CHAPTER 2

Installing the Cisco SAMI

This chapter provides information on installing the Cisco Service and Application Module for IP (SAMI) in a Cisco 7600 Series Router chassis and includes the following topics:

Preparing to Install the SAMI

This section provides information about preparing your site for installation. It includes the following sections:

Safety Guidelines

Before you begin installing the SAMI, review the safety guidelines in this section to avoid injuring yourself or damaging the SAMI.

Follow the "Reviewing Safety Recommendations" section on page 2-5 for specific safety information when installing the SAMI in a Cisco 7600 Series Router chassis.

Caution The SAMI is *not* hot-swappable. Do *not* remove the SAMI from the chassis until the SAMI has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Safety with Equipment

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

The following guidelines help ensure your safety and protect the equipment. This list is not all- inclusive of all potentially hazardous situations, so be *alert*.

- Always disconnect all power cords and interface cables before moving the system.
- Never assume that power is disconnected from a circuit; *always* check.
- Keep the chassis area clear and dust-free during, before, and after installation.
- Keep tools and assembly components away from walk areas where you or others could fall over them.
- Do not work alone if potentially hazardous conditions exist.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Do not wear loose clothing that may get caught in the chassis.
- Wear safety glasses when working under conditions that may be hazardous to your eyes.

Safety with Electricity

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

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.** Statement 43

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.** Statement 12

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Follow these guidelines when working on equipment powered by electricity:

- Locate the room's emergency power-off switch. Then, if an electrical accident occurs, you can quickly turn off the power.
- Before working on the system, turn off the DC main circuit breaker and disconnect the power terminal block cable.
- Disconnect all power before doing the following:
  - Working on or near power supplies
  - Installing or removing a router chassis or network processor module
  - Performing most hardware upgrades
- Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Never assume that power is disconnected from a circuit; *always* check.
- Never perform any action that creates a potential hazard to people or makes the equipment unsafe.
- If an electrical accident occurs, proceed as follows:
  - Use caution, and do not become a victim yourself.
  - Turn off power to the router.
  - If possible, send another person to get medical aid. Otherwise, determine the condition of the victim, and then call for help.
  - Determine whether the person needs rescue breathing or external cardiac compressions; then take appropriate action.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but still connected to telephone wiring or network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for it.
- Never touch un-insulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD can occur when electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the router chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the chassis.

Caution For the safety of your equipment, periodically check the resistance value of the antistatic wrist strap. It should be between 1 and 10 Mohm.

Verifying System and Site Requirements

Before you install the SAMI:

- Verify that the system requirements for the SAMI, including hardware, software, and environmental requirements, are met—See the "System Requirements and Specifications" section on page 1-12).
- Prepare the site (as defined in the site requirements) and review the installation plans or method of procedures (MOPs)—See the "Site Requirements" section on page 2-4.
- Unpack and inspect the module—See the "Unpacking and Checking the Contents of your Shipment" section on page 2-5.
- Gather tools and test equipment required to properly install the module—See the "Required Tools" section on page 2-5.

Site Requirements

Typically, you should have prepared the installation site beforehand. As described previously, part of your preparation includes reviewing installation plans or MOPs. An example of a MOP (pre-installation checklist of tasks and considerations that must be addressed and agreed upon before proceeding with the installation) is as follows:

Note The example assumes that you are installing the Cisco 7600 Series Router chassis as well as the SAMI at the same time. However, the example MOP can be simplified to accommodate just the SAMI.

1. Assign personnel.
2. Determine protection requirements for personnel, equipment, and tools.
3. Evaluate potential hazards that may affect service (Cisco 7600 Series Router chassis).
4. Schedule time for installation.
5. Determine any space requirements (Cisco 7600 Series Router chassis).
6. Determine any power requirements (Cisco 7600 Series Router chassis).
7. Identify any required procedures or tests.
8. On an equipment plan, make a preliminary decision that locates each SAMI that you plan to install.
9. Read this user guide.
10. Modify the preliminary plan, if necessary.
11. Verify the list of replaceable parts for installation (screws, bolts, washers, and so on) so that the parts are identified (Cisco 7600 Series Router chassis).
12. Check the required tools list to make sure the necessary tools and test equipment are available (see the "Required Tools" section on page 2-5).
13. Perform installation.

