

Replacing Memory

This appendix describes how to replace or upgrade memory in a Cisco 4000 series router and contains the following sections:

- Memory Upgrade Options
- Replacing Main Memory SIMMs
- Replacing Shared-Memory SIMMs
- Replacing Flash Memory SIMMs
- Replacing Boot ROMs in the Cisco 4000-M

There are two dynamic random-access memory (DRAM) systems in Cisco 4000 series routers. One is the shared memory, which is the interface that the network processor modules send data to or transmit data from, and the other is the primary or main memory, which is reserved for the CPU. In addition, the Cisco 4000-M has Flash memory for storing the system software image; the Cisco 4500-M, Cisco 4700-M, and Cisco 4800-M have Flash memory for both the system software image and for the boot helper image.

Note For complete information about memory requirements, see product bulletin number 419, “Memory Options for Cisco 4000 Series,” on the Web at <http://www.cisco.com>.



Caution To avoid damaging ESD-sensitive components, observe all ESD precautions. To avoid damaging the underlying system card, avoid using excessive force when you remove or replace SIMMs.

Memory Upgrade Options

Main memory upgrades:

- Cisco 4000-M main memory upgrade—replace the main memory configuration of 4 MB (one 4-MB SIMM) with one 8, 16, or 32-MB SIMM.
- Cisco 4500-M main memory upgrade—replace the main memory configuration of 8 MB (two 4-MB SIMMs) with two 8-MB SIMMs or two 16-MB SIMMs.
- Cisco 4700-M main memory upgrade—replace the main memory configuration of two 8-MB SIMMs (16 MB) with two 16-MB SIMMs (32 MB) or with two 32-MB SIMMs (64 MB).
- Cisco 4800-M main memory upgrade—replace the main memory configuration of two 8-MB SIMMs (16 MB) with two 16-MB SIMMs (32 MB), with two 32-MB SIMMs (64 MB), or with two 64-MB SIMMs (128 MB).

Shared memory upgrades:

- Cisco 4000-M shared-memory upgrade—replace the 4-MB shared-memory SIMM with a 16-MB shared-memory SIMM.
- Cisco 4500-M and Cisco 4700-M shared-memory upgrade—replace the 4-MB shared-memory SIMM with an 8-MB SIMM or a 16-MB SIMM.
- Cisco 4800-M shared-memory upgrade—replace the 8-MB shared-memory SIMM with a 16-MB SIMM.

Flash memory upgrades:

- Cisco 4000-M, Cisco 4500-M, Cisco 4700-M, and Cisco 4800-M Flash memory—replace the standard Flash memory configuration of 4 MB with 8 or 16 MB of Flash memory.

The Cisco 4000-M uses boot ROMs to store the boot helper Cisco IOS image. To upgrade the boot ROM software to a new software image in the Cisco 4000 or Cisco 4000-M, the existing boot ROMs must be replaced.

NVRAM in the Cisco 4000 series uses an internal lithium battery to maintain data. Although this is not a field-serviceable component, Cisco is required to provide the following safety warning:

