Hardware Installation Guide for Cisco 8100 Series Routers

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Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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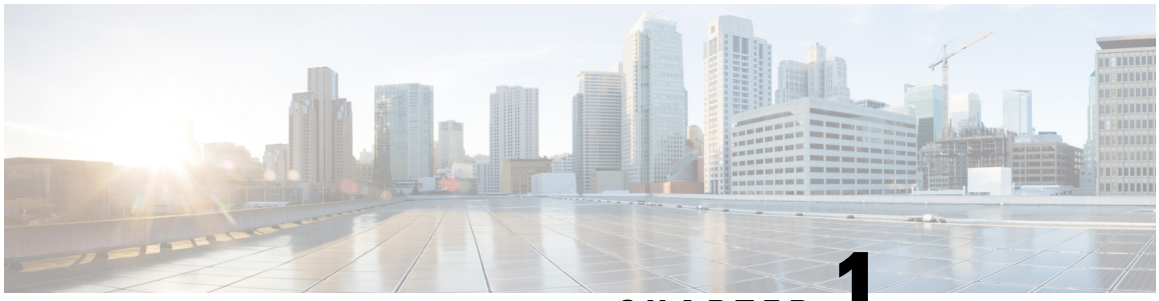


CHAPTER 1

Cisco 8100 Series Routers Overview

Cisco 8100 Series Routers

The Cisco 8100 Series Routers utilizes Cisco's new Router-on-Chip (RoC) model to deliver full routing functionality with a single ASIC per router. The RoC architecture is distinguished from System-on-Chip (SoC) switches by supporting large forwarding tables, deep buffers, more flexible packet operations, and enhanced programmability.

The Cisco 8100 series routers include the following variants:

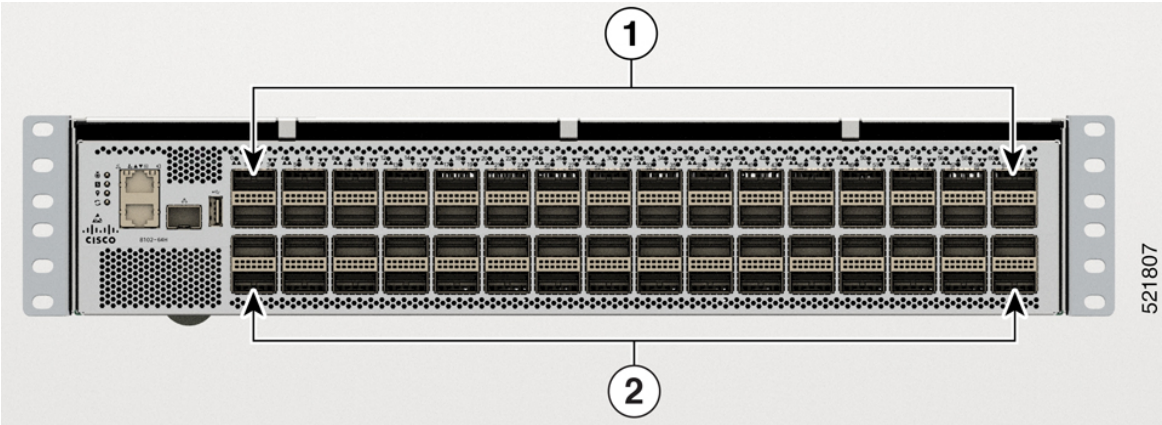
- Cisco 8102-64H-O - It provides 6.4 Tbps of network bandwidth with dramatically lower power consumption than contemporary 10 Tbps systems. The Cisco 8102-64H-O Router is a fixed port, high density, two rack unit form-factor router. Supported ports include 64 x 100G QSFP28. The Cisco 8102-64H-O supports Cisco-qualified open-source network operating systems, such as SONiC (Software for Open Networking in the Cloud).
- Cisco 8101-32FH-O - It provides 12.8Tbps of network bandwidth. The Cisco 8101-32FH-O Router is a fixed port, high density, one rack unit form-factor router. Supported ports include 32 x 400G QSFP-DD. The Cisco 8101-32FH-O supports Cisco-qualified open-source network operating systems, such as SONiC (Software for Open Networking in the Cloud). The functionality and installation of this router is similar to that of Cisco 8201-32FH. The Hardware Installation Guide for Cisco 8201-32FH is available here.
- Cisco 8101-32H-O - It provides 3.2 Tbps of network bandwidth with dramatically lower power consumption than contemporary 10 Tbps systems. The Cisco 8101-32H-O Router is a fixed port, high density, one rack unit form-factor router. Supported ports include 64 x 100G QSFP28. This variant supports the Cisco-qualified open-source network operating system, such as SONiC (Software for Open Networking in the Cloud).
- Cisco 8111-32EH-O - It provides 25.6Tbps of network bandwidth. The Cisco 8111-32EH-O Router is a fixed port, high density, one rack unit form-factor router. Supported ports include 32 x 800G QSFP-DD. This variant supports the Cisco-qualified open-source network operating system, such as SONiC (Software for Open Networking in the Cloud).

- Cisco 8122-64EH-O - It provides 51.2 Tbps of network bandwidth. The Cisco 8122-64EH-O Router is a fixed port, high density, two rack unit form-factor router. Supported ports include 64 x 800G QSFP-DD. This variant supports the Cisco-qualified open-source network operating system, such as SONiC (Software for Open Networking in the Cloud).
- Cisco 8102-28FH-DPU-O - This is a first-generation smart switch equipped with the Cisco Silicon One Q200L switching processor and an AMD DSC-200 Data Processing Unit (DPU), all housed in a two-rack unit form factor. It offers a total network bandwidth of 12.8Tbps, which includes 11.2Tbps for switching and 1.6Tbps for DPU processing, and it contains 28 QSFP-DD 400 GbE ports.

  The Cisco 8102-28FH-DPU-O supports Cisco-qualified open-source network operating systems, such as SONiC (Software for Open Networking in the Cloud).
- Cisco 8122-64EHF-O - It provides 51.2 Tbps of network bandwidth operating on the Cisco G200 network processor. The Cisco 8122-64EHF Router is a fixed port, high density, two rack unit form-factor router specifically designed for hyperscale data centers. Supported ports include 64 x 800G OSFP800. This variant supports Cisco-qualified open-source network operating systems, such as SONiC (Software for Open Networking in the Cloud).

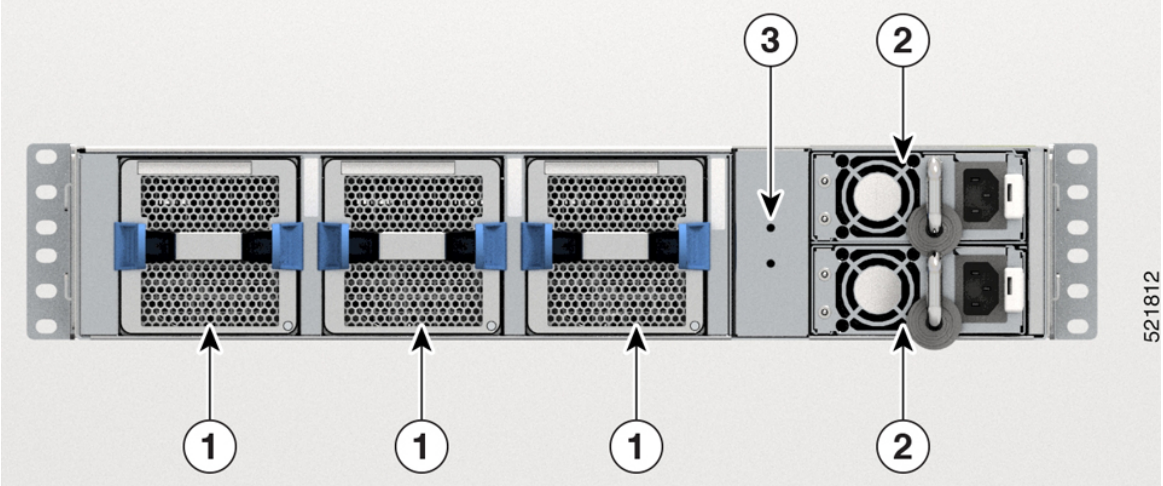
Cisco 8102-64H-O Router Front and Rear Panel View

Figure 1: Cisco 8102-64H-O Router—Front View



1	32 QSFP-DD ports
2	32 QSPF-DD ports

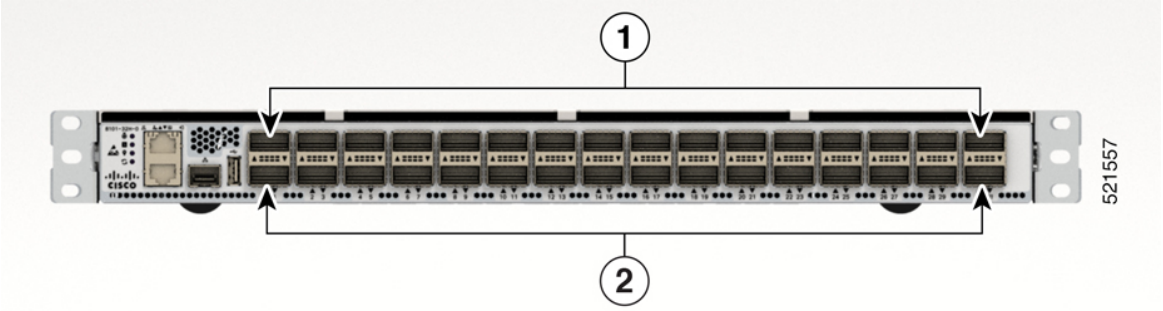
Figure 2: Cisco 8102-64H-O Router—Rear View



1	Fan Tray Three Fans: FT0, FT1, and FT2
2	PSU-0 and PSU-1
3	Ground Lug Location

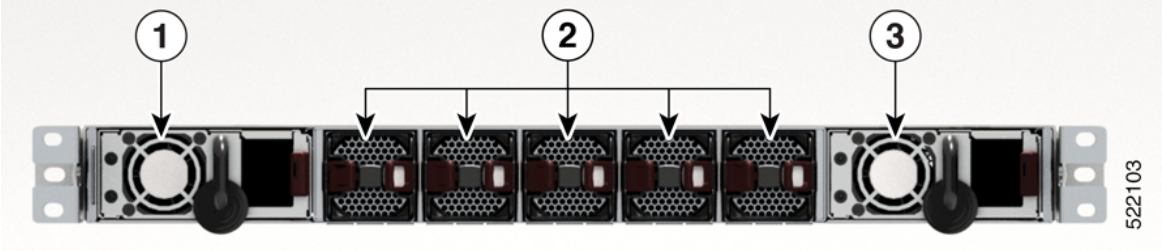
Cisco 8101-32H-O Router Front and Rear Panel View

Figure 3: Cisco 8101-32H-O Router—Front View



1	16 QSFP28 ports
2	16 QSPF28 ports

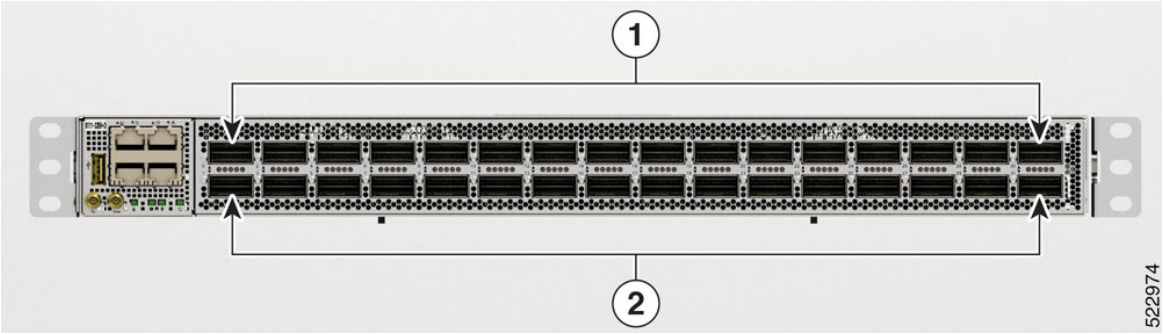
Figure 4: Cisco 8101-32H-O Router—Rear View



1	PSU-0
2	Fan Tray Five Fans: FT0, FT1, FT2, FT3, and FT4
3	PSU-1

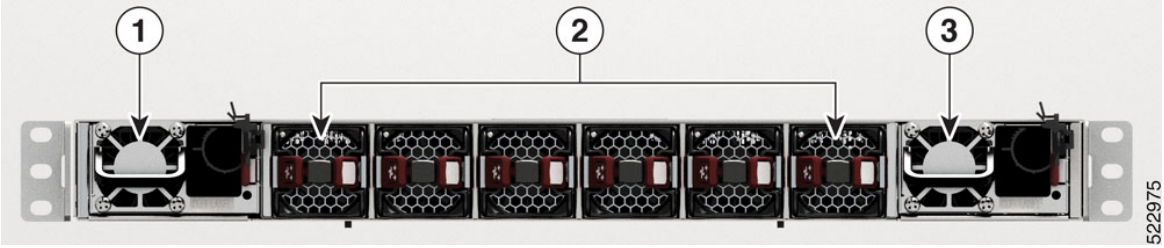
Cisco 8111-32EH-O Router Front and Rear Panel View

Figure 5: Cisco 8111-32EH-O Router—Front View



1	16 QSFP-DD ports. Supports 30W optics.
2	16 QSFP-DD ports. Supports 17W optics.

Figure 6: Cisco 8111-32EH-O Router—Rear View

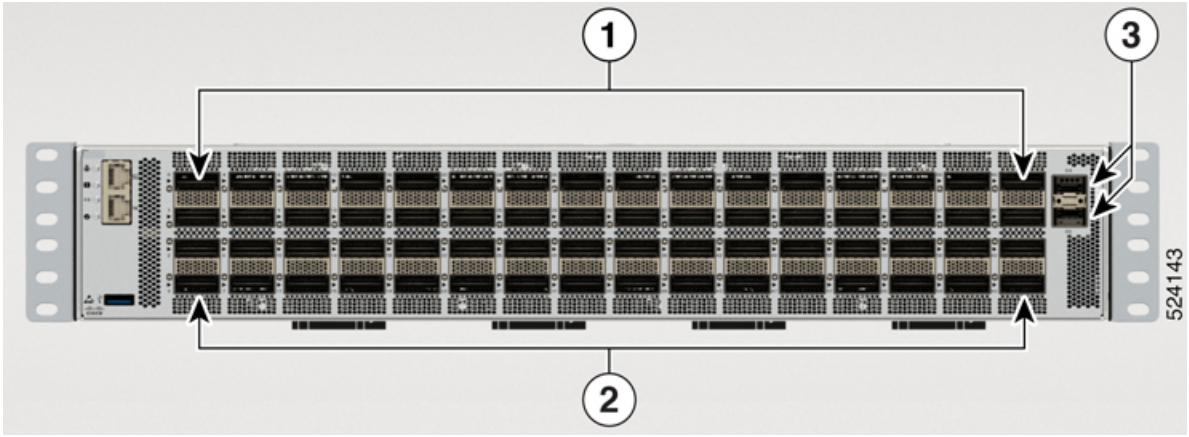


1	PSU-0

2	Fan Tray Six Fans: FT0, FT1, FT2, FT3, FT4, and FT5
3	PSU-1

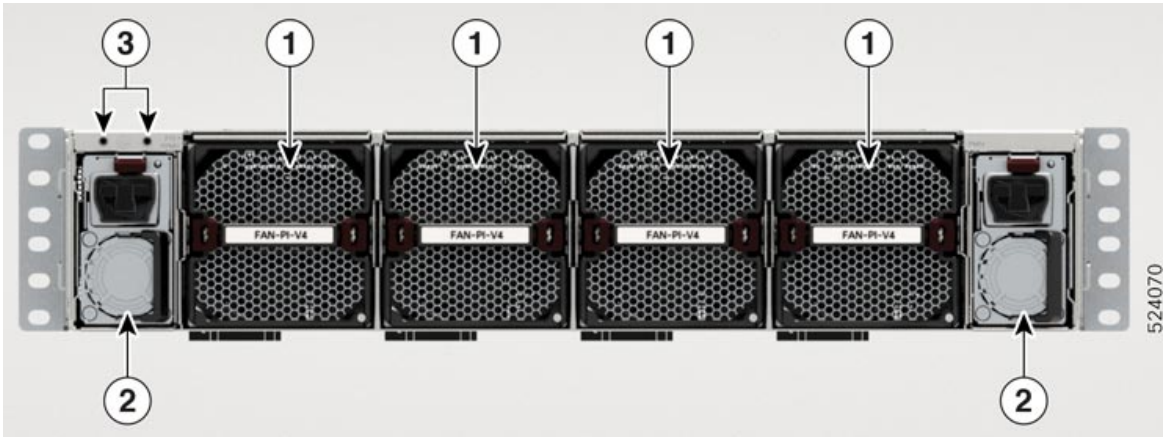
Cisco 8122-64EH-O Router Front and Rear Panel View

Figure 7: Cisco 8122-64EH-O Router-Front View



1	32 QSFP-DD ports
2	32 QSPF-DD ports
3	2 SFP28 ports

Figure 8: Cisco 8122-64EH-O Router—Rear View

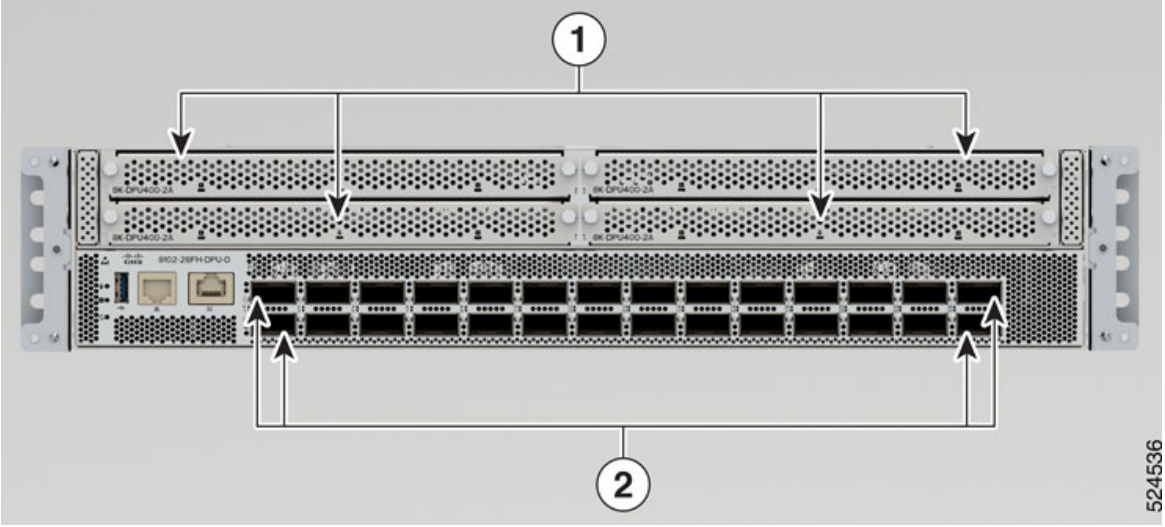


1	Fan Tray Four Fans: FT0, FT1, FT2, and FT3
2	PSU-0 and PSU-1

3	Ground Lug Location

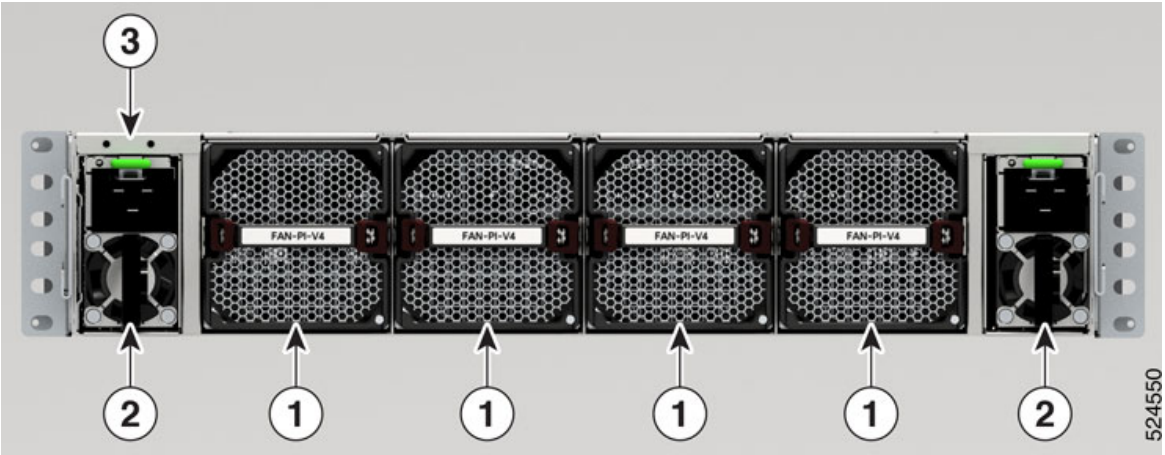
Cisco 8102-28FH-DPU-O Smart Switch Front and Rear Panel View

Figure 9: Cisco 8102-28FH-DPU-O—Front View



1	4 DPU adapters. 2 DPU complexes per adapter.
2	28 QSFP-DD 400 GbE

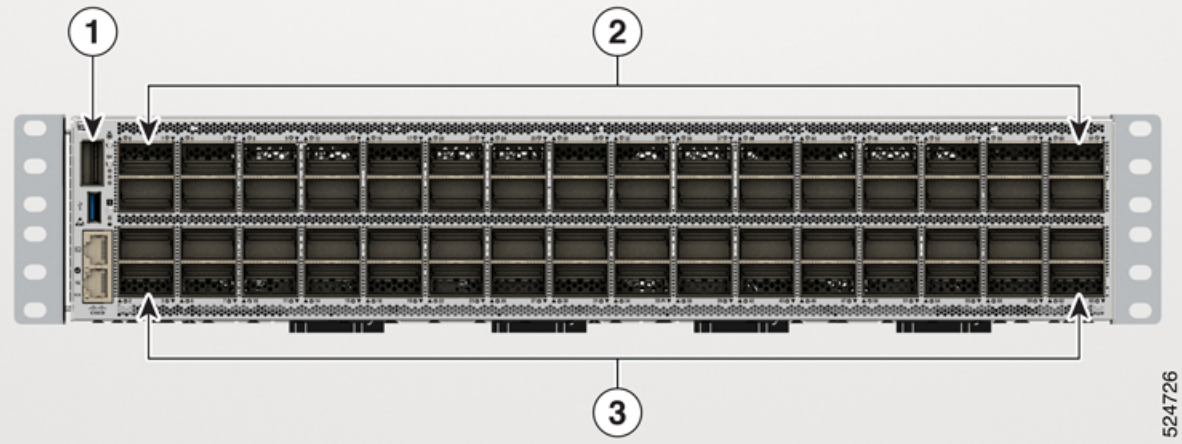
Figure 10: Cisco 8102-28FH-DPU-O—Rear View



