Maintaining the Router

This appendix contains selected maintenance procedures you might need to perform on a Cisco 2600 series router as your internetworking needs change. Cisco 2600 series routers include the following models:

- Cisco 2610 and Cisco 2610XM
- Cisco 2611 and Cisco 2611XM
- Cisco 2612 and Cisco 2613
- Cisco 2620 and Cisco 2620XM
- Cisco 2621 and Cisco 2621XM
- Cisco 2650 and Cisco 2650XM
- Cisco 2651 and Cisco 2651XM
- Cisco 2691

This appendix includes the following sections:

Additional maintenance procedures are available on Cisco.com and the Documentation CD-ROM that shipped with your router.

Caution Before opening the chassis, be sure that you have discharged all static electricity from your body and the power is OFF. Before performing any procedures described in this appendix, review the "Safety Recommendations" section on page 21.

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units. To see translations of the various warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Accessing the System Board

You must open the chassis to access the system board.

Removing the Chassis Cover on Cisco 261x, Cisco 262x, Cisco 265x, and Cisco 26xxXM

This section describes the procedure for opening the chassis by removing the chassis cover.

Warning **Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is OFF and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. To see translations of the various warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Two people are required to lift the chassis. Grasp the chassis underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back. To prevent damage to the chassis and components, never attempt to lift the chassis with the handles on the power supplies or on the interface processors, or by the plastic panels on the front of the chassis. These handles were not designed to support the weight of the chassis. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Tools Required

You will need the following tools to remove and replace the chassis cover:

- Number 2 Phillips screwdriver
- Electrostatic discharge (ESD)-preventive wrist strap

Removing the Chassis Cover

To remove the chassis cover:

Step 1 Power OFF the router and unplug the AC power cord. If the router uses a DC power supply, remove power from the DC circuit with the following steps:

a. Locate the circuit breaker on the panel board that services the DC circuit.

b. Switch the circuit breaker to the OFF position.

Step 2 Disconnect all cables from the rear panel of the router.

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the various warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Step 3 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

Step 4 Remove the screws located on the top of the chassis. Note that the chassis is comprised of two sections: top and bottom.

Step 5 Holding the chassis with both hands, position it as shown in Figure B-1.

Step 6 Slide the top section away from the bottom section as shown in Figure B-2.

Figure B-1 Holding Chassis for Cover Removal

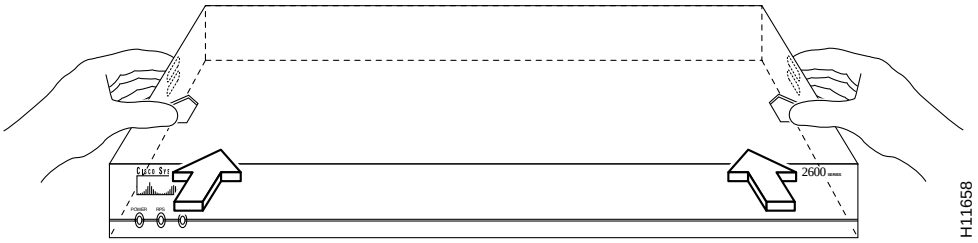


Figure B-2 Removing Chassis Cover

Step 7 When the top cover is off, set it aside. Figure B-5 shows the layout of the system board.

Note The system board layout in Figure B-5 shows the boot ROM in position U22. On the Cisco 261x, the boot ROM is in position U23.

Removing the Chassis Cover on Cisco 2691

Complete the following procedure to remove the chassis cover:

Step 1 Power OFF the router and unplug the AC power cord.

Step 2 Disconnect all network interface cables from the rear panel.

Warning **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see translations of the various warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

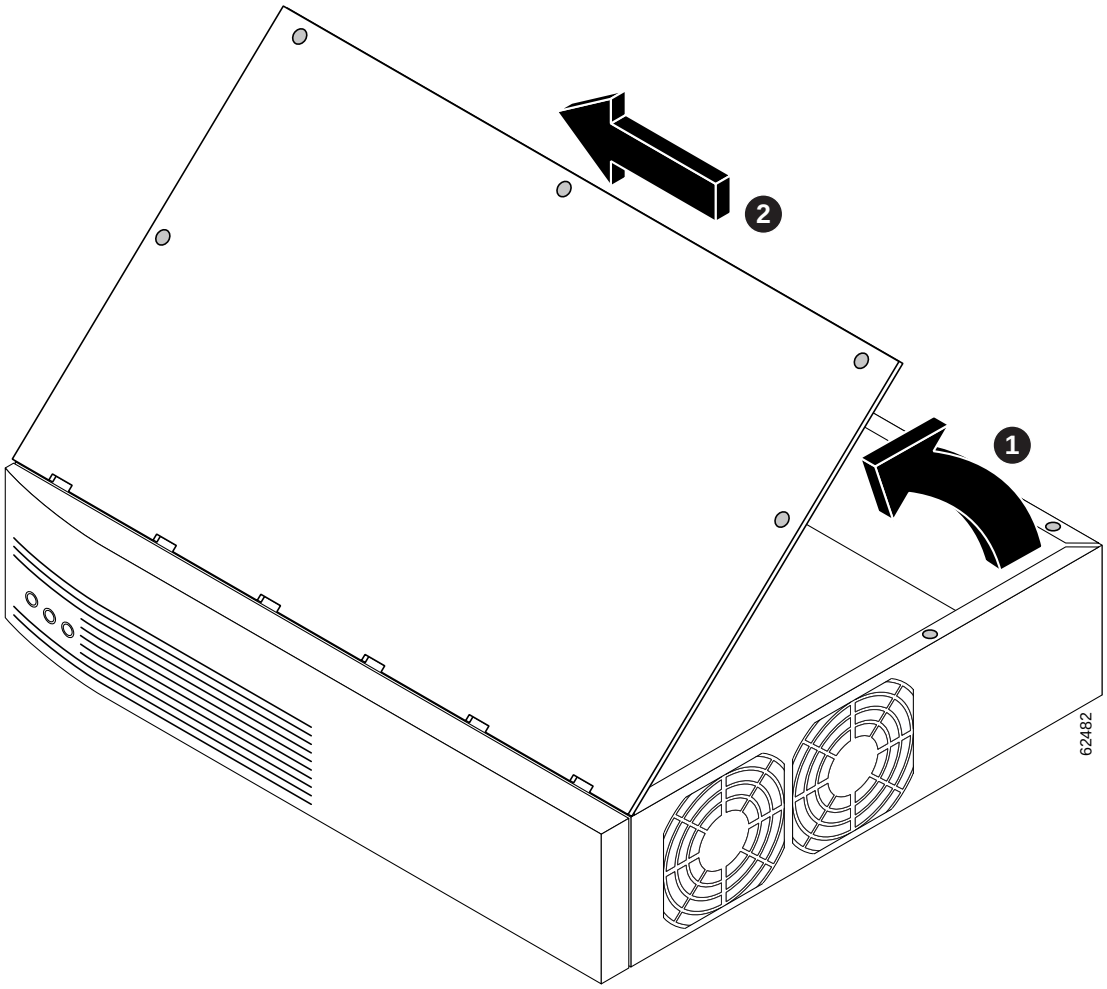
Step 3 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

Step 4 Place the router on a flat surface. Remove the five screws located on top of the cover.

Step 5 Rotate the cover up to a 45-degree angle. (See part 1, Figure B-3.)

Step 6 Slide the cover to the side until the tabs are free from the slots. (See part 2, Figure B-3.)

Figure B-3 Removing the Cisco 2691 Router Cover



Upgrading DRAM

This section describes how to upgrade dynamic random-access memory (DRAM) on the system card. You might need to upgrade DRAM for the following reasons:

- You have upgraded to a new Cisco IOS software feature set or release.
- You are using very large routing tables or many protocols (for example, when the router is set up as part of both a large external network and your internal network).

To see how much memory is currently installed in the router, enter the **show version** command. Near the middle of the resulting output, a message similar to the following appears:

```
Cisco 2610(MPC860) processor (revision 0x200) with 28672K/4096K bytes of memory.
```

This line shows how much memory is installed (in this example, 28672K/4096K). The first number represents primary memory and the second number represents shared memory.

Memory Capacities

Cisco 2600 series routers use two types of dynamic memory:

- 5V EDO DRAM DIMMs (Cisco 2610, Cisco 2611, Cisco 2612, Cisco 2613, Cisco 2620, and Cisco 2621 routers)
- 3.3V SDRAM DIMMs (Cisco 26xxXM, Cisco 2650, Cisco 2651, and Cisco 2691 routers)

Caution EDO DRAM and SDRAM DIMMs are not interchangeable. Although it is mechanically possible to install an incorrect DRAM DIMM into a router, the router will not boot.

DRAM memory capacities are shown in Table B-1:

Table B-1 Cisco 2600 Series DRAM Memory Table

Router	DRAM Capacity	DRAM Type
Cisco 2610	32- to 64-MB EDO DRAM	5V 100-pin DIMM
Cisco 2611		
Cisco 2612		
Cisco 2613		
Cisco 2620		
Cisco 2621		
Cisco 2650	32-to 128-MB SDRAM	3.3V 100-pin DIMM
Cisco 2651		
Cisco 2610XM		
Cisco 2611XM		
Cisco 2620XM		
Cisco 2621XM		
Cisco 2650XM		
Cisco 2651XM		
Cisco 2691	64- to 256-MB SDRAM	3.3V 168-pin DIMM

Cisco 261x, Cisco 262x, Cisco 265x, and Cisco 26xxXM

Most Cisco 2600 series routers contain two 100-pin dual in-line memory module (DIMM) sockets (or banks) for DRAM, numbered 0 and 1. (See Figure B-5.) Each socket can be filled with a 100-pin DRAM DIMM (EDO or SDRAM DIMMs depending on router model). You can use the **memory-size iomem** software command to configure DRAM as a mixture of shared memory, which is used for data transmitted or received by network modules and WAN interface cards, and primary or main memory, which is reserved for the CPU. For further information about this command, refer to the Cisco IOS configuration guides and command references, located at:

Cisco Product Documentation > Cisco IOS Software > *Cisco IOS Software Release you are using* **> Configuration Guides and Command References**

Caution It is critical that the correct voltage DRAM modules be installed in the Cisco 2600 series routers. Using the incorrect memory will cause the system to malfunction and may cause damage to the system board or memory card. For memory voltage requirements, see Table B-1.

