



## Installing the Cisco ONS 15530

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This chapter describes the installation procedures for the Cisco ONS 15530 chassis and its components. This chapter includes the following sections:

- [Before Installing, page 2-1](#)
- [Chassis-Lifting Guidelines, page 2-2](#)
- [Rack-Mounting the Shelf, page 2-4](#)
- [Grounding the Shelf, page 2-14](#)
- [Installing and Removing Line Cards or Motherboards, page 2-17](#)
- [Installing and Removing Modules, page 2-24](#)
- [Replacing the Fan Assembly, page 2-27](#)
- [Power Guidelines, page 2-29](#)
- [Powering Up the Shelf, page 2-31](#)



Note

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Before you install, operate, or service the system, read the [Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series](#) for important safety information you should know before working with the system.

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Note

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To ensure that your Cisco IOS software release supports your hardware, see the [“New and Changed Information” section on page vii](#). Also refer to the “Hardware Supported” section of the latest release notes for the Cisco ONS 15530.

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## Before Installing

Before you install the Cisco ONS 15530, you must complete the following tasks:

- Unpack and inspect the shelf.
- Maintain a network record.
- Assemble required tools and equipment.
- Mount the shelf.

**Caution**

Use extreme care when removing or installing connectors so you do not damage the connector housing or scratch the end-face surface of the fiber. Always install protective covers on unused or disconnected components to prevent contamination. Always clean fiber connectors before installing them.

## Unpacking and Inspecting the Shelf

The Cisco ONS 15530 comes with the standard mounting set. The shelf is thoroughly inspected before shipment. If any damage has occurred during transportation or if any item is missing, notify your Cisco customer service representative immediately.

Upon receipt, inspect the equipment as follows:

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**Step 1** Take inventory.

Compare the equipment inside with the packing slip and the equipment list provided by customer service. If there are any discrepancies, notify the Customer Service Center.

**Step 2** Check for external damage.

Visually check all components and immediately report any shipping damage to your customer service representative. Have the following information ready:

- Invoice number of shipper (see packing slip)
  - Model and serial number of the damaged unit
  - Description of damage
  - Effect of damage on the installation
- 

Keep a record of all of your hardware, configuration options, and network settings.

## Mounting the Shelf

The unit is designed for rack-mounting in a cabinet rack. Use star-type lock washers on the rack screws to ensure a good conductive connection between the chassis and the rack. For information about installing the units in a customer cabinet, see the instructions from the cabinet manufacturer.

## Chassis-Lifting Guidelines

The fully configured system weighs approximately 71 pounds. The chassis is not intended to be moved frequently. Before you install the system, ensure that your site is properly prepared so you can avoid having to move the chassis later to accommodate power sources and network connections.

Two or more people are required to lift the chassis. Each time you lift the chassis or any heavy object, follow these guidelines:

- Never attempt to lift the chassis by yourself. Because of the size and weight of the chassis, use at least two people to safely lift and move it without causing injury or damaging the equipment.
- Ensure that your footing is solid, and balance the weight of the chassis between your feet.

- Lift the chassis slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your back muscles.
- Do not remove installed components from the chassis.
- Always disconnect all external cables before lifting or moving the chassis.

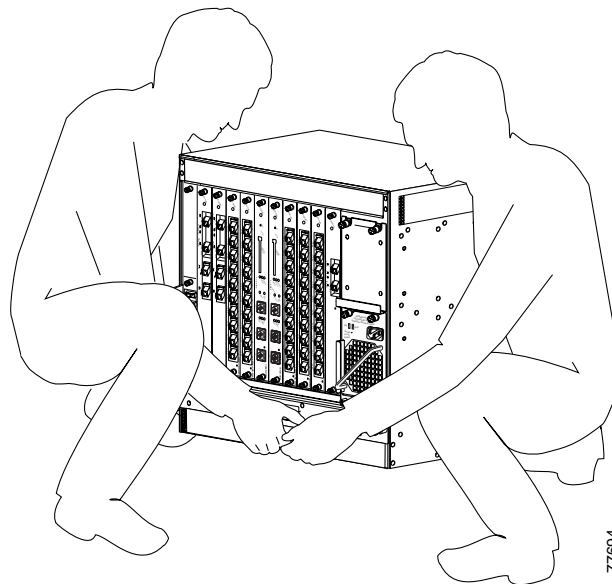
To safely lift the chassis, follow these steps:

**Warning**

**Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back.**

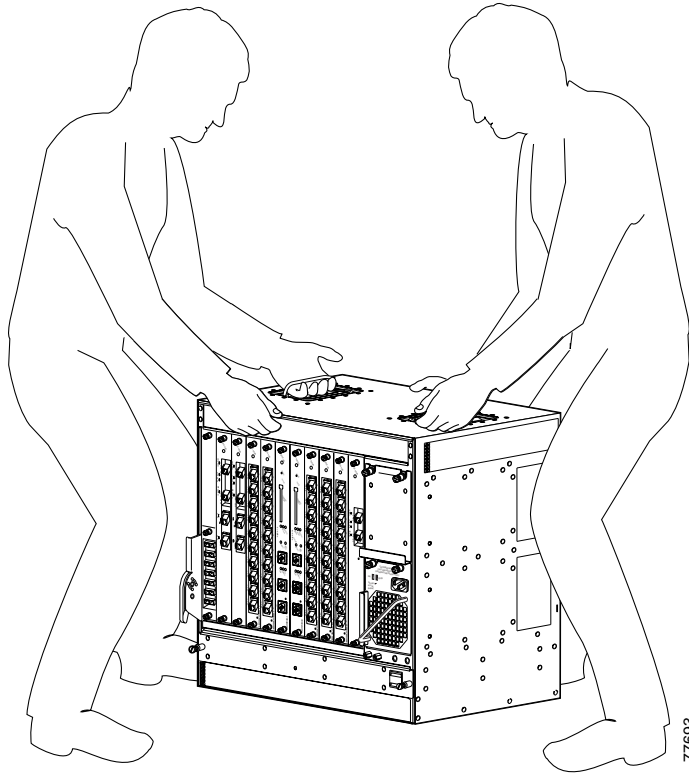
- Step 1** Each person should stand on either side of the chassis, and place one hand under the air intake at the bottom front of the chassis.
- Step 2** With the other hand, grasp the handle on the chassis and carefully lift the chassis as shown in [Figure 2-1](#) and [Figure 2-2](#).

*Figure 2-1 Lifting the Cisco ONS 15530 CHAS-E*



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*Figure 2-2 Lifting the Cisco ONS 15530 CHAS-N*



## Rack-Mounting the Shelf

Rack-mounting the shelf is the preferred method of installation for the Cisco ONS 15530. This section gives general rack-mount installation guidelines and explains how to install the rack-mount and cable-management brackets on the Cisco ONS 15530 for the following types of installations:

- [General Rack-Mount Installation Guidelines, page 2-5](#)
- [Flush-Mounting the Cisco ONS 15530 CHAS-N in a 19-Inch Rack, page 2-5](#)
- [Flush-Mounting the Cisco ONS 15530 CHAS-E in a 21-Inch Rack, page 2-7](#)

## General Rack-Mount Installation Guidelines

When planning your rack-mount installation, consider the following guidelines:

- Allow a minimum of 11 rack units (17.7 inches or 45.0 cm) of vertical rack space for the Cisco ONS 15530 CHAS-E chassis with the air ramp baffle. The Cisco ONS 15530 CHAS-N chassis requires a minimum of 9 rack units (15.7 inches or 39.9 cm) of vertical rack space. Measure the proposed rack location before mounting the chassis in the rack.



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**Note** The Cisco ONS 15530 CHAS-E chassis cannot be installed in a 19-inch rack.

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- Check for obstructions (such as a power strip) that could impair rack-mount installation before using a particular rack. If a power strip does impair a rack-mount installation, remove the power strip before installing the chassis, and then replace it after the chassis is installed.
- Allow sufficient clearance around the rack for maintenance. If the rack is mobile, you can push it back near a wall or cabinet for normal operation and pull it out for maintenance (installing or moving line cards, connecting cables, or replacing or upgrading components). Otherwise, allow 19 inches (48.3 cm) of clearance to remove FRUs (field replaceable units).
- Maintain a minimum clearance of 3 inches (7.62 cm) on the front, top, and sides of the chassis for the cooling air inlet and exhaust ports, respectively. Avoid placing the chassis in an overly congested rack or directly next to another equipment rack; otherwise, the heated exhaust air from other equipment can enter the inlet air vents and cause an over temperature condition inside the chassis.



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**Caution** To prevent chassis overheating, never install a Cisco ONS 15530 in an enclosed rack or room that is not properly ventilated or air conditioned.

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**Caution** Always install the air ramp baffle below the Cisco ONS 15530 CHAS-E.

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- Always install heavier equipment in the lower half of a rack to maintain a low center of gravity to prevent the rack from falling over.
- Install and use the cable-management brackets included with the Cisco ONS 15530 to keep cables organized and out of the way of the line cards and CPU switch modules. Ensure that cables from other equipment already installed in the rack do not impair access to the line cards, or require you to disconnect cables unnecessarily to perform equipment maintenance or upgrades.
- Install rack stabilizers (if available) before you mount the chassis.
- Provide an adequate chassis ground (earth) connection for your chassis.

## Flush-Mounting the Cisco ONS 15530 CHAS-N in a 19-Inch Rack

The Cisco ONS 15530 CHAS-N can be flush-mounted in a 19-inch equipment rack using the rack-mounting kit provided with your system. The rack-mounting kit contains the following parts:

- Two mounting brackets and screws
- Cable management brackets
- Optional 23-inch rack-mount brackets

**Note**

The Cisco ONS 15530 CHAS-E chassis cannot be installed in a 19-inch rack.