1	Fan Modules Four Fans: FT0, FT1, FT2 and FT3
2	PSU-0 and PSU-1
3	Ground Lug Location

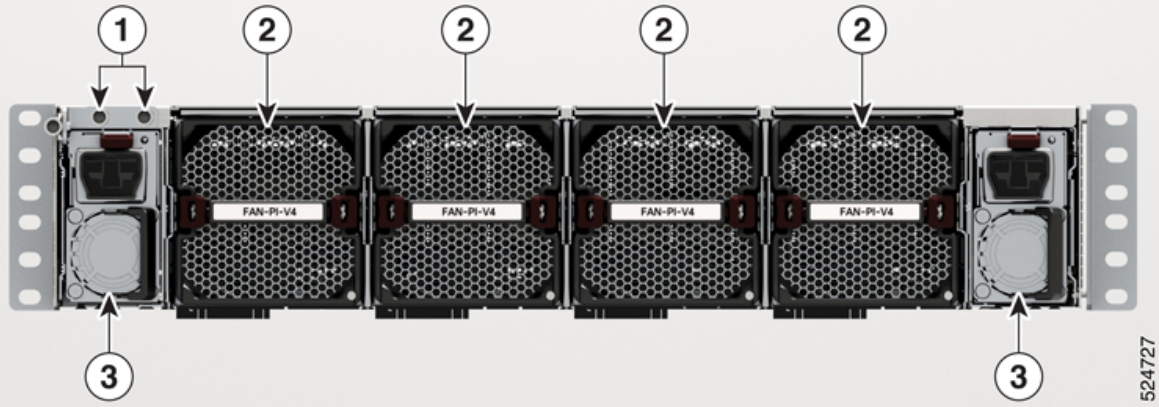
Cisco 8122-64EHF-O Router Front and Rear Panel View

Figure 11: Cisco 8122-64EHF-O Router-Front View



1	QSFP28 port
2	32 OSFP800 ports
3	32 OSFP800 ports

Figure 12: Cisco 8122-64EHF-O Router—Rear View



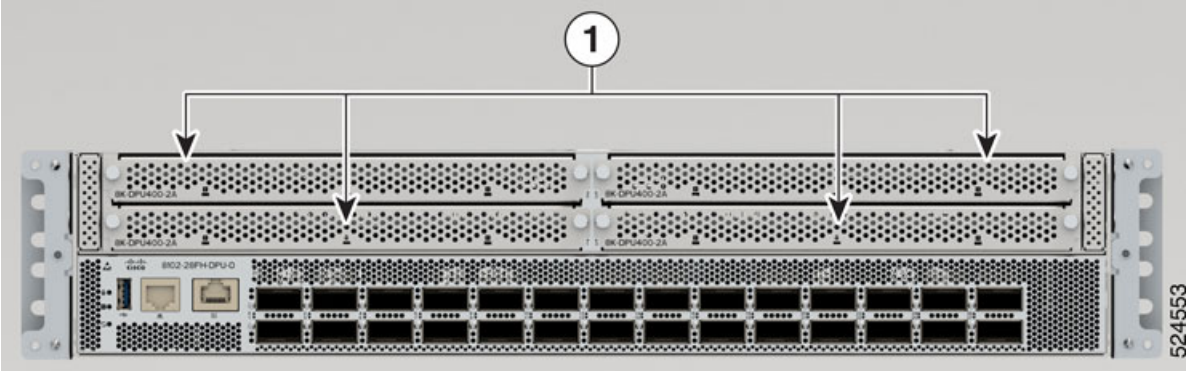
1	Ground Lug Location
2	Fan Tray Four Fans: FT0, FT1, FT2, and FT3
3	PSU-0 and PSU-1

Cisco 8102-28FH-DPU-O Smart Switch DPU Adapter

The Cisco 8102-28FH-DPU-O Smart Switch features four Data Processing Unit (DPU) adapters, which are responsible for managing data plane services. Each adapter contains two DPU complexes, resulting in a total

of eight DPU complexes in the switch, providing a combined data processing bandwidth of 1.6Tbps. Each DPU complex comprises of AMD DPU chip, 32GB of on board DDR4 memory, 64GB of eMMC storage and a common power management CPLD (complex programmable logic device). Each DPU adapter offers 200Gbps of network bandwidth and supports a variety of network functionalities within the smart switch.

Figure 13: DPU - Cisco 8102-28FH-DPU-O



1	4 DPU adapters. 2 DPU complexes per DPU adapter.

Field Replaceable Units

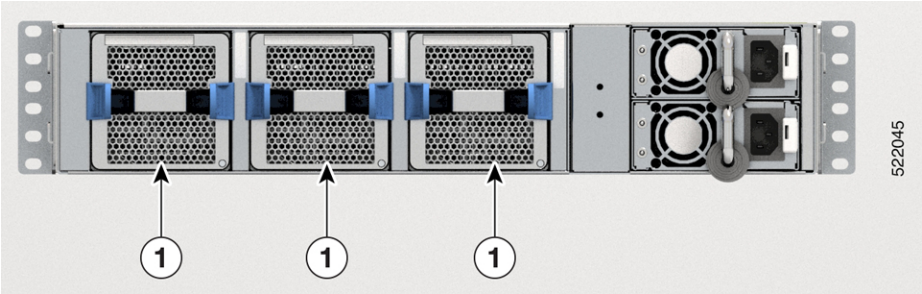
The router has the following field replaceable units (FRUs):

- Fan Module - The router features field-replaceable fan modules that are installed into the chassis from the rear. These fan modules are crucial for cooling the system and maintaining proper airflow. Designed with N+1 redundancy, the fan modules ensure reliable performance.
- Power Supply Unit - The router is equipped with two power supply units (PSUs) that install into the chassis from the rear. These PSUs provide 12V power to the entire system and operate with 1+1 redundancy to ensure continuous and reliable power delivery.

Designed for easy installation and removal, the PSUs support Online Insertion and Removal (OIR) to minimize downtime and maintain system availability.

Fan Module View

Figure 14: Fan Module - Cisco 8102-64H-O



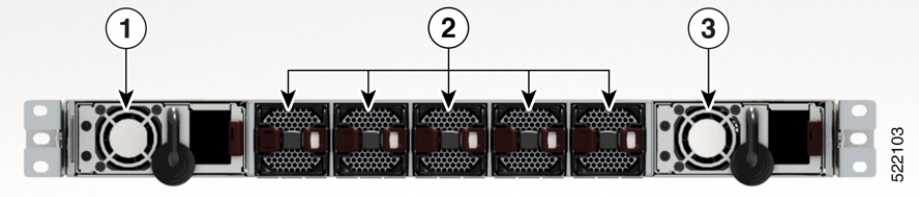
1	Fan

The router has three latched fan modules that installs into the chassis from the rear. Fans cool the system and maintain proper airflow through the system. The fan modules work with N+1 redundancy.

Table 1: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-2RU-PI-V2 The color of the fan module is Burgundy.
Port-side Exhaust	FAN-2RU-PE-V2 The color of the fan module is Blue.

Figure 15: Fan Module - Cisco 8101-32H-O

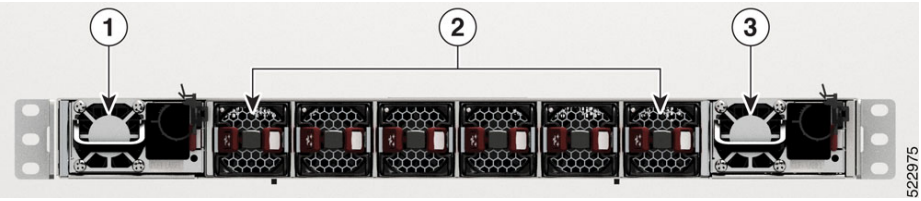


2	Fan

Table 2: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-1RU-PI-V2 The color of the fan module is Burgundy.
Port-side Exhaust	FAN-1RU-PE-V2 The color of the fan module is Blue.

Figure 16: Fan Module - Cisco 8111-32EH-O



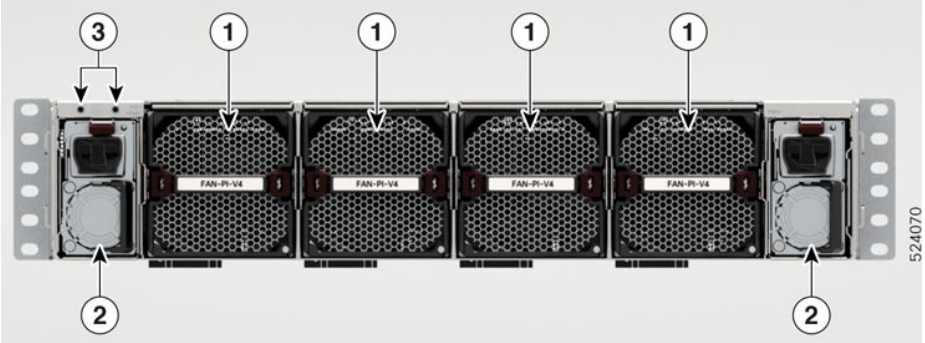
Note The Cisco 8111-32EH-O router supports only port-side intake configuration.

2	Fan

Table 3: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-1RU-PI-V2 The color of the fan module is Burgundy.

Figure 17: Fan Module - Cisco 8122-64EH-O



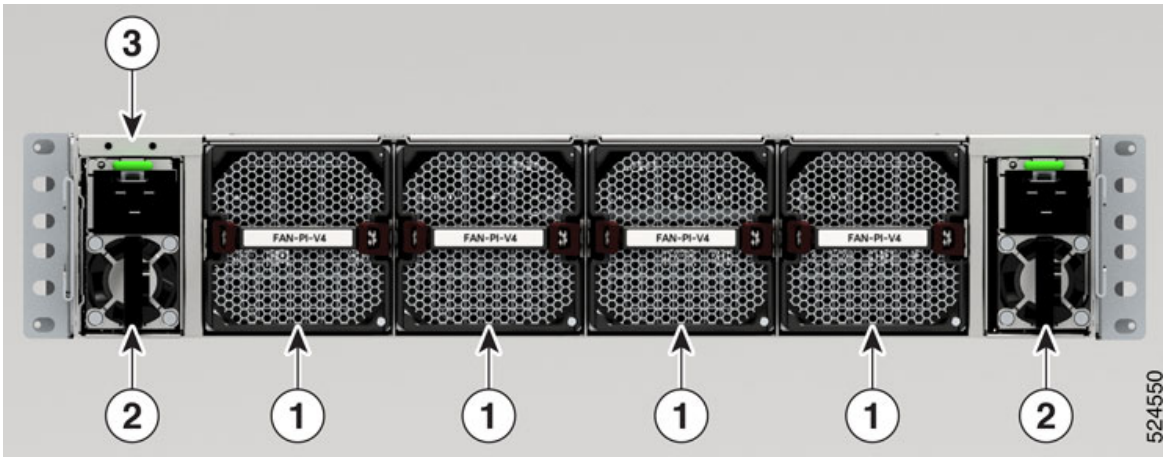
The router has four latched fan modules that installs into the chassis from the rear. Fans cool the system and maintain proper airflow through the system. The fan modules work with N+1 redundancy.

1	Fan
2	PSU
3	Ground lug location

Table 4: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-2RU-PI-V3 or FAN-2RU-PI-V4 The color of the fan module is Burgundy.

Figure 18: Fan Module - Cisco 8102-28FH-DPU-O

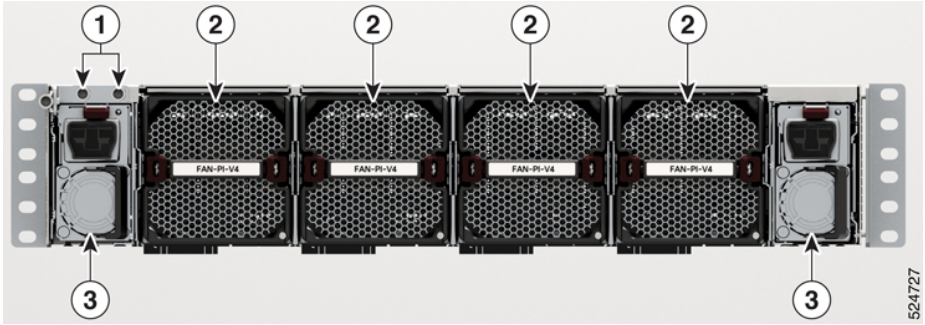


1	Fan
2	PSU
3	Ground lug location

Table 5: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-2RU-PI-V4 The color of the fan module is Burgundy.

Figure 19: Fan Module - Cisco 8122-64EHF-O



The router has four latched fan modules that installs into the chassis from the rear. Fans cool the system and maintain proper airflow through the system. The fan modules work with N+1 redundancy.

1	Ground lug location
2	Fan
3	PSU

Table 6: Fan Module PIDs

Configuration	Fan Module PID
Port-side Intake	FAN-PI-V4 The color of the fan module is Burgundy.

Power Supply Unit

Table 7: PIDs for Power Supply Unit

Router	AC PID	DC PID	HVPI PID
Cisco 8102-64H-O and Cisco 8101-32H-O	• PSU650W-ACPI • PSU650W-ACPE	• PSU930W-DCPI • PSU930W-DCPE	
Cisco 8111-32EH-O	• PSU2KW-ACPI • PSU3KW-HVPI	• PSU2KW-DCPI	• PSU3KW-HVPI
Cisco 8122-64EH-O	PSU3KW-HVPI		PSU3KW-HVPI
Cisco 8102-28FH-DPU-O	UCSC-PSU1-2300W	NA	
Cisco 8122-64EHF-O	PSU3KW-HVPI		PSU3KW-HVPI

Note For Cisco 8111-32EH-O router, when all the 32 x QSFP-DD ports are being used and you want to use 1+1 redundancy, you must use the 3KW PSU.

Figure 20: Power Supply Unit - Cisco 8101-32H-O and Cisco 8102-64H-O

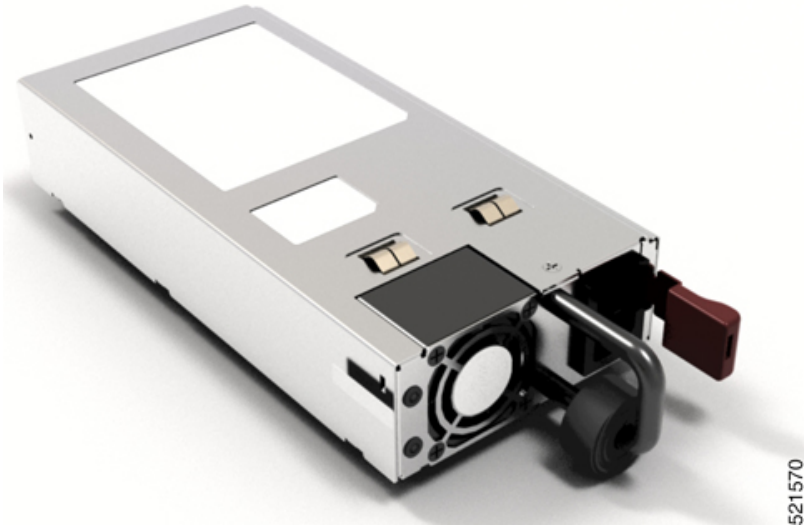
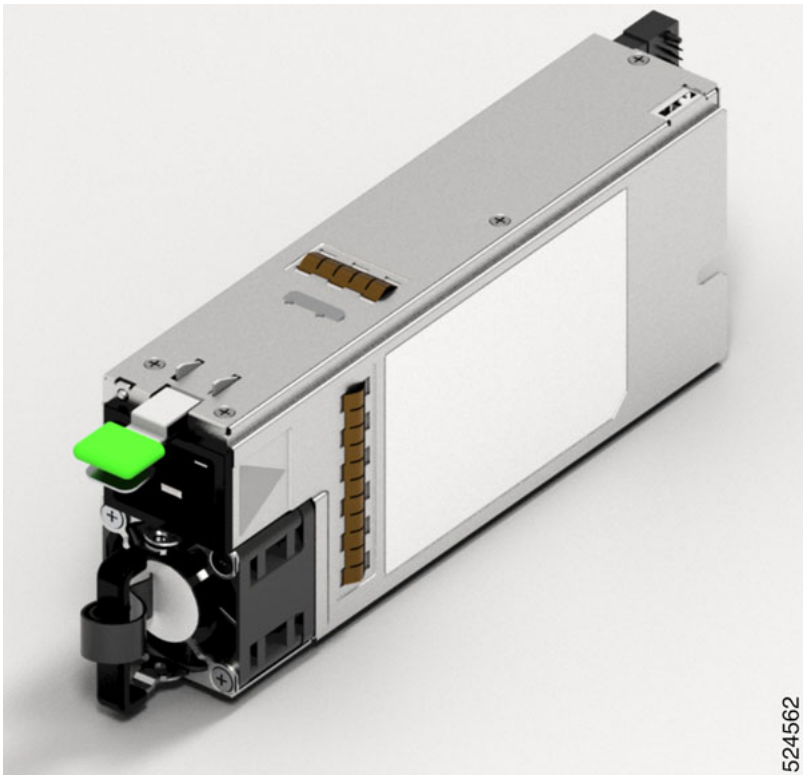


Figure 21: Power Supply Unit - UCSC-PSU1-2300W

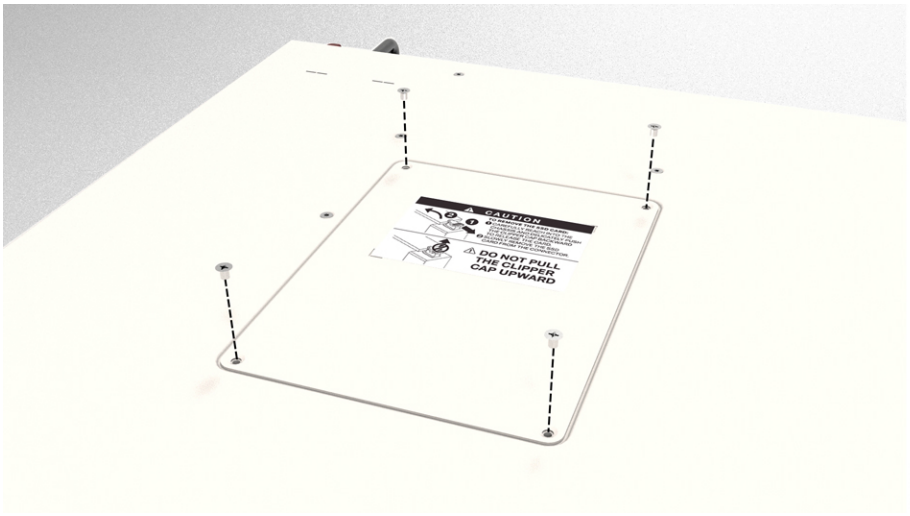


SSD Card

The router has a removable Solid State Drive (SSD) card. We recommend to remove the SDD card before shipping the hardware for a Return Merchandise Authorization (RMA) request. Removal of the SSD card enforces customer data security while performing an RMA.

You can access the SSD card by using the hatch provided on the top panel. To remove the SSD card, follow the instructions mentioned on the printed label on the hatch.

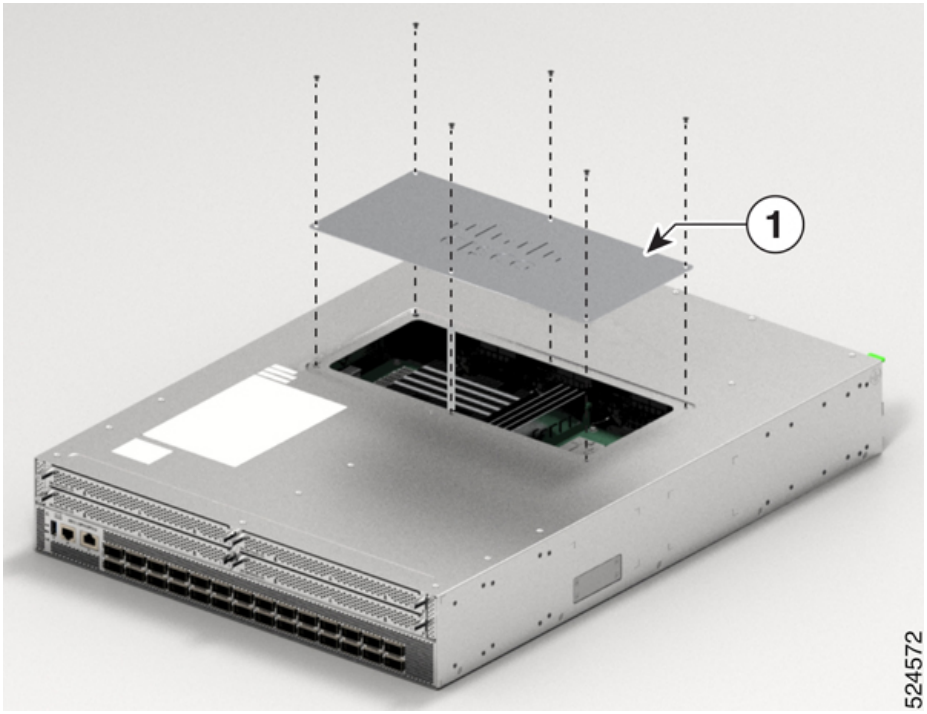
Figure 22: Remove the Hatch



To remove the SSD card from the Cisco 8102-28FH-DPU-O smart switch, perform these steps:

1. Remove the screws from the hatch present on the top panel.

Figure 23: Cisco 8102-28FH-DPU-O- Remove the Hatch



2. Carefully reach into the chassis and delicately push the clipper cap backward to release the card.

Figure 24: SSD Card Removal Instructions

3. Slowly remove the SSD card from the connector.

Airflow Direction

The Cisco 8100 series routers support these configurations:

- Post-Side Intake (PSI) configuration - the airflow through both the fan trays and power supplies is from the front-side to the rear-side. In PSI configuration, the power and fan modules are in Burgundy color.
- Post-Side Exhaust (PSE) configuration - the airflow through both the fan trays and power supplies is from the rear-side to the front-side. In PSE configuration, the power and fan modules are in Cisco Safety Blue color.

Note The PSE configuration is not supported on these routers:

- Cisco 8111-32EH-O
- Cisco 8122-64EH-O
- Cisco 8102-28FH-DPU-O
- Cisco 8122-64EHF-O

Note The airflow direction must be the same for all power supply and fan modules in the chassis. Depending upon the required airflow direction, you can change the fan type. You must then also change the power supply.

