



Connecting to the Cisco 3200 Series Router and Using the Command-Line Interface

This chapter describes how to connect to the router and use the Cisco IOS command-line interface (CLI) that you can use to configure the Cisco wireless mobile interface card (WMIC).

Before You Start

Before you install the WMIC, make sure that your computer is connected to the same network as the WMIC, and obtain the following information from your network administrator:

- A system name for the WMIC
- The case-sensitive wireless service set identifier (SSID) that your WMICs use
- If not connected to a DHCP server, a unique IP address for your WMIC (such as 172.17.255.115)
- If the WMIC is not on the same subnet as your PC, a default gateway address and subnet mask
- A Simple Network Management Protocol (SNMP) community name and the SNMP file attribute (if SNMP is in use)

Resetting the WMIC to the Default Settings

You can use the CLI to reset the WMIC to a factory default configuration.



Note

The following steps reset all configuration settings to factory defaults, including passwords, WEP keys, the IP address, and the SSID.

To use the CLI to reset the WMIC configuration to factory default values, follow these steps, beginning in privileged EXEC mode:

- Step 1** Enter **erase nvram:** to erase all NVRAM files including the startup configuration.
- Step 2** Enter **Y** when the following CLI message displays: *Erasing the nvram filesystem will remove all configuration files! Continue? [confirm].*
- Step 3** Enter **reload** when the following CLI message displays: *Erase of nvram: complete.* This command reloads the operating system.

Step 4 Enter **Y** when the following CLI message displays: *Proceed with reload? [confirm]*.



Caution

Do not interrupt the boot process to avoid damaging the configuration file. You can see the following CLI message when the load process has finished: *Line protocol on Interface Dot11Radio0, changed state to up.*

Step 5 After the WMIC reboots, you can reconfigure the WMIC by using the CLI. To display the IP address of the WMIC, you can use the **show interface bvi1** CLI command.

Cisco IOS Command Modes

The Cisco IOS user interface includes many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

When you start a session on the WMIC, you begin in user mode, often called *user EXEC mode*. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the WMIC reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you must enter privileged EXEC mode before you can enter the global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the WMIC reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

[Table A-1](#) describes the main command modes, how to access each one, the prompt that is displayed for each mode, and how to exit each mode. The examples in the table use the hostname *BR*.

Table A-1 *Command Mode Summary*

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session with your WMIC.	bridge>	Enter logout or quit .	Use this mode to: <ul style="list-style-type: none"> • Change terminal settings • Perform basic tests • Display system information
Privileged EXEC	While in user EXEC mode, enter the enable command.	bridge#	Enter disable to exit.	Use this mode to verify commands. Use a password to protect access to this mode.

Table A-1 Command Mode Summary (continued)

Mode	Access Method	Prompt	Exit Method	About This Mode
Global configuration	While in privileged EXEC mode, enter the configure command.	bridge(config)#	To exit to privileged EXEC mode, enter exit or end , or press Ctrl-Z .	Use this mode to configure parameters that apply to the entire device.
Interface configuration	While in global configuration mode, enter the interface command (with a specific interface).	bridge(config-if)#	To exit to global configuration mode, enter exit . To return to privileged EXEC mode, press Ctrl-Z or enter end .	Use this mode to configure parameters for the Ethernet and radio interfaces. The 2.4-GHz radio is radio 0.

Getting Help

You can enter a question mark (?) at the system prompt to display a list of that commands that are available for each command mode. You can also obtain a list of the associated keywords and arguments, as shown in [Table A-2](#).

Table A-2 Help Summary

Command	Purpose
help	Obtains a brief description of the help system in any command mode.
<i>abbreviated-command-entry?</i>	Obtains a list of commands that begin with a particular character string. For example: bridge# di? dir disable disconnect
<i>abbreviated-command-entry</i> <Tab>	Completes a partial command name. For example: bridge# sh conf <tab> bridge# show configuration
?	Lists all commands available for a particular command mode. For example: bridge> ?
<i>command ?</i>	Lists the associated keywords for a command. For example: bridge> show ?
<i>command keyword ?</i>	Lists the associated arguments for a keyword. For example: bridge(config)# cdp holdtime ? <10-255> Length of time (in sec) that receiver must keep this packet

Abbreviating Commands

You have to enter only enough characters for the WMIC to recognize the command as unique. This example shows how to enter the **show configuration** privileged EXEC command:

```
bridge# show conf
```

Using no and default Forms of Commands

Most configuration commands also have a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

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.