**Warning**

At least three people are required to mount the chassis in the equipment rack: two people are needed to hold the chassis in place while a third person tightens the mounting screws. When handling the chassis, always follow proper lifting practices as outlined in the [“Chassis-Lifting Guidelines”](#) section on page 2-2.

To flush-mount the Cisco ONS 15530 CHAS-N chassis in a 19-inch equipment rack, follow these steps :

- Step 1** Attach the mounting brackets to the shelf (see [Figure 2-3](#)).
- Step 2** Lift the shelf into position between the rack posts (requires two people).
- Step 3** Align the mounting bracket holes with the rack post holes (see [Figure 2-4](#)) and attach the shelf to the rack (performed by the third person).

**Figure 2-3** Attaching Mounting Brackets to Shelf

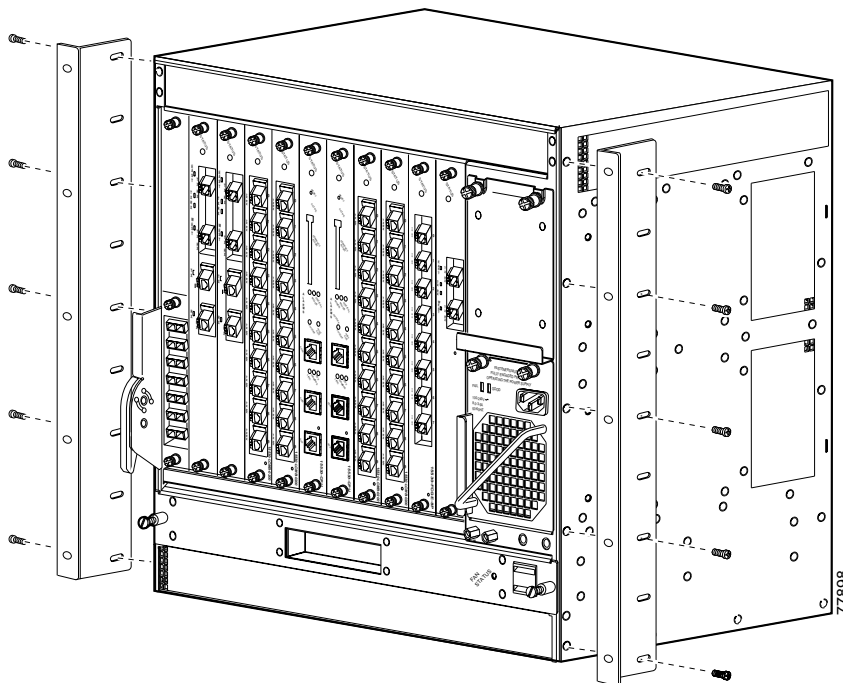
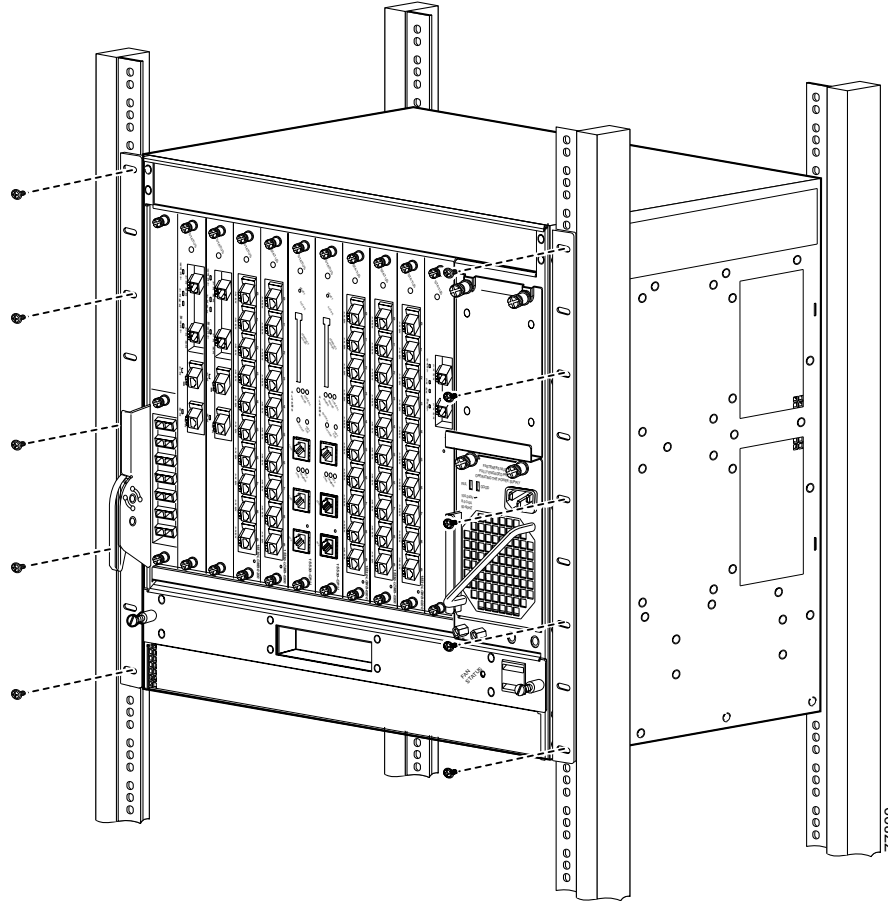


Figure 2-4 Attaching Shelf to Equipment Rack



- Step 4 Check that all release levers are in the closed position, the chassis mounting screws are tight, and all CPU switch module and line card captive screws are tight.

## Flush-Mounting the Cisco ONS 15530 CHAS-E in a 21-Inch Rack

The Cisco ONS 15530 CHAS-E can be flush-mounted in a 21-inch equipment rack using the rack-mounting kit provided with your system. The rack-mounting kit contains the following parts:

- Two mounting brackets and screws
- Cable management brackets



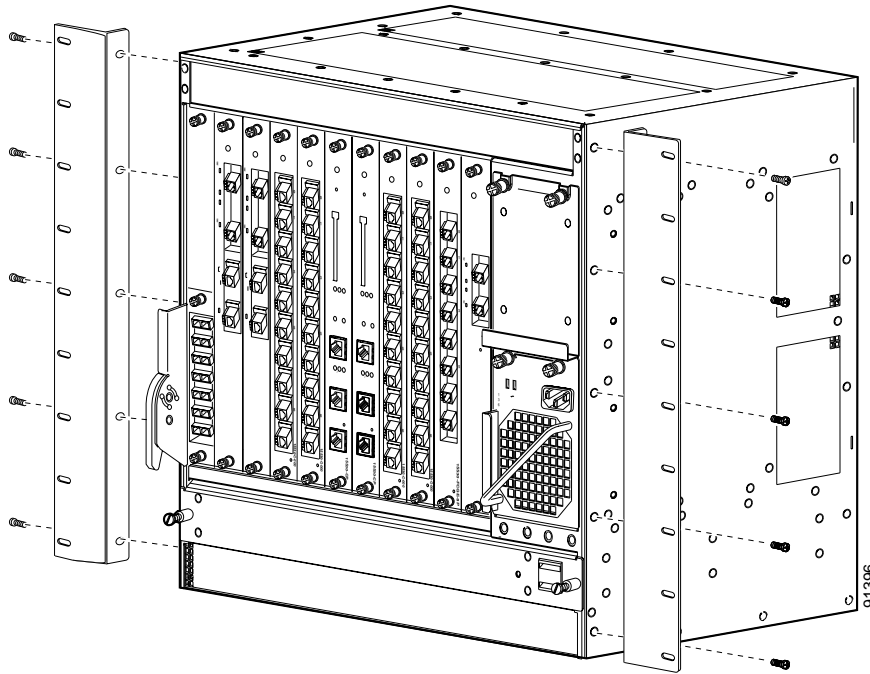
### Caution

At least three people are required to mount the chassis in the equipment rack: two people are needed to hold the chassis in place while a third person tightens the mounting screws. When handling the chassis, always follow proper lifting practices as outlined in the [“Chassis-Lifting Guidelines”](#) section on [page 2-2](#).

