Install and upgrade internal modules and FRUs

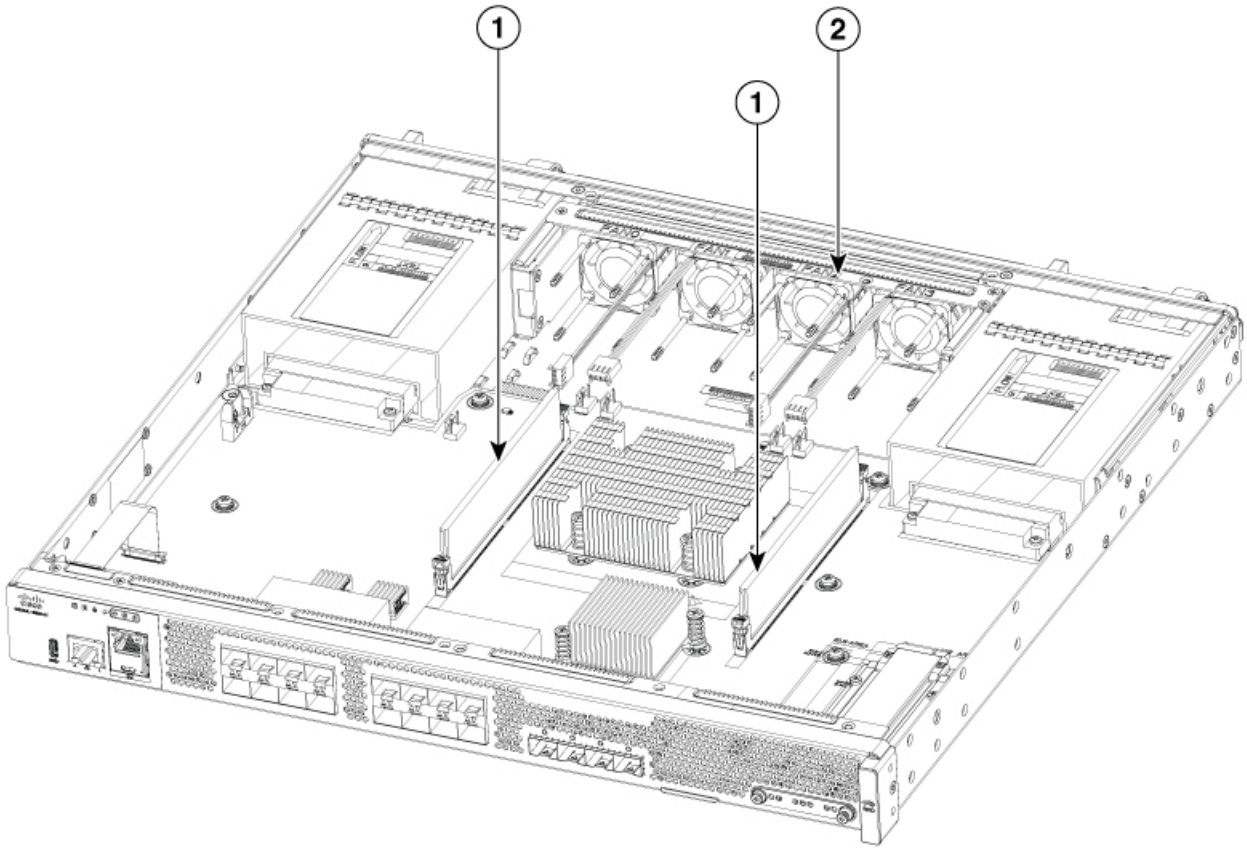
This document describes how to install and upgrade internal modules and field replaceable units (FRUs) in the Cisco 8400 Series Secure Routers.

- Internal modules, on page 1
- Remove and replace DDR DIMMs, on page 5
- AC power supply, on page 8
- Remove and replace the power supplies , on page 11
- DC power supply, on page 13
- AC/DC/HVDC power supply, on page 20
- Fan tray , on page 21
- SFP modules, on page 23
- M.2 storage device, on page 25

Internal modules

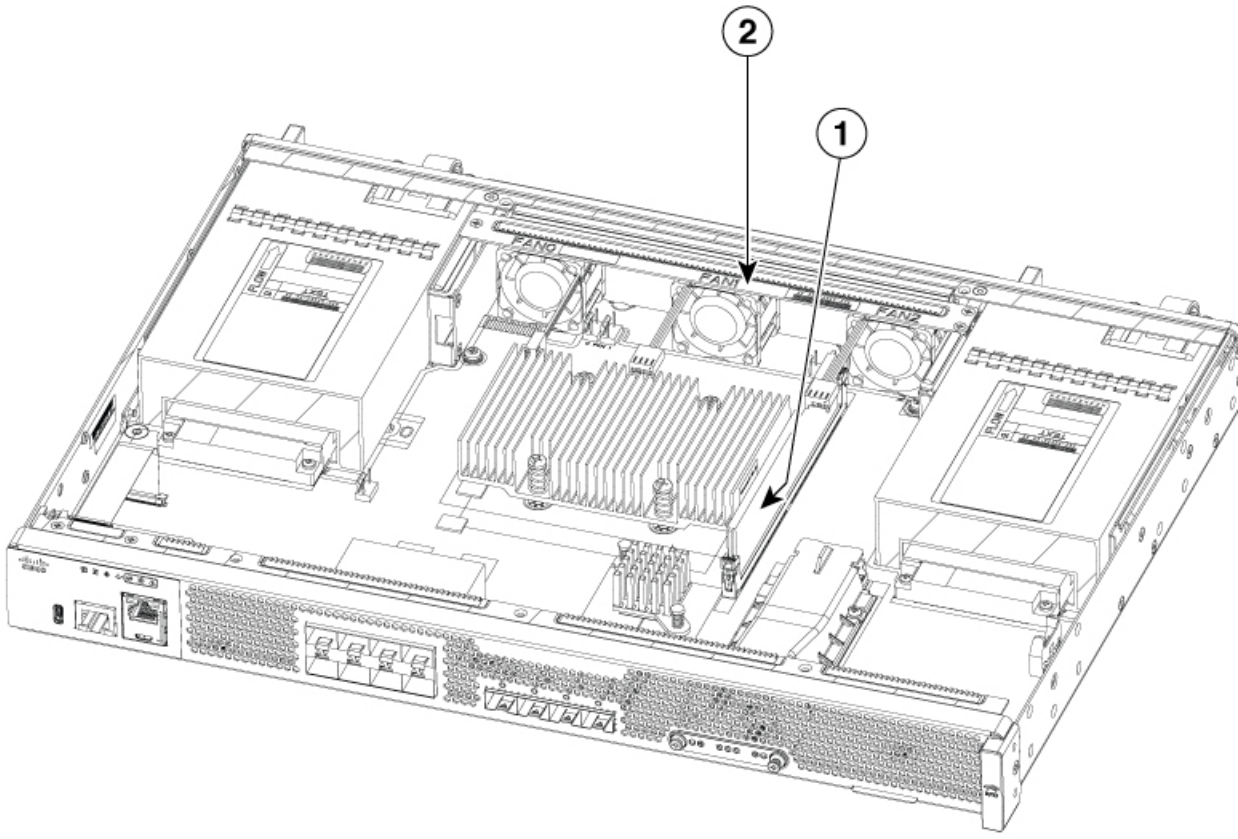
To access the internal modules on the device, you must first remove the chassis cover. For instructions on how to remove and replace the chassis cover on the device, see the sections on Precautions, on page 3.

Figure 1: Internal module locations in the C8475-G2



Number	Description
1	DIMMs
2	Fan tray

Figure 2: Internal module locations in the C8455-G2



Number	Description
1	DIMM
2	Fan tray

Precautions

Before removing the cover, note these details:

- Do not run the router with the cover off. Doing so can cause the router to overheat.
- Disconnect all power cables.
- Remove the device from the rack
- Use a number-2 Phillips screwdriver to perform the following tasks.

