Installing the Cisco Remote-PHY Solution

This chapter provides information on how to install the hardware components of the Cisco Remote-PHY solution.

Preparing for the Installation

Before you install the Cisco Remote-PHY solution, consider the following:

- Power and cabling requirements that must be in place at your installation sites
- Equipment required to install the Cisco Remote-PHY solution
- Environmental conditions your installation site must meet to maintain normal operation

Note Do not unpack the equipment until you are ready to install it. Keep the equipment in the shipping container to prevent accidental damage until you determine an installation site.

This section provides information on:

General Safety Guidelines

When you install a component, observe all caution and warning statements mentioned in this section.

The following guidelines will help ensure your safety and protect the equipment. However, these guidelines may not cover all potentially hazardous situations you may encounter during system installation, *so be alert*.

- Install your product in compliance with the national and local electrical codes. In the United States, this means the National Fire Protection Association (NFPA) 70, United States National Electrical Code. In Canada, Canadian Electrical Code, part I, CC22.1. In other countries, International Electrotechnical Commission (IEC) 364, part 1 through part 7.

- Review the safety warnings listed in the regulatory compliance and safety documentation before installing, configuring, or performing maintenance on the product.
- Disconnect power at the source before you install or remove a chassis.
- Do not attempt to lift an object you might find too heavy to lift safely.
- Keep the equipment area clear and as dust free as possible during and after installation.
- Keep tools and equipment components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the equipment.
- Use the product in accordance with its marked electrical ratings and product usage instructions.

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

Electrical Equipment Guidelines

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone in potentially hazardous conditions.
- Never assume that power has been disconnected from a circuit; always check.
- 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.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage occurs when electronic cards or components are improperly handled, and can result in complete or intermittent failures. All line cards consist of a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the cards from ESD, use an antistatic strap each time you handle the modules. Handle the carriers by the edges only; never touch the cards or connector pins.

Caution Always tighten the captive installation screws on all system components when you are installing them. These screws prevent accidental removal of the module, provide proper grounding for the system, and help to ensure that the line card connectors are properly seated in the backplane. Captive screws should be torqued to 6-8 in-lbs to ensure proper grounding and mechanical support. Never use cordless or corded drills to tighten screws; power screwdrivers and hand tools are acceptable.

Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of your system components. As you continue to work on your system, periodically touch an unpainted metal surface on the computer chassis.

The following guidelines can prevent ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to the ESD plug at the bottom of the chassis below the power entry modules. Ensure that the chassis or rack or both have a grounding cable installed.
- Handle line cards by the faceplate and carrier edges only; avoid touching the card components or any connector pins.
- When removing a card, place the removed module component-side-up on an antistatic surface or in a static-shielding bag. If the module will be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist-strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.
- When transporting a sensitive component, first place it an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.

⚠

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

Site Requirements

This section provides information about environmental, power, cabling, and mounting requirements. Ensure that you have met all of these requirements before you install your product.

Environmental Requirements for the Cisco CMC

The table below lists the operating and non-operating environmental site requirements. The ranges listed are those within which the equipment continues to operate; however, a measurement that is approaching the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental anomalies before they approach a maximum operating range.

Table 1: Specifications for Operating and Non-operating Environments for the Cisco CMC

Specification	Minimum	Maximum
Operating Temperature (nominal)	-40°F (-40°C)	131°F (55°C)
Operating Temperature (short-term)	-40°F (-40°C)	131°F (55°C)

Specification	Minimum	Maximum
Operating Humidity (nominal, with relative humidity)	10%	90%
Operating Humidity (short-term)	10%	90%
Storage Temperature	-40°F (-40°C)	185°F (85°C)
Storage (relative humidity)	5%	93%
Operating Altitude Over Allowable Temperature Range	-197 ft (-60 m)	6,000 ft (2000 m)
Maximum Operational Altitude (40°C ambient temperature)	-197 ft (-60 m)	13,800 ft (4000 m)
Non-Operating Altitude Over Allowable Temperature Range	-197 ft (-60 m)	30,000 ft (9144 m)

Environmental Requirements for the Cisco uBR-MC3GX60V-RPHY Line Card

The table below lists the operating and non-operating environmental site requirements. The ranges listed are those within which the equipment continues to operate; however, a measurement that is approaching the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental anomalies before they approach a maximum operating range.

Table 2: Specifications for Operating and Non-operating Environments for the Cisco uBR-MC3GX60V-RPHY

Specification	Minimum
Power Consumption	211W
Thermal Heat Dissipation	211W
Mean Time Between Failure (MTBF)	360,870 hours
Temperature Range	Operating: 41 to 104°F (5 to 40°C)
	Non-operating: -4 to 149°F (-20 to 65°C)
Relative Humidity	Operating: 10 to 90% non-condensing
	Non-operating: 10 to 90%
Operating Altitude	-196 to 13,123 ft. (-60 to 4000 m)

Power Guidelines

Important If this equipment is a Class I equipment, it must be grounded.

- If this equipment plugs into an outlet, the outlet must be near this equipment, and must be easily accessible.
- Connect this equipment only to the power sources that are identified on the equipment-rating label, which is normally located close to the power inlet connector.
- This equipment may have two power sources. Be sure to disconnect all power sources before working on this equipment.
- If this equipment does not have a main power switch, the power cord connector serves as the disconnect device.
- Always disconnect the plug or the connector to disconnect a cable. Do not pull the cable itself.

Laser Safety Guidelines for the Cisco CMC

- Do not stare into an unmated fiber or at any mirror-like surface that could reflect light emitted from an unterminated fiber.
- Do not view an activated fiber with optical instruments such as eye loupes, magnifiers, or microscopes.
- Use safety-approved optical fibers to maintain compliance with applicable laser safety requirements.

Warning **This equipment is a Class 1 laser product.** Statement 1008

Warning **Invisible laser radiation present. Avoid direct exposure to the laser light source.** Statement 1016

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

Mounting Considerations for the Cisco CMC

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024.

Warning **Avoid personal injury and damage to this equipment. An unstable mounting surface may cause this equipment to fall.**

The Cisco CMC supports two types of mounting. Consider the following guidelines for mounting the Cisco CMC:

Wall-Mounting Guidelines for the Cisco CMC

The Cisco CMC can be mounted on a concrete, brick, wood, or metal wall, or in a cabinet. Before you wall-mount the Cisco CMC, consider the following guidelines:

- Be aware of the size and weight of the equipment. A fully loaded Cisco CMC weighs over 26 lbs (11.8 kg). Ensure that the mounting location has a stable, flat surface, and can safely support the maximum weight of the equipment.
- Ensure that the installation site meets the ventilation requirements given in the data sheet to avoid the possibility of equipment overheating.
- Ensure that the installation site and operating environment is compatible with the International Protection (IP) rating specified in the data sheet.
- Ensure that proper handling and lifting techniques are employed when working in confined spaces with heavy equipment.

Strand-Mounting Guidelines for the Cisco CMC

Before you strand-mount the Cisco CMC, consider the following guidelines:

- Be aware of the size and weight of the equipment while strand-mounting. A fully loaded Cisco CMC weighs over 26 lbs (11.8 kg). Ensure that the strand can safely support the maximum weight of the equipment.
- Ensure that proper handling and lifting techniques are employed when working in confined spaces with heavy equipment.
- Ensure the ground area below the installation site is clear of personnel before hoisting the equipment. If possible, block the walkway below the hoisting area to prevent pedestrian traffic during hoisting.

Tools for Installation

Tools for the Cisco CMC Installation

You need the following tools to install and cable the Cisco CMC:

- Torque wrench capable of 5 to 12 ft-lbs (6.8 to 16.3 Nm)
- 4-inch to 6-inch extension for torque wrench
- 1/8-inch slot screwdriver for the F-connectors
- 1/2-inch socket for the strand clamp bolts

- #2 Phillips-head screwdriver for the grounding screw
- Heavy-duty wire cutters or snips for cutting the cable
- Deburring tool for filing the rough edges

Tools for the Cisco uBR-MC3GX60V-RPHY Line Card Installation

You need the following tools to install and cable the Cisco uBR-MC3GX60V-RPHY line card:

- T-10 Torx driver tool
- 1/4-inch flathead screwdriver
- Blank Cisco uBR10012 slot cover (if required)
- ESD-preventive wrist strap
- Antistatic surface, such as a mat or antistatic bag

Torque Specifications for the Cisco CMC

The table below provides the torque specifications for the fasteners used with the Cisco CMC.

Fastener	Torque Specification	Illustration
Strand clamp mounting bracket bolts	5 ft-lb to 8 ft-lb (6.8 Nm to 10.8 Nm)	
Housing closure bolts	5 ft-lb to 12 ft-lb (6.8 Nm to 16.3 Nm)	
5/8" port plugs	6.7 ft-lb (9 Nm)	
PG11-to-5/8" adapter	4.63 ft-lb (6.25 Nm)	
RJ-45 port PG16 plug	5.55 ft-lb (7.5 Nm)	

Fastener	Torque Specification	Illustration
Power port PG11 gland	Plastic: 3 ft-lb (4 Nm) Metal: 4.63 ft-lb (6.25 Nm)	
RJ-45 port PG16 gland	Plastic: 4.44 ft-lb (6 Nm) Metal: 5.5 ft-lb (7.5 Nm)	
PG11 F-connector	4.63 ft-lb (6.25 Nm)	
5/8" F-connector	6.7 ft-lb (9 Nm)	

Unpacking the Equipment

Before You Begin

Read the safety guidelines and review the electrical safety and ESD-preventive guidelines.

Caution Ensure that you are properly grounded with an ESD-preventive wrist strap.

Step 1 Open the shipping box.

Step 2 Remove the equipment from the box.

Step 3 Place the equipment on an antistatic surface.

Installing the Cisco CMC

This section provides information on how to install the Cisco CMC.

Mounting the Cisco CMC

Wall-Mounting the Cisco CMC

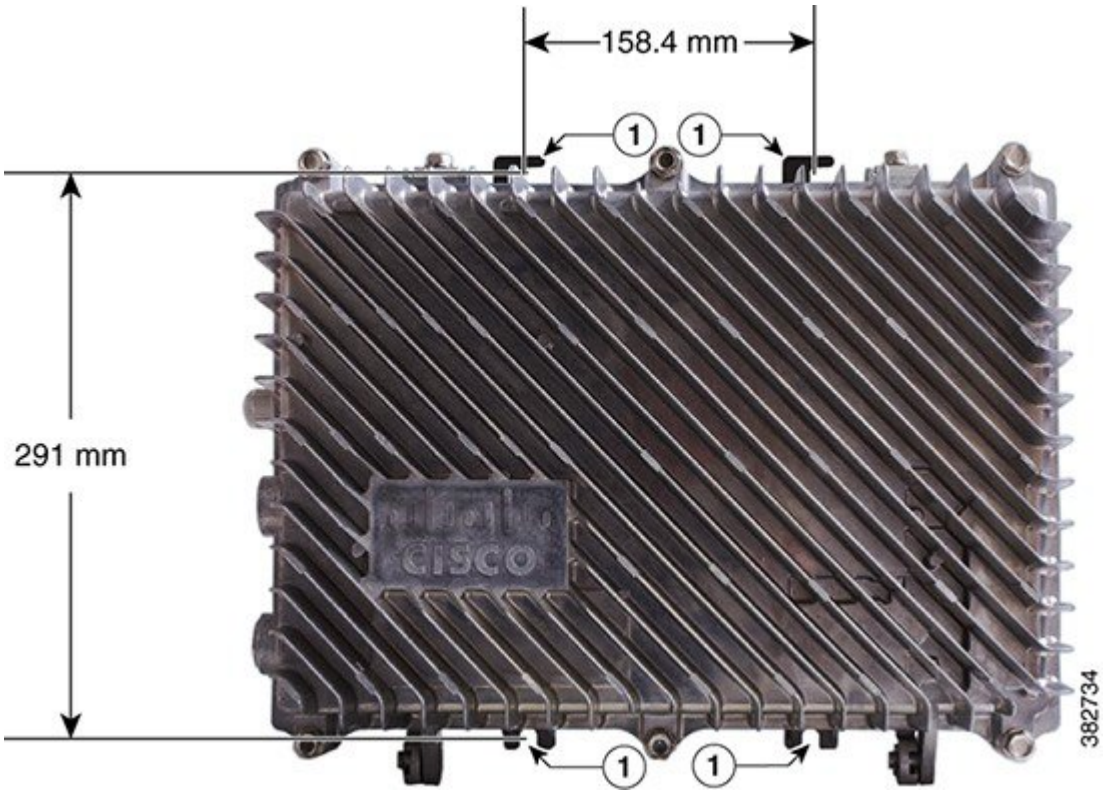
Before You Begin

- To prevent injury and damage to the equipment, review the safety guidelines in Wall-Mounting Guidelines for the Cisco CMC, on page 6 before installing the Cisco CMC on the wall.
- Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Step 1 Drill four holes at a distance of 291 mm x 158.4 mm on the wall as shown in the figure below.