Figure 25: Airflow Direction for Cisco 8102-64H-O Router

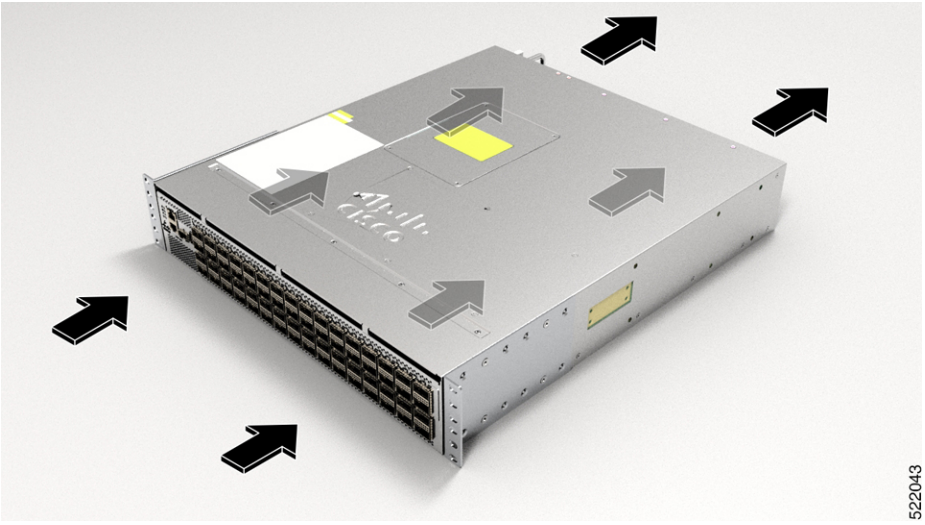


Figure 26: Airflow Direction for Cisco 8101-32H-O Router

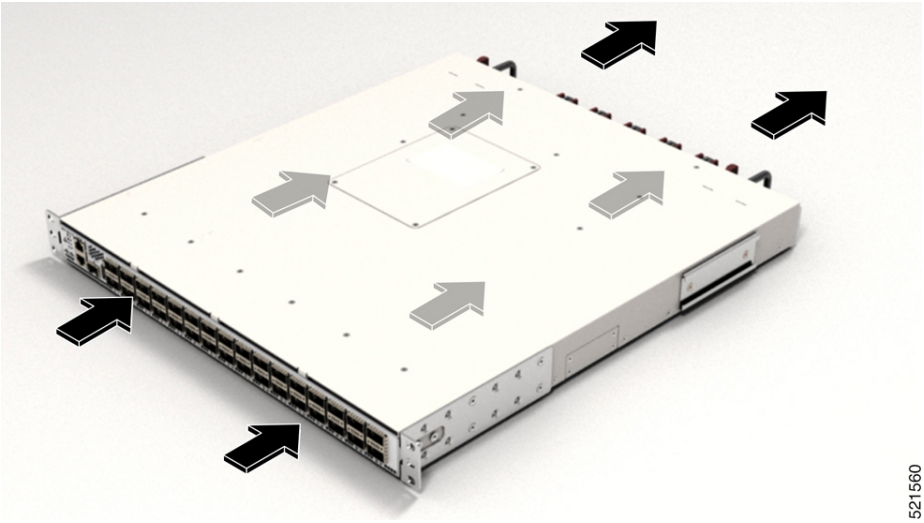


Figure 27: Airflow Direction for Cisco 8111-32EH-O Router

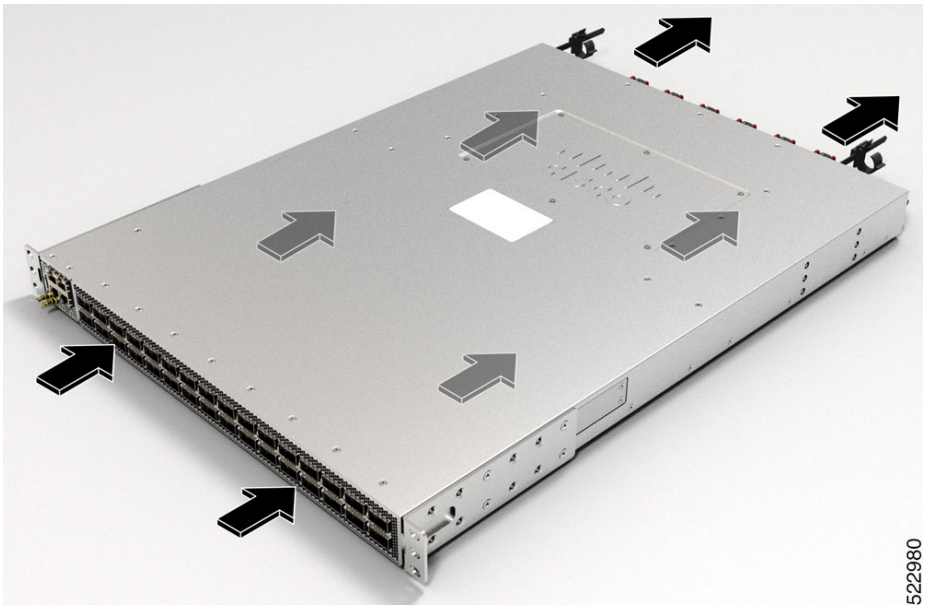


Figure 28: Airflow Direction for Cisco 8122-64EH-O Router

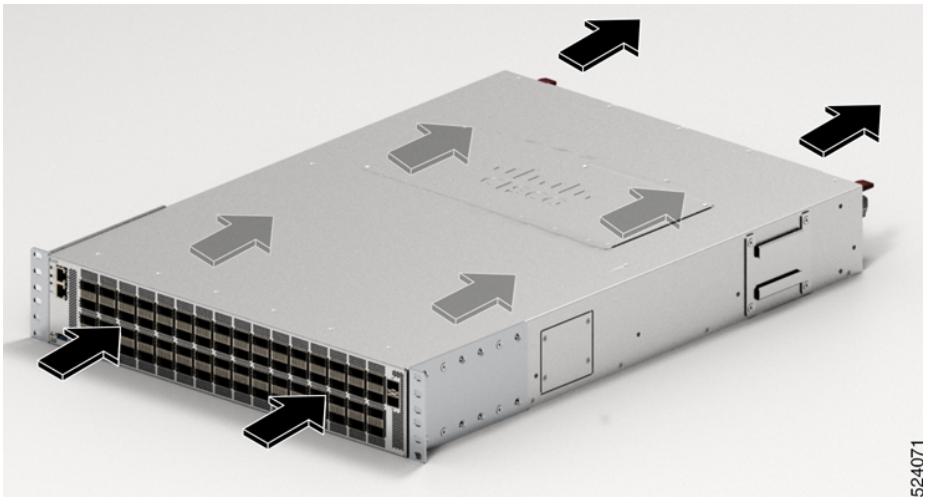


Figure 29: Airflow Direction for Cisco 8102-28FH-DPU-O Router

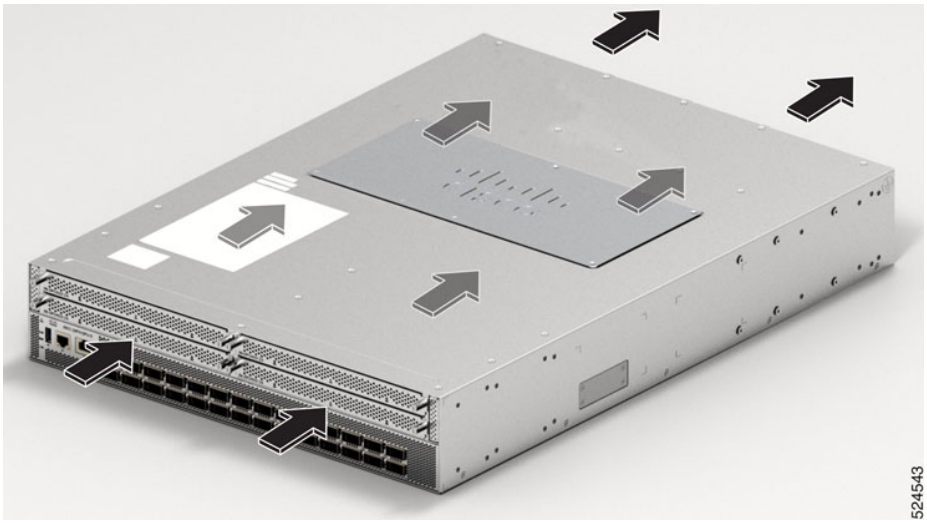
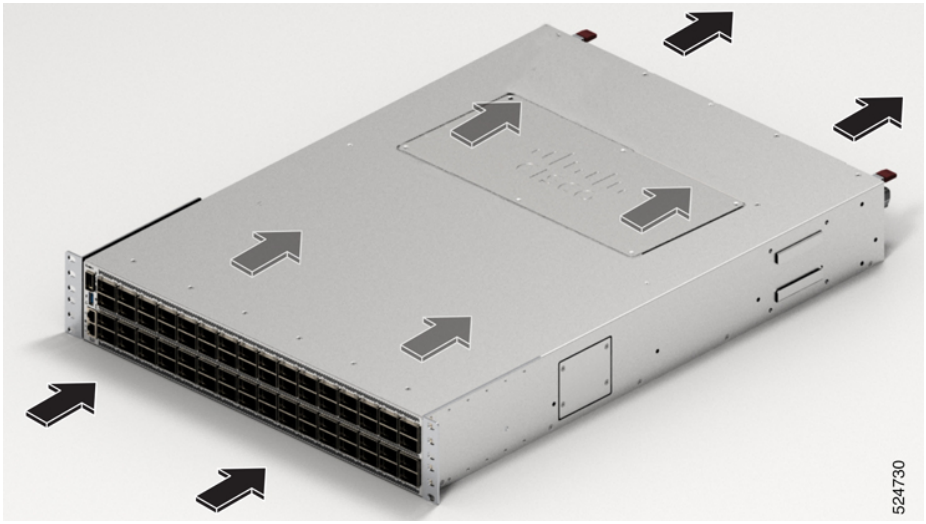
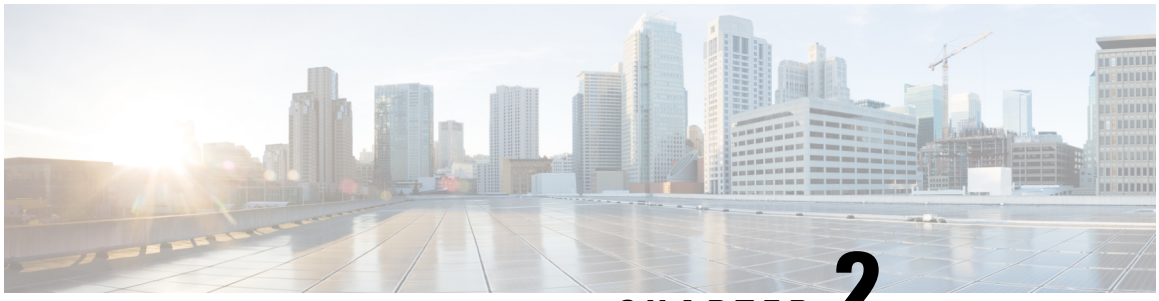


Figure 30: Airflow Direction for Cisco 8122-64EHF-O Router





CHAPTER 2

Prepare for Installation

Note The images in this chapter are only for representational purposes, unless specified otherwise. The chassis' actual appearance and size may vary.

Warning **Statement 1071**—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS

Safety Guidelines

Before you perform any procedure in this document, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment. The following guidelines are for your safety and to protect the equipment. Because the guidelines do not include all hazards, be constantly alert.

- Keep the work area clear, smoke and dust-free during and after installation. Do not allow dirt or debris to enter into any laser-based components.
- Do not wear loose clothing, jewelry, or other items that could get caught in the router or other associated components.
- Cisco equipment operates safely when used in accordance with its specifications and product-usage instructions.
- If potentially hazardous conditions exist, do not work alone.
- Take care when connecting multiple units to the supply circuit so that wiring is not overloaded.
- 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 about whether suitable grounding is available.
- When installing or replacing the unit, the ground connection must always be made first and disconnected last.
- To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.
- Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

Compliance and Safety Information

The Cisco 8000 Series Routers are designed to meet the regulatory compliance and safety approval requirements. For detailed safety information, see Regulatory Compliance and Safety Information—Cisco 8000 Series Routers.

Warning **Statement 1089—**Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 9001—**Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Warning **Statement 1090—**Installation by Skilled Person

Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person.

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 1029—**Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Laser Safety

Warning **Statement 1051—**Laser Radiation

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

Warning **Statement 1055—**Class 1/1M Laser

Invisible laser radiation is present. Do not expose to users of telescopic optics. This applies to Class 1/1M laser products.

Warning **Statement 1255—**Laser Compliance Statement

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

Energy Hazard

The routers can be configured for a DC power source. Do not touch terminals while they are live. Observe the following warning to prevent injury.

Warning **Statement 1086—**Replace Cover on Power Terminals

Hazardous voltage or energy may be present on power terminals. To reduce the risk of electric shock, make sure the power terminal cover is in place when the power terminal is not being serviced. Be sure uninsulated conductors are not accessible when the cover is in place.

Preventing Electrostatic Discharge Damage

Many router components can be damaged by static electricity. Not exercising the proper electrostatic discharge (ESD) precautions can result in intermittent or complete component failures. To minimize the potential for ESD damage, always use an ESD-preventive antistatic wrist strap (or ankle strap) and ensure that it makes adequate skin contact.

Note Check the resistance value of the ESD-preventive strap periodically. The measurement should be 1–10 megohms.

Before you perform any of the procedures in this guide, attach an ESD-preventive strap to your wrist and connect the leash to the chassis.

Cautions and regulatory compliance statements for NEBS

The NEBS-GR-1089-CORE regulatory compliance statements and requirements are discussed in this section.

Note **Statement 7001—**ESD Mitigation

This equipment may be ESD sensitive. Always use an ESD ankle or wrist strap before handling equipment. Connect the equipment end of the ESD strap to an unfinished surface of the equipment chassis or to the ESD jack on the equipment if provided.

Warning **Statement 7003—**Shielded Cable Requirements for Intrabuilding Lightning Surge

The intrabuilding port(s) of the equipment or subassembly, which is the management Ethernet port, must use shielded intrabuilding cabling/wiring that is grounded at both ends.

Warning **Statement 7005—**Intrabuilding Lightning Surge and AC Power Fault

The intrabuilding port(s) of the equipment or subassembly, which is the management Ethernet port, must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intrabuilding 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.

Warning **Statement 7011—**Surge Protection Device Requirements for GR-1089 Antenna Ports

Protect equipment antenna ports, that are classified as Type 6 according to GR-1089-CORE, with lightning surge protectors that are rated at a minimum of 600 V peak surge of 1.2/50 uS duration.

Connecting a Cable to the GNSS Antenna Interface

- GNSS modules have built-in ESD protections on all pins, including the RF-input pin. However, additional surge protection is required if an outdoor antenna is being connected. The Lightning Protector must be able to provide a low clamping voltage (less than 600V).
- A lightning protection must be mounted at the place where the antenna cable enters the building. The primary lightning protection must be capable of conducting all potentially dangerous electrical energy to PE (Protective Earth).
- Surge arrestors should support DC-pass and suitable for the GPS frequency range (1.575GHz) with low attenuation.

Warning **Statement 7012—**Equipment Interfacing with AC Power Ports

Connect this equipment to AC mains that are provided with a surge protective device (SPD) at the service equipment that complies with NFPA 70, the National Electrical Code (NEC).

Note **Statement 7013—**Equipment Grounding Systems—Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

Note **Statement 7016—**Battery Return Conductor

The battery return conductor of this equipment shall be treated as (DC-I).

Note **Statement 7018—**System Recover Time

The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

Note **Statement 8015—**Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Note **Statement 8016—**Installation Location Where the National Electric Code (NEC) Applies

This equipment is suitable for installation in locations where the NEC applies.

Installation Guidelines

Before installing the chassis, ensure that the following guidelines are met:

- Site is properly prepared so that there is sufficient room for installation and maintenance.
- Operating environment is within the ranges that are listed in Environment and Physical specifications. For more details on environmental requirements, see Cisco 8000 Series Routers Data Sheet.
- Chassis is mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the chassis in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the chassis in the rack.
- Airflow around the chassis and through the vents is unrestricted.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.
- Each port must match the wave-length specifications on each end of the cable, and the cable must not exceed the stipulated cable length.

Note Cisco 8000 Series Routers function in operating temperatures of up to 40°C at sea level. For every 300 meters (1000 ft) above sea level, the maximum temperature is reduced by 1°C. For more details on environmental requirements, see Cisco 8000 Series Routers Data Sheet.

Note For fixed-port routers that support port side exhaust fans and power supplies, the maximum temperature is reduced by 5°C (for example, 35°C at sea level or 30°C at 1500 meters).

Procure Tools and Equipment

Obtain these necessary tools and equipment for installing the chassis:

- Number 1 and number 2 Phillips screwdrivers with torque capability to rack-mount the chassis.
- 3/16-inch flat-blade screwdriver.
- Tape measure and level.
- ESD wrist strap or other grounding device.
- Antistatic mat or antistatic foam.
- Two-hole 2 AWG lug (1) is provided with the accessory kit. If you choose to use a different sized ground wire, you must procure your own two-hole lug that has .25 inch holes and .625 inch spacing between the holes.
- Crimping tool for lug.
- Wire-stripping tool.

Router Accessory Kit

The following table contains the router accessory kit PIDs. The router accessory kit contains the rack mount kit and the ground lug kit. The rack mount kit present in the accessory kit contains the screws and brackets required for installation.

Router	Accessory Kit	Items in Accessory Kit and Rack Depth Range
Cisco 8102 Router	8100-2RU-KIT	Rack mount kit and ground lug kit
Cisco 8101 Router	8100-1RU-KIT	Rack mount kit and ground lug kit
Cisco 8111-32EH-O Router	8K-1RU-KIT-S	For rack depths between 23 in. (584.2 mm) and 32.29 in. (820.16 mm). Contains rack mount kit and ground lug kit.
	8K-1RU-KIT-L	For rack depths between 32.40 in. (822.96 mm) and 42 in. (1066.8 mm). Contains rack mount kit and ground lug kit.
	8K-1RU-RAIL-KIT	Rack mount kit and ground lug kit

Router	Accessory Kit	Items in Accessory Kit and Rack Depth Range
Cisco 8122-64EH-O Router	8K-2RU-CBLMGMT	2RU chassis cable management
	8K-2RU-FILTER	2RU chassis filter
	8K-2RU-KIT-M	2RU chassis rail kit
Cisco 8102-28FH-DPU-O	8K-2RU-KIT-L	For rack depths between 30 in. (762 mm) and 40 in. (1016 mm). Contains rack mount kit and ground lug kit.
	8K2RU-KIT-S	For rack depths between 23 in. (584.2 mm) and 30 in. (762 mm). Contains rack mount kit and ground lug kit.
	8K-2RU-2P-KIT	Rack mount kit and ground lug kit
Cisco 8122-64EHF-O Router	8K-2RU-CBLMGMT	2RU chassis cable management
	8K-2RU-FILTER	2RU chassis filter
	8K-2RU-KIT-SB	2RU chassis rail kit

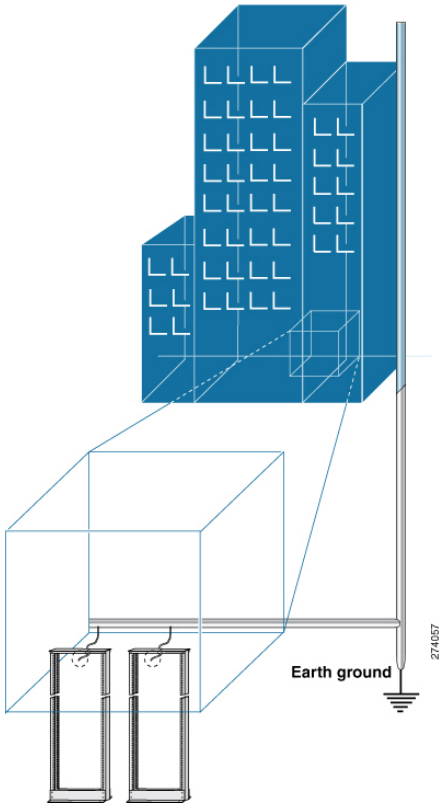
Prepare Your Location

This section illustrates how the building that houses the chassis must be properly grounded to the earth ground.

Note Unless specified otherwise, the image is only for representational purposes. The rack's actual appearance and size may vary.

Note This image is only for representational purposes. Your grounding requirement depends on your building.

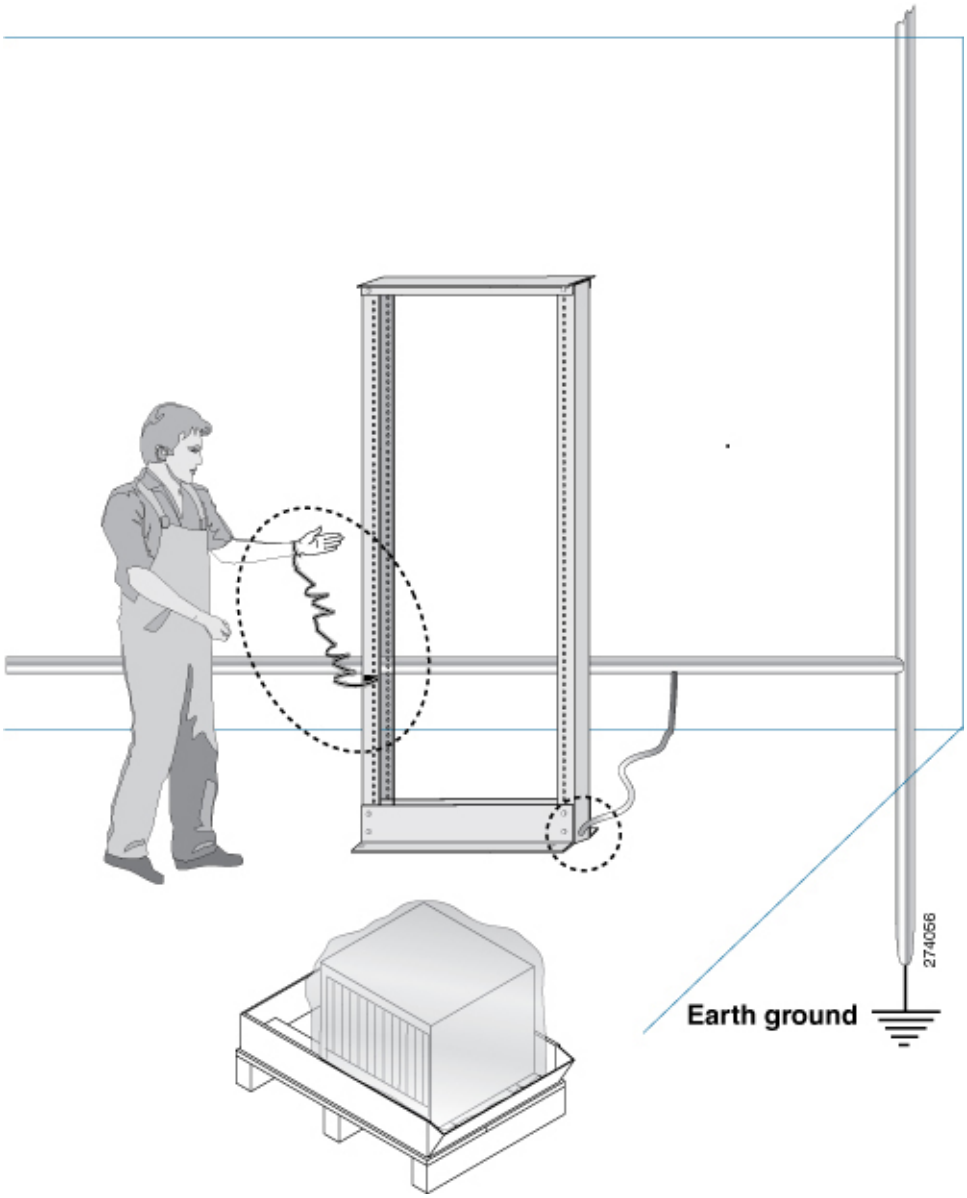
Figure 31: Building with Rack Room Connected to Earth Ground



Prepare Yourself

This section illustrates how to prepare yourself before removing the chassis from the sealed antistatic bag. The figures show how to cuff the ESD strap around the wrist and the ground cord that connects the cuff to the ground. ESD wrist straps are the primary means of controlling static charge on personnel.

