



Installing and Upgrading Memory and Packet Voice Data Modules

This chapter describes how to install or upgrade memory or data modules in your router and contains the following sections:

- [Safety Information](#)
- [Opening the Chassis](#)
- [Locating Modules](#)
- [Installing a DIMM](#)
- [Installing a SIMM](#)
- [Installing a PVDM](#)
- [Closing the Chassis](#)

Safety Information

This section contains safety information that you should read before installing or upgrading memory in the router.



Warning

Before working on a system that has an on/off switch, turn off the power and unplug the power cord.

**Warning**

Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages.

**Warning**

Do not work on the system or connect or disconnect cables during periods of lightning activity.

**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.

**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 weld the metal object to the terminals.

**Warning**

Only trained and qualified personnel should be allowed to install or replace this equipment.

**Warning**

Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first.

**Warning**

During this procedure, wear grounding wrist straps to avoid ESD damage to the router. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

Opening the Chassis

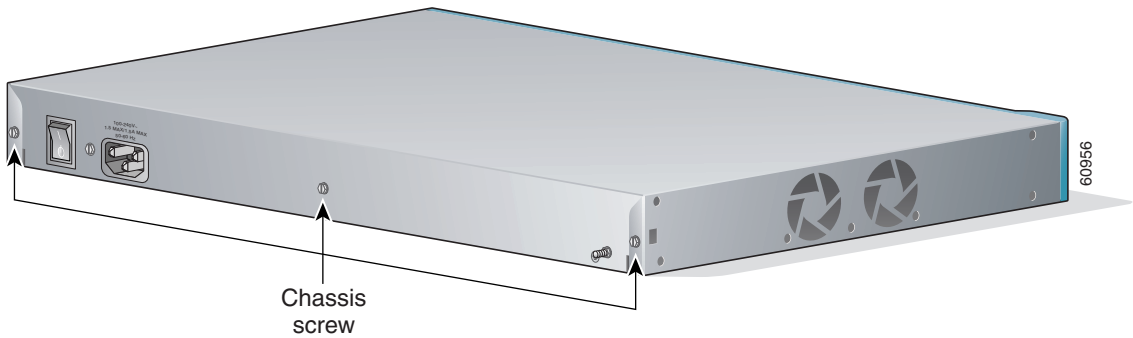
Follow these steps to open the chassis:

- Step 1** Make sure that the router is turned off and is disconnected from the power supply.
- Step 2** Use a flat-head screwdriver to remove the screws that hold the top and bottom of the chassis together, as shown in [Figure C-1](#).



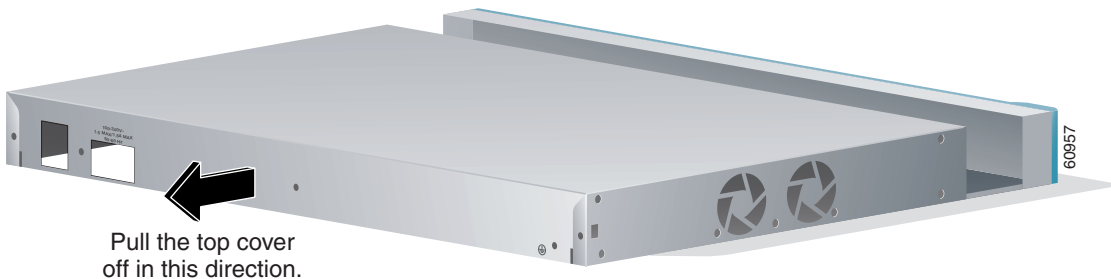
Note Some Cisco 1760 routers have five chassis screws in the rear assembly, but most models have three screws in the rear assembly.

Figure C-1 Removing the Cisco 1760 Chassis Screws



- Step 3** Gently slide the top cover of the router toward you, as shown in [Figure C-2](#).