To identify a 3.3V 100-pin SDRAM memory module, look for the part number label on the front of the card. (See Figure B-4.) Table B-2 and Table B-3 show the part numbers for the memory modules.

Figure B-4 Cisco 2600 Series 3.3 and 5V 100-Pin DRAM Module

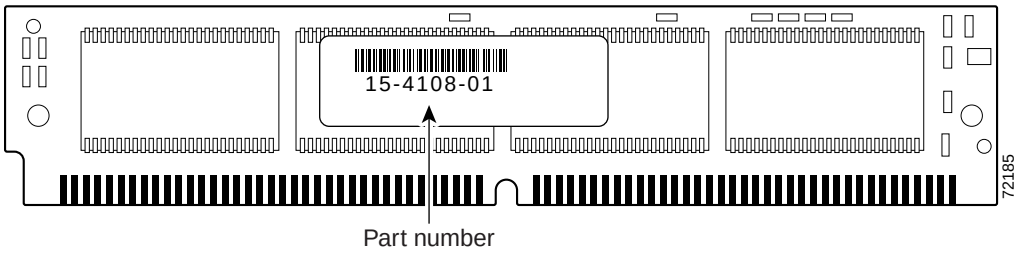


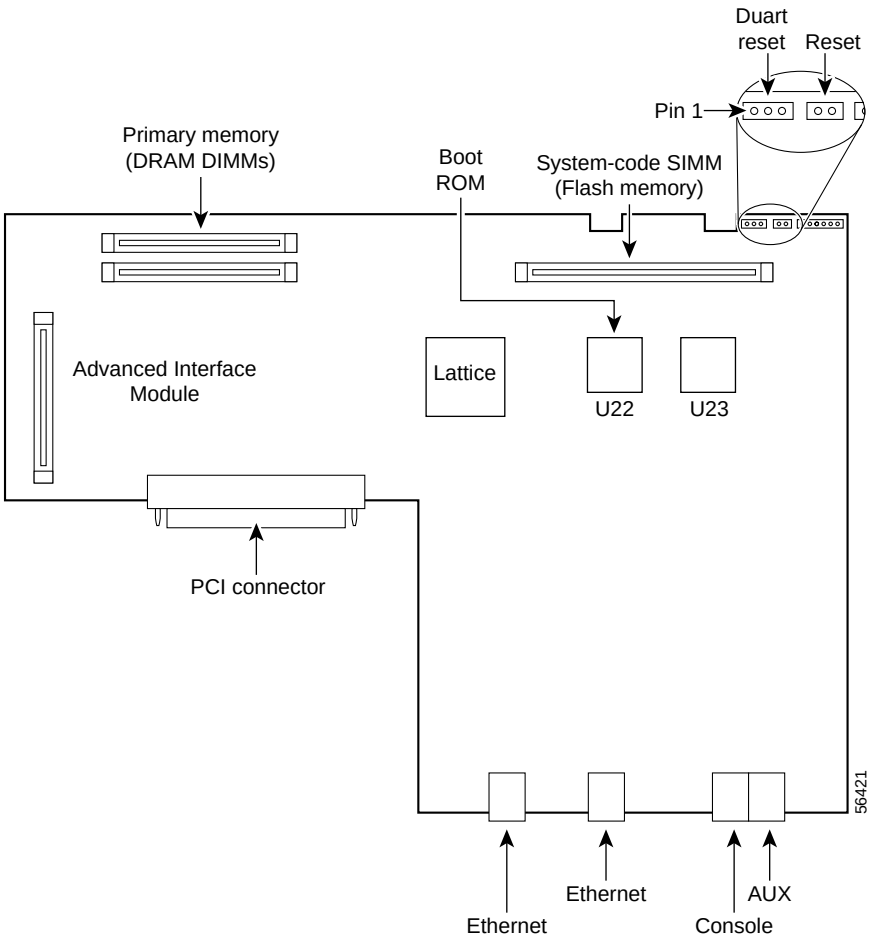
Table B-2 3.3V SDRAM Part Numbers

Memory Size	3.3V SDRAM
32 MB	15-4108-xx
64 MB	15-4508-xx

Table B-3 5V EDO DRAM Part Numbers

Memory Size	5V EDO DRAM
8 MB	15-2854-xx
16 MB	15-2853-xx
32 MB	15-2851-xx

Figure B-5 DIMM Socket Location



DRAM DIMM Installation

To install the DRAM DIMMs:

Step 1 Power OFF the router.

Step 2 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

Step 3 Open the cover following the instructions in the "Removing the Chassis Cover" section on page B2.

Step 4 Begin removing the existing DRAM DIMM by pulling outward on the connectors to unlatch them, as shown in step 1 of part A in Figure B-6. Be careful not to break the holders on the DIMM connector.

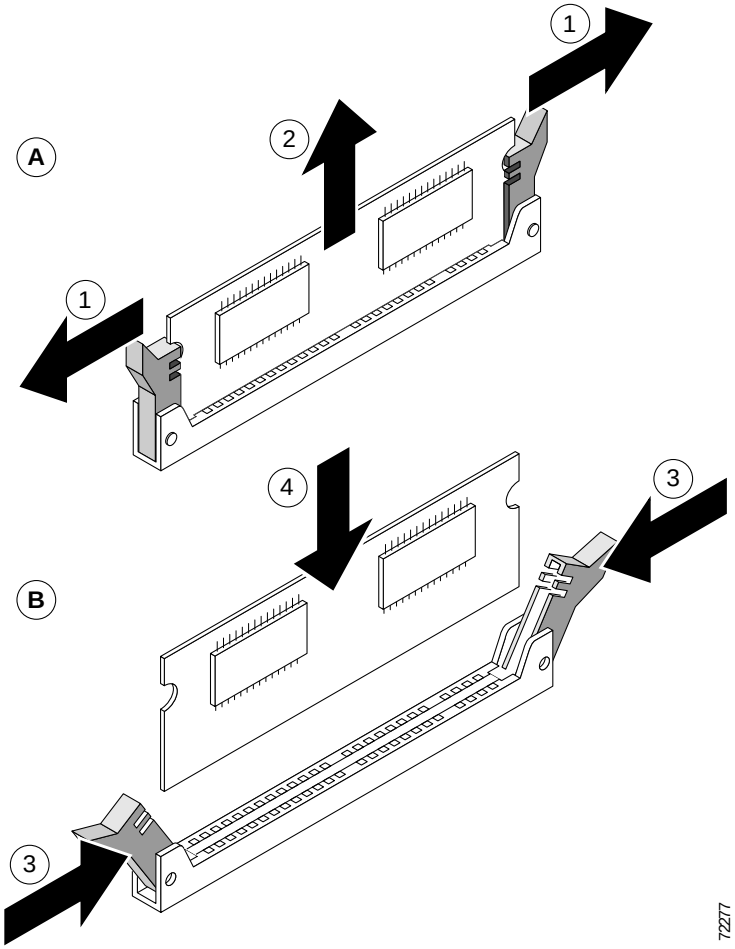
Step 5 Remove the existing DRAM DIMM by pulling the module straight up, as shown in step 2 of part A inFigure B-6.

Caution To prevent damage, do not press on the center of the DIMMs. Handle each DIMM carefully.

Step 6 Position the new DIMM so that the polarization notch is located at the left end of the DIMM socket as shown in Figure B-6.

Note Make sure the new DIMM is the correct type, EDO or SDRAM, for your router. (See Table B-1.)

Figure B-6 Removing and Replacing the 100-Pin DRAM DIMM



Step 7 Insert the new DRAM DIMM by sliding the end with the metal fingers into the DIMM connector socket at approximately a 90º angle to the system card. Gently rock the DIMM back into place until the latch on either side snaps into place. See steps 3 and 4 of part B in Figure B-6. Do not use excessive force because the connector might break.

Step 8 Replace the router cover. Follow the instructions in the "Closing the Chassis" section on page B34.

Cisco 2691

This section describes how to upgrade synchronous dynamic random access memory (SDRAM) dual in-line memory modules (DIMMs) in the Cisco 2691 routers.

The Cisco 2691 router contains two 168-pin DIMM sockets for SDRAM. Each socket can be filled with a single 64-bit-wide, 168-pin SDRAM DIMM. You can configure SDRAM as a mixture of main memory, which is reserved for the CPU, and shared memory, which is used for data transmitted or received by modules and WAN interface cards. See Figure B-7 for DIMM locations.

To see how much memory is currently installed in the router, enter the **show version** command while the router is in privileged EXEC mode (`Router#`). Near the middle of the resulting output, a message similar to the following displays:

```
cisco 2691 (R7000) processor (revision 0.5) with 121856K/9216K bytes of memory.
```

This line shows how much memory is installed (in this example, 24576K/8192K). The first number represents primary memory and the second number represents shared memory. Your router supports up to 256 MB of SDRAM.

Each DIMM slot corresponds to one bank of memory. Fill banks from 0, and empty banks starting with 1. Bank 0 must always be filled first and emptied last.

The Cisco 2691 router supports both parity and nonparity PC-100 DIMMs ranging in capacity from 64 to 128 MB. Only certain combinations of SDRAM DIMMs are permitted. (See Table B-4.)

Note An advantage of parity DIMMs over nonparity DIMMs is how much easier memory errors are identified; a disadvantage however is lower processing speed.