To flush-mount the Cisco ONS 15530 CHAS-N chassis in a 19-inch equipment rack, use the following steps:

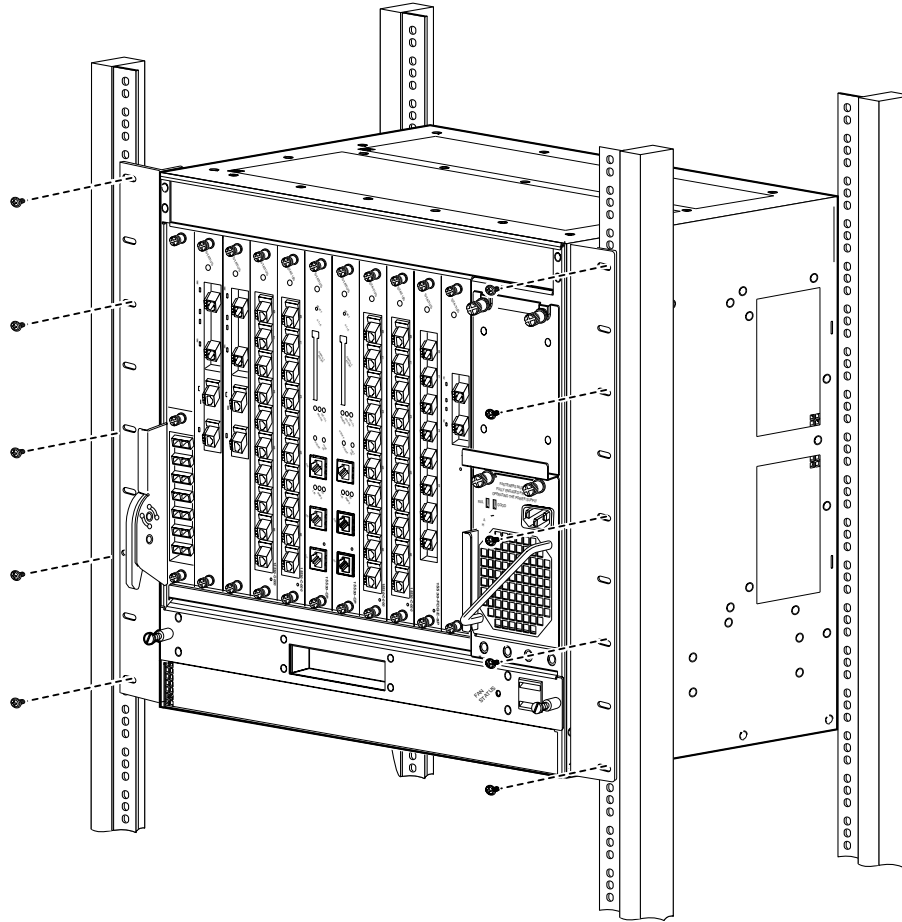
- 
- Step 1** Attach the mounting brackets to the shelf (see [Figure 2-5](#)).
  - Step 2** Lift the shelf into position between the rack posts (requires two people).
  - Step 3** Align the mounting bracket holes with the rack post holes (see [Figure 2-6](#)) and attach the shelf to the rack (performed by the third person).

*Figure 2-5 Attaching Mounting Brackets to Shelf*





*Figure 2-6 Attaching Shelf to Equipment Rack*



- Step 4** Check that all release levers are in the closed position, the chassis mounting screws are tight, and all CPU switch module and line card captive screws are tight.
- Step 5** Proceed to the [“Attaching the Air Ramp Baffle”](#) section on page 2-10.
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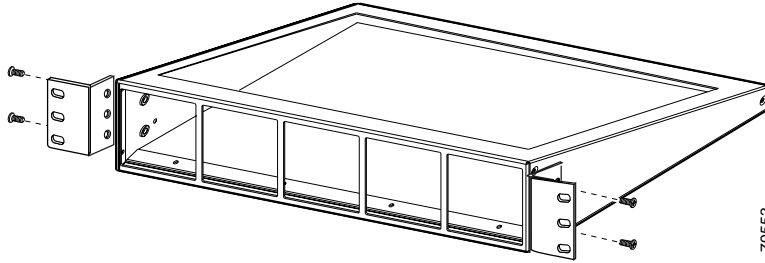
## Attaching the Air Ramp Baffle

The air ramp baffle redirects the intake of cooling air from directly below, to the front of the Cisco ONS 15530 CHAS-E chassis, while deflecting hot exhaust air from equipment installed below.

To attach the air ramp baffle to the Cisco ONS 15530 CHAS-E chassis, follow these steps:

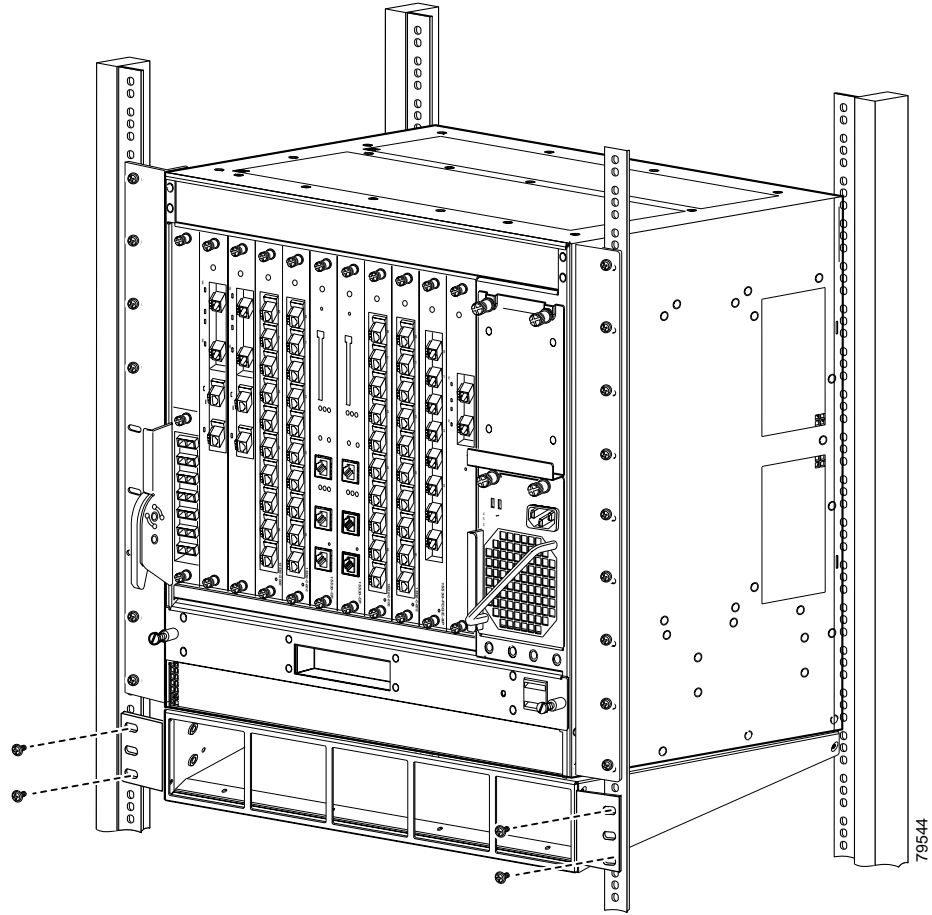
- Step 1** Attach the mounting brackets to the air ramp baffle as shown in [Figure 2-7](#).

*Figure 2-7 Air Ramp Baffle Mounting Brackets*



- Step 2** Position the air ramp baffle directly under the Cisco ONS 15530 CHAS-E chassis.
- Step 3** Screw the air ramp baffle to the equipment rack as shown in [Figure 2-8](#).

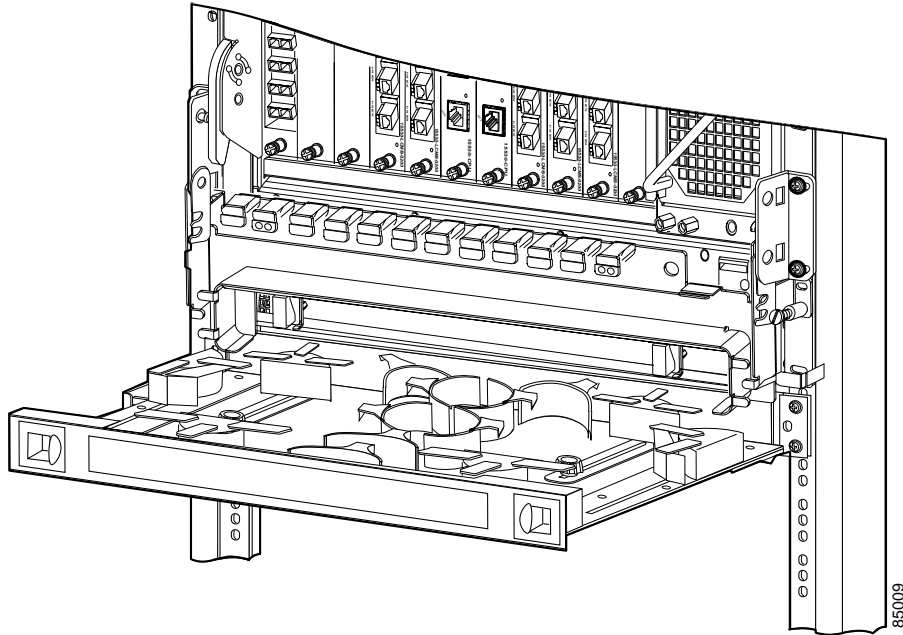
Figure 2-8 Installing the Air Ramp Baffle



## Installing the Fiber Routing Management System

The fiber routing management system contains two main components; the cable routing tray and the cable routing drawer. The fiber routing tray is installed directly over the fan assembly, and the fiber routing drawer is installed below the Cisco ONS 15530 chassis. (See [Figure 2-9](#).)

