



Installing the Cisco ASR 920 Series Router

This chapter describes how to install the router and includes the following sections:

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Prerequisites

Before installing the router, it is important to prepare for the installation by:

- Preparing the site (site planning) and reviewing the installation plans or method of procedures (MOP). See *Site Planning* section.
- Unpacking and inspecting the router. See *Chassis-Lifting Guidelines* section.
- Gathering the tools and test equipment required to properly install the router. See *Tools and Equipment* section.

For more instructions on how to prepare for the installation of the router, see *Preparing for Installation* section.

Installing the Router in a Rack

Each Cisco ASR 920 Series Aggregation Services Router router includes rack-mounting brackets. Using the rack-mounting brackets, you can mount the router in a 19-inch, 23-inch, or an ETSI rack that conforms to the EIA-310-D specification.

Using the two rack-mounting brackets for mounting, you can recess the router in the equipment rack. This arrangement provides extra space in front of the router for the cables and allows you to close the doors of racks equipped with front-close doors.

To attach or replace the rack-mounting brackets, see the *Attaching Brackets to the Router* section.

The rack-mounting brackets are slotted to allow the router to be mounted in racks with EIA 1.25-inch (3.175-cm) or WECCO 1.0-inch (2.54-cm) hole spacing. When installed in the rack, the router requires one EIA 1.75-inch (4.4-cm) vertical mounting space (or 1 rack unit [RU]) for mounting (see the *Mounting the Router in a Rack* section).

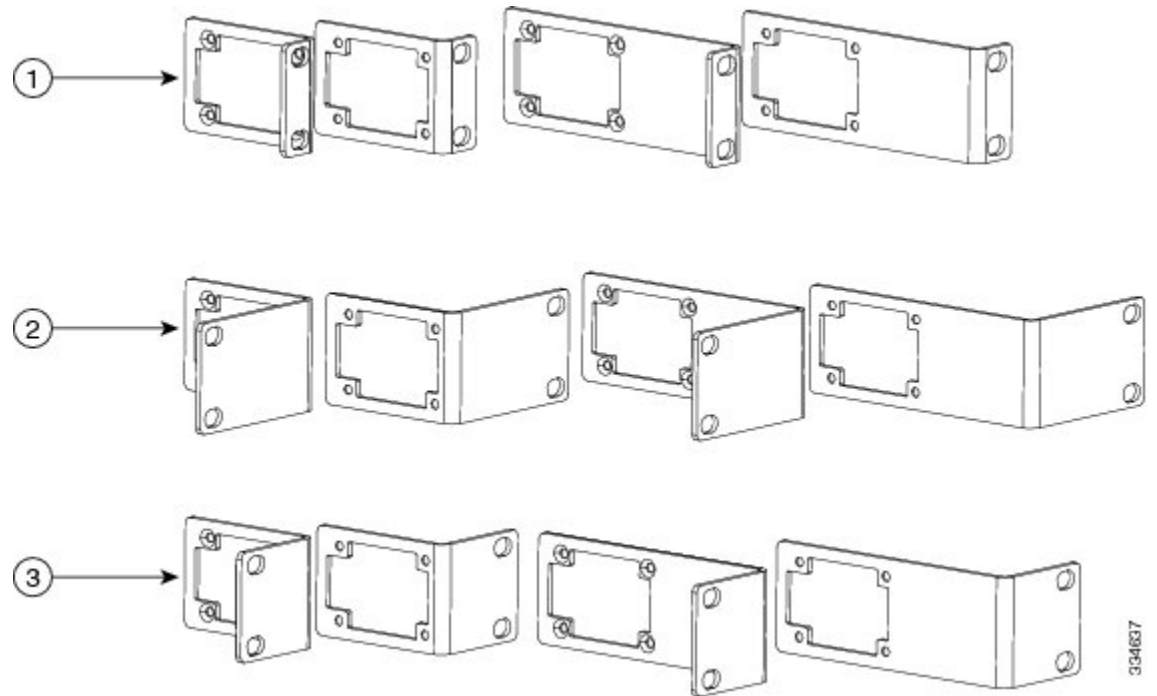


Caution Allow clearance on either side of the router for cooling air to be drawn in through the right side and circulated through the chassis and out the three-fan exhaust ports mounted on the other side of chassis.

The sections describe how to install the router in a rack. The procedures in this section apply to both horizontal and vertical mounting of the router in a rack:

Attaching Brackets to the Router

The bracket orientation and the brackets that you use depend on whether you are attaching the brackets for a 19-inch, 23-inch, or an ETSI rack. The following figure shows the types of mounting brackets.

Figure 1: Rack-Mounting Brackets

1	19-inch brackets	2	23-inch brackets
3	ETSI-rack brackets	—	—

- For 19-inch racks, use part number 700-39959-01 (see *Attaching Brackets for 19-Inch Racks* section).
- For 23-inch racks, use part number 700-40065-01 (see *Attaching Brackets for 23-Inch Racks* section).
- For ETSI racks, use part number 700-40067-01 (see *Attaching Brackets for ETSI Racks* section).

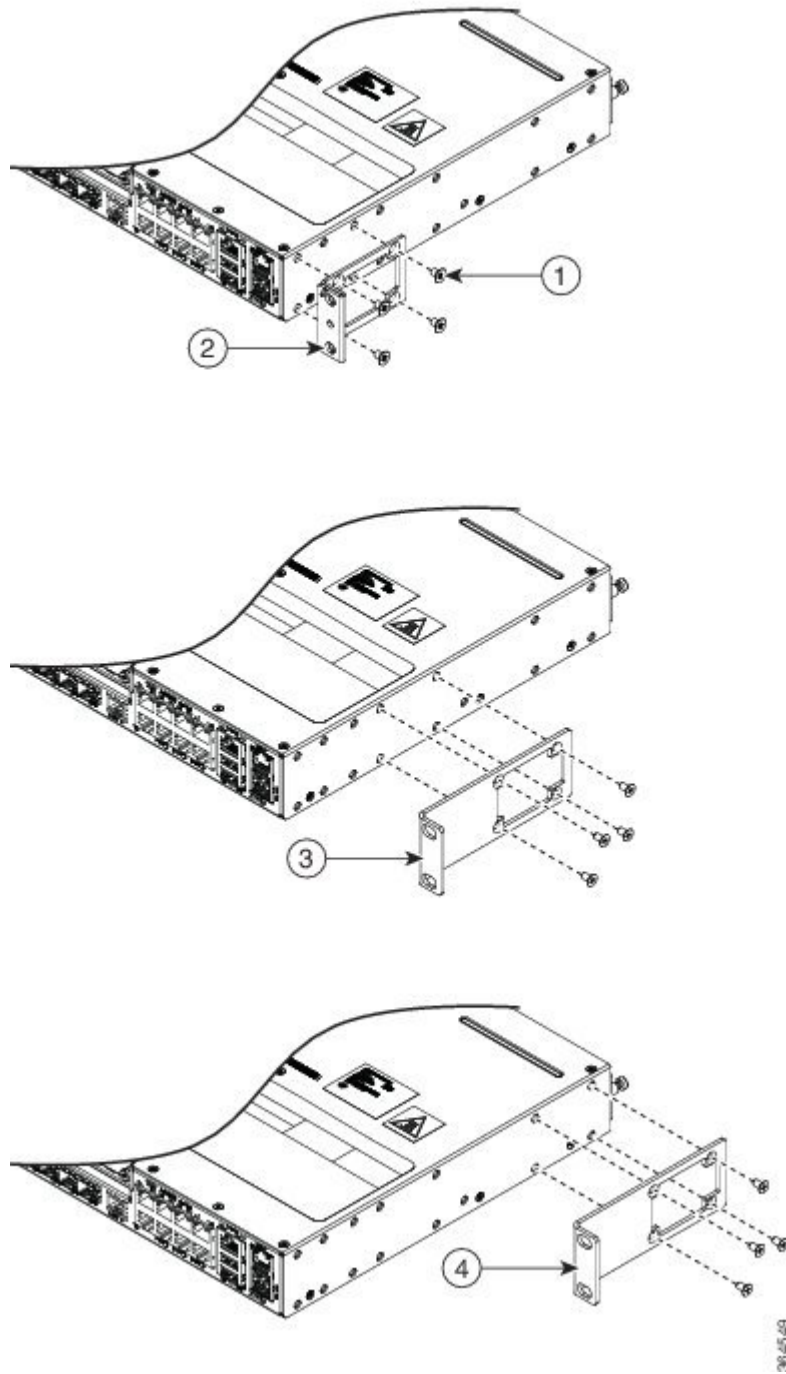


Note The bracket mounting screws are pre-installed on the router. Depending on the bracket mounting position of the chassis, you must remove the appropriate screws, fix the bracket, and install the screws again.

Attaching Brackets for 19-Inch Racks

The following figure shows how to attach brackets for 19-inch racks on the router.

Figure 2: Attaching Brackets for 19-Inch Racks

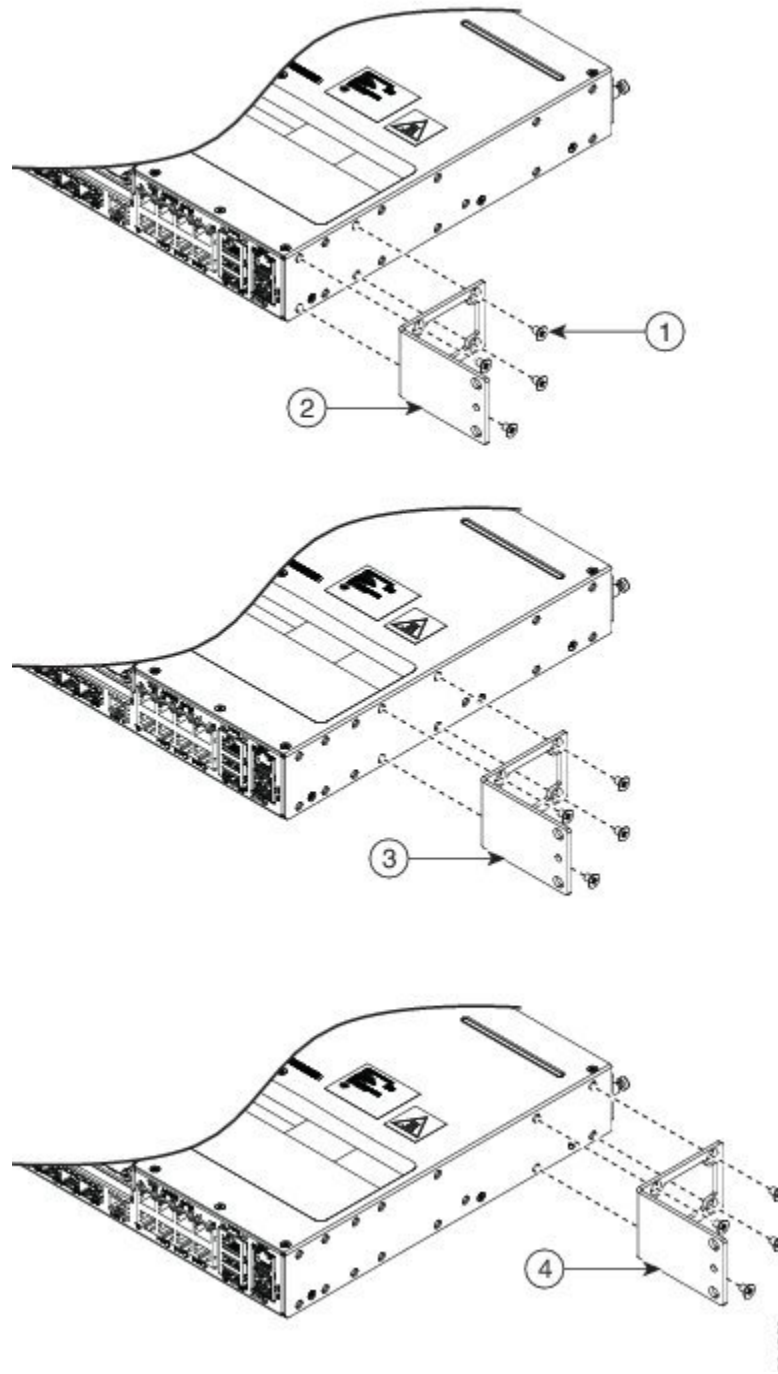


1 Phillips flat-head screws	2 Front-mounting position
3 Mid-mounting position	4 Rear-mounting position

Attaching Brackets for 23-Inch Racks

The following figure shows how to attach brackets for 23-inch racks on the router.

Figure 3: Attaching Brackets for 23-Inch Racks



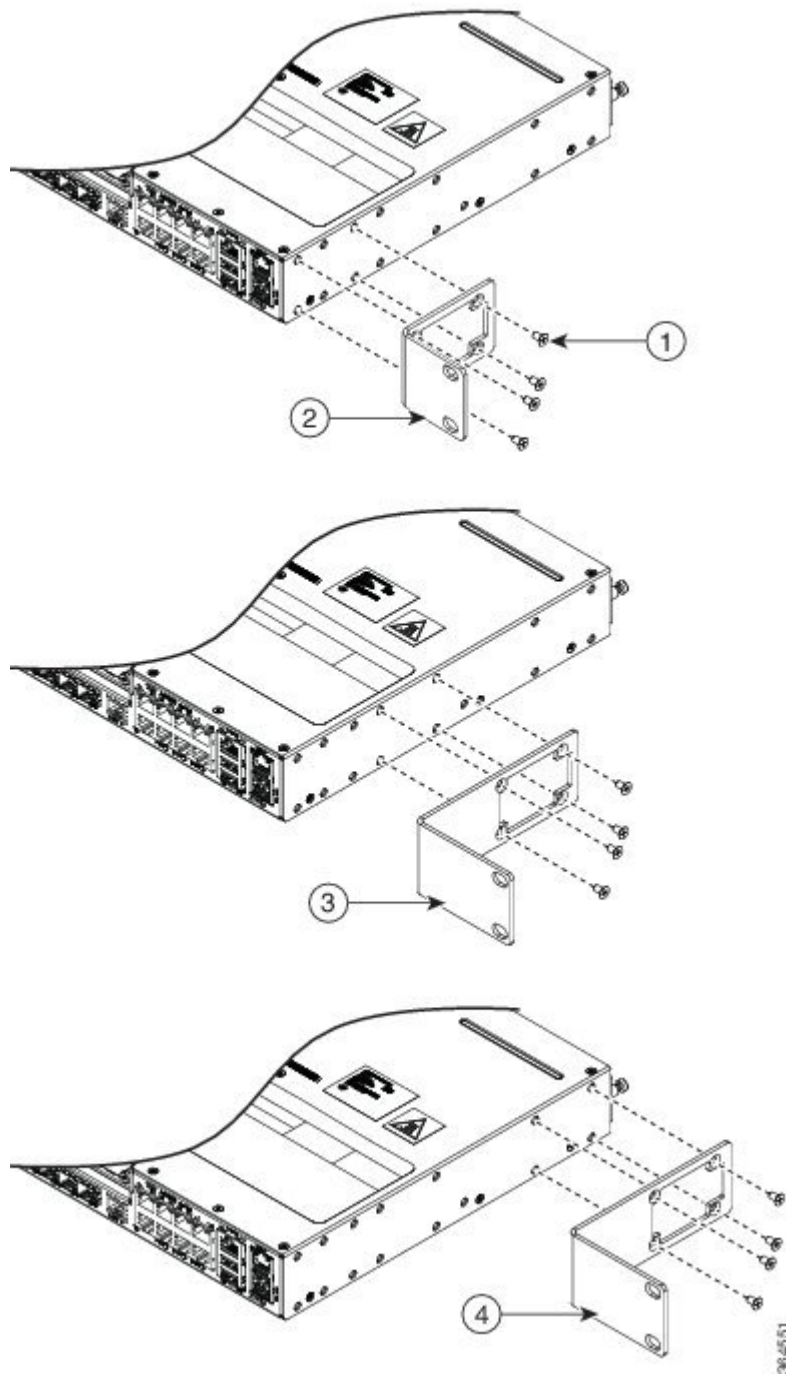
1 Phillips flat-head screws	2 Front-mounting position
-----------------------------	---------------------------

3 Mid-mounting position	4 Rear-mounting position
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Attaching Brackets for ETSI Racks

The following figure shows how to attach brackets for ETSI racks on the router.

Figure 4: Attaching Brackets for ETSI Racks



1	Phillips flat-head screws	2	Front-mounting position
3	Mid-mounting position	4	Rear-mounting position

Mounting the Router in a Rack

Perform the steps given below to mount the router into the equipment rack.



Note To secure the router to the equipment rack, you must use the two mounting screws (provided) for each side or follow your local practices for installing the router into your equipment rack. Ensure that the rack-mount brackets are securely fastened. For more information, see the *Attaching Brackets to the Router* section.

Procedure

-
- Step 1** Locate the equipment rack position where you plan to install the router.
 - Step 2** Verify that there are no obstructions and ensure that the equipment rack is stabilized.
 - Step 3** Determine whether you are mounting the router on a 19-inch, 23-inch, or an ETSI rack. *Rack-Mounting Brackets* figure shows the types of mounting brackets.
 - Step 4** Determine the mounting position (Front-, Mid-, or Rear-mounting) of the router. (For 19-inch racks, see *Attaching Brackets for 19-Inch Racks* section. For 23-inch racks, see *Attaching Brackets for 23-Inch Racks* section. For ETSI racks, see *Attaching Brackets for ETSI Racks* section.)
 - Step 5** Locate the mounting holes of the router.
 - Step 6** Align the rack-mounting bracket with the router and position with the four #6-32 x 0.25-inch screws (provided).
 - Step 7** Insert the screws (four places) and tighten using a Number 2 Phillips screwdriver (each side).
 - Step 8** Position the router in the equipment rack lining up the bracket holes on the router with the holes on the rack and secure with four #6-32 x 0.25-inch mounting screws (two on each side).
 - Step 9** Tighten the screws using a 1/4-inch flat-blade screwdriver (each side). The recommended maximum torque is 10 in.-lb.
-

Installing the Router Chassis in the Rack



Note Ensure adequate air flow when mounting the router in a rack. For more information, see the *Air Flow Guidelines* section in the *Cisco ASR-920-12SZ-IM and ASR-920U-12SZ-IM Aggregation Services Router Hardware Installation Guide*.



Note Install the cable guides before installing the router in a 19-inch EIA rack. See the *Attaching the Cable Guides* section in the *Cisco ASR-920-12SZ-IM and ASR-920U-12SZ-IM Aggregation Services Router Hardware Installation Guide*.

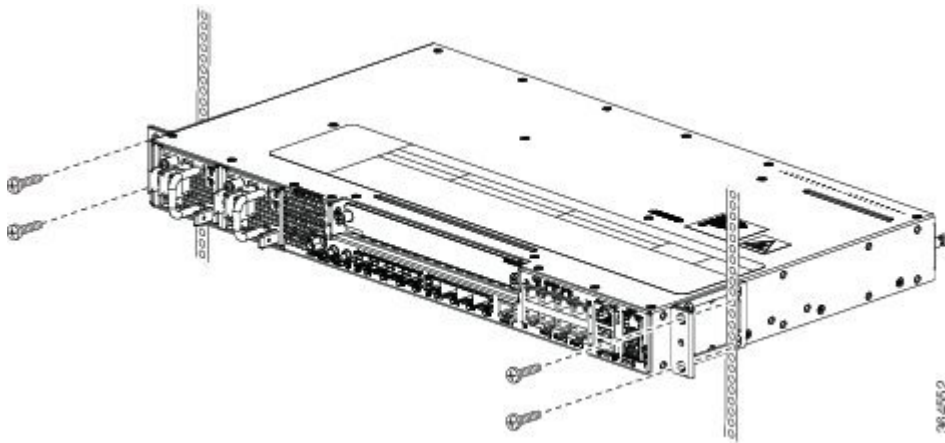
To install the router chassis in the equipment rack, perform these steps:

Procedure

- Step 1** Position the chassis in the rack as follows:
- If the front of the chassis (front panel) is at the front of the rack, insert the rear of the chassis between the mounting posts.
 - If the rear of the chassis is at the front of the rack, insert the front of the chassis between the mounting posts.
- Step 2** Align the mounting holes in the bracket (and optional cable guide) with the mounting holes in the equipment rack.

The following figure shows how to install the router in a 19-inch EIA rack.

Figure 5: Installing the Chassis in a 19-inch EIA Rack



- Step 3** Install the four M6x12mm zinc-plated steel screws through the holes in the bracket and into the threaded holes in the equipment rack posts.
- Step 4** Use a tape measure and level to verify that the chassis is installed straight and level.

Attaching the Cable Guides

The Cisco ASR 920 Series Router supports the following cable guides:

- A920-CBL-GUIDE (left and right)—help in routing the cables from all components on the front panel thereby enabling a proper cable-bending radius.



Note If the chassis is mounted using 19-inch brackets, you must assemble the cable guides before installing the chassis on the rack.

To install the cable guides, perform these steps:

Procedure

- Step 1** Position the cable guide-left and cable guide-right against the front of the chassis and align the four screw holes, as shown in the following figure.

Figure 6: Cable Guide Installation For 19-inch Rack Brackets

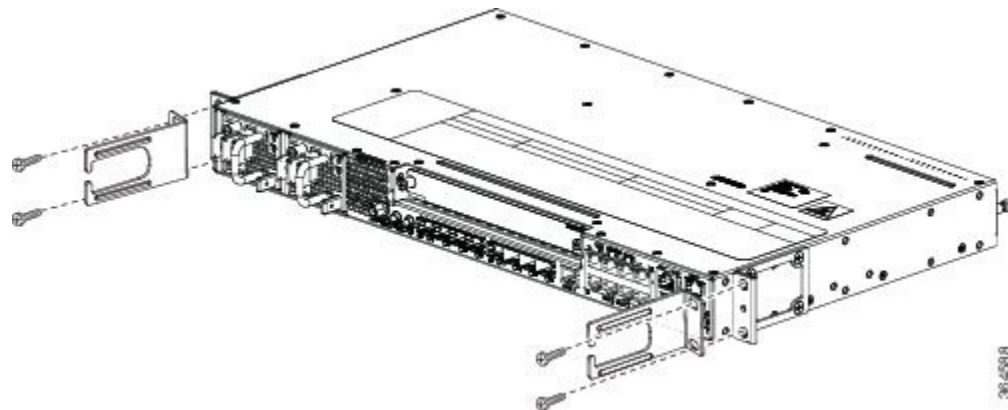
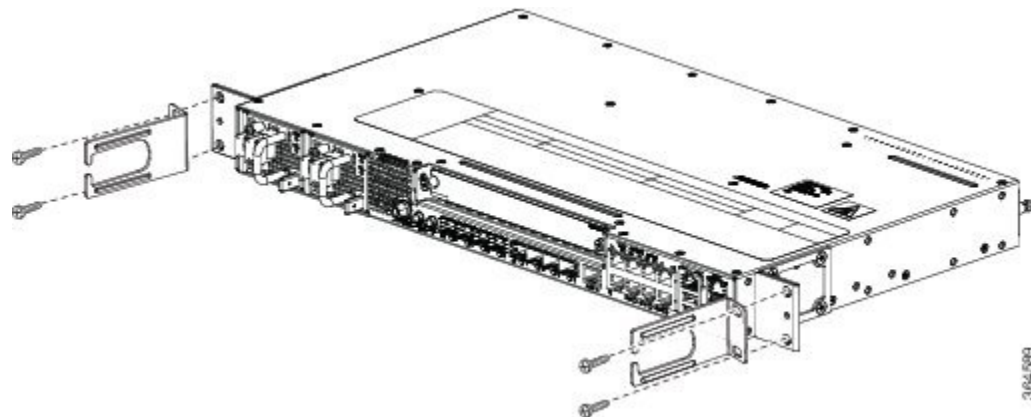
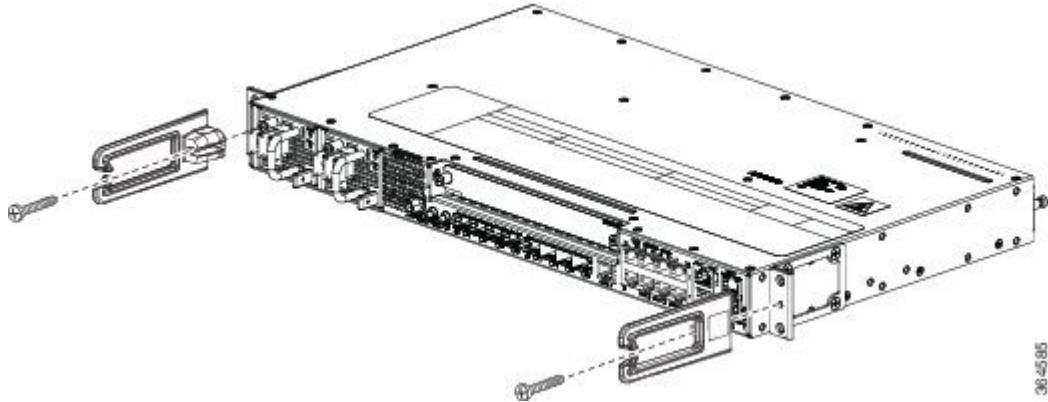


Figure 7: Cable Guide Installation For ETSI Rack Brackets



- Step 2** Secure the cable guides with the four M6x12mm screws supplied with the cable kit. The recommended maximum torque is 3N-m.