Note To use a 64-bit mode SDRAM configuration, the DIMM in slot 1 must be less than or equal to the size of the DIMM in slot 0.

Figure B-7 SDRAM DIMM Locations in the Cisco 2691 Router

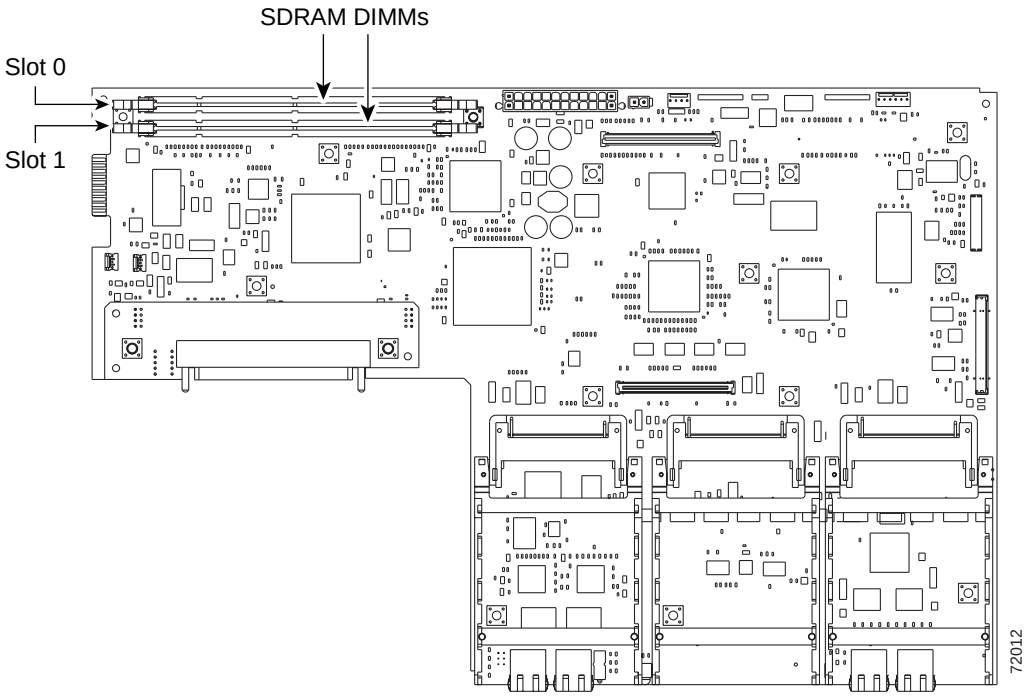


Table B-4 SDRAM Configurations for Cisco 2691 Routers

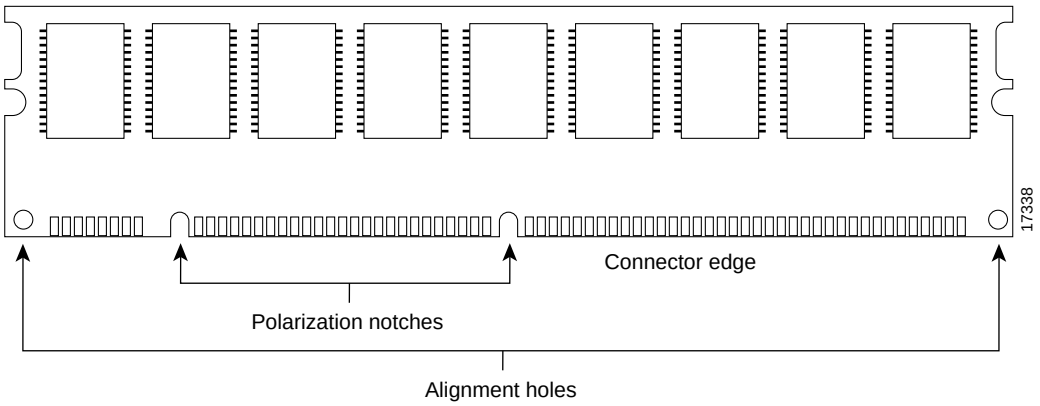
DIMM 0	DIMM 1	Total
64 MB DIMM	—	64 MB
128 MB DIMM	—	128 MB
64 MB DIMM	64 MB DIMM	128 MB
—	128 MB DIMM	128 MB
64 MB DIMM	128 MB DIMM	192 MB
128 MB DIMM	64 MB DIMM	192 MB
128 MB DIMM	128 MB DIMM	256 MB

SDRAM DIMM Orientation

DIMMs are manufactured with polarization notches to ensure proper orientation and alignment holes to ensure proper positioning. Figure B-8 shows the polarization notches and alignment holes on a DIMM.

Caution To avoid damaging ESD-sensitive components, observe all ESD precautions. To avoid damaging the system board, do not use excessive force when you remove or replace DIMMs.

Figure B-8 168-Pin SDRAM DIMM



Removing SDRAM DIMMS

Follow these steps to remove SDRAM DIMMs:

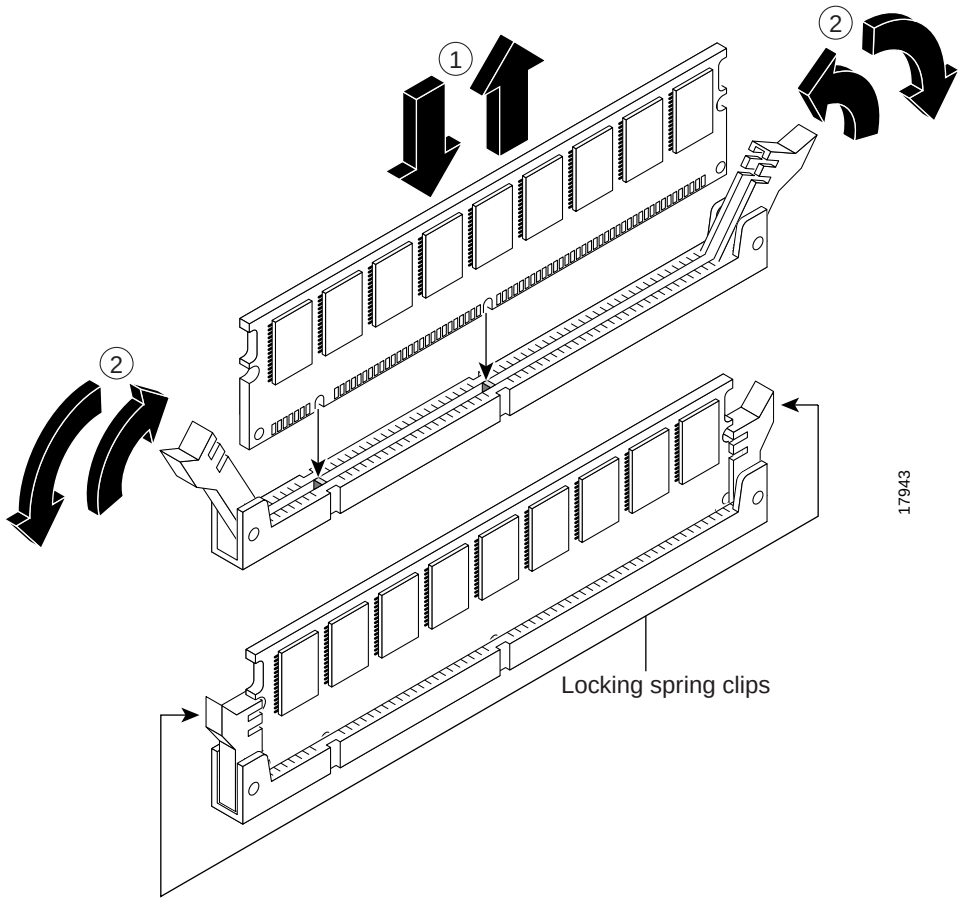
Step 1 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

Step 2 On the system board, locate the SDRAM DIMM sockets shown in Figure B-7.

Caution Handle DIMMs by the edges only. DIMMs are ESD-sensitive components and can be damaged by mishandling.

Step 3 Remove the DIMM by pushing the locking spring clips on both sides outward, as shown in step 2 of Figure B-9. This ejects the DIMM from its socket.

Figure B-9 Removing and Installing SDRAM DIMMs on the Cisco 2691



Step 4 Hold the DIMM by the edges with your thumb and index finger and lift it out of the socket, as shown in step 1 of Figure B-9. Place the removed DIMM in an antistatic bag to protect it from ESD damage.

Step 5 If necessary, repeat Step 3 and Step 4 for the other DIMM.

Installing SDRAM DIMMs

Follow this procedure to install SDRAM DIMMs:

Step 1 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

Step 2 On the system board, locate the SDRAM DIMM sockets shown in Figure B-7.

Caution Handle DIMMs by the nonconnector edges only. DIMMs are ESD-sensitive components and can be damaged by mishandling.

Step 3 Hold the DIMM with the polarization notch on the right, near the rear of the chassis, and with the connector edge at the bottom.

Step 4 Beginning with socket 0, insert the DIMM perpendicular to the socket. Push firmly into place, as shown in step 1 of Figure B-9. When the DIMM is properly seated, the socket guide posts fit through the alignment holes, and the locking spring clips click into place, as shown in Step 2 of Figure B-9.

Step 5 Ensure that each DIMM is straight (perpendicular to the socket). (See Figure B-9.)

Caution It is normal to feel some resistance when installing a DIMM, but do not use excessive force on the DIMM, and do not touch the surface components.

Step 6 Repeat Step 3 through Step 5 for each DIMM.

Step 7 Replace the router cover. Follow the instructions in the "Closing the Chassis" section on page B34.

Replacing Flash Memory

Cisco 261x, Cisco 262x, Cisco 265x, and Cisco 26xxXM

The system code (router operating system software) is stored in a Flash memory 80-pin single in-line memory module (SIMM).