*Figure 2-9 Fiber Management System*

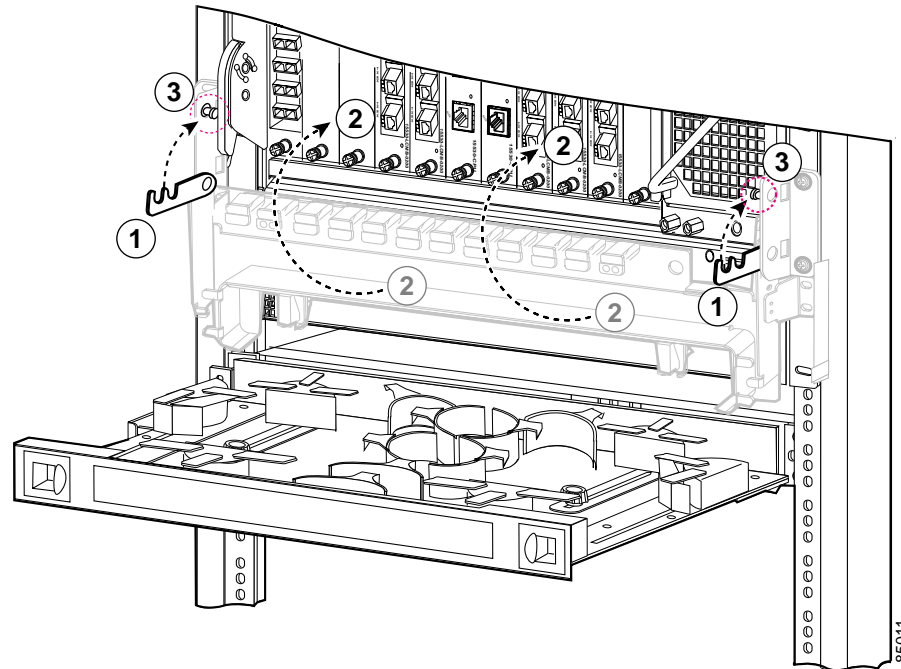


## Installing the Fiber Routing Tray

To install the fiber routing tray, follow these steps:

- Step 1** Place the fiber routing tray (2) over the fan assembly, ensuring that the fan assembly can be accessed when the fiber routing tray is locked (1 and 2) in the raised position. (See [Figure 2-10](#).)

*Figure 2-10 Raising the Fiber Routing Tray*



1	Hook	3	Latch
2	Flip up		

- Step 2** Secure the fiber routing tray to the rack with four 12-24 screws, two on each side.
- Step 3** Hold the fiber routing drawer with both hands and position it in the rack beneath the chassis. (See [Figure 2-9](#).)
- Step 4** Align the mounting holes on the bracket with the mounting holes in the equipment rack.
- Step 5** Install the 12-24 or 10-32 screws through the elongated holes in the brackets and into the threaded holes in the mounting post. Repeat this step for the other side.

## Installing the Fiber Routing Drawer

To install the fiber routing drawer, follow these steps:

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | Hold the drawer with both hands and position the drawer in the rack beneath the chassis. (See <a href="#">Figure 2-9</a> .)  |
| <b>Step 2</b> | Align the mounting holes on the bracket with the mounting holes in the equipment rack.   |
| <b>Step 3</b> | Install the 12-24 or 10-32 screws through the elongated holes in the brackets and into the threaded holes in the mounting post. Repeat this step for the other side. |
- 

## Grounding the Shelf

Two system (earth) grounding holes are provided under the power supplies at the bottom right of the shelf.

## Shelf Grounding Guidelines

To make an adequate grounding connection, you need the following parts and tools:

- Grounding lug.
- Two M4 (metric) hex-head screws with locking washers.
- One grounding wire (6 AWG recommended).
- Number 2 Philips head screwdriver.
- Crimping tool. This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug.
- Wire-stripping tool.



**Note**

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The grounding lug and M4 screws are included in your accessory kit that ships with the system.

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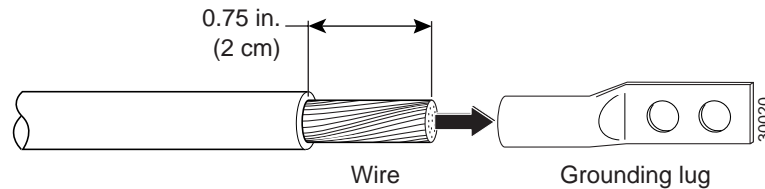
## Shelf Grounding Procedures

This section describes how to connect the Cisco ONS 15530 to earth ground. You must complete this procedure before connecting system power or powering up your shelf.

To ground the shelf, follow these steps:

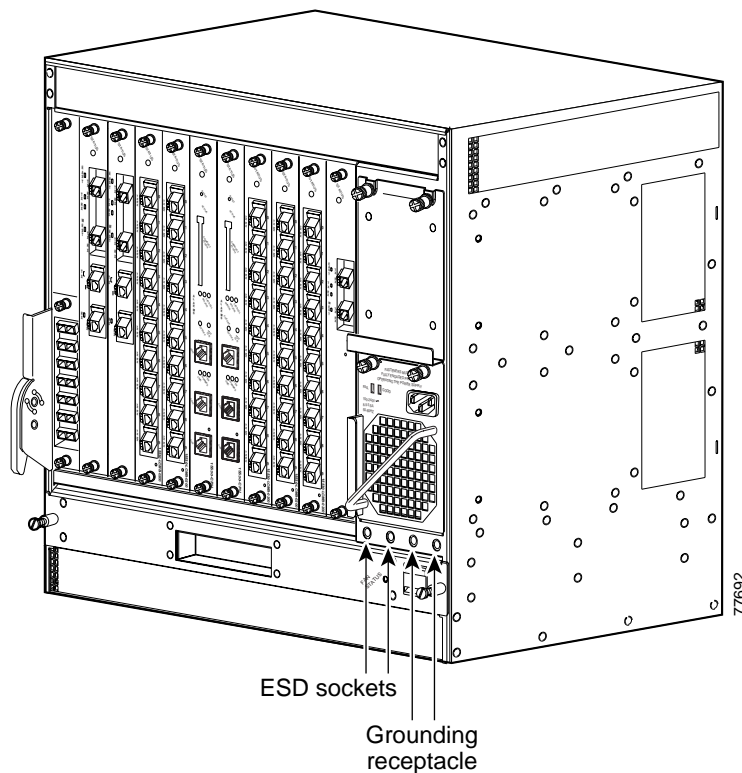
- Step 1** Use a wire-stripping tool to remove approximately 0.75 inch (20 mm) of the covering from the end of the grounding wire (see [Figure 2-11](#)).

**Figure 2-11** Attaching the Grounding Wire to Grounding Lug



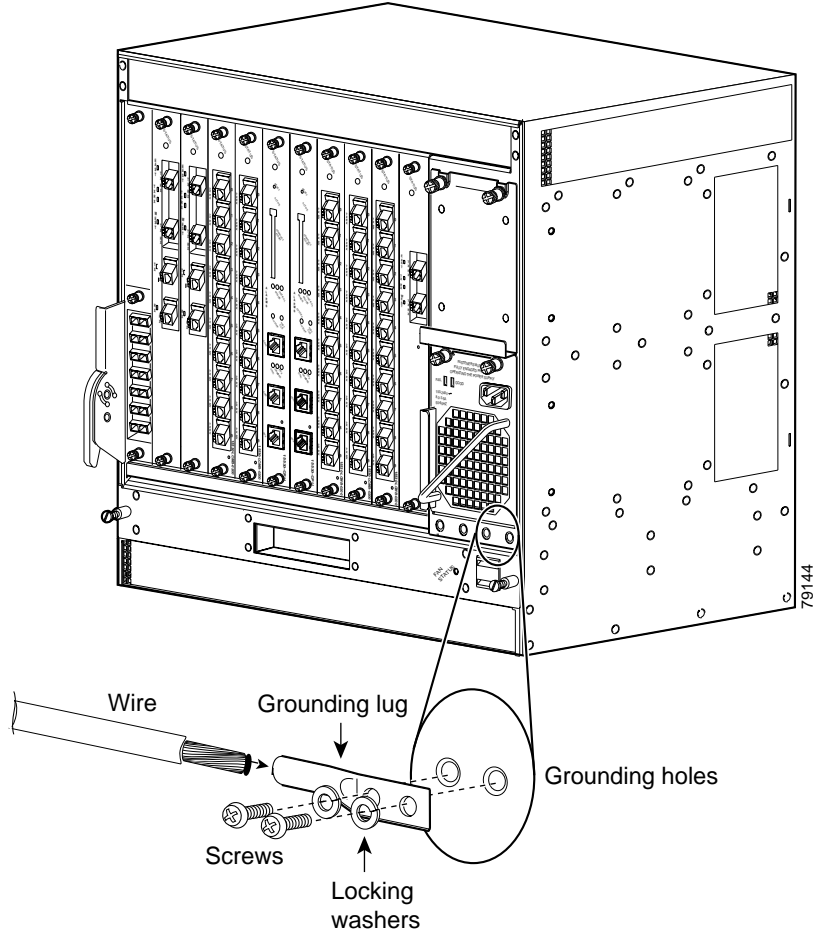
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug (see [Figure 2-11](#)).
- Step 3** Use the crimping tool to secure the grounding wire in place in the grounding lug.
- Step 4** Locate the grounding receptacles on the chassis (see [Figure 2-12](#)).

**Figure 2-12** Cisco ONS 15530 ESD Sockets



- Step 5** Place the grounding lug against the grounding receptacle at the bottom right of the chassis (see [Figure 2-13](#)).

Figure 2-13 Installing the Grounding Lug



- Step 6** Insert two screws through the holes in the grounding lug and the grounding receptacle. Ensure that the grounding lug does not interfere with other hardware or rack equipment.
- Step 7** Install the locking washers and nuts; tighten them to secure the grounding lug to the grounding receptacle.
- Step 8** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the Cisco ONS 15530.



**Note**

The Grounding lug shown in [Figure 2-13](#) should be positioned at a 45 degree angle to allow room for cables.