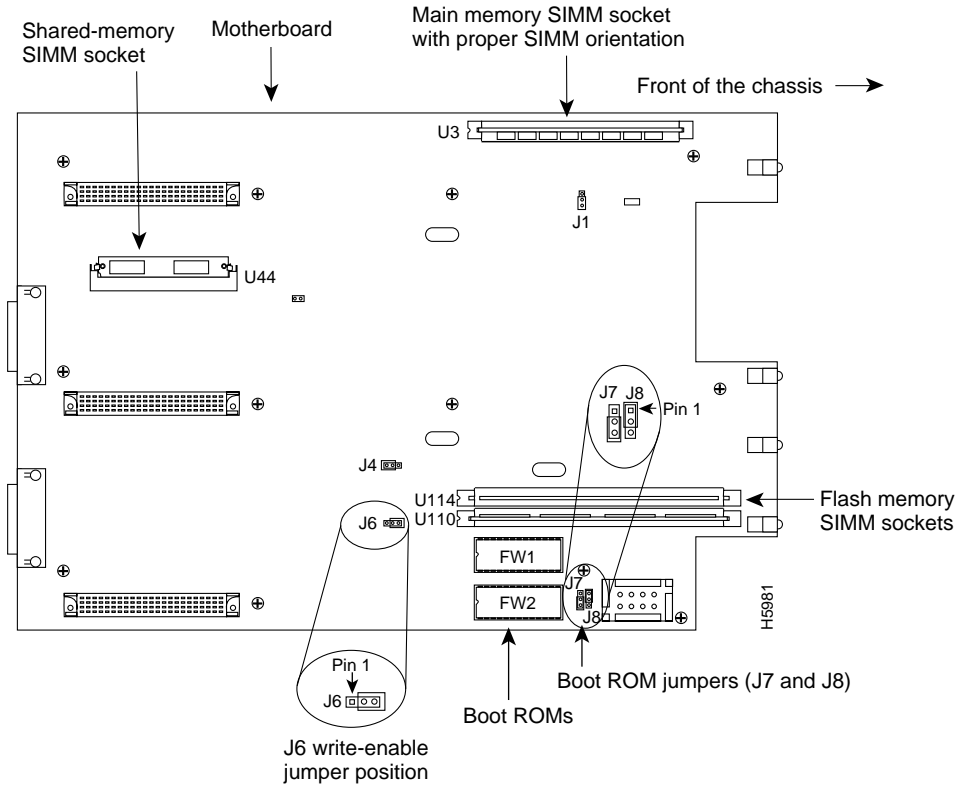


Warning There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

The following figures show SIMM and jumper locations on the motherboards. Figure C-1 shows the Cisco 4000-M motherboard, Figure C-2 shows the Cisco 4500-M and Cisco 4700-M motherboard, and Figure C-3 shows the Cisco 4800-M motherboard. Note that all motherboards contain a jumper close to the Flash SIMMs that enables a write to Flash memory.

You can access the main memory and Flash memory SIMMs by removing the component tray. Figure C-4 shows a component tray removed and SIMMs visible. To access shared memory, NVRAM, and the ROMs, you must also remove network processor modules.

Figure C-1 Cisco 4000-M SIMM Locations



Note Configure the J5 jumper as shown in Figure C-1 to permit writing to Flash memory.

