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Upgrading Cisco 3000 Memory

Cisco Product Numbers MEM-3C16M= and MEM-3C8M=

This publication provides the procedures for installing the Cisco 3000 memory upgrade kit. MEM-3C16M= provides replacement dynamic random access memory (DRAM) single in-line memory modules (SIMMs) (an additional 12 megabytes (MB) of memory in the Cisco 3000 models 3101, 3102, 3103, and 3202) and MEM-3C8M= provides an additional 4 MB in models 3104 and 3204. This publication contains the following sections:

Warning To ensure your safety, be sure the power is off and the power cord disconnected before opening the chassis.

Caution To avoid damaging ESD-sensitive components, be sure you have discharged all static electricity from your body before opening the chassis.

Before performing procedures described in this publication, review the following sections: “Safety Recommendations,” “Safety with Electricity,” and “Tools and Equipment Required.”

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Put removed chassis covers in a safe place. Keep tools away from walk areas where you or others could trip over them.
- Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

Safety with Electricity

Warning Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or can weld to the terminals.

Follow these guidelines when working on equipment powered by electricity:

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can act quickly to shut the power off.
- Before working on the system, turn off the power and unplug the power cord.
- Disconnect all power before doing the following:
  - Installing or removing a chassis
  - Working near power supplies
  - Performing a software upgrade
- Never assume that power has been disconnected from a circuit. Always check.
- Do not work alone when potentially hazardous conditions exist.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
  - Use caution; do not become a victim yourself.
  - Turn off power to the system.
  - If possible, send another person to get medical aid. Otherwise, assess the victim’s condition and then call for help.
  - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures.

Always follow ESD prevention procedures when removing and replacing cards. Ensure that the chassis is electrically connected to earth ground. Wear an ESD wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted chassis frame surface to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively.

If no wrist strap is available, ground yourself by touching the metal part of the chassis.

Tools and Equipment Required

You need the following tools and equipment to upgrade your system's memory:

- ESD cord and wrist strap
- Screwdriver, No. 1 Phillips
- Antistatic mat or antistatic foam
- New DRAM SIMMs for your model router: four 4MB x 9 DRAM SIMMs for models 3101, 3102, 3103, or 3202; or one 8 megabyte (MB) DRAM SIMM for models 3104 or 3204

Cover and Tray Removal Procedures

This section outlines the steps required to open the Cisco 3000 chassis. In the following discussion, it is assumed that you are looking at the chassis from the front. Use Figure 2 as a guide when removing the cover and power supply tray.

Caution To avoid damaging ESD-sensitive components, be sure you have discharged all the static electricity from your body before opening the chassis (as discussed in the section, "Preventing Electrostatic Discharge Damage").

Figure 1 Internal View of Cisco 3000

Removing the Chassis Cover

To remove the chassis cover, follow these steps:

Step 1 Turn OFF the unit and unplug it.

Step 2 Remove all cables from the back of the chassis (including the power cable) to ensure that the unit is not powered on and that the cover will not get caught on the cables.

Caution Avoid damaging any cables as you remove the cover.

Step 3 Turn the unit up so that the back of the chassis is resting on a surface, and the underside of the chassis is facing you, taking care not to damage the Ethernet or serial connectors.

Step 4 Remove the latch screw behind the latch on the right side of the underside of the chassis. The latch will not open until this screw is removed.

Step 5 Put the unit back down with the LEDs facing you.

Step 6 Place your fingers inside the two front latches on the underside of the chassis and push the latches *away* from you until they snap open.

Step 7 Lift the chassis cover from the front edge where the LEDs are located. The chassis cover will tilt up from the front toward the back. If you feel excessive resistance when opening the unit, one of the latches might still be closed. Push back on the latches again.

Figure 2 Cisco 3000 Tray Assembly

Step 8 Remove the ground wire (green with yellow stripes) connecting the left hinge post on the cover with the main ground stud, as shown in Figure 2. The ground wire is attached to the main ground stud with a FASTON lug, so the wire can be slipped off easily.

Step 9 Remove the chassis cover the rest of the way by pulling it up and forward so that the hinge posts come free from the notches in the bottom tray.

Step 10 Set the cover aside.

Removing the Power Supply Tray Assembly

To access the Cisco 3000 system card, you must remove the power supply tray assembly as follows.

Step 1 Locate the DC power harness on the far left edge of the power supply tray assembly. (See Figure 2). Detach the DC power harness from the system card under the power supply tray assembly using the pull tab provided.

Caution If you lift the power supply tray assembly without first removing the power supply harness, you might damage the cable that provides all power to the system card.