Tools Required

You will need the following tools to remove and replace the system-code SIMM on the router:

- Medium-size flat-blade screwdriver (1/4-in. [0.625 cm])
- ESD-preventive wrist strap
- Flash SIMM

Preparing to Install the System-Code SIMM

There is one system-code (Flash memory) SIMM socket on the system board. You can verify how much Flash memory is already installed in your router by entering the **show flash** EXEC command.

Caution The system code is stored on the Flash memory SIMM, but new system-code SIMMs are shipped without preinstalled software. Before continuing with this procedure, use the **copy flash tftp** EXEC command to back up the system code to a Trivial File Transfer Protocol (TFTP) server.

Note Cisco 2650 and Cisco 2651 routers support a maximum of 32 MB of Flash memory. The Cisco 2620 and Cisco 2621 can be upgraded to supp6rt a maximum of 32 MB of Flash memory when using both the Cisco 2600 boot ROM version 12.2(6r) (supplied with Cisco part number MEM2620-32FSBoot=) and either Cisco IOS Release 12.1(3)T or Cisco IOS Release 12.2T or later Cisco IOS releases. The 32 MB Flash SIMM module is not supported on the Cisco 2610, Cisco 2611, Cisco 2612, or Cisco 2612.

Note For more information about the **copy flash tftp** command and other related commands, refer to the Cisco IOS configuration and command reference publications. These publications are available on the Documentation CD-ROM that accompanied your router, and on Cisco.com. You can also order printed copies. See "Obtaining Documentation" section on page xii for ordering information.

Caution It is critical that the correct voltage SIMM modules be installed in the Cisco 2600 series routers. Using the incorrect memory will cause the system to malfunction and may cause damage to the system board or memory card. For Flash memory requirements, see Table B-5.

Table B-5 Cisco 2600 Series Flash Memory Table

Router	Flash Memory Capacity	Flash Device
Cisco 2610	8- to 16-MB	5V SIMM module
Cisco 2611		
Cisco 2612		
Cisco 2613		
Cisco 2620	8- to 32-MB	
Cisco 2621		
Cisco 2650		
Cisco 2651		
Cisco 2610XM	16- to 48-MB	3.3V SIMM module
Cisco 2611XM		
Cisco 2620XM		
Cisco 2621XM		
Cisco 2650XM		
Cisco 2651XM		
Cisco 2691	32- to 128-MB	Compact FLASH

To identify a SIMM module, look for the part number label on the front of the module. (See Figure B-10.) Table B-6 and Table B-7 show the part numbers for the SIMM modules.

Figure B-10 Cisco 2600 Series 3.3 and 5V 80-Pin SIMM Module

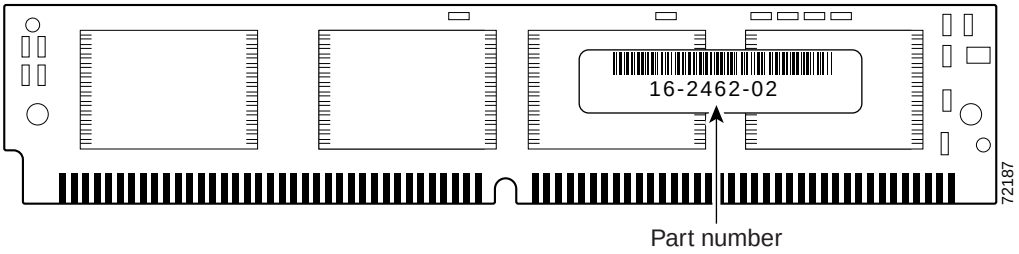


Table B-6 3.3V SIMM Module Part Numbers

Memory Size	3.3V SIMMs
16 MB	16-2462-xx
32 MB	16-2346-xx

Table B-7 5V SIMM Module Part Numbers

Memory Size	5V SIMMs
8 MB	16-0965-xx
16 MB	16-1378-xx
32 MB	16-1745-xx

System-Code SIMM Replacement

To replace the system-code Flash memory SIMM:

Step 1 If you have not already done so, enter the **copy flash tftp** EXEC command to back up the system code.

Step 2 Power OFF the router.

Step 3 Remove all cables from the rear panel of the router.

Step 4 Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis.

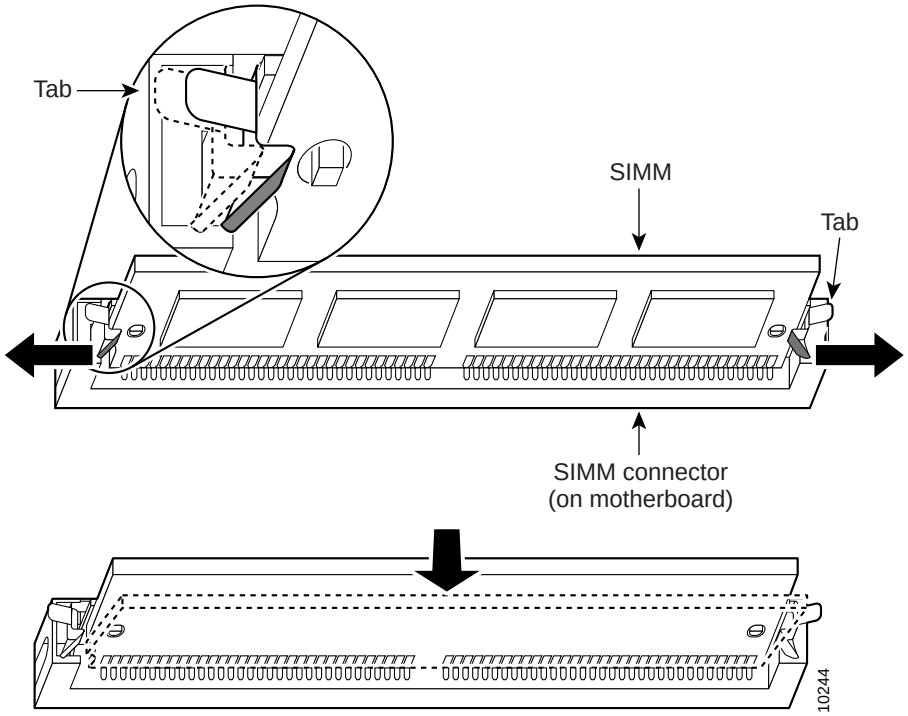
Step 5 Open the chassis cover following the procedure in the "Removing the Chassis Cover" section on page B2.

Step 6 Locate the system-code SIMM on the system card. (See Figure B-5.)

Step 7 If necessary, remove the existing system-code SIMM by pulling outward on the connector holders to unlatch them. The connector holds the SIMM tightly, so be careful not to break the holders on the SIMM connector. (See Figure B-11.)

Caution To prevent damage, do not press on the center of the SIMM. Handle each SIMM carefully.

Figure B-11 Removing and Replacing the System-Code SIMM



Step 8 Position the new SIMM so that the polarization notch is located at the left end of the SIMM socket.

Caution To prevent damage, note that some Flash memory SIMMs have the components mounted on the rear side; therefore, when inserting the SIMM, always use the polarization notch as a reference and *not* the position of the components on the SIMM.

Step 9 Insert the new SIMM by sliding the end with the metal fingers into the SIMM connector socket at approximately a 90º angle to the system card. Gently rock the SIMM back into place until the latches on both sides snap into place. Do not use excessive force because the connector might break.

Step 10 Replace the router cover following the procedure in the "Closing the Chassis" section on page B34.

Step 11 Refer to the "Procedures for Recovering Boot and System Images" section on page C6 for instructions on how to place the Cisco IOS image on the new SIMM.

Installing and Formatting Compact Flash Memory Cards in Cisco 2691 Routers

The operation system software, or image, is stored in Flash memory on a compact Flash memory card. This section describes how to install compact Flash memory cards in Cisco 2691 routers, how to format the cards into a Class B Flash file system (low end file system) or a Class C Flash file system (similar to DOS), and how to perform file and directory operations in each file system. In Cisco 2691 routers, the compact Flash memory card mounts on a connector on the system board. You can install a compact Flash memory card with 32-, 64-, or 128-MB of memory.

This section contains the following subsections:

Preventing Electrostatic Discharge Damage

Compact Flash memory cards can be damaged by electrostatic discharge (ESD). ESD damage, which can occur when electronic cards or components are handled improperly, can cause complete or intermittent failures.

Follow these guidelines to prevent ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- Place a removed compact Flash memory card on an antistatic surface or in a static shielding bag. If the card will be returned to the factory, immediately place it in a static shielding bag.
- Avoid contact between the card and clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.
- Do not remove the wrist strap until the installation is complete.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

Tools and Equipment Needed

You need the following tools and equipment to remove and install compact Flash memory cards:

- ESD-preventive wrist strap
- Antistatic bag or mat
- Number 2 Phillips screwdriver or flat-blade screwdriver

Compact Flash Memory Card Installation and Removal

To remove or install a compact Flash memory card mounted internally on the router, perform the procedures described in this section.