Figure C-2 Cisco 4500-M and Cisco 4700-M SIMM Locations

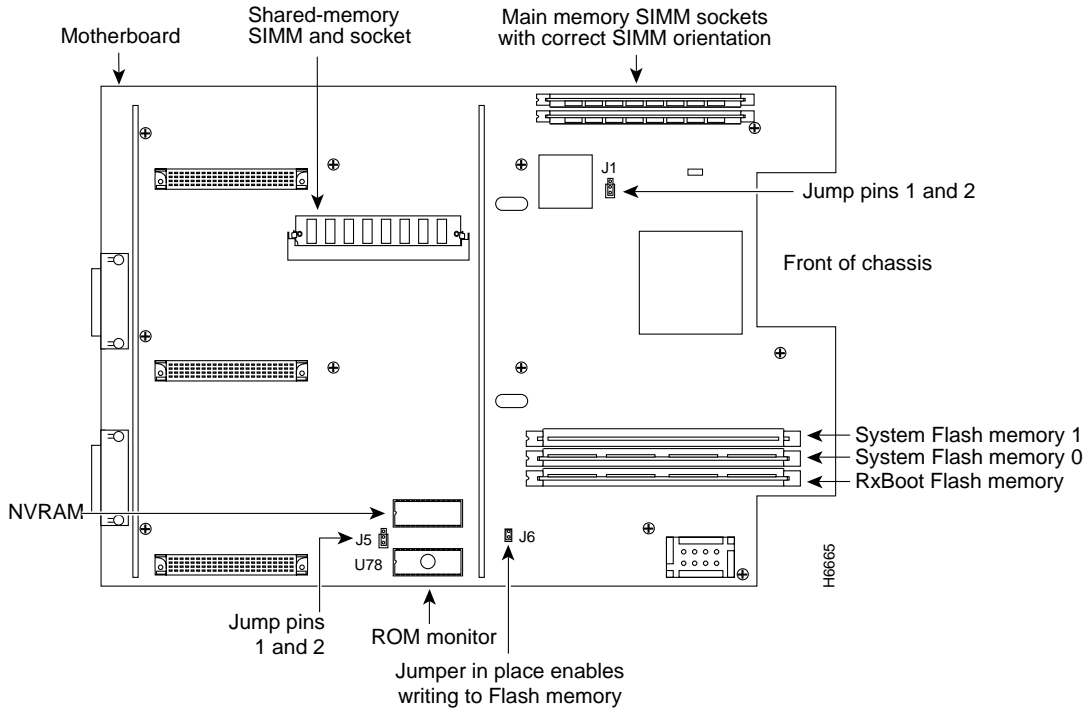


Figure C-3 Cisco 4800-M SIMM Locations

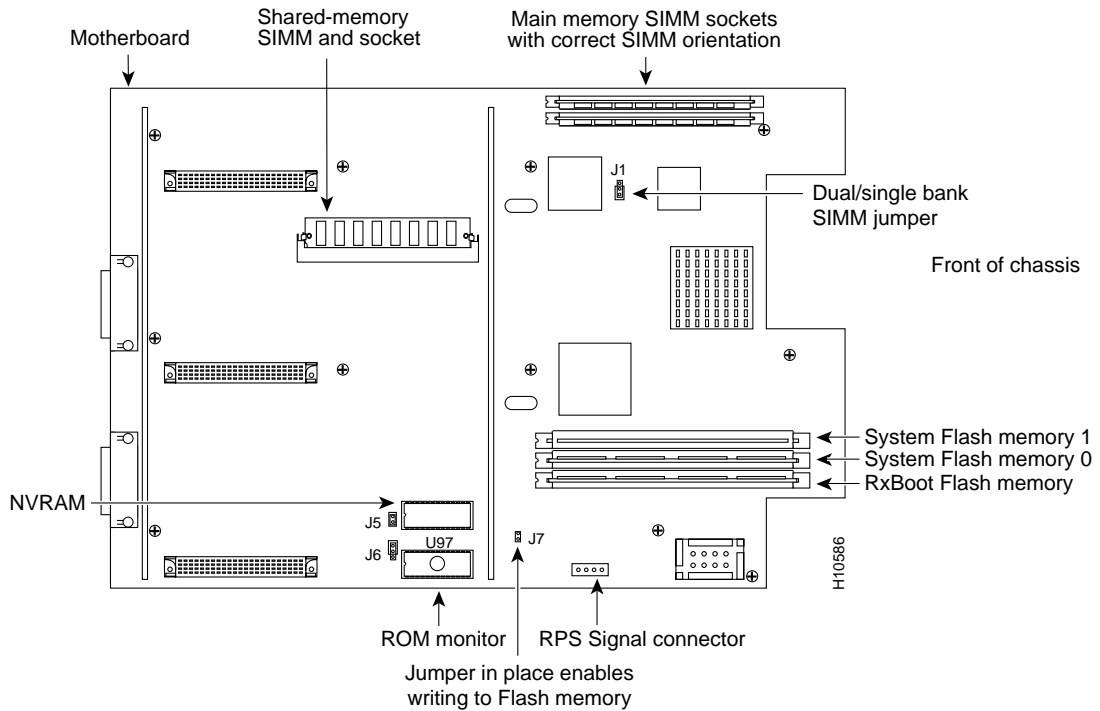
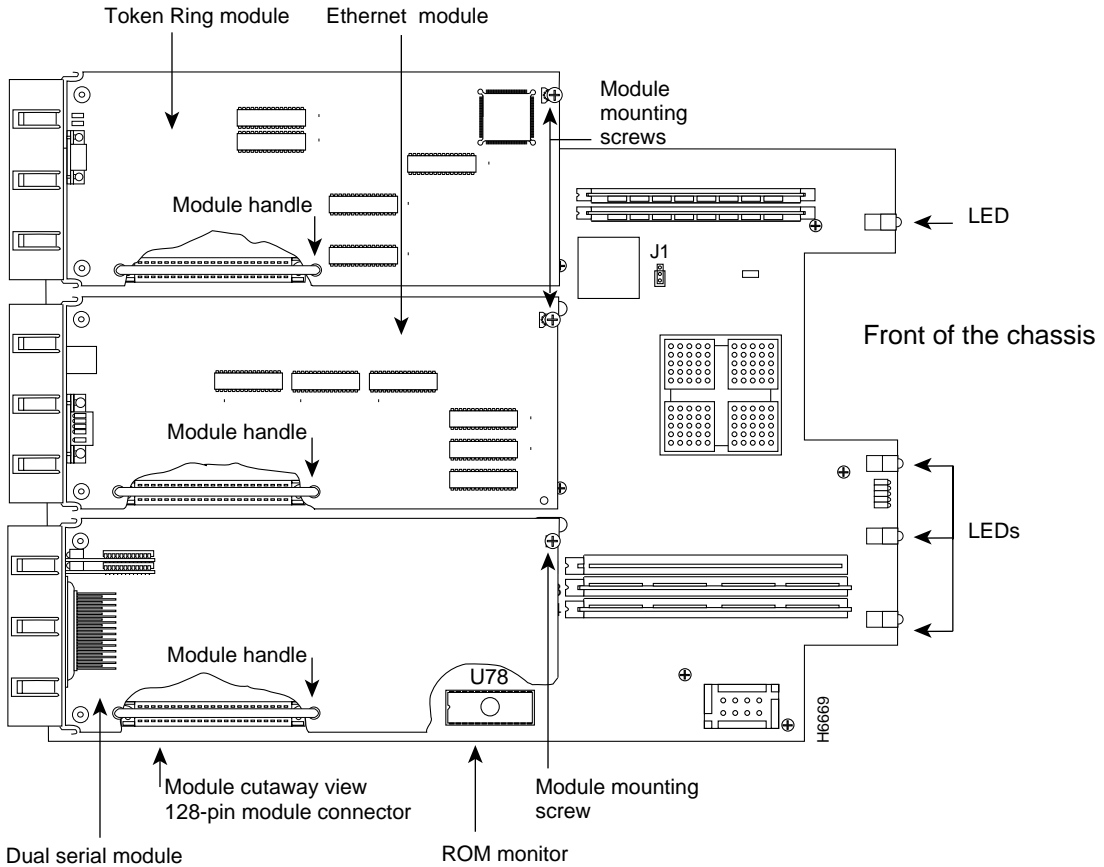


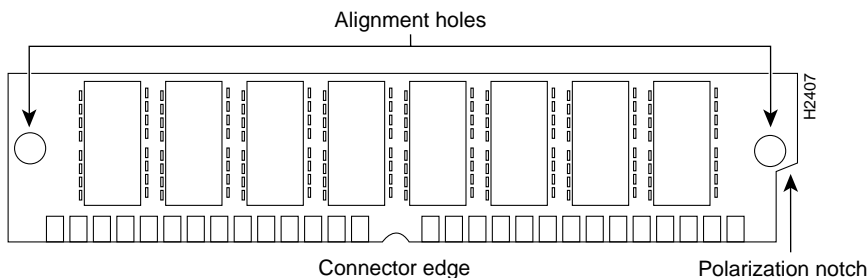
Figure C-4 Component Tray with Motherboard (Cisco 4700-M and Cisco 4500-M)