Figure 8: Installing the Cable Guides (As Per the Standard Kit)



Wall Mounting the Router

To install the router on a wall, follow the instructions in these procedures:

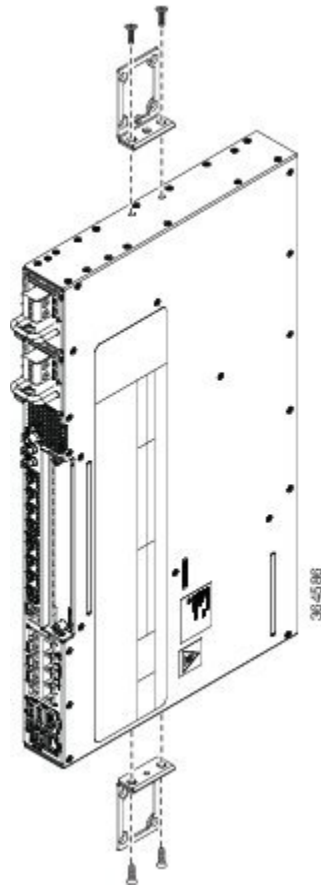
Attaching the Brackets to the Router for Wall-Mounting



Note While wall mounting the router, always ensure that the power supplies are at the top position.

The following figure shows how to attach a 19-inch bracket to one side of the router. Follow the same steps to attach the second bracket to the opposite side.

Figure 9: Attaching 19-inch Brackets for Wall Mounting



Mounting Router on the Wall

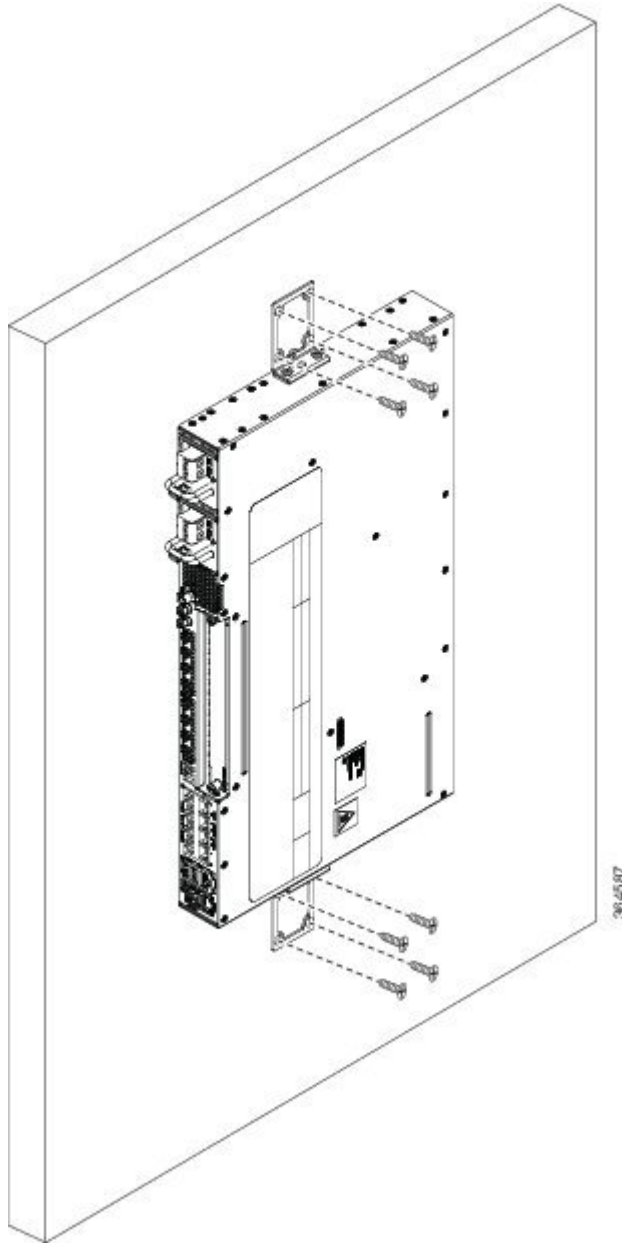
For the best support of the router and cables, ensure the router is attached securely to wall studs or to a firmly attached plywood mounting backboard.



Warning Suitable for mounting on and over a concrete or other non-combustible surface only. Statement 345

Mount the router with the front panel as shown in the following figure.

Figure 10: Mounting the Router on the Wall



Caution When mounting the router vertically, ensure that the power supplies are at the top.

Installing and Removing SFP Modules

These sections describe how to install and remove SFP modules. The modules are inserted into the SFP module slots as depicted in *Installing an SFP Module into an SFP Module Slot* figure. These field-replaceable modules provide interfaces.

Each port must match the wavelength specifications on the other end of the cable. For reliable communications, the cable must not exceed the stipulated cable length.

Use only Cisco SFP modules on the Cisco router. Each SFP module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the SFP module meets the requirements for the router.

For detailed instructions on installing, removing, and cabling the SFP module, see the SFP module documentation.

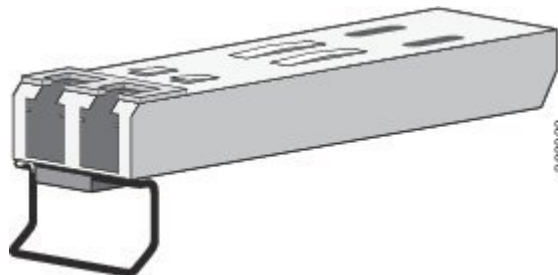
Installing SFP Modules

The following figure shows an SFP module that has a bale-clasp latch.

**Caution**

We strongly recommend that you do not install or remove fiber-optic SFP modules with cables attached because of the potential damage to the cables, the cable connector, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing an SFP module. Removing and installing an SFP module can shorten its useful life. Do not remove and insert SFP modules more often than is absolutely necessary.

Figure 11: SFP Module with a Bale-Clasp Latch



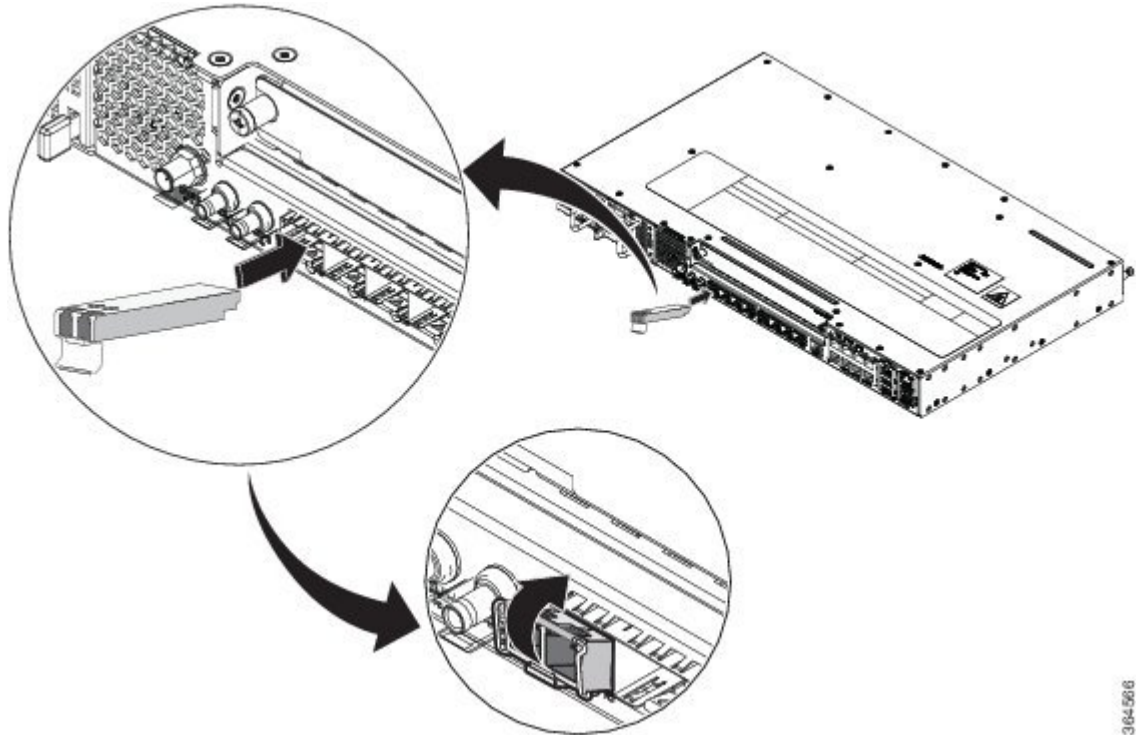
To insert an SFP module into the module slot, follow these steps:

Procedure

- Step 1** Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.
Some SFP modules identify the top side of the module with send (TX) and receive (RX) markings or arrows that show the direction of the connection.
- Step 2** If the SFP module that you are using has the markings, use them to identify the top side of the module.
- Step 3** Align the SFP module in front of the slot opening.

- Step 4** Insert the SFP module into the slot until you feel the connector on the module snap into place in the rear of the slot.

Figure 12: Installing an SFP Module into an SFP Module Slot



Caution Do not remove the dust plugs from the fiber-optic SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light. Store the dust plugs for later use.

- Step 5** Insert the cable connector into the SFP module:
- For fiber-optic SFP modules, insert the LC cable into the SFP module.
 - For copper 1000BASE-T SFP modules, insert the RJ-45 cable connector into the SFP module.

Removing SFP Modules

To remove an SFP module from a module receptacle, follow these steps:

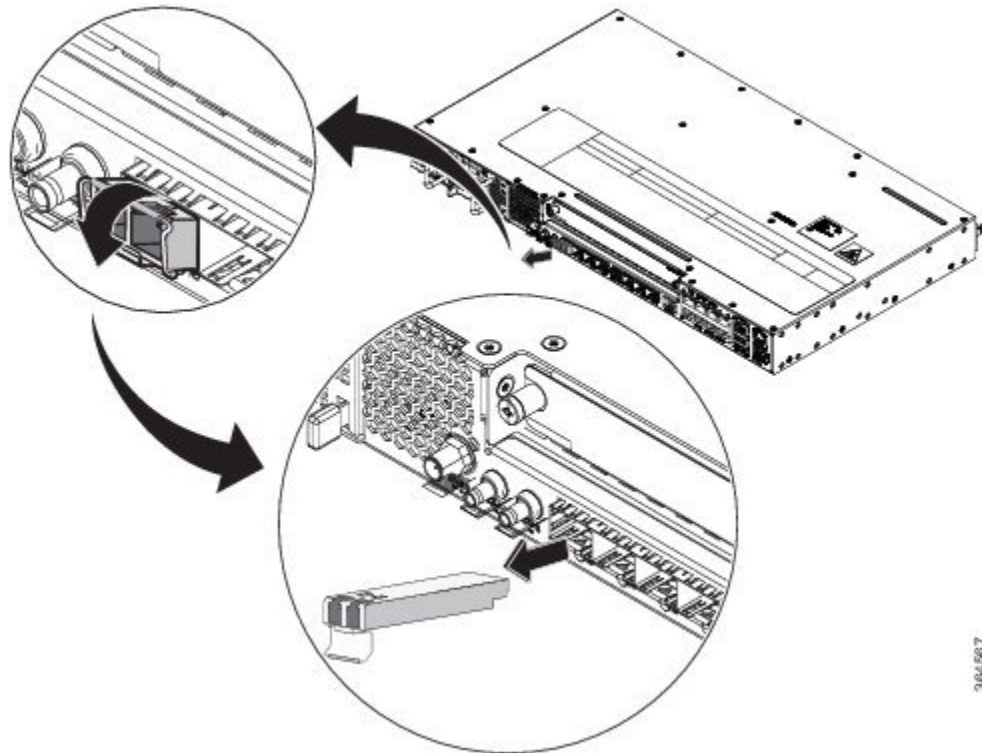
Procedure

- Step 1** Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis.
- Step 2** Disconnect the cable from the SFP module, and insert a dust plug into the cable end.
- Tip** For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3 Unlock and remove the SFP module, as shown in the following figure.

If the module has a bale-clasp latch, pull the bale out and down to eject the module. If the bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale-clasp latch.

Figure 13: Removing a Bale-Clasp Latch SFP Module



Step 4 Grasp the SFP module between your thumb and index finger, and carefully remove it from the module slot.

Step 5 For fiber-optic SFP modules, insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.

Step 6 Place the removed SFP module in an antistatic bag or other protective environment.

Connecting to the Copper Ports

Copper ports [0:7] are capable of working 10/100/1000 Mbps.



Note The router copper ports configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the port speed and duplex parameters on both ends of the connection.

Procedure

-
- Step 1** When connecting to workstations, servers, and routers, connect a straight-through cable to an RJ-45 connector on the front panel. When connecting to routers or repeaters, use a crossover cable.
- Note** You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the router detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 100/1000, or an SFP module port on the router, regardless of the type of device on the other end of the connection.
- Step 2** Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both the router and the connected device have established link.
- If the port LED does not turn on, the device at the other end might not be turned on, or there might be a cable problem or a problem with the adapter installed in the attached device.
- Note** On user network interface (UNI) ports, the port LED is green after the link is established.
- Step 3** Reconfigure and reboot the connected device, if necessary.
- Step 4** Repeat Steps 1 through 3 to connect each device.
-

Connecting to SFP Modules

This section describes how to connect to SFP modules. For instructions on how to connect to fiber-optic SFP modules, see the *Connecting to Fiber-Optic SFP Modules* section.

For instructions about how to install or remove an SFP module, see the *Installing and Removing SFP Modules* section.

Connecting to Fiber-Optic SFP Modules

Follow these steps to connect a fiber-optic cable to an SFP module:



Danger Class 1 laser product. Statement 1008



Caution Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Procedure

- Step 1** Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.
- Step 2** Insert one end of the fiber-optic cable into the SFP module port.
- Step 3** Insert the other cable end into a fiber-optic connector on a target device.
- Step 4** Observe the port status LED.

The LED turns green when the router and the target device have an established link.

If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be problem with the adapter installed in the target device.

- Step 5** If necessary, reconfigure and restart the router or target device.

Installing the Chassis Ground Connection

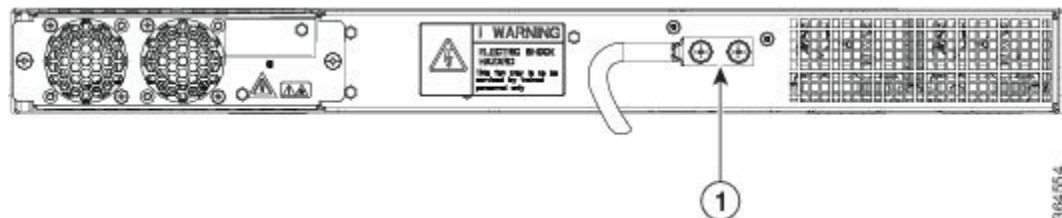
Before you connect the power or turn on the power to the router, you must provide an adequate chassis ground (earth) connection to your router.

This section describes how to ground the chassis. The grounding lug location is on the back panel of the router.



Tip Ensure that the grounding lug wire does not cover the fan opening.

Figure 14: Attaching a Grounding Lug to the Rear of the Router



1 Grounding-lug

To ensure that the chassis ground connection that you provide is adequate, you need the following parts and tools:

- Ratcheting torque screwdriver with Phillips head that exerts up to 15 in.-lb (1.69 N-m) of torque for attaching the ground wire to the router
- Crimping tool as specified by the ground lug manufacturer
- 6-AWG or larger copper wire for the ground wire
- Wire-stripping tools appropriate to the wire you are using



Caution Before making connections to the router, ensure that you disconnect the power at the circuit breaker. Otherwise, severe injury to you or damage to the router may occur.



Caution Electric Shock Hazard: This fan tray has to be serviced by trained personnel only.



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 Use copper conductors only. Statement 1025



Warning When installing the unit, the ground connection must always be made first and disconnected last. Statement 42

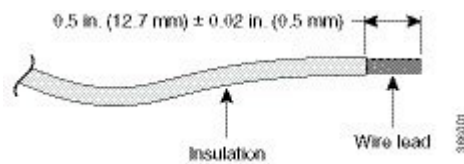
This unit is to be installed in a restrictive access location and must be permanently grounded to a minimum 6-AWG copper ground wire.

Perform the following procedure to ground the router using a 2-hole lug and the corresponding mounting point. Most carriers require a minimum 6-AWG ground connection. Verify your carrier's requirements for the ground connection.

Procedure

Step 1 If your ground wire is insulated, use a wire-stripping tool to strip the ground wire to 0.5 inch \pm 0.02 inch (12.7 mm \pm 0.5 mm).

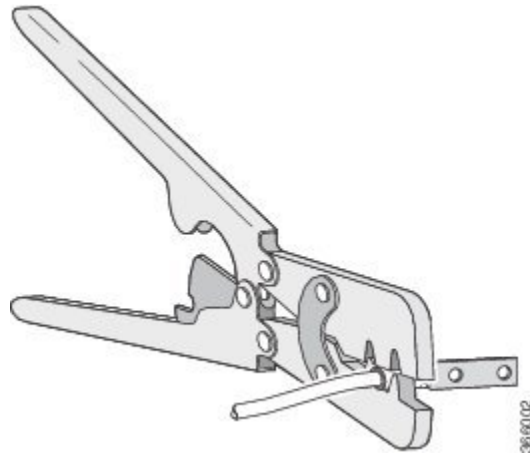
Figure 15: Stripping a Ground Wire



Step 2 Slide the open end of your 2-hole ground lug over the exposed area of the ground wire.

Step 3 Using a crimping tool (as specified by the ground lug manufacturer), crimp the ground lug to the ground wire as shown in the following figure.

Figure 16: Crimping a Ground Lug on to the Ground Wire



- Step 4** Use a Phillips head screwdriver to attach the 2-hole ground lug and wire assembly to the router with the 2 pan-head Phillips head screws.
- Step 5** Connect the other end of the ground wire to a suitable grounding point at your site.

Installing and Removing the Fan Tray

This section describes how to install and remove fan trays.

Installing the Fan Tray

Follow these steps to install the fan tray in the chassis:



Caution Electric Shock Hazard: This fan tray has to be serviced by trained personnel only.



Caution Always wear the ESD wrist strap when installing or uninstalling the fan tray.

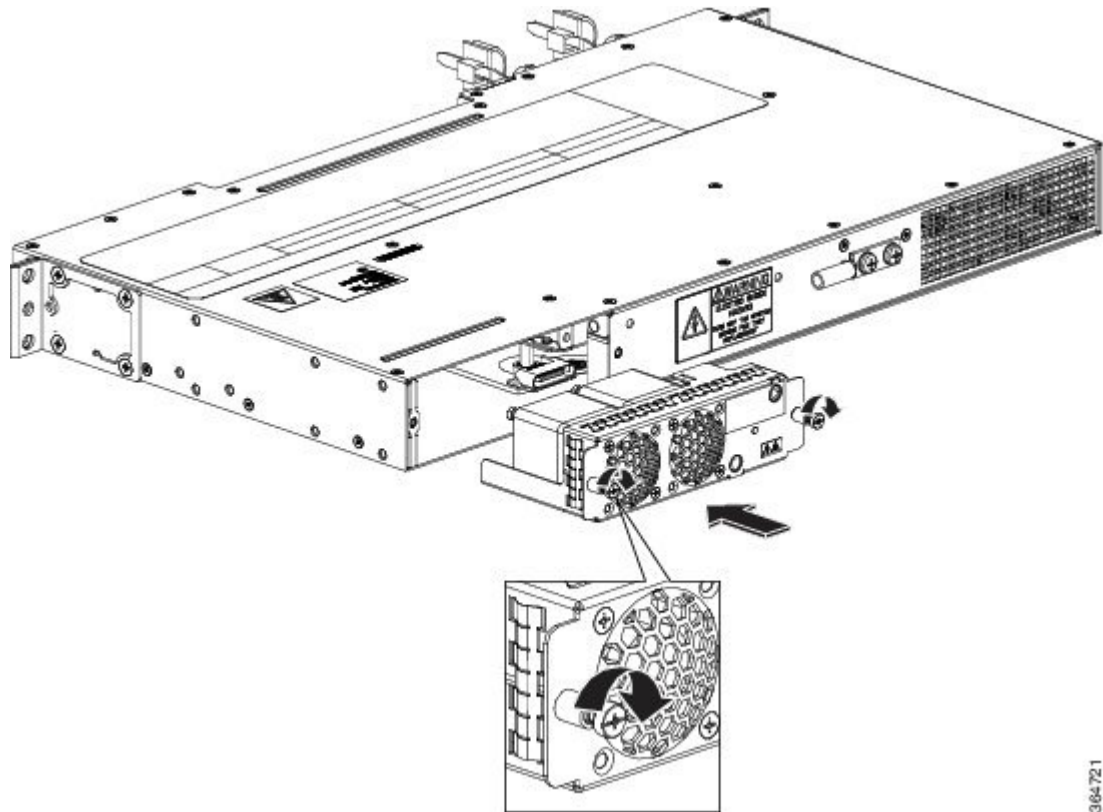


Caution Unplug all power sources before performing this procedure.

Procedure

- Step 1** Orient the fan tray so that the captive screws are aligned to the chassis cavity on the back panel. See the following figure.

Figure 17: Installing the Fan Tray in the Chassis



366472-1

- Step 2** Push the fan assembly into the chassis until the power connector seats in the backplane and the captive installation screws make contact with the chassis.
- Step 3** Tighten the captive installation screws, using a flat-blade or number 2 Phillips-head screwdriver.

Removing the Fan Tray

To remove the existing fan assembly, follow these steps:



Caution When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades stop completely before you remove the fan tray.



Caution Unplug all power sources before performing this procedure.

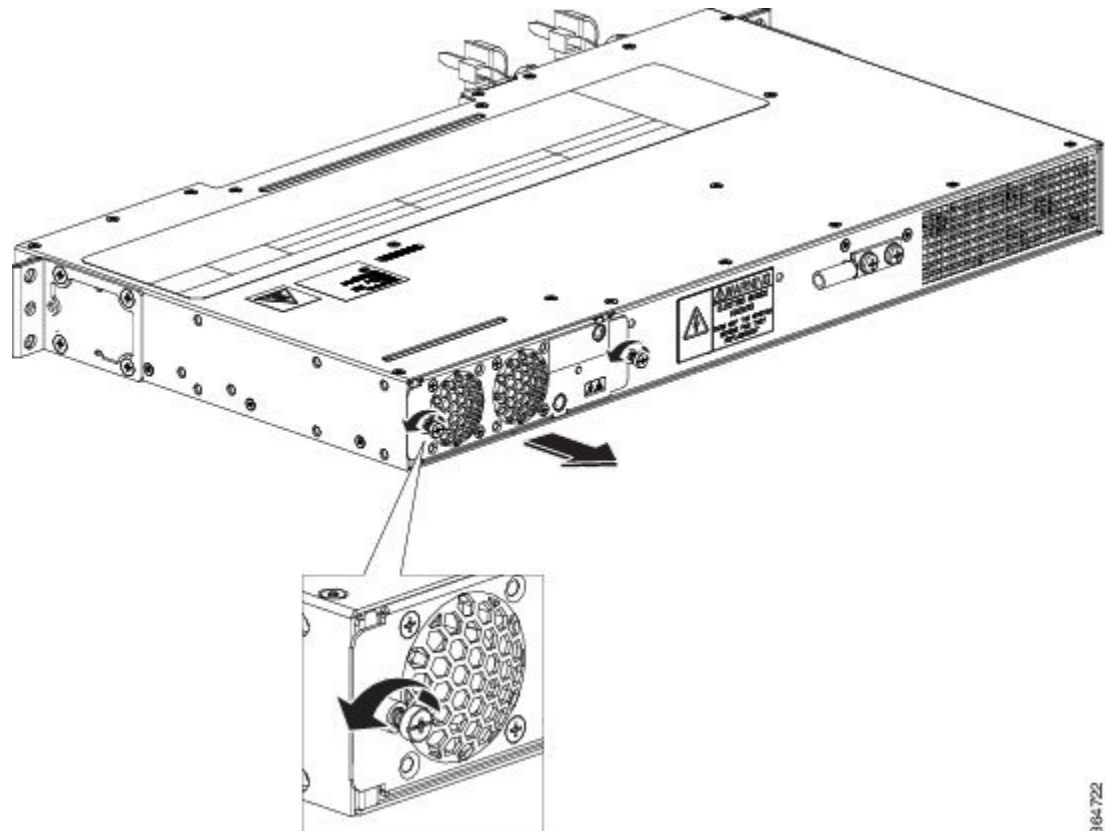


Caution Always wear the ESD wrist strap when installing or uninstalling the fan tray.

Procedure

- Step 1** Locate the fan assembly in the chassis. The fan tray is located to the left of the chassis on the rear side. See the following figure.

Figure 18: Uninstalling the Fan Tray from the Chassis



3164-722

- Step 2** Loosen the two fan tray captive installation screws by turning them counterclockwise, using a flat-blade or number 2 Phillips-head screwdriver.
- Step 3** Grasp the fan assembly with both hands, and pull it outward; rock it gently, if necessary, to unseat the fan assembly power connector from the backplane.
- Step 4** Pull the fan assembly clear of the chassis, and set it aside.

Interface Module Installation

The following sections describe the various tasks of associated with interface module installation:

Installing an Interface Module



Caution Before inserting an interface module, make sure that the chassis is grounded.