Remove the chassis cover

To remove the cover, perform these steps:

Procedure

Step 1 Read the Safety Warnings and disconnect the power supply before you perform any module replacement.

Step 2 Confirm the device is turned off and disconnected from the power supply or power supplies. If a redundant power is used, disconnect from the redundant power supply.

Step 3 Place the chassis on a flat surface.

Step 4 Remove the top and side cover screws.

Step 5 Lift the cover straight up.

Replace the cover

To replace the cover, perform these steps:

Procedure

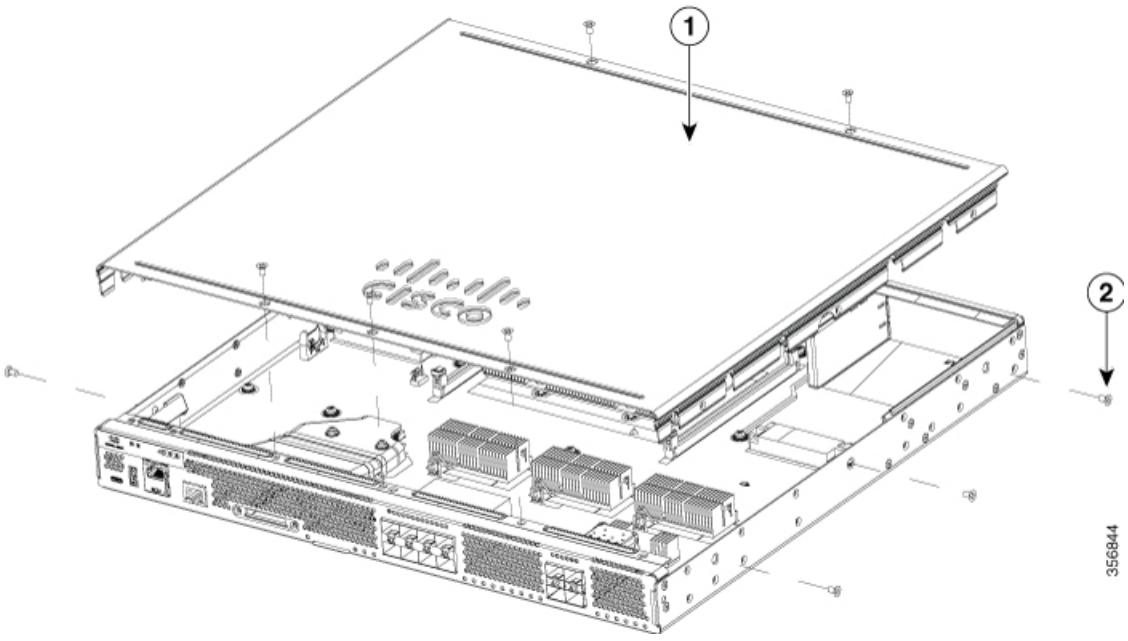
Step 1 Place the chassis on a flat surface.

Step 2 Drop the cover straight down and ensure that the side flanges insert into the chassis. Care should be taken to not damage the EMC Gaskets.

Note
The correct orientation of the cover is determined by location of the CISCO logo as shown in image below.

Step 3 Install the top and side cover screws.

Figure 3: Install the cover



Number	Description
1	Chassis cover
2	Screws

Remove and replace DDR DIMMs

To access the DIMMs, you must remove the chassis cover as described in the *Access and Install Modules* section.

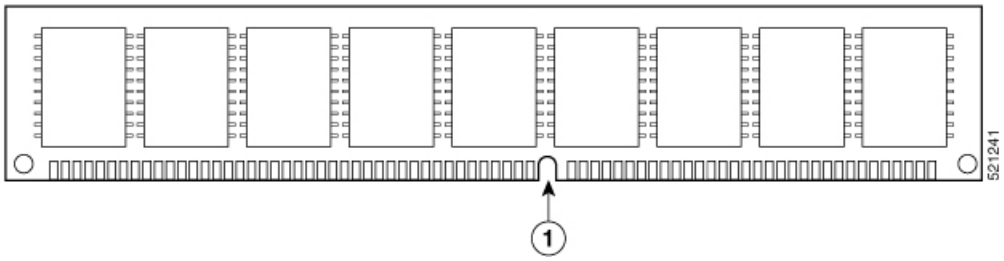
Caution Always wear an ESD-preventive wrist strap and ensure that it makes good contact with your skin when you remove or install DIMMs. Connect the equipment end of the wrist strap to the metal part of the chassis.

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

Locate and orient DIMM

DIMMs have a polarization notch on the mating edge to prevent incorrect insertion. This image shows the polarization notch on a DIMM.

Figure 4: DIMM showing polarization notch



Number	Description
1	Polarization notch

Remove a DIMM

Use these steps to remove a DIMM:

Procedure

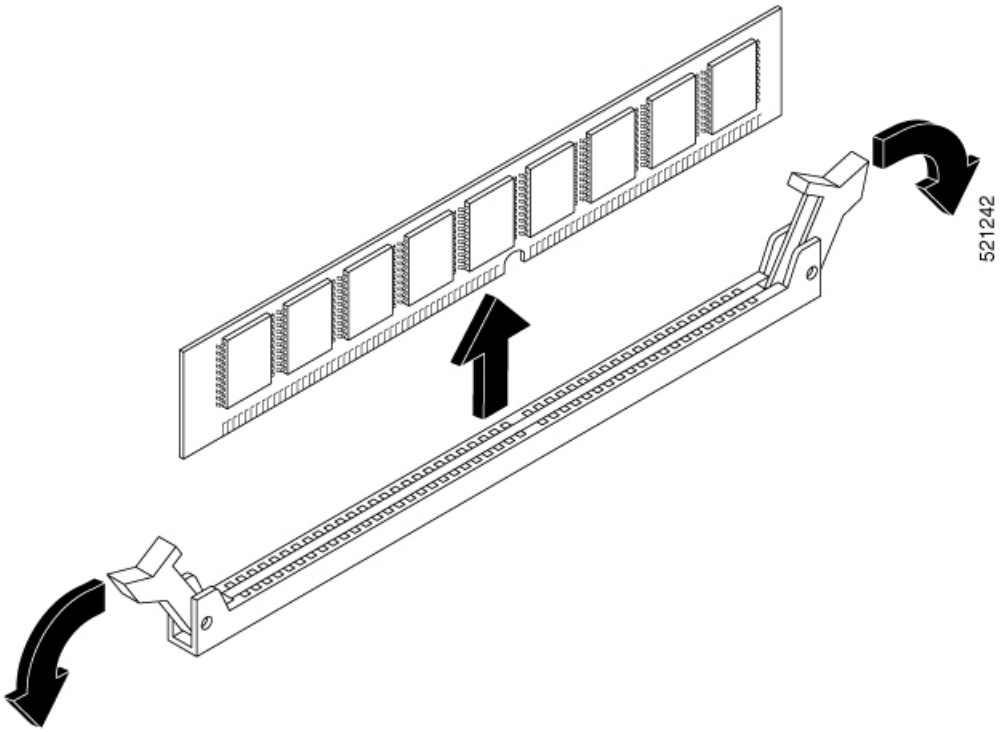
Step 1 Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.

Step 2 Remove the chassis cover. See the *Remove the Chassis Cover* section

Step 3 Locate the DIMM module to find the DIMM sockets on the chassis.

Step 4 Rotate DIMM connector handles downwards to extract the DIMM module.

Figure 5: Remove a DIMM



Install a DIMM

Follow these steps to install a DIMM on the Cisco 8400 Series Secure Routers.

Procedure

Step 1 Read the *Safety Warnings* section and disconnect the power supply before you perform any DIMM replacement.

Step 2 Remove the chassis cover.

Step 3 Locate the DIMM module to find the DIMM sockets on the device.