Note Ensure proper ventilation around the equipment. Inadequate ventilation can cause the equipment to overheat.

Figure 1: Wall-Mounting the Cisco CMC



1	Mounting holes		—

Step 2 Align the mounting holes on the Cisco CMC with the holes on the wall.

Step 3 Insert a 5/16" or M8 expansion bolt through each mounting hole on the Cisco CMC and then into the hole on the wall.

Strand-Mounting the Cisco CMC

Strand-mounting is the aerial installation of the Cisco CMC.

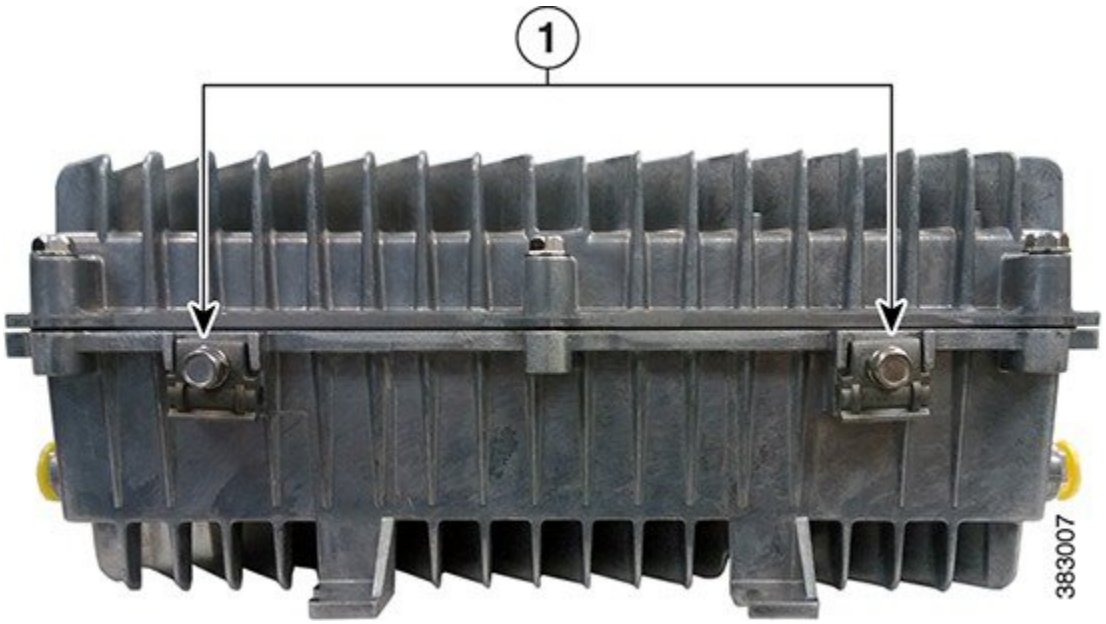
Before You Begin

- To prevent injury and damage to the equipment, review the safety guidelines in Strand-Mounting Guidelines for the Cisco CMC, on page 6 before installing the Cisco CMC on the strand.
- Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.
- Have the following tools ready before performing this task:
  - Torque wrench
  - 1/2-inch socket

Step 1 Check the strand size. The minimum strand diameter must be 5/16".

Step 2 Loosen the strand clamp bolts on the Cisco CMC to separate the clamps enough to insert the strand, but do not remove them.

Figure 2: Location of the Strand Clamp Bolts on the Cisco CMC



1	Strand clamp bolts		—

Step 3 Place the Cisco CMC into proper position on the strand.

Step 4 Insert the clamps over the strand and tighten the strand clamp bolts with your fingers. This allows additional side-to-side movement of the Cisco CMC as needed.

Figure 3: Strand-Mounting the Cisco CMC

1	Strand	2	Strand clamps

Step 5 Move and position the Cisco CMC on the strand as required for installing the cables.

Step 6 Tighten the strand clamp bolts from 5 ft-lb to 8 ft-lbs (6.8 to 10.8 Nm) using a torque wrench and 1/2-inch socket .

Note Due to the strand tension, a slight tilt of the face of the Cisco CMC is normal.

Opening the Cisco CMC

Installation or maintenance of the Cisco CMC requires opening the housing to access the internal components.

Before You Begin

Have the following tools ready before performing this task:

- Torque wrench

Step 1 Loosen the 1/2-inch closure bolts on the Cisco CMC lid using a torque wrench.

Figure 4: Location of the Closure Bolts on the Cisco CMC

1	Closure bolts		—

Step 2 Open the Cisco CMC lid.

Note The closure bolts remain attached to the Cisco CMC lid after opening the housing.

Removing and Installing the Accessories on the Cisco CMC

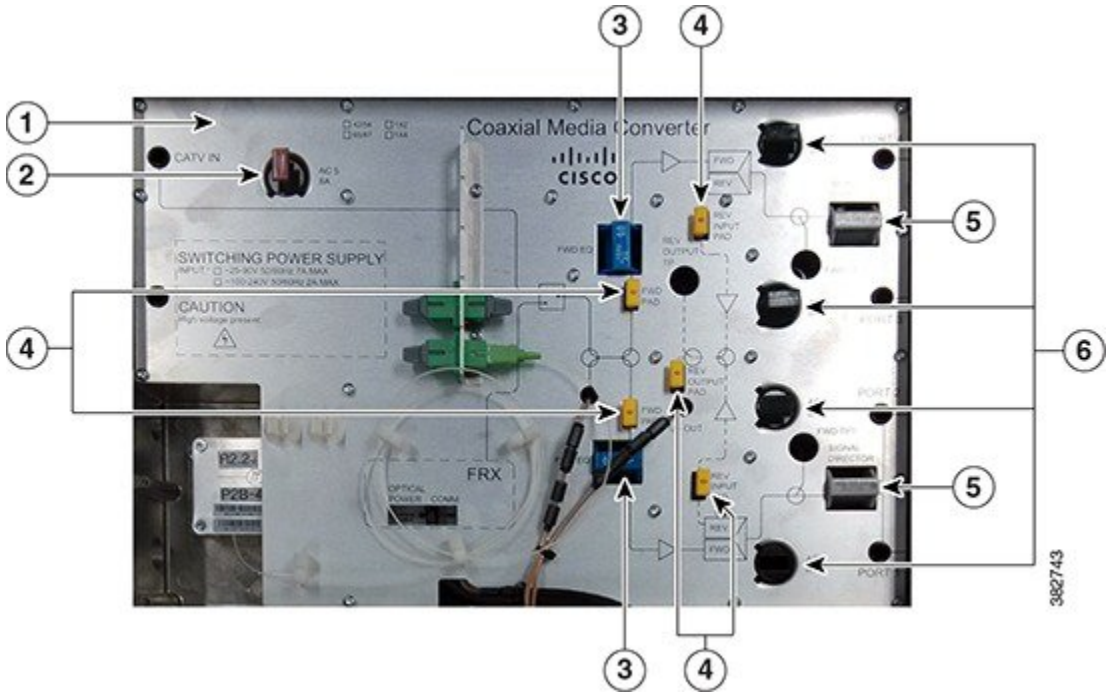
This section provides information on how to remove and install the following accessories located inside the Cisco CMC.

Accessory	Description	Illustration
Attenuator pads	An attenuator pad produces flat (even) loss across the forward and reverse frequency spectrums. It is used during the station balancing to adjust signal levels. The loss (in dB) produced by an attenuator pad is equal to the value printed on the top of the attenuator pad. An attenuator pad with *75* Ω printed on the top works as a 75 ohm terminator. **Important** Do not change the attenuator pads, unless specified by the system design.	
Equalizers	An equalizer produces linear tilt. It must be used on the Cisco CMC if the output tilt does not have the desired output tilt. The EQ value specified on the equalizer is the amount of tilt from lowest to highest frequency (52 to 1002 MHz).	

Accessory	Description	Illustration
Signal director—Splitter	A splitter splits the RF input signal to feed two RF output ports. It is used for configuring the 4-way RF configuration on the Cisco CMC.	
Signal director—Jumper	A jumper routes the RF input signal to the RF output port. It is used for configuring the 2-way RF configuration on the Cisco CMC.	
AC shunts	An AC shunt is used for configuring the power direction in the Cisco CMC with the 60VAC power supply unit. Use the red AC shunt for the RF input port and black AC shunts for the RF output ports. **Warning** Remove all the AC shunts if they are installed in the Cisco CMC before connecting the coaxial cables to the F-connectors. **Note** Do not use AC shunts in the Cisco CMC with the 220VAC power supply unit.	

These accessories can be removed and installed in the Cisco CMC through the cutouts in the base cover.

Figure 5: Location of the Accessories Inside the Cisco CMC



1	Base cover	4	Attenuator pads
2	AC shunt for the CATV IN port	5	Signal directors
3	Equalizers	6	AC shunts for the RF output ports

Before You Begin

Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove the existing accessory from the slot if it is already installed.

Step 2 Align all the pins on the accessory with the pin holes in the appropriate accessory slot.

Step 3 Insert the accessory into the slot.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Installing the Coaxial Cables on the Cisco CMC

Coaxial cables carry the forward-path RF signal input and outputs, and reverse-path RF signal inputs on the Cisco CMC. The coaxial cables can also supply 25 to 90VAC power input to the Cisco CMC. You can install up to:

- Five coaxial cables on the Cisco CMC with the 220VAC Power Supply Unit (PSU)
- Six coaxial cables on the Cisco CMC with the 60VAC PSU

Trimming the Center Conductor on the F-Connector

F-connectors are used for the RF connections on the Cisco CMC. The Cisco CMC supports PG11 and 5/8" F-connectors. The Cisco CMC has a strip on the external housing that shows the center conductor pin trim length for the F-connector. You must trim the center conductor pin if it extends beyond the strip line on the Cisco CMC before inserting it into the RF ports.