Procedure

- Step 1** To insert the interface module, carefully align the edges of the interface module between the upper and lower edges of the router slot.
 - Step 2** Carefully slide the interface module into the router slot until the interface module makes contact with the backplane.
 - Step 3** Tighten the locking thumbscrews on both sides of the interface module. The recommended maximum torque is 5.5 in.-lb (.62 N-m).
 - Step 4** Connect all the cables to each interface module.
-

Removing an Interface Module

Procedure

- Step 1** To remove an interface module, disconnect all the cables from the interface module.
 - Step 2** Loosen the locking thumbscrews on both sides of the interface module.
 - Step 3** Slide the interface module out of the router slot by pulling on the handles. If you are removing a blank filler plate, pull the blank filler plate completely out of the router slot using the captive screws.
-

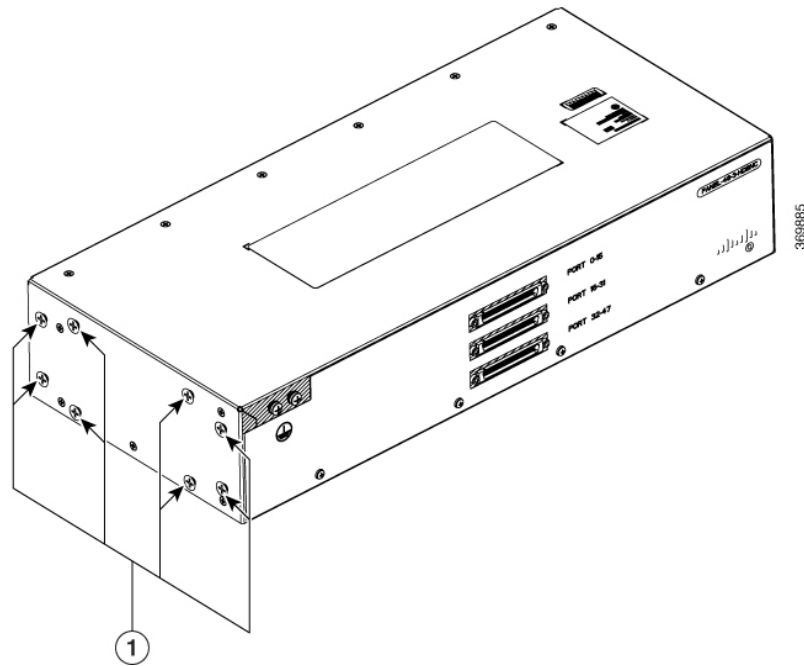
Installing Patch Panel

To install the brackets on the rear of the patch panel, perform these steps:

Procedure

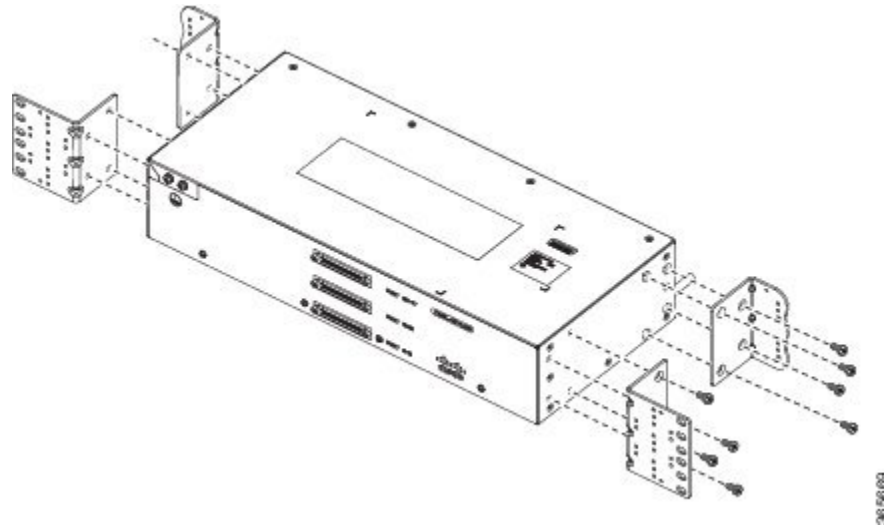
- Step 1** Remove the larger (M4) rack mount screws (as indicated in the *Rack Mount Screws* figure below) from both sides. To secure the brackets, follow the instructions in Step-3.
- Step 2** Remove the patch panel rack-mount brackets from the accessory kit and position them beside the patch panel.
- Step 3** Position the brackets against the patch panel sides, and align with the screw holes. Secure the rack mount bracket to patch panel using a torque of 13.2 in.-lb (1.5 N-m) see the figure below.

Figure 19: Rack Mount Screws



(1) Rack mount screws to secure rack mount brackets on both the sides.

Figure 20: Patch Panel Front View with Brackets



Step 4 Position the cable management guides against the mounting brackets on the patch panel, see the figure below.

Figure 21: Patch Panel Front View with Brackets and Guides

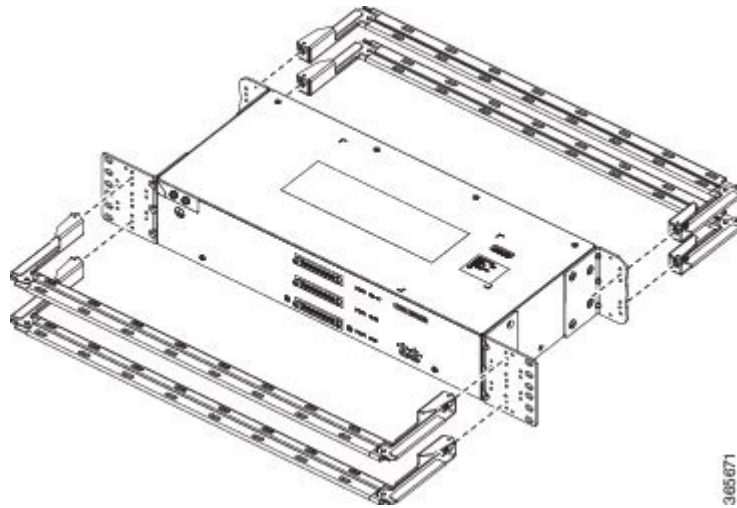
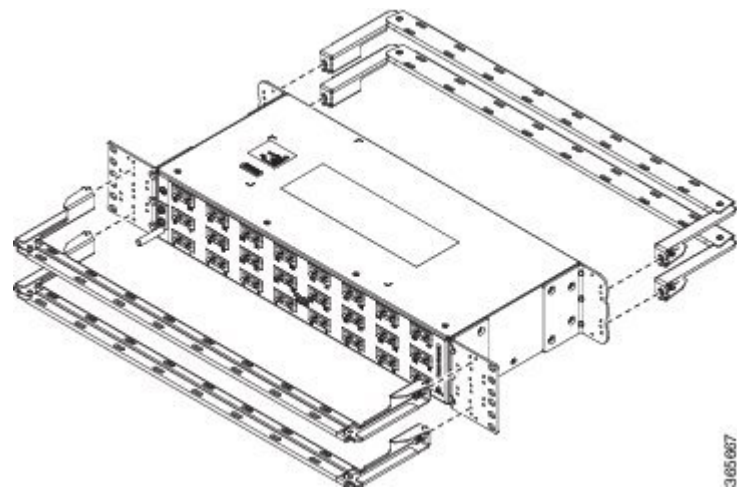


Figure 22: Patch Panel Rear View with Brackets and Guides



Step 5 Secure the guides to the brackets with the screws. The recommended maximum torque is 28 in.-lb (3.16 N-m).

Step 6 **Note** Cable brackets should be assembled according to the PID used as different PIDs have different set and quantity of brackets. Refer figures 110 to 115 for PID and cable bracket details.

Position the patch panel with brackets and guide onto the rack and secure with screws provided. The recommended maximum torque is 28 in.-lb (3.16 N-m), see the figure below.

Figure 23: Patch Panel Front View with Brackets and Guides Installed on Rack

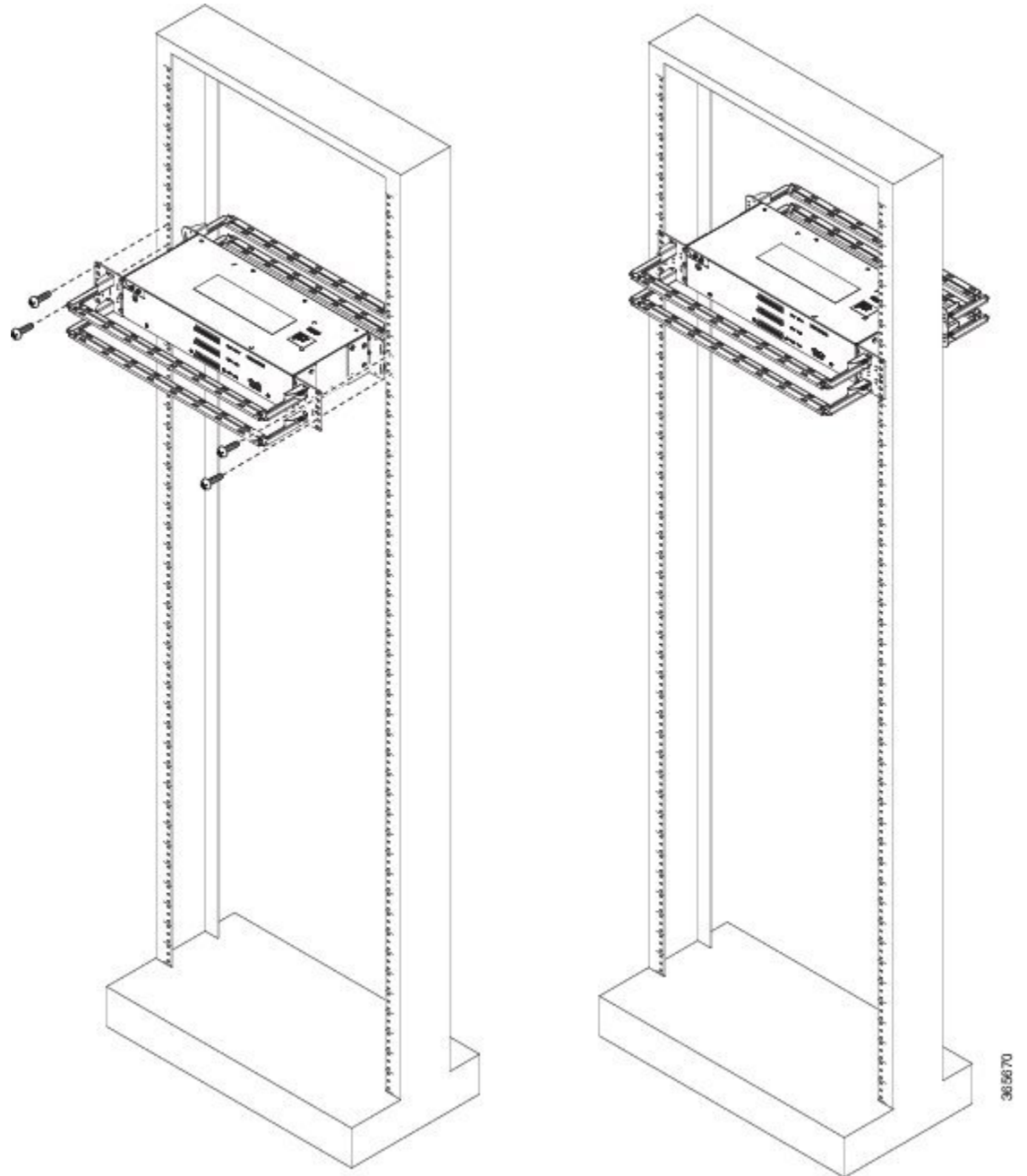


Figure 24: Patch Panel Rear View with Brackets and Guides Installed on Rack

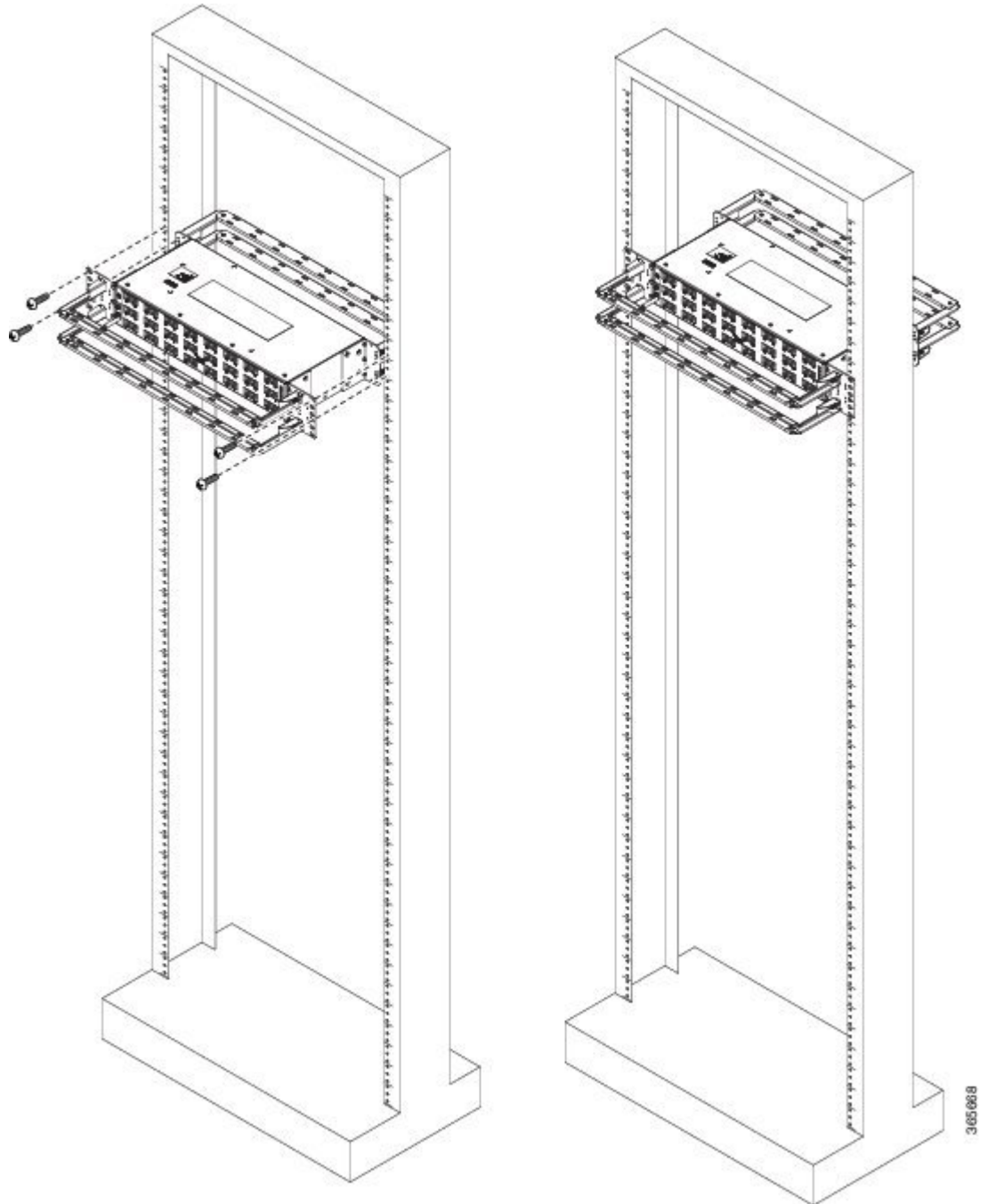


Figure 25: PANEL-16-DIN Patch Panel Mounting Installed on Rack

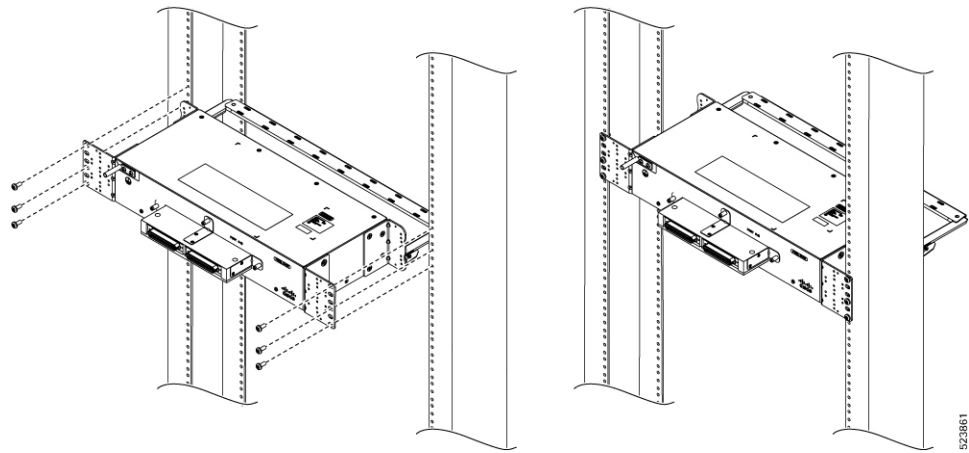


Figure 26: PANEL-48-1-AMP64

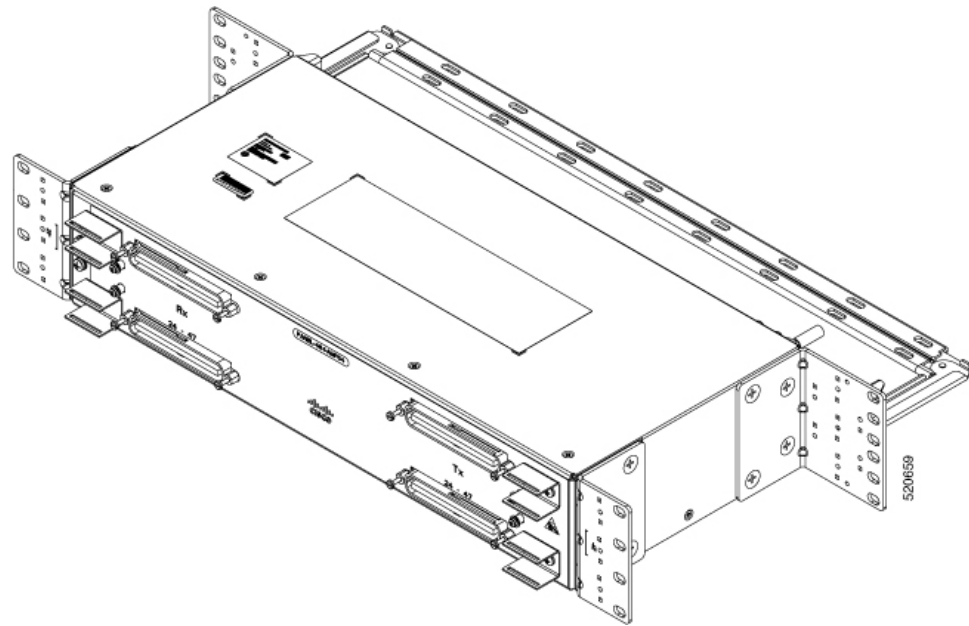
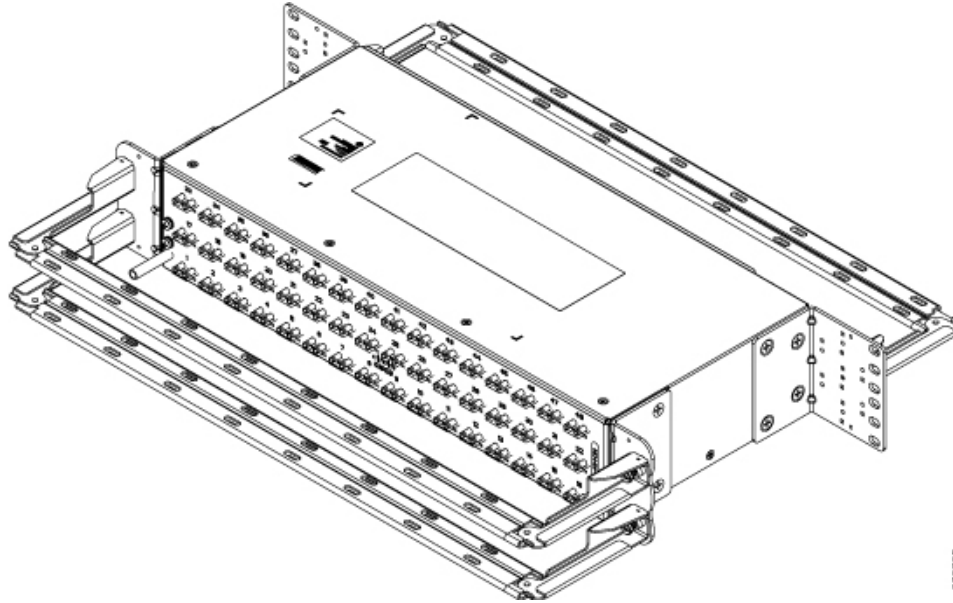
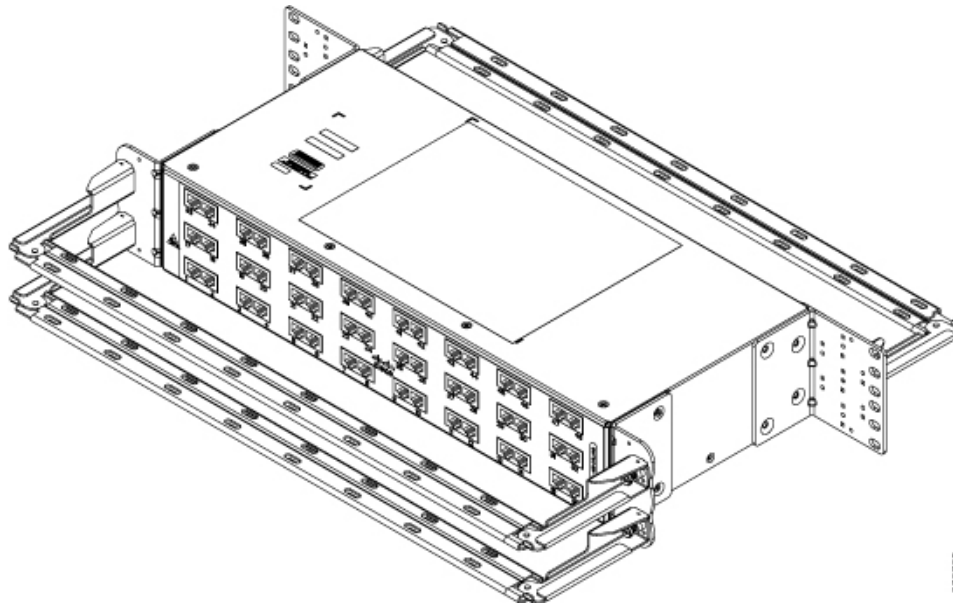


Figure 27: PANEL-48-1-DIN



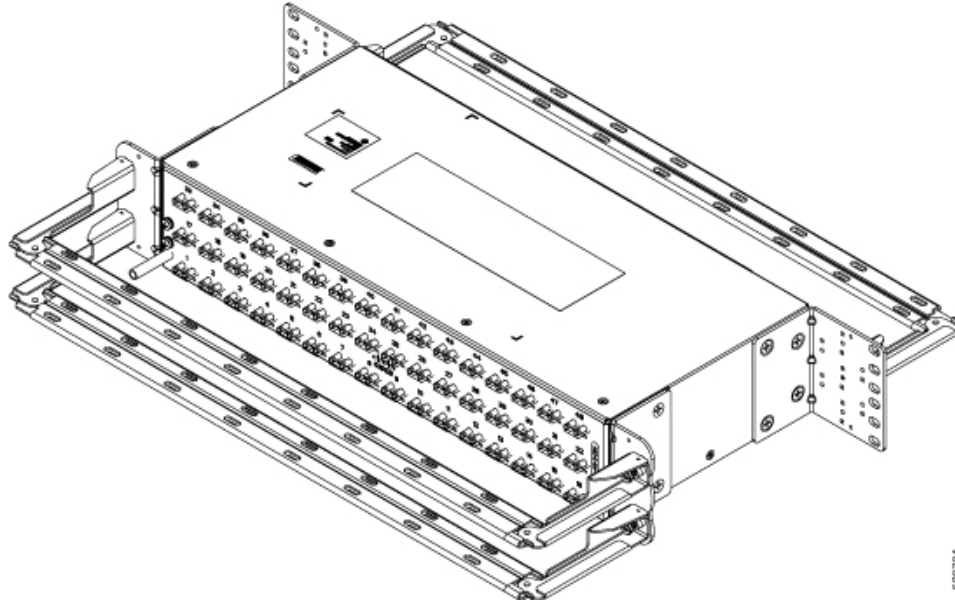
520702

Figure 28: PANEL-48-1-RJ48



520703

Figure 29: PANEL-48-3-DIN



Note The installation of PANEL-48-1-AMP64, PANEL-48-1-DIN, PANEL-48-1-RJ48, and PANEL-48-3-DIN is similar to the installation steps mentioned above.