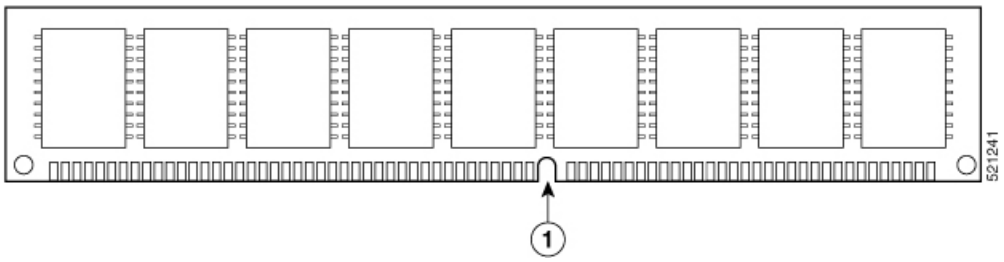
Step 4 Ensure that both latches on the DIMM connector are in the open position.

Step 5 Orient the DIMM so that the polarization notch lines up with the polarization key on the connector.

Step 6 Insert the DIMM into the connector one side at a time.

Step 7 Rotate the connector handles upward and click into place.

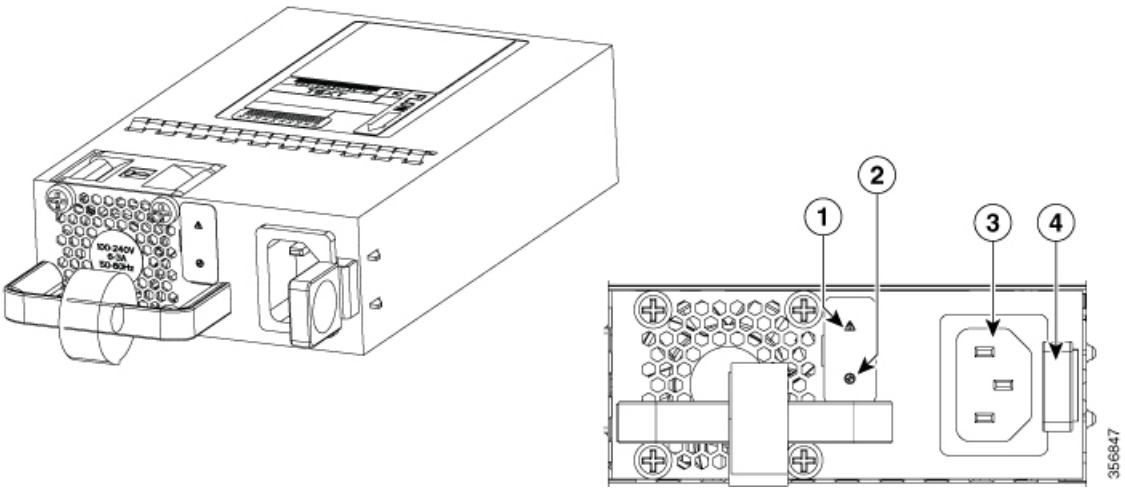
Figure 6: DIMM showing polarization notch



Step 8 Replace the chassis cover.

AC power supply

Figure 7: AC power supply



Number	Description
1	Alarm Fail LED
2	Status LED
3	AC socket
4	Latch

Install AC power supply

Note Do not install the power supplies with the chassis cover off.

Procedure

Step 1 Ensure that the chassis power switch on the chassis is in the Standby position.

Note
It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

Step 2 Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.

Step 3 Insert the power supply cables firmly into the power supplies.

Note
Ensure the power supplies are inserted firmly and the power cords are in place.

Step 4 If you have changed the chassis power switch to the Standby position in Step 1, press the power switch to the On position.

The power supply LEDs are illuminated (green).

Replace the AC power supply

Note The device has redundant power supplies that can be hot-swapped.

To remove an AC power supply from Cisco 8400 Series Secure Routers, perform these steps:

Procedure

Step 1 Read the safety warnings section of this document.

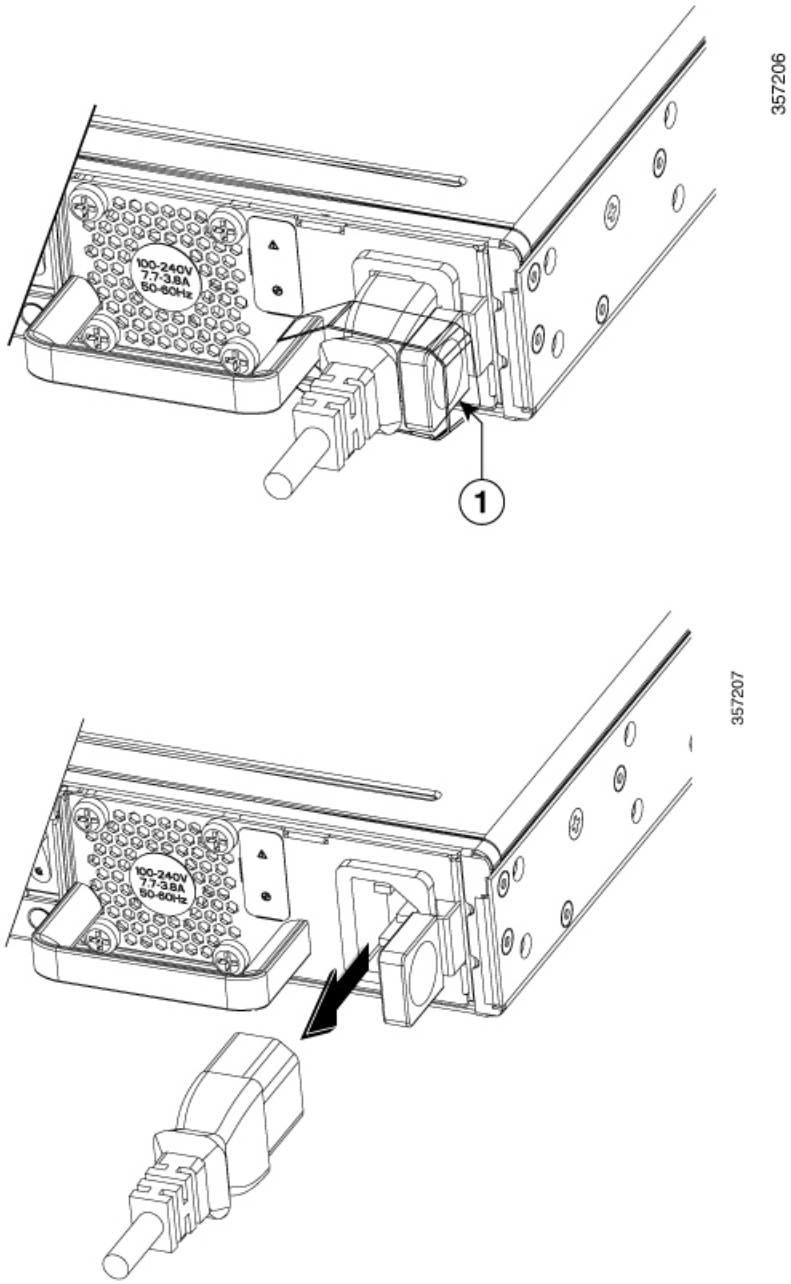
Step 2 The device has redundant power supplies and does not have to be shut down prior to replacing the power supply.