Step 1 Remove the power supply tray screw. (See Figure 2.)

Note The power supply tray screw that holds down the power supply tray assembly is not obvious. This screw must be removed before the power supply tray assembly can be removed.

Step 2 Place your fingers underneath the front edge of the power supply tray assembly and pull the edge up. The latches holding the power supply tray assembly will release.

Step 3 Slide the power supply tray assembly toward you, lift it off the base, and remove it. The system card is now exposed. You do not need to remove the system card from the base of the chassis.

Step 4 Set the power supply tray assembly onto your work surface.

Step 5 Proceed to the section "Cisco 3000 Interface Options."

Cisco 3000 Interface Options

Table 4 lists the interface ports on the various Cisco 3000 models.

Table 4 Network Interface Options

Model	Ethernet	Token Ring	Serial	BRI
3101 (See Figure 5)[1]	2	0	0	0
3102 (See Figure 5)	1	0	1	0
3103 (See Figure 5)	1	0	0	1
3202 (See Figure 6)	0	1	1	0
3104 (See Figure 4)	1	0	2	1
3204 (See Figure 3)	0	1	2	1

1. Figure 5 is indicative of the models 3101, 3102, and 3103.

Figure 3 shows the location of the DRAM SIMM on the model 3204 system card.

Figure 3 Model 3204 System Card Layout

Figure 4 shows the location of the DRAM SIMM on the model 3104 system card.

Figure 4 Model 3104 System Card Layout

Figure 5 shows the location of the DRAM SIMMs on models 3101, 3102, and 3103. (Model 3101 is shown as typical of all three models.)

Figure 5 Model 3101 System Card Layout—Typical of Models 3101, 3102, and 3103

Figure 6 shows the location of the DRAM SIMMs on the model 3202 system card.

Figure 6 Model 3202 System Card Layout

Replacing DRAM SIMMs

The router contains primary (main) and secondary (shared) memory. Primary and secondary memory size, in kilobytes (KB), is shown in the system banner on the console screen. Primary memory is implemented with dynamic random access memory (DRAM) single in-line memory modules (SIMMs). Secondary memory, used for packet buffering, consists of a fixed 512 KB (2 megabytes (MB) for models 3104 and 3204).

After booting up, the system banner displays the amount of system memory. The following example shows a system with 4096 KB (4 MB) of primary memory.

```
System Bootstrap, Version 4.6(0.15), SOFTWARE
Copyright (c) 1986-1992 by cisco Systems
Cisco 3000/030 processor with 4096 Kbytes of memory
>
```

Primary memory may need to be expanded when you use very large routing tables or many protocols. This might be necessary with configurations in which the router is set up as a connection device between large external networks and your internal network.

Primary Memory Configurations for Models 3101, 3102, 3103, and 3202

The standard primary memory (main memory) configuration of the router models 3101, 3102, 3103, and 3202 is 4 MB of 32-bit-wide DRAM. Upgrade to 16 MB of 32-bit-wide DRAM by replacing the system's four 1 MB x 9 SIMMs. For 16-MB configurations, substitute four 4 MB x 9 DRAM SIMMs.

Memory upgrade kits for the router include four new 4 MB x 9 DRAM SIMMs.

Approved DRAM SIMMs for Models 3101, 3102, 3103, and 3202s

Table 5 lists approved 4 MB x 9, 80-nanosecond DRAM SIMMs for models 3101, 3102, 3103, and 3202.

Table 5 Approved 4 MB x 9, 80-Nanosecond DRAM SIMMs

Manufacturer's Name	Manufacturer's Part Number
Motorola	MCM94000AS80
Micron	MT9D49M-8
Texas Instruments	TM100EAD9-80

After booting up, the system banner displays the amount of system memory.The following example shows a system with 4096 KB (4 MB) of primary memory and 512 KB (1/2 MB) of secondary memory:

```
System Bootstrap, Version 9.1 ROUTER SOFTWARE
Copyright (c) 1986-1992 cisco Systems, Inc.
Cisco 3000/030 processor with 4608 Kbytes of memory
>
```

Primary Memory Configurations for Models 3104 and 3204

The standard primary memory configuration of the router models 3104 and 3204 are 4 MB and 8 MB. You can upgrade from 4 MB of DRAM (main memory) by replacing the 72-pin DRAM SIMM in the main memory socket on the system card. Memory upgrade kits for router models 3104 and 3204 are obtainable from us. If you are upgrading with DRAM SIMMs you obtain from other vendors, use the SIMMs listed in Table 5.