## Preventing ESD Damage

Electrostatic discharge (ESD) damage occurs when electronic cards or components are mishandled and can result in complete or intermittent failures. Note the following guidelines before you install or service the system:

- Always wear an ESD-preventive wrist or ankle strap when handling electronic components. Connect one end of the strap to an ESD jack or an unpainted metal component on the system (such as a captive installation screw).
- Handle cards by the faceplates and edges only; avoid touching the printed circuit board and connector pins.
- Place any removed component on an antistatic surface or in a static shielding bag.
- Avoid contact between the cards and clothing. The wrist strap only protects the card from ESD voltages on the body; ESD voltages on clothing can still cause damage.

**Note**

For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

## Installing and Removing Line Cards or Motherboards

The line cards and modules used on the Cisco ONS 15530 are hot-swappable. This section describes the procedures for installing and removing the following line cards and motherboards from the chassis:

- ESCON aggregation cards
- 4-port 1-Gbps/2-Gbps FC aggregation cards
- 8-port FC/GE aggregation cards
- 8-port multi-service muxponders
- 2.5-Gbps ITU trunk cards
- 10-Gbps ITU trunk cards
- 10-Gbps ITU tunable trunk cards
- 10-Gbps uplink cards
- Transponder line cards
- Carrier motherboards
- CPU switch modules

## Installing Line Cards or Motherboards

To install a line card or motherboard, follow these steps:

- 
- Step 1** Take the new line card or motherboard from the shipping container.
- Step 2** Insert the line card or motherboard carefully into the chassis slot while guiding the upper and lower edges line card or of the motherboard in the tracks until its connectors come into contact with the backplane.

- Step 3 Use the release levers to push the line card or motherboard or processor card in until it is fully seated in the backplane connector.
  - Step 4 Push the release levers in simultaneously to lock the line card or motherboard into the slot.
  - Step 5 Use a number 1 Philips screwdriver to tighten the captive installation screws.
  - Step 6 Check the LED to ensure proper installation while powered.
- 

## Removing Line Cards or Motherboards

To remove a line card or motherboard, follow these steps:

- Step 1 Remove all cables from the line card or motherboard.
  - Step 2 Install appropriate dust covers on the fiber cable connectors and the blind plugs into the connectors on the motherboard.
  - Step 3 Use a number 1 Philips screwdriver to loosen the captive installation screws.
  - Step 4 Pull the release levers out to release the line card or motherboard from the slot in the chassis.
  - Step 5 Use the release levers to pull the line card or motherboard out of the chassis.
  - Step 6 Place the removed line cards in a container appropriate for shipping and storage.
- 

## Installing SFPs into Aggregation Cards and Muxponders

To install SFPs into the ESCON aggregation cards, 8-port FC/GE aggregation cards, and 8-port multi-service muxponders, follow these steps:

- Step 1 Take the desired SFP from the shipping container.
  - Step 2 Install the SFP by inserting it in the aggregation card or muxponder.
  - Step 3 Push the SFP until you hear a click. The click indicates that it is securely set in the module.
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## Installing SFP with Mini SMB Coax Connectors

To install the 15500-XVRA-10E1SFP with mini SMB coax connectors into the 8-port multi-service muxponder, follow these steps:

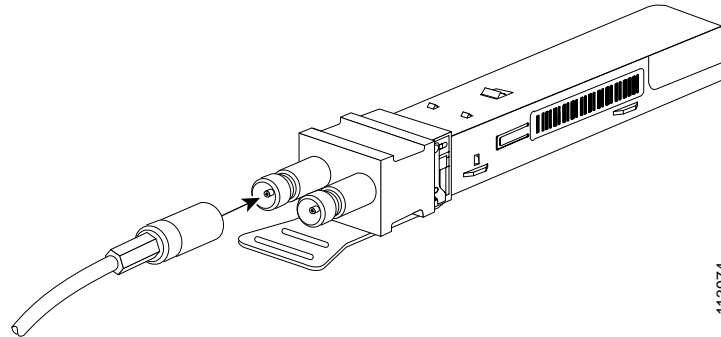
- Step 1 Take the desired SFP from the shipping container.
- Step 2 Install the mini SMB coax connector into the SFP by pushing the cable into the SFP. (See [Figure 2-14.](#))



**Note** If you are installing the 15500-XVRA-10E1, you must attach the cable to the SFP before installing the SFP into the 8-port multi-service muxponder.

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*Figure 2-14 Installing the 15500-XVRA-10E1 SFP*



- Step 3** Twist the cable to secure it in the SFP.
- Step 4** Install the SFP by inserting it in the muxponder.



**Tip**

In an unlikely event of the pull-tab is damaged or missing, use a screwdriver to push on the hinge pin to unlock the SFP cage latch and pull the SFP out from SFP port

## Removing SFP from Aggregation Cards and Muxponders

The SFPs used on the aggregation cards and muxponders have different types of connectors. The different connector types on the SFP optics are:

- RJ-45 connector (for 8-port multi-service muxponders)
- MT-RJ connector (for ESCON aggregation cards)
- LC connector (for 8-port FC/GE aggregation cards)
- Mini SMB coax connector (for 8-port multi-service muxponders)

Each connector requires a different method of removal.



**Note**

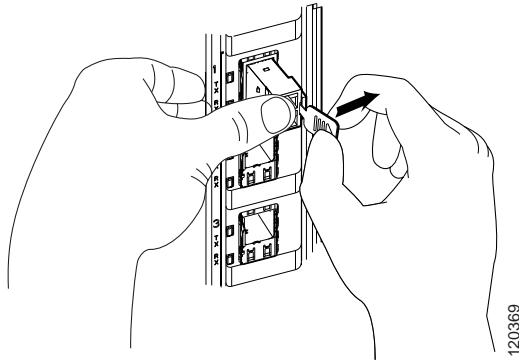
Use the **show hardware** command to see what SFP you have currently installed in your module.

### Removing Pull Tab SFPs with RJ-45 Connectors

To remove an SFP with an RJ-45 connector from the muxponder, follow these steps:

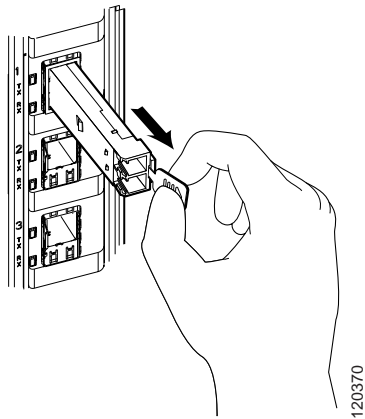
- Step 1** Remove the cable from the desired SFP.
- Step 2** Use the thumb on your left hand to push against the RJ-45 connector.
- Step 3** Use your right hand to pull the pull tab on the SFP.
- Step 4** Rotate the SFP while simultaneously pushing against the connector and pulling the pull tab. This releases the SFP from the latch lock of the cage. (See [Figure 2-15](#).)

Figure 2-15 Releasing the SFP



**Step 5** Pull the SFP out and place it in a container appropriate for shipping and storage. (See [Figure 2-16](#).)

Figure 2-16 Removing the SFP

**Tip**

In an unlikely event of the pull-tab is damaged or missing, use a screwdriver to push on the hinge pin to unlock the SFP cage latch and pull the SFP out from SFP port

**Note**

SFPs with RJ-45 connectors require cabling after it is installed, and removal of cables is required before removing the SFP from the card.

## Removing Non-Pull Tab SFPs with RJ-45 Connectors

To remove an SFP with an RJ-45 connector from the muxponder, follow these steps:

- 
- Step 1** Remove the cable from the desired SFP.
  - Step 2** Pull the latch on the SFP out. This releases the SFP from the latch lock of the cage.
  - Step 3** Pull the SFP out and place it in a container appropriate for shipping and storage.
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**Note**

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SFPs with RJ-45 connectors require cabling after it is installed, and removal of cables is required before removing the SFP from the card.

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## Removing SFP Optics with MT-RJ Connectors

**Note**

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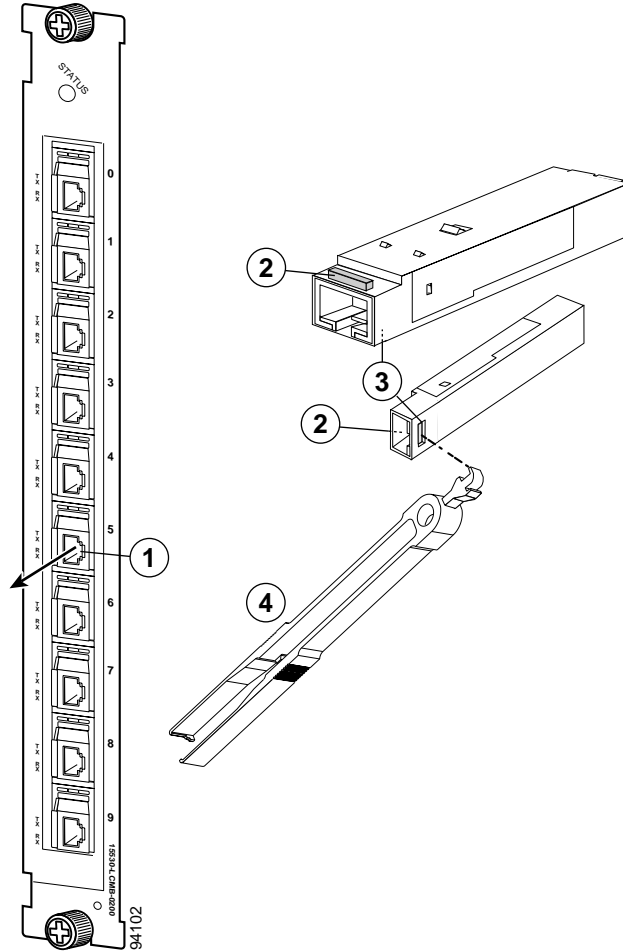
You need the SFP extraction and cable installation and removal tool to remove the SFP with the MT-RJ connector.