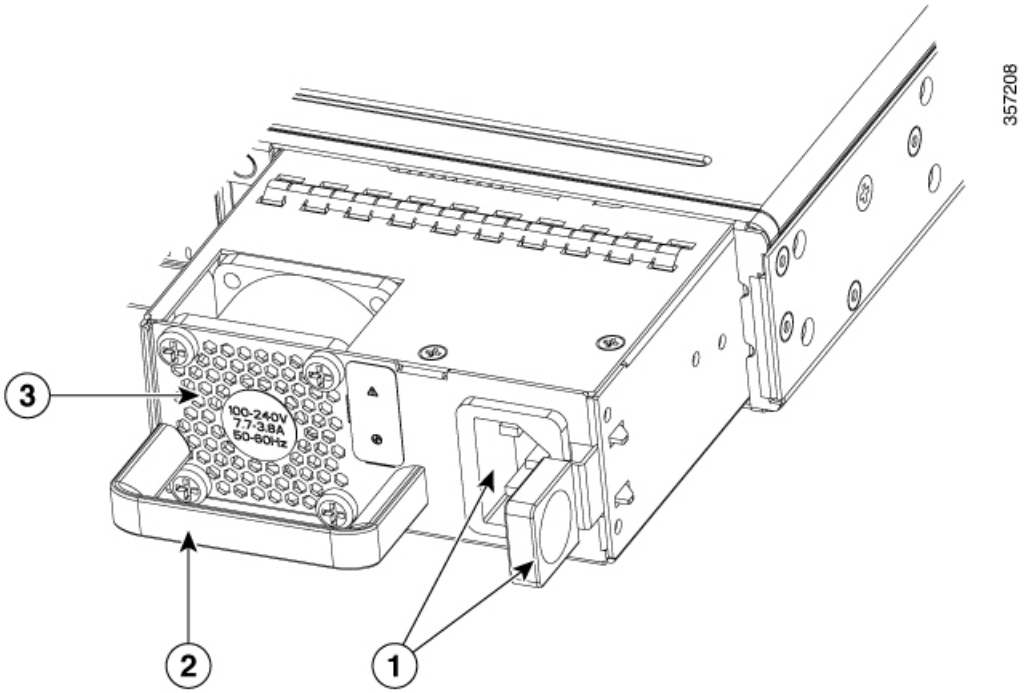
Step 3 If in use, remove the strain relief securing the power supply cable to the power supply latch.

Step 4 Remove the power cord from the power socket.

Step 5 Depress the power supply latch and use the handle to pull the supply out of the router.

Figure 8: Replace the AC power supply





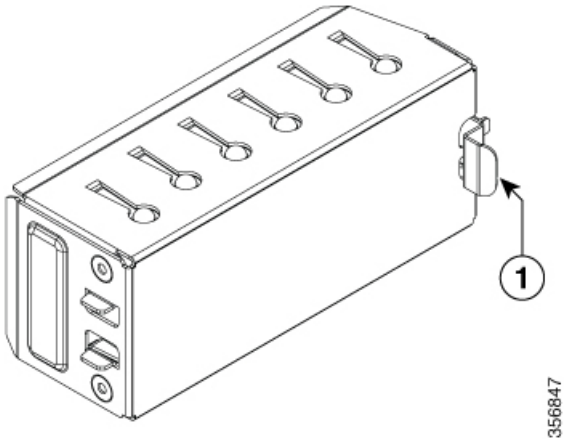
Number	Description
1	latch and AC socket
2	Latch
3	AC Power

Remove and replace the power supplies

Note If a PSU which is failed is removed, a PSU-blank must be installed in the slot until a new PSU is installed.

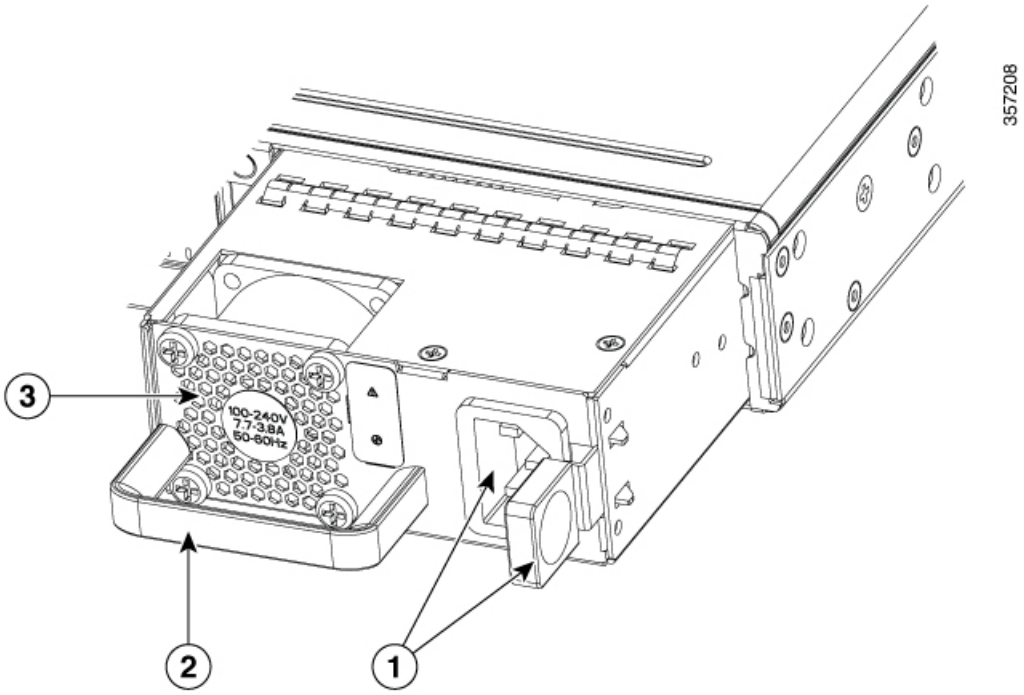
Note The Cisco 8400 Series Secure Routers support dual hot-swap PSUs.

Figure 9: Power supply blank



Number	Description
1	Latch

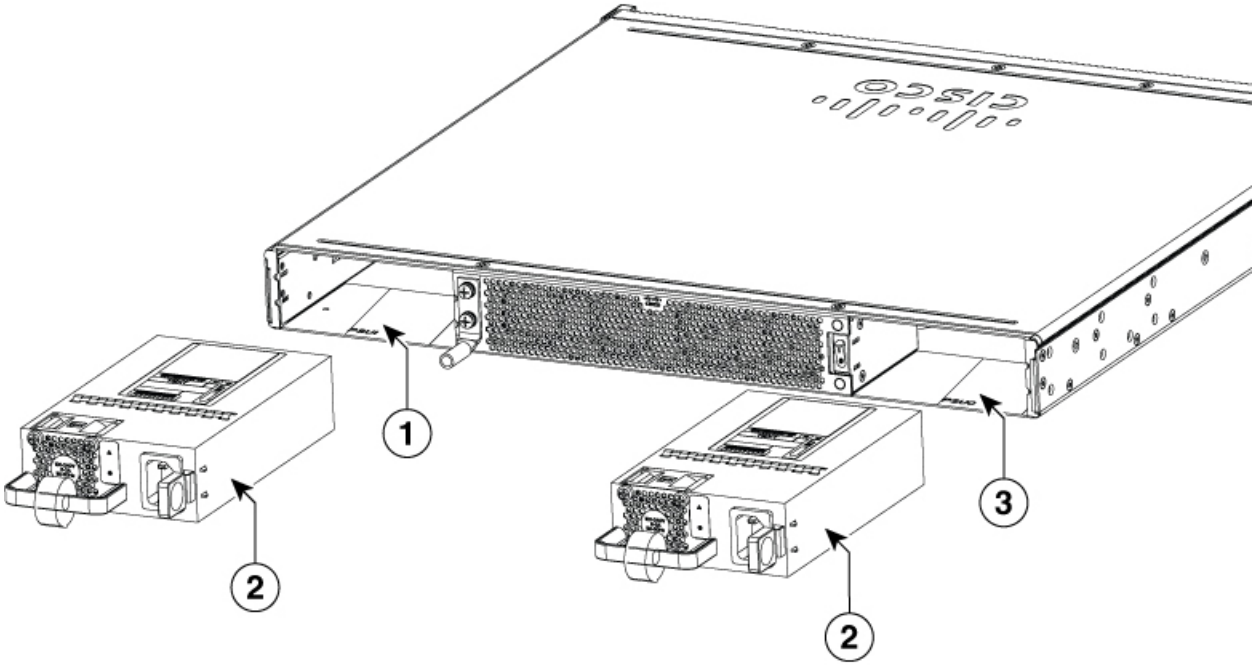
Figure 10: Correct orientation of the power supply unit



Note When installing a PSU, ensure the orientation is correct.