Unpacking and Checking the Contents of your Shipment

The shipping package for the SAMI is designed to reduce the possibility of product damage associated with routine handling experienced during shipment. To reduce the potential damage to the product, transport the SAMI in its Cisco specified packaging. Failure to do so may result in damage to the SAMI. Also do not remove the SAMI from its shipping container until you are ready to install it.

Note Do not discard the packaging materials used in shipping your SAMI. You will need the packaging materials in the future if you move or ship your SAMI.

Required Tools

Use the following tools to install the SAMI.

Warning **Only trained and qualified personnel should install, replace, or service this equipment.** Statement 1030

Note Before installing the SAMI, you must install the Cisco 7600 Series Router chassis and at least one supervisor engine. For information on installing the switch chassis, refer to the appropriate Cisco 7600 Series Router documentation listed in the "Related Documentation" section on page 9.

These tools are required to install the SAMI into the Cisco 7600 Series Router chassis:

- Flat-blade screwdriver
- Phillips-head screwdriver
- Wrist strap or other grounding device
- Antistatic mat or antistatic foam

Reviewing Safety Recommendations

As described in the "Safety Warnings" section on page 3, safety warnings appear throughout this *user guide* in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement (see the "Safety Guidelines" section on page 2-1 for general safety information for installing your SAMI in a Cisco 7600 Series Router chassis).

The following safety recommendations are specific to your SAMI installation.

Warning **Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system.** Statement 200

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the SAMI. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 181

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all SAMIs, faceplates, front covers, and rear covers are in place.** Statement 1029

Installing the SAMI

This section describes how to install the SAMI into a Cisco 7600 Series Router chassis.

Caution The Cisco 7600 Series Router supports hotswapping. However, the SAMI does *not* support hot swapping. Do *not* remove the SAMI from the chassis until the module has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Caution To prevent ESD damage, handle the SAMI by the edges only.

Caution During this procedure, wear grounding wrist straps to avoid ESD damage to the modules.

Caution Do not directly touch the backplane with your hand or any metal tool, or you may shock yourself.

To install the SAMI into Cisco 7600 Series Router chassis, perform these steps:

Step 1 Choose a slot for the SAMI.

The Cisco 7600 Series Routers include the Cisco 7604, Cisco 7606, Cisco 7609, and Cisco 7613 routers. In these router chassis, the slots can be used as follows:

- Cisco 7604 (four horizontal slots)
  - Slot 1, the top-most slot, is reserved for the Supervisor 720 engine.
  - Slot 2 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, slots 2 through 4 are available for modules. If a redundant supervisor is required, slots 3 and 4 are available for modules.
- Cisco 7606 (six horizontal slots) and the Cisco 7609 (nine vertical slots)
  - Slot 5 is reserved for the Supervisor 720 engine.
  - Slot 6 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, the following slots are available for modules:

    Slots 1 through 4 and slot 6 on the 6-slot chassis

    Slots 1 through 4 and slots 6 through 9 on the 9-slot chassis
  - If a redundant supervisor engine is required, the following slots are available for modules:

    Slots 1 through 4 on the 6-slot chassis

    Slots 1 through 4 and slots 7 through 9 on the 9-slot chassis
- Cisco 7613 (13 horizontal slots)
  - Slot 7 is reserved for the Supervisor 720 engine.
  - Slot 8 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, slots 1 through 6 and slots 8 through 13 are available for modules. If a redundant supervisor engine is required, slots 1 through 6 and slots 9 through 13 are available for modules.
- Empty slots on all Cisco 7600 Series Router chassis require filler panels to maintain consistent airflow through the chassis.

Step 2 Verify that there is enough clearance to accommodate any interface equipment that you will connect directly to the module ports. If possible, place the modules between empty slots that contain only the module filler panels.