Figure C-2 Removing the Top Cover of the Router

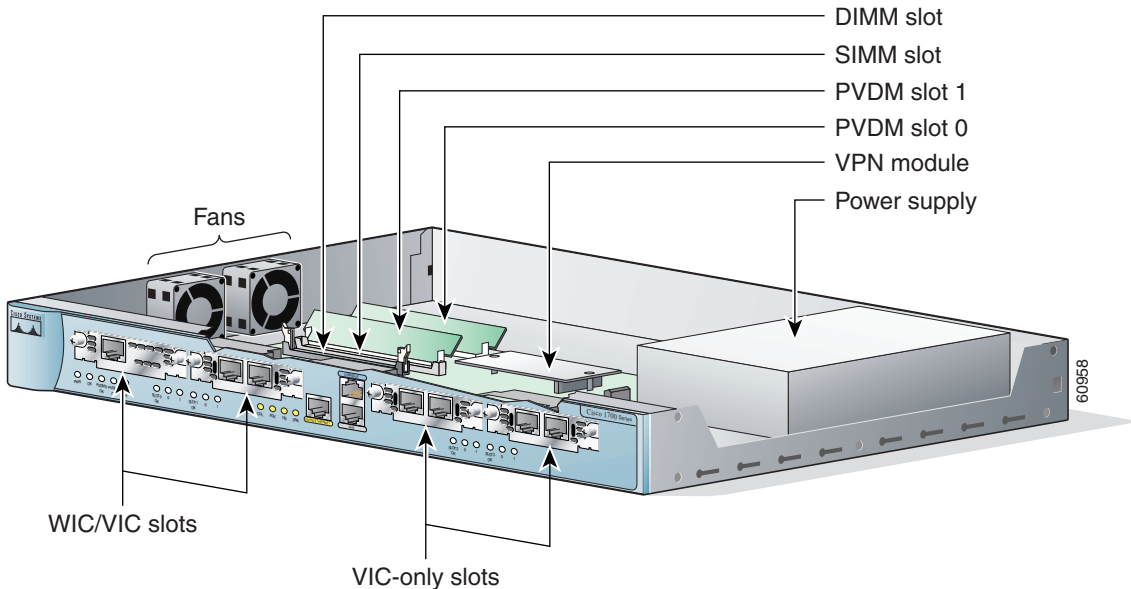


- Step 4** Place the router bottom on an antistatic mat, and begin installing modules.

Locating Modules

Figure C-3 shows where to install a dual in-line DRAM memory module (DIMM), a single inline Flash memory module (SIMM) and packet voice data modules (PVDMs) on the motherboard.

Figure C-3 Cisco 1760 Motherboard—Module Locations



Installing a DIMM

You can install a DIMM to increase the amount of dynamic RAM (DRAM) in the router. DIMMs are available in the following sizes:

- 16 MB

- 32 MB
- 64 MB

Use the **show version** command to see the router memory size. This command is described in the “Amounts of Memory” section of the “Cisco 1760 Router Overview” chapter.

Follow these steps to install a DIMM on the router motherboard:

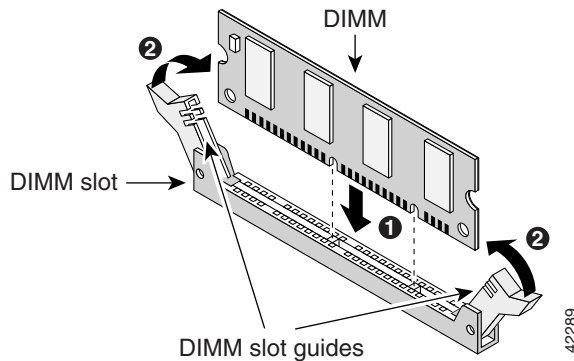
**Warning**

During this procedure, wear grounding wrist straps to avoid ESD damage to the router. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

Step 1 Locate the DIMM slot on the motherboard. See [Figure C-3 on page C-4](#).

Step 2 Remove any existing DIMM by pulling the DIMM slot guides (shown in [Figure C-4](#)) away from the DIMM and down toward the motherboard.

Figure C-4 Installing a DIMM



Step 3 Insert the DIMM into the DIMM slot, making sure that the notches on the edge of the DIMM are inserted over the bars inside the DIMM slot.

**Caution**

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

- Step 4** Press the DIMM firmly into the slot until the slot guides on each side of the slot move up and over the end of the DIMM. If the guides do not move up over the edge of the DIMM, move them with your hands.
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Installing a SIMM

You can install one SIMM to increase the amount of Flash memory in the router. The SIMM used to upgrade Flash memory is 16 MB in size.

Follow these steps to install a SIMM on the router motherboard.



Warning

During this procedure, wear grounding wrist straps to avoid ESD damage to the router. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

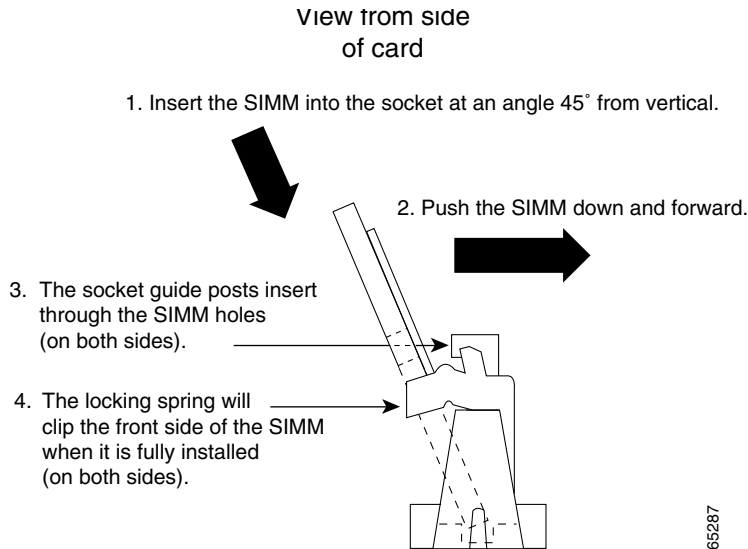
- Step 1** Locate the SIMM slot on the motherboard. See [Figure C-3 on page C-4](#).
- Step 2** Remove any existing SIMM by pulling the locking spring clips on both sides outward and tilting the SIMM free of the clips.
- Step 3** Face the front panel of the router. Hold the SIMM with the component side toward you.