1. Latch and power input on right side.
2. Handle on bottom left.
3. Power markings are oriented such that they are readable when viewed straight on.

Figure 11: Power supply unit



Number	Description
1	PSU Slot 1
2	PSU
3	PSU Slot 0

DC power supply

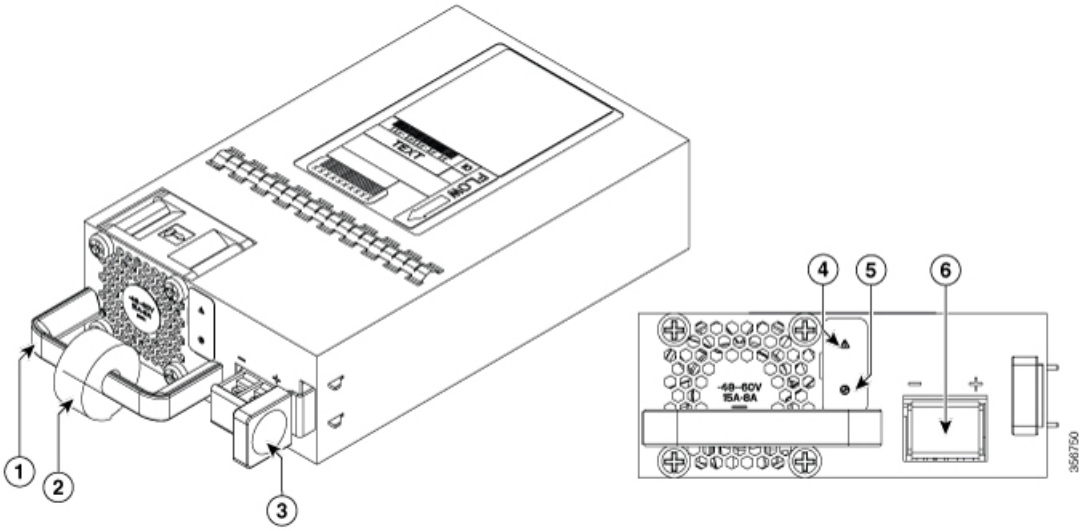
This section describes how to install the DC power supply input power that leads to the DC input power supply:

Note The device has redundant power supplies that can be hot-swapped.

The DC input connector has negative(-) on left and positive(+) on right with mark.

The power supply has a handle to be used for insertion and extraction. The module must be supported with one hand because of its length.

Figure 12: DC power



supply

400W DC

1	Handle	2	Strain relief
3	Latch	4	Fail LED
5	Status LED	6	Terminal block

Install DC power supply

Note Do not install the power supplies with the chassis cover off.

This section describes how to install the DC power supply input power leads to the DC input power supply. Before you begin, read these important notices:

- The color coding of the DC input power supply leads depends on the color coding of the DC power source at your site. Ensure that the lead color coding you choose for the DC input power supply matches the lead color coding used at the DC power source and verify that the power source is connected to the negative (–) terminal and to the positive (+) terminal on the power supply.

- Ensure that the chassis ground is connected on the chassis before you begin installing the DC power supply. Follow the steps provided in the *Chassis Ground Connection* section.

Each DC input power cable is terminated at the PSU by a cable lug, as shown in the following figure.

Note DC input power cables must be connected to the PSU terminal studs in the proper positive (+) and negative (–) polarity. In some cases, the DC cable leads are labeled, which is a relatively safe indication of the polarity. However, you must verify the polarity by measuring the voltage between the DC cable leads. When making the measurement, the positive (+) lead and the negative (–) lead must always match the (+) and (–) labels on the power distribution unit.

Note To avoid hazardous conditions, all components in the area where DC input power is accessible must be properly insulated. Therefore, before installing the DC cable lugs, be sure to insulate the lugs according to the manufacturer's instructions.

Remove and replace the DC power supply

The device has redundant power supplies that can be hot-swapped.

This section describes how to remove a DC power supply from C8400 Series Routers

Follow these steps:

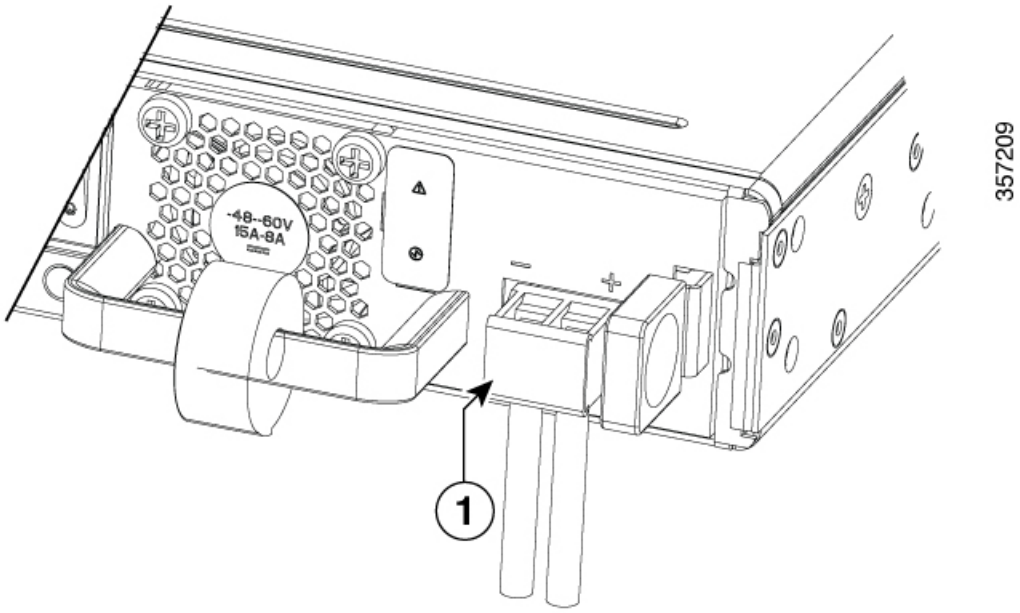
Procedure

Step 1 Read the safety warnings section of this document.

Step 2 The device has redundant power supplies and does not have to be shut down prior to replacing the power supply. The power supply may be replaced while the device is in service.

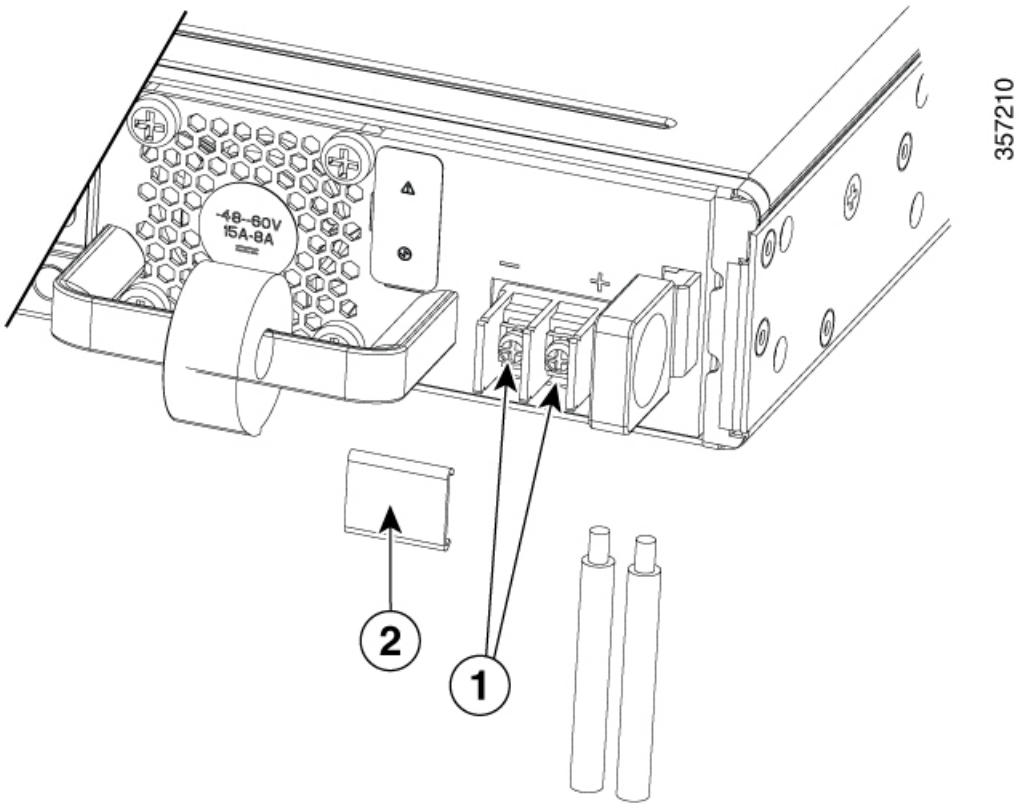
Step 3 At the power supply unit or at the local circuit breaker, remove the power from the DC power leads (label **1**) attached to the power supply to be replaced.