Before You Begin

Have the following tools ready before performing this task:

- Heavy-duty wire cutter
- Deburring tool

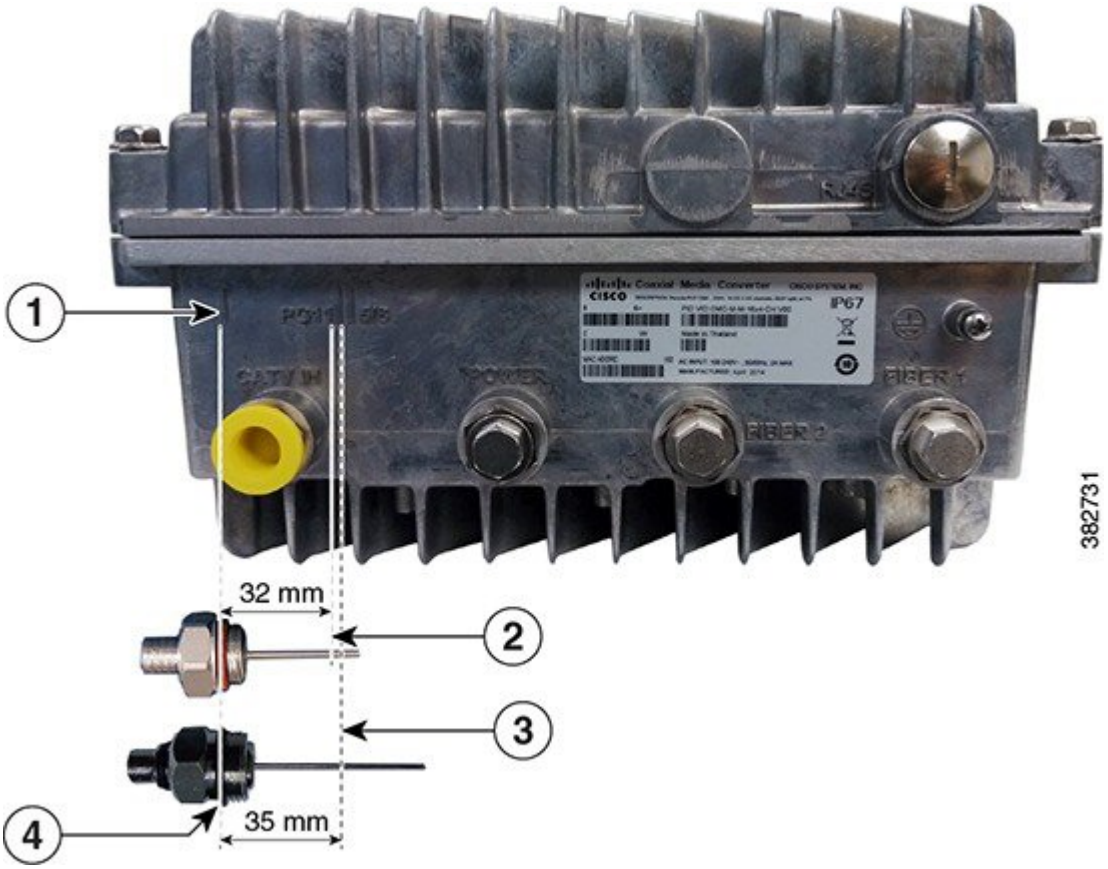
Step 1 Place the F-connector above the CATV IN port on the Cisco CMC so that the seal shoulder aligns with the strip.

Step 2 Perform one of the following:

- For the 5/8" F-connector, if the center conductor pin extends beyond the 5/8”-strip line, trim the pin to the 5/8”-strip line (35 mm) using a heavy-duty wire cutter.
- For the PG11 F-connector, if the center conductor pin extends beyond the PG11-strip line, trim the pin to the PG11-strip line (32 mm) using a heavy-duty wire cutter.

The figure below shows a visual guide of the center conductor trim length.

Figure 6: Trimming the Center Conductor Pin



1	Strip	3	5/8"-strip
2	PG11-strip	4	Seal shoulder

Step 3 Remove any burrs or sharp edges on the trimmed end of the center conductor pin using a deburring tool.

Connecting the Coaxial Cable to the Cisco CMC

Use the 75 ohm coaxial cables with the Cisco CMC.

Before You Begin

- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.
- Remove the plastic cover or 5/8" port plug from the RF ports on the Cisco CMC using a torque wrench.

- Have the following tools ready before performing this task:
  - Heavy-duty wire cutter
  - Torque wrench
  - Slot screwdriver

Step 1 Trim the center conductor pin with a heavy-duty wire cutter if it extends beyond the strip line on the Cisco CMC. See Trimming the Center Conductor on the F-Connector, on page 16.

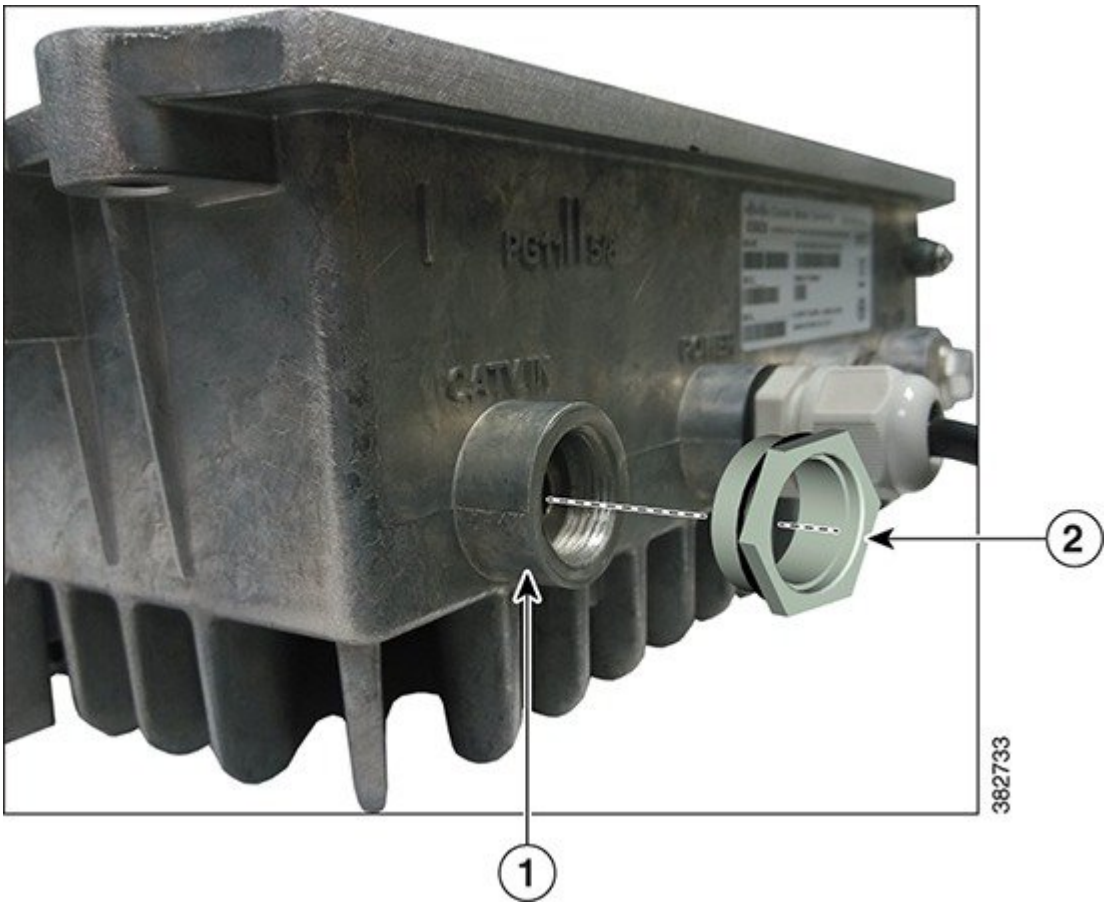
Step 2 Lightly loosen the seizure screw, do not remove it. The figure below shows the location of the seizure screw inside the Cisco CMC.

Figure 7: Location of Seizure Screw

1	Seizure screw		—

Step 3 To use the PG11 F-connector, remove the PG11-to-5/8" adapter plug from the RF port using a torque wrench. The figure below shows the PG11-to-5/8" adapter plug.

Figure 8: Removing the PG11-to-5/8" Adapter Plug



1	RF port	2	PG11-to-5/8" adapter plug

Step 4 Insert the F-connector into the RF port. Tighten the connector nut with a torque wrench.

Step 5 Tighten the seizure screw from 2 ft-lb to 5 ft-lb (2.7 Nm to 6.8 Nm) using a slot screwdriver.

Step 6 Remove the AC shunt for the RF port to prevent damage to the equipment that is connected to the other end of the coaxial cable.

Step 7 Connect the coaxial cable to the F-connector.

Step 8 Reinstall the AC shunt for the RF port.

Step 9 Repeat Step 1, on page 18 through Step 7, on page 19 for each RF port used.

Step 10 Check if RF signal is present at the unused RF ports and perform one of the following:

- If RF signal is present, insert a 75 ohm terminator into the RF port and tighten according to the manufacturer specifications.

- If RF signal is not present, insert a 5/8" port plug into the RF port and tighten from 5 ft-lb to 8 ft-lb (6.8 Nm to 10.8 Nm) using a torque wrench.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Installing a Fiber Adapter on the Cisco CMC

The Cisco CMC supports two types of fiber adapters:

- SC/APC-LC/APC fiber adapter
- SC/APC-SC/APC fiber adapter

The Cisco CMC contains two pre-installed SC/APC-SC/APC fiber adapters. Perform this procedure to install additional fiber adapters.

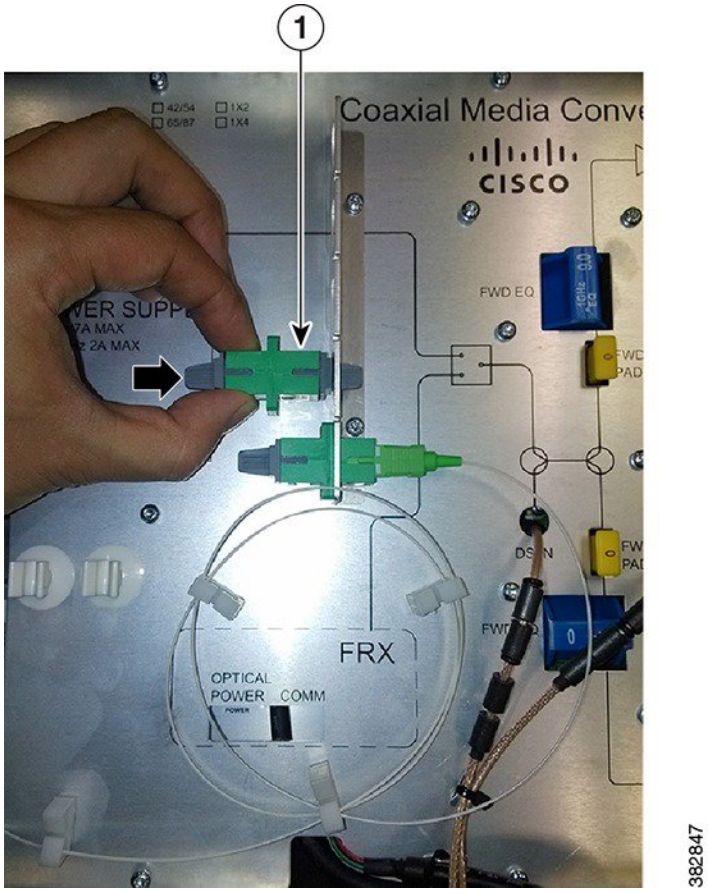
Before You Begin

Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Align the fiber adapter with the slot.

Step 2 Insert the fiber adapter through the slot as shown in the figure below until you feel the fiber adapter lock into the slot.

Figure 9: Installing the Fiber Adapter on the Cisco CMC



1	SC/APC-SC/APC fiber adapter		—

Step 3 Remove the dust plug from the fiber adapter and connect the optical fibers. See Connecting the Optical Fibers to the SFP Module, on page 23 and Connecting the Optical Fibers to the FRx, on page 28.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Installing an SFP Module on the Cisco CMC

The Cisco CMC supports Gigabit Ethernet SFP and Ethernet Passive Optical Network (EPON) SFP.

Before You Begin

Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove the SFP module from its protective packaging.