Figure 30: PANEL-48-3-HDBNC

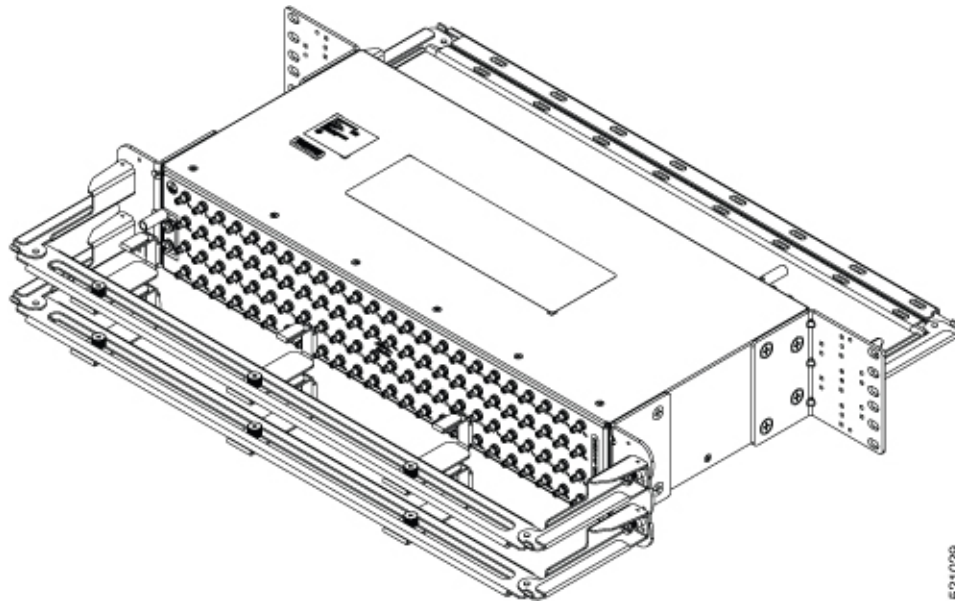


Figure 31: PANEL-144-1-AMP64

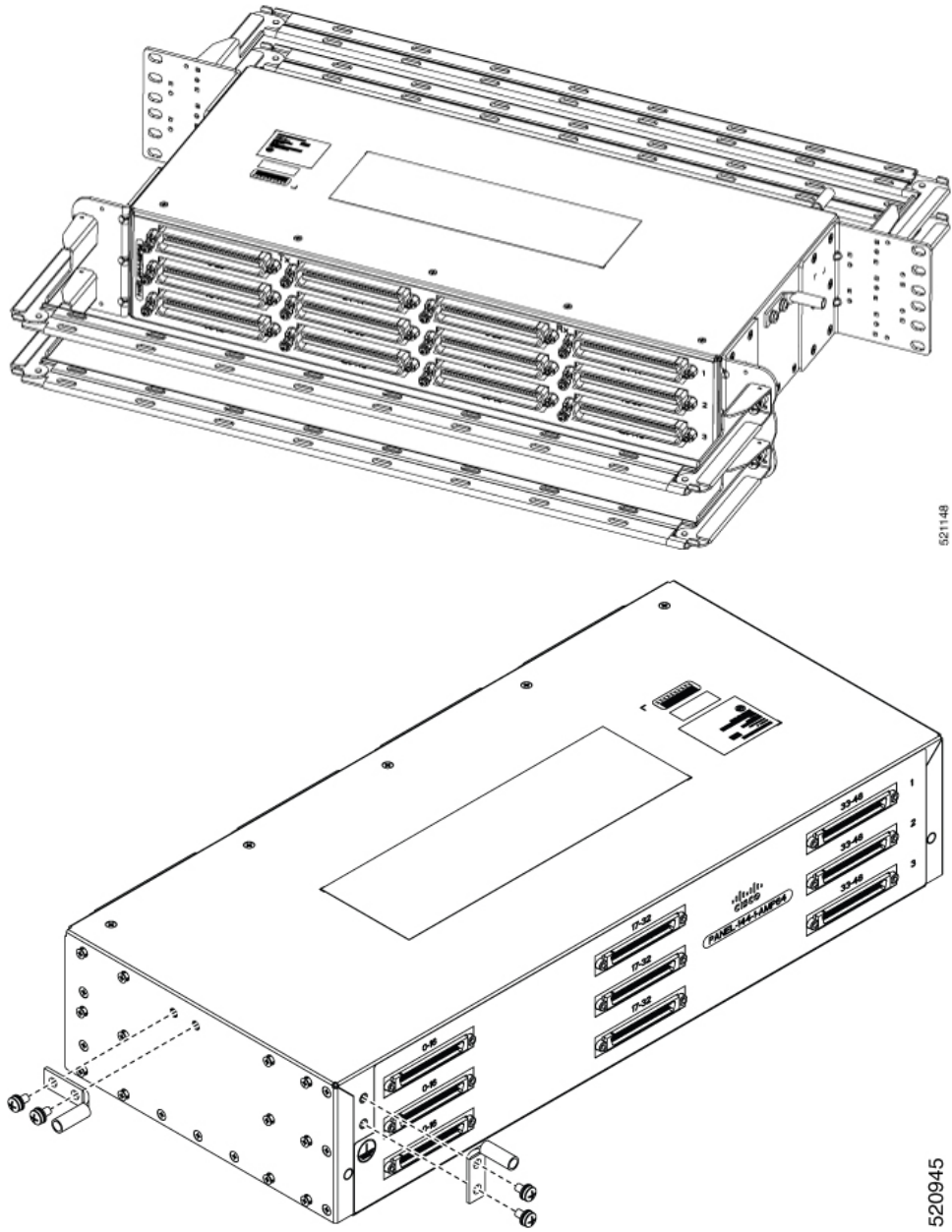
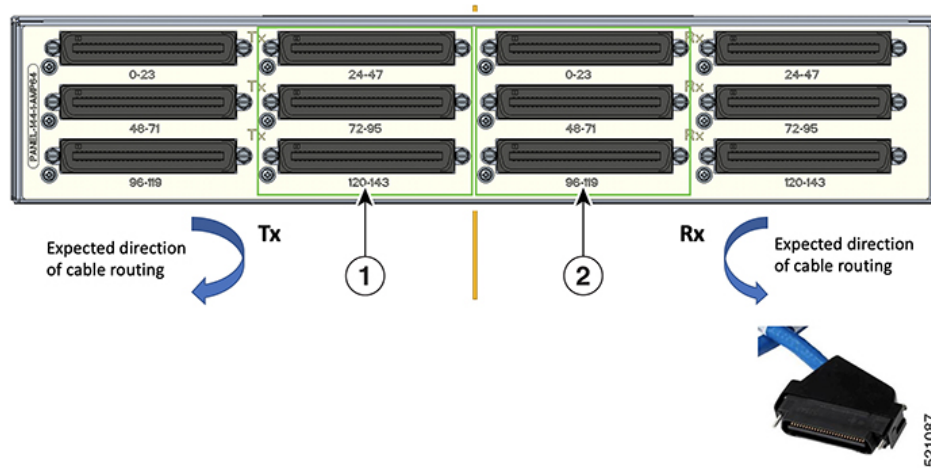


Figure 32: Example of 120° Exit Cable Hood



The following table shows details of the 120° exit cable hood:

Table 1: Cable Routing Recommendation for Panel-144-1-AMP64

1	120° exit cable hood with left routing should be used for centre ports on the Tx side.
2	120° exit cable hood with right routing should be used for centre ports on the Rx side.

Install 3G Patch Panel

You can choose to either set up the Cisco ASR 903 3G patch panel on a rack or wall mount it.

Install Rack Brackets

Procedure

- Step 1** Connect the grounding lugs using a crimping tool (as specified by the ground lug manufacturer), crimp the ground lug to the ground wire.
- Step 2** Use a 6 AWG ground wire to connect the other end to a suitable grounding point at your site.

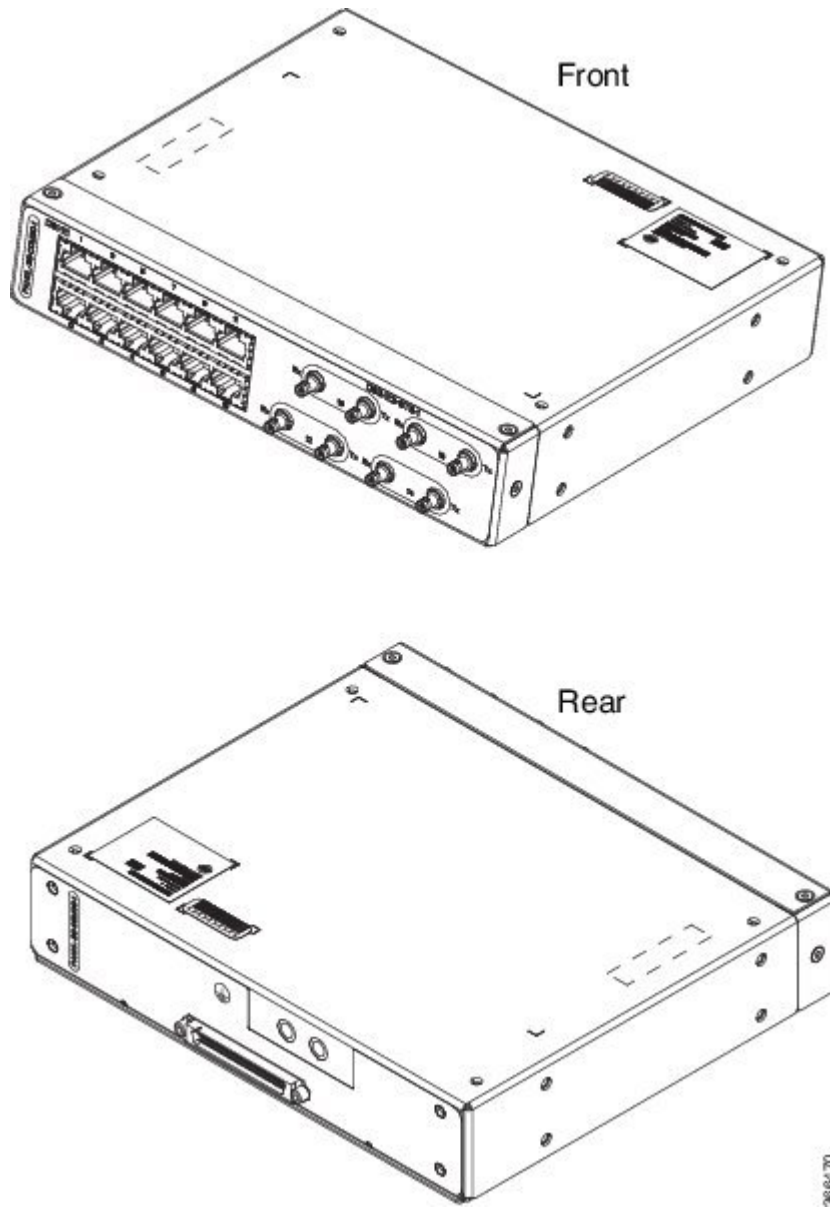
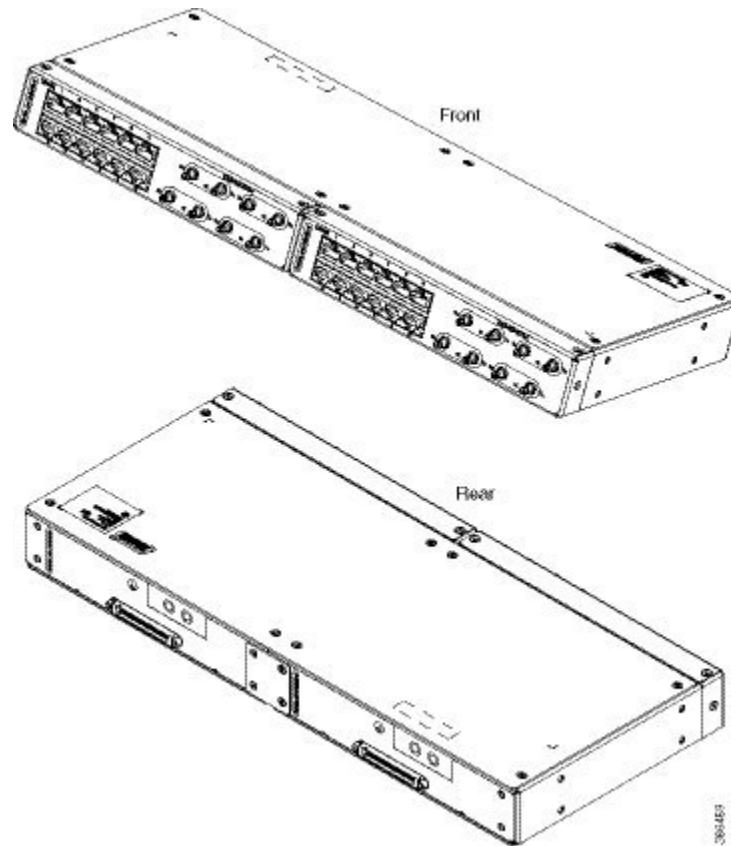
Figure 33: Patch Panel Grounding - Single

Figure 34: Patch Panel Grounding - Dual



- Step 3** Position the patch panel in the rack as follows:
- If the front of the patch panel is at the front of the rack, insert the rear of the chassis between the mounting posts.
 - If the rear of the patch panel is at the front of the rack, insert the front of the chassis between the mounting posts.
- Step 4** Align the mounting holes in the bracket with the mounting holes in the equipment rack.

Figure 35: Installing the Patch Panel - Single in a 19-inch Rack

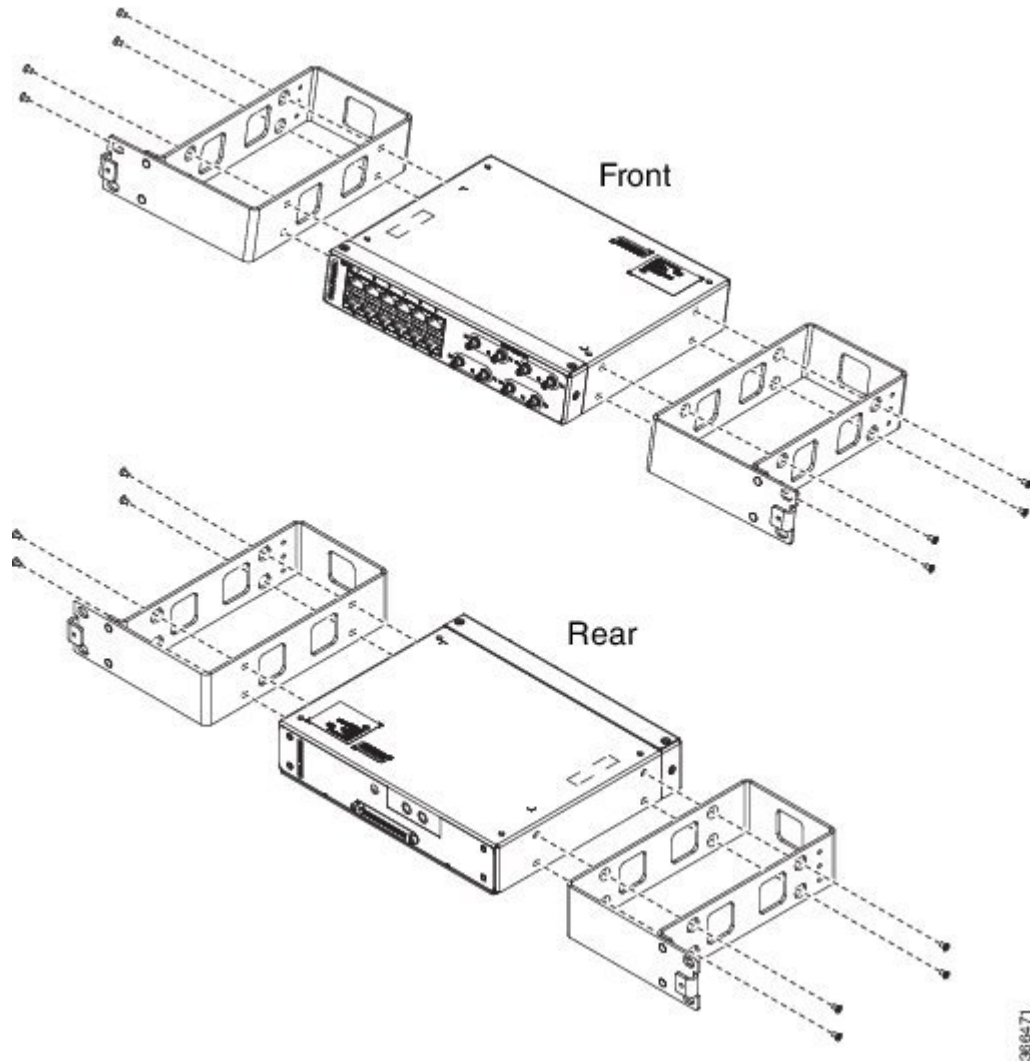
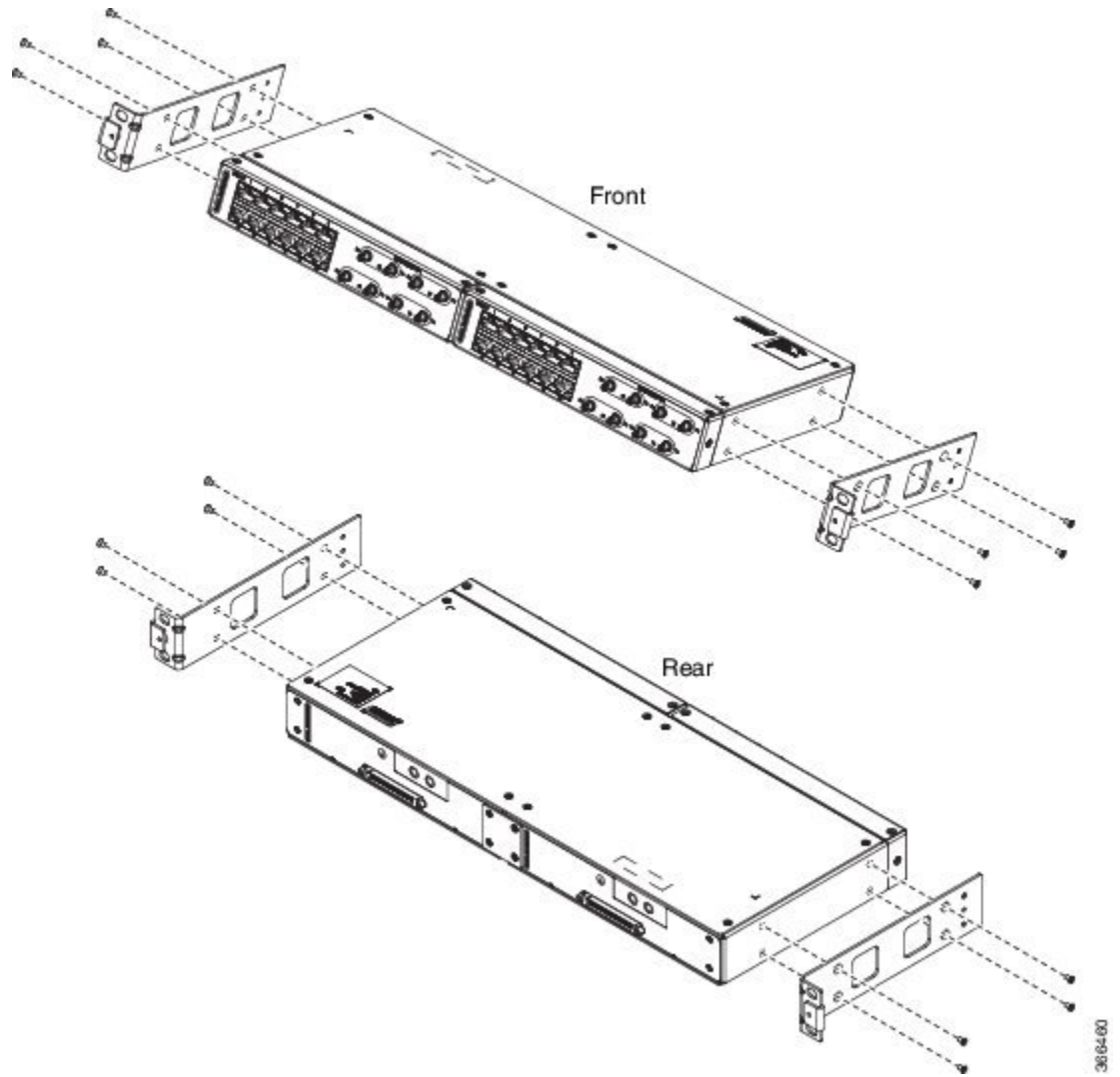