Replacing Main Memory SIMMs

SIMMs are manufactured with a polarization notch to prevent them from being installed backward. Figure C-5 shows the polarization notch and locations of the alignment holes on a main memory SIMM card. The main memory SIMM cards are installed with the connector edge down and the component side facing in, as shown in the upper right of Figure C-1, Figure C-2, and Figure C-3.

Figure C-5 Cisco 4000 Series Main Memory SIMM



Removing Main Memory SIMMS

Take the following steps to remove main memory SIMMs:

- Step 1** Put on 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, avoiding contact with the connectors.
- Step 2** Remove the component tray as described in the section “Removing the Component Tray” in the chapter “Maintenance.” Main memory SIMMs are visible in the component tray as shown in Figure C-4.
- Step 3** On the motherboard, locate the main memory SIMM card sockets shown in the upper right corner of Figure C-1 (Cisco 4000-M), Figure C-2 (Cisco 4500-M and Cisco 4700-M), and Figure C-3 (Cisco 4800-M).

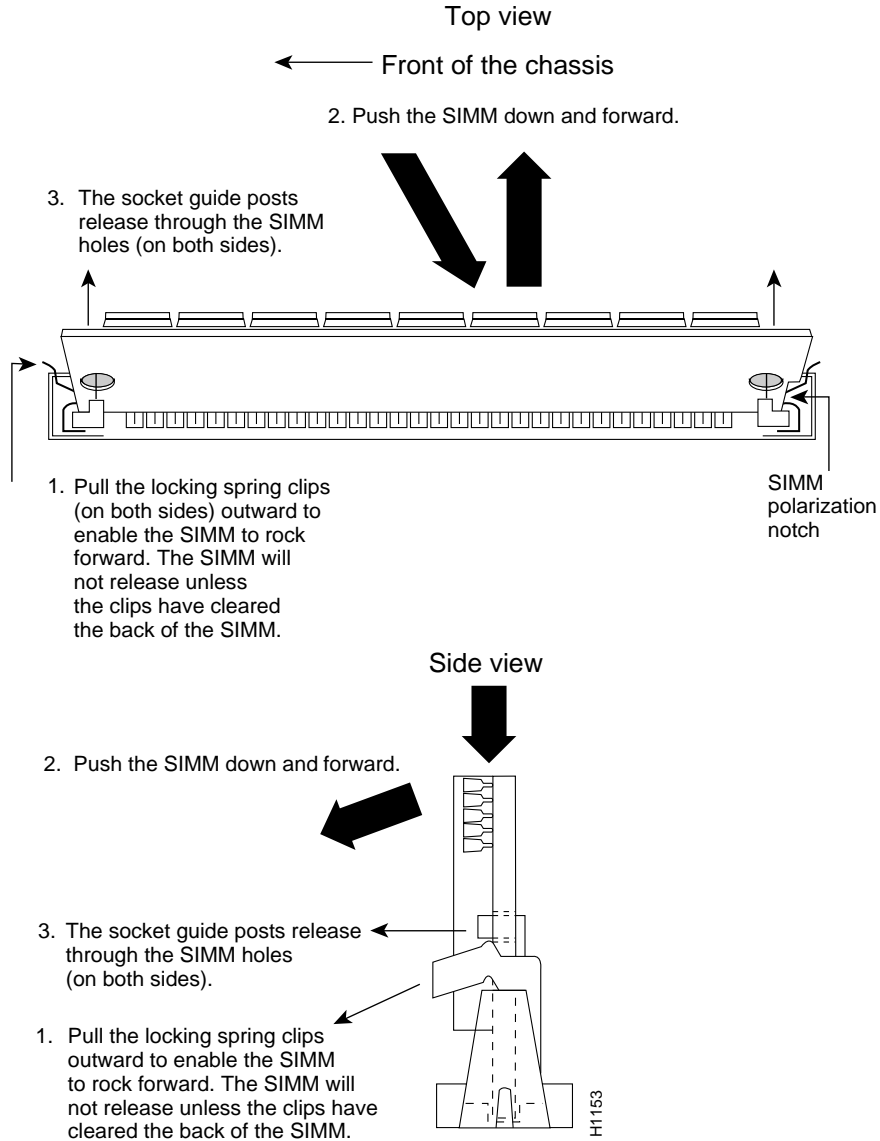


Caution Handle SIMMs by the card edges only. SIMMs are ESD-sensitive components and can be damaged by mishandling.

Step 4 Remove one SIMM at a time, beginning with the SIMM farthest from the edge of the motherboard. (The Cisco 4000-M has only one main memory SIMM.)