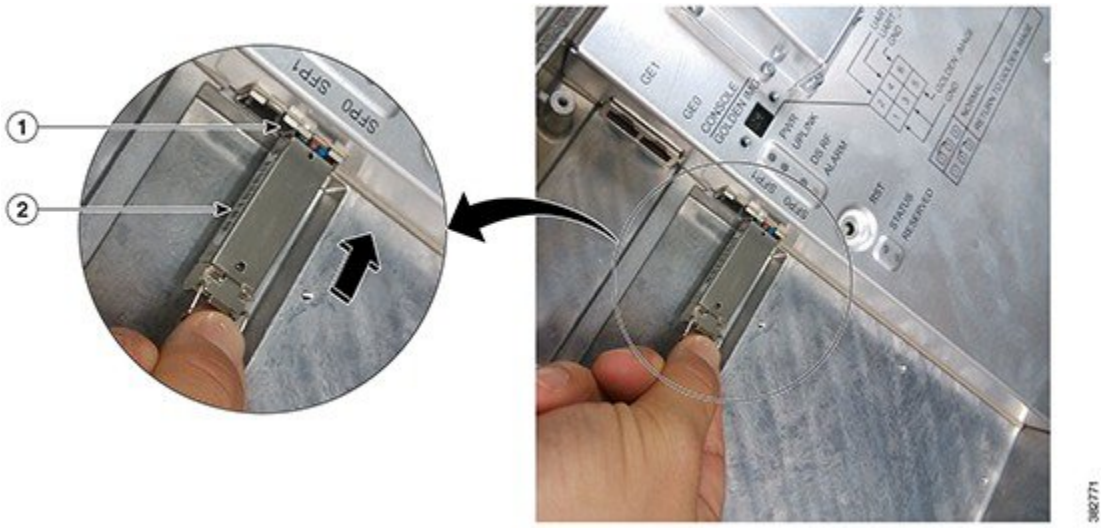
Step 2 Locate the transmit (Tx) and receive (Rx) markings on the top side of the SFP module.

Note On some SFP modules, the Tx and Rx markings may be replaced by arrowheads pointing from the SFP connector (transmit direction or Tx) and towards the connector (receive direction or Rx).

Step 3 Align the SFP module with the socket opening.

Step 4 Insert the SFP module into the socket until you feel the SFP module connector lock into the socket connector and then close the SFP latch.

Figure 10: Installing the SFP module on the Cisco CMC



1	SFP port	2	SFP module

Step 5 Remove the dust plug from the SFP module and save it for future use.

Note For optical SFP module, before you remove the dust plugs and make any optical connections, observe these guidelines:

- Do not remove the protective dust plugs on the SFP module until you are ready to make a connection.
- Inspect and clean the connector end-faces just before you make any connections.
- Grasp the connector housing to plug or unplug a optical.

Step 6 Perform one of the following:

- For the optical SFP module, connect the optical fibers to the SFP module. See Connecting the Optical Fibers to the SFP Module, on page 23.
- For the Gigabit Ethernet SFP module, connect the RJ-45 cable to the Gigabit Ethernet SFP module. See Connecting the RJ-45 Cables to the Cisco CMC, on page 25.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Connecting the Optical Fibers to the SFP Module

Before You Begin

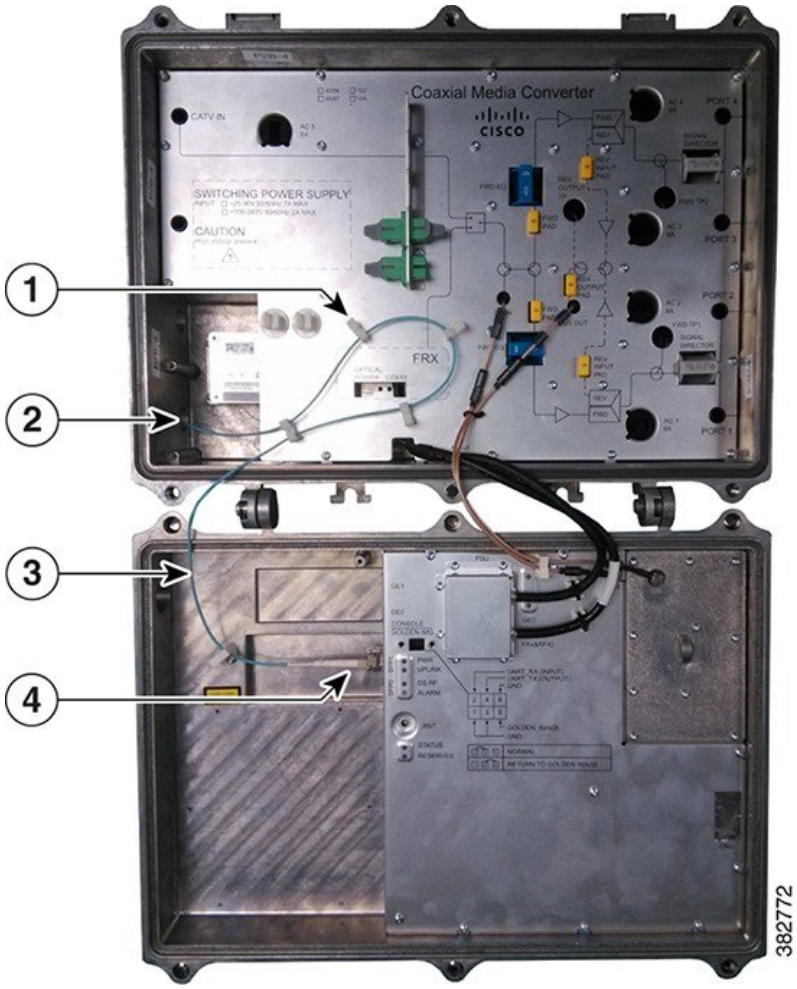
- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.
- Install the SFP module on the Cisco CMC. See Installing an SFP Module on the Cisco CMC, on page 22.

- Remove the 5/8" port plug from the fiber port on the Cisco CMC using a torque wrench

Step 1 Insert the optical fiber into the fiber port.

Step 2 Secure the optical fibers using the cable clips and insert the optical fiber connector into the SFP port until it clicks and locks into place and as shown in the figure below:

Figure 11: Connecting Optical Fiber to the SFP Port



1	Cable clips	3	Optical fiber
2	Fiber port	4	Optical fiber connector

Step 3 Seal the fiber port with an appropriate gland to waterproof the port.

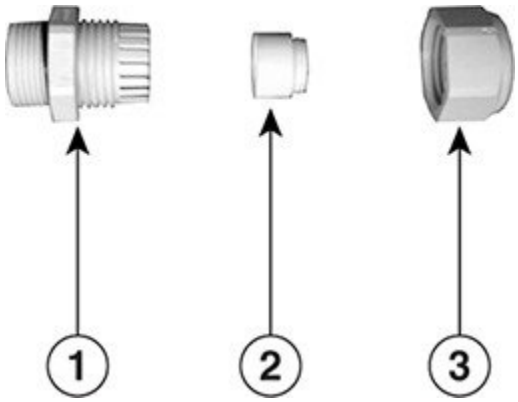
What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Connecting the RJ-45 Cables to the Cisco CMC

Use the PG16 gland to connect the RJ-45 cable to the Cisco CMC.

Figure 12: PG16 Gland



1	Body	3	Sealing nut
2	Seal		—

The Cisco CMC supports two types of PG16 glands for the RJ-45 port:

- PG16 gland with one hole for single Ethernet connection
- PG16 gland with two holes for dual Ethernet connection

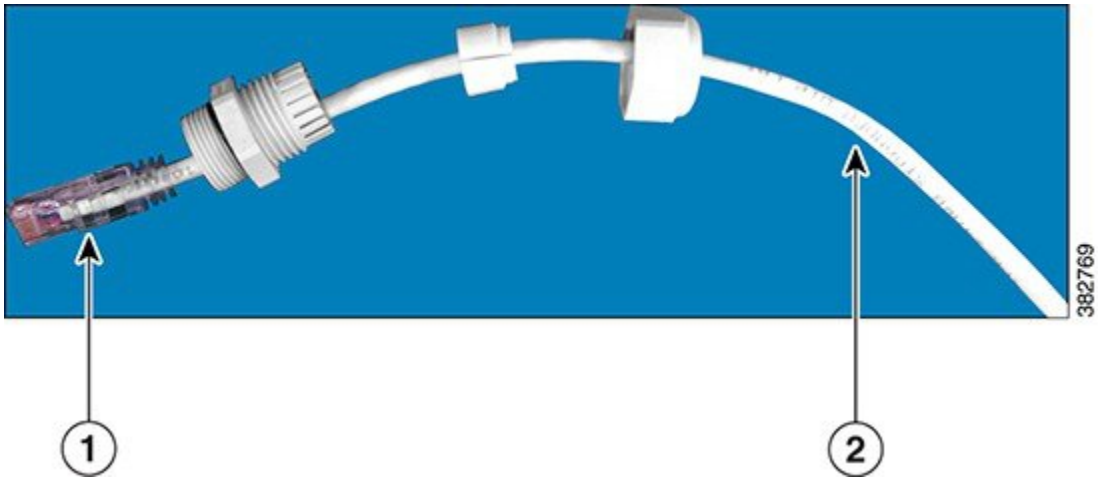
Before You Begin

- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.
- Have the following tools ready before performing this task:
  - Torque wrench

Step 1 Remove the PG16 port plug or the PG16 gland from the RJ-45 port on the Cisco CMC if it is already installed.

Step 2 Insert the RJ-45 cable through the PG16 gland as shown in the figure below.

Figure 13: Inserting the RJ-45 Cable through the PG16 Port Plug

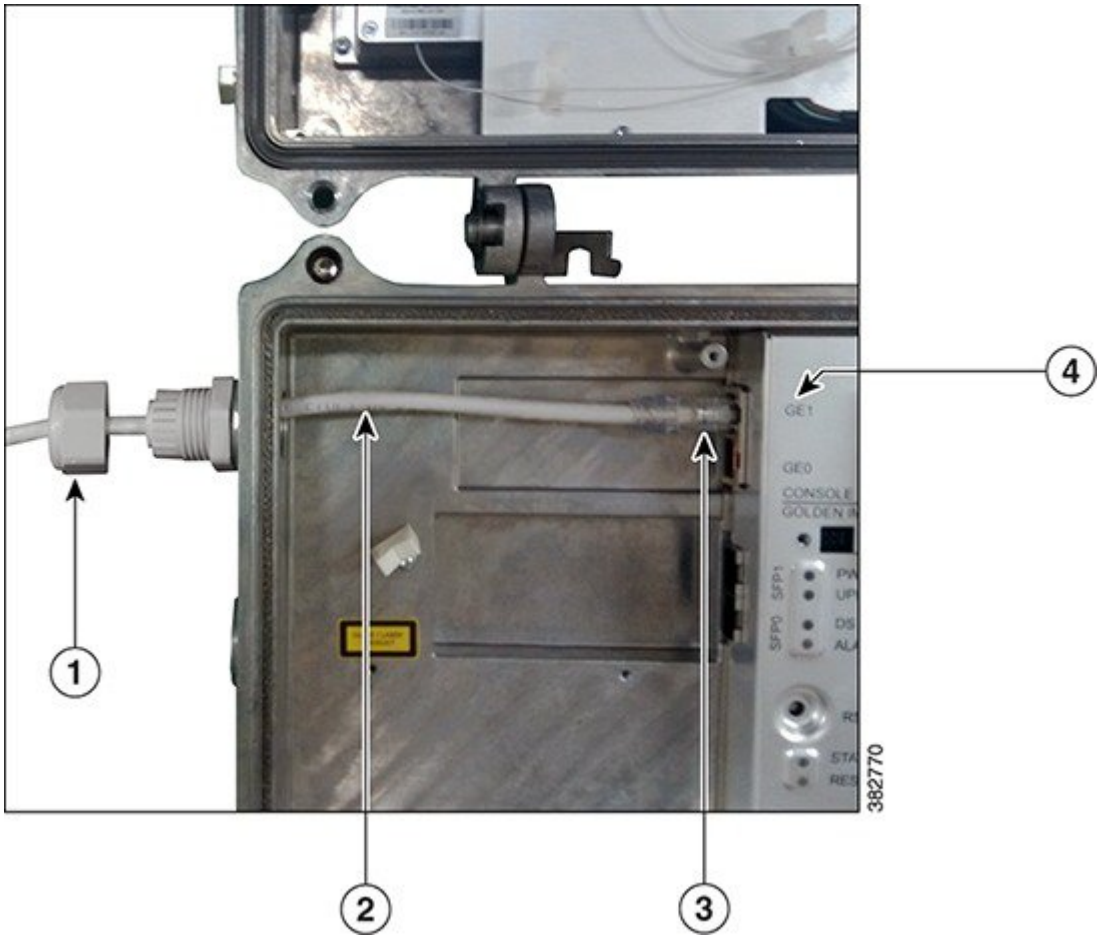


1	RJ-45 connector	2	RJ-45 cable

Step 3 Insert the RJ-45 connector through the RJ-45 port on the Cisco CMC.