Figure 32: Wearing the ESD Strap



Prepare Rack for Chassis Installation

Install the Cisco 8100 Series Routers on a standard 19 inch, Electronic Industries Alliance (EIA) rack with mounting rails that conform to English universal hole spacing according to Section 1 of the ANSI/EIA-310-D-1992 standard.

Note The Cisco 8102-64H-O, Cisco 8122-64EH-O and Cisco 8111-32EH-O, and Cisco 8102-28FH-DPU-O router rack mount kit contains the rack mounting brackets for 19-inch rack. To install the chassis in a 23-inch rack or an ETSI rack, you need adapter plates to accommodate the 19-inch rack mount brackets.

The spacing between the posts of the rack must be (EIA-310-D-1992 19-inch rack compatible) wide enough to accommodate the width of the chassis.

Before you move the chassis or mount the chassis into the rack, we recommend that you do the following:

Procedure

Step 1 Place the rack at the location where you plan to install the chassis.

Step 2 (Optional) Secure the rack to the floor.

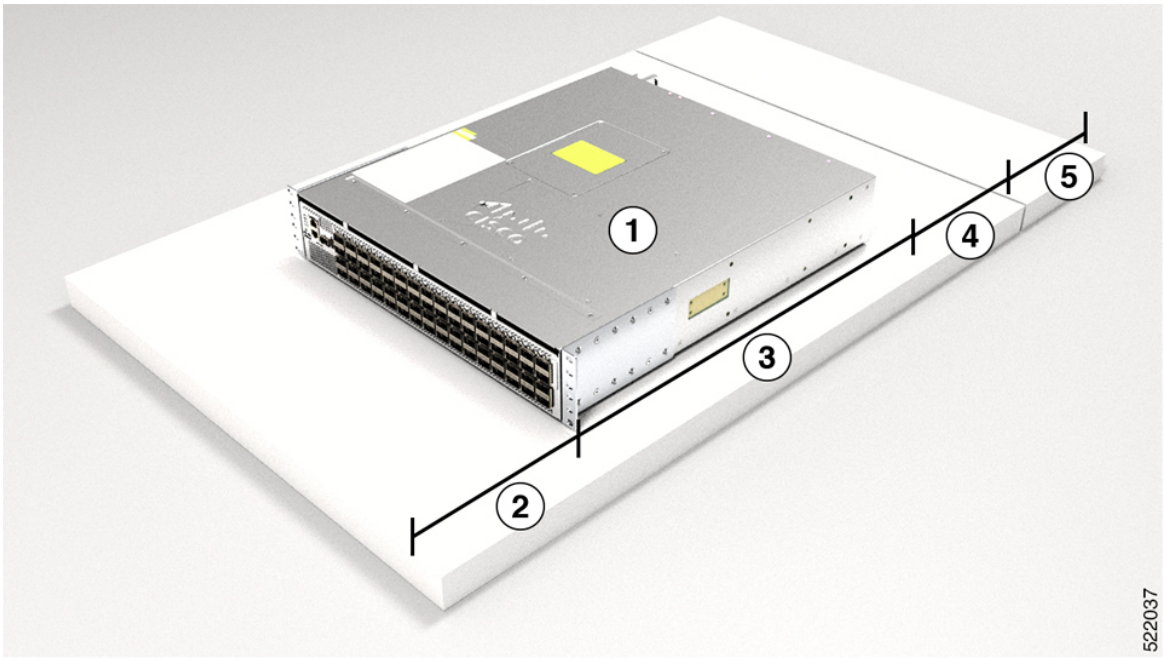
To bolt the rack to the floor, a floor bolt kit (also called an anchor embedment kit) is required. For information on bolting the rack to the floor, consult a company that specializes in floor mounting kits (such as Hilti; see Hilti.com for details). Make sure that floor mounting bolts are accessible, especially if annual retorquing of bolts is required.

Note
Ensure that the rack in which the chassis is being installed is grounded to earth ground.

Clearance Requirements

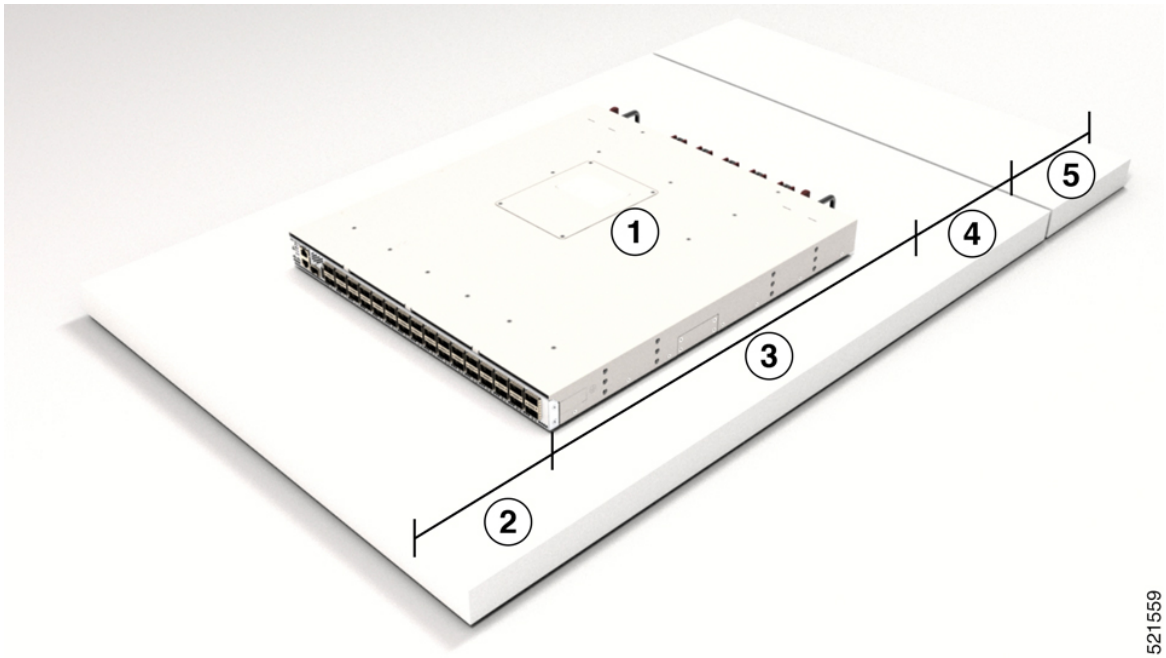
The chassis requires front-to-back airflow. Leave at least 6.0 in. (15.24 cm) front and rear clearance for air intake or exhaust. We recommend that you have at least 6.0 in. (15.24 cm) of space in front of the chassis to provide room to maneuver the cables to make the required connections. Leave an extra 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.

Figure 33: Clearances Required Around the Chassis for Cisco 8102-64H-O



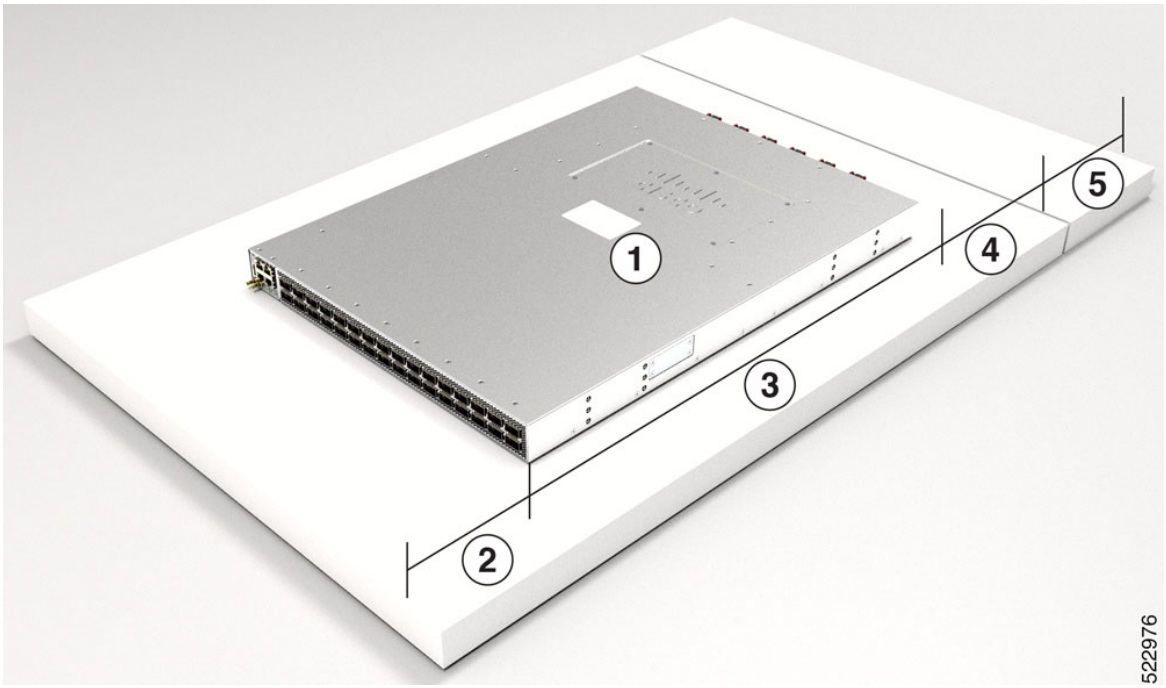
1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	20.1 in. (51.1 cm) Chassis depth.		

Figure 34: Clearances Required Around the Chassis for Cisco 8101-32H-O



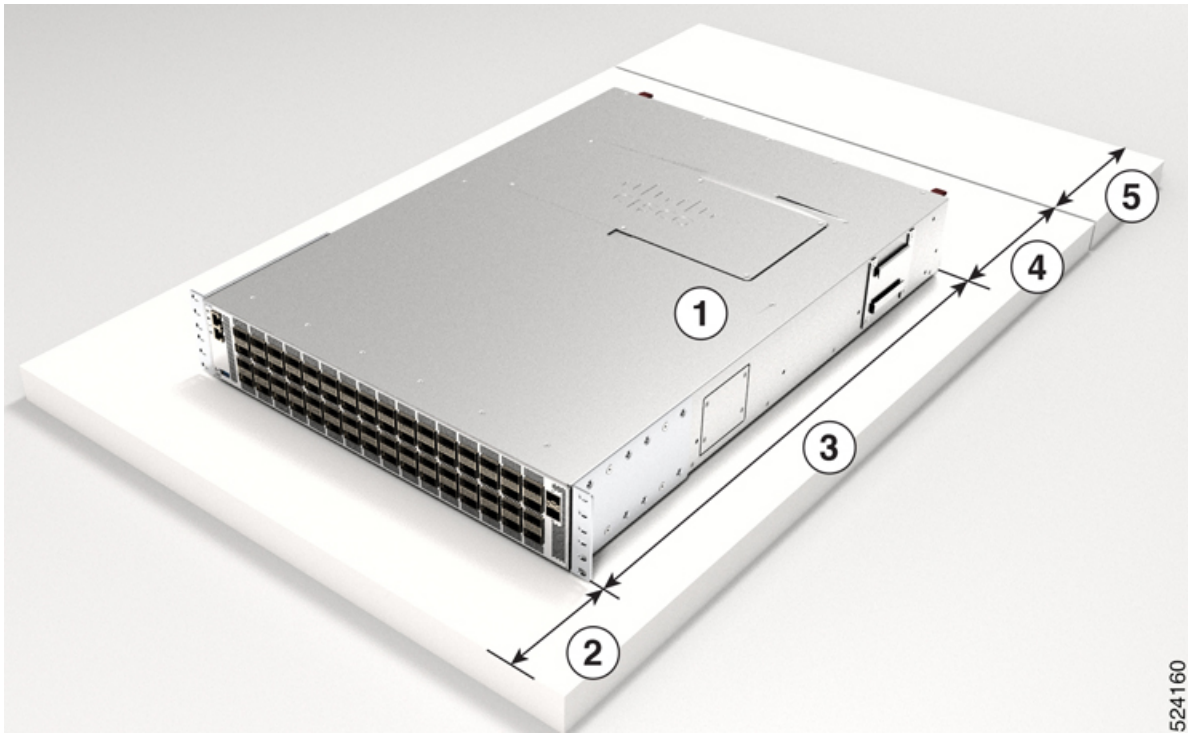
1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	19.34 in. (49.1 cm) Chassis depth.		

Figure 35: Clearances Required Around the Chassis for Cisco 8111-32EH-O



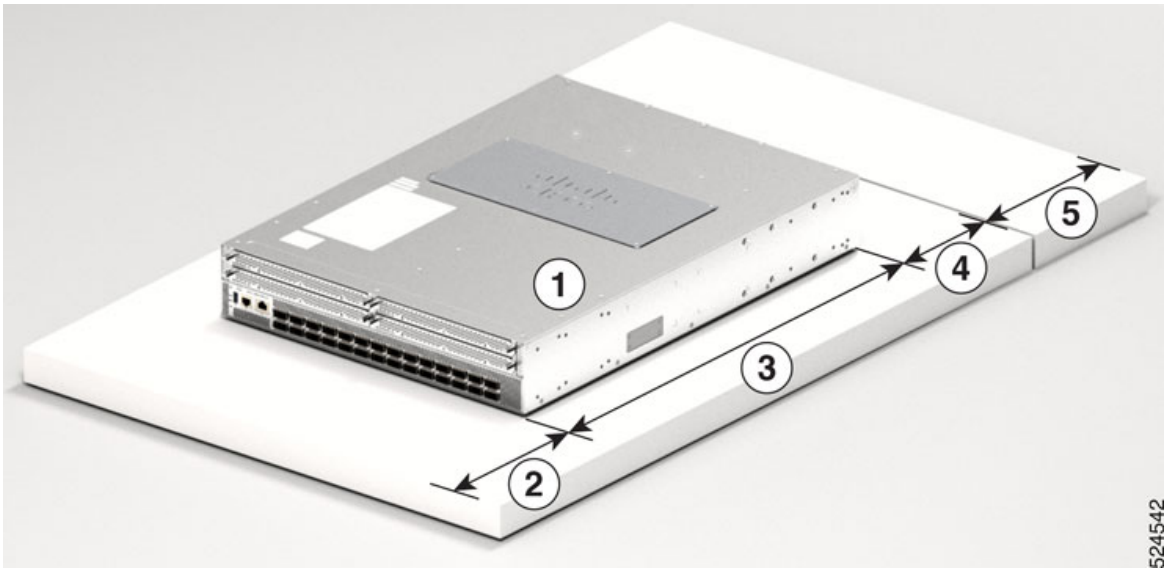
1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	23.6 in. (60 cm) Chassis depth.		

Figure 36: Clearances Required Around the Chassis for Cisco 8122-64EH-O



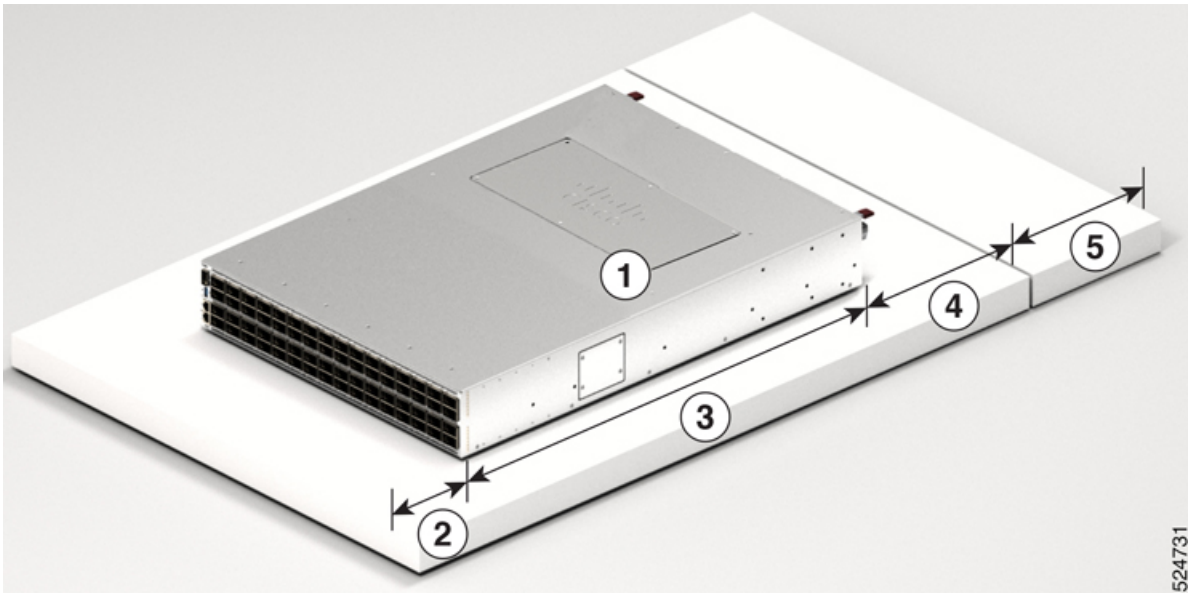
1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	24.7 in. (62.7 cm) Chassis depth.		

Figure 37: Clearances Required Around the Chassis for Cisco 8102-28FH-DPU-O



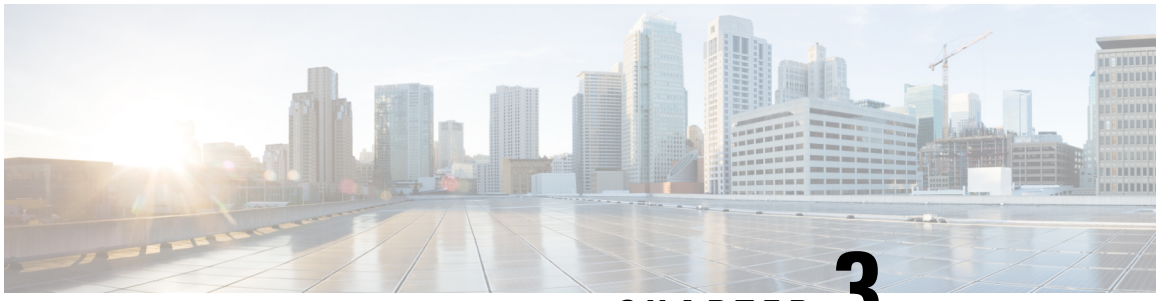
1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	23.6 in. (60 cm) Chassis depth.		

Figure 38: Clearances Required Around the Chassis for Cisco 8122-64EHF-O



1	Chassis	4	6.0 in. (15.24 cm) rear clearance for air intake/exhaust.

2	6.0 in. (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	24.7 in. (62.7 cm) Chassis depth.		



CHAPTER 3

Installing the Chassis

Rack Mount the Chassis

The chassis can be mounted on a 4-post or a 2-post rack.

Warning

Statement 1032—Lifting the Chassis

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules, such as power supplies, fans, or cards. These types of handles are not designed to support the weight of the unit.

Warning

Statement 1006—Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Rack-Mount the Chassis in a 4-Post Rack

This section describes how to install these routers in a 4-post rack:

- Cisco 8102-64H-O
- Cisco 8101-32H-O
- Cisco 8111-32EH-O
- Cisco 8122-64EH-O
- Cisco 8102-28FH-DPU-O
- Cisco 8122-64EHF-O

Caution If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

The following table lists the items that are contained in the rack-mount kit.

Table 8: Rack-Mount Kit

Quantity	Part Description
2	Rack-mount brackets
18	M4 x 6-mm Phillips flat-head screws
2	M4 x 6-mm Phillips pan-head screws
2	Rack-mount guides
2	Rack-mount guide rails, 2 lengths for different 4-post depths
1	Grounding lug and screws

Note These routers do not support the Port-Side Exhaust (PSE) configuration:

- Cisco 8102-64H-O
- Cisco 8111-32EH-O
- Cisco 8122-64EH-O
- Cisco 8102-28FH-DPU-O
- Cisco 8122-64EHF-O

Procedure

Step 1 Install the rack-mount brackets to the router as follows:

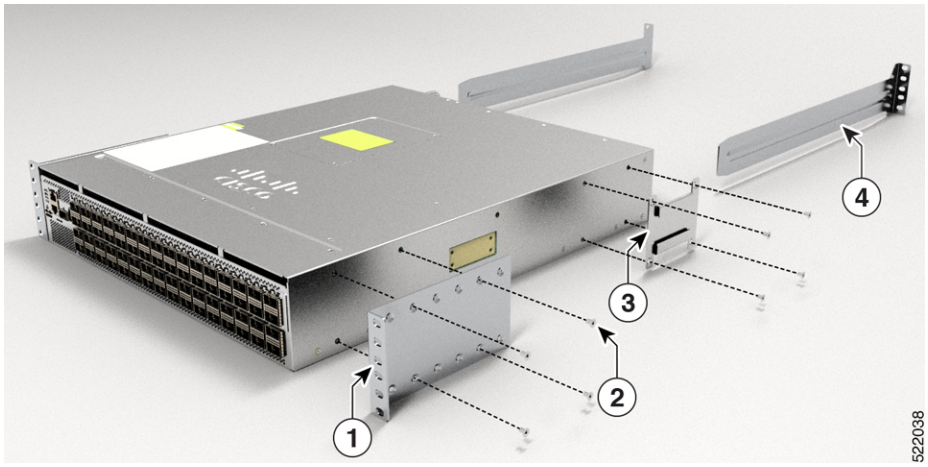
a) Determine which end of the chassis is to be located in the cold aisle as follows:

- If the router has port-side intake modules (fan modules and power modules with burgundy coloring), position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules (fan modules and power modules with blue coloring), position the router so that the fan and power supply modules are in the cold aisle.

b) Position a rack-mount bracket on the side of the chassis with its four holes that are aligned to four of the screw holes on the side of the chassis, and then use four M4 flat-head screws with 13.25 in-lbs (1.5 N-m) torque value to attach the bracket to the chassis.