Step 5 Pull the locking spring clips on both sides outward and tilt the SIMM free of the clips to lift the SIMM out of its socket. (See Figure C-6.)

Figure C-6 Removing Main Memory SIMMs



Step 6 Hold the SIMM by the edges with your thumb and index finger and lift it out of the socket. Place the removed SIMM in an antistatic bag to protect it from ESD damage.

Step 7 Repeat Step 3 through Step 6 for each main memory SIMM card.

Proceed to the next section, “Installing Main Memory SIMMs.”

Installing Main Memory SIMMs

Take the following steps to install main memory SIMMs. The steps assume that you are wearing an ESD-preventive wrist strap, the component tray is removed, and you have located the main memory SIMM sockets as described in the previous procedure.

Step 1 Make sure all of the main memory SIMM sockets are empty. If not, follow the steps in the in the previous procedure “Removing Main Memory SIMMS.”



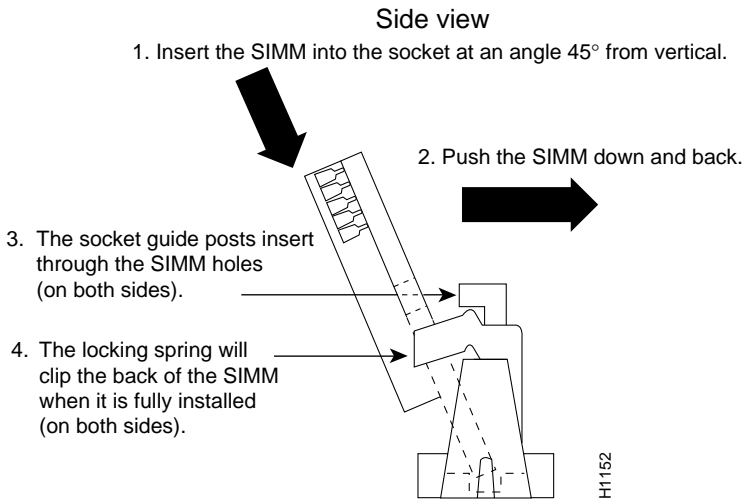
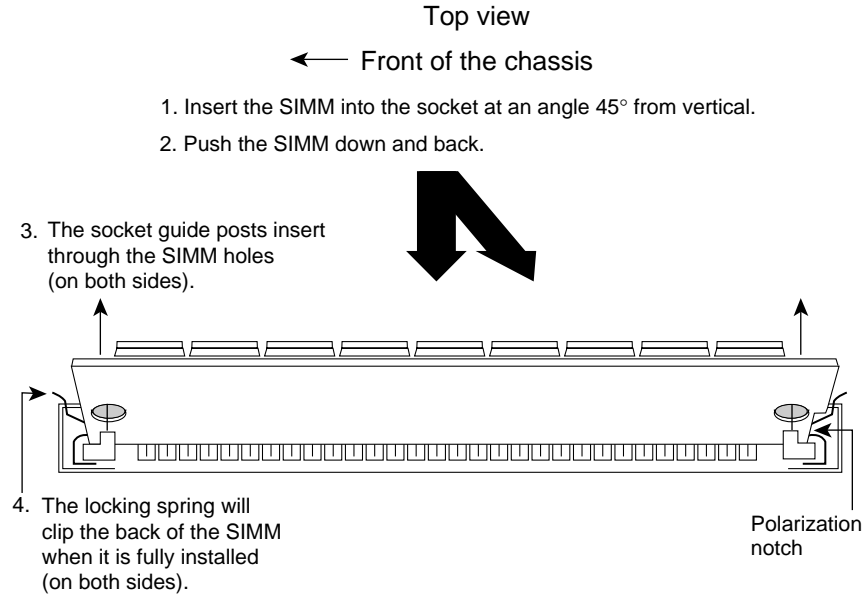
Caution Handle SIMMs by the card edges only. SIMMs are ESD-sensitive components and can be damaged by mishandling.

Step 2 Hold the SIMM with the polarization notch on the right and the component side away from you with the connector edge at the bottom. (See Figure C-5.)

Step 3 Beginning with the SIMM nearest the edge of the motherboard, insert the main memory SIMM card at a 45-degree angle and rock it into its vertical position (see Figure C-7), using the minimum amount of force required. When the SIMM is properly seated, the socket guide posts will insert through the alignment holes, and the connector springs will click into place.

Step 4 Ensure that each SIMM is straight and that the alignment holes (as shown in Figure C-7) line up with the plastic socket guides on the socket.

Figure C-7 Installing Main Memory SIMMs





Caution You will feel some resistance, but *do not use excessive force on the SIMM and do not touch the surface components to avoid damaging them.*

- Step 5** Repeat Step 2 through Step 4 for each main memory SIMM.
- Step 6** For the Cisco 4800-M, set jumper J1 for the type of SIMM installed. See Figure C-3 for the location of the jumper.
- For dual-bank SIMMs, jumper pins 2 and 3
 - For single-bank SIMMs, jumper pins 1 and 2.

Reviewers, how can installer tell dual from single?