Removing the Chassis Cover

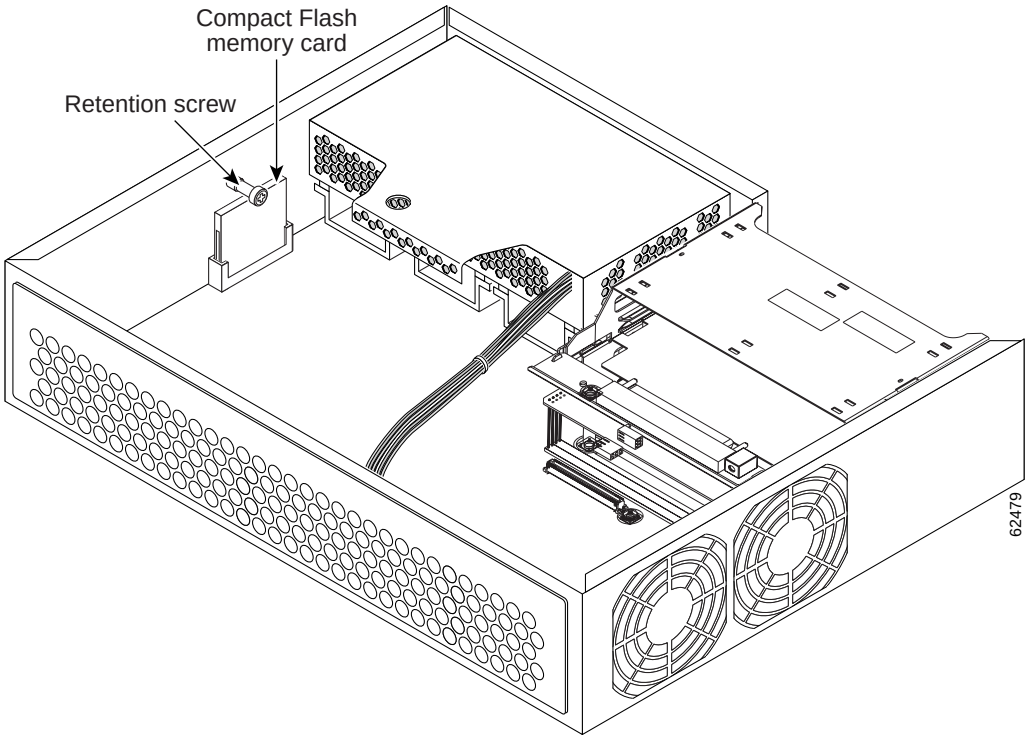
See the "Removing the Chassis Cover on Cisco 2691" section on page B4 for instructions on removing the Cisco 2691 chassis cover. This section describes how to remove the chassis cover to access the compact Flash memory card.

Removing the Compact Flash Memory Card

After removing the chassis cover, complete the following steps to remove the compact Flash memory card from the router:

Step 1 Locate the compact Flash memory card on the system board. (See Figure B-12.)

Figure B-12 Compact Flash Memory Card Location in a Cisco 2691



Step 2 Remove the retention screw that retains the compact Flash memory card by using the Phillips screwdriver; save the retention screw for reinstallation.

Step 3 Carefully pull the compact Flash memory card free from the connector.

Step 4 Place the removed compact Flash memory card on an antistatic surface or in a static shielding bag.

Installing the Compact Flash Memory Card

You can install a compact Flash memory card with 32-, 64-, or 128-MB of memory.

Complete the following steps to install the compact Flash memory card:

Step 1 Locate the compact Flash memory-card connector on the system board. (See Figure B-12.)

Step 2 Insert the connector end of the compact Flash memory card into the connector until the card is seated in the connector. The card is keyed, so that it cannot be inserted incorrectly.

Step 3 Reinstall the retention screw to retain the compact Flash memory card.

Step 4 Install the chassis cover as described in the "Replacing the Chassis Cover on Cisco 2691" section on page B35.

Step 5 Refer to the "Formatting Procedures for Compact Flash Memory Cards" section on page B20 for instructions on formatting the compact Flash memory card.

Formatting Procedures for Compact Flash Memory Cards

Cisco recommends that you erase (Class B) or format (Class C) new compact Flash memory cards to initialize them with either a Class B or Class C Flash file system. This ensures proper formatting and enables the ROM monitor to recognize and boot the Flash.

The Class B Flash file system is also known as the low end file system (LEFS).

The Class C Flash file system is similar to the standard DOS file system.

Note A compact Flash memory card formatted with the standard DOS file system does not support booting from the ROM monitor.

Determining the File System on a Compact Flash Memory Card

To determine the file system of a compact Flash memory card in a Cisco 2691, enter the **show flash:** command.

- If geometry and format information of the card is not displayed, the card is formatted with a Class B Flash file system.
- If geometry and format information of the card is displayed, the card is formatted with a Class C Flash file system.

The following examples show outputs for Class B and Class C Flash file systems:

Class B Flash File System (Geometry and Format Information not Displayed):

```
Router# show flash:

System CompactFlash directory:
File  Length   Name/status
  1   6380496 c2691-i-mz.122-7.6.T1
[6380560 bytes used, 9675760 available, 16056320 total]
15680K bytes of ATA System CompactFlash (Read/Write)
```

Class C Flash File System (Geometry and Format Information Displayed):

```
Router# show flash:

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:      8
   Number of Cylinders    978
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          250368

ATA CARD FORMAT
   Number of FAT Sectors  123
   Sectors Per Cluster    8
   Number of Clusters     31209
   Number of Data Sectors 250080
   Base Root Sector       374
   Base FAT Sector        128
   Base Data Sector       406
```

Formatting Compact Flash Memory as a Class C Flash File System

To format a new internal compact Flash memory card with a Class C Flash file system, or to remove the files from a previously installed internal compact Flash memory card, enter the **format flash:** command.

The following example shows output for formatting an internal compact Flash memory card formatted with a Class C Flash file system:

```
Router# format flash:
Format operation may take a while. Continue? [confirm]
Format operation will destroy all data in "flash:".  Continue? [confirm]
Enter volume ID (up to 64 chars)[default flash]:
Current Low End File System flash card in flash will be formatted into DOS
File System flash card!  Continue? [confirm]
Format:Drive communication & 1st Sector Write OK...
Writing Monlib sectors ..............................................................
Monlib write complete
..
Format:All system sectors written. OK...

Format:Total sectors in formatted partition:250592
Format:Total bytes in formatted partition:128303104
Format:Operation completed successfully.

Format of flash complete
Router#
```

Formatting Compact Flash Memory as a Class B Flash File System

To format a new internal compact Flash memory card with a Class B Flash file system (LEFS), or to remove the files from a previously installed internal compact Flash memory card, enter the **erase flash:** command.

The following example shows output for formatting an internal compact Flash memory card with a Class B Flash file system:

```
Router# erase flash:
Erasing the flash filesystem will remove all files! Continue? [confirm]
Current DOS File System flash card in flash: will be formatted into Low
End File System flash card!  Continue? [confirm]
```

```
Erasing device...
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
...erased
Erase of flash: complete
Router#
```

File and Directory Operations

The following sections describe file and directory procedures for internal compact Flash memory cards. File and directory operations vary according to the formatted file system—Class B or Class C.

Operations for Use With Class C Flash File System

The following file operations are useful for compact Flash memory cards formatted with a Class C Flash file system.

File Operations for Class C Flash File System

Copy Files

To copy the files to another location, use the **copy flash:** command.

The following example shows output for copying a configuration file to the startup configuration in an internal compact Flash memory card (`flash:`):

```
Router# copy flash:my-config1 startup-config

Destination filename [startup-config]?
[OK]
517 bytes copied in 4.188 secs (129 bytes/sec)
Router#
```

The following example shows output for copying a configuration file to the running configuration in an internal compact Flash memory card (`flash:`):

```
Router# copy flash:my-config2 running-config

Destination filename [running-config]?
709 bytes copied in 0.72 secs
Router#
```

Display the Contents

To display the contents (directories and files) of a compact Flash memory card formatted with a Class C Flash file system, use the **dir flash:** command.

The following example shows output for displaying the contents of a compact Flash memory card:

```
Router# dir flash:

Directory of flash:/

    1  -rw-     6380496        Jan 04 2002 01:40:14          c2691-i-mz.122-7.6.T1

16056320 bytes total (9675760 bytes free)
```

Display Geometry and Format Information

To display the geometry and format information of a compact Flash memory card formatted with a Class C Flash file system, use the **show flash:** command.

The following example shows output for displaying the geometry and format information of a compact Flash memory card:

```
Router# show flash:
******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
  Number of Heads:       2
  Number of Cylinders    490
  Sectors per Cylinder   32
  Sector Size            512
Total Sectors          31360

ATA CARD FORMAT
  Number of FAT Sectors  12
  Sectors Per Cluster    8
  Number of Clusters     3885
  Number of Data Sectors 31264
  Base Root Sector       152
  Base FAT Sector        128
  Base Data Sector       184

Please use "dir" command to display the contents of the card.
```

Delete Files from Compact Flash Memory

To delete a file from a compact Flash memory card, use the **delete flash:** command.

The following example shows output for deleting a Cisco IOS file from a compact Flash memory card:

```
Router# delete flash:c2691-i-mz.122-7.6.T1

Delete filename [c2691-i-mz.122-7.6.T1]?
Delete flash:/c2691-i-mz.122-7.6.T1? [confirm]

Router# dir flash:


Directory of flash:/

 3475  -rw-     9169616   May 07 1993 02:54:28 c2691-i-mz.122-7.5.T1

127832064 bytes total (118661120 bytes free)
```

Rename a File

To rename a file in a compact Flash memory card, use the **rename flash:** command.

The following example shows output for renaming a Cisco IOS file in an internal compact Flash memory card:

```
Router# dir flash:

Directory of flash:/

    3  -rw-    14221136   May 07 1993 03:18:24 c2691-i-mz.122-7.6.T1
 3475  -rw-     9169616   May 07 1993 03:27:32 c2691-i-mz.122-7.5.T1

127832064 bytes total (104439808 bytes free)

Router# rename flash:c2691-i-mz.122-7.6.T1 flash:c2691-i-mz.tmp
```

```
Destination filename [c2691-i-mz.tmp]?

Router# dir flash:

Directory of flash:/

    3  -rw-    14221136   May 07 1993 03:18:24 c2691-i-mz.122-7.6.T1
 3475  -rw-     9169616   Mar 01 1993 00:08:24 c2691-i-mz.tmp

127832064 bytes total (104439808 bytes free)
```

Display File Content

To display the content of a file in a compact Flash memory card, use the **more flash:** command.