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To remove an SFP with an MT-RJ connector from the ESCON aggregation card, follow these steps:

- 
- Step 1** Remove the cable from the desired SFP.
- Step 2** Remove the SFP from the module by pushing against the lever on the SFP to release it from the module. (See [Figure 2-17](#).)

Figure 2-17 Removing the SFP with MT-RJ Connector



1	SFP placement in the module	3	Hole where the SFP extraction end of the tool is inserted (two views)
2	Lever on the SFP (two views)	4	SFP extraction and cable installation and removal tool

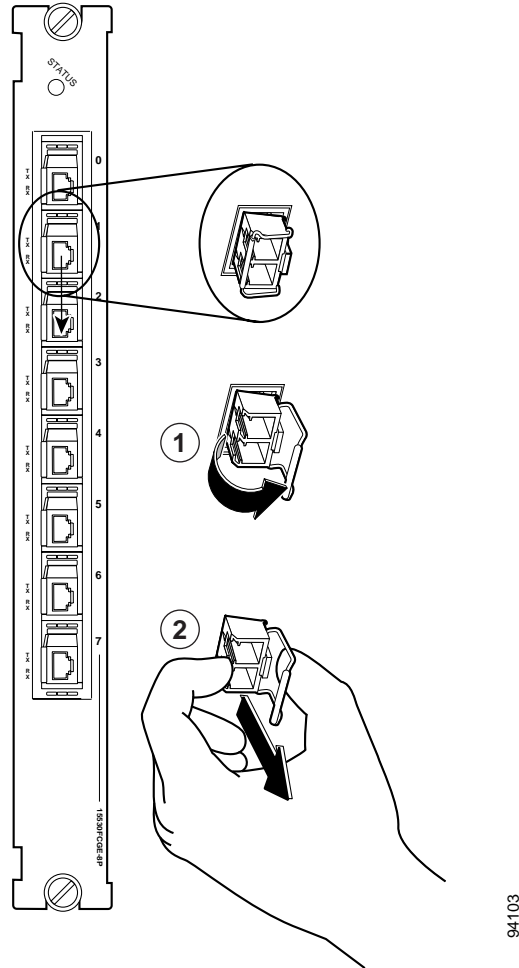
- Step 3** Use the extraction tool to remove the SFP by inserting it into the side of the transceiver and pulling it out of the module. (See [Figure 2-17](#).)
- Step 4** Place the removed SFP in a container appropriate for shipping and storage.

## Removing SFP Optics with LC Connectors

To remove an SFP with an LC connector from the 8-port FC/GE aggregation card, follow these steps:

- 
- Step 1** Remove the cable from the desired SFP.
- Step 2** Remove the SFP from the module by pulling the latch on top of the SFP to release it from the module. (See [Figure 2-18](#).)

*Figure 2-18 Removing the Transceiver with the LC Connector*



1	Release the latch.	2	Pull out the SFP optics.
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- Step 3** Continue to pull the latch down and use the latch to pull the SFP out of the module. (See [Figure 2-18](#).)
- Step 4** Place the removed SFP in a container appropriate for shipping and storage.
-

## Removing SFPs with Mini SMB Coax Connectors

To remove the 15500-XVRA-10E1 SFP with mini SMB coax connectors(MINISMB/BNC=) from the 8-port multi-service muxponder, follow these steps:

- 
- Step 1 Use the thumb on your left hand to push against the SFP.
  - Step 2 Use your right hand to pull the pull tab on the SFP.
  - Step 3 Twist the SFP slightly to unlock it from the latch lock of the cage.
  - Step 4 Remove the desired SFP from the 8-port multi-service muxponder.




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**Note** If you are removing the 15500-XVRA-10E1, you must remove the SFP from the muxponder before detaching the cable.

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- Step 5 Twist the connector to loosen the cable.
  - Step 6 Pull the connector from the SFP.
  - Step 7 Place the removed SFP in a container appropriate for shipping and storage.
- 

## Installing and Removing Modules

The modules used on the Cisco ONS 15530 are hot-swappable. This section describes the procedures for installing and removing the OADM (optical add drop multiplexing) module, the PSM (protection switch modules), the OSC (optical supervisory channel) module, the WB-VOA (wide-band variable optical attenuator) module, and the PB-OE (per-band power equalizer) module.



**Warning**

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

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## Installing OADM Modules and PSMs

Slot 0 of the Cisco ONS 15530 chassis holds half height OADM modules and PSMs.

To install an OADM module or PSM, follow these steps:

- 
- Step 1 Remove the module or the filler module from slot 0 of the Cisco ONS 15530 chassis.
  - Step 2 Take a new module from the shipping container.
  - Step 3 Insert the module carefully into slot 0 of the Cisco ONS 15530 chassis while guiding the upper and lower edges of the module in the tracks until its connectors come into contact with the backplane connectors. Place the module locking lever in place, and then use a number 1 Philips screwdriver to tighten the module locking lever.



- Step 4 Attach the appropriate cables.
  - Step 5 Check the LEDs to ensure proper installation.
- 

## Installing OSC Modules, WB-VOA Modules, and PB-OE Modules

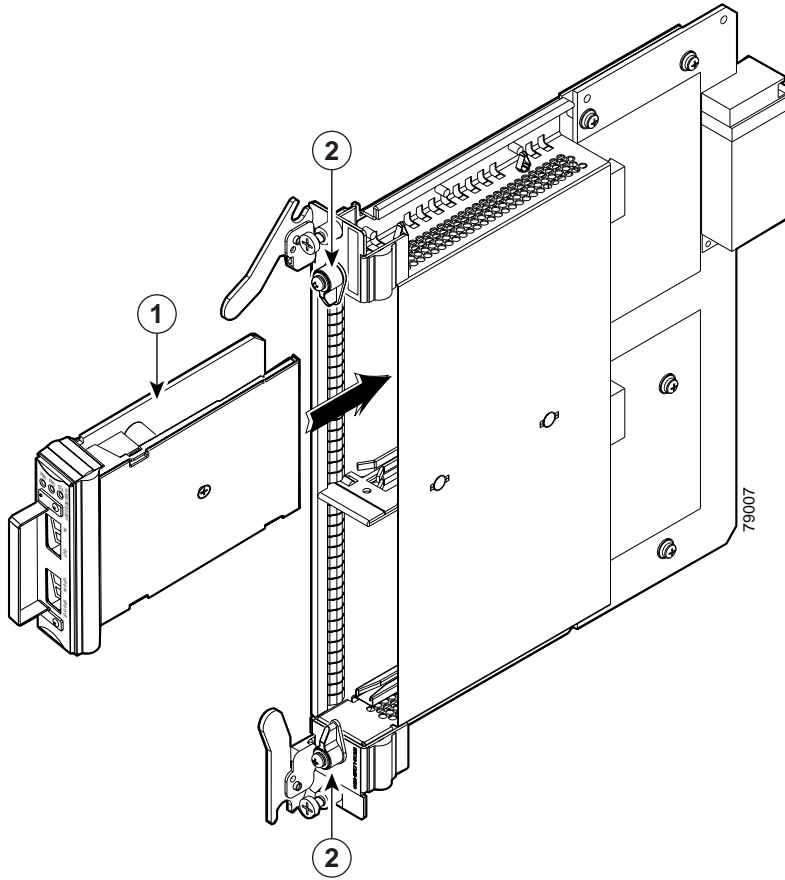
Up to two OSC modules can be installed in the carrier motherboard, one module for the west direction and one for the east direction. The WB-VOA module and PB-OE module are also installed in the carrier motherboard.

To install the OSC module, the WB-VOA module, or the PB-OE module, follow these steps:

---

- Step 1 Disconnect all optical fiber connections from the WB-VOA and PB-OE modules.
- Step 2 Remove the module or the filler module from the carrier motherboard.
- Step 3 Take a new module from the shipping container.
- Step 4 Insert the module carefully into the carrier motherboard (see [Figure 2-19](#)) slot while guiding the upper and lower edges of the module in the tracks until its connectors come into contact with the backplane connectors. Place the module locking lever in place, and then use a number 1 Philips screwdriver to tighten the module locking lever.

Figure 2-19 Module Insertion in Carrier Motherboard



1	Module	2	Module locking lever
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- Step 5 Attach the appropriate cables.
- Step 6 Check the LEDs to ensure proper installation.

Save the filler modules with the packaging material.

## Removing Modules

  
Warning

High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag.