Figure 36: Installing the Patch Panel - Dual in a 19-inch Rack



36-04-03

Figure 37: Installing the Patch Panel - Single in a 21-inch Rack

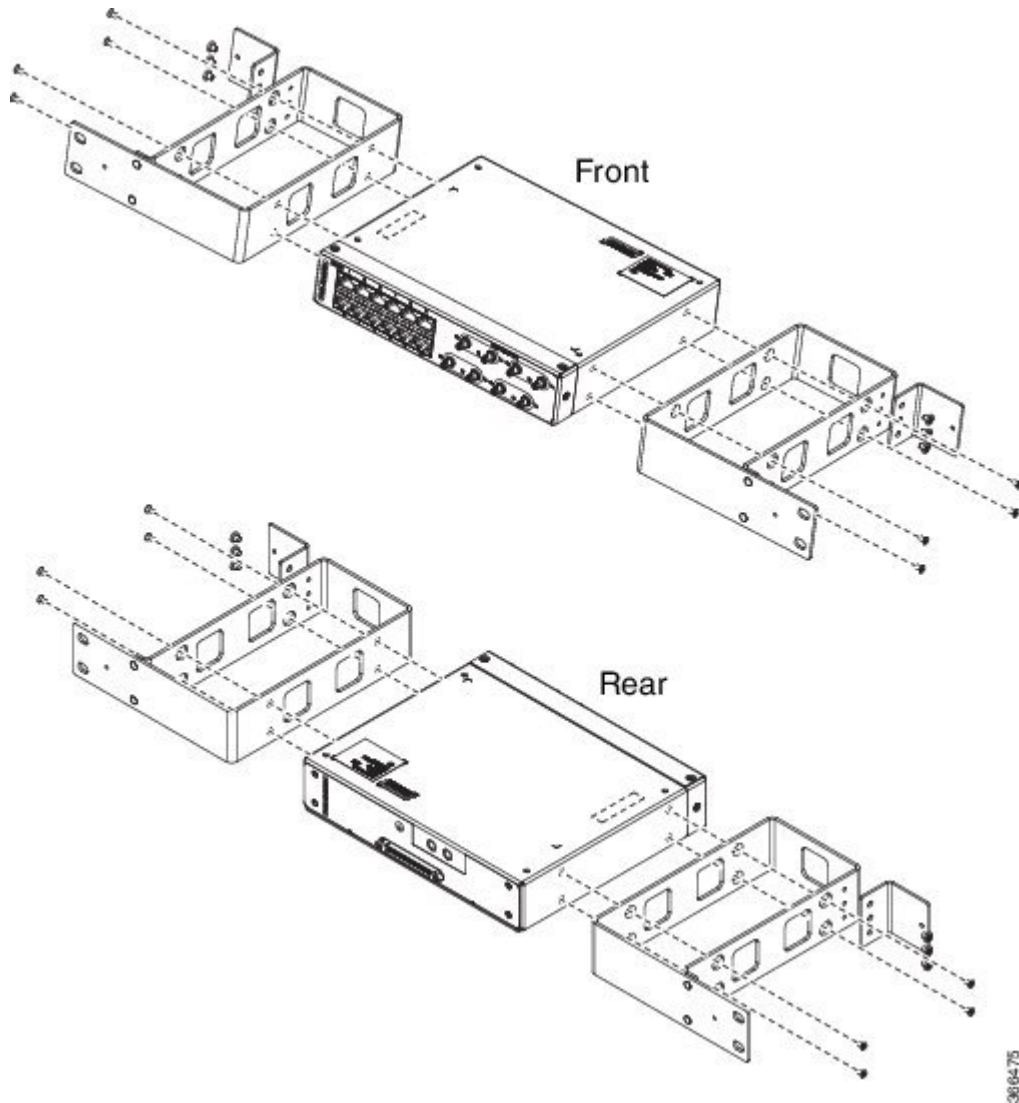


Figure 38: Installing the Patch Panel - Dual in a 21-inch Rack

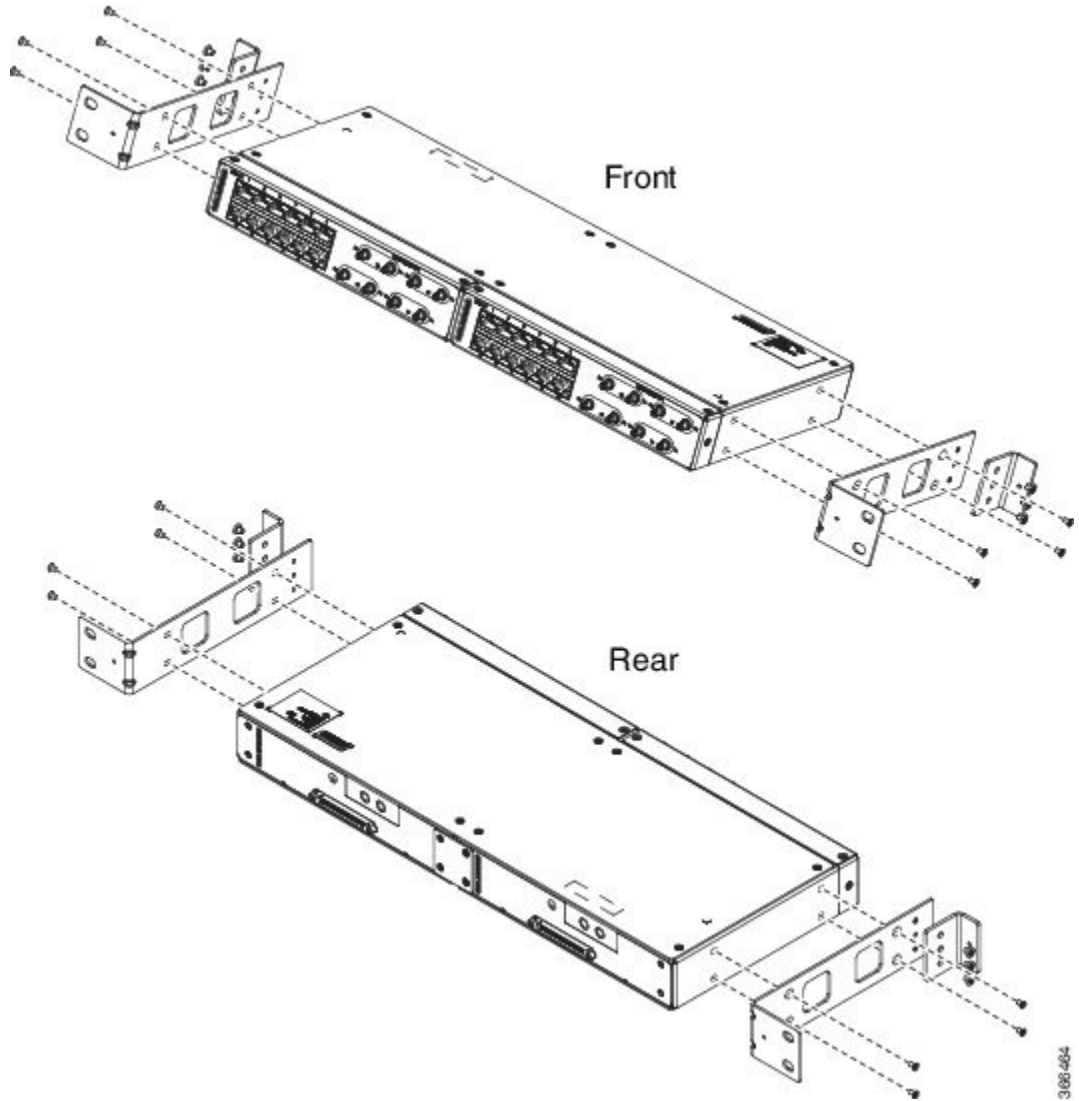


Figure 39: Installing the Patch Panel - Single in a 23-inch Rack

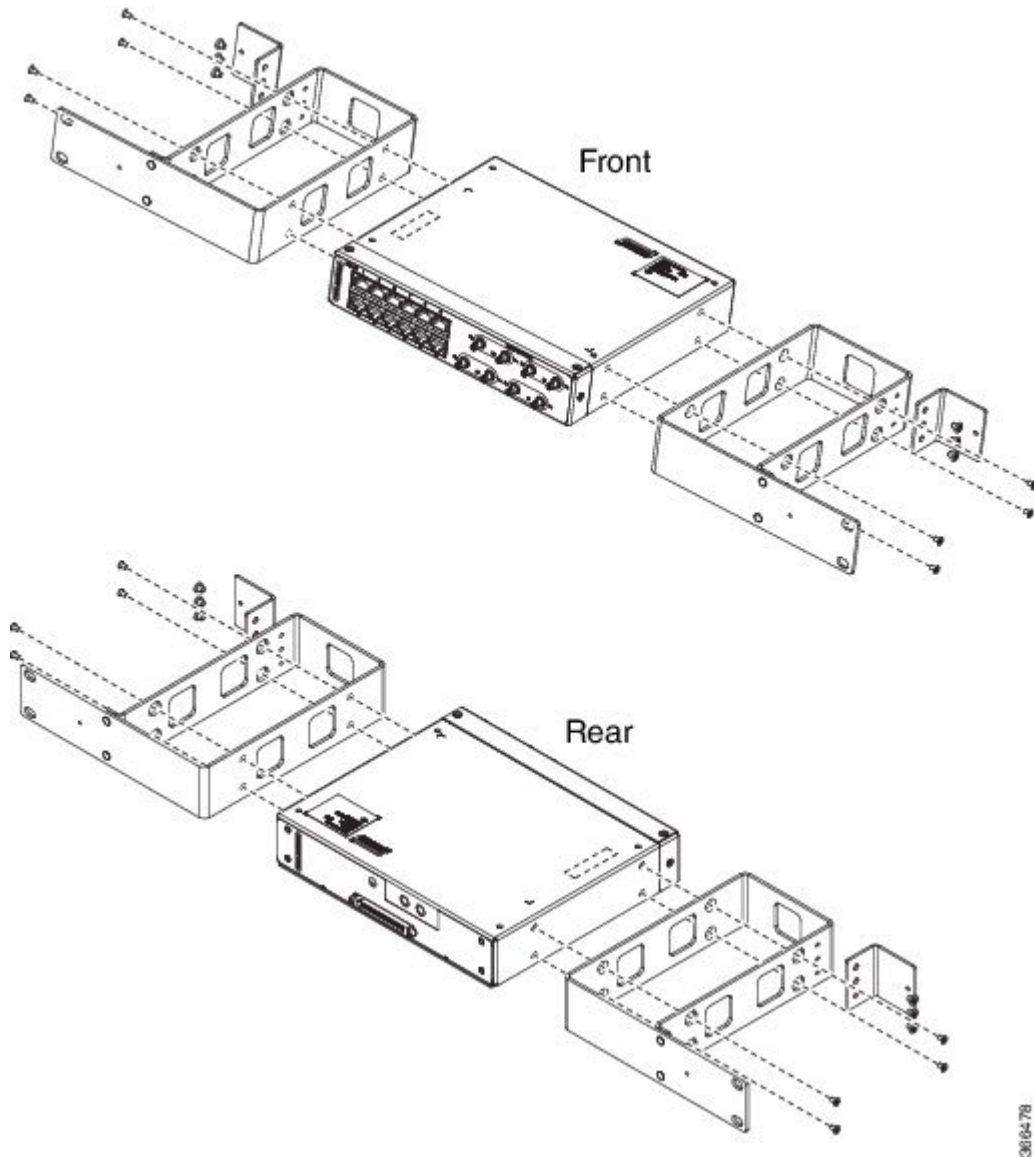
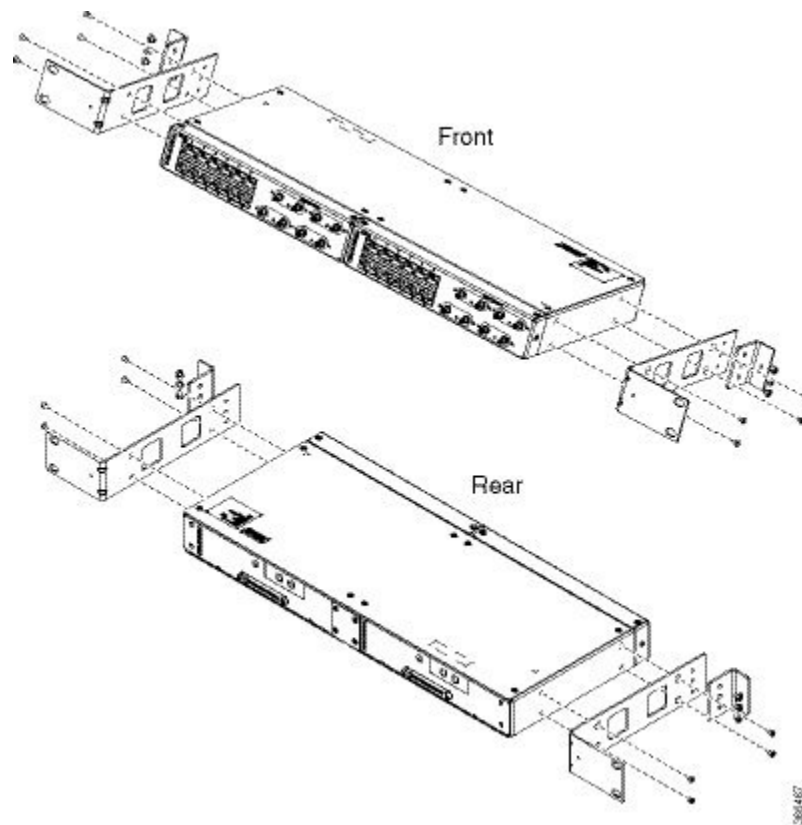


Figure 40: Installing the Patch Panel - Dual in a 23-inch Rack



- Step 5** Secure the brackets to the chassis with the screws. The recommended maximum torque is 28 in.-lb (3.16 N-m).
- EIA 19 and 23 inches mounting brackets for both single and double 3G interface module patch panels.
 - ETSI 21 inches mounting brackets for both single and double 3G interface module patch panels.

Set up 3G Patch Panel on Rack

To install the optional cable management brackets, perform these steps:

Procedure

- Step 1** Position the cable management brackets against the front of the chassis and align the screw holes, as shown in the figure.
- Step 2** Secure the cable management brackets with the screws. The recommended maximum torque is 10 in.-lb (1.12 N-m).

Figure 41: Attaching 19-inch Brackets to Patch Panel - Single

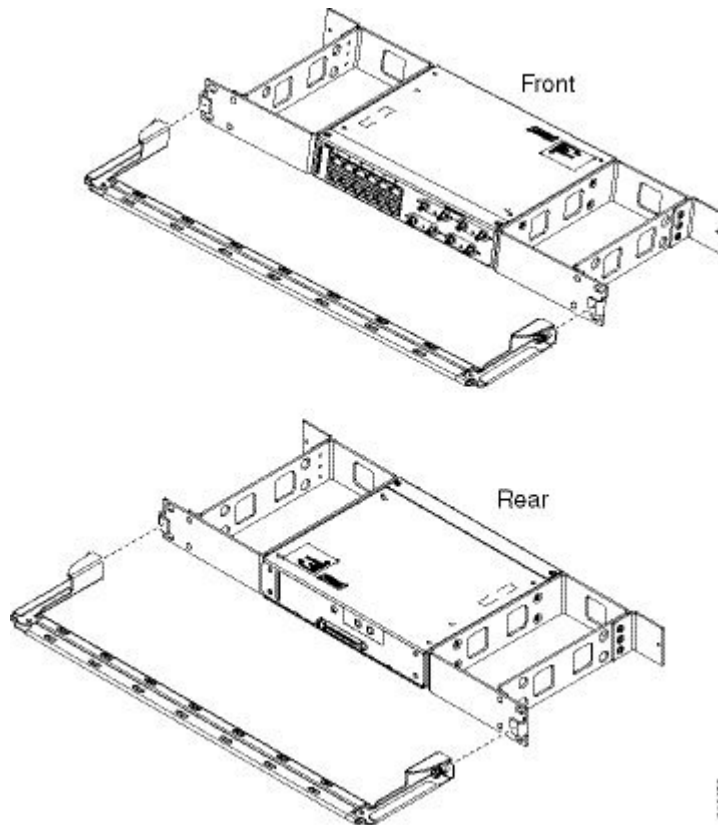


Figure 42: Installing 19-inch Brackets on to Rack - Single

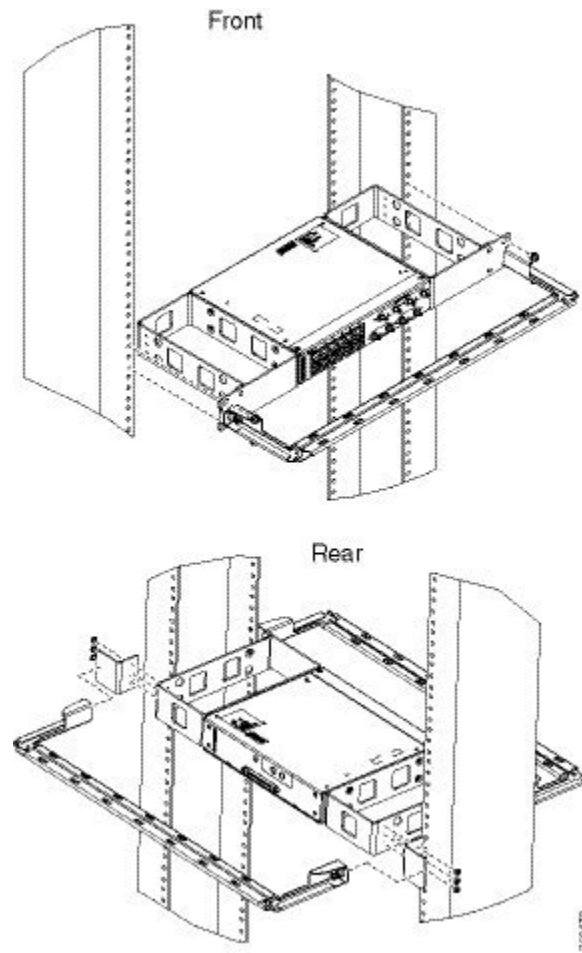
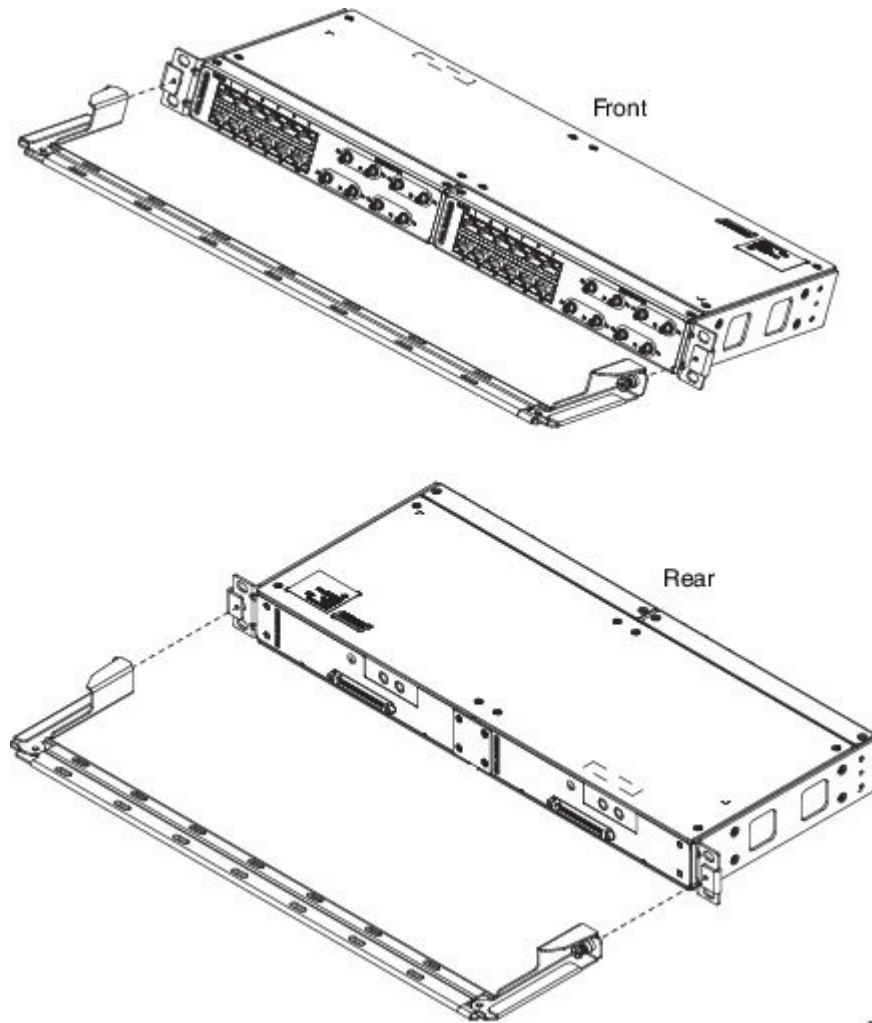


Figure 43: Attaching 19-inch Brackets to Patch Panel - Dual



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Figure 44: Installing 19-inch Brackets on to Rack - Dual