Understanding CLI Messages

[Table A-3](#) lists some error messages that you might encounter while using the CLI to configure your WMIC.

Table A-3 Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for your WMIC to recognize the command.	Re-enter the command followed by a question mark (?) with a space between the command and the question mark. The keywords that you can enter with the command are displayed.
% Incomplete command.	You did not enter all the keywords or values required by this command.	Re-enter the command followed by a question mark (?) with a space between the command and the question mark. The keywords that you can enter with the command are displayed.
% 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 can enter with the command are displayed.

Using Command History

The Cisco IOS provides a history or record of commands that you have entered. This feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize the command history feature to suit your needs, as described in these sections:

- [Changing the Command History Buffer Size, page A-5](#)
- [Recalling Commands, page A-5](#)
- [Disabling the Command History Feature, page A-6](#)

Changing the Command History Buffer Size

By default, the WMIC records 10 command lines in its history buffer. To change the number of command lines that the WMIC records during the current terminal session, enter the following command in privileged EXEC mode:

```
bridge# terminal history [size number-of-lines]
```

The range is from 0 to 256.

To configure the number of command lines the WMIC records for all sessions on a particular line, enter the following command in privileged EXEC mode:

```
bridge(config-line)# history [size number-of-lines]
```

The range is from 0 to 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in [Table A-4](#):

Table A-4 *Recalling Commands*

Action ¹	Result
Press Ctrl-P or the Up arrow key.	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Press Ctrl-N or the Down arrow key.	Returns 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.
show history	While in privileged EXEC mode, lists the last several commands that you just entered. The number of commands that are displayed is determined by the setting of the terminal history global configuration command and the history line configuration command.

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

Disabling the Command History Feature

The command history feature is automatically enabled.

To disable the feature during the current terminal session, enter the **terminal no history** command in privileged EXEC command.

To disable command history for the line, enter the **no history** command in line configuration mode.

Using Editing Features

This section describes the editing features that can help you manipulate the command line. It contains these sections:

- [Enabling and Disabling Editing Features, page A-6](#)
- [Editing Commands Through Keystrokes, page A-7](#)
- [Editing Command Lines that Wrap, page A-8](#)

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it.

To reenble the enhanced editing mode for the current terminal session, enter this command in privileged EXEC mode:

```
bridge# terminal editing
```

To reconfigure a specific line to have enhanced editing mode, enter this command in line configuration mode:

```
bridge(config-line)# editing
```

To globally disable enhanced editing mode, enter this command in line configuration mode:

```
bridge(config-line)# no editing
```

Editing Commands Through Keystrokes

Table A-5 shows the keystrokes that you can use to edit command lines.

Table A-5 *Editing Commands Through Keystrokes*

Capability	Keystroke ¹	Purpose
Move around the command line to make changes or corrections.	Ctrl-B or the left arrow key	Moves the cursor back one character.
	Ctrl-F or the right arrow key	Moves the cursor forward one character.
	Ctrl-A	Moves the cursor to the beginning of the command line.
	Ctrl-E	Moves the cursor to the end of the command line.
	Esc B	Moves the cursor back one word.
	Esc F	Moves the cursor forward one word.
	Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Recall commands from the buffer and paste them in the command line. The WMIC provides a buffer with the last ten items that you deleted.	Ctrl-Y	Recalls the most recent entry in the buffer.
	Esc Y	Recalls the next buffer entry. The buffer contains only the last 10 items that you have deleted or cut. If you press Esc Y more than ten times, you cycle to the first buffer entry.
Delete entries if you make a mistake or change your mind.	Delete or Backspace	Erases the character to the left of the cursor.
	Ctrl-D	Deletes the character at the cursor.
	Ctrl-K	Deletes all characters from the cursor to the end of the command line.
	Ctrl-U or Ctrl-X	Deletes all characters from the cursor to the beginning of the command line.
	Ctrl-W	Deletes the word to the left of the cursor.
	Esc D	Deletes from the cursor to the end of the word.
Capitalize or lowercase words or capitalize a set of letters.	Esc C	Capitalizes at the cursor.
	Esc L	Changes the word at the cursor to lowercase.
	Esc U	Capitalizes letters from the cursor to the end of the word.
Designate a particular keystroke as an executable command, perhaps as a shortcut.	Ctrl-V or Esc Q	