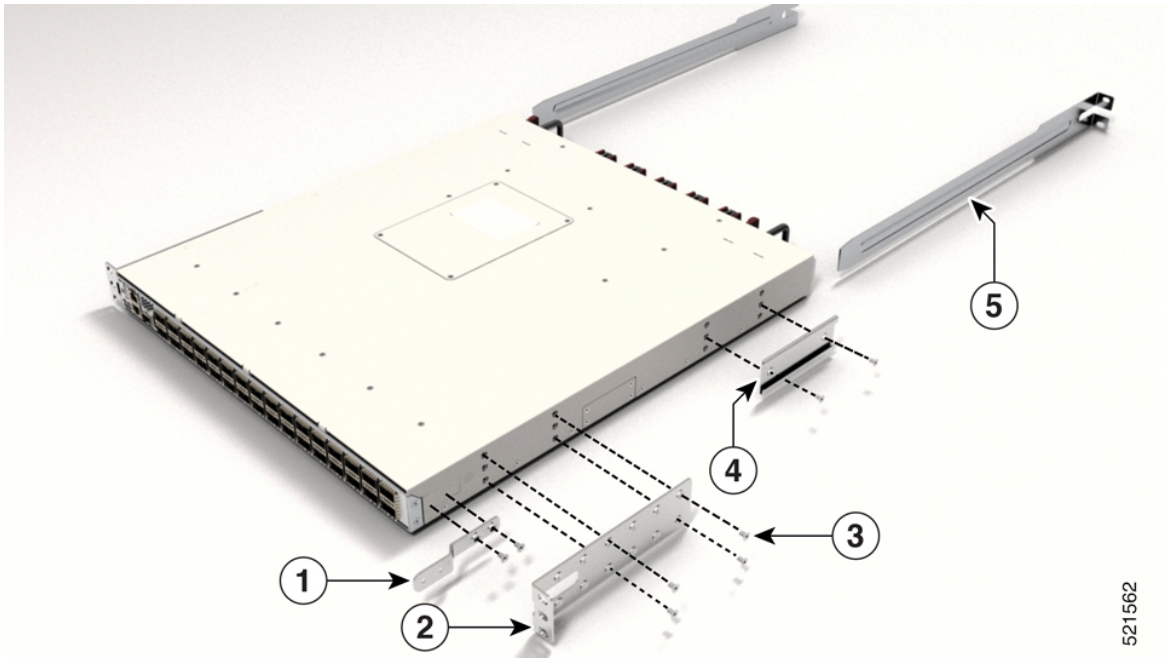
Note
You can align four holes in the rack-mount bracket to four screw holes on the front side of chassis or four screw holes on the rear side of the chassis. The holes that you use depend on which end of your chassis is located in the cold aisle.

Figure 39: Rack-Mount Brackets on Cisco 8102-64H-O Router—Port-Side Intake



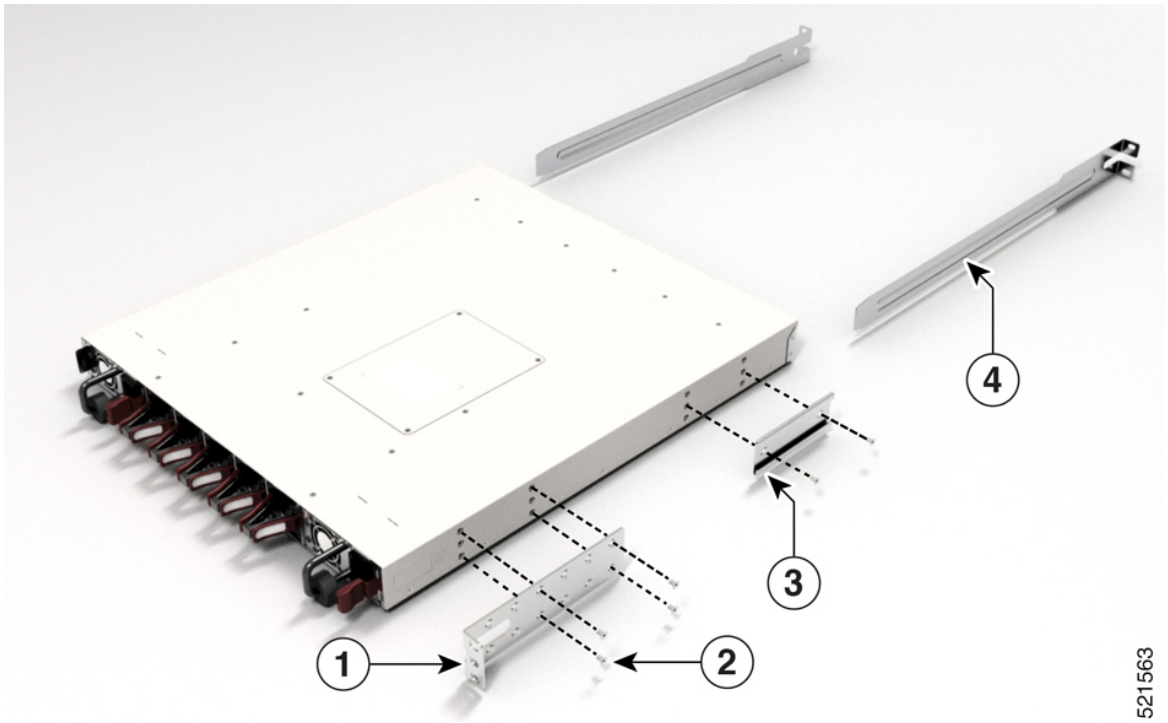
1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails

Figure 40: Rack-Mount Brackets on Cisco 8101-32H-O Router—Port-Side Intake



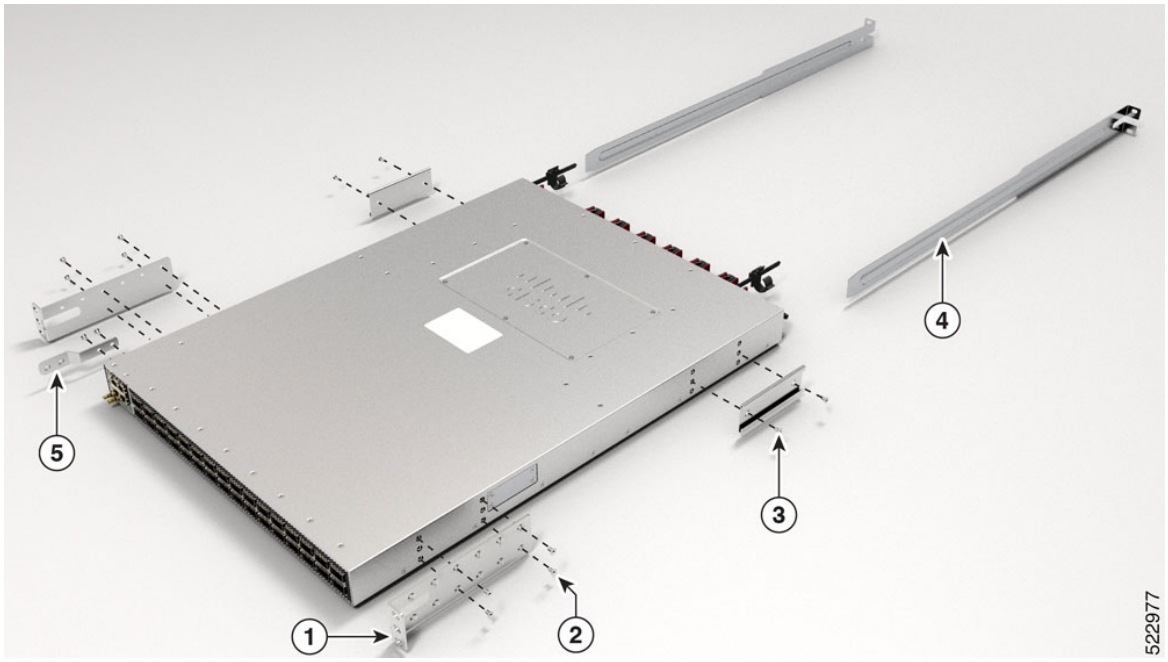
1	Grounding plate	4	Rack-mount guide
2	Rack-mount brackets	5	Rack-mount guide rails. The orientation of the rail changes depening upon the rail that you select.
3	M4 x 6mm Phillips flat-head screws		

Figure 41: Rack-Mount Brackets on Cisco 8101-32H-O Router—Port-Side Exhaust



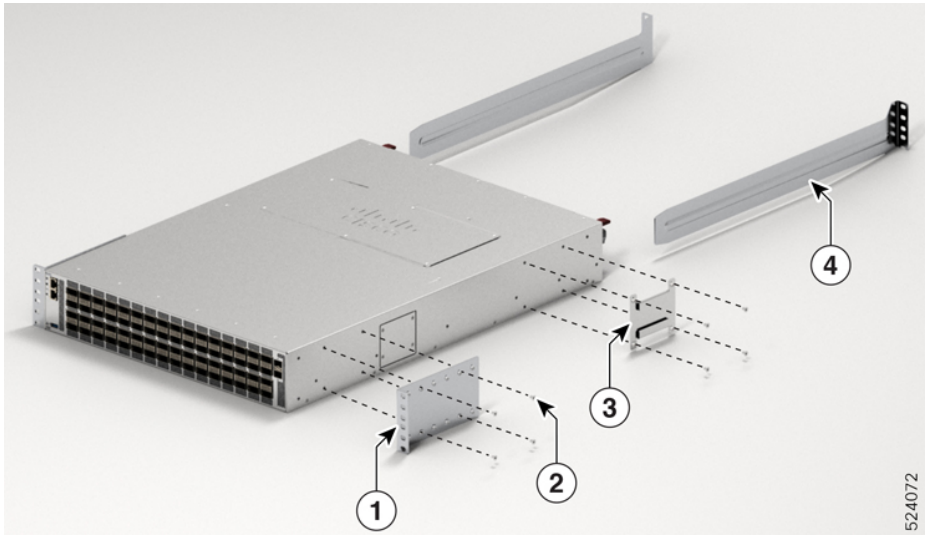
1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails. The orientation of the rail changes depening upon the rail that you select.

Figure 42: Rack-Mount Brackets on Cisco 8111-32EH-O Router—Port-Side Intake



1	Rack-mount brackets	4	Rack-mount guide rails. The orientation of the rail changes depening upon the rail that you select.
2	M4 x 6mm Phillips flat-head screws	5	Grounding plate
3	Rack-mount guide		

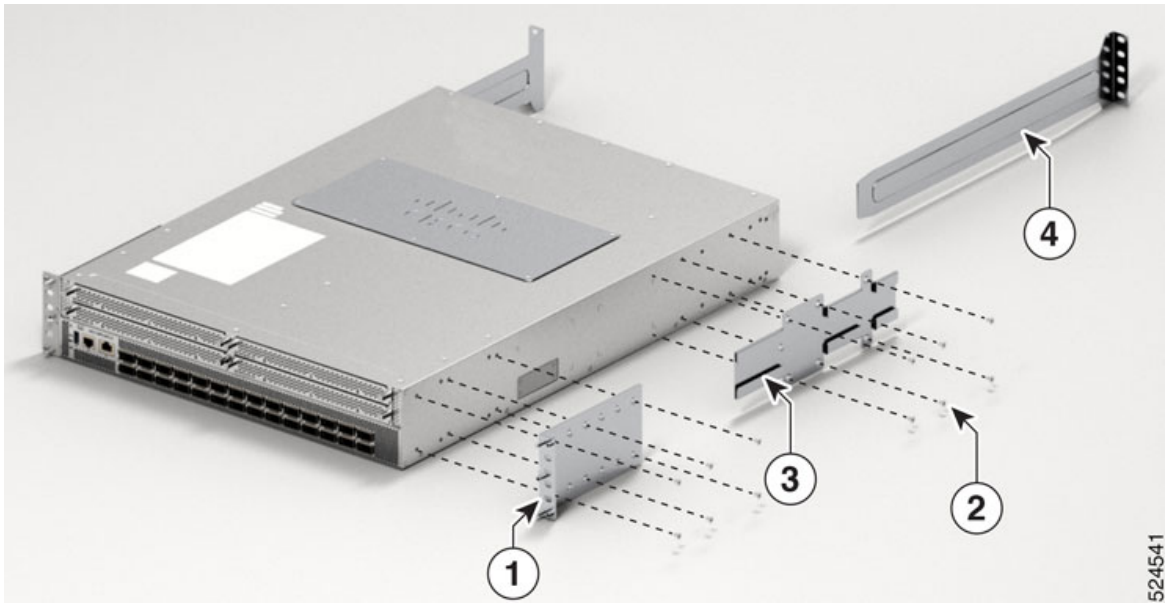
Figure 43: Rack-Mount Brackets on Cisco 8122-64EH-O Router—Port-Side Intake



1	Rack-mount brackets	3	Rack-mount guide

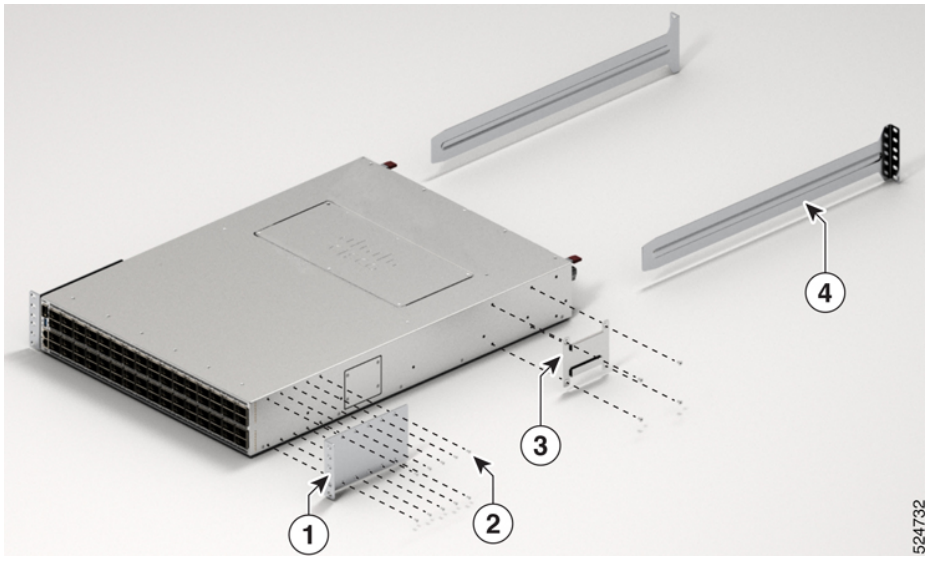
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails

Figure 44: Rack-Mount Brackets on Cisco 8102-28FH-DPU-O —Port-Side Intake



1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails. The orientation of the rail changes depening upon the rail that you select.

Figure 45: Rack-Mount Brackets on Cisco 8122-64EHF-O Router—Port-Side Intake



1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails

c) Repeat Step 1b with the other rack-mount bracket on the other side of the router.

Step 2 Install the two rack-mount guides on the chassis:

a) Position a rack-mount guides on the side of the chassis with its two holes aligned to the two screw holes on the side of the chassis, and use two M4 flat-head screws to attach the guides to the chassis. Tighten the screws to a torque of 13.27 in-lb (1.5 N-m).

b) Repeat with the other rack-mount guides on the other side of the router.

Step 3 Install the guide rails to the rack:

a) Position the guide rails at the desired levels on the back side of the rack and use four 12-24 screws or four 10-32 screws, depending on the rack thread type, to attach the rails to the rack.

Note
For racks with square holes, you may need to position a 12-24 or 10-32 cage nut behind each mounting hole in a guide rail before using a 12-24 or 10-32 screw.

b) Repeat with the other guide rail on the other side of the rack.

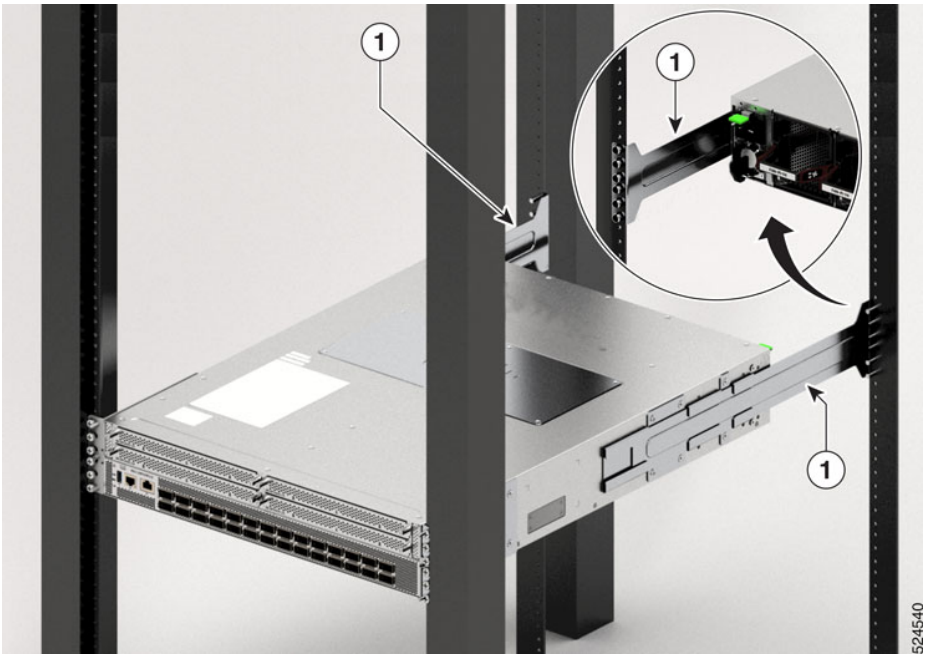
c) Use a tape measure and level to verify that the rails are at the same height and horizontal.

Step 4 Insert the router into the rack and attach:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.

b) Align the two rack-mount guides on either side of the router with the guide rails installed in the rack. Slide the rack-mount guides onto the guide rails, and then gently slide the router all the way into the rack.

Figure 46: Install Cisco 8102-28FH-DPU-O to the rack —Port-Side Intake



1	Rack-mount guide rails.

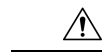
Note
If the router does not slide easily, try realigning the rack-mount guides on the guide rails.

c) Holding the chassis level, insert two screws (12-24 or 10-32, depending on the rack type) through the holes in each of the rack-mount brackets and into the cage nuts or threaded holes in the rack-mounting rail.
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Rack-Mount the Chassis in a 2-Post Rack

This section describes how to install these routers into a cabinet or in a 2-post rack:

- Cisco 8101-32H-O
- Cisco 8111-32EH-O
- Cisco 8122-64EH-O
- Cisco 8102-28FH-DPU-O
- Cisco 8122-64EHF-O



Caution If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

The following table lists the items contained in the rack-mount kit that is provided with the routers.

Table 9: Rack-Mount Kit

Quantity	Part Description
2	Rack-mount brackets
8	M4 x 0.7 x 6-mm Phillips flat-head screws

Procedure

Step 1 Install two rack-mount brackets to the router:

a) Determine which end of the chassis is to be located in the cold aisle:
   - If the router has port-side intake modules (fan modules and power modules with burgundy coloring), position the router so that its optical ports are in the cold aisle, and fans and power modules will be in the hot aisle.
   - If the router has port-side exhaust modules (fan modules and power modules with blue coloring), position the router so that its fan and power supply modules are in the cold aisle and optical ports will be in the hot aisle.

b) With the bracket ears facing toward the center of the chassis, position a front rack-mount bracket on the side of the chassis so that the four holes are aligned to four of the screw holes on the side of the chassis.
c) Use four M4 flat-head screws with 13.25 in-lbs (1.5 N-m) torque value to attach the bracket to the chassis.

Figure 47: Rack-Mount Brackets on Cisco 8101-32H-O Router—Port-Side Intake

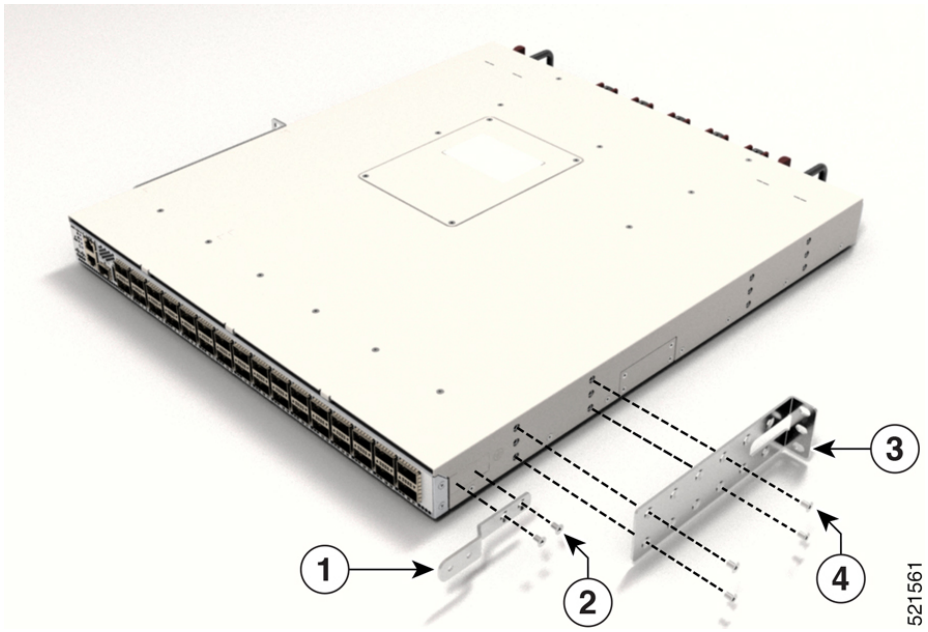
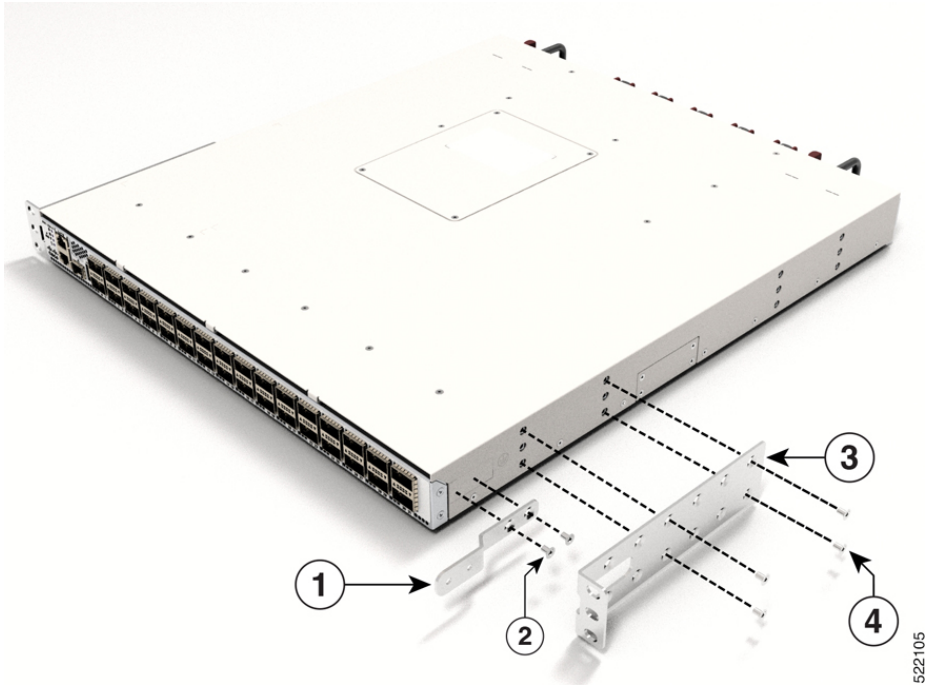
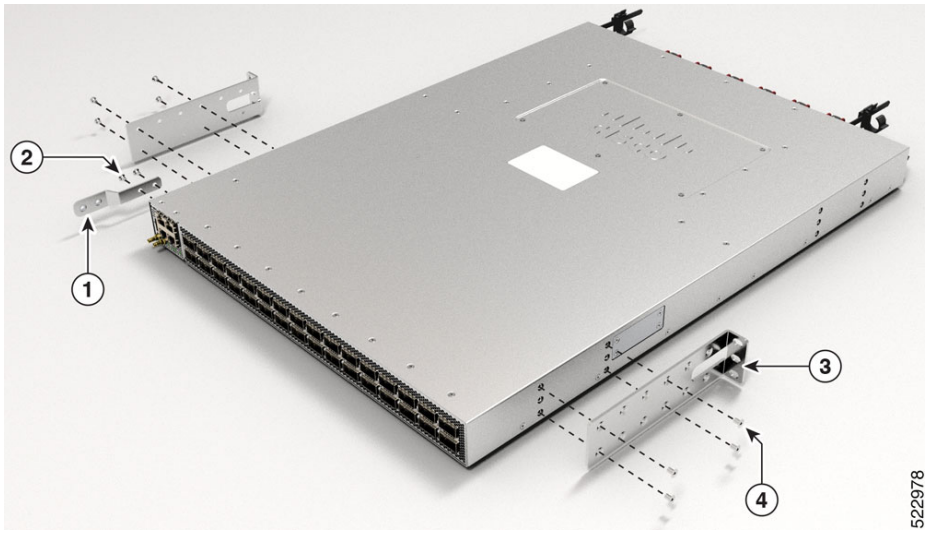