If you are done with all SIMM replacement procedures, reassemble the router as described in the section “Replacing the Component Tray” in the “Maintenance” chapter.

Replacing Shared-Memory SIMMs

Use the following procedures to replace shared-memory SIMMs in a Cisco 4000-M, Cisco 4500-M, Cisco 4700-M, or Cisco 4800-M.

Removing Shared-Memory SIMMs

Take the following steps to remove the shared-memory SIMMs:

- Step 1** Unplug the chassis power cord and network connections.
- Step 2** Put on 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, avoiding contact with the connectors.
- Step 3** Remove the component tray as described in the section “Removing the Component Tray” in the “Maintenance” chapter.
- Step 4** Remove and safely store all the network processor modules present as described in the section “Removing Network Processor Modules” in the “Maintenance” chapter.

Replacing Shared-Memory SIMMs

- Step 5** Locate the shared-memory SIMM card socket shown on the left of the motherboard as shown in Figure C-1 (Cisco 4000-M), Figure C-2 (Cisco 4500-M and Cisco 4700-M), or Figure C-3 (Cisco 4800-M).
- Step 6** Turn the chassis so that the rear of the chassis is closest to you.
- Step 7** Push apart the two metal clasps on the shared memory SIMM. Angle the SIMM upward and pull it out. (See Figure C-7.)



Caution Do not exert pressure on the components on the SIMM surface because it might damage them. The sides of the SIMM must clear the metal clasps before the SIMM can be safely removed.

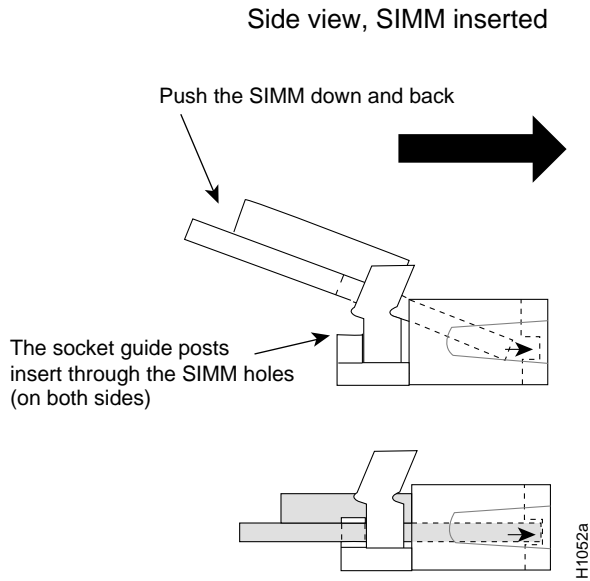
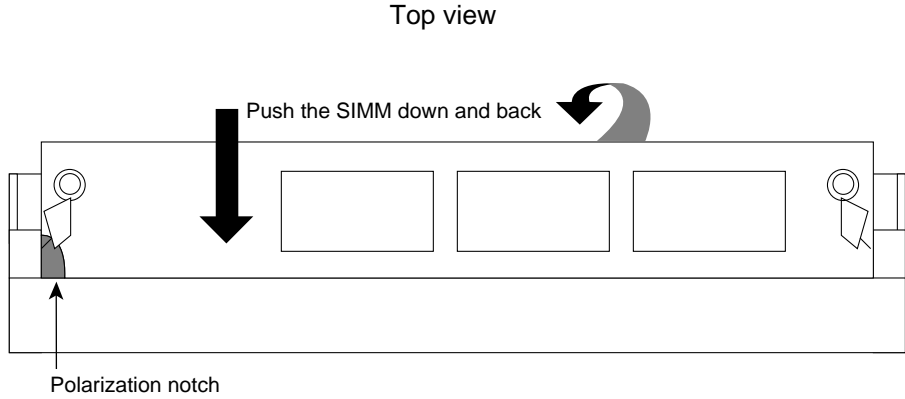
- Step 8** Place the removed SIMM in an antistatic bag to protect it from ESD damage.
- Step 9** Repeat Step 7 and Step 8 for each SIMM.
- Step 10** Proceed to the next section, “Installing Shared-Memory SIMMs.”

Installing Shared-Memory SIMMs

Take the following steps to install shared-memory SIMMs. The steps assume that the component tray and modules are removed and you have located the as SIMM card socket as described in the previous procedure.

- Step 1** Turn the chassis so that the side with the shared-memory SIMM cards is closest to you.
- Step 2** Hold the SIMM with the connector edge at the bottom, with the component side facing you, and the polarization notch on the left. (See Figure C-8.)

Figure C-8 Inserting Shared-Memory SIMMs



Replacing Flash Memory SIMMs



Caution Handle SIMMs by the card edges only. SIMMs are sensitive components and can be shorted by mishandling.

Step 3 To insert a SIMM, angle it into position, then carefully push down and back on the edges, holding each edge so that it securely snaps into place. (See Figure C-8.) When it snaps into place, the two metal holders clip over the edge of the SIMM, and it sits horizontally.



Caution Avoid damage to the SIMMs and SIMM socket by handling them gently. The SIMMs are also sensitive to ESD damage.