The following example shows output from the **more** command on a compact Flash memory card:

```
Router# more flash:c2691-i-mz.tmp
00000000: 7F454C46 01020100 00000000 00000000    .ELF .... .... ....
00000010: 00020061 00000001 80008000 00000034    ...a .... .... ...4
00000020: 00000054 20000001 00340020 00010028    ...T  ... .4.  ...(
00000030: 00050008 00000001 0000011C 80008000    .... .... .... ....
00000040: 80008000 00628A44 00650EEC 00000007    .... .b.D .e.l ....
00000050: 0000011C 0000001B 00000001 00000006    .... .... .... ....
00000060: 80008000 0000011C 00004000 00000000    .... .... ..@. ....
00000070: 00000000 00000008 00000000 00000021    .... .... .... ...!
00000080: 00000001 00000002 8000C000 0000411C    .... .... ..@. ..A.
00000090: 00000700 00000000 00000000 00000004    .... .... .... ....
000000A0: 00000000 00000029 00000001 00000003    .... ...) .... ....
000000B0: 8000C700 0000481C 00000380 00000000    ..G. ..H. .... ....
000000C0: 00000000 00000004 00000000 0000002F    .... .... .... .../
000000D0: 00000001 10000003 8000CA80 00004B9C    .... .... ..J. ..K.
000000E0: 00000020 00000000 00000000 00000008    ...  .... .... ....
000000F0: 00000000 0000002F 00000001 10000003    .... .../ .... ....
00000100: 8000CAA0 00004BBC 00623FA4 00000000    ..J  ..K< .b?$ ....
00000110: 00000000 00000008 00000000 3C1C8001    .... .... .... <...
00000120: 679C4A80 3C018001 AC3DC70C 3C018001    g.J. <... ,=G. <...
00000130: AC3FC710 3C018001 AC24C714 3C018001    ,?G. <... ,$G. <...
00000140: AC25C718 3C018001 AC26C71C 3C018001    ,%G. <... ,&G. <...
00000150: AC27C720 3C018001 AC30C724 3C018001    ,'G  <... ,0G$ <...
00000160: AC31C728 3C018001 AC32C72C 3C018001    ,1G( <... ,2G, <...
--More--
```

Directory Operations

Create a New Directory

To create a directory in compact Flash memory, use the **mkdir flash:** command.

The following example shows output for first displaying the contents of an internal compact Flash memory card, and then creating a directory named `config` and a subdirectory named `test-config`:

```
Router# dir flash:

Directory of flash:/

    3  -rw-    14221136   May 07 1993 03:18:24 c2691-i-mz.122-7.6.T1
 3475  -rw-     9169616   Mar 01 1993 00:08:24 c2691-i-mz.tmp

127832064 bytes total (104439808 bytes free)

Router# mkdir flash:/config
```

```
Create directory filename [config]?
Created dir flash:/config

Router# mkdir flash:/config/test-config

Create directory filename [/config/test-config]?
Created dir flash:/config/test-config

Router# dir flash:

Directory of flash:/

    3  -rw-    14221136   May 07 1993 03:18:24 c2691-i-mz.122-7.6.T1
 3475  -rw-     9169616   Mar 01 1993 00:08:24 c2691-i-mz.tmp
    1  drw-           0   Mar 01 1993 00:11:04  config

127832064 bytes total (104431616 bytes free)

Router# cd flash:/config

Router# dir flash:


Directory of flash:/config/

    2  drw-           0   Mar 01 1993 00:11:20  test-config

127832064 bytes total (104431616 bytes free)
```

Remove a Directory

To remove a directory from compact Flash memory, use the **rmdir flash:** command.

Before you can remove a directory, remove all files and subdirectories from the directory.

The following example shows output for displaying the contents of an internal compact Flash memory card, then removing the subdirectory named `test-config`:

```
Router# dir flash:
Directory of flash:/config/

  1581  drw-           0   Mar 01 1993 23:50:08  test-config

128094208 bytes total (121626624 bytes free)
Router# rmdir flash:/config/test-config
Remove directory filename [/config/test-config]?
Delete flash:/config/test-config? [confirm]
Removed dir flash:/config/test-config
Router# dir flash:
Directory of flash:/config/

No files in directory

128094208 bytes total (121630720 bytes free)
Router#
```

Enter a Directory and Determine Which Directory You Are in

To enter a directory in compact Flash memory, use the **cd flash:** command.

To determine which directory you are in, use the **pwd** command.

If you enter only **cd**, the router will enter the default home directory, which is `flash:/`.

The following example shows output for the following actions:

- Entering the home directory of a compact Flash memory card (`flash:/`)
- Verifying that you are in the home directory
- Displaying the contents of the home directory
- Entering the `/config` directory
- Verifying that you are in the `/config` directory
- Returning to the home directory (`flash:/`)
- Verifying that you are in the home directory

```
Router# cd

Router# pwd

flash:
Router# dir

Directory of flash:/

    3  -rw-    14221136   May 07 1993 03:18:24 c2691-i-mz.122-7.6.T1
 3475  -rw-     9169616   Mar 01 1993 00:08:24 c2691-i-mz.tmp
    1  drw-           0   Mar 01 1993 00:11:04  config

127832064 bytes total (104431616 bytes free)
Router# cd config

Router# pwd

flash:/config/
Router# cd

Router# pwd

flash:
```

Operations for Use With Class B Flash File System

The following file operations are useful for compact Flash memory cards formatted with a Class B Flash file system.

File Operations

Copy Files

To copy the files to another location, use the **copy flash:** command.

The following example shows output for copying a configuration file to the startup configuration in an internal compact Flash memory card (`flash:`):

```
Router# copy flash:my-config1 startup-config
Destination filename [startup-config]?
[OK]
517 bytes copied in 4.188 secs (129 bytes/sec)
Router#
```

The following example shows output for copying a configuration file to the running configuration in an internal compact Flash memory card (`flash:`):

```
Router# copy flash:my-config2 running-config
```

```
Destination filename [running-config]?
709 bytes copied in 0.72 secs
Router#
```

Display the Contents of a Compact Flash Memory Card

To display the contents (directories and files) of a compact Flash memory card formatted with a Class B Flash file system, use the **dir flash:** command or the **show flash:** command.

The following example shows output for displaying the contents of a compact Flash memory card using the **dir flash:** command.

```
Router# dir flash:

Directory of flash:/

    1  -rw-    14221136              <no date> c2691-i-mz.122-7.6.T1
    2  -rw-     9169616              <no date> c2691-i-mz.122-7.4.T1

128188416 bytes total (104797536 bytes free)
```

The following example shows output for displaying the contents of a compact Flash memory card using the **show flash:** command.

```
Router# show flash:

System CompactFlash directory:
File  Length   Name/status
  1   14221136 c2691-i-mz.122-7.6.T1
  2   9169616 c2691-i-mz.122-7.4.T1
[23390880 bytes used, 104797536 available, 128188416 total]
125184K bytes of ATA System CompactFlash (Read/Write)
```

Delete Files from Compact Flash Memory

To delete a file from compact Flash memory, use the **delete flash:** command, followed by the **squeeze flash:** command.

When a file is deleted in the Class B Flash file system, the memory space occupied by the deleted file is not released until you enter the **squeeze flash:** command. Although the memory space once occupied by the deleted file remains, the deleted file cannot be recovered. To release the memory space occupied by a deleted file, enter the **squeeze flash:** command.

Note The **dir** command does not show deleted files; the **show** command shows all files, including any deleted files if the **squeeze** command has not been entered.

The following example shows output for deleting a Cisco IOS file from compact Flash memory, and then releasing the memory space originally occupied by the file:

```
Router# dir flash:

Directory of flash:/
    1  -rw-    14221136              <no date> c2691-i-mz.122-7.6.T1
    2  -rw-     9169616              <no date> c2691-i-mz.122-7.4.T1
128188416 bytes total (104797536 bytes free)

Router# delete flash:c2691-i-mz.122-7.6.T1

Delete filename [c2691-i-mz.122-7.6.T1]?
Delete flash:c2691-i-mz.122-7.6.T1? [confirm]
```

```
Router# dir flash:


Directory of flash:/

    2  -rw-     9169616              <no date> c2691-i-mz.122-7.4.T1

128188416 bytes total (104797536 bytes free)

Router# show flash:

flash CompactFlash directory:
File  Length   Name/status
  1   14221136 c2691-i-mz.122-7.6.T1 [deleted]
  2   9169616 c2691-i-mz.122-7.4.T1
[23390880 bytes used, 104797536 available, 128188416 total]
125184K bytes of ATA flash CompactFlash (Read/Write)

Router# squeeze flash:
Squeeze operation may take a while. Continue? [confirm]
squeeze in progress...
sssssssssssssssssssssssseeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
Rebuild file system directory...
Squeeze of flash complete
```

Display file content

To display the content of a file in compact Flash memory, use the **more flash:** command.

The following example shows output from the **more** command on a compact Flash memory card:

```
Router# more flash:c2691-i-mz.122-7.4.T1
00000000: 7F454C46 01020100 00000000 00000000    .ELF .... .... ....
00000010: 00020061 00000001 80008000 00000034    ...a .... .... ...4
00000020: 00000054 20000001 00340020 00010028    ...T  ... .4.  ...(
00000030: 00050008 00000001 0000011C 80008000    .... .... .... ....
00000040: 80008000 00628A44 00650EEC 00000007    .... .b.D .e.l ....
00000050: 0000011C 0000001B 00000001 00000006    .... .... .... ....
00000060: 80008000 0000011C 00004000 00000000    .... .... ..@. ....
00000070: 00000000 00000008 00000000 00000021    .... .... .... ...!
00000080: 00000001 00000002 8000C000 0000411C    .... .... ..@. ..A.
00000090: 00000700 00000000 00000000 00000004    .... .... .... ....
000000A0: 00000000 00000029 00000001 00000003    .... ...) .... ....
000000B0: 8000C700 0000481C 00000380 00000000    ..G. ..H. .... ....
000000C0: 00000000 00000004 00000000 0000002F    .... .... .... .../
000000D0: 00000001 10000003 8000CA80 00004B9C    .... .... ..J. ..K.
000000E0: 00000020 00000000 00000000 00000008    ...  .... .... ....
000000F0: 00000000 0000002F 00000001 10000003    .... .../ .... ....
00000100: 8000CAA0 00004BBC 00623FA4 00000000    ..J  ..K< .b?$ ....
00000110: 00000000 00000008 00000000 3C1C8001    .... .... .... <...
00000120: 679C4A80 3C018001 AC3DC70C 3C018001    g.J. <... ,=G. <...
00000130: AC3FC710 3C018001 AC24C714 3C018001    ,?G. <... ,$G. <...
--More-- q
```

Replacing the Boot ROM

Cisco 261x, Cisco 262x, Cisco 265x, and Cisco 26xxXM Routers

Note 32 MB Flash memory support is limited to the Cisco 2620(XM), Cisco 2621(XM), Cisco 2650(XM) and Cisco 2651(XM). The Cisco 261x (2610, 2611, 2612 and 2613) cannot be upgraded to support 32 MB of Flash regardless of the boot ROM version.