Figure 48: Rack-Mount Brackets on Cisco 8101-32H-O Router—Port-Side Intake



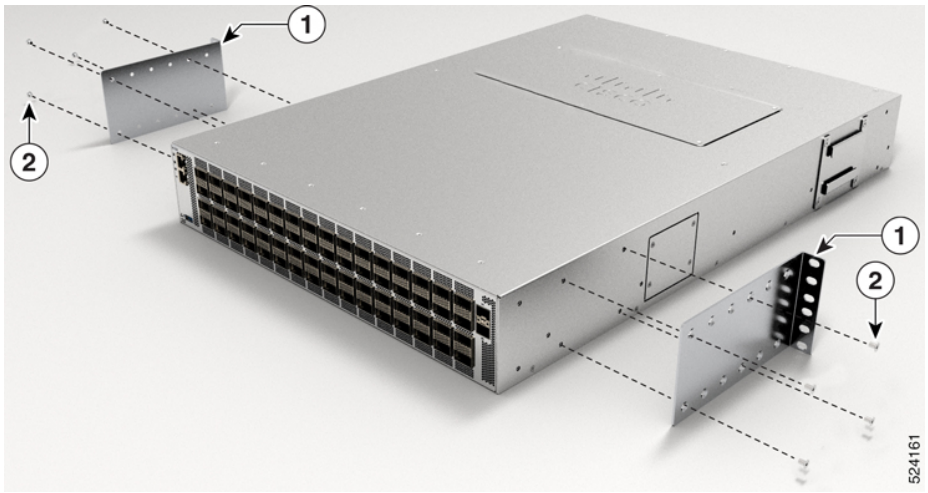
1	Grounding plate	2	M4 x 6-mm Phillips flat-head screws
3	Rack-mount brackets	4	M4 x 6-mm Phillips flat-head screws

Figure 49: Rack-Mount Brackets on Cisco 8111-32EH-O Router—Port-Side Intake



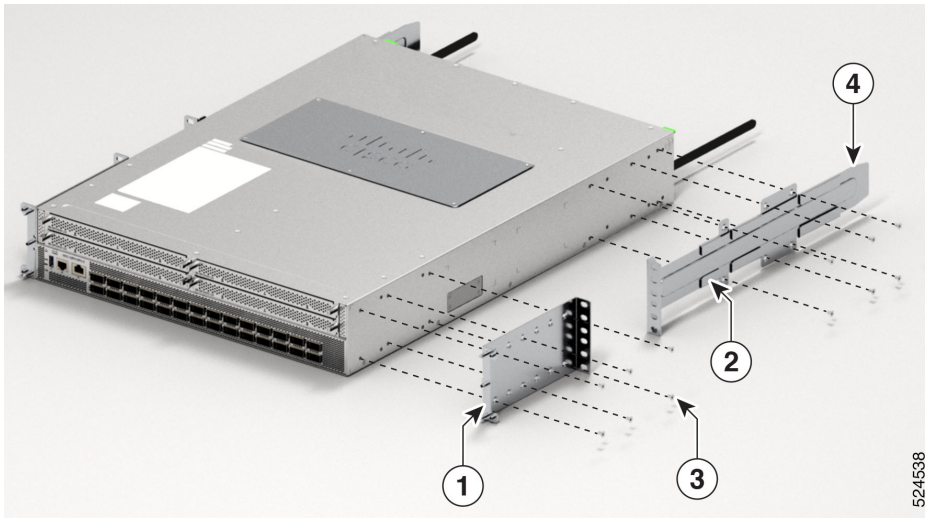
1	Grounding plate	2	M4 x 6-mm Phillips flat-head screws
3	Rack-mount brackets	4	M4 x 6-mm Phillips flat-head screws

Figure 50: Rack-Mount Brackets on Cisco 8122-64EH-O Router—Port-Side Intake



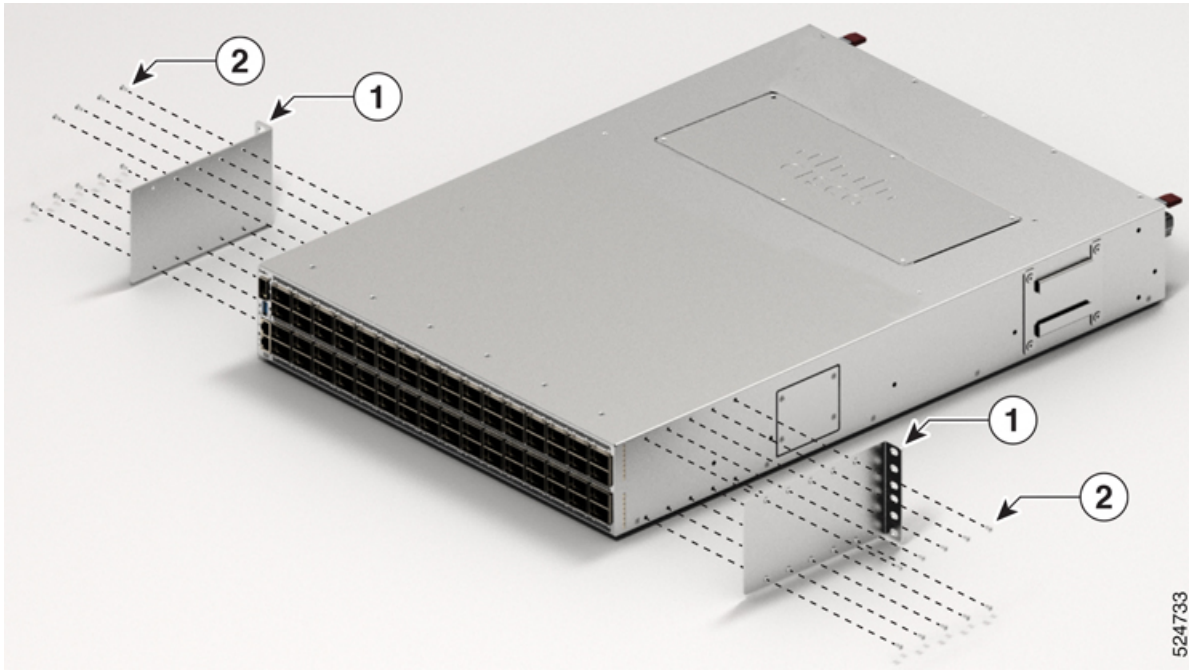
1	Grounding plate	2	M4 x 6-mm Phillips flat-head screws

Figure 51: Rack-Mount Brackets on Cisco 8102-28FH-DPU-O —Port-Side Intake



1	Rack-mount bracket	3	M4 x 6-mm Phillips flat-head screws
2	Slider fixed in rack-mount bracket	4	Rail slider

Figure 52: Rack-Mount Brackets on Cisco 8122-64EHF-O Router—Port-Side Intake



1	Grounding plate	2	• Nine M4 x 6-mm Phillips flat-head screws on the left side • Ten M4 x 6-mm Phillips flat-head screws on the right side

d) Repeat Steps 1b and 1c with the other rack-mount bracket on the other side of the router.

Step 2 Install the router onto the 2-post rack:

a) With the assistance of another person, lift the router into position between the two rack posts.

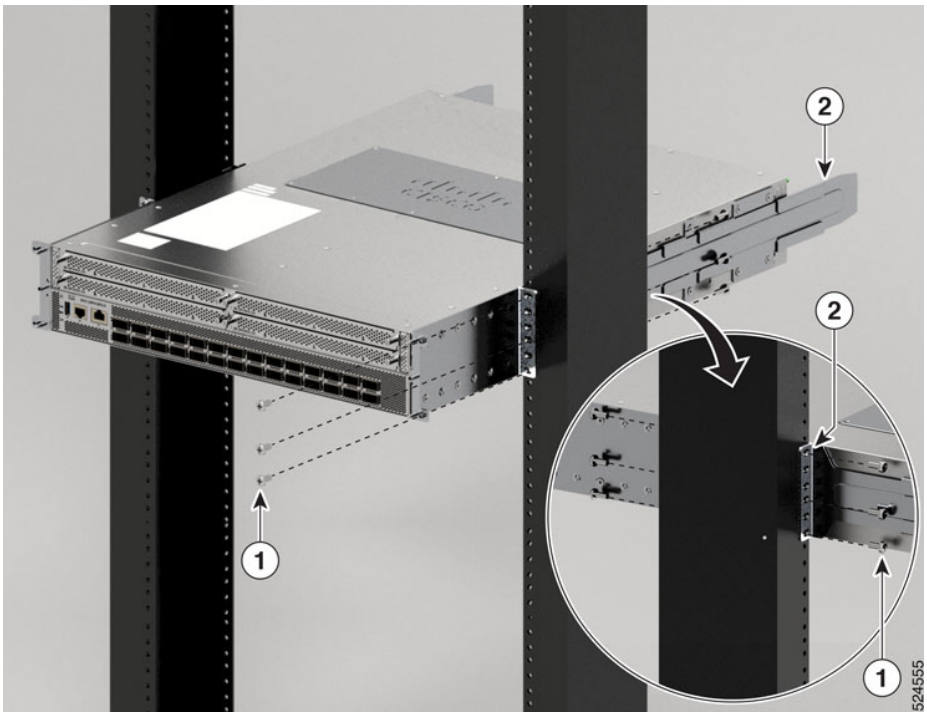
b) Move the router until the rack-mount brackets come in contact with two rack posts.

c) Hold the chassis at a level position while the second person inserts two screws (12-24 or 10-32, depending on the rack type) in each of the two rack-mount brackets (a total of four screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.

For Cisco 8102-28FH-DPU-O chassis:

1. Hold the chassis at a level position while the second person inserts three screws (12-24 or 10-32, depending on the rack type) in each of the two front rack-mount brackets (a total of six screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
2. Attach the rear rack mount bracket and rail slider on both sides of the chassis You must first slide the rail into rear rack mount and then fix them in the assembled condition to the chassis.
3. Insert the two screws (12-24 or 10-32, depending on the rack type) in each of the two rear rack-mount brackets (a total of four screws) and into the cage nuts or threaded holes in the vertical rack mounting rails.

Figure 53: Cisco 8102-28FH-DPU-O



1	M4 x 6-mm Phillips flat-head screws	2	Slider fixed in rack-mount bracket

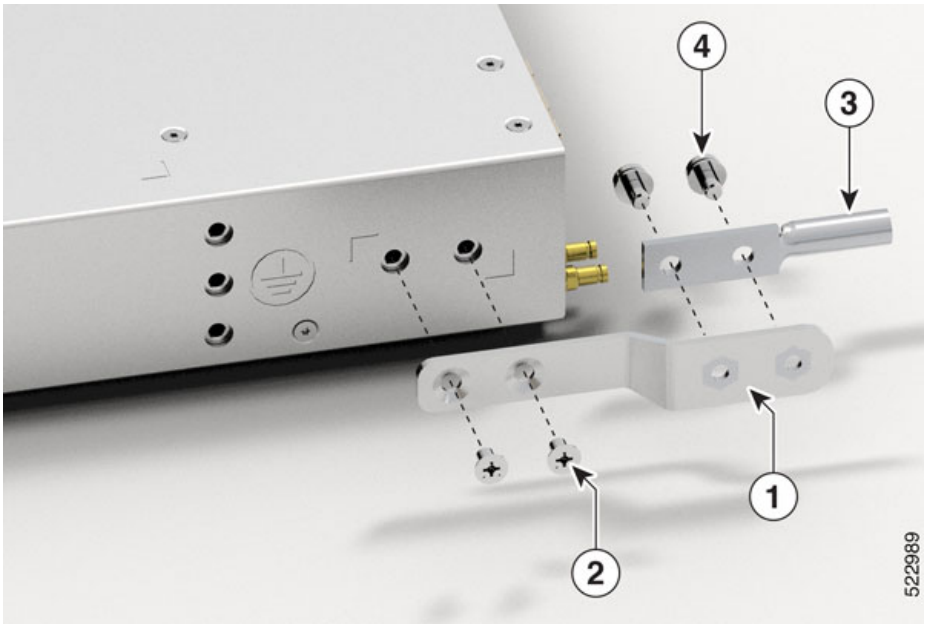
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Rack-Mount the Cisco 8111-32EH-O Router in a 4-Post Guide Rail

Note The 4-post guide rail is designed only for a 19-inch, Electronic Industries Alliance (EIA) rack with square-hole vertical rails.

1. Install the ground lug to the chassis.

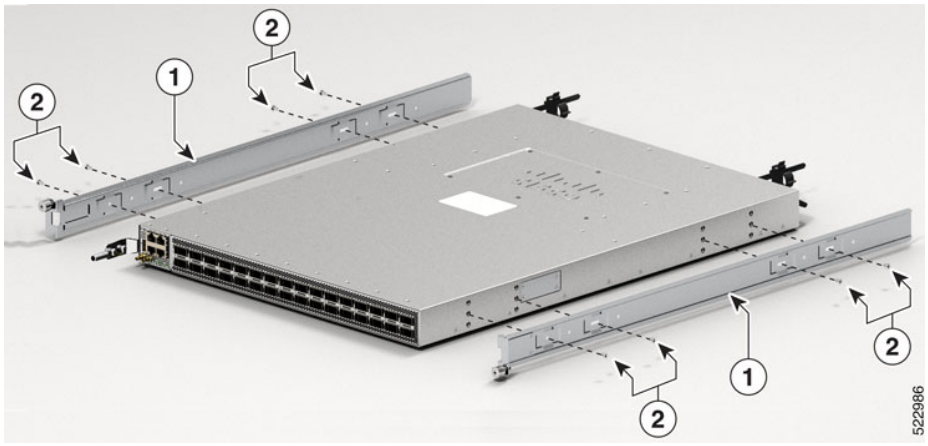
Figure 54: Install the Ground Lug



1	Grounding plate	3	Ground lug
2	M4 x 6-mm Phillips flat-head screws	4	Captive screws

2. Install the side brackets on the left-side and right-side of the chassis.

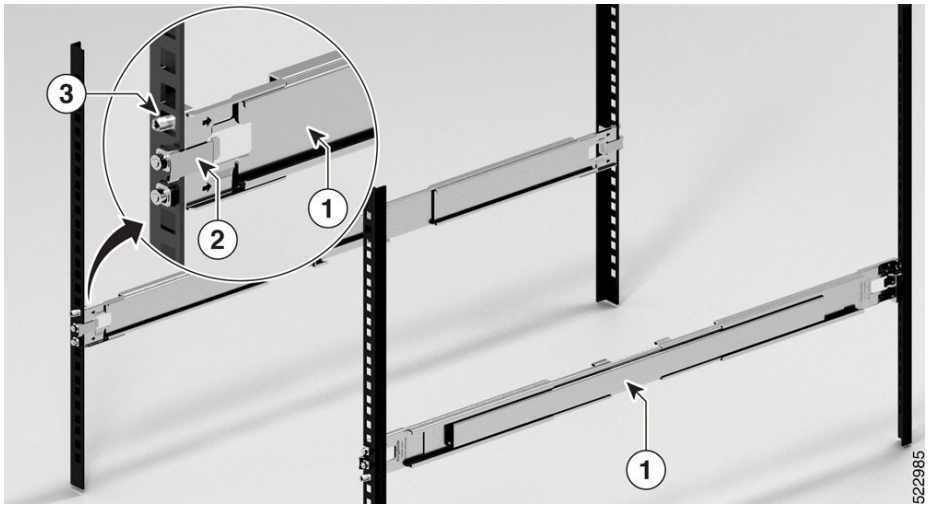
Figure 55: Install Side Brackets to the Chassis



1	Side brackets	2	M4 x 6-mm Phillips flat-head screws

3. Secure the slide rails to each side of the square-hole vertical rails by using the latch.

Figure 56: Secure Slide Rails with the Latch

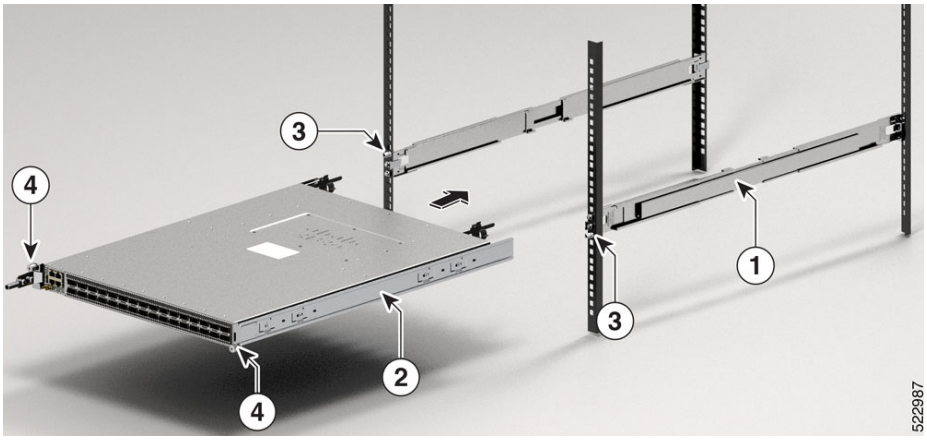


1	Slide rails	2	Latch
3	Thread for captive screws		

Note The two slide rails are identical and can be installed to either left or right vertical rails in any orientation.

4. Slide the chassis into the mounted rack.

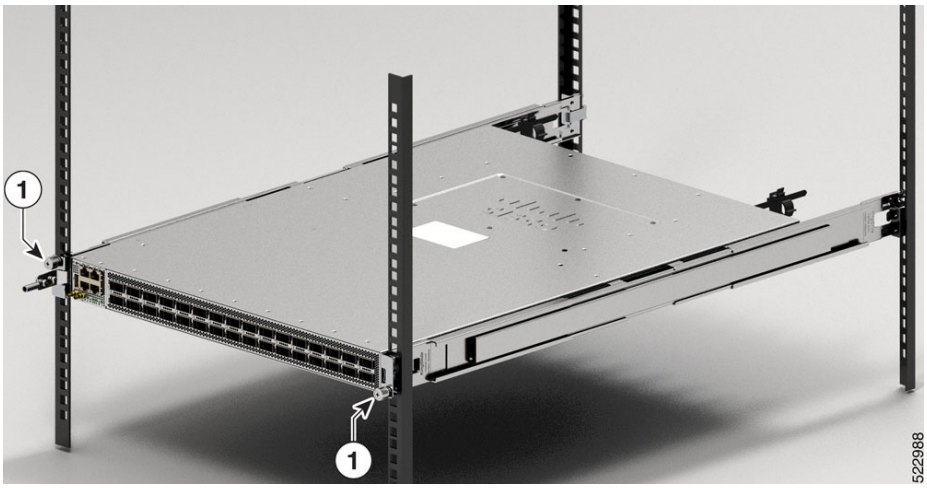
Figure 57: Slide Chassis into the Rack



1	Slide rails	2	Chassis with side brackets
3	Thread for captive screws	4	Captive screws

5. Tighten captive screws on front bracket (on each side) to secure chassis to the rack. Tighten the screws to a torque value of 14 in-lbs (1.58 N-m).

Figure 58: Tighten Captive Screws on the Front of the Chassis



1	Captive screws

Installing a Cable Management Bracket

This procedure is applicable to these routers:

- Cisco 8122-64EH-O
- Cisco 8122-64EHF-O

Note The cable management brackets for Cisco 8122-64EH-O chassis supports only optics cables.

To install a cable-management bracket, follow these steps:

Procedure

Step 1 Attach an ESD-preventive wrist or ankle strap and follow its instructions for use.

Step 2 Align the cable-management bracket with the two alignment pins on the rack-mount bracket.