Step 4 Check that the SIMM is straight and that the holes are aligned with the socket guide posts on the socket. (See Figure C-8.)

If you are done with all SIMM replacement procedures, reassemble the router as described in the section “Replacing Network Processor Modules” and “Replacing the Component Tray” in the “Maintenance” chapter.

Replacing Flash Memory SIMMs

All Cisco 4000 series routers use Flash memory SIMMs to store system code (Cisco IOS software). The Cisco 4500-M, Cisco 4700-M, and Cisco 4800-M use Flash memory SIMMs to store a boot helper image (Rxboot image).

Note The Cisco 4000-M stores the boot helper image in ROM.

Removing the Flash Memory SIMMs

Take the following steps to remove Flash memory SIMM:

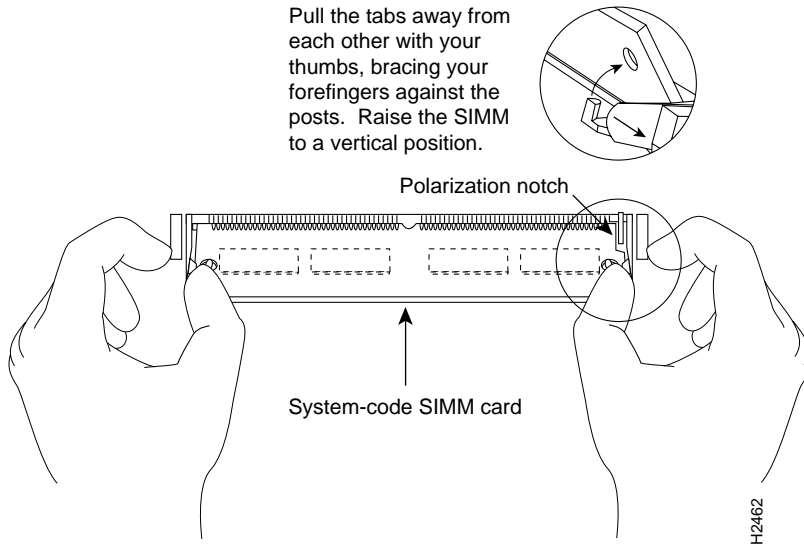
- Step 1** Put on an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Remove the component tray as described in the section “Removing the Component Tray” in the chapter “Maintenance.”
- Step 3** Locate the appropriate SIMM card socket on the lower right corner of the motherboard as shown in Figure C-1 (Cisco 4000-M), Figure C-2 (Cisco 4500-M and Cisco 4700-M), or Figure C-3 (Cisco 4800-M). The motherboard contains a label for each SIMM.



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

- Step 4** Pull the locking spring clips on both sides outward, tilt the SIMM free of the clips, and lift the SIMM out of its socket. (See Figure C-9.)

Figure C-9 Removing the Flash Memory SIMM



Proceed to the next section, “Installing Flash-Memory SIMMs.”

Installing Flash-Memory SIMMs

Take the following steps to add Flash memory SIMMs. The steps assume you are wearing an ESD-preventive wrist strap, have disassembled the router, and have located the Flash-memory SIMM sockets as described in the previous procedure.



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

Step 1 Hold the SIMM with the polarization notch on the right and the component side away from you with the connector edge at the bottom.

Step 2 Referring to Figure C-10, insert the Flash-memory SIMM at a 45-degree angle and rock it into its vertical position. When the SIMM is properly seated, the socket guide posts will insert through the alignment holes, and the locking springs will click into place. Use the minimum amount of force required.