  
Warning

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

To remove a module from the Cisco ONS 15530 without interrupting system operation, follow these steps:

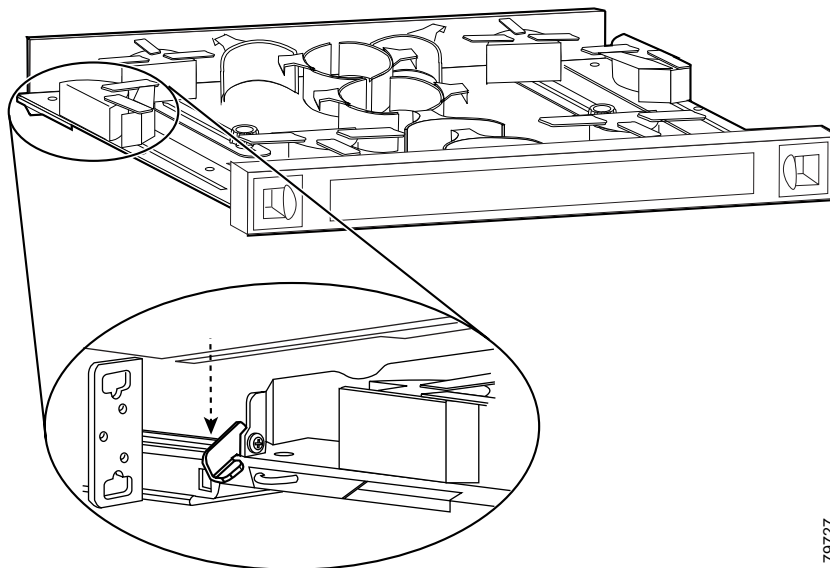
- 
- Step 1** Remove all cables from the desired module.
  - Step 2** Use a number 1 Philips screwdriver to loosen the module locking lever (see [Figure 2-19](#)).
  - Step 3** Remove the module by carefully pulling it out of its slot.
  - Step 4** Reinstall the blank filler module.
  - Step 5** Place the removed module in a container appropriate for shipping and storage.
- 

## Replacing the Fan Assembly

To replace the fan assembly in the Cisco ONS 15530, follow these steps:

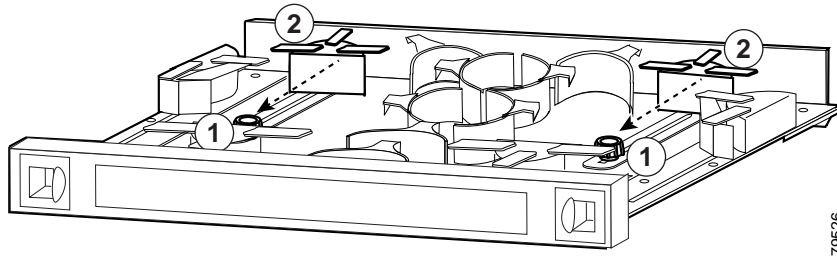
- 
- Step 1** Open and pull out the cable storage drawer installed immediately beneath the chassis that holds the system fiber optic cables.
  - Step 2** Lock the drawer by pushing the lever down at the back left side of the drawer. (See [Figure 2-20](#).)

*Figure 2-20*     *Drawer Lock*



**Step 3** Untwist the black fasteners in the drawers to loosen the cable guide spools. (See [Figure 2-21](#))

*Figure 2-21 Loosening the Cables*



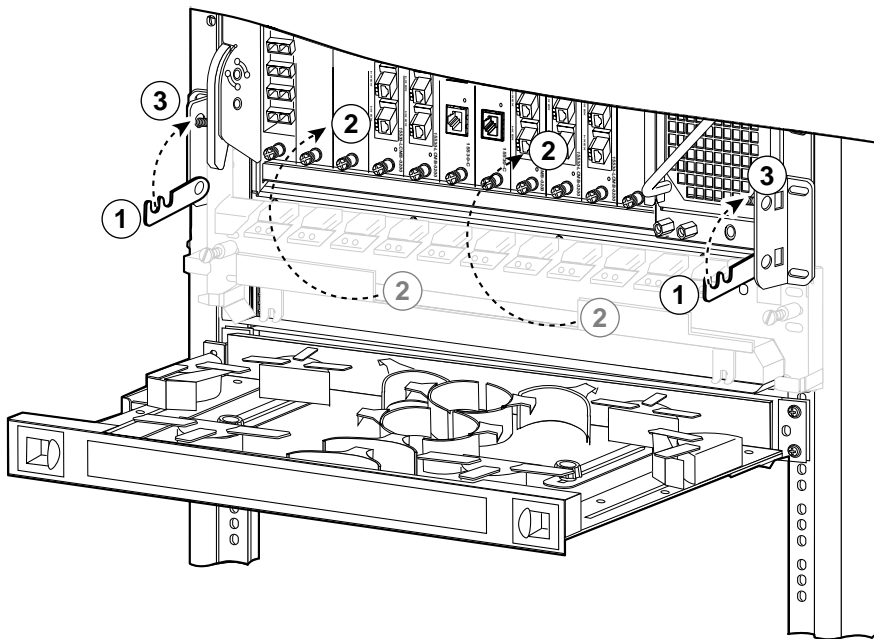
79526

1	Fasteners	2	Spools
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**Step 4** Push the spools down towards the black fasteners. Carefully pull out the cables from the spools towards the outside of the drawers. (See [Figure 2-21](#).)

**Step 5** Flip the cable management tray up so that it no longer covers the fan tray. (See [Figure 2-22](#).)

*Figure 2-22 Hooking the Cable Management Tray*



91201

1	Hook	3	Latch
2	Flip up		

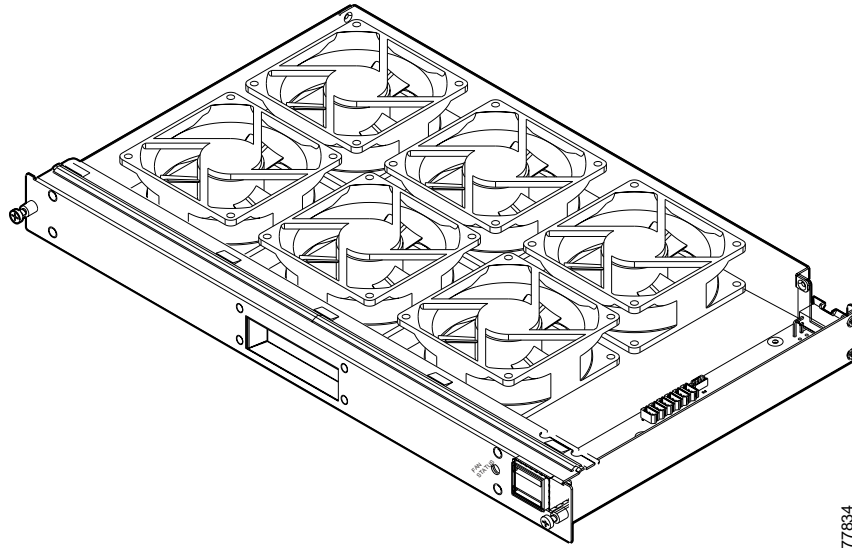
**Step 6** Attach the hook on the tray to the rack mount part of the tray on the rack so that it stays in the up position.

**Step 7** Unscrew the captive installation screws on the fan assembly.

**Step 8** Grasp the fan assembly captive installation screws and pull them towards you.

- Step 9** Pull the fan assembly out of the bay and put it aside. See [Figure 2-23](#).

*Figure 2-23 Fan Assembly*



- Step 10** Place the new fan assembly into the front chassis cavity so it rests on the chassis. Lift the fan assembly up slightly and align the top and bottom guides.
- Step 11** Push the fan assembly into the chassis until the captive installation screws meet the chassis.
- Step 12** Tighten each of the captive installation screws.
- Step 13** Power up the system and verify fan assembly operation by checking the fan assembly status. The fan status is normal when the fan assembly LED is green.

## Power Guidelines

Follow these precautions and recommendations when planning power connections to the Cisco ONS 15530:

- Check the power at your site before installation and periodically after installation to ensure that you are receiving clean power. Install a power conditioner if necessary.
- Provide proper grounding to avoid damage from lightning and power surges.



### Caution

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

**Note**

The Cisco ONS 15530 installation must comply with all applicable codes and is approved for use with copper conductors only. The ground bond fastening hardware should be of compatible material and preclude loosening, deterioration, and electrochemical corrosion of hardware and joined material. Attachment of the chassis ground to a central office or other interior ground system should be made with a 6-AWG, copper ground conductor at a minimum.

## Power Connection Guidelines for DC-Powered Systems

The DC-input power supply allows the Cisco ONS 15530 to operate at –48 VDC nominal in North America and –60 VDC in Europe.

See [Appendix A, “Specifications,”](#) for system power specifications, including input voltage and operating frequency ranges.

**Note**

The DC return is to remain isolated from the system frame and chassis (DC-I).

**Warning**

**A readily accessible disconnect device must be incorporated in the building's installation wiring.**

**Warning**

**This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a Listed and Certified fuse or circuit breaker, 25A minimum 60 VDC, is used on all current-carrying conductors.**

## Plant Wiring Guidelines

Following are guidelines for setting up the plant wiring and cabling at your site. When planning the location of the new system, consider the distance limitations for signaling, EMI, and connector compatibility, as described in the following sections.

### Interference Considerations

When wires are run for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires. This fact has two implications for the construction of plant wiring:

- Bad wiring practice can result in radio interference emanating from the plant wiring.
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in the Cisco ONS 15530.

**Note**

To predict and remedy strong EMI, you may also need to consult experts in radio frequency interference (RFI).

If you use twisted-pair cable in your plant wiring with a good distribution of grounding conductors, the plant wiring is unlikely to emit radio interference. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable.

If wires exceed recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

## Cabling Guidelines

The size of your networks and the distances between connections depend on the type of signal, the signal speed, and the transmission media (the type of cabling used to transmit the signals). For example, standard coaxial cable has a greater channel capacity than twisted-pair cabling. The distance and rate limits in the following descriptions are the IEEE recommended maximum speeds and distances for signaling; however, you can usually get good results at speeds and distances far greater than these. For example, the recommended maximum rate for V.35 is 2 Mbps, but it is commonly used at 4 Mbps without any problems. If you understand the electrical problems that might arise and can compensate for them, you should get good results with rates and distances greater than those shown here; however, do so at your own risk.