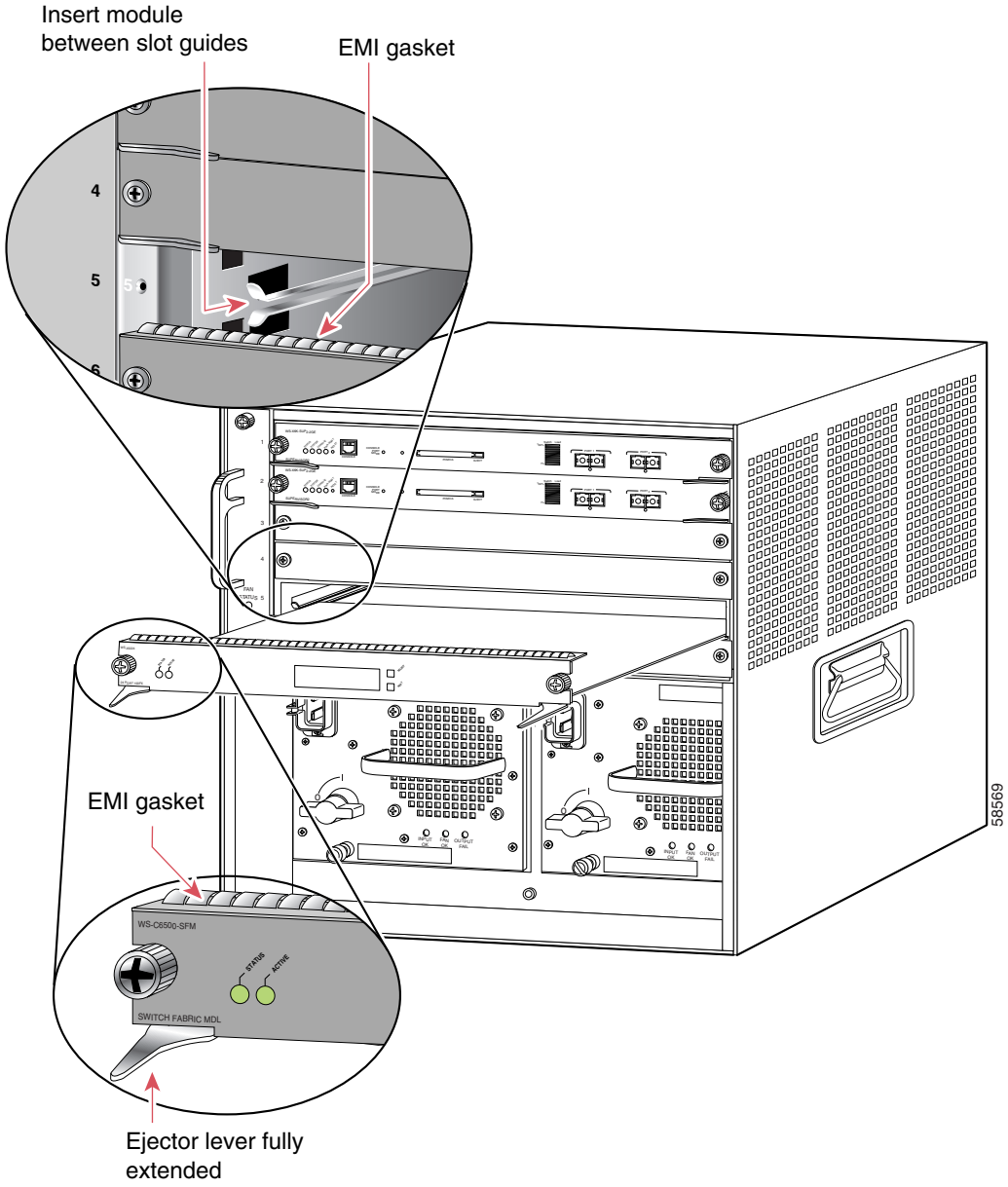
Step 3 Verify that the captive installation screws are tightened on all modules installed in the chassis. This action ensures that the EMI gaskets on all modules are fully compressed to maximize the opening space for the new or replacement module.