Table A-5 Editing Commands Through Keystrokes (continued)

Capability	Keystroke ¹	Purpose
Scroll down a line or screen on displays that are longer than the terminal screen can display. Note The <code>More</code> prompt appears for output that has more lines than can be displayed on the terminal screen, including show command output. You can use the Return and Space bar keystrokes whenever you see the <code>More</code> prompt.	Return	Scrolls down one line.
	Space	Scrolls down one screen.
Redisplay the current command line if the WMIC suddenly sends a message to your screen.	Ctrl-L or Ctrl-R	Redisplays the current command line.

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

Editing Command Lines that Wrap

You can use 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 to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.



Note

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

In this example, the **access-list** global configuration command entry extends beyond one line. When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign (\$) shows that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.

```
bridge(config)# access-list 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1
bridge(config)# $ 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1.20 255.25
bridge(config)# $t tcp 131.108.2.5 255.255.255.0 131.108.1.20 255.255.255.0 eq
bridge(config)# $108.2.5 255.255.255.0 131.108.1.20 255.255.255.0 eq 45
```

After you complete the entry, press **Ctrl-A** to check the complete syntax before pressing the **Return** key to execute the command. The dollar sign (\$) appears at the end of the line to show that the line has been scrolled to the right:

```
bridge(config)# access-list 101 permit tcp 131.108.2.5 255.255.255.0 131.108.1$
```

The software assumes you have a terminal screen that is 80 columns wide. If you have a width other than that, use the **terminal width** privileged EXEC command to set the width of your terminal.

Use line wrapping with the command history feature to recall and modify previous complex command entries. For information about recalling previous command entries, see the “[Editing Commands Through Keystrokes](#)” section on page A-7.

Searching and Filtering the Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command, followed by the *pipe* character (`|`), one of the keywords **begin**, **include**, or **exclude**, and an expression that you want to search for or filter out:

```
command | {begin | include | exclude} regular-expression
```

Expressions are case sensitive. For example, if you enter `| exclude output`, the lines that contain *output* are not displayed, but the lines that contain *Output* are displayed.

This example shows how to include in the output display only the lines in which the expression *protocol* appears:

```
bridge# show interfaces | include protocol
Vlan1 is up, line protocol is up
Vlan10 is up, line protocol is down
GigabitEthernet0/1 is up, line protocol is down
GigabitEthernet0/2 is up, line protocol is up
```

Cisco 3200 WMIC Image Upload Procedure

This document provides the procedures for configuring a Cisco 3200 Series router (referred to as the Mobile Access Router Card (MARC)) as a TFTP server and uploading a Cisco IOS image to the router and two WMICs enclosed with the router. The major advantage of this procedure is that all the cards in the router receive the same version of the Cisco IOS image to avoid conflicts when the devices communicate.

Overview

The Cisco 3200 Series router is actually a *stack* of devices contained in an enclosure that can include multiple devices that process data from the network independently. For example, a Cisco 3200 Series router with two WMICs is actually three devices in one enclosure; one router, consisting of a MARC and possibly a Fast Ethernet Switch mobile interface card (FESMIC) and/or a Serial mobile interface card (SMIC), and two WMICs.

The MARC communicates with a FESMIC or a SMIC through the internal PCI bus. The FESMIC and the SMIC depend on the MARC to process the data that the FESMIC or SMIC send and receive. As a result, FESMIC and SMIC cards are seen by the MARC as expansion cards, similar to the way in which a modular Cisco router increases functionality with the addition of expansion modules. The cards physically and logically become part of the router.

Each WMIC has an on-board CPU that processes data it sends and receives independent of the MARC. The WMICs draw power from the internal bus; they do not use the bus to communicate with the other devices in the stack. The WMICs communicate with the router by using the switched Fast Ethernet ports and the routed Fast Ethernet port to create a small, internal Ethernet network. As a result, each WMIC must store a copy of the Cisco IOS image in its memory and be configured independently.