Step 4 Insert the RJ-45 connector into the Gigabit Ethernet port until it clicks and locks into place.

Figure 14: Connecting the RJ-45 Connector to the Cisco CMC



1	PG16 gland	3	RJ-45 connector
2	RJ-45 cable	4	RJ-45 Gigabit Ethernet port

Step 5 Tighten the PG16 gland into the RJ-45 port using a torque wrench (4.44 ft-lb) and then tighten the dome cap using a torque wrench (2.44 ft-lb).

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Connecting the Optical Fibers to the FRx

Before You Begin

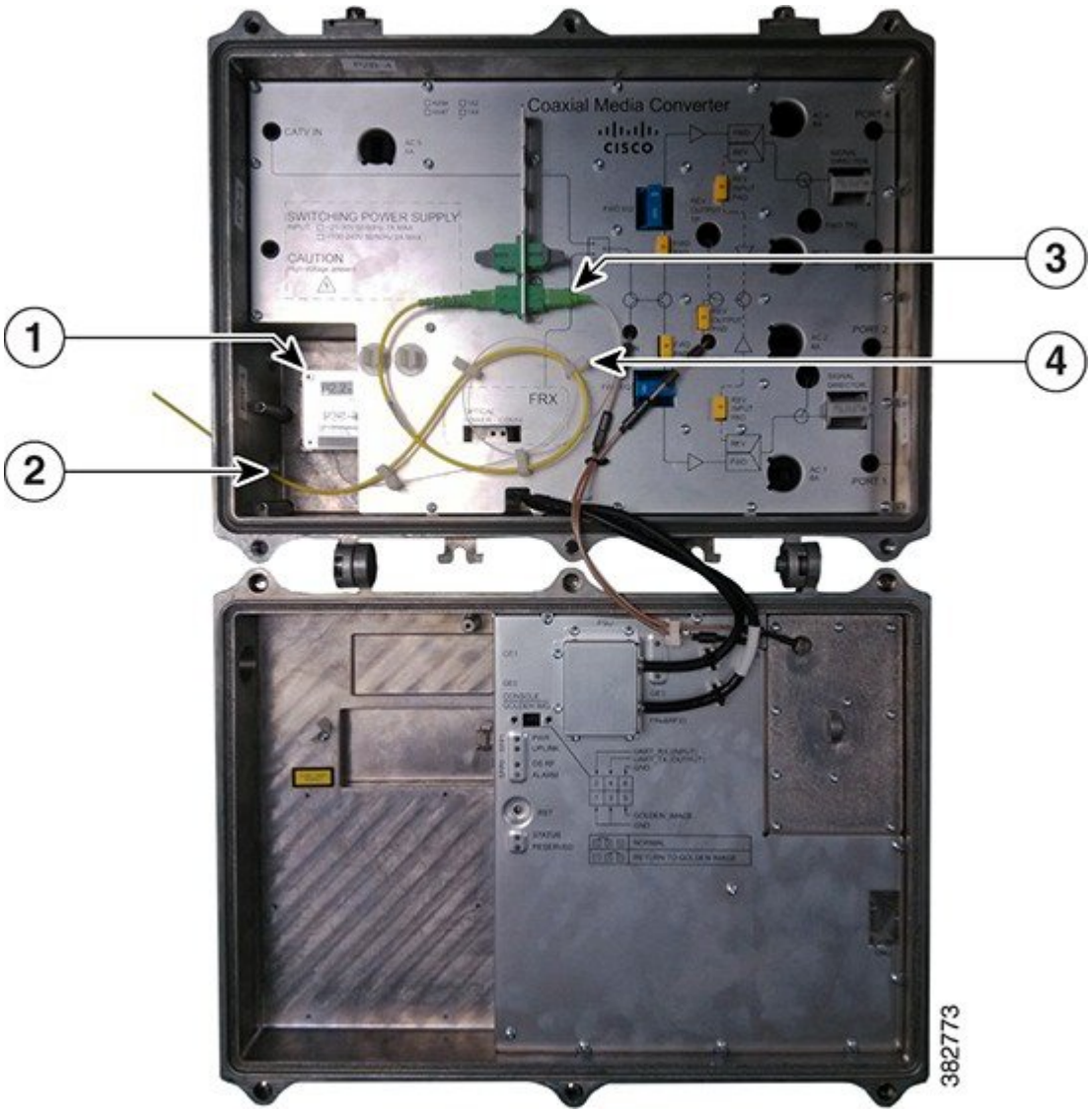
- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.
- Ensure that the Forward Optical Receiver Module (FRx) module is installed on the Cisco CMC. To install the FRx on the Cisco CMC, contact the Cisco Technical Assistance Center (TAC) for further assistance.

- Remove the 5/8" port plug from the fiber port on the Cisco CMC using a torque wrench.

Step 1 Insert the optical fiber into the fiber port.

Step 2 Secure the optical fiber using the cable clips and insert the optical fiber connector to the fiber adapter as shown in the figure below:

Figure 15: Connecting Optical Fiber to the Fiber Adapter



1	FRx	3	Fiber adapter
2	Optical fiber	4	Cable clip

Step 3 Seal the fiber port with an appropriate gland to waterproof the port.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Connecting I/O to the Cisco CMC

The Cisco CMC supports two types of I/O configurations:

- Forward-path I/O configurations
- Reverse-path I/O configurations

Forward-Path I/O Configurations

Forward-path refers to the signals received at the Cisco CMC from the headend. These signals are amplified in the Cisco CMC and routed to the subscribers through the cable modems. The Cisco CMC supports the following forward-path RF configurations:

- 4-way forward output RF configuration (default RF configuration)
- 2-way forward output RF configuration

Reverse-Path I/O Configurations

Reverse-path refers to the signals received at the Cisco CMC from the cable modem. These signals are amplified in Cisco CMC and returned to the headend optically through the fiber portion of the network. The reverse-path RF configuration is not used in all networks. The Cisco CMC supports the following reverse-path RF configurations:

- 4-way reverse input RF configuration (default RF configuration)
- 2-way reverse input RF configuration

The following sections provide information on how to enable the different RF configurations on the Cisco CMC:

Enabling the 4-Way Forward Output RF Configuration on the Cisco CMC

Before You Begin

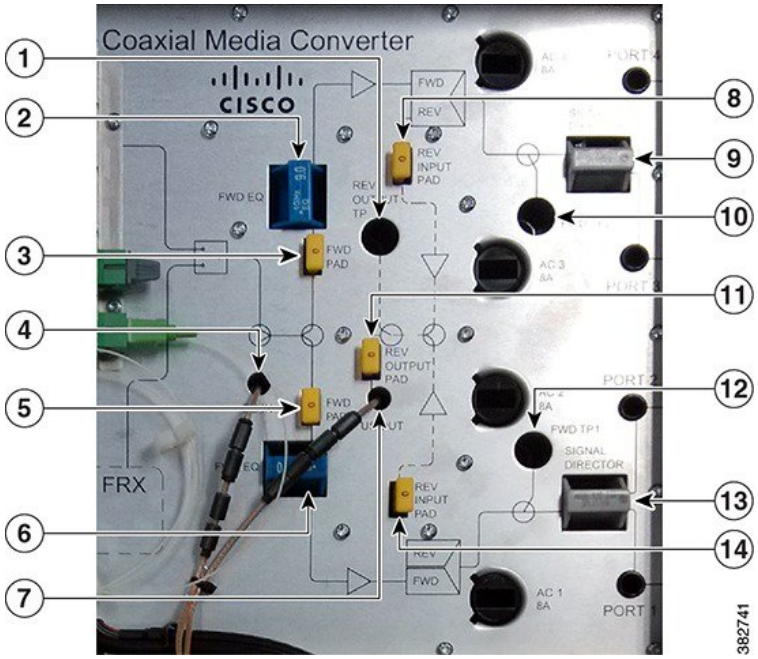
Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove all the AC shunts installed on the Cisco CMC. Removing the AC shunts prevents damage to the equipment that is connected on the other end of the coaxial cable. Power surge to the components and F-connectors is reduced when the AC shunts are removed.

Caution The RF connectors and housing seizure assemblies can get damaged if the AC shunts are not removed from the Cisco CMC before installing or removing the components from the housing.

Step 2 Insert the signal director—splitter to provide the RF output to the four RF output ports.

Figure 16: 4-Way Forward Output RF Configuration



1	Reverse output test point	8	Reverse input pad 2
2	Forward equalizer 2	9	Splitter 2
3	Forward pad 2	10	Forward test point 2
4	Downstream input port	11	Reverse output pad
5	Forward pad 1	12	Forward test point 1
6	Forward equalizer 1	13	Splitter 1
7	Upstream input port	14	Reverse input pad 1

Step 3 Perform one of the following:

- If FRx is installed on the Cisco CMC, connect the optical input signal to the FRx. See Connecting the Optical Fibers to the FRx, on page 28.

- If FRx is not installed on the Cisco CMC, insert the F-connector into the CATV IN port. Connect the coaxial cable from the node or amplifier in the HFC network to the F-connector. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Step 4 Insert the F-connector into each RF output port (Port 1 through Port 4). Connect the coaxial cable from each F-connector to the cable modem. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Step 5 Reinstall the AC shunts on the Cisco CMC.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Enabling the 2-Way Forward Output RF Configuration on the Cisco CMC

Before You Begin

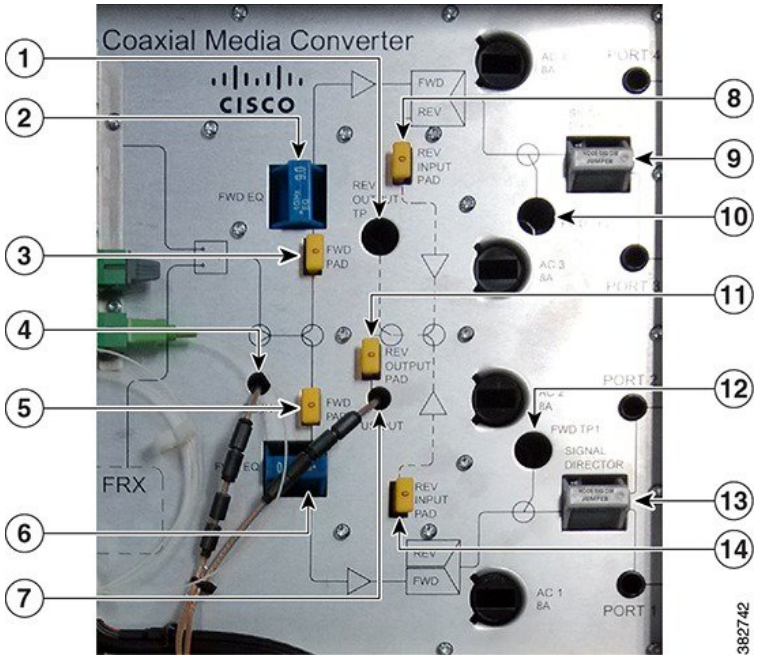
Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove all the AC shunts installed on the Cisco CMC. Removing the AC shunts prevents damage to the equipment that is connected on the other end of the coaxial cable. Power surge to the components and F-connectors is reduced when the AC shunts are removed.

Caution The RF connectors and housing seizure assemblies can get damaged if the AC shunts are not removed from the Cisco CMC before installing or removing the components from the housing.

Step 2 Insert the signal director—jumper to provide the RF output to two RF output ports.