Figure 59: Cable-Management Bracket Installation and Removal on Cisco 8122-64EH-O Router

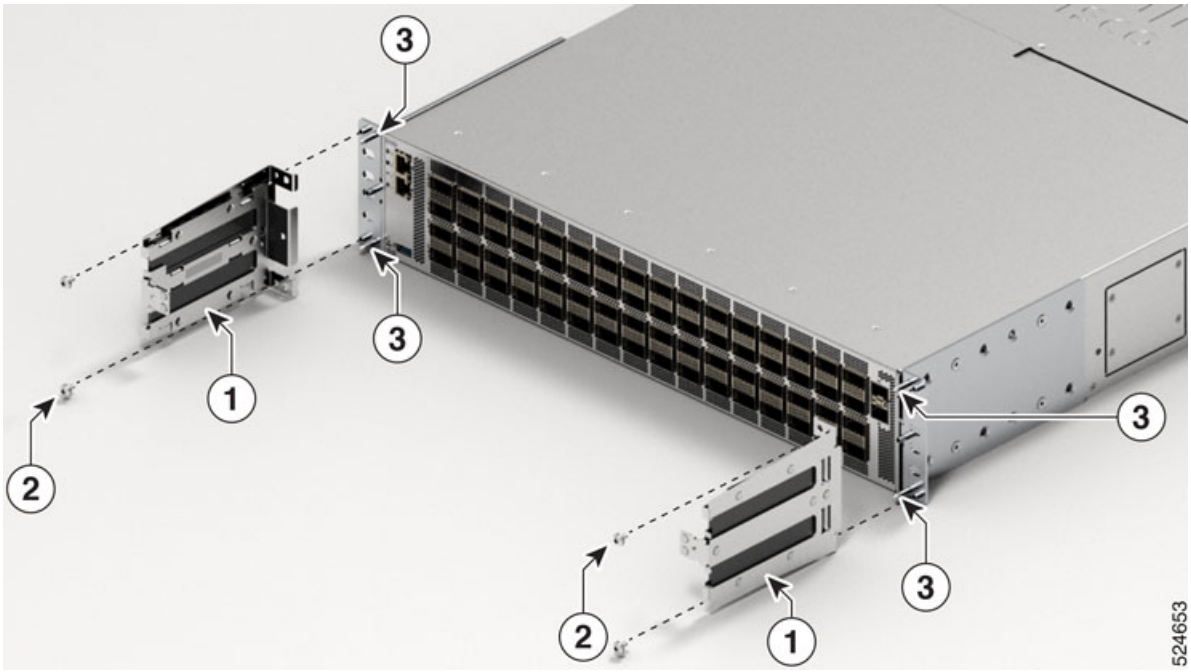
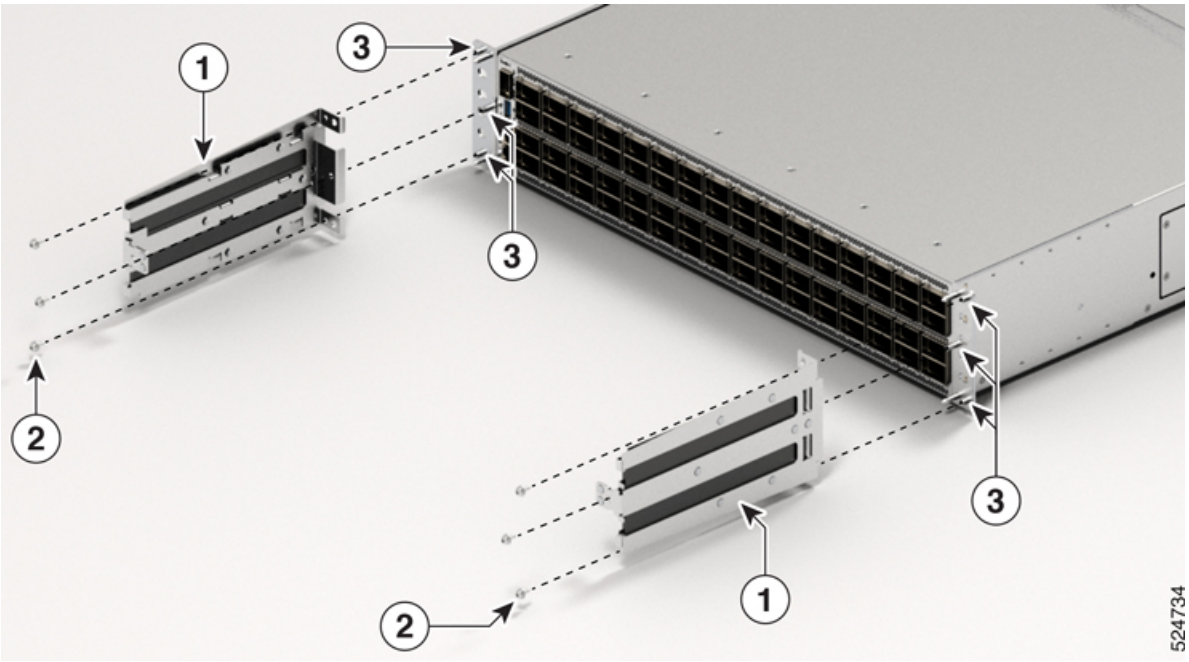


Figure 60: Cable-Management Bracket Installation and Removal on Cisco 8122-64EHF-O Router



1	Cable-Management Bracket	2	Securing Screws - M3 x 8mm pan-head screws
3	Alignment Pins		

Step 3 Secure the cable management bracket with the screws provided in the cable management kit.

Step 4 Connect all the cables to the intended ports and pass them through the cable management bracket in an organized manner.

Ground the Chassis

Warning **Statement 1101—**Connected To Grounded Outlet

In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

Note Statement 1101 is applicable to AC unit only.

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, 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.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Caution Grounding the chassis is required, even if the rack is already grounded. A grounding pad with two threaded holes is provided on the chassis for attaching either a grounding lug or a grounding plate used to attach the ground lug to the chassis. The ground lug must be NRTL-listed. In addition, a copper conductor (wires) must be used and the copper conductor must comply with NEC code for ampacity.

Caution When terminating the frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick connect connectors, or other friction-fit connectors.

Procedure

Step 1 Use a wire-stripping tool to remove approximately 0.75 inches (19 mm) of the covering from the end of the #6 AWG grounding cable.

Step 2 Insert the stripped end of the grounding cable into the open end of the grounding lug.

Step 3 Use the crimping tool to secure the grounding cable (#6 AWG cable) in the grounding lug.

Step 4 (Only Cisco 8102-28FH-DPU-O) Attach the grounding plate (L-bracket) to the rear of the chassis. Use two M3 x 6mm Phillips flat-head screws to fasten, applying a torque between 5 and 6.8 in-lbs (0.56 N-m to 0.76 N-m).

Step 5 Attach the ground cable:

Position the grounding lug against the grounding plate or the grounding point on the chassis to ensure solid metal-to-metal contact. Insert the provided screws through the holes in the grounding lug and into the grounding plate or grounding point.

Figure 61: Cisco 8102-64H-O Router Ground Lug

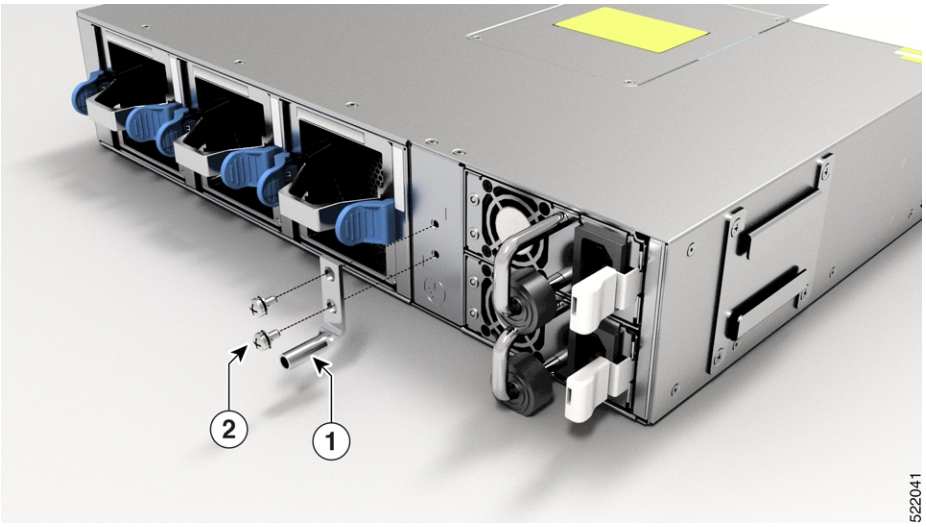


Figure 62: Cisco 8101-32H-O Ground Lug

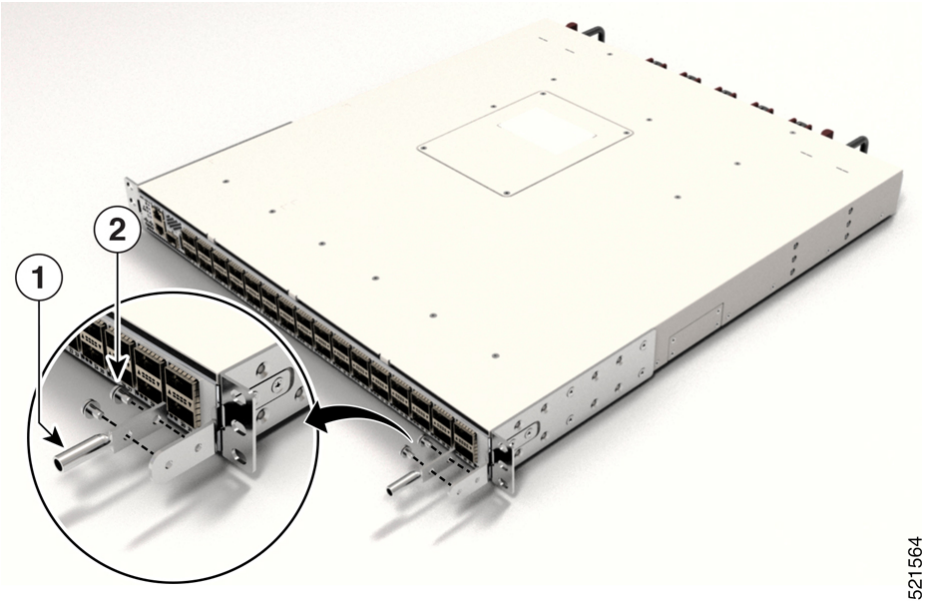


Figure 63: Cisco 8111-32EH-O Ground Lug

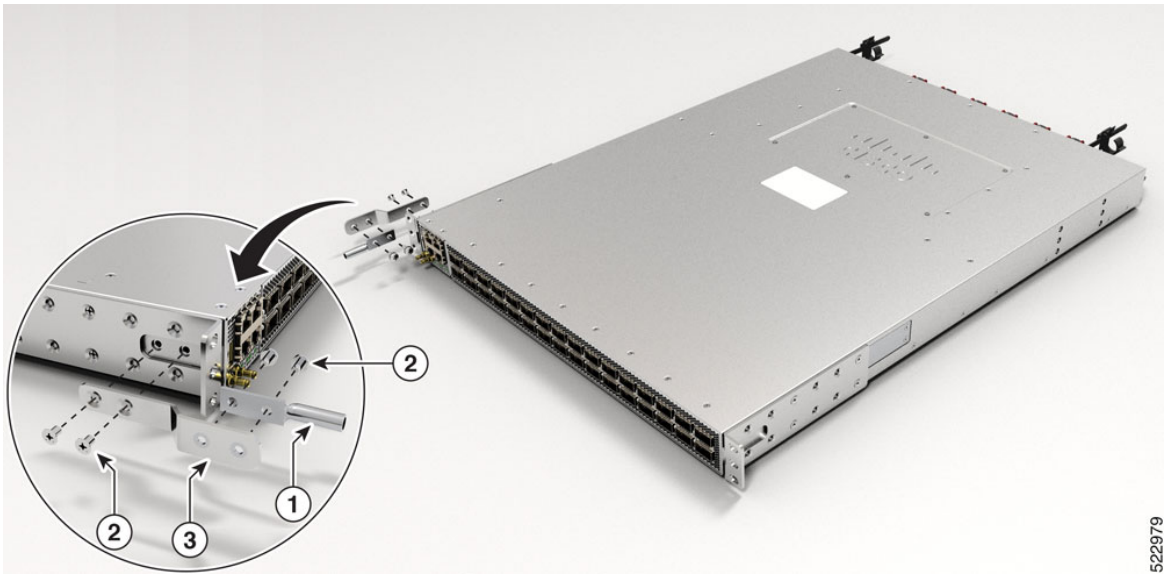
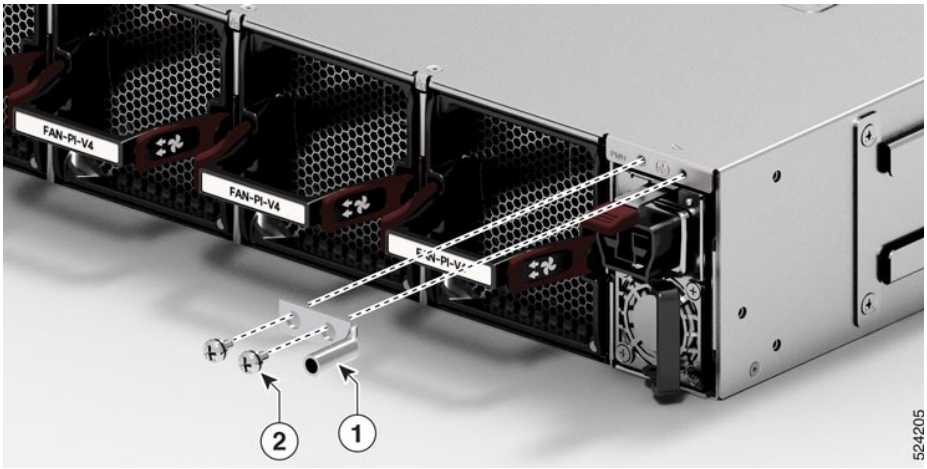


Figure 64: Cisco 8122-64EH-O Ground Lug



1	Grounding lug	2	M4 x 6mm pan-head screws
3	Grounding plate		

Figure 65: Cisco 8102-28FH-DPU-O Ground Lug

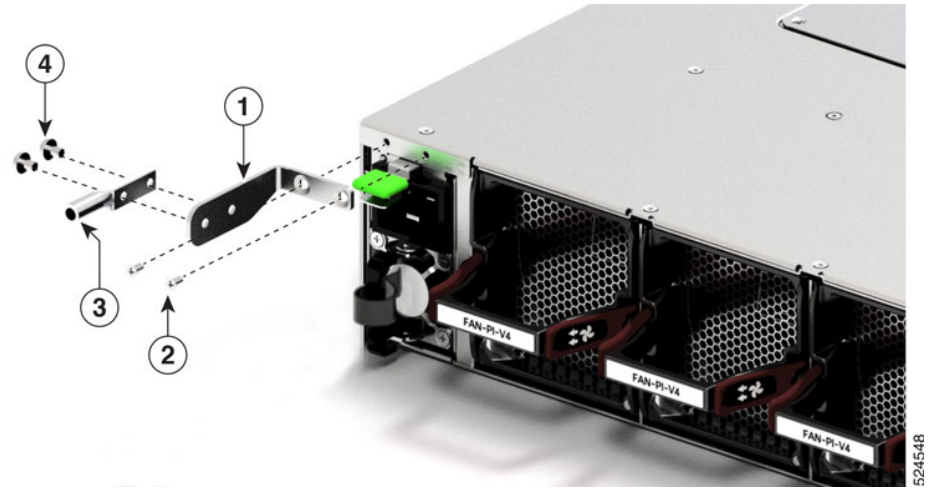
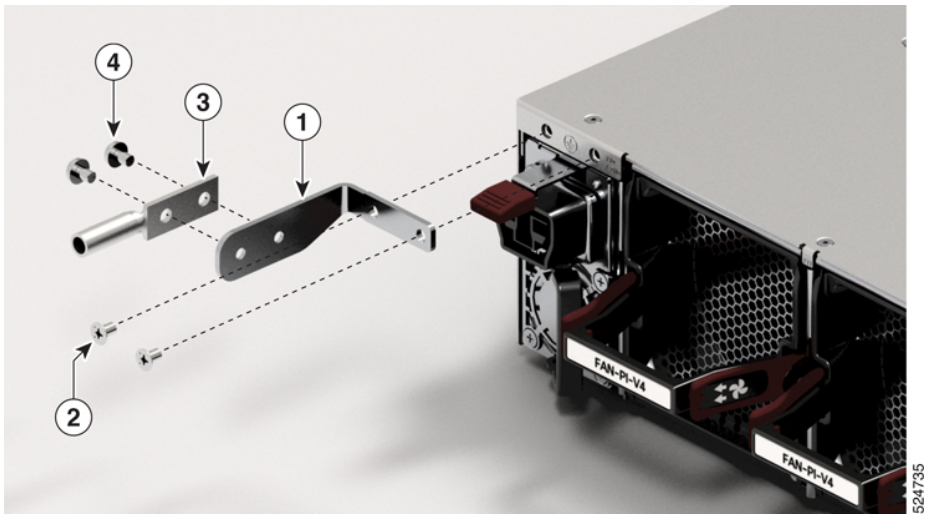


Figure 66: Cisco 8122-64EHF-O Ground Lug



1	Grounding plate (L Bracket)	2	M3 x 6mm flat-head screws
3	Grounding lug	4	M4 x 6mm pan-head screws

Step 6 Tighten the Phillips pan-head screws to torque value of 13.25 in-lbs (1.5 N-m).

Step 7 Ensure that the lug and cable do not interfere with other equipment.

Step 8 Prepare the other end of the grounding cable, and connect it to an appropriate grounding point in your site to ensure adequate earth ground.

Power Connection Guidelines

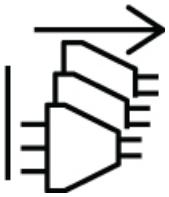
Warning **Statement 1091—**Installation by an Instructed Person

Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person.

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning **Statement 1005—**Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than:

- 20 A (North America) and 16 A (Europe) circuit breaker for an AC-input power supply module.
- 83 A DC-rated circuit breaker for each input of a DC-input power supply module, for safety purposes - irrespective of whether the inputs are power from a single or separate DC sources.

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1003—**DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC power before removing or replacing components or performing upgrades.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, 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.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

For DC power supply units:

- All power connection wiring should conform to the rules and regulations prescribed by the National Electrical Code (NEC), as well as local codes, if any.
- The DC return must remain isolated from the system frame and the chassis (DC-I).

  The color coding of the source DC power cable leads depends on the color coding of the site DC power source. Typically, green or green and yellow stripes indicate that the cable is a ground cable. Since there is no color code standard for source DC wiring, you must ensure that the power cables are connected to the DC-input power supply terminal block in the proper + and - polarity.

  In some cases, the source DC cable leads might have a positive (+) or a negative (–) label. This label is a relatively safe indication of polarity, but you must verify the polarity by measuring the voltage between the DC cable leads. When measuring, ensure that the positive lead and the negative lead always match the "+" and "-" labels on the DC-input power supply terminal block, respectively.
- DC power cables use the M-CRPS connector at the power supply end.
- The circuit must be protected by a dedicated two-pole DC-rated circuit breaker.

  The circuit breaker is considered to be the disconnect device and must be easily accessible. For DC-input power supply units with multiple inputs, each DC input must be protected by a dedicated DC-rated circuit breaker or a fuse.

The circuit breaker or fuse should be sized according to the power supply input rating and local or national code requirements.

- If the DC inputs are powered from separate sources, the cables must be wired straight across to their respective sources and terminals.

  Crossed cables in a setup where the DC source has floating outputs means that no damage will occur, but the LEDs will not light up, and the module will not operate.

  Crossed cables in a setup with a positive ground or a negative ground power system constitute a severe safety hazard that includes causing electric shock and generating excessive EMI and RFI.

Power Supply Restrictions and Considerations

Observe the following guidelines and limitations:

- Use one type of power supply in a router.
- The power supply type that is used in the router depends on the type and configuration of the transceivers installed in it.
- Do not install a mix of AC and DC power supplies in a router.
- The airflow direction must be the same for all power supply and fan modules in the router.
- The system requires two power supply units for redundancy.

Power Supply Unit Input and Output Ranges

Table 10: Electrical Ratings at Low Line, High Line, Low Voltage, and High Voltage Applications

AC, DC, and HVPI Power Supply Unit PIDs	Supported Routers	Input Voltage	Input Current (Max)	Input Frequency	Output Power
PSU650W-ACPI PSU650W-ACPE	Cisco 8102-64H-O Cisco 8101-32H-O	100-240V	7.6 – 3.65A	50-60Hz	650W (at 100-240V)
PSU2KW-ACPI	Cisco 8101-32FH-O Cisco 8111-32EH-O	100-127V AC 200-240V AC	12A	50-60Hz	1000W (at 100-127V) 2000W (at 200-240V)
PSU2KW-HVPI For AC high line applications	Cisco 8101-32FH-O	200V-277V AC	12A	50-60Hz	2000W (at 200V-277V)
PSU2KW-HVPI For AC low line applications	Cisco 8101-32FH-O	100V - 120V AC	12A	50-60Hz	1000W (at 100V - 120V)

AC, DC, and HVPI Power Supply Unit PIDs	Supported Routers	Input Voltage	Input Current (Max)	Input Frequency	Output Power
PSU2KW-HVPI For HVDC applications	Cisco 8101-32FH-O	240V - 380V DC	12A	NA	2000W (at 240V - 380V DC)
PSU3KW-HVPI	Cisco 8111-32EH-O Cisco 8122-64EH-O Cisco 8122-64EHF-O	100V - 120V AC 200V - 277V AC	16A 16A	50-60Hz	1500W (at 100V - 120V) 3000W (at 200V - 277V)
PSU3KW-HVPI For HVDC applications	Cisco 8111-32EH-O Cisco 8122-64EH-O Cisco 8122-64EHF-O	240V - 380V DC	14A	NA	3000W
PSU930W-DCPI PSU930W-DCPE	Cisco 8102-64H-O Cisco 8101-32FH-O Cisco 8101-32H-O	-48 to -60V DC	23A – 18A	NA	930W
PSU2KW-DCPI	Cisco 8111-32EH-O	-40 to -72V DC	55A	NA	2000W
UCSC-PSU1-2300W	Cisco 8102-28FH-DPU-O	100-120V 200-240V	14A (at 100-120V) 13A (at 200-240V)	50-60Hz	1200W (at 100-120V) 2300W (at 200-240V)

Connect AC Power to the Chassis

Caution The chassis relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and national electrical codes.

Note We recommend that you occupy both the power supply slots of the fixed port routers with power supplies. In case a power module fails, it is recommended to retain the failed power module in its slot until it is replaced with a new power module. This recommendation ensures that the system airflow is not impacted adversely, which may then result in the overheating of the router and its components.

Procedure

Step 1 Verify that the AC cable is installed in the correct AC source and outlet type.

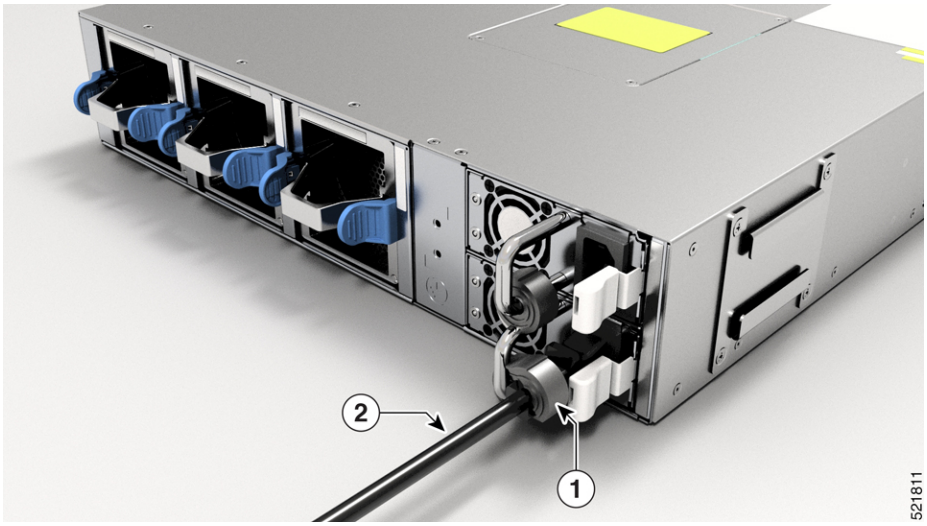
Step 2 Attach the AC power cable to the AC input of the AC Power module.

Step 3 Place the cable through the opening in the cable clamp or cable retainer.

Step 4 Slide the cable clamp or the cable retainer toward the plug.

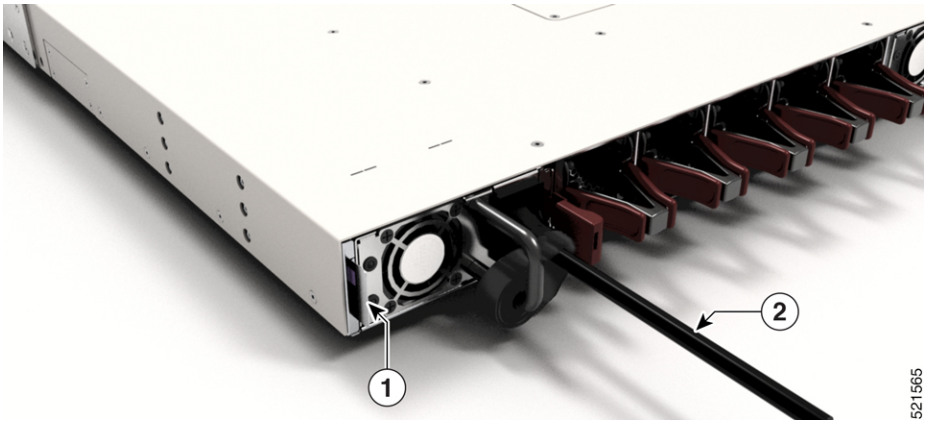
Step 5 Close the cable clamp or cable retainer on the shoulder of the power cable to secure the power cable.