To upgrade the router ROM software to a new ROM monitor version, you must replace the existing ROM. Follow this procedure to replace the ROM:

Caution Correct placement of the ROM is crucial. If improperly positioned, the new component could be damaged when the router is powered on. Read all instructions before proceeding. To prevent damage to the ROM from ESD (when handling the router and its components), follow the ESD procedures described in your hardware guide and see the *Regulatory Compliance and Safety Information* document. Be careful not to damage or scratch the printed circuit card under the ROM.

Step 1 Locate the ROM on the system card (motherboard) layout as shown in Figure B-13 and Figure B-14.

Figure B-13 System Card Layout for Cisco 261x, Cisco 262x, and Cisco 265x Routers

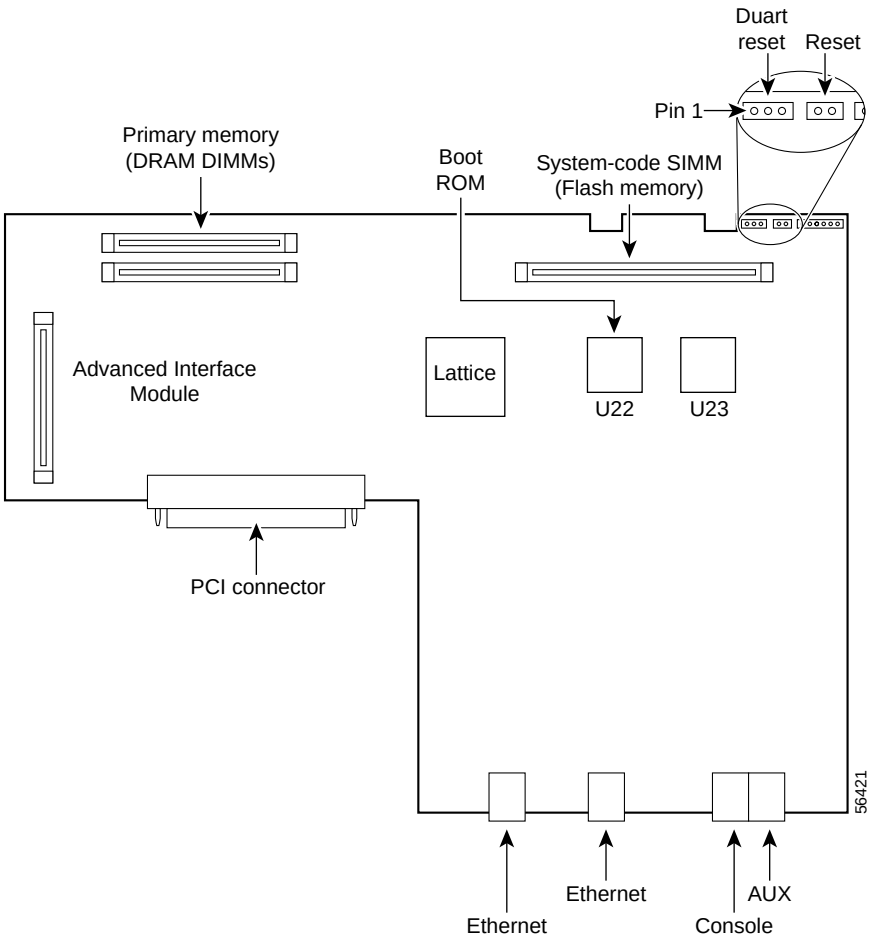
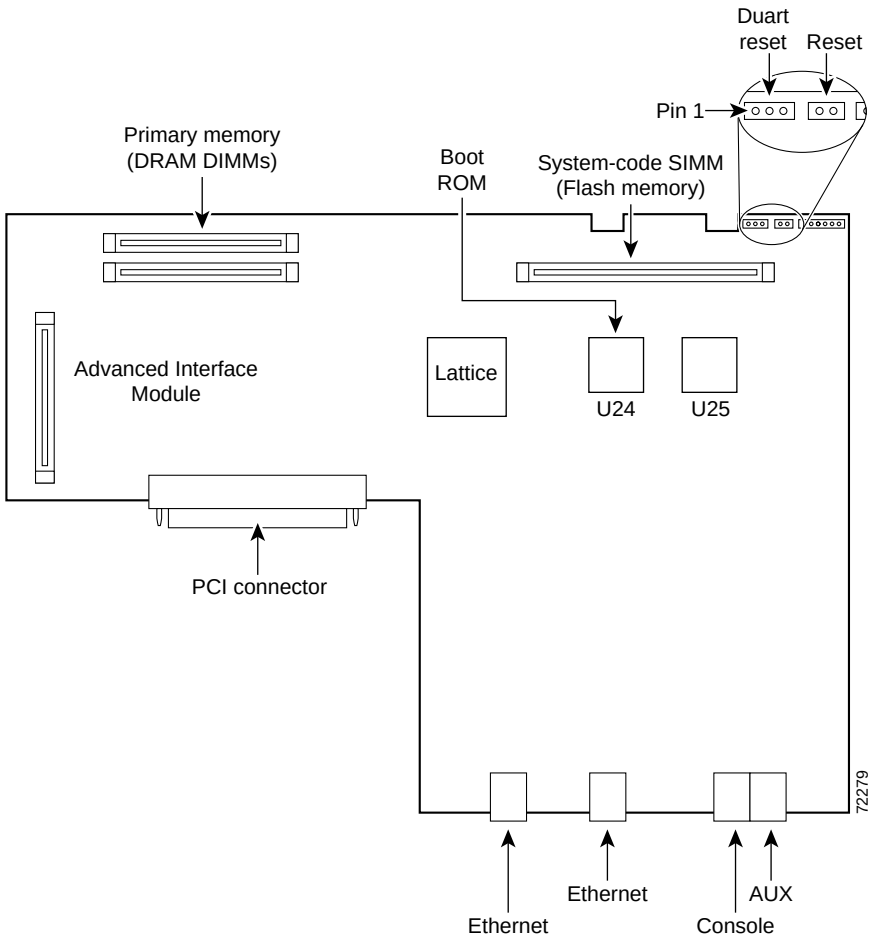
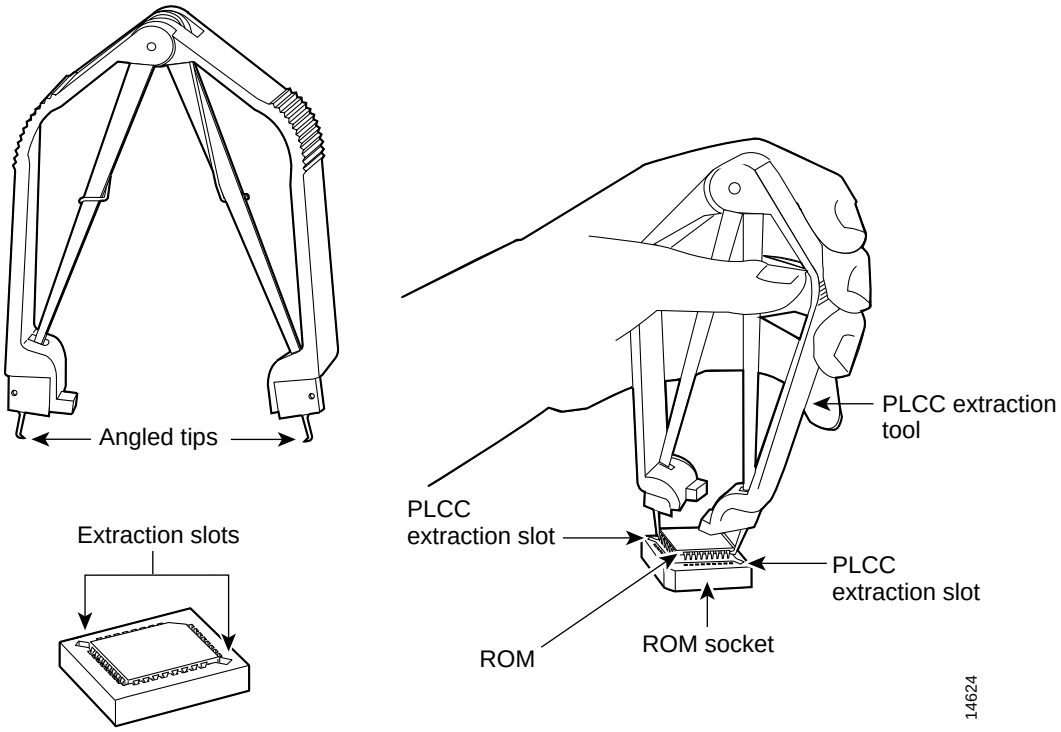


Figure B-14 System Card Layout for Cisco 26xxXM Routers



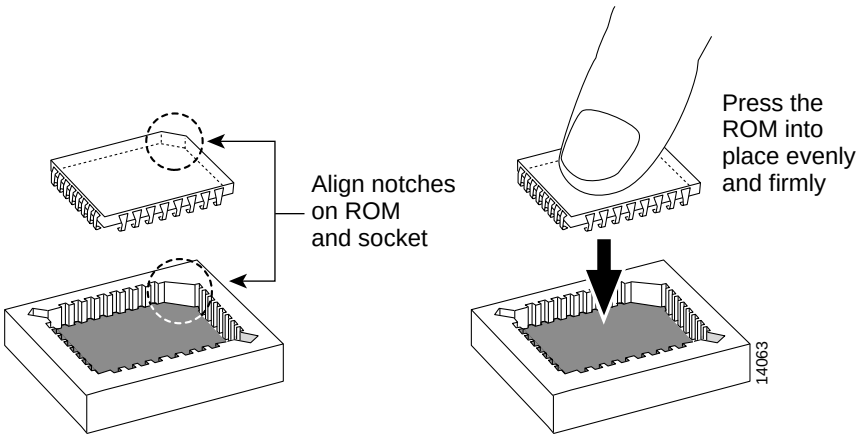
Step 2 Gently remove the old ROM with a ROM extraction tool or a small flat-blade screwdriver, and set it aside. (See Figure B-15.)