When preparing your site for network connections to the Cisco ONS 15530, you must consider a number of factors related to each type of interface:

- The type of cabling required for each type (fiber, thick or thin coaxial, foil twisted-pair, or unshielded twisted-pair cabling)
- Distance limitations for each signal type
- The specific cables you need to connect each interface
- Any additional interface equipment you need, such as transceivers, hubs, switches, modems, channel service units (CSUs), or data service units (DSUs)

Before you install the Cisco ONS 15530, have all additional external equipment and cables on hand. For ordering information, contact a customer service representative.

The extent of your network and the distances between network interface connections depend in part on the following factors:

- Signal type
- Signal speed
- Transmission medium

The distance and rate limits referenced in the following sections are the IEEE-recommended maximum speeds and distances for signaling purposes. Use this information as a guideline in planning your network connections *prior to* installing the Cisco ONS 15530.

## Powering Up the Shelf

System power is supplied by redundant –48 VDC or by redundant 120–240 VAC power supplies located on the right side of the chassis. The Cisco ONS 15530 supports the use –48 VDC and 120–240 VAC power supplies used together to provide redundancy.

## Connecting DC-Input Power



Warning

A readily accessible disconnect device must be incorporated in the building's installation wiring.



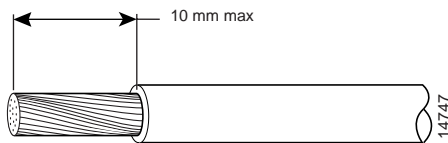
Warning

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a Listed and Certified fuse or circuit breaker 25A, minimum 60 VDC, is used on all current-carrying conductors.

To apply DC-input power to your Cisco ONS 15530, follow these steps:

- Step 1** Strip not more than 0.4 inches (10 mm) of insulation off the ends of the DC power leads (see [Figure 2-24](#)).

**Figure 2-24** Stripping Insulation



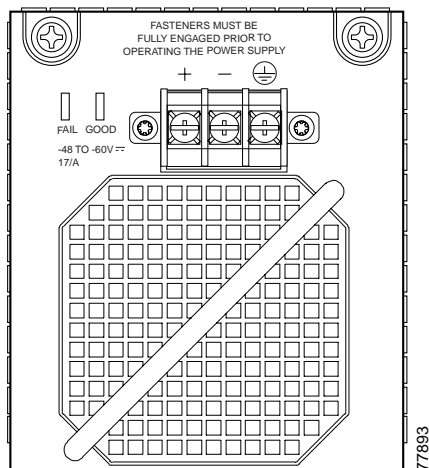
- Step 2** Connect the ground wire to the power supply ground terminal (see [Figure 2-25](#)).



**Note** The ground connections should always be connected first and disconnected last.

- Step 3** Connect the positive DC power lead from the external power source to the positive (+) DC terminal (see [Figure 2-25](#)).

**Figure 2-25** DC Power Supply



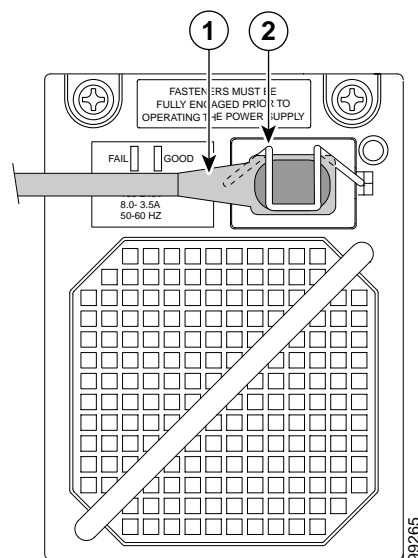


- Step 4** Connect the negative DC power lead from the external power source to the negative (–) DC terminal (see [Figure 2-25](#)).
- Step 5** If you are installing redundant DC power, repeat [Step 3](#) and [Step 4](#) on the second power supply, connecting to a second external power source.

## Connecting AC-Input Power

The Cisco ONS 15530 can be powered directly from the facility VAC input through the Cisco ONS 15530 120–240 VAC power supply (see [Figure 2-26](#)). A retention clip secures the power cord to the power supply.

**Figure 2-26** 120–240 VAC Power Supply



1	Power cord	2	Retention clip
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### Note

The AC power cord that connects to the Cisco ONS 15530 120–240 VAC power supply power cord and then to the building AC is not shipped with the Cisco ONS 15530. You must order this power cord separately.

The AC-input power supply differ in plug type; make sure you have the correct style for your site (see [Figure 2-27](#) and [Table 2-1](#).) All AC-input power supply power cords measure 8 feet (2.5 m). We recommend that you:

- Install an uninterruptible power source where possible.
- Install proper grounding to avoid damage from lightning and power surges (see the “[Grounding the Shelf](#)” section on page 2-14).

Figure 2-27 AC Power Cords

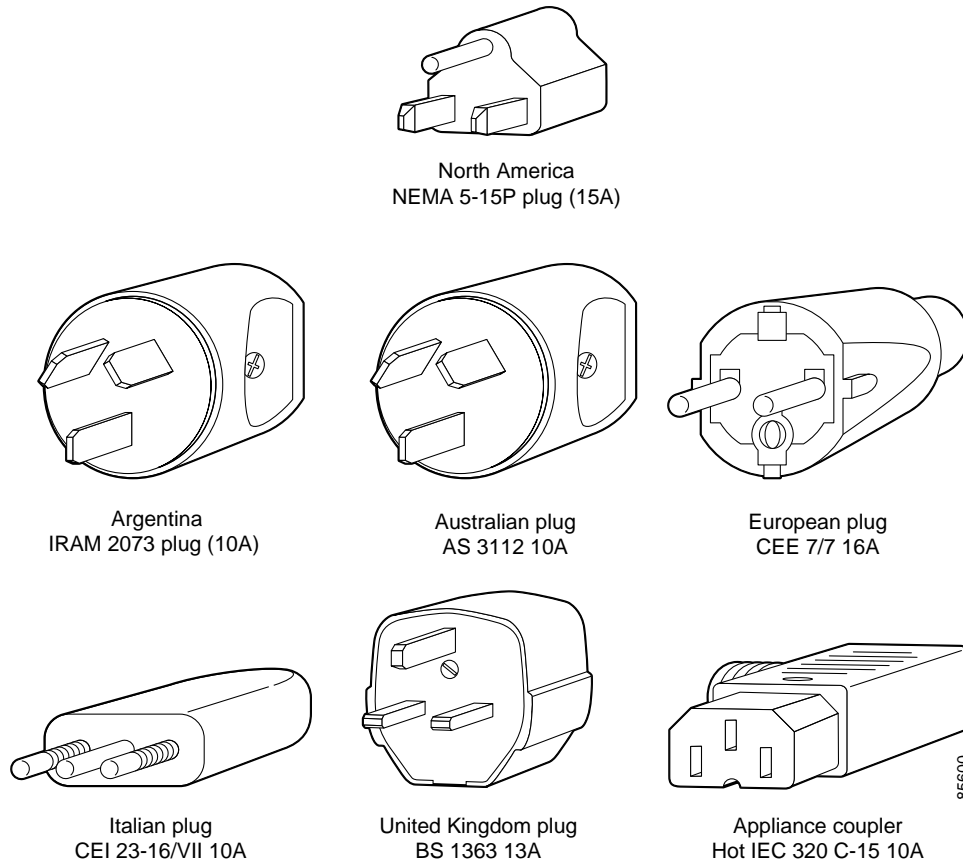


Table 2-1 AC Power Cord Options

Label	Description	Product Number
North America	120 VAC, 60 Hz AC power cord	15500-CAB-AC
Argentina	250 VAC, 50 Hz AC power cord	15500-CAB-ACR
Australian	240 VAC, 50 Hz AC power cord	15500-CAB-ACA
European	230 VAC, 50 Hz AC power cord	15500-CAB-ACE
Italian	220 VAC, 50 Hz AC power cord	15500-CAB-ACI
United Kingdom	240 VAC, 50 Hz AC power cord	15500-CAB-ACU
Switzerland (not shown)	240 VAC, 50 Hz AC power cord	15500E-CAB-ACS

Table 2-2 lists the nominal and acceptable value ranges for source AC power.

**Table 2-2** Source AC Power Specifications

Specifications	Nominal Value	Acceptable Range
AC input voltage	100 to 240 VAC, single phase	90 to 255 VAC
AC input line frequency	50/60 Hz	47 to 63 Hz
AC input current	8 A @100 VAC 3.5 A @240 VAC	—

## Installing and Removing the Power Supplies

To install an AC or DC power supply, follow these steps:

- 
- Step 1** Remove the power supply from its packaging.
  - Step 2** Grasp the power supply handle with one hand. Place your other hand underneath to support the bottom of the external power supply.
  - Step 3** Place the power supply correctly at the bay opening.
  - Step 4** Carefully slide the power supply into the bay. Make sure that the power supply is installed completely and that the faceplate is flush with the chassis.
  - Step 5** Secure the power supply installation by securing the captive installation screws at the top of the power supply.
- 

To power on the chassis, see the [“Powering Up the Shelf” section on page 2-31](#).

To remove an AC or DC power supply, follow these steps:

- 
- Step 1** Unplug the power cord on an AC power supply or remove the negative, positive, and ground connections from the DC power supply.



**Note** The ground connections should always be connected first and disconnected last.

---

- Step 2** Unscrew the captive installation screws at the top of the power supply.
  - Step 3** Grasp the power supply handle with one hand and pull the power supply out of the bay. Place your other hand underneath to support the bottom of the external power supply.
-