Table 6 Approved 2 MB x 36, 80-Nanosecond DRAM SIMMs

Manufacturer's Name	Manufacturer's Part Number
Micron	MT18D236M-8
NEC	MC-422000A36B-80

Upgrading Primary Memory in Router Models 3204 and 3104

You can upgrade your router, models 3204 and 3104, from the standard 4 MB of primary memory to 8 MB (see Table 5) using the memory upgrade kit as follows:

Step 1 Turn OFF the unit and unplug it.

Step 2 Attach ESD protection.

Step 3 Open the cover according to the procedures in the section "Cover and Tray Removal Procedures."

Step 4 Locate the primary memory (DRAM SIMMs) by using Figure 3 or Figure 4.

Step 5 Remove the existing DRAM SIMMs by pulling outward on the connectors to unlatch them, as shown in Figure 7. Be careful not to break the holders on the SIMM connector.

Figure 7 Removing a SIMM from the SIMM Connector Socket

Step 6 Insert the new DRAM SIMM into the open connector by sliding the end with the metal *fingers* into the DRAM SIMM connector socket, at approximately a 45-degree angle to the system card. Gently rock the DRAM SIMM back into place until the latch on either side snaps into place. Do not use excessive force, or the connector could break.

Step 7 Reassemble the router following the procedures in the section "Replacing the Chassis Cover and Tray," taking care not to pinch the DC power harness.

Step 8 Connect the router to a console terminal and turn ON the power. If error messages relating to memory are displayed, repeat steps 1 through 6, taking care to firmly seat the SIMM in its socket.

Upgrading to 16 MB of Primary Memory in Models 3101, 3102, 3103, and 3202

You can upgrade your router, models 3101, 3102, 3103, and 3202 from the standard 4 MB of primary memory to 16 MB using the memory upgrade kit as follows:

Step 1 Turn OFF the unit and unplug it.

Step 2 Attach ESD protection.

Step 3 Open the cover according to the procedures in the section "Cover and Tray Removal Procedures."

Step 4 Locate the DRAM SIMMs by using Figure 5 or Figure 6.

Step 5 Remove the existing DRAM SIMMs by pulling outward on the connectors to unlatch them, as shown in Figure 7. Be careful not to break the holders on the SIMM connector.

Figure 8 Removing a SIMM from the SIMM Connector Socket

Step 6 Plug each new DRAM SIMM (4 MB x 9) into the open connector. To insert a new DRAM SIMM card, slide the end with the metal *fingers* straight down into the SIMM connector socket, at an angle perpendicular to the card. Gently rock the DRAM SIMM back toward the SIMMs already installed, and snap into place. Do not use excessive force, or the connector could break.

Step 7 Repeat step 5 for each new DRAM SIMM card.

Step 8 Reassemble the router following the procedures in the section "Replacing the Chassis Cover and Tray," taking care not to pinch the DC power harness.

Step 9 Connect the router to a console terminal and turn ON the power. If error messages relating to memory are displayed, repeat steps 1 through 7, taking care to firmly seat the DRAM SIMMs in their sockets.

Replacing the Chassis Cover and Tray

After you have performed the memory upgrade for your system, replace the cover and component tray by following these steps:

Step 1 Replace the metal tray on the chassis.

Step 2 Replace the ground wire.

Step 3 Replace the DC power harness, taking care not to pinch the DC power harness.

Step 4 Replace the chassis cover.

Step 5 Replace the screw that holds the cover down.

Step 6 Replace the latch screw.

Step 7 Replace the chassis cables.

Note The power cable is designed so that if it is installed backwards or offset, +5V is shorted to ground. This enables the protective circuitry on the power supply to protect the system card from reversed voltage. If this happens, you will hear a quiet clicking from the power supply, but you will *not* hear other noises, such as the fan, and no LEDs will light.

Testing the Installation

To test the SIMM upgrade installation, perform the following check:

Step 1 Connect the Cisco 3000 to a console terminal.

Step 2 Turn on the power. If you get an error message relating to memory, repeat steps 1 through 8 of the section "Upgrading to 16 MB of Primary Memory in Models 3101, 3102, 3103, and 3202," taking care to firmly seat the SIMMs in their sockets.

This completes the Cisco 3000 memory upgrade procedures.

Note If you experience trouble during the installation or need additional upgrade or product information, contact a customer service representative or the Cisco Systems Technical Assistance Center (TAC) for assistance. TAC telephone numbers and e-mail address follow: 800 553-2447, 415 903-7209, `tac@cisco.com`.

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This document is to be used in conjunction with the *Cisco 3000 Hardware Installation and Maintenance* publication.