Figure B-15 Removing the ROM from the System Board



Step 3 Orient and insert the new ROM in its socket as shown in Figure B-16, being careful to not bend or crush any of the bottom pins. To straighten out a bent pin, use needlenose pliers. Align the notch in the new ROM with the notch in the ROM socket, ignoring the orientation of the label.

Figure B-16 Installing the ROM in the System Board



Caution The notch on the ROM must match the notch on the socket on the card. Installing the ROM backward will damage it.

Testing ROM Installation

Tip Before testing your ROM installation, close the router chassis using the procedure provided in the "Closing the Chassis" section on page B34.

Test your installation by rebooting the router. If you installed the ROM correctly, the router will boot into the ROM monitor or operating system.

If you suspect that the ROM is inserted incorrectly, remove and reinstall the ROM as described in the "Replacing the Boot ROM" section on page B29. Reboot the router again.

Cisco 2691

The boot Flash device on the Cisco 2691 router is a 1 MB, fixed Flash device that is not field-replaceable. The ROM image can be upgraded by downloading new software. The first image in ROM is read-only and cannot be erased and the upgrade image is a read-write image that is stored in ROM Flash as the second image. You can configure the router to boot from either image.

In order to upgrade the ROM on the Cisco 2691, you will need to have a ROM image file available to copy from a remote server or internal Flash memory.

Follow these steps to upgrade the Cisco 2691 ROM from a TFTP server:

Step 1 Copy the ROM image from the TFTP server:

```
Router# upgrade rom-monitor file tftp://172.19.169.99/rommon_file.srec
Loading rommon_file.srec from 172.19.169.99 (via FastEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 651041/1301504 bytes]
Router#
This command will reload the router. Continue? [yes/no]: y
ROMMON image upgrade in progress
Erasing boot flash eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
Programming boot flash pppp

Now Reloading
System Bootstrap, Version 12.2(4r)XT1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2001 by cisco Systems, Inc.

 Running new upgrade for first time

System Bootstrap, Version 12.2(4r)XT1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2001 by cisco Systems, Inc.
c3745 processor with 131072 Kbytes of main memory
Main memory is configured to 64 bit mode with parity disabled

Upgrade ROMMON initialized
Router#
```

Step 2 Reboot the router using the new ROM image:

```
Router# reload
This command will reload the router. Continue? [yes/no]: y
```

Step 3 Verify the ROM version:

```
Router# show rom-monitor

ReadOnly ROMMON version:

System Bootstrap, Version 12.2(4r)XT1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2001 by cisco Systems, Inc.

Upgrade ROMMON version:

System Bootstrap, Version 12.2(4r)XT1, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 2001 by cisco Systems, Inc.

Currently running ROMMON from Upgrade region
ROMMON from Upgrade region is selected for next boot
Router#
```

Step 4 Select the ROM image for next reboot:

```
Router# upgrade rom-monitor preference [readonly | upgrade]
You are about to mark Upgrade region of ROMMON for the highest boot preference.
Proceed? [confirm] y
Done! Router must be reloaded for this to take affect.
Router#
```

Closing the Chassis

This section describes the procedure for closing the chassis.

Replacing the Chassis Cover on Cisco 261x, Cisco 262x, Cisco 265x, and Cisco 26xxXM

To close the chassis:

Step 1 Position the two chassis sections, as shown in Figure B-2.

Step 2 Referring to Figure B-2, press the two chassis sections together and verify the following:

- The top section fits *into* the rear of the bottom section. The bottom section fits *into* the front of the top section.
- Each side of the top and bottom sections fits together.

Caution To fit the two sections together, it might be necessary to work them together at one end and then the other, working back and forth; however, use care to prevent bending the chassis edges.

Step 3 When the two sections fit together snugly, slide the chassis top so it fits into the front bezel.

Step 4 Replace the cover screws. Tighten the screws to no more than 8 or 9 inch/pound of torque.

Step 5 Reinstall the chassis on the wall, rack, desktop, or table.

Step 6 Reconnect all cables. If the router uses a DC power supply, switch the circuit breaker to the ON position.

Replacing the Chassis Cover on Cisco 2691

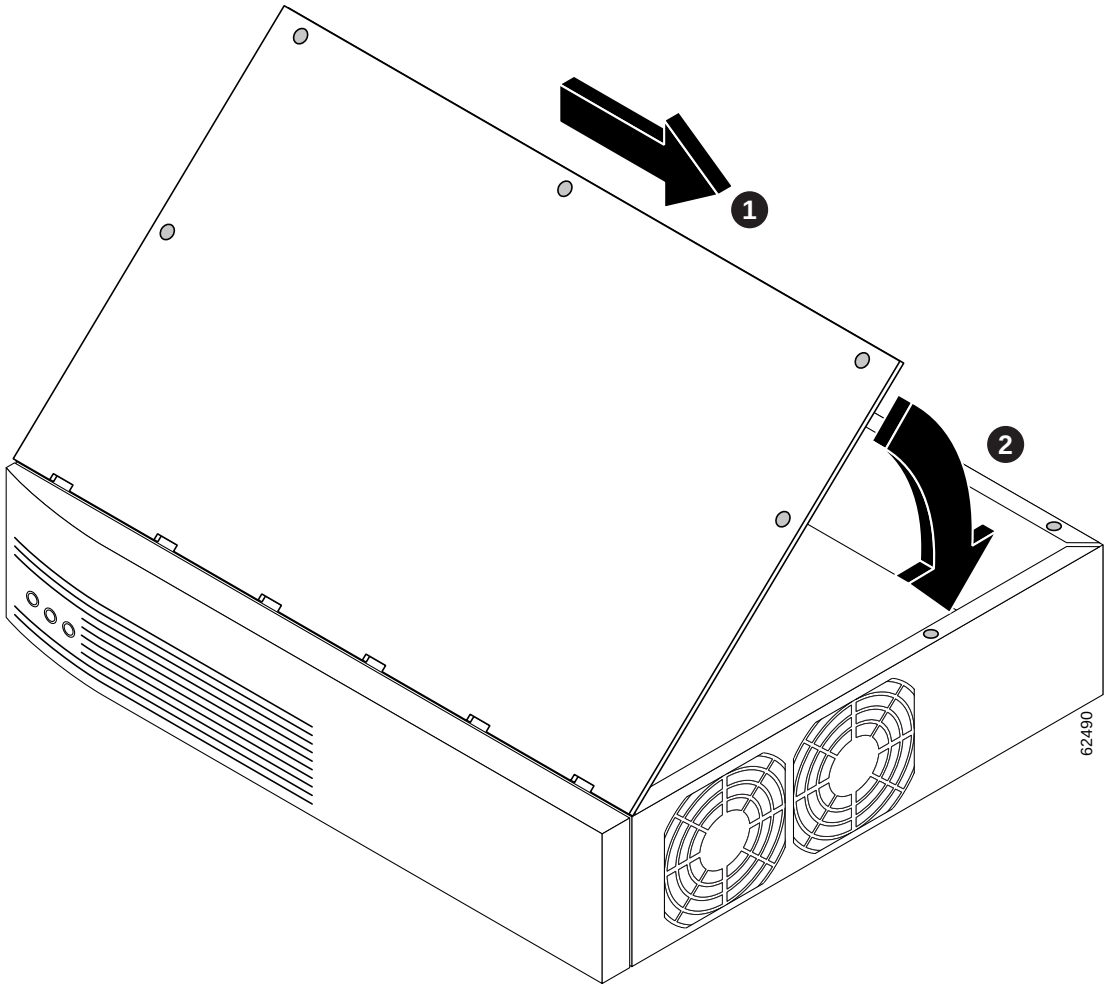
Step 1 Place the chassis bottom so the front panel is closest to you.

Step 2 Hold the cover so the tabs at the rear of the cover are aligned with the chassis bottom.

Step 3 Push the cover toward the rear, making sure that the cover tabs fit under the chassis back panel, and the back panel tabs fit under the cover.

Slide the cover slightly to the left to lock the cover into position (See part 1 in Figure B-17).

Figure B-17 Replacing the Cisco 2691 Router Cover



Step 4 Lower the front of the cover onto the chassis (See part 2 in Figure B-17).

Step 5 Fasten the cover with the five screws you set aside earlier.

Step 6 Replace the chassis.

Step 7 Reinstall network interface cables.

Replacing the Power Supply

For complete information about replacing AC and DC power supplies for the Cisco 2600 series routers, refer to these documents:

Cisco 2600 Series Power Supply Configuration Note or *Installing AC Power Supplies in Cisco 2691 Routers*, located at:

Cisco Product Documentation > Access Servers and Access Routers > Modular Access Routers Cisco 2600 Routers > Hardware installation documents for Cisco 2600 series > Cisco 2600 series hardware configuration notes