Note If the captive installation screws are loose, the EMI gaskets on the installed modules push adjacent modules towards the open slot, reducing the opening size and making it difficult to install the replacement module.

Step 4 Remove the filler panel by removing the two Phillips pan-head screws from the filler panel.

Step 5 Open both ejector levers fully on the module (Figure 2-1 on page 2-8).

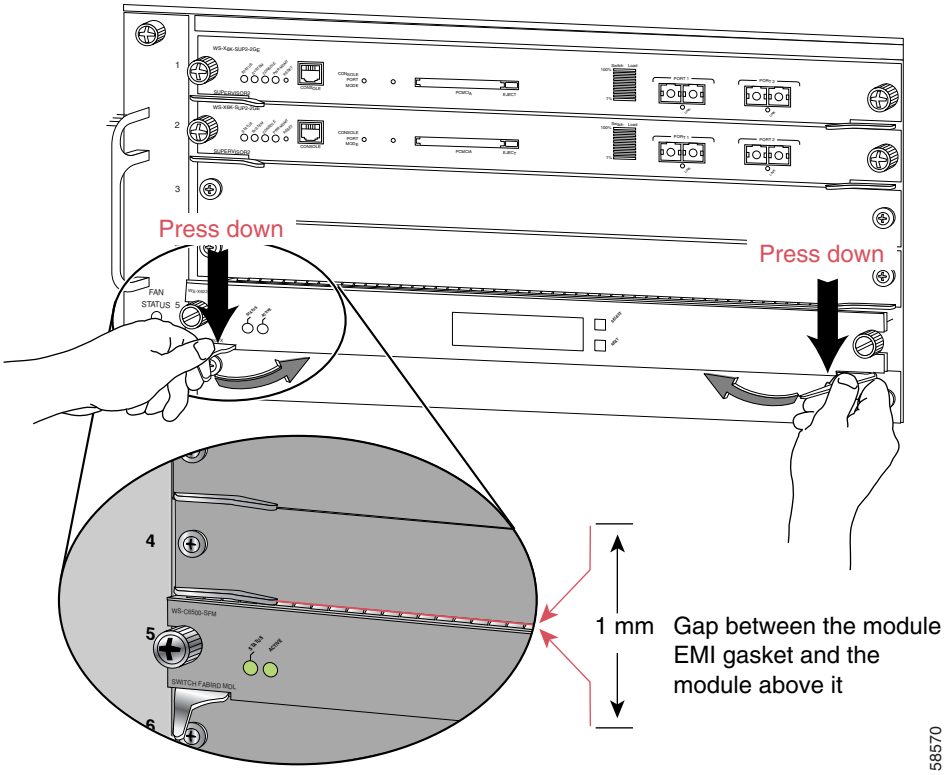
Figure 2-1 Positioning the Module in a Horizontal Slot Chassis



Step 6 Position the modules in the slot (Figure 2-1). Make sure that you align the sides of the module carrier with the slot guides on each side of the slot.

Step 7 Carefully slide the module into the slot until the EMI gasket along the top edge of the module makes contact with the module in the slot above it and both ejector levers have closed to approximately 45 degrees with respect to the module faceplate (Figure 2-2).