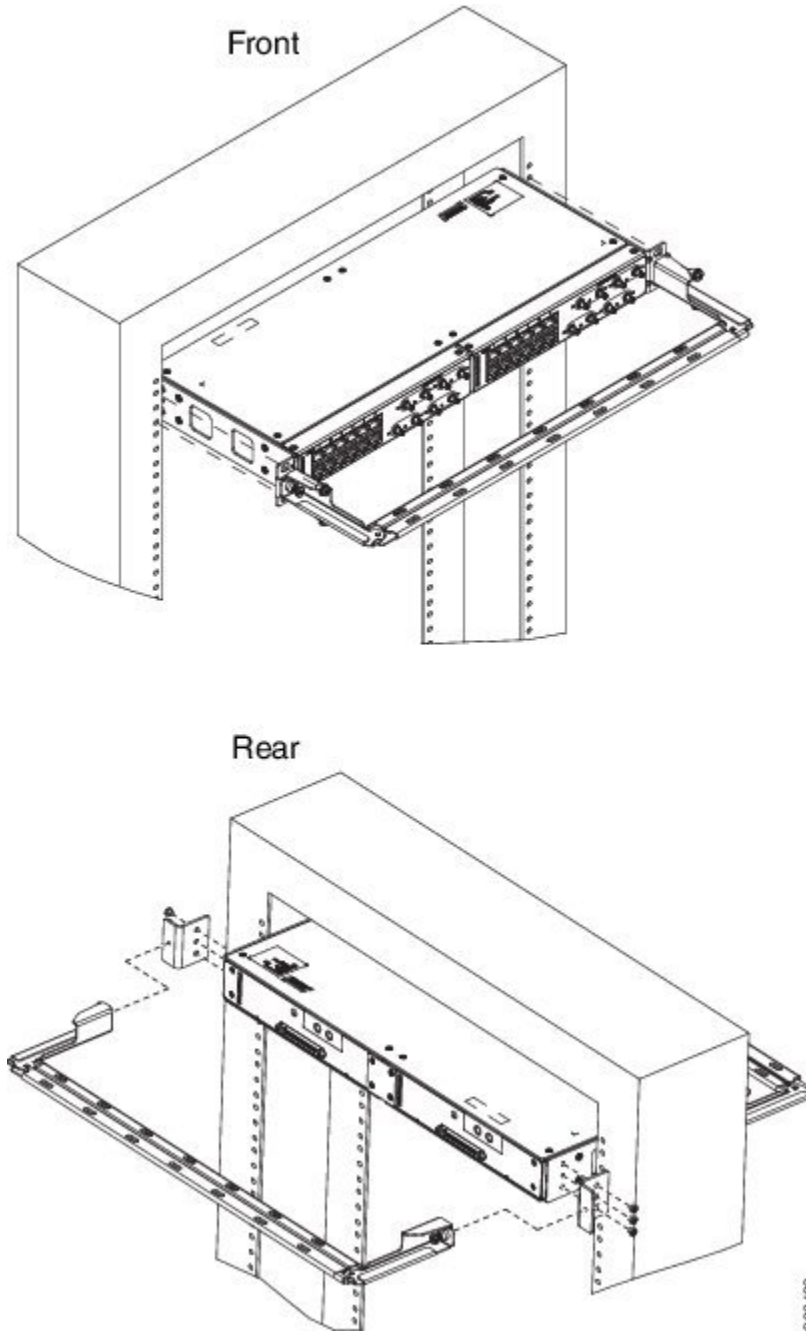


Figure 45: Attaching 21-inch Brackets to Patch Panel - Single

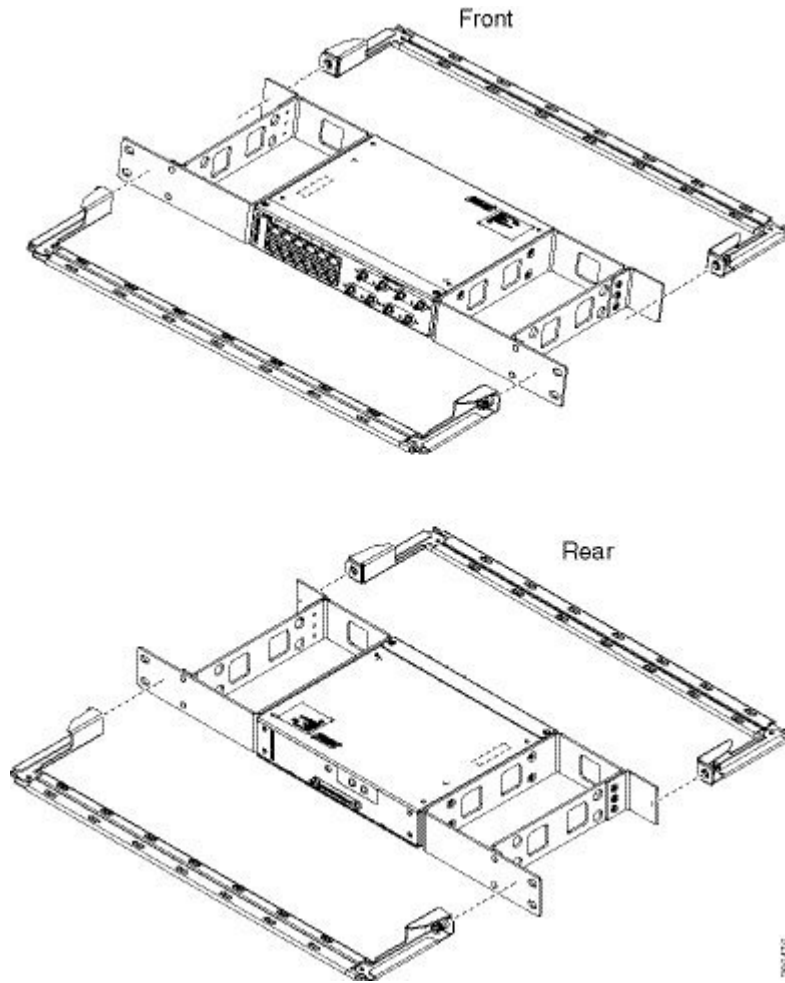


Figure 46: Installing 21-inch Brackets on to Rack - Single

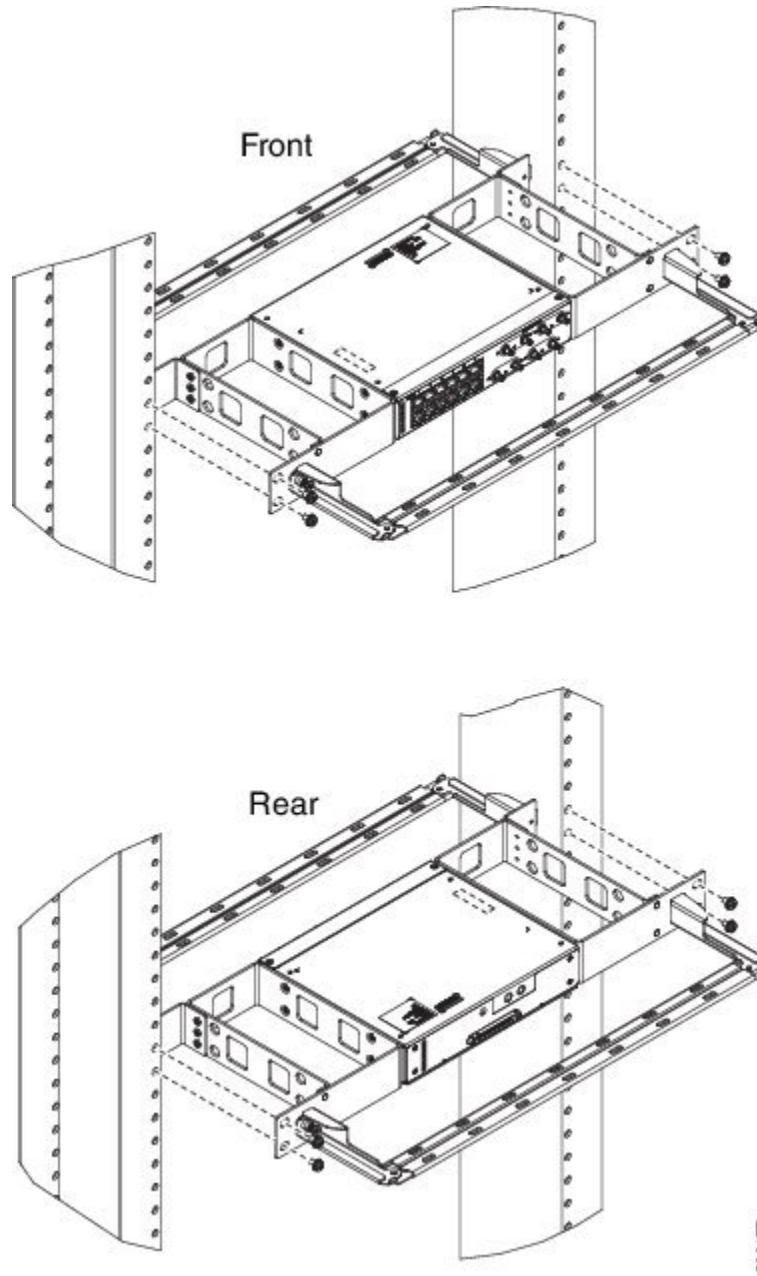


Figure 47: Attaching 21-inch Brackets to Patch Panel - Dual

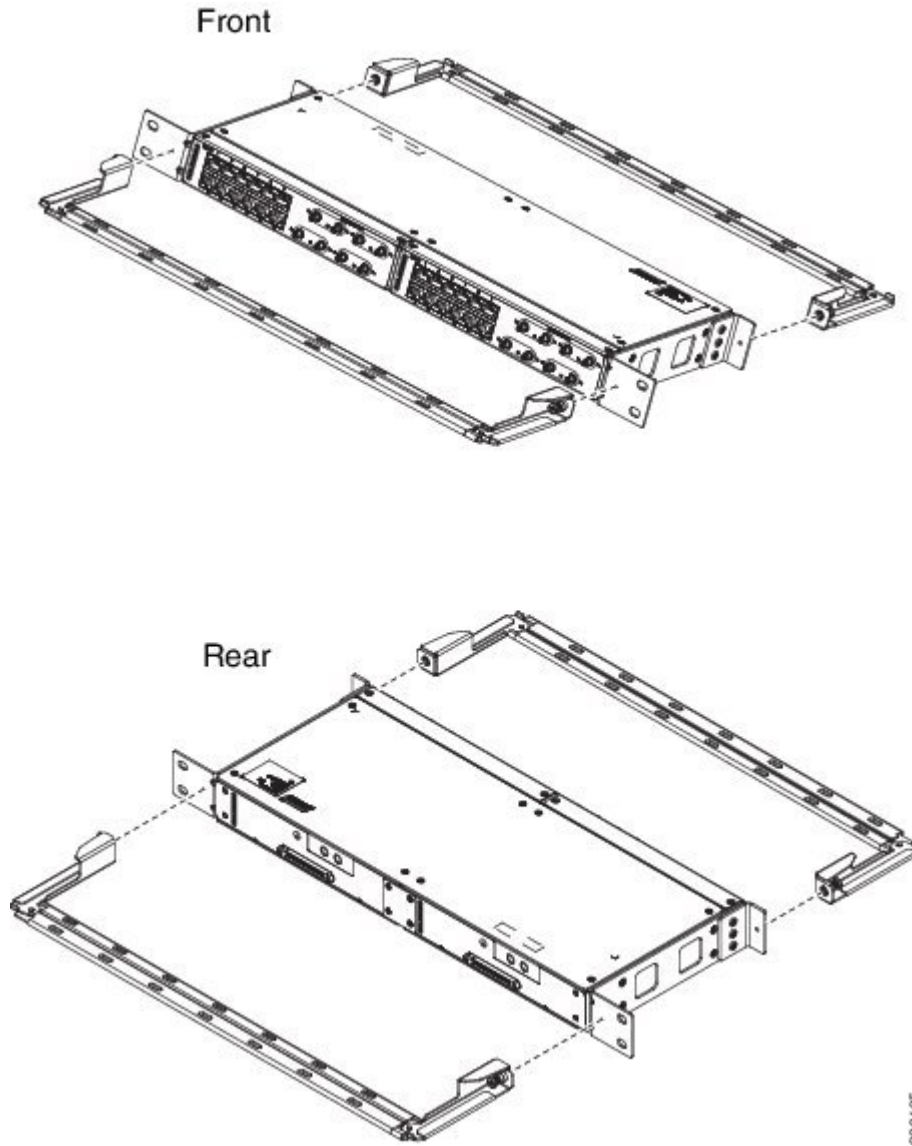


Figure 48: Installing 21-inch Brackets on to Rack - Dual

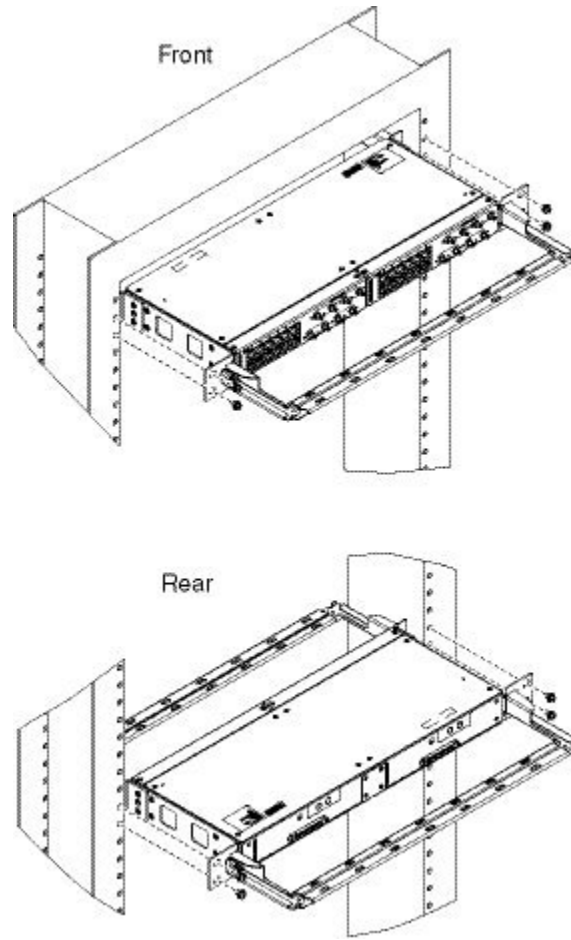
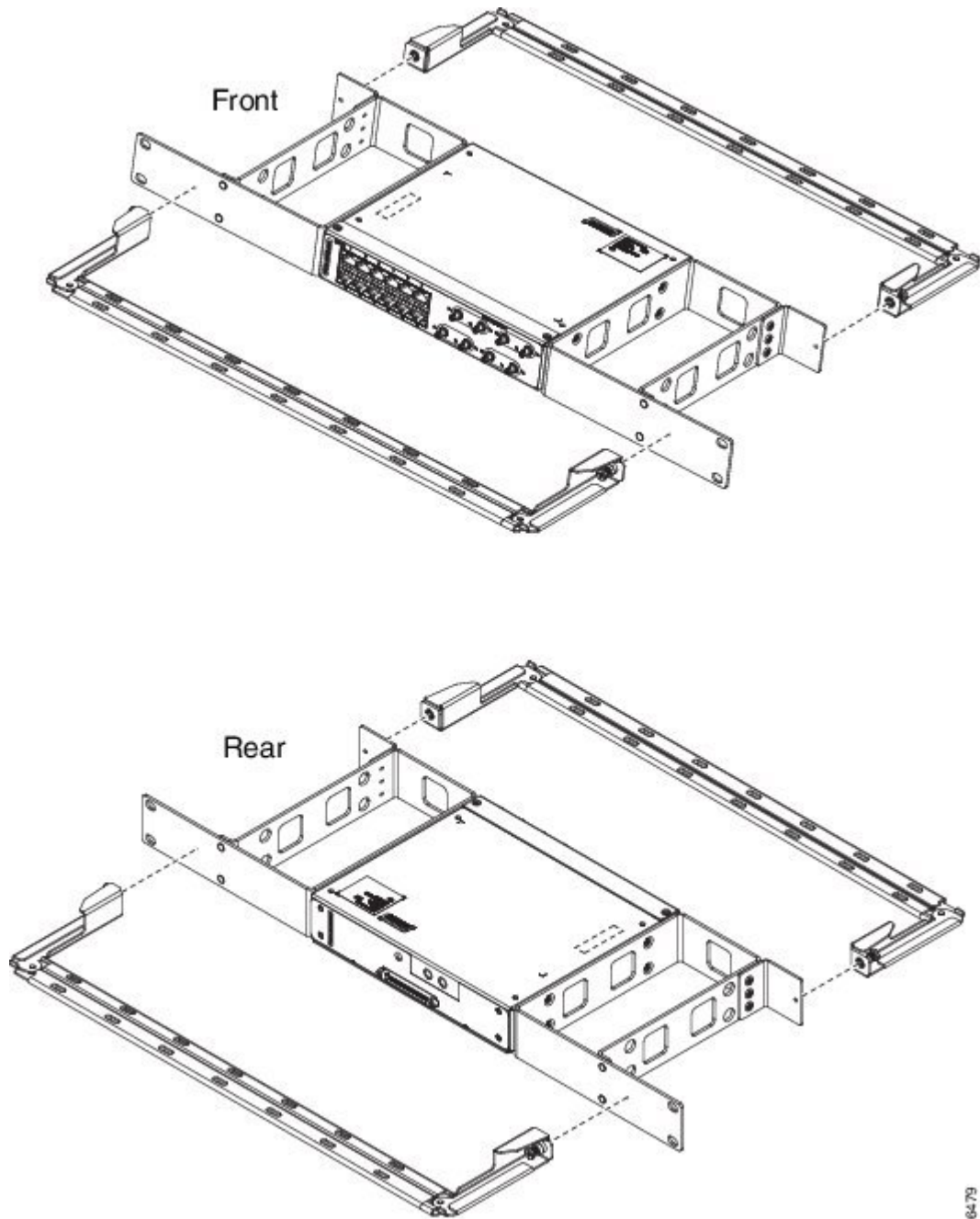


Figure 49: Attaching 23-inch Brackets to Patch Panel - Single



36-64-79

Figure 50: Installing 23-inch Brackets on to Rack - Single

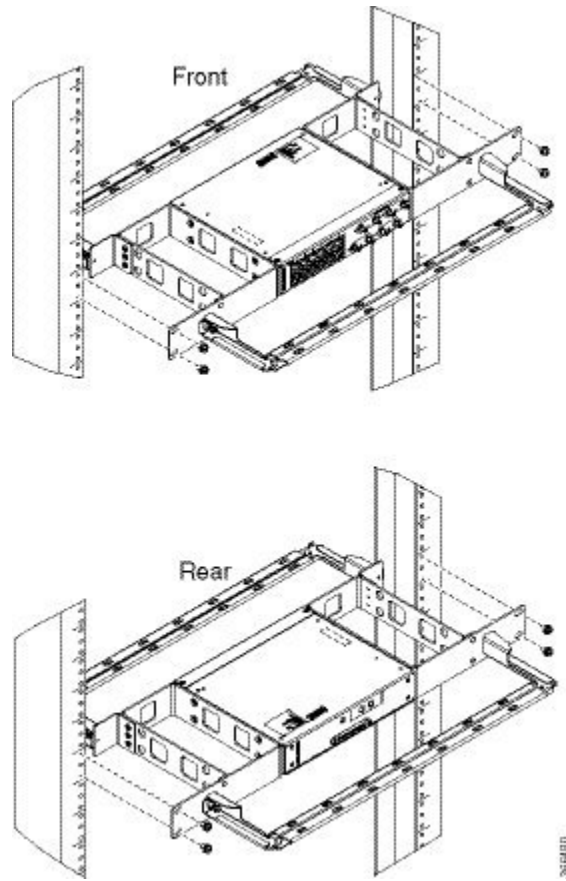
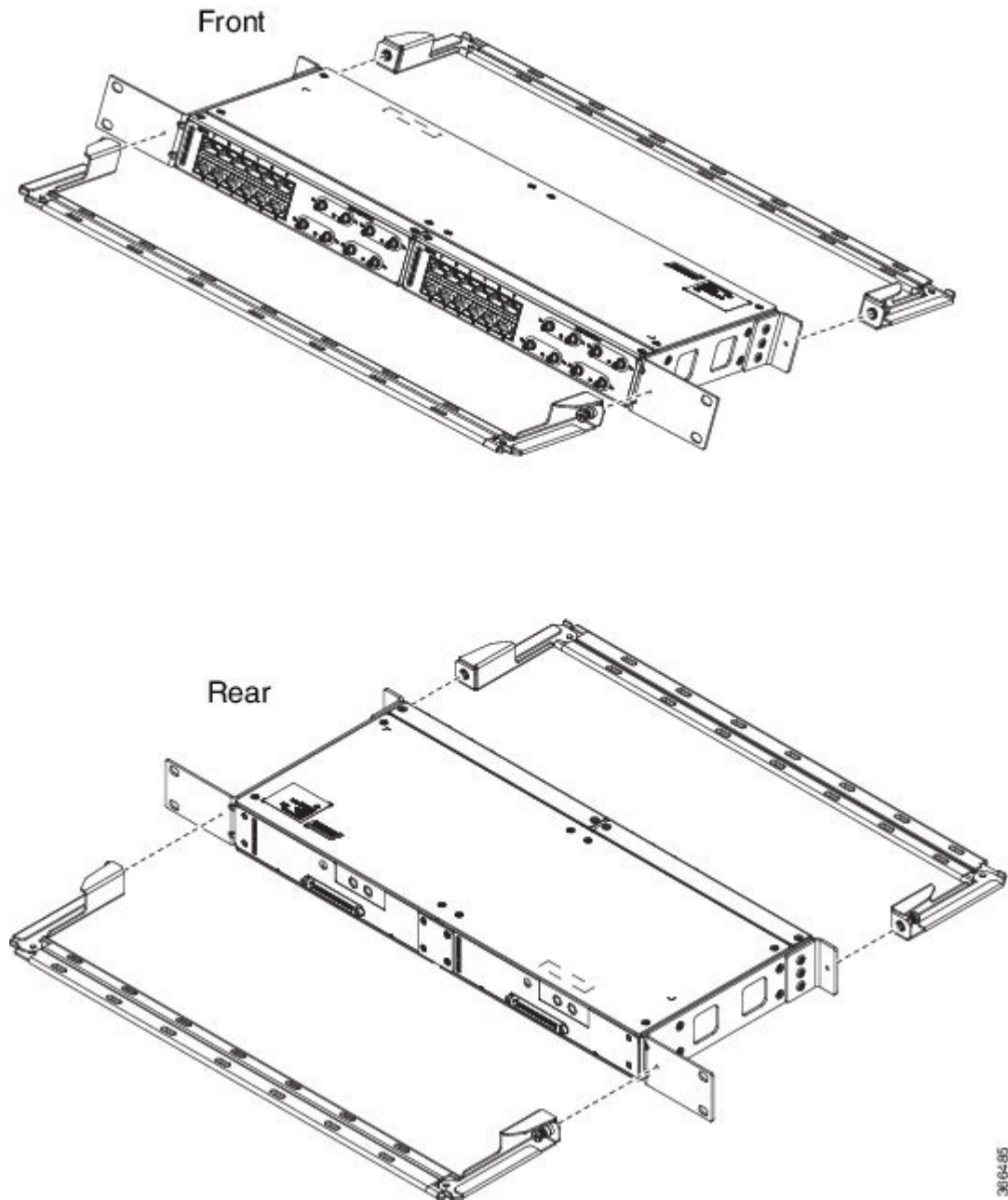
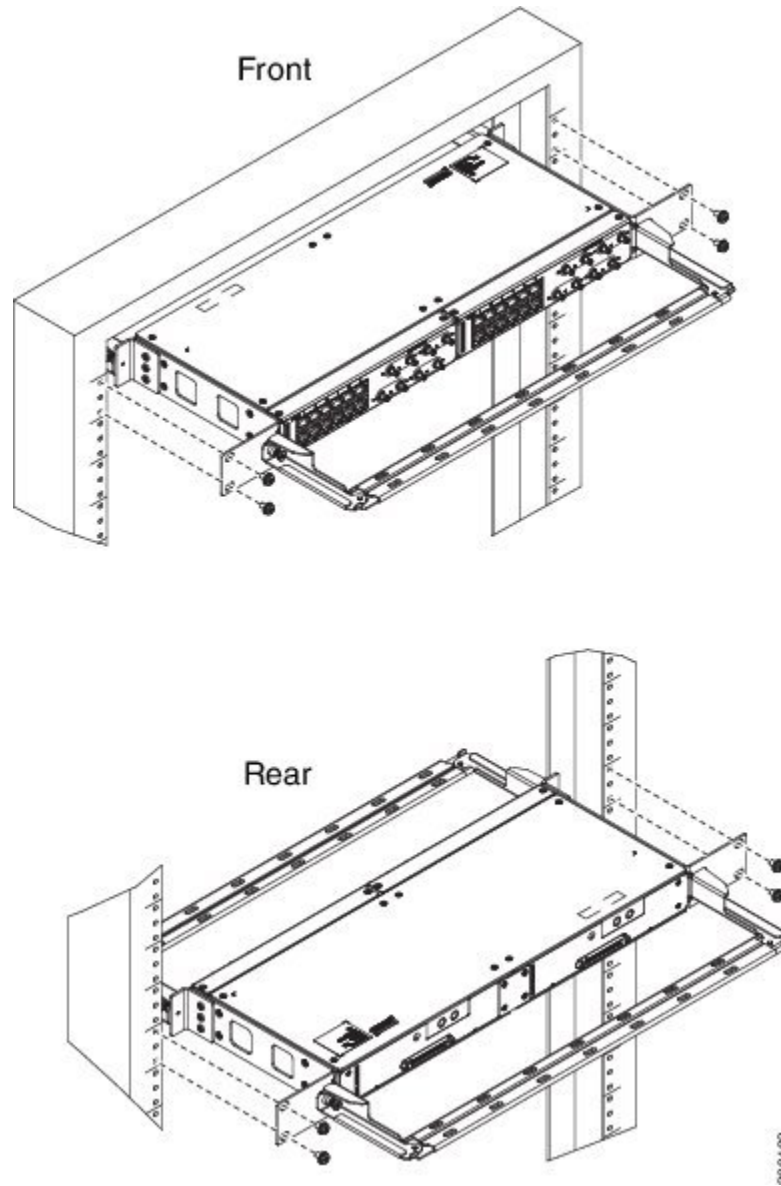


Figure 51: Attaching 23-inch Brackets to Patch Panel - Dual



38-64-85

Figure 52: Installing 23-inch Brackets on to Rack - Dual



Wall Mount 3G Patch Panel

Before you begin

You must first install the mounting brackets and cable guides on to the patch panel before you mount it on the wall. You can use the same rack mount brackets (700-113653-01) for wall mount.

Procedure

Step 1 Remove the mounting brackets from the accessory kit and position them beside the device.

Note You can install the brackets as shown in the figure.

Figure 53: Wall Mount - Single

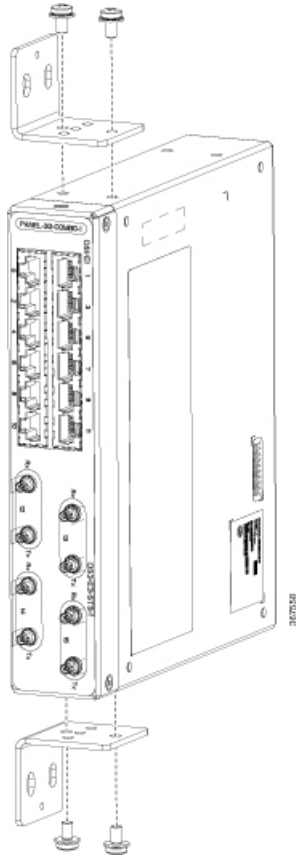
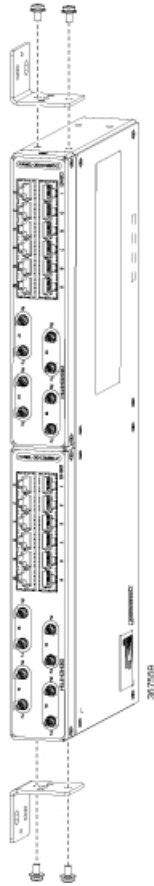


Figure 54: Wall Mount - Dual

- Step 2** Secure the bracket to the device with the recommended maximum torque of 10 inch-pounds (1.1 newton meters).
- Step 3** Position the device vertically on the wall.
- Caution** Before mounting the device, ensure that all unused holes at the sides of the device are protected with screws.
- Step 4** Use a tape measure and level to verify that the device is installed straight and on level.
-

Patch Panel Dimensions

Following are the various patch panel dimensions.

Figure 55: Patch Panel Without Brackets

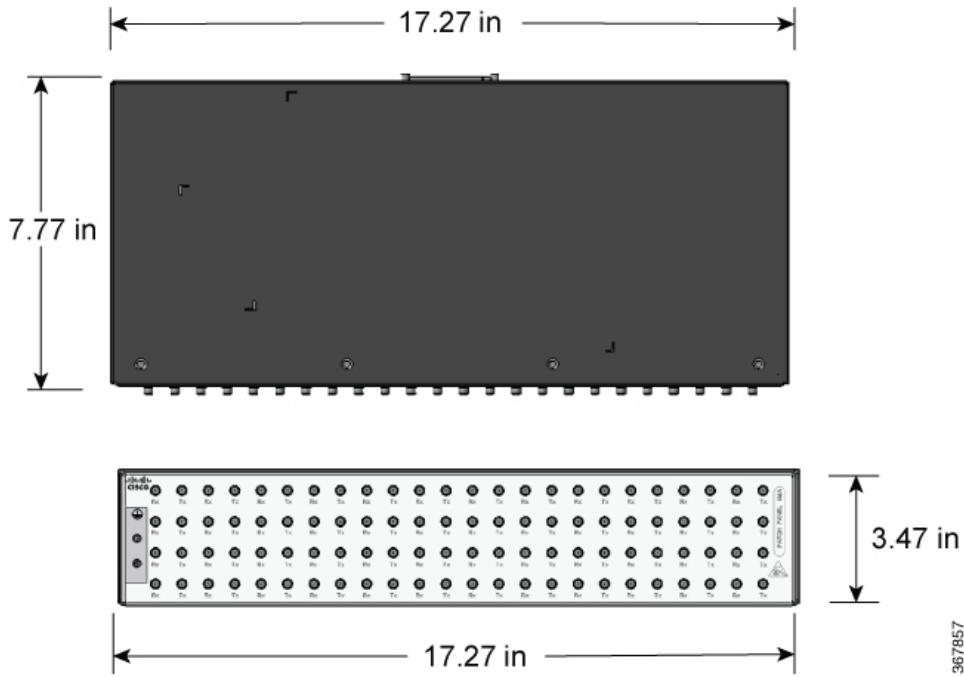


Figure 56: Patch Panel With Brackets

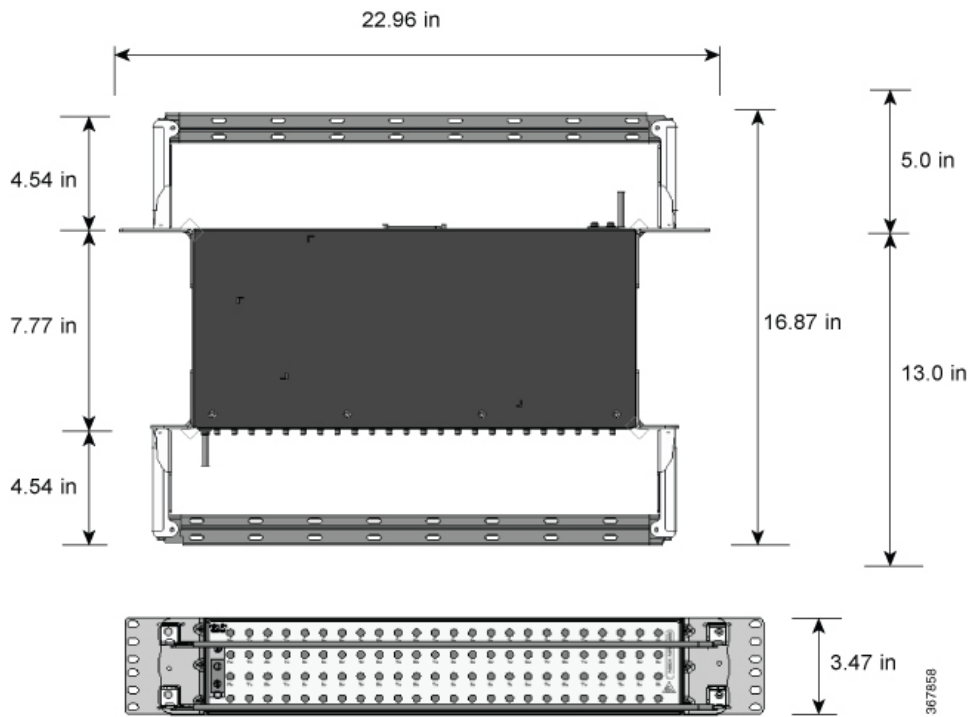
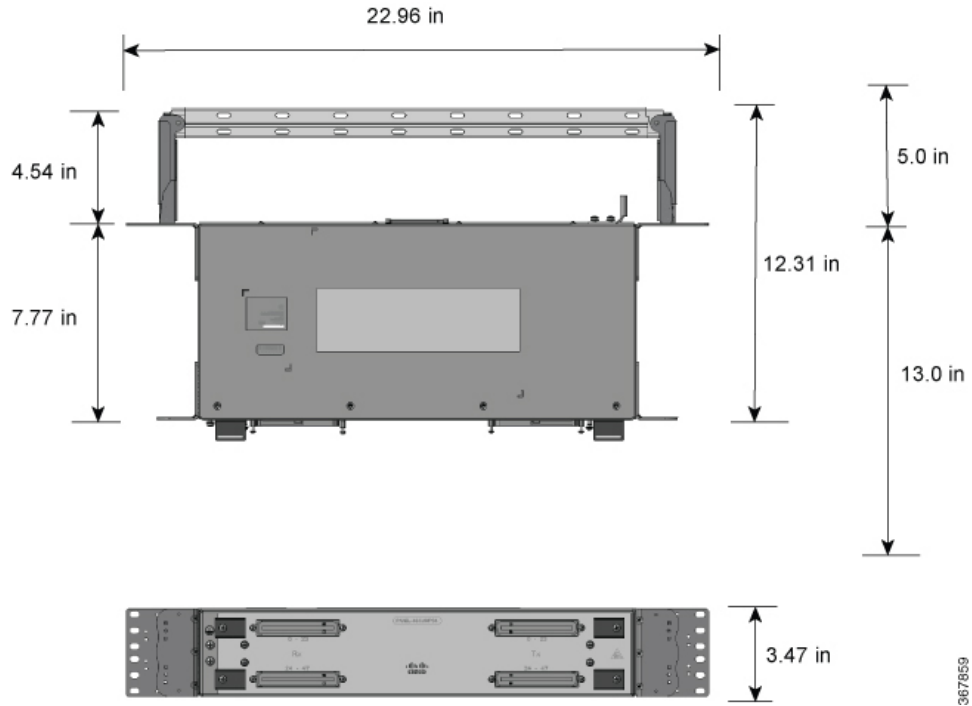