Figure 13: Remove DC power



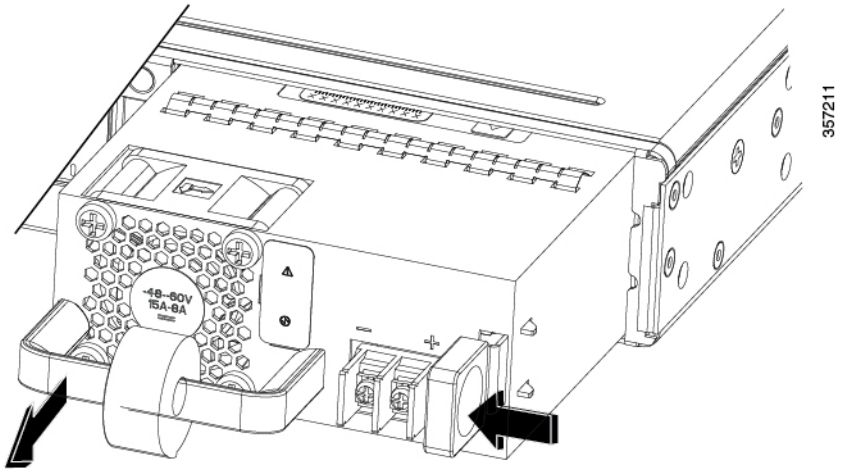
Step 4 Remove the terminal block cover and loosen the terminal screws (label **1**) securing the power cabling. Remove the power cabling from the terminal block.

Figure 14: Remove power cabling



Step 5 Depress the power supply latch and use the handle to pull the supply out of the device.

Figure 15: Pull out power supply



This completes the procedure for removing a DC power supply.

Wire the DC power

In the Cisco 8400 Series Secure Routers, the DC power supply has a terminal block that is installed into the power supply terminal block header.

Use the following steps to wire the DC input power source:

Procedure

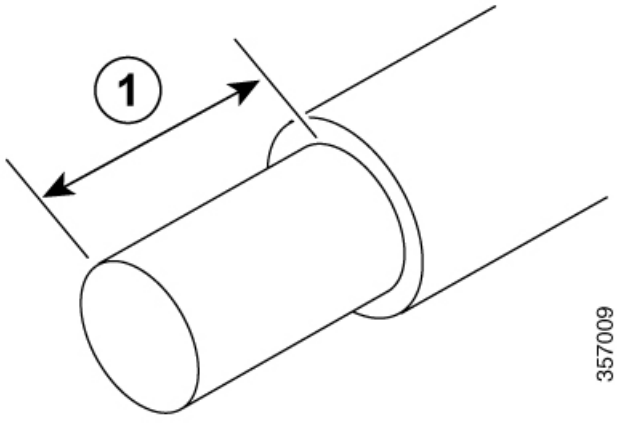
Step 1 Turn off the circuit breaker from the power source to be connected to the power source.

Step 2 Insert the power module in the power-supply slot, and gently push it into the slot.

- The DC power supply (excluding the extraction handle) is flushed with the device.

Step 3 Wire can be stripped and terminated directly to the power supply terminal block, or a crimp style spade terminal lug can be used. If using a terminal lug follow the manufacturer's instructions for terminating the lug to the wire. If terminating directly to the terminal block using bare wire, following the below directions. Use a wire-stripping tool to strip each of the two wires coming from the DC input power source and strip the wires to approximately 0.39 inch (10 mm) + 0.02 inch (0.5 mm). It it recommended that 14 AWG insulated wire be used. Do not strip more than the recommended length of wire because doing so could leave the wire exposed from the terminal block and shows a stripped DC input power source wire.

Figure 16: Stripped DC input power source wire



1	0.39 inch (10 mm) is the recommended wire-strip length for the terminal block.

Warning

An exposed wire lead from a DC input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC input power source wire extends from the terminal block. Statement 122

Step 4 Identify the positive and negative feed positions for the terminal block connection.

a) Positive (+) lead wire (right)
b) Negative (–) lead wire (left)

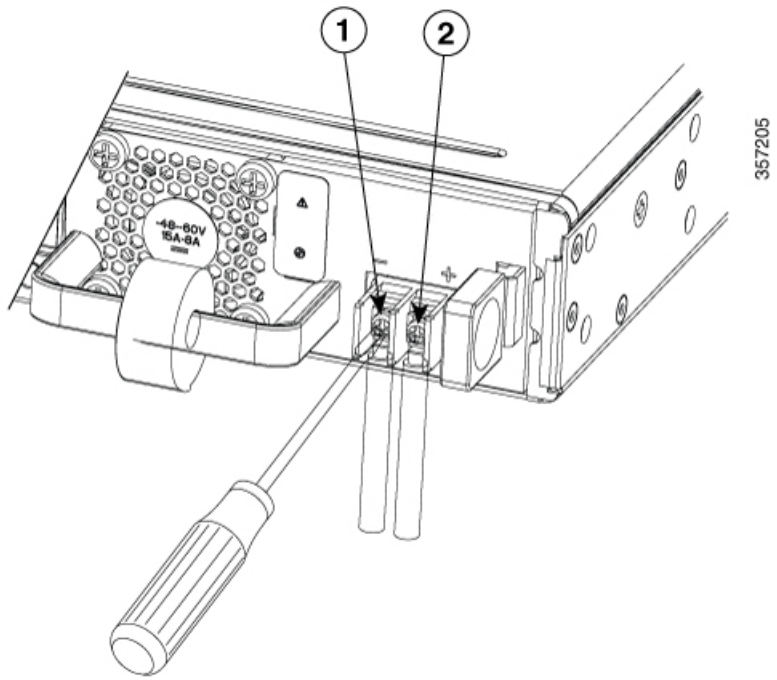
Step 5 Remove the terminal block cover.

Step 6 Insert the exposed wire into the terminal block. Ensure that you cannot see any wire lead outside the plastic cover. Only wires with insulation should extend from the terminal block.

Caution
Do not overtorque the terminal block captive screws. Ensure that the connection is snug, but the wire is not crushed. Verify by tugging lightly on each wire to ensure that they do not move.

Step 7 Use a screwdriver to tighten the terminal block captive screws.