To avoid conflicts, we recommend that you upload the same image to all of the devices (CPUs) in the enclosure by configuring the router as a TFTP server that can serve the Cisco IOS image to the WMICs. The following major steps are required to upload the Cisco IOS image to all the devices in a Cisco 3200 Series router stack.

-
- Step 1** Configure the router as shown in the “[Configuration Example for the MARC](#)” section and verify connectivity to a TFTP server.
- Step 2** To copy the image to the MARC, use the **copy tftp flash:tarfilename** command.
- Step 3** Enter the **tftp-server flash:tarfilename** command to configure the MARC as a TFTP server, making the image available to the WMICs.
- Step 4** Configure router for IP connectivity to all of the WMICs. Examples are provided in the “[Fast Ethernet 0/0 WMIC Configuration Example Configuration](#)” section on page A-11, the “[Configuration Example for the WMIC Attached to Switch Port 4](#)” section on page A-11, and the “[Configuration Example for the WMIC Attached to Switch Port 3](#)” section on page A-12.
- Step 5** Upload the new image to the WMICs, for example:
- Enter the **archive download-software /overwrite tftp://20.20.20.1/c3202-k9w7-tar** command
 - Enter the **archive download-software /overwrite tftp://10.10.10.1/c3202-k9w7-tar** command
 - Enter the **archive download-software /overwrite tftp://10.10.10.2/c3202-k9w7-tar** command
- Step 6** To verify that the new image is in place, use the **show version** command.
-

Configuration Example for the MARC

```

hostname MAR
!
ip routing
!
interface FastEthernet0/0
 ip address 20.20.20.1 255.255.255.0
!
interface FastEthernet2/0
 no ip address
 shutdown
!
interface FastEthernet2/1
 no ip address
 shutdown
!
interface FastEthernet2/2
 no ip address
 no shutdown
!
interface FastEthernet2/3
 no ip address
 no shutdown
!
interface Vlan1
 ip address 10.10.10.1 255.255.255.0

```

```
no shutdown
!
tftp-server flash: c3202-k9w7-tar
!
end
```

Fast Ethernet 0/0 WMIC Configuration Example Configuration

```
hostname MAR1-AP
!
bridge irb
!
interface Dot11Radio0
no ip address
no ip route-cache
no shutdown
!
ssid tsunami
authentication open
infrastructure-ssid
!
cca 0
speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
rts threshold 4000
station-role workgroup-bridge
infrastructure-client
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled
!
interface FastEthernet0
no ip address
bridge-group 1
no bridge-group 1 source-learning
bridge-group 1 spanning-disabled
no shutdown
!
interface BVI1
ip address 20.20.20.2 255.255.255.0
no ip route-cache
no shutdown
!
ip default-gateway 20.20.20.1
!
bridge 1 route ip
!
end
```

Configuration Example for the WMIC Attached to Switch Port 4

```
hostname MAR1-SWITCHPORT4
!
bridge irb
!
interface Dot11Radio0
no ip address
no ip route-cache
```

```

no shutdown
!
cca 0
speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
rts threshold 4000
station-role root ap-only
infrastructure-client
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled
!
interface FastEthernet0
no ip address
bridge-group 1
no bridge-group 1 source-learning
bridge-group 1 spanning-disabled
no shutdown
!
interface BVI1
ip address 10.10.10.2 255.255.255.0
no ip route-cache
!
ip default-gateway 10.10.10.1
bridge 1 route ip
!
end

```

Configuration Example for the WMIC Attached to Switch Port 3

```

hostname MAR1-SWITCHPORT3
!
bridge irb
!
interface Dot11Radio0
no ip address
no ip route-cache
no shutdown
!
cca 0
speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
rts threshold 4000
station-role root ap-only
infrastructure-client
bridge-group 1
bridge-group 1 subscriber-loop-control
bridge-group 1 block-unknown-source
no bridge-group 1 source-learning
no bridge-group 1 unicast-flooding
bridge-group 1 spanning-disabled
!
interface FastEthernet0
no ip address
bridge-group 1
no bridge-group 1 source-learning
bridge-group 1 spanning-disabled
no shutdown
!
interface BVI1
ip address 10.10.10.3 255.255.255.0

```

```
no ip route-cache
!  
ip default-gateway 10.10.10.1  
bridge 1 route ip  
!  
end
```