Figure 17: 2-Way Forward Output RF Configuration



1	Reverse output test point	8	Reverse input pad 2
2	Forward equalizer 2	9	Jumper 2
3	Forward pad 2	10	Forward test point 2
4	Downstream input port	11	Reverse output pad
5	Forward pad 1	12	Forward test point 1
6	Forward equalizer 1	13	Jumper 1
7	Upstream input port	14	Reverse input pad 1

Step 3 Perform one of the following:

- If FRx is installed on the Cisco CMC, connect the optical input signal to the FRx. See Connecting the Optical Fibers to the FRx, on page 28.
- If FRx is not installed on the Cisco CMC, insert the F-connector into the CATV IN port. Connect the coaxial cable from the node or amplifier in the HFC network to the F-connector. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Step 4 Insert the F-connector into two RF output ports. Connect the coaxial cable from each F-connector to the cable modem. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Note We recommend that you provide the RF output through the Port 1 and Port 4 for the 2-way forward output RF configuration.

Step 5 Reinstall the AC shunts on the Cisco CMC.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Enabling the 4-Way Reverse Input RF Configuration on the Cisco CMC

Before You Begin

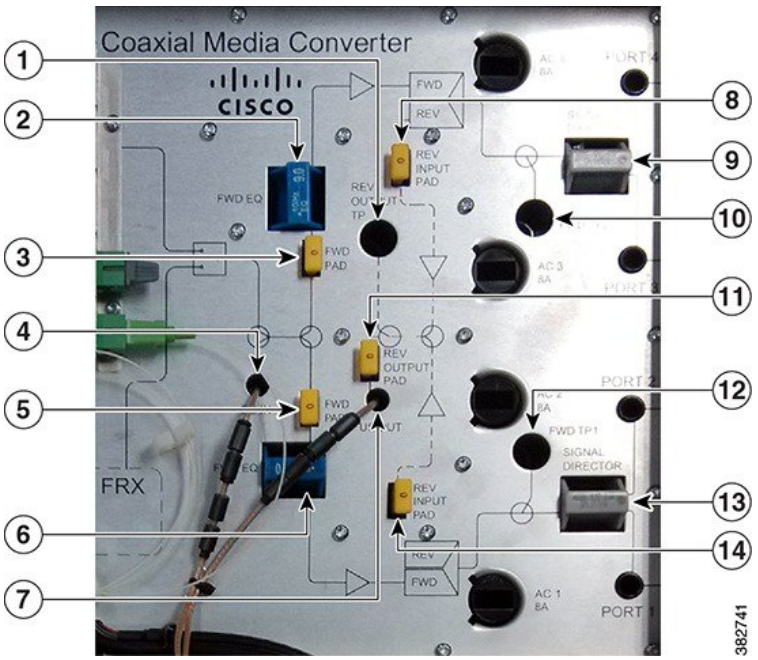
Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove all the AC shunts installed on the Cisco CMC. Removing the AC shunts prevents damage to the equipment that is connected on the other end of the coaxial cable. Power surge to the components and F-connectors is reduced when the AC shunts are removed.

Caution The RF connectors and housing seizure assemblies can get damaged if the AC shunts are not removed from the Cisco CMC before installing or removing the components from the housing.

Step 2 Insert the signal director—splitter to provide the RF input from the four RF output ports.

Figure 18: 4-Way Reverse Input RF Configuration



1	Reverse output test point	8	Reverse input pad 2

2	Forward equalizer 2	9	Splitter 2
3	Forward pad 2	10	Forward test point 2
4	Downstream input port	11	Reverse output pad
5	Forward pad 1	12	Forward test point 1
6	Forward equalizer 1	13	Splitter 1
7	Upstream input port	14	Reverse input pad 1

Step 3 Insert the F-connector into each RF output port (Port 1 through Port 4). Connect the coaxial cables from the cable modems to each F-connectors. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Step 4 Reinstall the AC shunts on the Cisco CMC.

Step 5 Perform one of the following:

- If the optical SFP module is installed on the Cisco CMC, connect the optical fiber from the SFP module to the digital fiber network. See Connecting the Optical Fibers to the SFP Module, on page 23.
- If the optical SFP module is not installed on the Cisco CMC, connect the RJ-45 cable from the Gigabit Ethernet port to the PON module in the digital fiber network. See Connecting the RJ-45 Cables to the Cisco CMC, on page 25.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Enabling the 2-Way Reverse Input RF Configuration on the Cisco CMC

Before You Begin

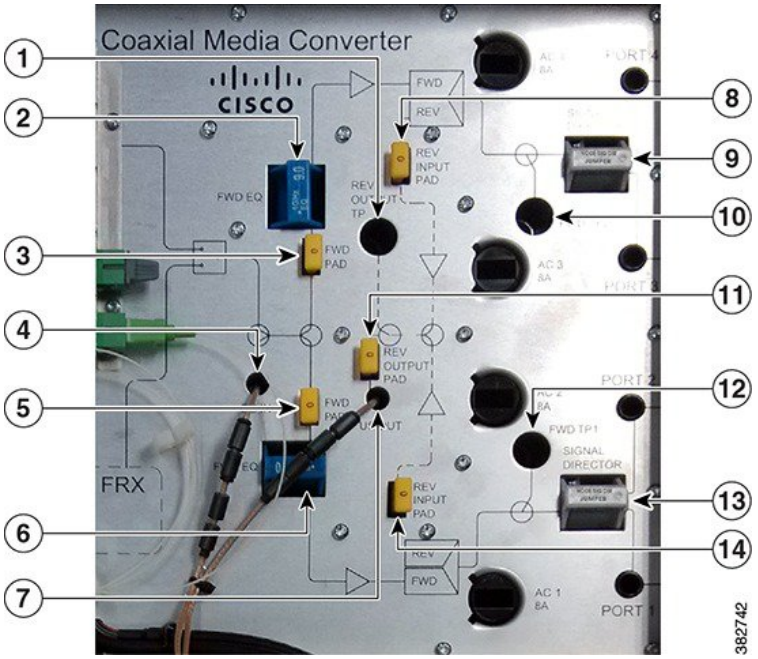
Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Remove all the AC shunts installed on the Cisco CMC. Removing the AC shunts prevents damage to the equipment that is connected on the other end of the coaxial cable. Power surge to the components and F-connectors is reduced when the AC shunts are removed.

Caution The RF connectors and housing seizure assemblies can get damaged if the AC shunts are not removed from the Cisco CMC before installing or removing the components from the housing.

Step 2 Insert the signal director—jumper to provide the RF input from the two RF output ports.

Figure 19: 2-Way Reverse Input RF Configuration



1	Reverse output test point	8	Reverse input pad 2
2	Forward equalizer 2	9	Jumper 2
3	Forward pad 2	10	Forward test point 2
4	Downstream input port	11	Reverse output pad
5	Forward pad 1	12	Forward test point 1
6	Forward equalizer 1	13	Jumper 1
7	Upstream input port	14	Reverse input pad 1

Step 3 Insert the F-connector into two RF output ports. Connect the coaxial cable from the cable modems to each F-connector. See Installing the Coaxial Cables on the Cisco CMC, on page 16.

Note We recommend that you provide the RF input through the Port 1 and Port 4 for the 2-way reverse input RF configuration.

Step 4 Reinstall the AC shunts on the Cisco CMC.

Step 5 Perform one of the following:

- If the optical SFP module is installed on the Cisco CMC, connect the optical fiber from the SFP module to the digital fiber network. See Connecting the Optical Fibers to the SFP Module, on page 23.

- If the optical SFP module is not installed on the Cisco CMC, connect the RJ-45 cable from the Gigabit Ethernet port to the PON module in the digital fiber network. See Connecting the RJ-45 Cables to the Cisco CMC, on page 25.

What to Do Next

Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Powering Up the Cisco CMC

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 **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **This unit might have more than one power supply connection. All connections need to be removed to de-energize the unit.** Statement 1028

Before powering up the Cisco CMC, you must provide an adequate ground connection for the equipment.

The Cisco CMC available in the following variants of the power supply unit (PSU):

- Cisco CMC with the 220VAC PSU
- Cisco CMC with the 60VAC PSU

The following sections provide information on how to ground and power up the Cisco CMC:

Grounding the Cisco CMC

Grounding the equipment is mandatory for the Cisco CMC with the 60VAC PSU and optional for the Cisco CMC with the 220VAC PSU.

Warning **Use copper conductors only.** Statement 1025.

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024.

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046.

Before You Begin

Have the following tools ready before performing this task:

- M4 (metric) panhead Philips screwdriver

Step 1 Power down the Cisco CMC.

Step 2 Connect one end of an 18-gauge or larger wire to the grounding screw on the Cisco CMC using the M4 panhead Phillips screwdriver.

Figure 20: Location of the Grounding Screw on the Cisco CMC

1	Grounding screw		—

Step 3 Connect the other end of the grounding wire to an appropriate ground source.

Powering Up the Cisco CMC with the 220VAC PSU

Before You Begin

Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Step 1 Ensure that the 220VAC power source is switched off.

Step 2 Connect the power cord on the Cisco CMC to the 220VAC power source.

Figure 21: Connecting 220VAC Power to the Cisco CMC

1	Power cord		—

Step 3 Switch on the power source to power up the Cisco CMC.

What to Do Next

Verify if the PWR LED illuminates (green) to ensure that the Cisco CMC is powered up. Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Powering Up the Cisco CMC with the 60VAC PSU

This section describes how to power up the Cisco CMC with the 60VAC PSU:

Connecting 60VAC Power to the Cisco CMC Through the Power Port

Before You Begin

- Ensure that the grounding wire is installed before powering up the Cisco CMC. See Grounding the Cisco CMC, on page 37.
- The F-connector used for connecting the 60VAC power must meet the following requirements:
  - Impedance of 75 ohms
  - IP rating of IP67
  - Pass through current not greater than 8A
- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Restrictions

Warning You must supply 60VAC power to the Cisco CMC with 60VAC PSU using only one coaxial cable. Connecting more than one coaxial cable with the 60VAC power damages the Cisco CMC. If you are connecting a modem to the port that has a black AC shunt, ensure to use combiners in the network to isolate pass-through power to prevent accidental injury.

Restrictions

Warning F-connector is not capable of handling pass through current greater than 8A. For 15A pass through current applications, ensure that the chosen connector - rather than F-connector - is capable of safely passing the desired current

Step 1 Ensure that the power source is switched off.

Step 2 Install the F-connector in the power port. See Connecting the Coaxial Cable to the Cisco CMC, on page 17.

Figure 22: Connecting 60VAC Power to the Cisco CMC Through the Power Port

1	Power port		—

Step 3 Connect the coaxial cable to the F-connector.

Step 4 Connect the other end of the coaxial cable to a 60VAC power source.

Step 5 Switch on the power source to power up the Cisco CMC.

What to Do Next

Verify if the PWR LED illuminates (green) to ensure that the Cisco CMC is powered up. Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Connecting 60VAC Power to the Cisco CMC Through the RF Port

For the Cisco CMC with the 60VAC PSU, the power direction is configured by installing the AC shunts for the RF ports through which the AC power is passed. Use the red AC shunt for the RF input port and black AC shunts for the RF output ports.

Figure 23: Location of AC Shunts on the Cisco CMC

1	AC shunt for the CATV IN port	4	AC shunt for the RF output port (Port 2)
2	AC shunt for the RF output port (Port 4)	5	AC shunt for the RF output port (Port 1)
3	AC shunt for the RF output port (Port 3)		—

Before You Begin

- Ensure that the grounding wire is installed before powering up the Cisco CMC. See Grounding the Cisco CMC, on page 37.
- The F-connector used for connecting the 60VAC power must meet the following requirements:
  - Impedance of 75 ohms
  - IP rating of IP67
  - Pass through current not greater than 8A
- Open the Cisco CMC lid. See Opening the Cisco CMC, on page 12.