Figure 57: AMP64 Patch Panel With Brackets



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Figure 58: 3G Patch Panel Without Brackets - Single

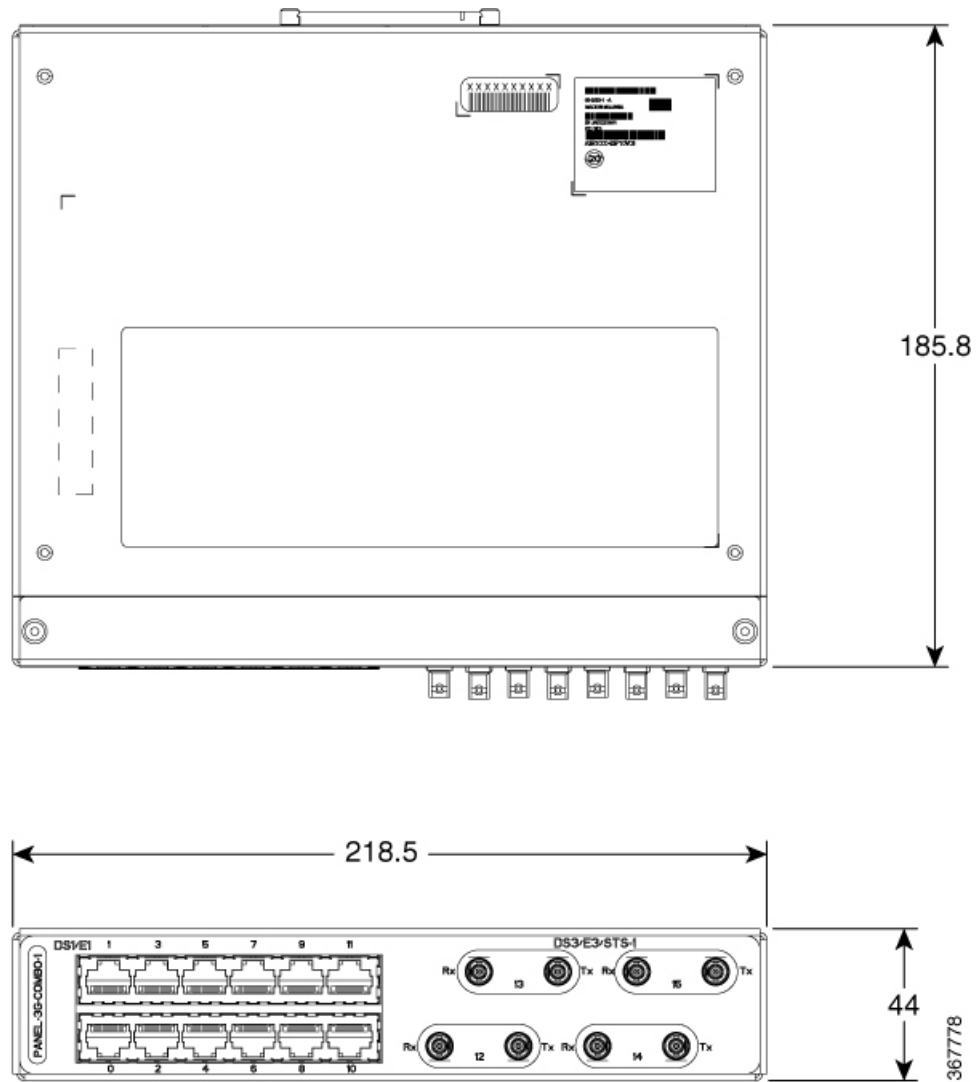
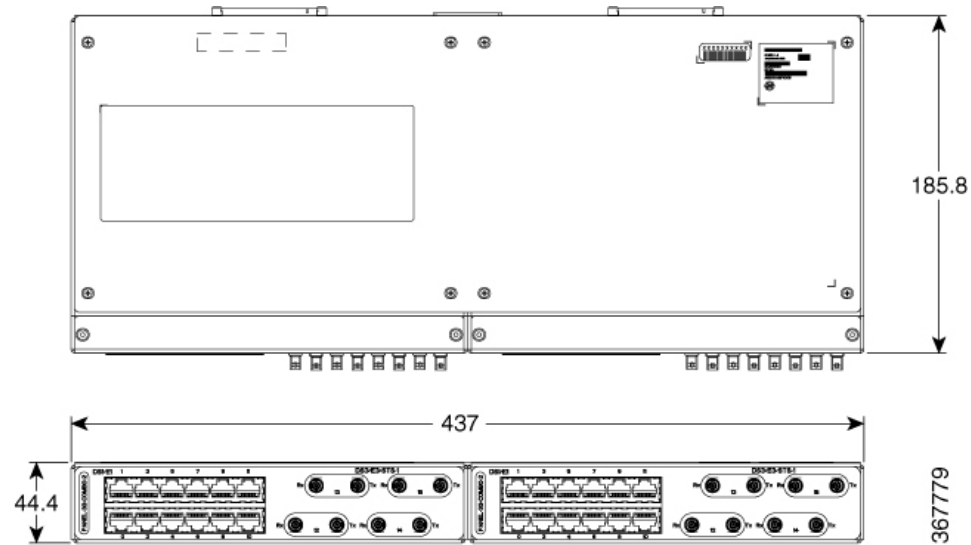


Figure 59: 3G Patch Panel Without Brackets - Dual



Patch Panel Pinout

Given below are the pinout information for the regular crossover and the straight-through cable patch panel.

Table 2: Pinout Details

Pin #	Crossover	Straight-through
1	Receive Tip	Transmit Tip
2	Receive Ring	Transmit Ring
3	—	—
4	Transmit Tip	Receive Tip
5	Transmit Ring	Receive Ring
6	—	—
7	—	—
8	—	—

Panel and Bracket

Table 3: Panel and Bracket Details

Panel	Bracket Description
PANEL-3G-COMBO-1	Single 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires crossover cable)
PANEL-3G-COMBO-2	Double 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires crossover cable)
PANEL-3G-COMBO-1S	Single 12E1 + 4xDS3 patch panel for 3G CEM/IMSG (requires a straight-through cable)
PANEL-3G-COMBO-2S	Double 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires a straight-through cable)
P3G1-RCKMNT-19IN	EIA 19 inches mounting brackets for single 3G CEM/IMSG IM patch panel
P3G1-RCKMNT-ETSI	ETSI 21 inches mounting brackets for single 3G CEM/IMSG IM patch panel
P3G1-RCKMNT-23IN	EIA 23 inches mounting brackets for single 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-19IN	EIA 19 inches mounting brackets for double 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-ETSI	ETSI 21 inches mounting brackets for double 3G CEM/IMSG IM patch panel
P3G2-RCKMNT-23IN	EIA 23 inches mounting brackets for double 3G CEM/IMSG IM patch panel

Installing the Power Supply

The router provides the choice of two different power supplies:

- DC power—The DC power supply uses 2-position terminal block-style connector with positive latching/securing and labeled connections for +24/48V, GRD, -24/48V. The terminal block connector is of suitable size to carry the appropriate AWG wire size to handle the input current of the power supply. No ON/OFF switch is provided.
- AC power—The AC power supply has an IEC 320-type power receptacle and a 15 Amp service connector. You can use standard right angle power cords with the AC power supply. The power supply includes a power cord retainer. No ON/OFF switch is provided.

You can install dual power supplies for redundancy.



Warning Read the installation instructions before connecting the system to the power source. Statement 10



Note Products that have an AC power connection are required to have an external surge protective device (SPD) provided as part of the building installation to comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety.



Caution Do not use interface module and power supply ejector handles to lift the chassis; using the handles to lift the chassis can deform or damage the handles.

Power Connection Guidelines

This section provides guidelines for connecting the router's power supplies to the site power source.



Warning 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 213



Warning The plug-socket combination must be accessible at all times because it serves as the main disconnecting device. Statement 1019



Warning 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. Statement 1045

Guidelines for DC-Powered Systems

Basic guidelines for DC-powered systems include the following:

- Each chassis power supply should have its own dedicated input power source. The source must comply with the safety extra-low voltage (SELV) requirements in the UL 60950, CSA 60950, EN 60950, and IEC 60950 standards.
- The circuit must be protected by a dedicated two-pole circuit breaker. The circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- The circuit breaker is considered the disconnect device and should be easily accessible.
- The system ground is the power supply and chassis ground.
- Do not connect the DC return wire to the system frame or to the system-grounding equipment.
- Use the grounding lug to attach a wrist strap for ESD protection during servicing.

- If the chassis is powered with -48V grounding of the positive, the it should be done at the power source side and chassis should protected by a dedicated two-pole circuit breaker.

Guidelines for AC-Powered Systems

Basic guidelines for AC-powered systems include the following:

- Each chassis power supply should have its own dedicated branch circuit.
- The circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

Preventing Power Loss

Use the following guidelines to prevent power loss to the router:

- To prevent loss of input power, ensure that the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.
- In some systems, you can use an UPS to protect against power failures at your site. Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco ASR 920 Series Router, which can have substantial current-draw fluctuations due to bursty data traffic patterns.

Use the information in the *Cisco ASR-920-12SZ-IM Router Specifications* table to estimate the power requirements and heat dissipation of the router based on a given configuration of the router. Determining power requirements is useful for planning the power distribution system needed to support the router.

Installing the DC Power Supply Module

This equipment is suitable for installation in Network Telecommunications Facilities and locations where the NEC applies.

This equipment is suitable for installations utilizing the Common Bonding Network (CBN).

The grounding architecture of this product is DC-Isolated (DC-I) for DC-powered products. DC-powered products have a nominal operating DC voltage of 48 VDC.

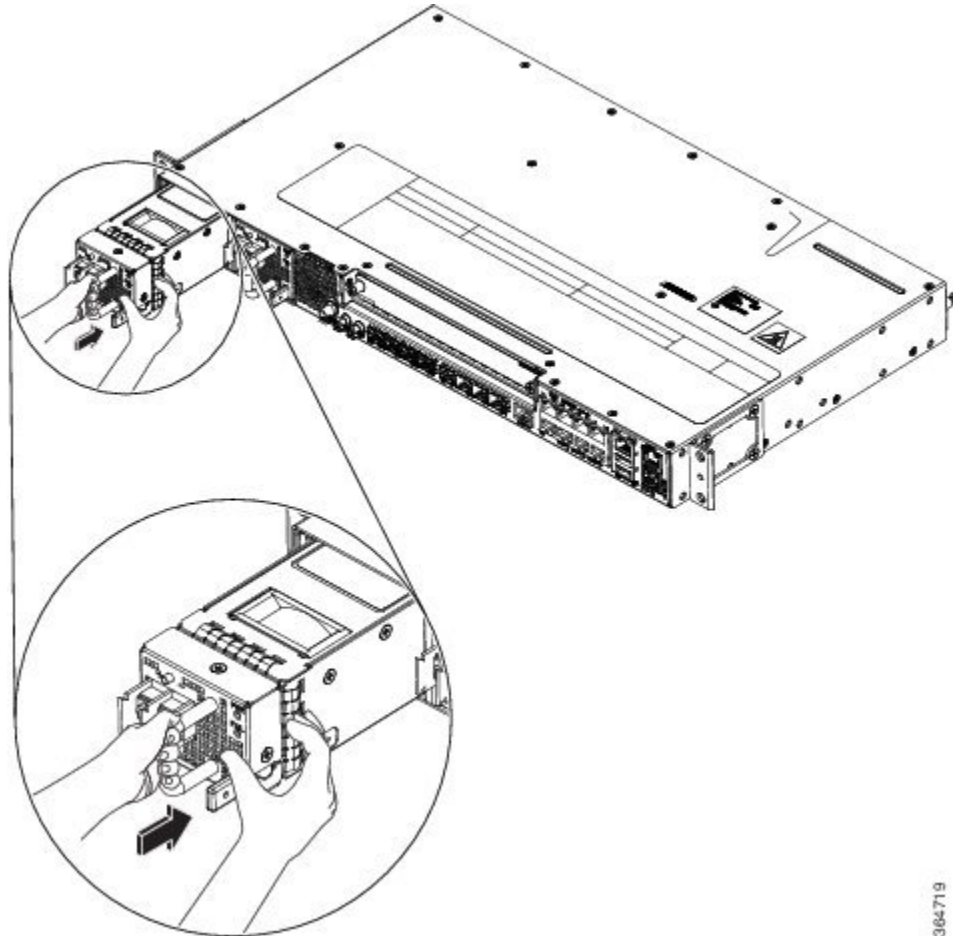
Perform the following procedure to install the power supply module:

Procedure

-
- Step 1** Ensure that the system (earth) ground connection has been made. See the following figure.
 - Step 2** If necessary, remove the blank power supply filler plate from the chassis power supply bay opening by loosening the captive installation screws.
 - Step 3** Verify that power to the DC circuit connected to the power supply you are installing is off. To ensure that power has been removed from the DC circuits, locate the circuit breakers for the DC circuits, switch the circuit breakers to the OFF position, and tape the circuit-breaker switches in the OFF position.
 - Step 4** Grasp the power supply handle with one hand. Place your other hand underneath the power supply. Slide the power supply into the power supply bay. Make sure that the power supply is fully seated in the bay.

- Step 5** Tighten the captive installation screws of the power supply. The recommended maximum torque is 5.5 in.-lb (0.62 N-m).

Figure 60: Installing the DC Power Supply Module



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Activate a DC Power Supply Module

Perform the following procedure to activate a DC power supply:

Procedure

- Step 1** Remove the tape from the circuit-breaker router handle, and restore power by moving the circuit-breaker router handle to the On (I) position.
- Step 2** Verify the power supply operation by checking whether the respective power supply front panel LED (PM0 or PM1) is green.
- Step 3** If the LEDs indicate any issues with power problem, see *Troubleshooting*.
- Step 4** If you are also connecting a redundant DC power supply, repeat these steps for the second power source.

Note If you are connecting a redundant DC power supply, ensure that each power supply is connected to a separate power source in order to prevent power loss in the event of a power failure.

Install the DC Power Cables



Note When installing DC power supply, use 12AWG, 90°C temperature rated cable. The recommended cable length is 3 meters maximum from source. Up to 5 meters use 10AWG, and up to 3 meters use 12AWG, 90°C temperature rated cable and for other length contact Cisco.



Note For N540X-16Z4G8Q2C-A/D and N540X-16Z8Q2C-D, when installing DC power supply, use 14-16AWG, 90°C temperature rated cable. The recommended cable length is 3 meters maximum from source. Up to 5 meters use 14AWG, and up to 3 meters use 16AWG, 90°C temperature rated cable and for other length contact Cisco.



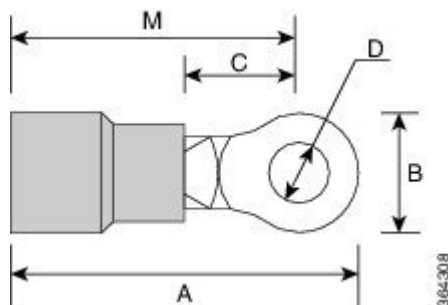
Note

- Always ensure that the building's installation for short-circuit (overcurrent) protection does not exceed 15A.
- We recommended using a Circuit breaker or a fast acting fuse with a maximum DC rating of 10A for over current protection.



Note The DC connector or terminal block has an in built screw and cage nut to which torque of 1.3 to 1.8 N-m can be applied.

Figure 61: DC Connector with In built Screw



A	0.74 in. (1.88 cm)	C	0.18 in. (0.46 cm)
B	0.25 in. (0.64 cm)	D	0.14 in. (0.36 cm)

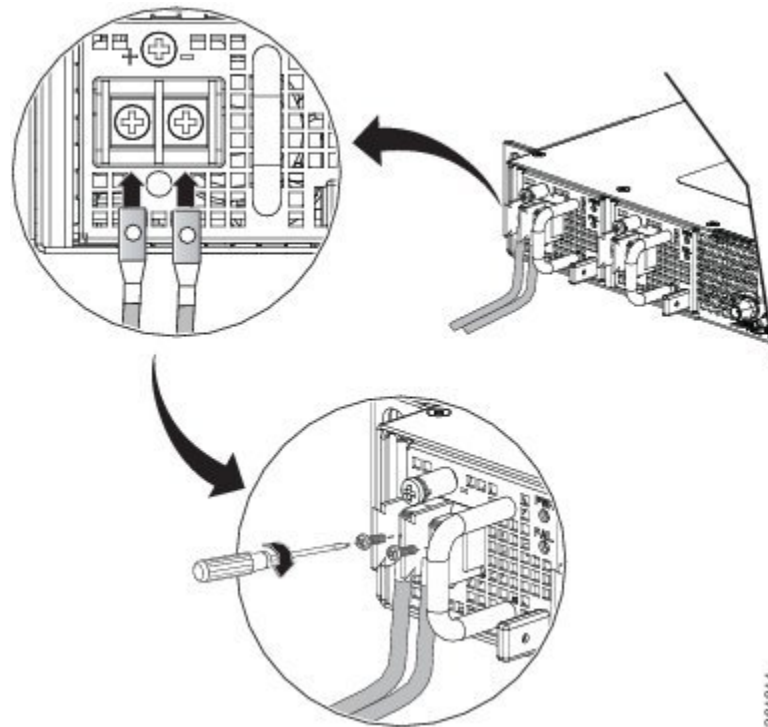
M	0.62 in. (1.58 cm)		
---	--------------------	--	--

To attach the DC power supplies:

Procedure

- Step 1** Locate the terminal block plug.
- Step 2** Insert the DC-input power source wires into the terminal block plug.
- Step 3** Attach the DC supply wires using the designated screws.
- Step 4** Use a ratcheting torque screwdriver to torque the terminal block plug captive screw. See the following figure.

Figure 62: Attach the DC Power Supply Wires



Note These images are for only representation purposes. Certain variants of Cisco NCS 540 may vary.

Removing the DC Power Supply Module

This section provides information about removing and replacing the DC power supply.



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



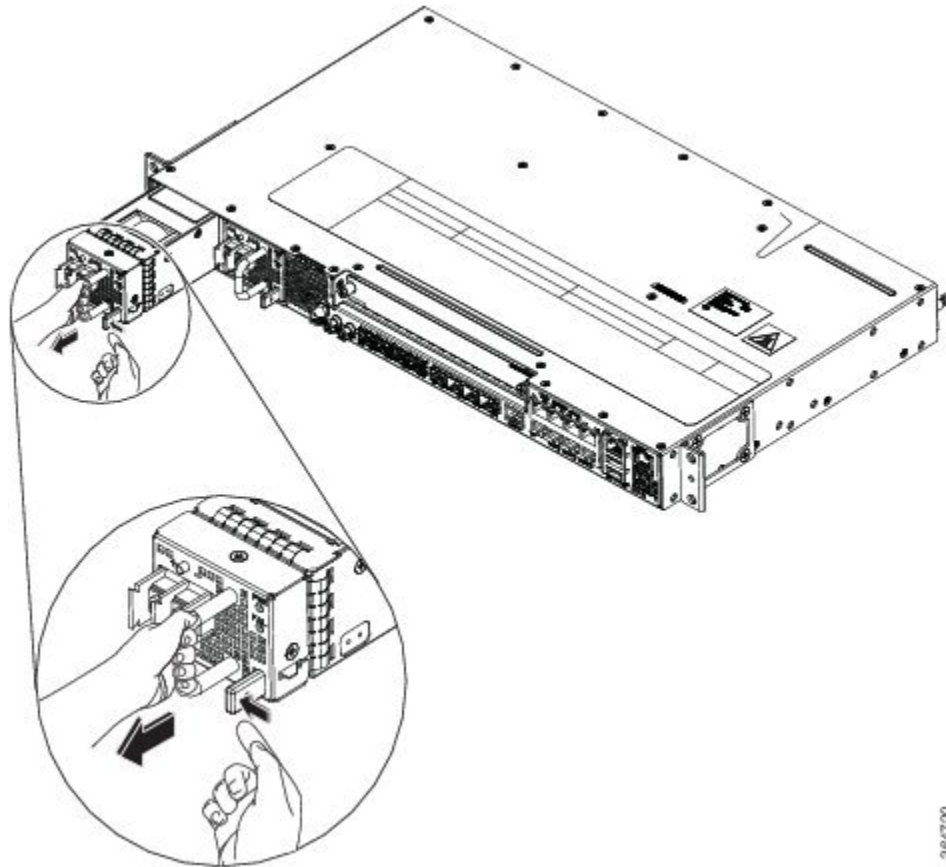
Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

Follow these steps to remove and replace the DC power supply:

Procedure

- Step 1** Before servicing the power supply, switch off the circuit breaker in your equipment area. As an additional precaution, tape the circuit-breaker switch in the Off position.
- Step 2** Slip on the ESD-preventive wrist strap that was included in the accessory kit.
- Step 3** Switch the power supply circuit-breaker switch to the Off (O) position.
- Step 4** Pull the terminal block plug connector out of the terminal block head in the power supply. See the following figure.
- Step 5** Loosen the captive screws on the DC power supply.
- Step 6** Grasp the power supply handle. Simultaneously press the power supply lock towards the left and pull the power supply out from the chassis while supporting it with the other hand.

Figure 63: Removing the DC Power Supply Module



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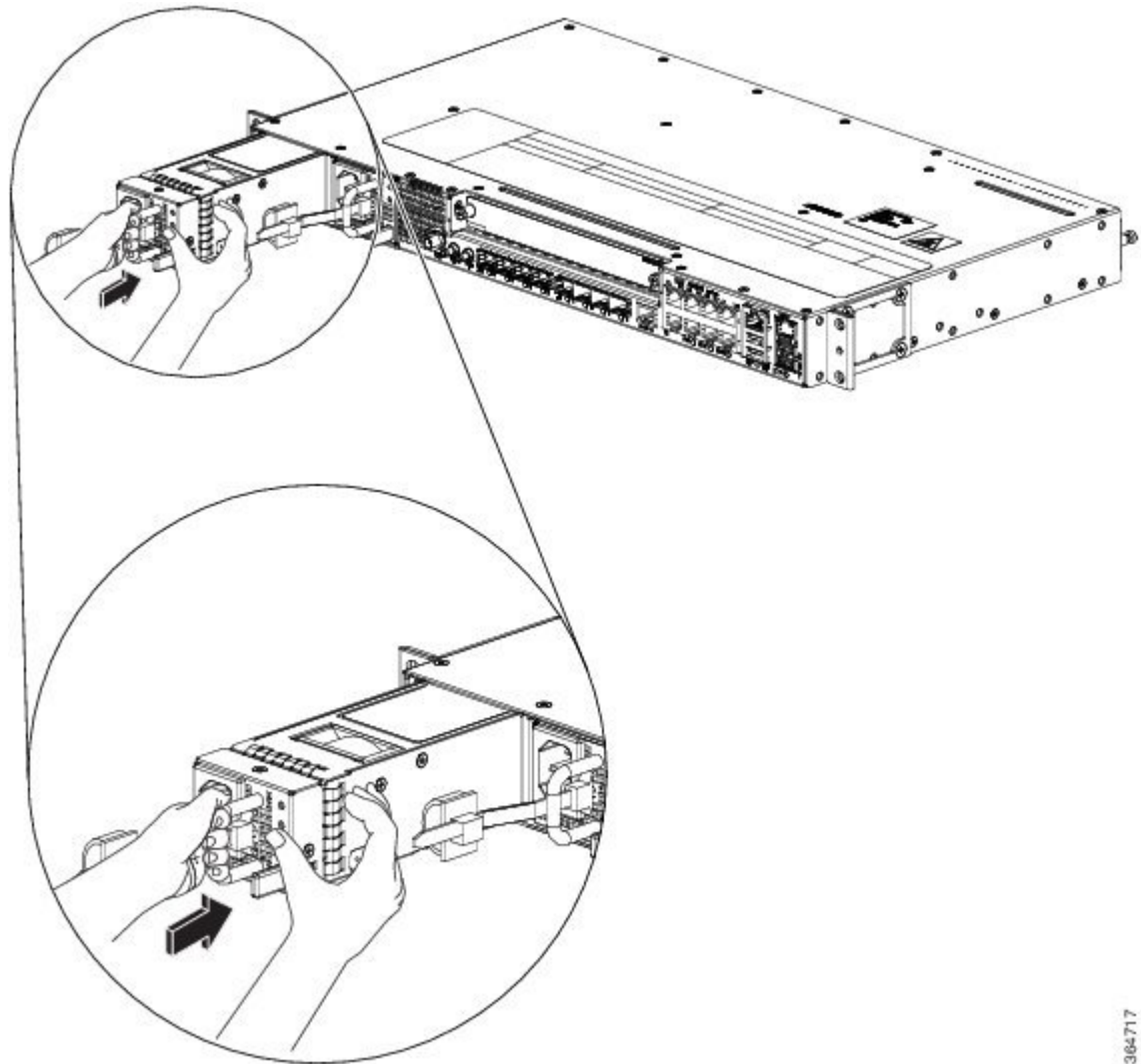
Installing the AC Power Supply Module

Follow these steps to install the AC power supply module:

Procedure

-
- Step 1** Ensure that the system (earth) ground connection has been made.
 - Step 2** If necessary, remove the blank power supply filler plate from the chassis power supply bay opening by loosening the captive installation screws.
 - Step 3** Grasp the power supply handle with one hand. Place your other hand underneath the power supply. Slide the power supply into the power supply bay. Make sure that the power supply is fully seated in the bay. See the following figure.