Caution

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

- Step 4** Position the SIMM so that the indexing slot in the connector (bottom edge) of the SIMM is lined up with the indexing tab inside the SIMM slot. Tilt the SIMM 45 degrees toward the rear of the router, and insert it into the slot (see [Figure C-5](#)). Rock it into its vertical position, using the minimum force necessary. When the SIMM is properly seated, the connector springs will click into place.

Figure C-5 *Installing a SIMM*

Installing a PVDM

You can install up to two PVDMs to support enhanced versions of digital signal processors (DSPs).

There are five types of PVDMs:

- PVDM-256K-4—Supports one DSP
- PVDM-256K-8—Supports up to two DSPs
- PVDM-256K-12—Supports up to three DSPs
- PVDM-256K-16—Supports up to four DSPs
- PVDM-256K-20—Supports up to five DSPs

Each DSP supports two analog voice ports or one ISDN BRI port. Each analog VIC used with the Cisco 1760 router has two voice ports and requires a single DSP. The 2-port ISDN Voice-BRI requires two DSPs. [Table C-1](#) shows the possible combinations of PVDMs and voice ports for the Cisco 1760 router.

Table C-1 PVDM and VIC Combinations¹

PVDM	Number of DSPs	Supported VIC Combinations
PVDM-256K-4	1	1 analog VIC
PVDM-256K-8	2	Up to 2 analog VICs or 1 voice-BRI VIC
PVDM-256K-12	3	Up to 3 analog VICs or 1 analog VIC and 1 voice-BRI VIC
PVDM-256K-16	4	Up to 4 analog VICs or Up to 2 voice-BRI VICs or Up to 2 analog VICs and 1 voice-BRI VIC
PVDM-256K-20	5	Up to 4 analog VICs or Up to 2 voice-BRI VICs or Up to 3 analog VICs and 1 voice-BRI VIC or 1 analog VIC and up to 2 voice-BRI VICs

1. HD PVDM (PVDM2) modules are not supported on the Cisco 1760 router.

The Cisco 1760 router has two PVDM slots. Any of the PVDMs can occupy either slot. The total number of DSPs provided by one or two PVDMs installed in those slots must be greater than or equal to the number of DSPs required by the number and type of VICs installed, as described in [Table C-1](#).

For example, if you have one PVDM (a single DSP), and you want to increase the number of DSPs to 3, you can either add a PVDM-256K-8 in the second slot or replace the PVDM-256K-4 with a PVDM-256K-12.

Follow these steps to install a PVDM on the router motherboard.

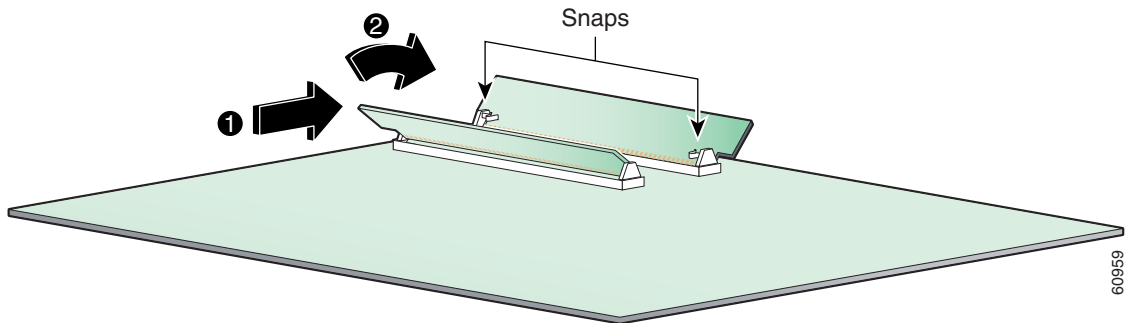
**Warning**

During this procedure, wear grounding wrist straps to avoid ESD damage to the router. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

Step 1 Locate the PVDM slots on the motherboard. (See [Figure C-3](#).)

- Step 2** Remove any existing PVDM modules by pulling the PVDM snaps away from the module. (See [Figure C-6](#).)

Figure C-6 Installing a PVDM



- Step 3** If only one module is to be installed, install it into PVDM slot 0.
- Step 4** Face the front panel of the router. Insert the module vertically into the PVDM slot. Orient the module so that the indexing slot in the connector (bottom edge) of the module is lined up with the indexing tab inside the PVDM slot, and so that all electrical connections are made.



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

- Step 5** Holding the module firmly in the slot, rotate it toward the rear of the router, until you hear a clicking sound and the module is firmly seated in the slot. Make sure that the snaps on both ends of the PVDM are engaged.

Closing the Chassis

After installing memory or data modules on the motherboard, close the chassis by following these steps:

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- Step 1** Slide the top cover of the router back on the bottom of the chassis by pushing it in the opposite direction from that shown in [Figure C-2](#), “[Removing the Top Cover of the Router](#),” on page C-3.
- Step 2** Replace the screws that you removed when you opened the chassis. (See [Figure C-1](#), “[Removing the Cisco 1760 Chassis Screws](#),” on page C-3.)
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