Restrictions

Warning You must supply 60VAC power to the Cisco CMC with 60VAC PSU using only one coaxial cable. Connecting more than one coaxial cable with the 60VAC power damages the Cisco CMC. If you are connecting a modem to the port that has a black AC shunt, ensure to use combiners in the network to isolate pass-through power to prevent accidental injury.

Restrictions

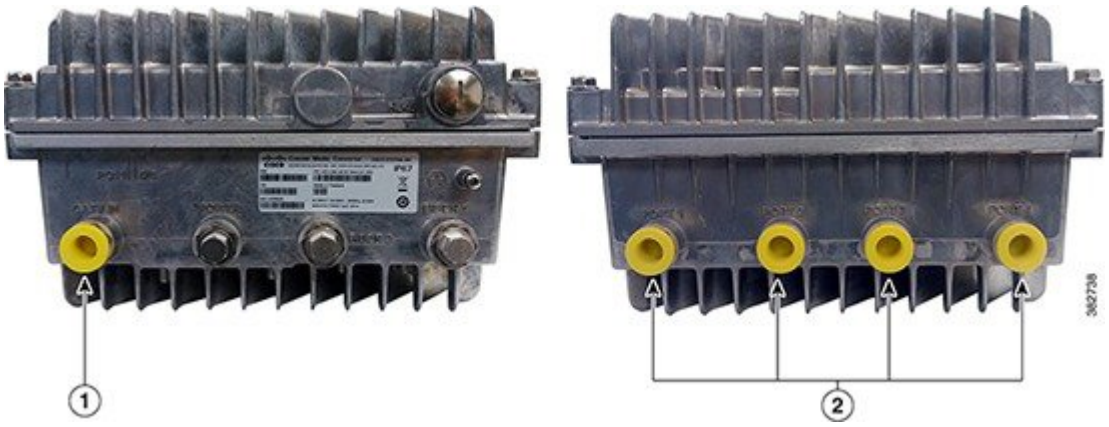
Warning F-connector is not capable of handling pass through current greater than 8A. For 15A pass through current applications, ensure that the chosen connector - rather than F-connector - is capable of safely passing the desired current

Step 1 Ensure that the power source is switched off.

Step 2 Install the F-connector in the CATV IN and four RF output ports (Port 1 through Port 4). See Connecting the Coaxial Cable to the Cisco CMC, on page 17.

Note Each RF port can support up to 8 A. Ensure that the total current from all the four RF output ports and Cisco CMC does not exceed 8 A.

Figure 24: Connecting 60VAC Power to the Cisco CMC Through the RF Port



1	CATV IN port	2	RF output ports

Step 3 Remove all the AC shunts installed on the Cisco CMC.

Step 4 Connect the coaxial cables to the F-connectors.

Step 5 Insert the black AC shunts for the RF ports that need to be supplied with 60VAC power **from** the Cisco CMC.

Step 6 Insert the red AC shunt for the RF port that supplies 60VAC power **to** the Cisco CMC. Connect the other end of the coaxial cable to a 60VAC power source.

Step 7 Switch on the power source to power up the Cisco CMC.

What to Do Next

Verify if the PWR LED illuminates (green) to ensure that the Cisco CMC is powered up. Close the Cisco CMC lid. See Closing the Cisco CMC, on page 44.

Closing the Cisco CMC

Proper housing closure is important to maintain the Cisco CMC in good working condition. Proper closure ensures a good seal against the environment and protects the internal modules.

Caution Avoid moisture damage and RF leakage. Follow the procedure exactly as shown below to ensure a proper seal.

The Cisco CMC has waterproof rubber and EMI gasket to seal the equipment.

Figure 25: Location of the Waterproof Rubber and EMI Gasket on the Cisco CMC

1	Waterproof rubber	2	EMI gasket

Before You Begin

- Ensure that the waterproof rubber and EMI gasket on the Cisco CMC are not worn out. Wipe off any excess dirt and debris. If the waterproof rubber or EMI gasket is worn out, contact the Cisco Technical Assistance Center (TAC) for further assistance.
- Have the following tools ready before performing this task:
  - Torque wrench
  - Hex driver or ratchet

Step 1 Close the lid.

Caution Ensure that all the cables are out of the way when closing the lid.

Step 2 Lightly secure the six 1/2-inch closure bolts using a hex driver or ratchet.

Step 3 Tighten the six housing closure bolts from 5 ft-lb to 12 ft-lb (6.8 Nm to 16.3 Nm) using a torque wrench in the correct sequence as shown in the figure below.

Figure 26: Torque Sequence

Step 4 Using the same sequence, tighten the closure bolts again with the same torque specification to ensure proper closure.

Installing the Cisco uBR-MC3GX60V-RPHY Line Card

This section provides information on how to install the Cisco uBR-MC3GX60V-RPHY line card.

Removing an SFP Module from the Existing Line Card

Before You Begin

Have the following tools and supplies ready before performing this task:

- Antistatic bag
- Dust plug, if required
- ESD-preventive wrist strap

Caution Removing and inserting an SFP module frequently can damage the SFP module. Do not remove and insert the SFP modules unless absolutely necessary.

Step 1 Disconnect all the network cables from the SFP module connector. For optical SFP module, immediately reinstall the dust plugs in the SFP optical bores.

Note We recommend that you do not remove the SFP module with the fiber-optic cables attached to it as it can damage the cable, cable connector, and optical interfaces in the SFP module.

Step 2 Unlock and remove the SFP module from the socket connector using one of the following:

- If the SFP module has a Mylar tab latch, pull the tab gently in a slightly downward direction until the SFP module disengages from the socket connector, and then pull the SFP module straight out of the socket. Do not twist or pull the Mylar tab as it can detach from the SFP module.
- If the SFP module has an Actuator button latch, gently press the Actuator button on the front of the SFP module until it clicks and the latch mechanism releases the SFP module from the socket connector. Grasp the Actuator button between your thumb and index finger, and carefully pull the SFP module straight from the socket.
- If the SFP module has a Bale-clasp latch, pull the bale to eject the SFP module from the socket. If the Bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or a long narrow instrument to open the bale-clasp latch. Grasp the SFP module between your thumb and index finger, and carefully remove it from the socket.

Step 3 Place the removed SFP module in an antistatic bag.

Step 4 Insert a dust plug into each unused Gigabit Ethernet port.

What to Do Next

- To remove the existing line card, see Removing the Existing Line Card from the Card Slot, on page 48.

- To install an SFP module on the Cisco uBR-MC3GX60V-RPHY line card, see Installing an SFP Module on the Cisco uBR-MC3GX60V-RPHY Line Card, on page 52

Removing the Existing Line Card from the Card Slot

Before You Begin

- Remove the SFP module from the line card. See Removing an SFP Module from the Existing Line Card, on page 47.
- Delete the existing configurations on the PRE using the **no card** command.

Have the following tools and supplies ready before performing this task:

- T-10 Torx driver tool or 1/4-inch flathead screwdriver
- Antistatic bag
- Blank card slot cover, if required
- ESD-preventive wrist strap

Step 1 Attach an ESD-preventive wrist strap to your wrist.

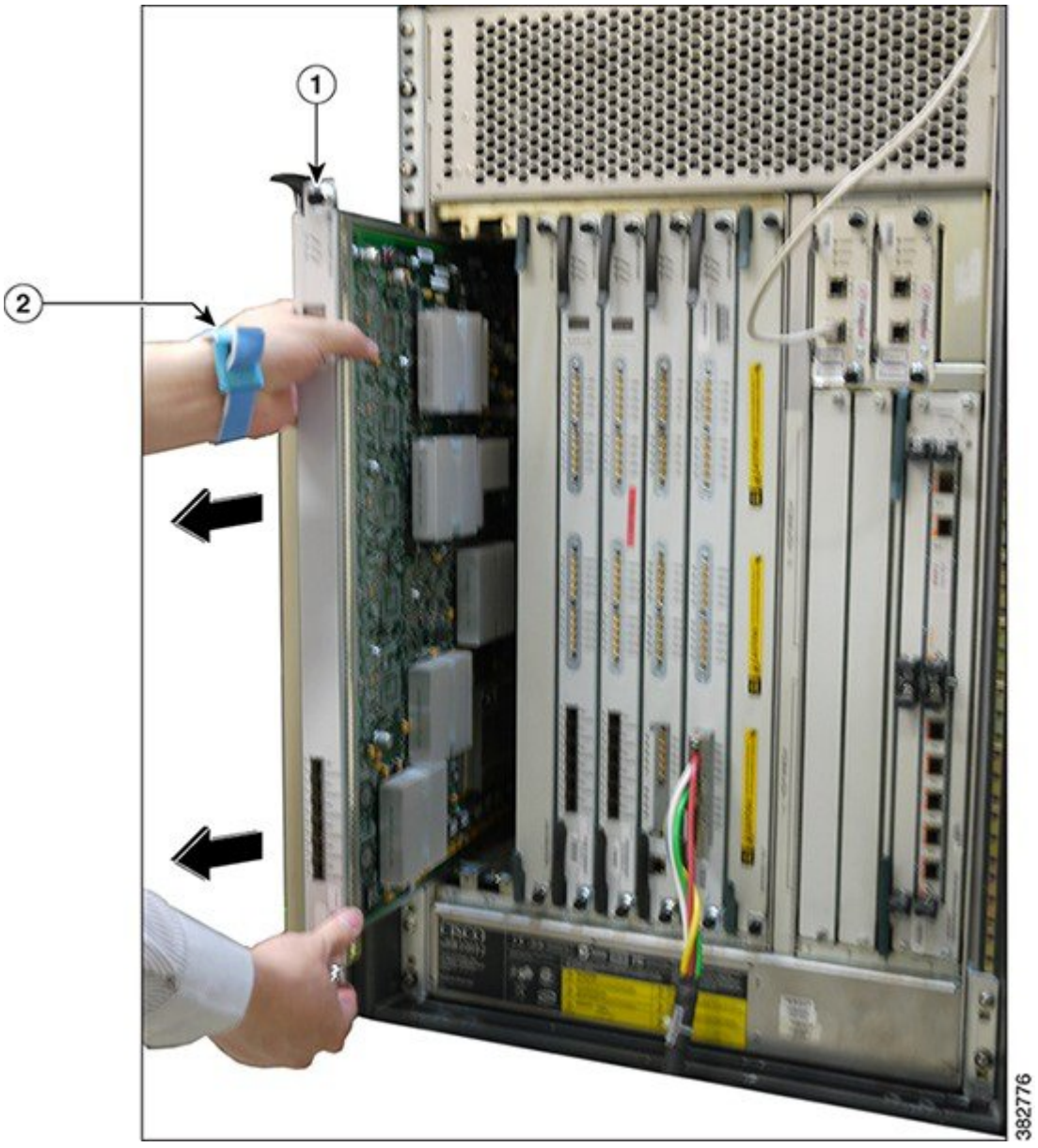
Step 2 Unscrew the top and bottom captive screws on the line card using a T-10 Torx driver tool or flathead screwdriver.

Step 3 Simultaneously pivot both ejector levers away from the line card to disengage the line card from the chassis.

Step 4 Slide the line card out of the slot in the chassis. Place it on an antistatic surface or in a static shielding bag with the component side up.

Caution Do not drop the line card. Dropping the line card can damage the carrier rails and card guides and prevent the reinstallation.

Figure 27: Removing the Existing Line Card from the Chassis



1	Captive screw	2	ESD-preventive strap

What to Do Next

Perform one of the following:

- Install a new or replacement Cisco uBR-MC3GX60V-RPHY line card, see Installing the Cisco uBR-MC3GX60V-RPHY Line Card in the Card Slot.
- Install a Blank card slot cover over the slot and tighten the captive screws, if you are not installing any line card in the slot. This ensures to keep dust out of the chassis and maintain proper airflow through the line card compartment.

