config-ipx-router) #	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, press Ctrl-Z .
Route-map configuration	From global configuration mode, enter by specifying the route-map command.	Router (config-route-map) #	To exit to global configuration mode, use the exit command. To exit to privileged EXEC mode, press Ctrl-Z .
ROM monitor	From privileged EXEC mode, use the reload EXEC command. Press Break during the first 60 seconds while the system is booting.	>	To exit to user EXEC mode, press c to continue.

Accessing User EXEC Mode

After you log in to the RSM, you are automatically in user EXEC command mode. The EXEC commands available at the user level are a subset of those available at the privileged level. In general, the user EXEC commands allow you to establish connections, change terminal settings on a temporary basis, perform basic tests, and list system information.

To list the user EXEC commands, perform this task:

Task	Command
List the user EXEC commands.	?

The user-level prompt consists of the RSM host name followed by an angle bracket (>):

```
Router>
```

You can change the RSM name using the **hostname** global configuration command described in the IOS Command Reference publications.

Accessing Privileged EXEC Mode

Because many of the privileged commands set operating parameters, privileged access should be password-protected to prevent unauthorized use. The privileged command set includes those commands contained in user EXEC mode, as well as the **configure** command through which you can access the remaining command modes. Privileged EXEC mode also includes high-level testing commands, such as **debug**. For details on the **debug** command, see the *Debug Command Reference* publication.

To access and list the privileged EXEC commands, perform this task:

Task	Command
Step 1 Enter the privileged EXEC mode.	enable [<i>password</i>]
Step 2 List privileged EXEC commands.	?

If the system administrator has set a password, you are prompted to enter it before being allowed access to privileged EXEC mode. The password is not displayed on the screen and is case sensitive. The system administrator uses the **enable password** global configuration command to set the password that restricts access to privileged mode. This command is described in the IOS Command Reference publications.

The privileged-level prompt consists of the RSM host name followed by the pound sign (#). (If the RSM was named with the **hostname** command, that name would appear as the prompt instead of “router.”)

```
router#
```

From the privileged level, you can access global configuration mode. For instructions, see the “Accessing Global Configuration Mode” section on page 2-23.

To return from privileged EXEC mode to user EXEC mode, perform this task:

Task	Command
Move from privileged EXEC mode to user EXEC mode.	disable

Accessing Global Configuration Mode

Global configuration commands apply to features that affect the system as a whole. Use the **configure** privileged EXEC command to enter global configuration mode. When you enter this command, the EXEC prompts you for the source of the configuration commands:

```
Configuring from terminal, memory, or network [terminal]?
```

You can then specify either the terminal, NVRAM, or a file stored on a network server as the source of configuration commands. The default is to enter commands from the terminal console. To begin this configuration method, press the **Return** key.

To access and list the global configuration commands, perform this task:

Task	Command
Step 1 At the terminal, from the privileged EXEC mode, enter global configuration mode.	configure { terminal memory network } ¹
Step 2 List the global configuration commands.	?

¹ This command is documented in the IOS Command Reference publications.

To exit global configuration mode and return to privileged EXEC mode, use one of the following commands:

Task	Command
Exit global configuration mode.	exit end Ctrl-Z

From global configuration mode, you can access seven configuration sublevels: interface, subinterface, line, router, ipx-router, route-map, and ROM monitor configuration commands. These command modes are described in the following sections.

Accessing Interface Configuration Mode

Many features are enabled on a per-interface basis. Interface configuration commands modify the operation of an interface such as a VLAN interface. Interface configuration commands always follow an **interface** command, which defines the interface type.

To access and list the interface configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, enter interface configuration mode.	interface <i>interface-type interface-number</i> ¹
Step 2 List the interface configuration commands.	?

¹ This command is documented in the IOS Command Reference publications.

To exit interface configuration mode and return to global configuration mode, enter the **exit** command. To exit Configuration mode and return to privileged EXEC mode, press **Ctrl-Z**.

Accessing Router Configuration Mode

Router configuration commands configure a routing protocol and always follow a **router** command. To access and list the router configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, enter router configuration mode.	router [<i>keyword</i>] ¹ See the list in the example for keywords.
Step 2 List the router configuration commands.	?