Figure 17: DC power supply with lead wires



1	Negative (–) lead wire	2	Positive (+) lead wire

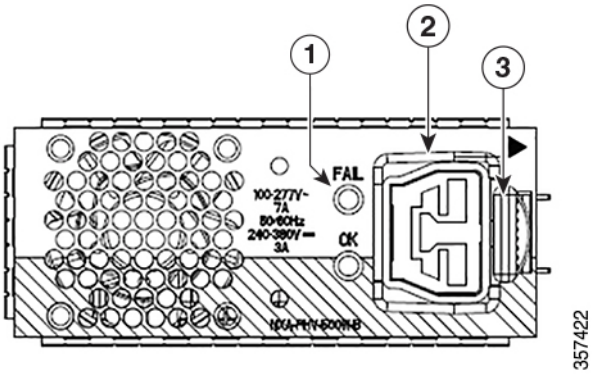
Step 8 Repeat these steps for the remaining DC input power source wire as applicable.

Step 9 Use a tie wrap to secure the wires to the rack, so that the wires are not pulled from the terminal block by casual contact.

Step 10 Turn on the circuit breaker at the power source.

AC/DC/HVDC power supply

Figure 18: 400W AC power supply



1	Status LED	2	HVAC/HVDC Socket
3	Latch		

Install AC/HVDC power supply

Note Do not install the power supplies with the chassis cover off.

Procedure

Step 1 Ensure that the chassis power switch on the chassis is in the Standby position.

Note
It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

Step 2 Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.

Step 3 Insert the power supply cables firmly into the power supplies.

Note
Ensure that both power supplies are inserted firmly and the power cords are in place.

Step 4 If you have changed the chassis power switch to the Standby position in Step 1, press the power switch to the On position.

The power supply LEDs are illuminated (green).

Remove AC/HVDC power supply

Procedure

Step 1 Ensure that the chassis power switch is in the Standby position.

Note
It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

Step 2 Unplug the power cable from the power supply.

Step 3 Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand.

Step 4 Repeat these steps if it is required to remove the other AC/HVDC power supply.

Fan tray

In the Cisco 8400 Series Secure Routers, there is a field replaceable unit (FRU) fan tray. The fan tray includes all the fans in one assembly. If a fan fails, replace the tray using a #1 Phillips screwdriver.

Replace the fan tray

Remove the fan tray

To remove the fan tray, complete the following steps:

Procedure

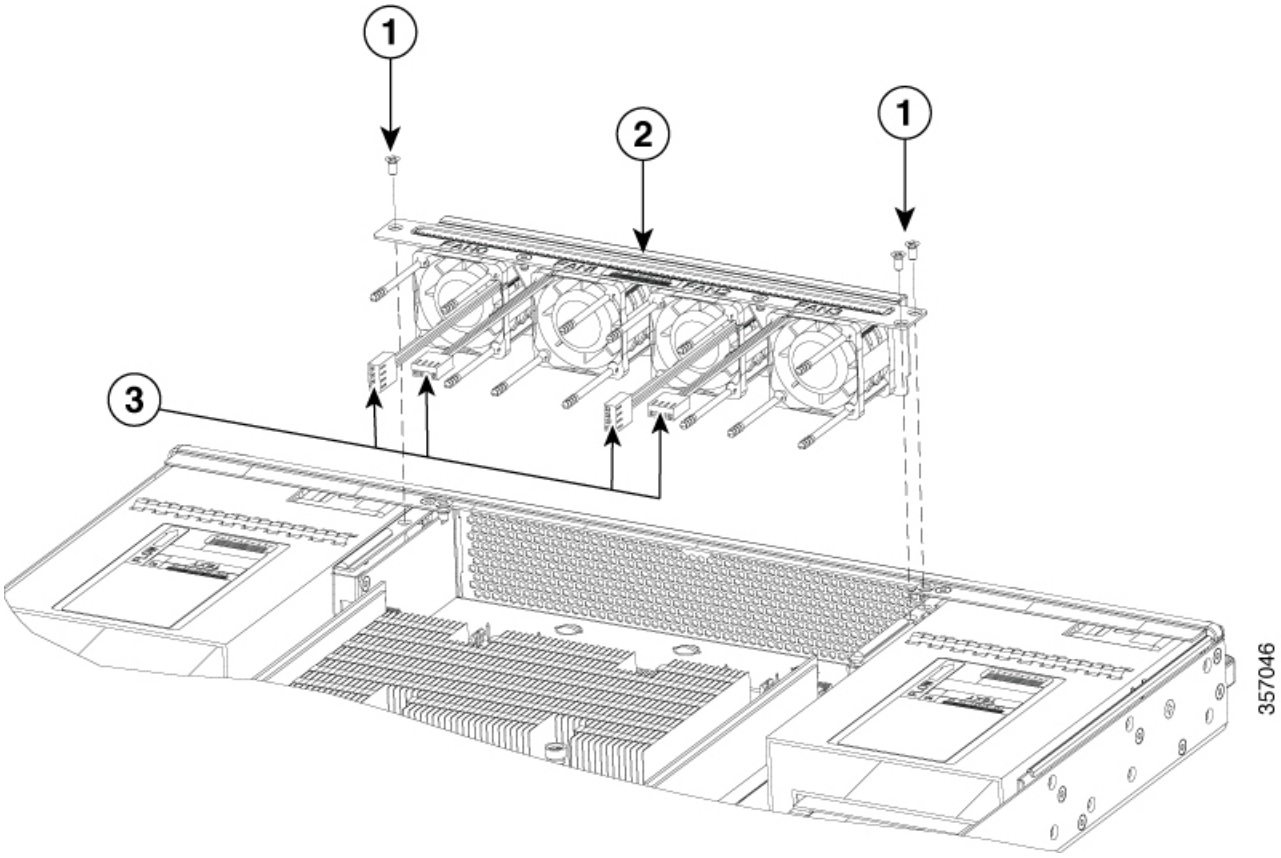
Step 1 Remove the top cover. See Remove the chassis cover, on page 3.

Step 2 Remove the three screws that secure the fan tray to the chassis.

Step 3 Disconnect fan cables from the motherboard.

Step 4 Remove the fan tray.

Figure 19: Fan tray



Number	Description
1	Screws
2	Fan Tray
3	Fan cable connectors

Install the fan tray

The Cisco C8400 series routers supports forward air flow (standard version). To install the fan tray, perform the following steps :

Procedure

Step 1 Install the fan tray.

Step 2 Install the three fan tray mounting screws.

Step 3 Connect the fan cables to the motherboard.

Note
The fan number (FAN0, FAN1, FAN2, and FAN3) is marked on the top of the fan tray and the motherboard by its connector. The fan wire should be connectedto its corresponding connector on the motherboard.

Step 4 Install the top cover

Step 5 Re-install the unit back in an equipment rack.

Step 6 Reinstall all cables from the chassis

Step 7 Power on the unit.

SFP modules

Before you begin

See Cisco Optics to Device Compatability Matrixfor a list of supported SFP modules. Use only supported SFP/SFP+/SFP28 modules on the router.

- Do not remove the dust plugs from the SFP modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP module can shorten its useful life. Do not remove and insert any SFP module more often than is necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.
- When you insert several SFP modules in multiple ports, wait for 5 seconds between inserting each SFP. This will prevent the ports from going into error disabled mode. Similarly, when you remove an SFP from a port, wait for 5 seconds before reinserting it.

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.

Step 2 Find the send (TX) and receive (RX) markings that identify the top of the SFP module.

On some SFP/SFP+ modules, the send and receive (TX and RX) markings might be shown by arrows that show the direction of the connection.

Step 3 If the SFP module has a bale-clasp latch, move it to the open, unlocked position.

Step 4 Align the module in front of the slot opening, and push until you feel the connector snap into place.

Step 5 If the module has a bale-clasp latch, close it to lock the SFP module in place.

Step 6 Remove the SFP dust plugs and save.

Step 7 Connect the SFP cables.

Laser safety guidelines

Optical SFPs use a small laser to generate the fiber-optic signal. Keep the optical transmit and receive ports covered whenever a cable is not connected to the port.

Warning **Statement 1255—**Laser Compliance Statement

Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019.

Follow these steps to install an SFP module in your router:

Procedure

Step 1 Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.

Step 2 Slide the SFP into the router connector until it locks into position

Tip
If the SFP uses a bale-clasp latch (see Laser Safety Guidelines section, the handle should be on top of the SFP module.