Figure 64: Installing the AC Power Supply Module



- Step 4** Slide the AC power supply cord inside the tie of the tie-and-holder and tighten the tie around the power supply cord.
- Step 5** Plug the power supply cord into the AC power supply.

Install the AC Power Cables

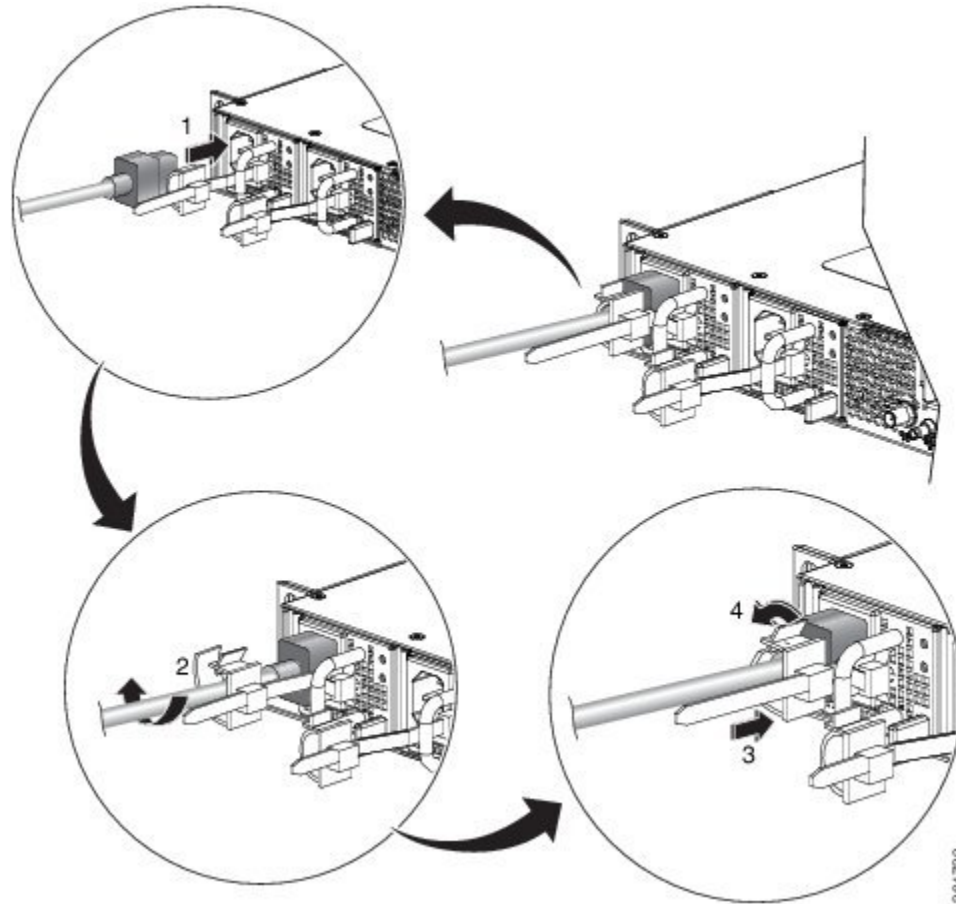
To install the AC power cables in the power supply slots:

Procedure

- Step 1** Plug the power supply cord in the power supply module.

- Step 2** Insert the power supply cord into the tie [1,3] and tighten the tie around the power supply cord as shown in [2,4] in the figure below.

Figure 65: Attach the AC Power Tie-and-Clip Cord



Note These images are for only representation purposes. Certain variants of Cisco NCS 540 do not include a tie for the power supply cord.

Activate an AC Power Supply Module

Perform the following procedure to activate an AC power supply:

Procedure

- Step 1** Plug the power cord into the power supply.
- Step 2** Connect the other end of the power cord to an AC-input power source.
- Step 3** Verify power supply operation by checking if the respective power supply front panel LED (PM0 or PM1) is green.
- Step 4** If the LEDs indicate a power problem, see *Troubleshooting* for troubleshooting information.

Step 5 If you are also connecting a redundant AC power supply, repeat these steps for the second power source.

Note If you are connecting a redundant AC power supply, ensure that each power supply is connected to a separate power source in order to prevent power loss in the event of a power failure.

Removing the AC Power Supply Module

This section describes how to remove and replace the AC power supply.



Warning When you install the unit, the ground connection must always be made first and disconnected last. Statement 1046



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



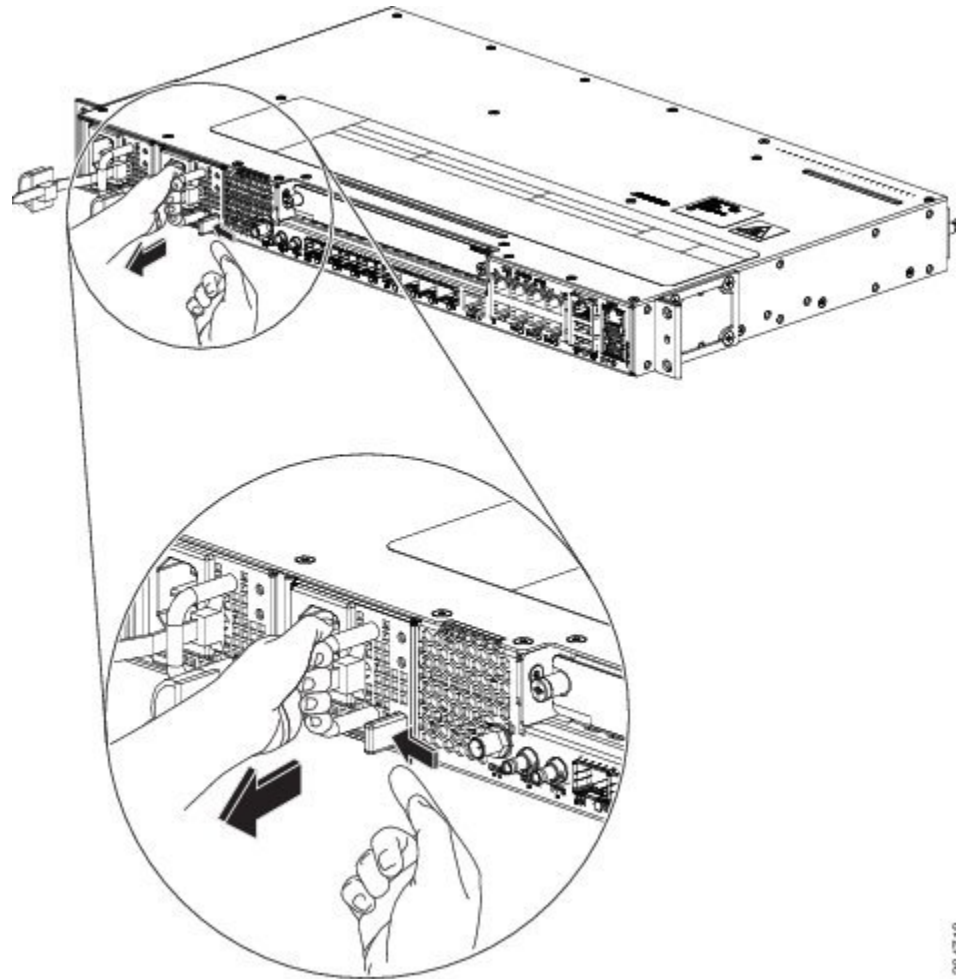
Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074

Follow these steps to remove and replace the AC power supply:

Procedure

- Step 1** Disconnect the power cord from the power source. Do not touch any metal on the power cord when it is still connected to the power supply.
- Step 2** Loosen the tie and remove the power cord from the tie-and holder.
- Step 3** Remove the power cord from the power connection on the power supply. Do not touch the metal prongs embedded in the power supply.
- Step 4** Grasp the power supply handle. Simultaneously press the power supply lock towards the left and pull the power supply out from the chassis while supporting it with the other hand.

Figure 66: Removing the AC Power Supply Module



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Powering On the Router

After the router is either rack mounted or mounted on the wall, perform these tasks to complete the installation:

- Power on the router.
- Connect the front-panel ports. See the *Connecting to SFP Modules* section to complete the installation.

Connecting the Router to the Network

The sections describe how to connect a router to the network:



Note Connect only SELV services to all the ports.

Connecting Console Cables

The sections describe how to connect to the router using console cables:

Connecting to the USB Serial Port Using Microsoft Windows

This procedure shows how to connect to the USB serial port using Microsoft Windows.



Note Install the USB device driver before establishing a physical connection between the router and the PC, by using the USB console cable plugged into the USB serial port. Otherwise, the connection will fail. For more information, see the *Installing the Cisco USB Device Driver* section in the *Cisco ASR-920-12SZ-IM and ASR-920U-12SZ-IM Aggregation Services Router Hardware Installation Guide*.

Procedure

Step 1 Connect a USB Type A-to-Type A cable to the USB console port. If you are using the USB serial port for the first time on a Windows-based PC, install the USB driver now according to the instructions in the following sections:

Note You cannot use the USB port and the EIA port concurrently. When the USB port is used, it takes priority over the EIA port.

Step 2 Connect the USB Type A cable to the PC.

Step 3 To communicate with the router, start a terminal emulator application, such as Microsoft Windows HyperTerminal. This software should be configured with the following parameters:

- 9600 baud
 - 8 data bits
 - no parity
 - 1 stop-bit
 - no flow control
-

Connecting to the Console Port Using Mac OS X

This procedure describes how to connect a Mac OS X system USB port to the console using the built-in OS X terminal utility.

Procedure

Step 1 Use the Finder to choose Applications > Utilities > Terminal.

Step 2 Connect the OS X USB port to the router.

Step 3 Enter the following commands to find the OS X USB port number:

Example:

```
macbook:user$ cd /dev
macbook:user$ ls -ltr /dev/*usb*
crw-rw-rw-  1 root  wheel          9,  66 Apr  1 16:46 tty.usbmodem1a21 DT-macbook:dev user$
```

Step 4 Connect to the USB port with the following command followed by the router USB port speed:

Example:

```
macbook:user$ screen /dev/tty.usbmodem1a21 9600
```

To disconnect the OS X USB console from the terminal window, enter Ctrl-a followed by Ctrl-\

Connecting to the Console Port Using Linux

This procedure shows how to connect a Linux system USB port to the console using the built-in Linux terminal utility.

Procedure

- Step 1** Open the Linux terminal window.
- Step 2** Connect the Linux USB port to the router.
- Step 3** Enter the following commands to find the Linux USB port number:

Example:

```
root@usb-suse# cd /dev
root@usb-suse /dev# ls -ltr *ACM*
crw-r--r--  1 root  root    188,  0 Jan 14 18:02 ttyACM0
root@usb-suse /dev#
```

Step 4 Connect to the USB port with the following command, followed by the router USB port speed:

Example:

```
root@usb-suse /dev# screen /dev/ttyACM0 9600
```

To disconnect the Linux USB console from the terminal window, enter Ctrl-a followed by : then quit

Installing the Cisco USB Device Driver

A USB device driver must be installed the first time a Microsoft Windows-based PC is connected to the USB serial port on the router.

This procedure describes how to install the Microsoft Windows USB device driver in Microsoft Windows XP, Windows Vista, Windows 2000, Windows 7, and Windows 8. Download the driver for your router model from the Tools and Resources [Download Software site](#), USB Console Software category.



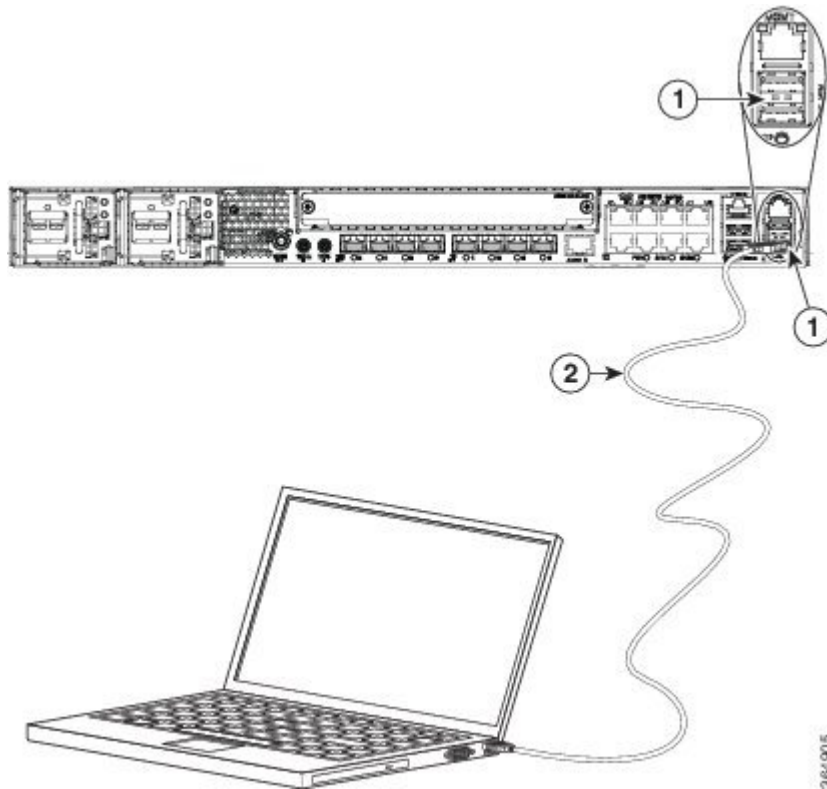
Note To download the driver, you must have a valid service contract associated to your Cisco.com profile.

Procedure

- Step 1** Unzip the file asr-9xx_usbconsole_drivers.zip.
- Step 2** Double-click xrusbser_ver2100_installer.exe in the XR21x141x-Win-DriversOnly-Vers2.1.0.0/EXE folder. Installation Wizard GUI is displayed.
- Step 3** Click Next. The InstallShield Wizard Completed window is displayed.
- Step 4** Click Finish.
- Step 5** Connect the USB cable to the PC and router USB console ports. Follow the on-screen instructions to complete the installation of the driver.
- Step 6** XR21V1401 USB UART Device driver successfully installed message is displayed.
The USB console is ready for use.

Uninstalling the Cisco USB Driver

Figure 67: Connecting the USB Console Cable to the Cisco ASR 920 Series Router



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1	USB Type-A console port	2	USB Type-A to USB Type-A console cable
---	-------------------------	---	--

This procedure describes how to uninstall the Microsoft Windows USB device driver in Microsoft Windows XP, Windows Vista, Windows 2000, Windows 7, and Windows 8.



Note Disconnect the router console terminal before uninstalling the driver.

Procedure

- Step 1** Choose **Start > Control Panel > Add or Remove Programs** .
- Step 2** Scroll to **Windows Driver Package - Exar corporation (xrusbser) Ports** and click **Remove**. The **Program Maintenance** window is displayed.
- Step 3** Click **Yes** to uninstall the driver.
-

Connecting to the EIA Console Port



Note The US-to-RJ45 adapter cable and the DB9 console cable are not included with the router; they can be ordered separately from Cisco.



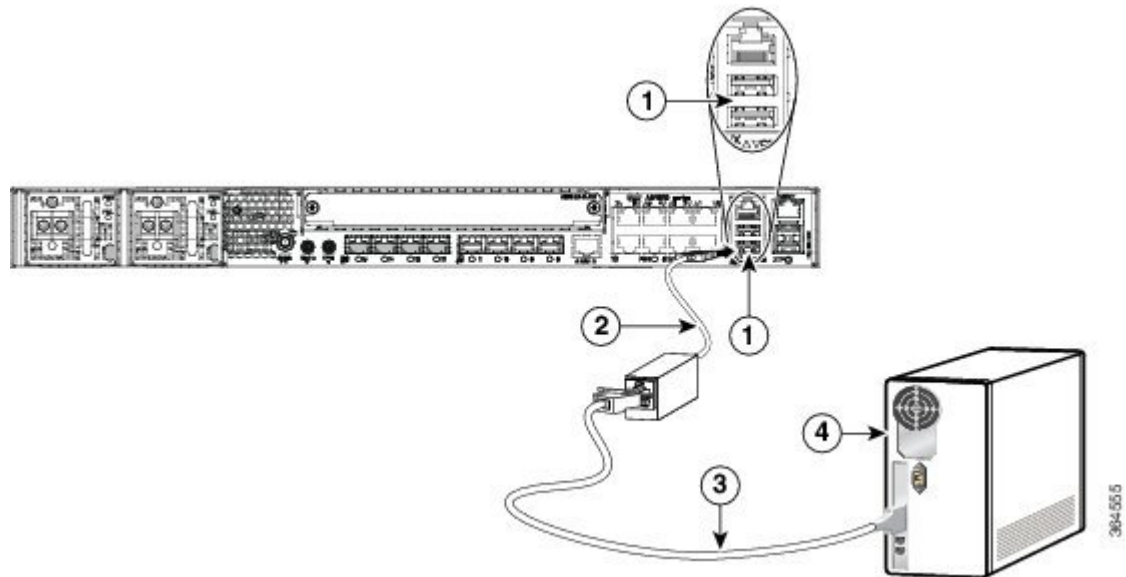
Note The serial console cable kit is not included with the router; it is ordered separately.

To connect a terminal to the EIA Console port on the router, follow these steps:

Procedure

- Step 1** Connect the USB end of the USB-to RJ-45 cable to the EIA Console port.
- Step 2** Connect the RJ-45 end of the DB-9 adapter cable to the USB-to RJ-45 cable, as shown in the following figure.

Figure 68: Connecting a Modem to the Cisco ASR 920 Series Router



Label	Component	Label	Component
1	EIA Console port	3	RJ-45 to DB-9 cable
2	USB-to-RJ45 adapter	4	Desktop or system

Step 3 Connect the DB-9 end of the console cable to the DB-9 end of the terminal.

Step 4 To communicate with the router, start a terminal emulator application, such as Microsoft Windows HyperTerminal. This software should be configured with the following parameters:

- 9600 baud
- 8 data bits
- no parity
- 1 stop-bit
- no flow control

Connecting a Management Ethernet Cable

When using the Ethernet Management port in the default mode (speed-auto and duplex-auto) the port operates in the auto-MDI/MDI-X mode. The port automatically provides the correct signal connectivity through the Auto-MDI/MDI-X feature. The port automatically senses a crossover or straight-through cable and adapts to it.

However, when the Ethernet Management port is configured to a fixed speed (10, 100, or 1000 Mbps) through command-line interface (CLI) commands, the port is forced to the MDI mode.

When in a fixed-speed configuration and MDI mode:

- Use a crossover cable to connect to an MDI port
- Use a straight-through cable to connect to an MDI-X port



Caution To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the Management Ethernet ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Installing and Removing SFP and SFP+ Modules

The Cisco ASR 920 Series Router supports a variety of SFP and SFP+ modules, including optical and Ethernet modules. For information on how to install and remove SFP and SFP+ modules, see the documentation for the SFP or SFP+ module at:

http://www.cisco.com/en/US/partner/products/hw/modules/ps5455/prod_installation_guides_list.html

For information about inspecting and cleaning fiber-optic connections, see:

http://www.cisco.com/en/US/partner/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml



Caution We recommend that you wait for 30 seconds between the removal and insertion of an SFP on an interface module. We recommend this to allow the transceiver software to initialize and synchronize with the Cisco ASR 920 Series Router. Changing an SFP more quickly could result in transceiver initialization issues that disable the SFP.

Connecting a USB Flash Device

To connect a USB flash device to the router, insert the memory stick in the USB port labeled USB MEM. The Flash memory module can be inserted only one way, and can be inserted or removed regardless of whether the router is powered up or not.

The following figure shows the USB port connector on the Cisco ASR 920 Series Router.

Figure 69: Flash Token Memory Stick



Removing a USB Flash Device

To remove and replace a USB flash token memory stick from and into a router, follow these steps:



Note If the USB flash device is abruptly removed, the constant sync operations of the file system in progress fail due to the USB device removal. These errors occur with ext2 or ext3 or ext4 file systems and are not seen with fat32 file system. This is a default behavior on any Linux platform.

The following error messages are displayed when you remove the USB device:

```
*Jun 24 10:29:45.766: %IOSXE-3-PLATFORM: R0/0: kernel: EXT2-fs (sda1): previous I/O error
to superblock detected
*Jun 24 10:29:45.878: %IOSXE-3-PLATFORM: R0/0: kernel: EXT2-fs (sda1): previous I/O error
to superblock detected
*Jun 24 10:29:46.012: %IOSXE-3-PLATFORM: R0/0: kernel: EXT2-fs (sda1): previous I/O error
to superblock detected
*Jun 24 10:29:46.013: %IOSXE-3-PLATFORM: R0/0: kernel: EXT2-fs (sda1): previous I/O error
to superblock detected
```

Procedure

Step 1 Execute the **eject usb0:** command before removing the USB from the router.

Example:

```
rommon 2 > eject usb0
rommon 2 >
```

If you do not run this command before removing the USB, the following error message is displayed:

```
rommon 2 > dir usb0:
usb_stor_BBB_comdat:usb_bulk_msg error
failed to send CBW status 34
RESET:stall
usb_stor_BBB_comdat:usb_bulk_msg error
failed to send CBW status 34
RESET:stall
usb_stor_BBB_comdat:usb_bulk_msg error
```

Step 2 Pull the memory stick from the USB port.

Step 3 To replace the Cisco USB Flash memory stick, simply insert the module into the USB port labeled USB MEM. The Flash memory module can be inserted only one way, and can be inserted or removed regardless of whether the router is powered up or not.

This completes the USB Flash memory installation procedure.

Connecting Timing Cables

The section describes how to connect timing cables to the Cisco ASR 920 Series Router:

Connecting Cables to a GPS Interface

The sections describe how to connect cables from the Cisco ASR-920-12SZ-IM Router to a GPS unit for input or output timing of frequency:

Connecting a Cable to the Input 10-Mhz or 1-PPS Interface

Procedure

- Step 1** Connect one end of a shielded mini-coax cable to the GPS unit.
- Step 2** Connect the other end of the shielded mini-coax cable to the 10-Mhz or 1-PPS port on the Cisco ASR 920 Series Router.
-

Connecting a Cable to the Output 10-Mhz or 1-PPS Interface

Procedure

- Step 1** Connect one end of a shielded mini-coax cable to the Slave unit.
- Step 2** Connect the other end of the shielded mini-coax cable to the 10-Mhz or 1-PPS port on the Cisco ASR 920 Series Router.
-

Connecting a Cable to the ToD Interface

Procedure

- Step 1** Connect one end of a straight-through Ethernet cable to the GPS unit.
- Step 2** Connect the other end of the straight-through Ethernet cable to the ToD or 1-PPS port on the Cisco ASR 920 Series Router.
-

What to do next



Note For instructions on how to configure clocking, see the *Cisco ASR 920 Series Aggregation Services Routers Configuration Guide*.



Warning To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the ToD ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.



Note For more information about GPS-port pinouts, see *Troubleshooting* section.

Connecting a Cable to the GNSS Antenna Interface

Procedure

- Step 1** Connect one end of a shielded coaxial cable to the GNSS RF IN port.
- Step 2** Connect the other end of the shielded coaxial cable to the GNSS antenna after the primary protector.

Note The GNSS RF In port should have a primary protector installed to meet the Local Safety guidelines.

- The GNSS RF In coaxial cable shield must be connected to the Facility Equipment Ground through the chassis. The chassis must have the ground wire connected to the Facility Equipment Ground.

Connecting Ethernet Cables

The Cisco ASR 920 Series Router interface modules support RJ-45 and Ethernet SFP ports. For instructions on how to connect cables to Ethernet SFP ports, see the *Connecting Cables to SFP Modules* section.

The RJ-45 port supports standard straight-through and crossover Category 5 unshielded twisted-pair (UTP) cables. Cisco does not supply Category 5 UTP cables; these cables are available commercially.



Warning To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the Gigabit Ethernet ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metallicly connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallicly to OSP wiring.

Follow these steps to connect a cable to a copper Gigabit Ethernet port:

Procedure

- Step 1** Confirm that the router is powered off.
- Step 2** Connect one end of the cable to the Gigabit Ethernet port on the router.
- Step 3** Connect the other end to the BTS patch or demarcation panel at your site.
-

Connecting Cables to SFP Modules

For information on connecting cables to Cisco optical and Ethernet SFP interfaces, see:

http://www.cisco.com/en/US/partner/products/hw/modules/ps5455/prod_installation_guides_list.html.

Connector and Cable Specifications

For more information on cable specifications and pinouts, see the *Troubleshooting* section.