1 This command is documented in the IOS Command Reference publications.

To list the available router configuration keywords, enter the **router** command followed by a space and a question mark (?) at the global configuration prompt:

```
Router(config)#router ?
  bgp      Border Gateway Protocol (BGP)
  egp      Exterior Gateway Protocol (EGP)
  eigrp    Enhanced Interior Gateway Routing Protocol (EIGRP)
  igrp     Interior Gateway Routing Protocol (IGRP)
  isis     ISO IS-IS
  iso-igrp IGRP for OSI networks
  mobile   Mobile routes
  odr      On Demand stub Routes
  ospf     Open Shortest Path First (OSPF)
  rip      Routing Information Protocol (RIP)
  static   Static routes
```

In the following example, the RSM is configured to support the Routing Information Protocol (RIP). The new prompt is `router(config-router)#`. Enter a question mark (?) to list router configuration commands.

```
Router(config)#router rip
Router(config-router)#?
Router configuration commands:
  auto-summary      Enable automatic network number summarization
  default           Set a command to its defaults
  default-metric    Set metric of redistributed routes
  distance          Define an administrative distance
  distribute-list    Filter networks in routing updates
  exit              Exit from routing protocol configuration mode
  help              Description of the interactive help system
  maximum-paths     Forward packets over multiple paths
  neighbor          Specify a neighbor router
  network           Enable routing on an IP network
  no                Negate a command or set its defaults
  offset-list       Add or subtract offset from IGRP or RIP metrics
  output-delay      Interpacket delay for RIP updates
  passive-interface Suppress routing updates on an interface
  redistribute      Redistribute information from another routing
                   protocol
  timers            Adjust routing timers
  validate-update-source Perform sanity checks against source address of
                   routing updates
  version           Set routing protocol version
```

The list of commands might vary slightly from this example, depending upon how your RSM has been configured.

To exit router configuration mode and return to global configuration mode, enter the **exit** command. To exit Configuration mode and return to privileged EXEC mode, press **Ctrl-Z**.

Accessing IPX-Router Configuration Mode

Internet Packet Exchange (IPX) is a Novell network-layer protocol. To access and list the IPX routing configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, enter IPX-router configuration mode.	ipx router <i>[keyword]</i> ¹
Step 2 List the IPX-Router configuration commands.	?

1 This command is documented in the IOS Command Reference publications.

In the following example, IPX RIP routing is configured. The new prompt is Router (config-ipx-router):

```
Router (config) #ipx router rip
Router (config-ipx-router) #?
```

To exit IPX-router configuration mode and return to global configuration mode, enter the **exit** command. To exit Configuration mode and return to privileged EXEC mode, press **Ctrl-Z**.

Accessing Route-Map Configuration Mode

Use the Route-Map Configuration mode to configure routing table and source and destination information. To access and list the **route-map** configuration commands, perform this task:

Task	Command
Step 1 From global configuration mode, enter Route-Map Configuration mode.	route-map <i>map-tag</i> [[permit deny] <i>[sequence-number]</i>] ¹
Step 2 List the route-map configuration commands.	?

1 This command is documented in the IOS Command Reference publications.

In the following example, a route map named *arizona1* is configured. The new prompt is Router (config-route-map). Enter a question mark (?) to list **route-map** configuration commands.

```
Router (config) #route-map arizona1
Router (config-route-map) #?
Route Map configuration commands:
  exit  Exit from route-map configuration mode
  help  Description of the interactive help system
  match Match values from routing table
  no    Negate or set default values of a command
  set   Set values in destination routing protocol
```

To exit Route-Map Configuration mode and return to global configuration Mode, enter the **exit** command. To exit Configuration mode and return to privileged EXEC mode, press **Ctrl-Z**.

Accessing ROM-Monitor Mode

If the RSM does not find a valid system image, or if its configuration file is corrupted at startup, the system might enter ROM-monitor mode. From ROM-monitor mode, you can boot the router or perform diagnostic tests.

You can also enter ROM-monitor mode by entering the **reload** EXEC command and then pressing the **Break** key during the first 60 seconds of startup. To save changes to the configuration file before reloading, use the **copy running-config startup-config** command before entering the **reload** command.

To access and list the ROM monitor configuration commands, complete the following tasks:

Task	Command
Step 1 Enter ROM-monitor mode from privileged EXEC mode.	reload ¹ Press Break during the first 60 seconds while the system is booting.
Step 2 List the ROM monitor commands.	?

¹ This command is documented in the IOS Command Reference publications.

The ROM monitor prompt is an angle bracket (>). The following example shows how to list the ROM monitor commands.

```
> ?
$ state      Toggle cache state (? for help)
B [filename] [TFTP Server IP address | TFTP Server Name]
              Load and execute system image from ROM or from TFTP server
C [address]  Continue execution [optional address]
D /S M L V   Deposit value V of size S into location L with modifier M
E /S M L     Examine location L with size S with modifier M
G [address]  Begin execution
H           Help for commands
I           Initialize
K           Stack trace
L [filename] [TFTP Server IP address | TFTP Server Name]
              Load system image from ROM or from TFTP server, but do not
              begin execution
O           Show configuration register option settings
P           Set the break point
S           Single step next instruction
T function   Test device (? for help)
Deposit and Examine sizes may be B (byte), L (long) or S (short).
Modifiers may be R (register) or S (byte swap).
Register names are: D0-D7, A0-A6, SS, US, SR, and PC
```

To return to user EXEC mode, enter **c** to continue. To boot the system image file, use the **b** command (described in the IOS Command Reference publications).