Figure 2-2 Clearing the EMI Gasket in a Horizontal Slot Chassis

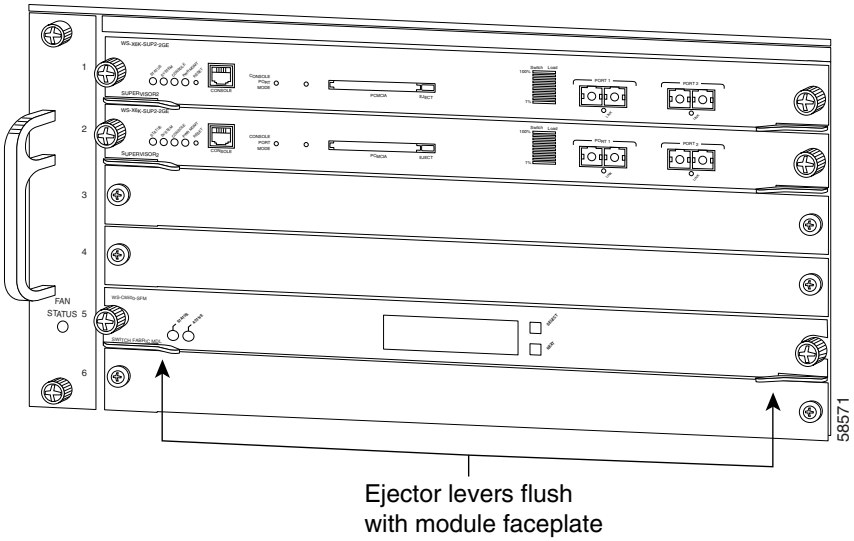


Step 8 Using the thumb and forefinger of each hand, grasp the two ejector levers and press down to create a small (0.040 inch [1 mm]) gap between the EMI gasket and the module above it (Figure 2-2).

Caution Do not press down too hard on the levers because you might bend or damage them.

Step 9 While pressing down, simultaneously close the left and right ejector levers to fully seat the module in the backplane connector. The ejector levers are fully closed when they are flush with the module faceplate (see Figure 2-3).

Figure 2-3 Ejector Levers Fully Closed in a Horizontal Slot Chassis



Note Failure to fully seat the module in the backplane connector can result in error messages.

Step 10 Tighten the two captive installation screws on the module. Make sure the ejector levers are fully closed before tightening the captive installation screws.

When you install a SAMI into the router chassis, it runs a startup sequence that requires no intervention. At the successful conclusion of the startup sequence, the green status LED lights and remains on. If the status LED is not green or is off, see "Status LED" section on page 1-10 to determine the module status.

This completes the SAMI installation procedure.

Removing a SAMI

This section describes how to remove an existing module from a Cisco 7600 Series Router chassis.

Caution The SAMI is *not* hot-swappable. Do *not* remove the SAMI from the chassis until the SAMI has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the SAMI. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 181

Warning **Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system.** Statement 200

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

To remove a module from the router chassis, perform these steps:

Step 1 Shut down the SAMI by completing the following tasks:

a. Enter the **show module** command and verify the SAMI status is OK.

b. Shut down the SAMI using the **hw-module module** *mod-num* **shutdown** command in privileged EXEC mode. Verify that the SAMI shuts down using the **show module** command to verify the module status is `ShutDown` and the status LED is orange. Shutdown might take several minutes.

c. Power down the SAMI using the **no power enable module** *slot* command in global configuration mode. Verify that the SAMI powers down using the **show module** command to verify the module status is `PwrDown` and the status LED is off. Do not remove the SAMI from the switch until the status LED is off.

Caution When you enter the **no power enable module** *slot* command to power down a module, the module configuration files are not saved. Therefore, ensure all configuration files are saved before issuing the **no power enable module** *slot* command.

Step 2 Verify that the captive installation screws on all of the modules in the chassis are tight. This step assures that the space created by the removed module is maintained.

Note If the captive installation screws are loose, the electromagnetic interference (EMI) gaskets on the installed modules will push the modules toward the open slot, reducing the opening size and making it difficult to remove the module.

Step 3 Loosen the two captive installation screws on the module.

Caution Use grounding wrist straps connected to a captive installation screw on an installed module or power supply when removing a module. At all other times (shipping, storage, and so on) keep the modules in their static-shielding protective bags.

Step 4 Place your thumbs on the left and right ejector levers, and simultaneously rotate the levers outward to unseat the module from the backplane connector.

Step 5 Grasp the front edge of the module and slide the module part all the way out of the slot. Place your other hand under the module to support the weight of the module. Do not touch the module circuitry.

Step 6 Place the SAMI on an antistatic mat or antistatic foam, or immediately reinstall it in another slot.

Warning **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all modules and faceplates are in place.** Statement 1051

Step 7 If the slot is to remain empty, install a module filler panel to keep dust out of the chassis and to maintain proper airflow through the chassis.