Caution
Do not remove the optical port plugs from the SFP until you are ready to connect cabling.

Step 3 Connect the network cable to the SFP module.

Remove small form-factor pluggable modules

Follow these steps to remove a Small Form-Factor Pluggable (SFP) from the device:

Procedure

Step 1 Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.

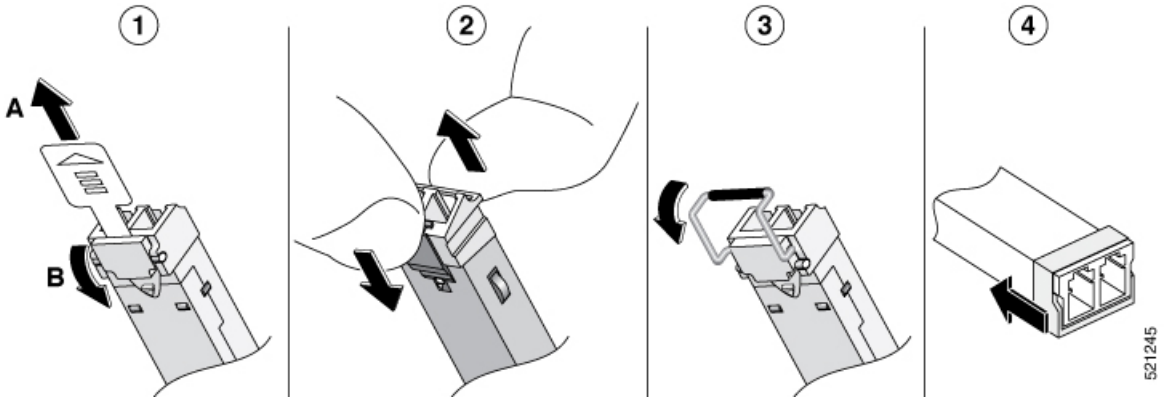
Step 2 Disconnect all cables from the SFP.

Caution
The latching mechanism used on many SFPs locks the SFP into place when cables are connected. Do not pull on the cabling in an attempt to remove the SFP.

Step 3 Disconnect the SFP latch.

Note
SFP modules use various latch designs to secure the module in the SFP port. Latch designs are not linked to SFP model or technology type. For information on the SFP technology type and model, see the label on the side of the SFP.

Figure 20: Disconnecting SFP Latch Mechanisms



Number	Description
1	Sliding latch
2	Swing and slide latch
3	Bale-clasp latch
4	Plastic collar latch

Tip
Use a pen, screwdriver, or other small straight tool to gently release a bale-clasp handle if you cannot reach it with your fingers.

Step 4 Grasp the SFP on both sides and remove it from the device.

M.2 storage device

This section describes how to install and replace an an M.2 module on the Cisco 8400 Series Secure Routers.

Prevent electrostatic discharge damage

The M.2 module is sensitive to electrostatic discharge (ESD) damage, which can occur when electronic cards or components are handled improperly. ESD results in complete or intermittent failures.

To prevent ESD damage, follow these guidelines:

- 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 the M.2 storage devices on an anti-static surface or in a static shielding bag. If you have to return the device to the factory, immediately place it in a static shielding bag.

- Avoid contact between the device and clothing. The wrist strap protects the device 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 anti static strap. The measurement should be between 1 and 10 megohms (Mohms).

Remove and replace the M.2 storage device

To remove and install a M.2 storage device, perform the following steps:

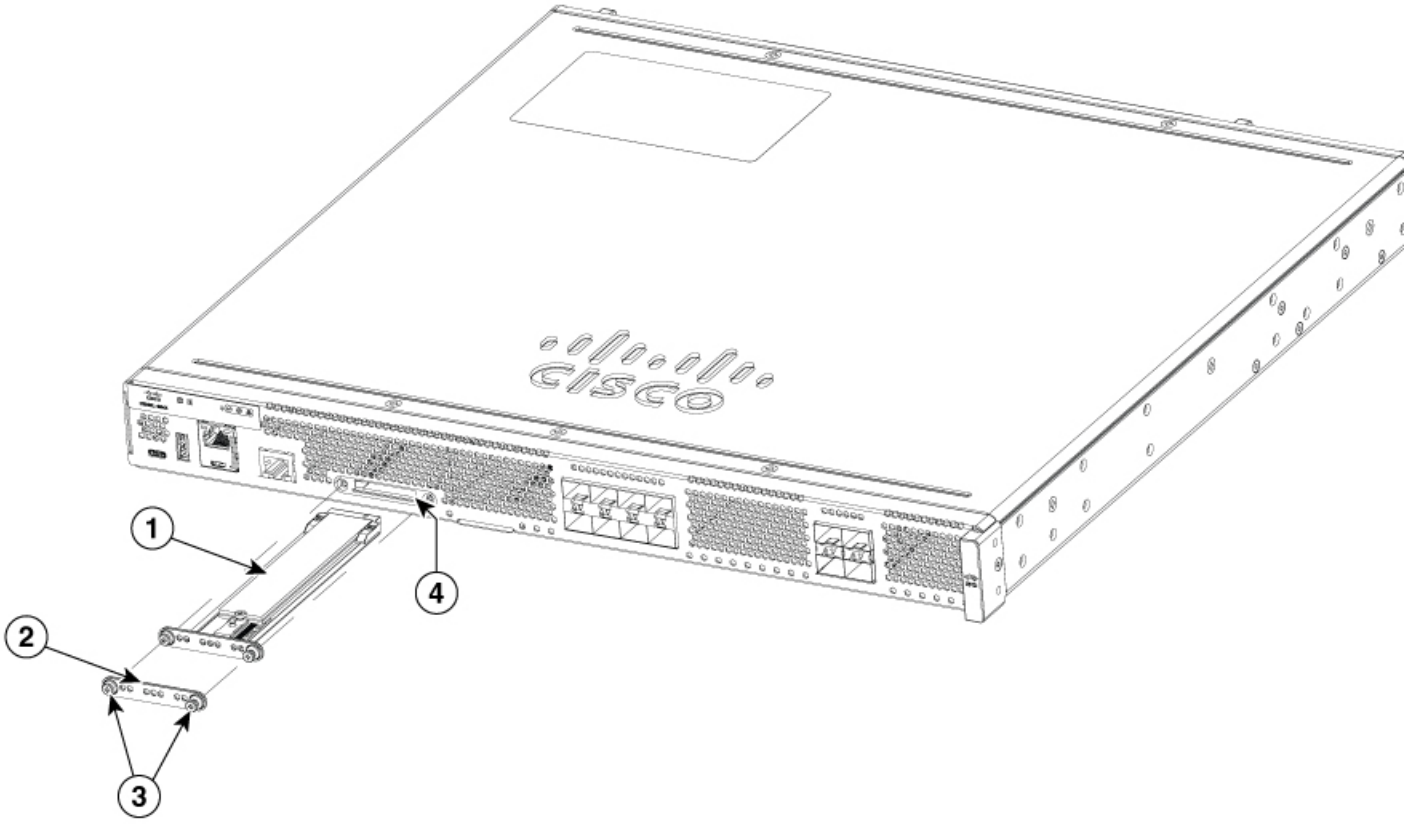
Procedure

Step 1 Disconnect the power supply to the Cisco 8400 Series Secure Routers before you perform any module replacement.

Step 2 Loosen the two mounting screws using a #1 Phillips screwdriver and then remove the M.2 module or blank.

Step 3 Install the M.2 memory module into the slot.

Figure 21: Remove the M.2 storage device



Number	Description
1	M.2 Module
2	M.2 Blank
3	Mounting Screws
4	Chassis Cutout (key to prevent installation of M.2 with incorrect orientation)

Note
When the M.2 module is not installed, install a blank in the slot.

Step 4 Secure the 2 mounting screws using a #1 Phillips screwdriver. Torque to 4-6 in-lbs.