Installing the Cisco uBR-MC3GX60V-RPHY Line Card in the Card Slot

Before You Begin

- Ensure that the existing line card or the Blank card slot cover is removed. See Removing the Existing Line Card from the Card Slot, on page 48.
- Ensure that you attach an ESD-preventive wrist strap to your wrist.
- For Class B emission compliance requirements, the two ferrites available in the CMTS accessory kit must be installed on the input DC power harness of the chassis. These ferrite beads are clamp-on type and should be placed as close to the input DC power connector (DC input terminal connector) as possible.

Have the following tools and supplies ready before performing this task:

- Cisco uBR-MC3GX60V-RPHY line card
- T-10 Torx driver tool or 1/4-inch flathead screwdriver
- ESD-preventive wrist strap

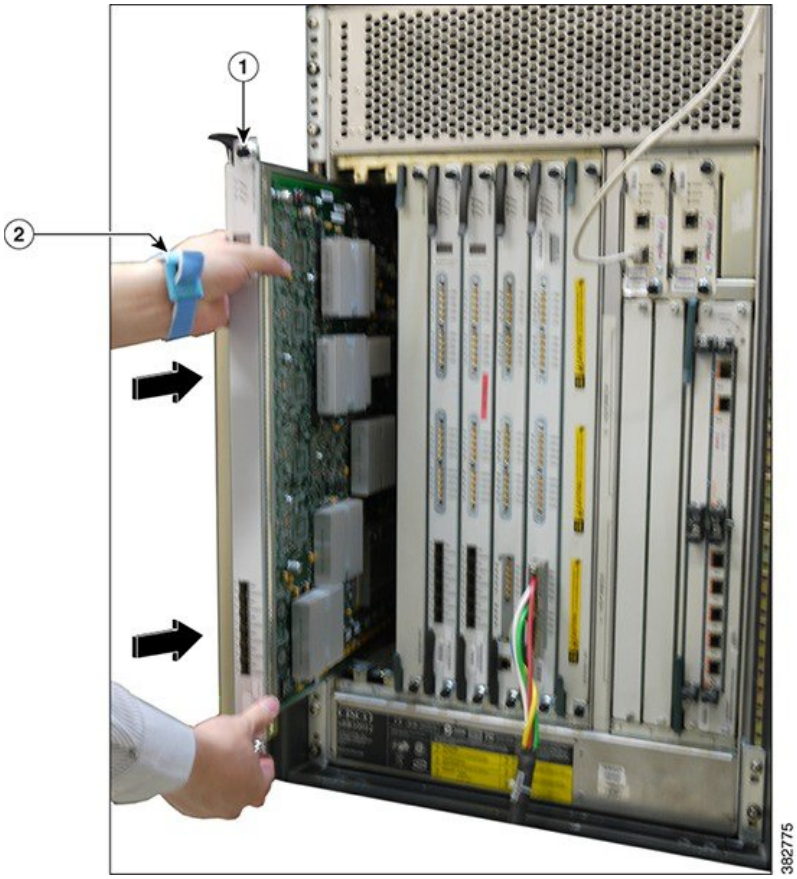
Step 1 Attach an ESD-preventive wrist strap to your wrist.

Step 2 Choose an available slot (5/0 to 8/0) for the line card and carefully align the upper and lower edges of the Cisco uBR-MC3GX60V-RPHY line card with the upper and lower guides in the chassis.

Caution The Cisco uBR-MC3GX60V-RPHY line card weighs 13 lbs. Use both hands when handling the Cisco uBR-MC3GX60V-RPHY line card. Do not drop the line card to avoid damaging the carrier rails. Bent or damaged rails can damage the line card guides and prevent line card installation. When installing line cards for the first time, or when all the captive screws of the line card are loose, insert cards first in slot 5/1 and work towards slot 8/0 to prevent uneven gasket pressure.

Step 3 Slide the Cisco uBR-MC3GX60V-RPHY line card into the slot until it is firmly seated in the chassis.

Figure 28: Installing the Cisco uBR-MC3GX60V-RPHY Line Card in the Cisco CMTS Chassis



1	Captive screw	2	ESD-preventive strap

Step 4 Close the ejector levers to secure the Cisco uBR-MC3GX60V-RPHY line card.

Step 5 Engage and tighten the captive screws with your fingers. Then, use either a T-10 Torx driver tool or a common flathead screwdriver to tighten the captive screws from 5 to 7 in-lbs.

What to Do Next

To install the SFP module, see Installing an SFP Module on the Cisco uBR-MC3GX60V-RPHY Line Card, on page 52.

Installing an SFP Module on the Cisco uBR-MC3GX60V-RPHY Line Card

Before You Begin

Ensure that the Cisco uBR-MC3GX60V-RPHY line card is installed in the Cisco CMTS chassis. See Installing the Cisco uBR-MC3GX60V-RPHY Line Card in the Card Slot, on page 50.

Have the following tools and supplies ready before performing this task:

- Appropriate SFP module
- ESD-preventive wrist strap

For more information on SFP modules that are supported on the Cisco uBR-MC3GX60V-RPHY line card, see SFP Modules for the Cisco uBR-MC3GX60V-RPHY Line Card.

Step 1 Attach an ESD-preventive wrist strap to your wrist.

Step 2 Remove the SFP module from its protective packaging.

Step 3 Locate the transmit (Tx) and receive (Rx) markings on the top side of the SFP module.

Note On some SFP modules, the Tx and Rx markings might be replaced by arrowheads pointing from the SFP connector (transmit direction or Tx) and towards the connector (receive direction or Rx).

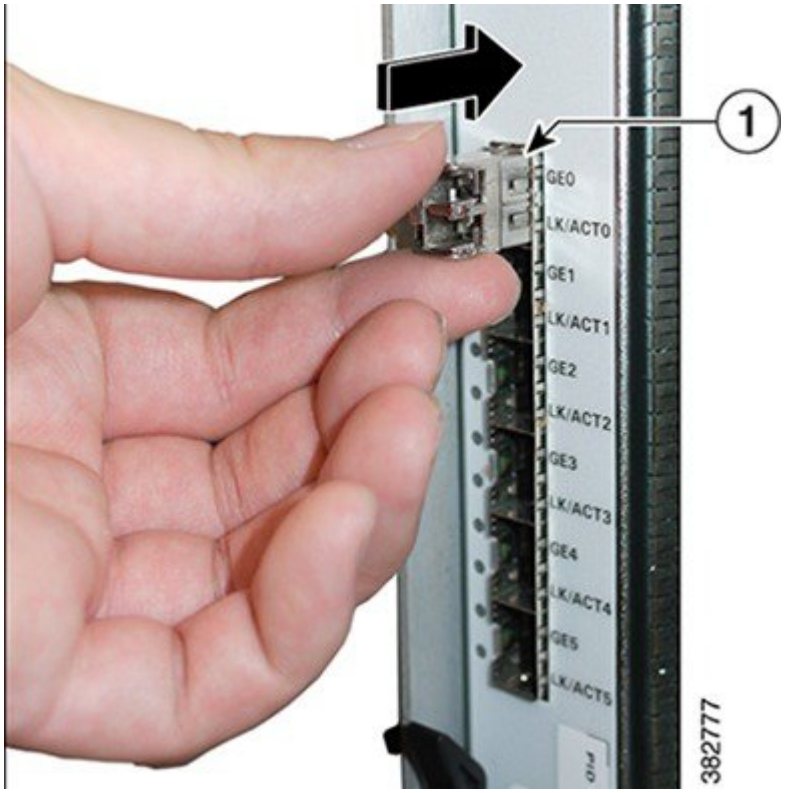
Step 4 Align the SFP module in front of the socket opening.

Step 5 Insert the SFP module into the socket until you feel the SFP module connector snap into the socket connector and then close the SFP latch.

Note For optical SFP modules, following are the guidelines to remove the dust plugs and make any optical connections:

- Do not remove the protective dust plugs on the unplugged fiber-optic cable connectors and the transceiver optical bores until you are ready to make a connection.
- inspect and clean the LC connector end-faces just before you make any connections.
- Grasp the LC connector housing to plug or unplug a fiber-optic cable.

Figure 29: Inserting an SFP Module into a Gigabit Ethernet Port



1	SFP Module		—

Step 6 Remove the dust plug from the SFP module and keep it safe for future use.

Note Leave the dust plug in the SFP module port if a cable is not being installed.

What to Do Next

To connect the network cable to an SFP module, see Connecting a Network Cable to an SFP Module, on page 54.

Connecting a Network Cable to an SFP Module

The following types of cables are used with Cisco uBR-MC3GX60V-RPHY line cards to connect to a switch or an OLT:

- RJ-45 10/100/1000BASE-T copper cable
- Single-mode or multimode fiber-optic cable

Before You Begin

- Ensure that the optical connectors are clean before making the connections. Contaminated connectors can damage the fiber and cause data errors.
- Ensure that the network cable has an appropriate connector to connect to an appropriate SFP module port.

Have the following tools and supplies ready before performing this task:

- Network cable with appropriate connector
- ESD-preventive wrist strap

For more information on the type of connectors supported, see SFP Modules for the Cisco uBR-MC3GX60V-RPHY Line Card.

Step 1 Attach an ESD-preventive wrist strap to your wrist.

Step 2 Remove the dust plug from the SFP module, if already installed.

Step 3 Insert the appropriate network cable connector into the SFP module port until it clicks and locks into place to ensure proper seating.

Note Ensure to insert the network connector completely into the socket
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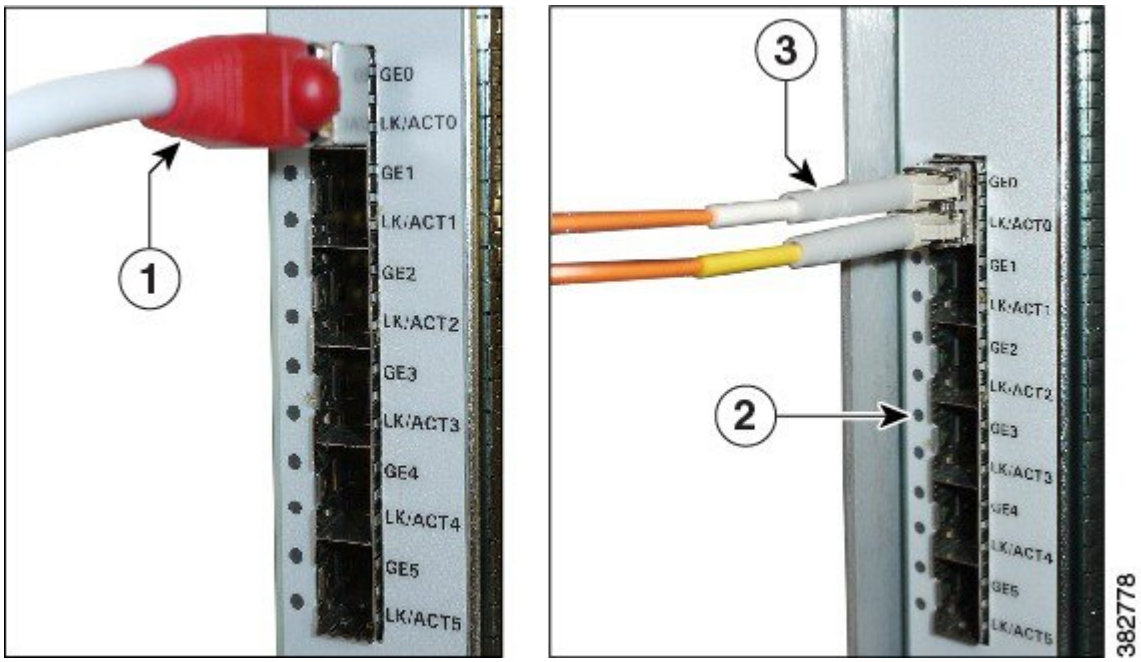
Figure 30: Gigabit Ethernet Port Cabling



1	RJ-45 connector	2	Gigabit Ethernet SFP module
3	LC fiber-optic connector		—

Step 4 Insert the other end of the network cable into the receptacle of a switch or an OLT.

Step 5 Repeat Step 3, on page 54 to Step 4, on page 55 until all cabling is complete.