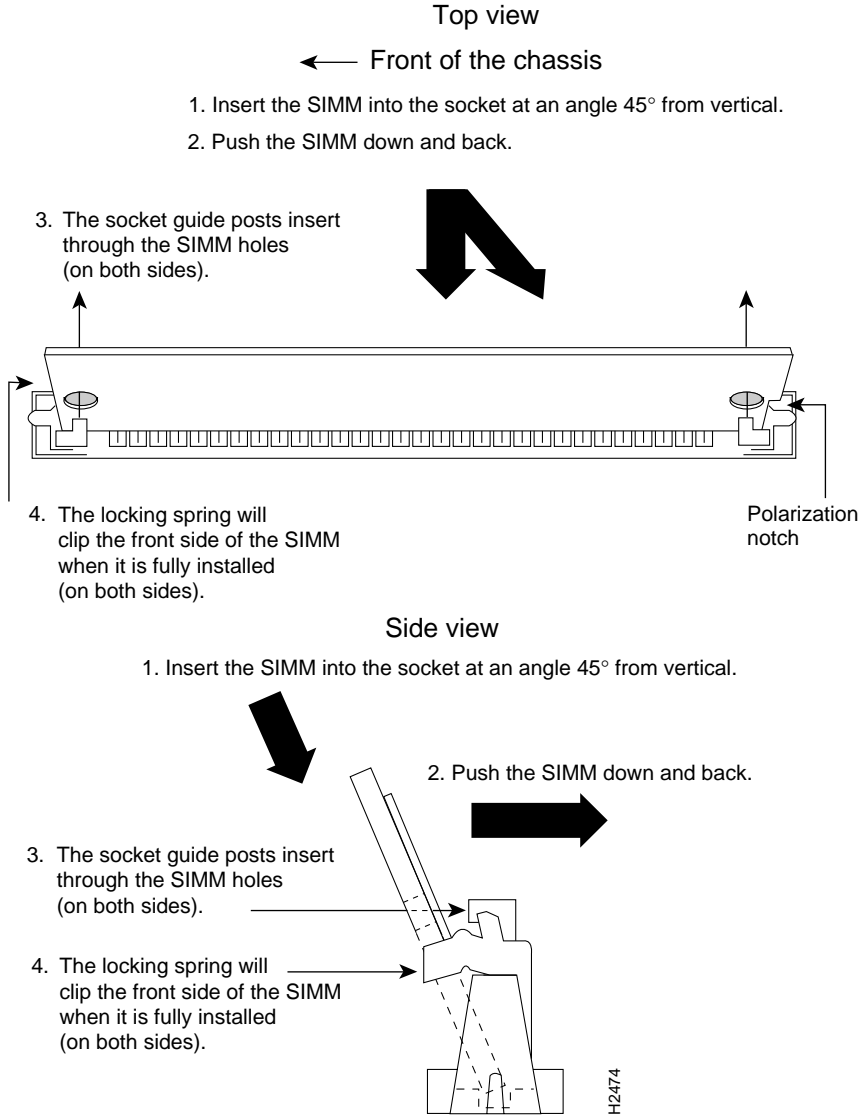


Caution You will feel some resistance, *but do not use excessive force on the SIMM and do not touch the surface components to avoid damaging them.*

Step 3 Check the alignment of each SIMM to make sure that it is straight and that the alignment holes are lined up with the plastic socket guides.

If you have completed all memory upgrade procedures, reassemble the router as described in the section “Replacing the Component Tray” in the “Maintenance” chapter.

Figure C-10 Inserting Flash-Memory SIMMs



Replacing Boot ROMs in the Cisco 4000-M

To upgrade the boot ROM software to a new Cisco IOS image, the existing boot ROMs must be replaced.

Take the following steps to replace boot ROMs in a Cisco 4000-M.

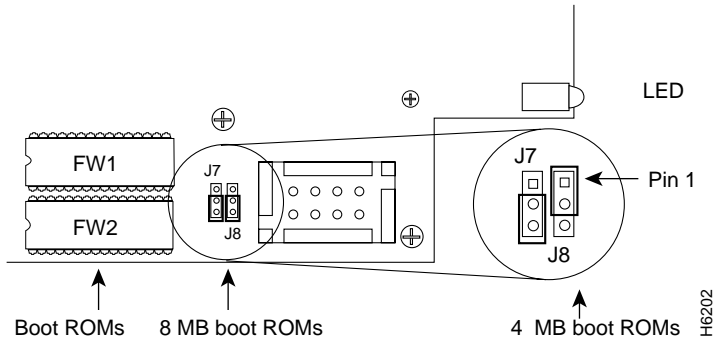
- Step 1** Put on an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Remove the component tray as described in the section “Removing the Component Tray” in the chapter “Maintenance.”
- Step 3** Remove and safely store all the network processor modules present as described in the “Removing Network Processor Modules” section in the “Maintenance.” chapter.
- Step 4** Locate the boot ROMs labeled FW1 and FW2 on the motherboard (see Figure C-1 and Figure C-11).
- Step 5** Gently extract the old ROMs with a ROM extraction tool or a small flat-blade screwdriver, and set the old boot ROMs aside.



Caution The correct placement of the boot ROMs is crucial. If improperly positioned, the new components could be damaged when the system is powered on. Read all of the instructions before proceeding. To prevent damage to the ROMs from ESD, make sure you have followed Step 1. Also, be careful not to damage or scratch the printed circuit card under the ROMs.

- Step 6** Insert the new boot ROMs in their respective sockets in the orientation shown in Figure C-11, being careful not to 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 C-11 Boot ROM Locations



Step 7 Jumpers J7 and J8 must be set to designate the capacity of the Boot ROMs. (See Figure C-11.)

- For the 8 MB boot ROMs used in Cisco IOS Release 10.2(8) and higher, short pins 2 and 3 on jumper J7 and on jumper J8.
- For the 4 MB boot ROMs used in Cisco IOS releases prior to version 10.2(8), short pins 2 and 3 on jumper J7 and pins 1 and 2 on jumper J8.

If you have completed all memory upgrade procedures, reassemble the router as described in the section “Replacing Network Processor Modules” and “Replacing the Component Tray” in the “Maintenance” chapter.

Testing Your Boot ROM Installation

Test your installing by rebooting the system. When you power up a system in which one or more of the boot ROMs was incorrectly inserted, the system will not boot into the ROM monitor or the operating system mode.

If you suspect that your boot ROMs were inserted incorrectly, remove the component tray, locate the affected boot ROM and remove it, straighten its pins, reinsert the boot ROM, and try booting the system again.



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