Figure 67: Connecting AC Power - Cisco 8102-64H-O



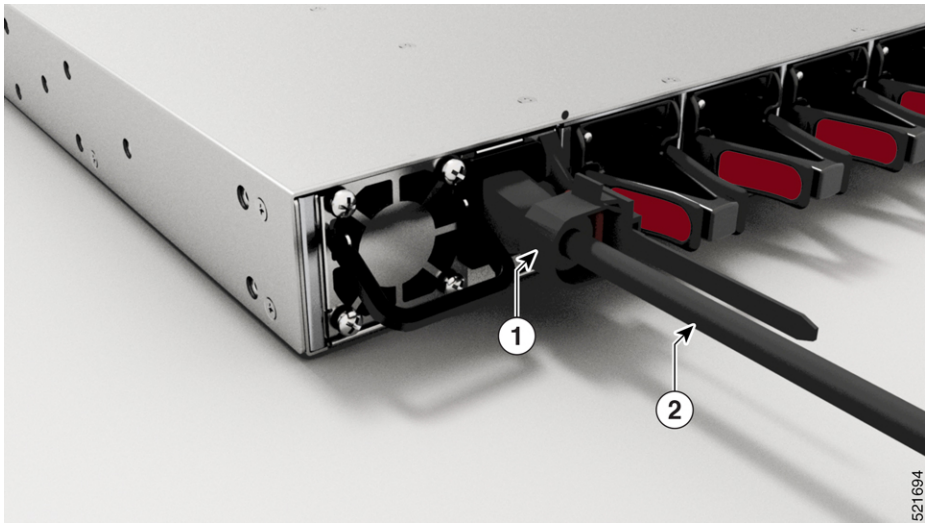
1	Cable retainer	2	AC power cable

Figure 68: Connecting AC Power - Cisco 8101-32H-O



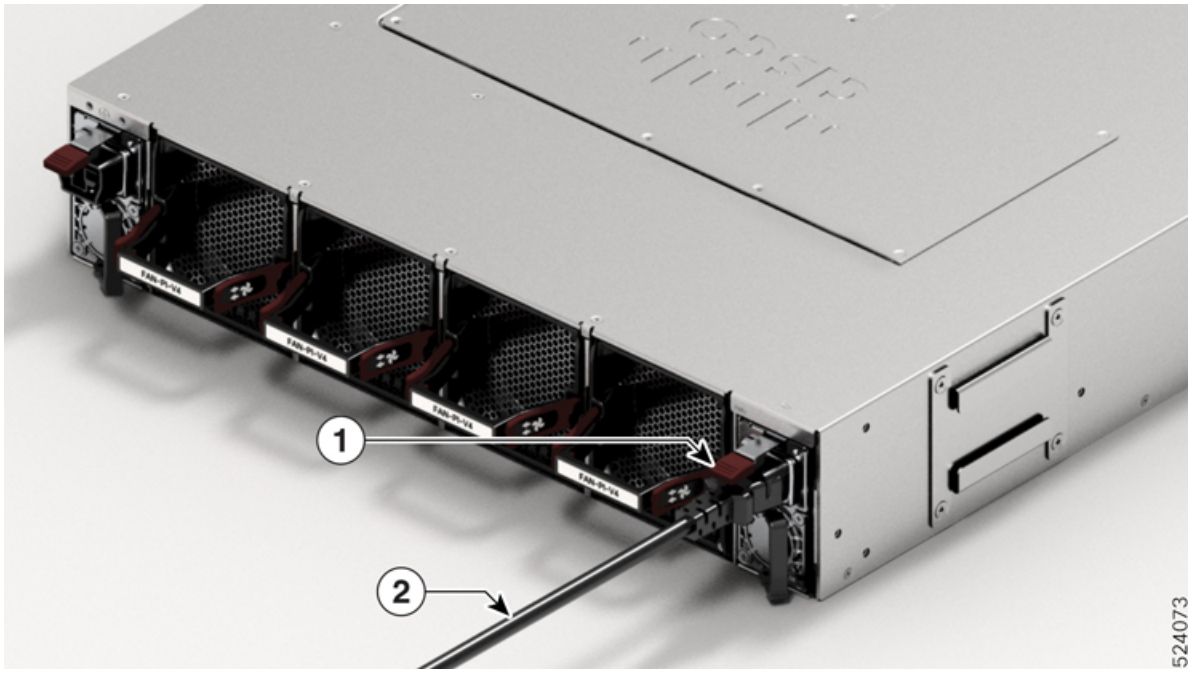
1	Tab	2	AC power cable

Figure 69: Connecting AC Power - Cisco 8111-32EH-O



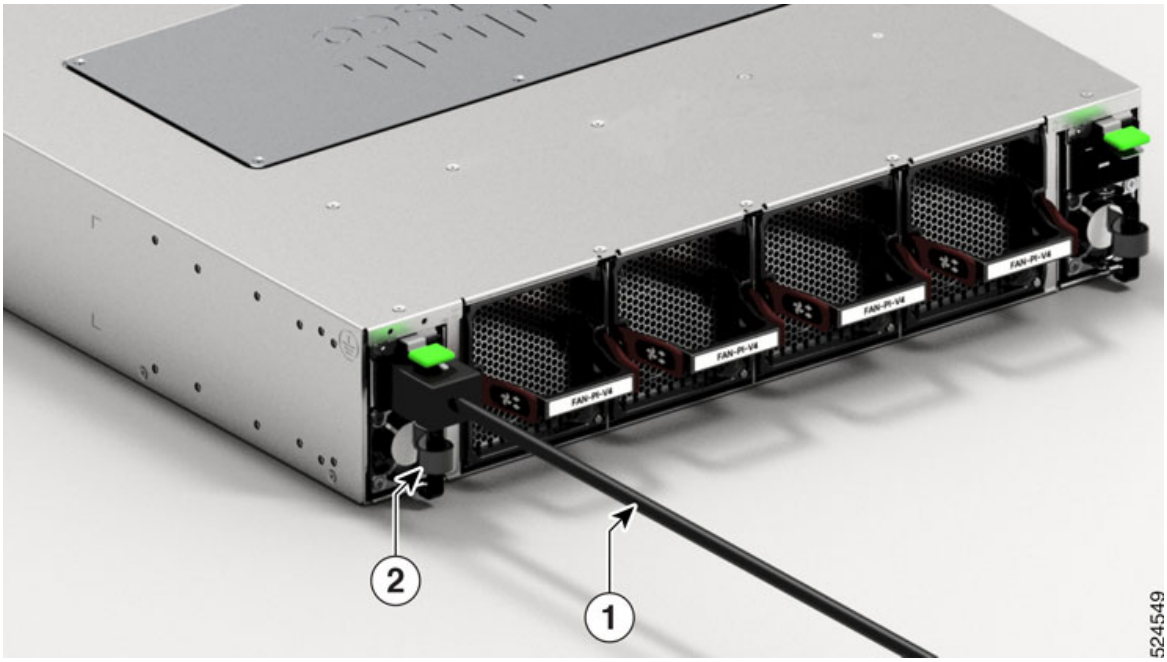
1	Cable clamp	2	AC power cable

Figure 70: Connecting AC Power - Cisco 8122-64EH-O



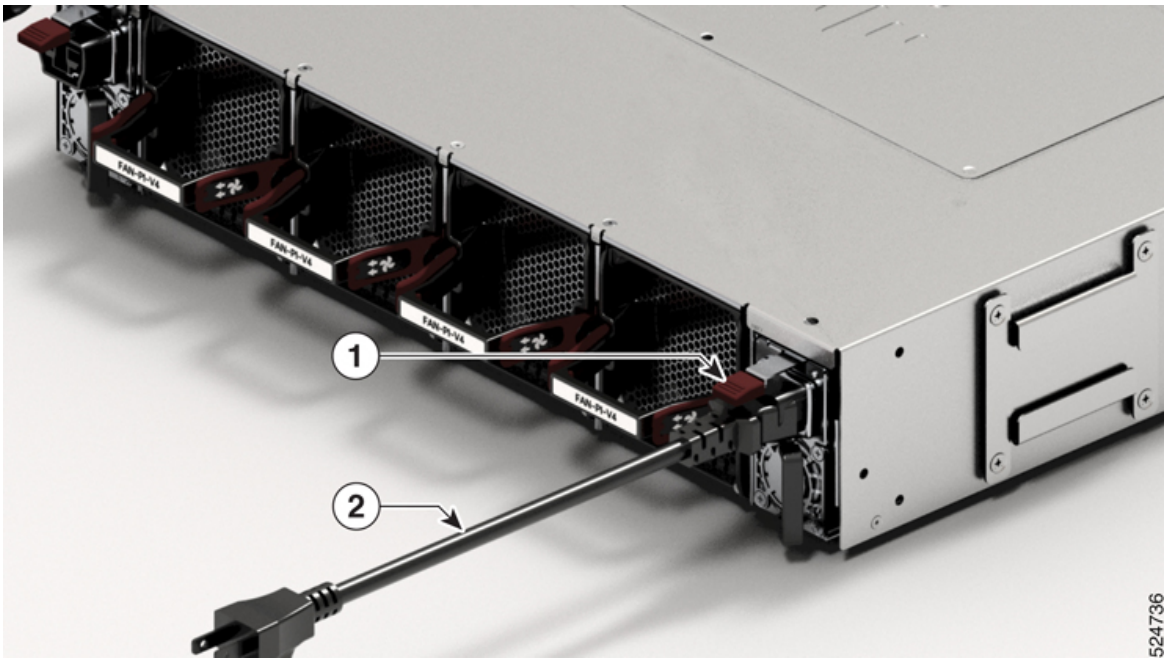
1	Tab	2	AC power cable

Figure 71: Connecting AC Power - Cisco 8102-28FH-DPU-O



1	AC power cable	2	Cable retainer

Figure 72: Connecting AC Power - Cisco 8122-64EHF-O



1	Tab	2	AC power cable

Note

These routers are designed to boot up in less than 30 minutes, provided the neighboring devices are in full operational state.

Connect DC Power to the Chassis

Caution The chassis relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and national electrical codes.

Note We recommend that you occupy both the power supply slots of the fixed port routers with power supplies. In case a power module fails, it is recommended to retain the failed power module in its slot until it is replaced with a new power module. This recommendation ensures that the system airflow is not impacted adversely, which may then result in the overheating of the router and its components.

Procedure

Step 1 Verify that the correct fuse panel is installed in the top mounting space.

Step 2 Ensure that the DC circuit is powered down (either breaker turned off or fuse pulled) and proper lockout tag out procedures are followed. Use the cable supplied with the power supply. You can purchase power supply cord separately from Cisco.

Step 3 Dress the power according to local practice.

Note
For a 2KW DC PSU, use the cable (PID: PWR-2KW-DC-CBL) supplied with the power supply. You can purchase power supply cord separately from Cisco.

Step 4 Connect the office battery and return cables according to the fuse panel engineering specifications.

Step 5 In case of PSU2KW-DCPI, PSU930W-DCPI/DCPE PSU, insert the DC connector into the DC receptacle on the power supply.

Figure 73: Connecting DC Power - Cisco 8102-64H-O

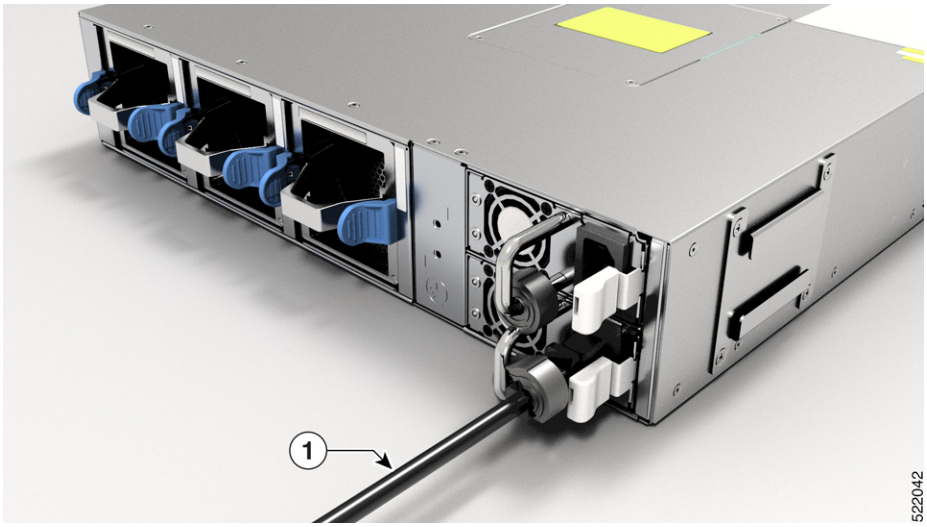


Figure 74: Connecting DC Power - Cisco 8111-32EH-O

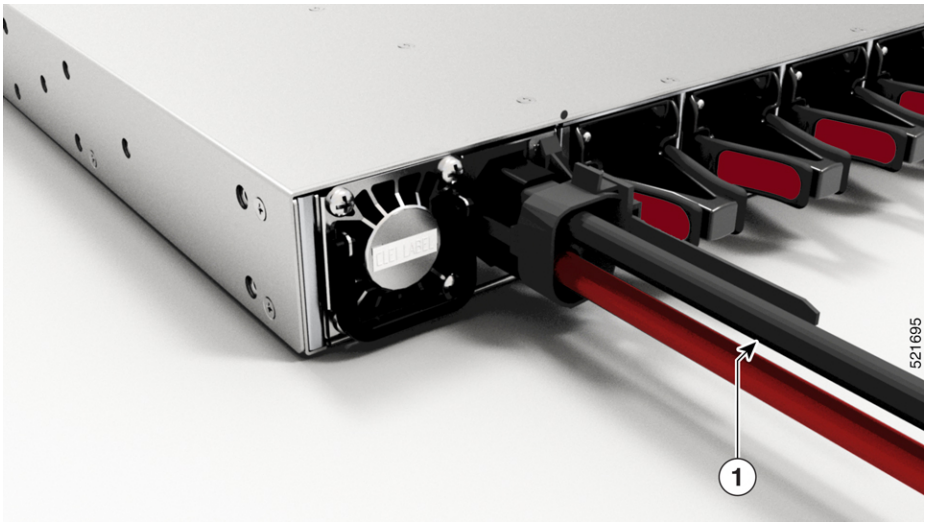
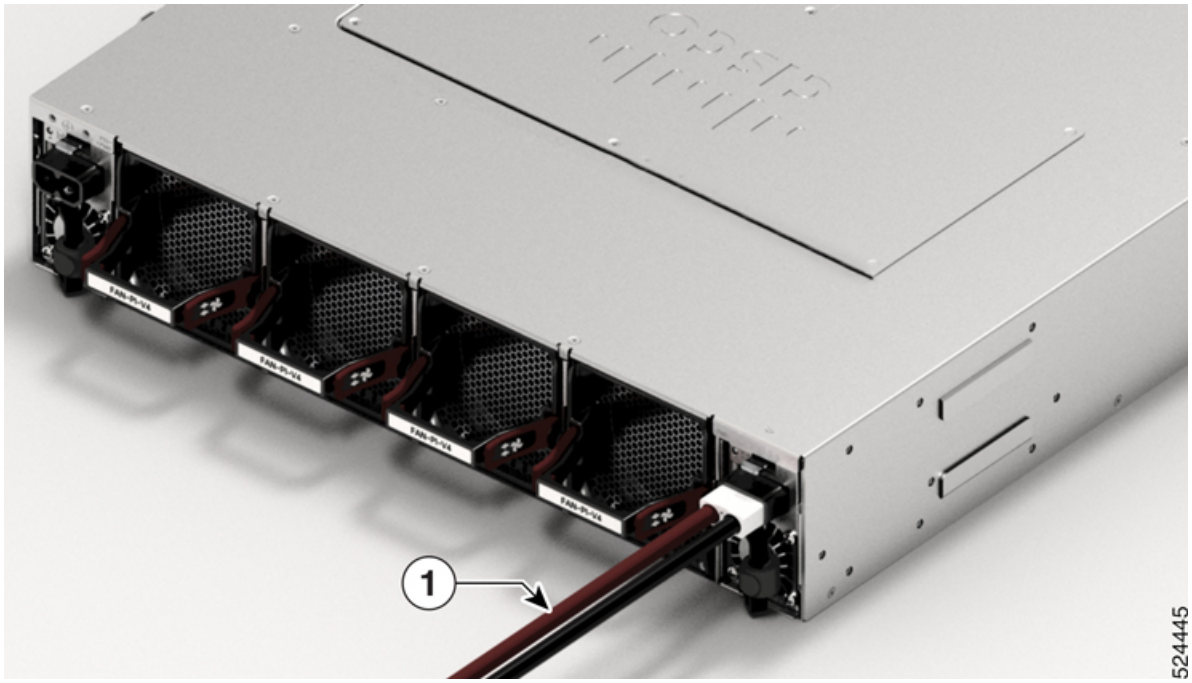
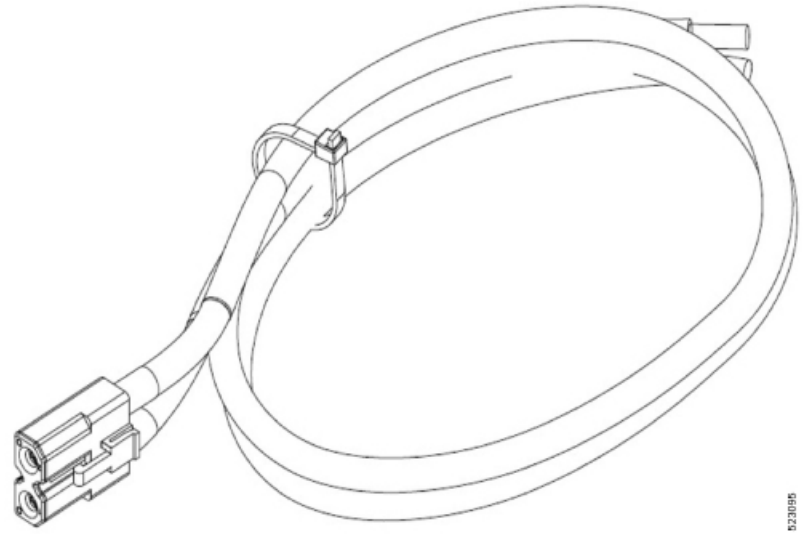


Figure 75: Connecting DC Power - Cisco 8122-64EH-O



1	DC power cable

Figure 76: DC Power Cable - PWR-2KW-DC-CBL



Note
Ensure that the locking mechanism has engaged to secure the cable.

Step 6 Turn on the circuit breaker at the power source.

Note

These routers are designed to boot up in less than 30 minutes, provided the neighboring devices are in full operational state.

Connect High Voltage Power Supply Unit to Power Source

The high voltage PSU (PSU2KW-HVPI or PSU3KW-HVPI) accepts AC, HVAC, or HVDC input power. The HVPI power supply has Anderson power connector for Saf-D-Grid T-latch power cord that can be used for AC, HVAC, or HVDC power.

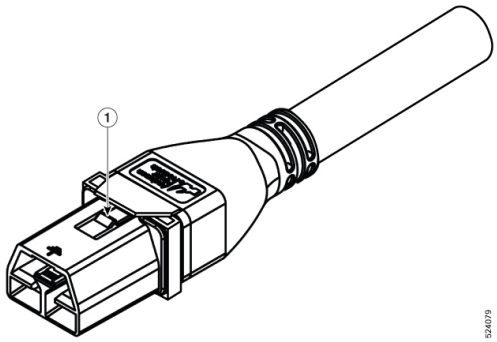
Procedure

Step 1 Choose your power source (AC, HVAC, or HVDC) and use the Saf-D-Grid T-latch power cord to connect to the PSU.

For power cord details, see Table 13: High-Voltage Input Power Cord Options for Cisco 8100 Series Router, on page 72.

Note
To remove the Saf-D-Grid power cord from the power supply, press the latch before pulling the power cord out.

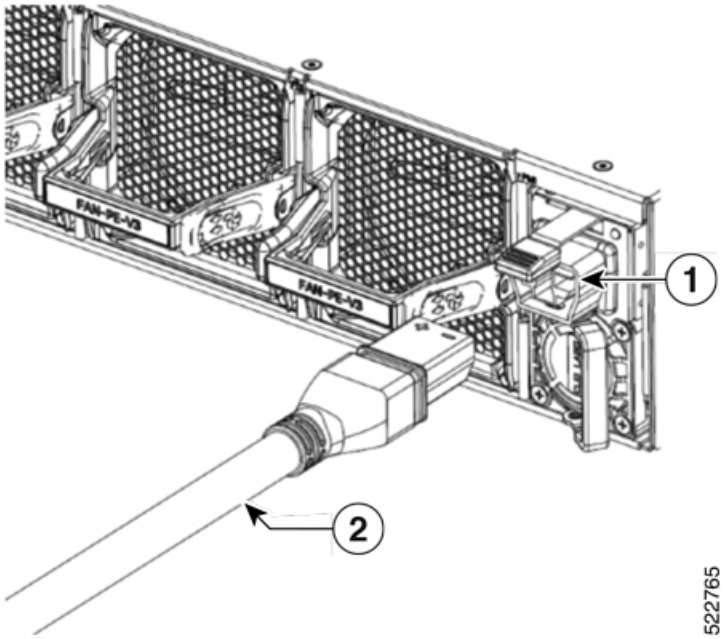
Figure 77: Latch on the Saf-D-Grid power cord



1	Latch

Step 2 Verify that the Saf-D-Grid plug is plugged in completely to secure the built-in retaining latch.

Figure 78: High Voltage (AC, HVAC, or HVDC) Power Connection



1	Anderson power connector	2	Saf-D-Grid T-latch power cord

Step 3 Turn on the circuit breaker for the AC, HVAC, or HVDC power source circuit.

AC-Input Power Cord Options

This table summarises the input and output power ranges for PSU high line applications:

Table 11: AC-Input Power Cord Options for Cisco 8100 Series Router

Locale	Part Number	Length	Power Cord Rating
Australia, New Zealand	CAB-AC-10A-ANZ	14 ft (4.26 m)	10A, 250 VAC
Brazil	CAB-AC-10A-BRZ	14 ft (4.26 m)	10A, 250 VAC
Britain	CAB-AC-10A-GBR	14 ft (4.26 m)	10A, 250 VAC
China	CAB-AC-10A-CHN	14 ft (4.26 m)	10A, 250 VAC
Denmark	CAB-AC-10A-DEN	14 ft (4.26 m)	10A, 250 VAC

Locale	Part Number	Length	Power Cord Rating
Europe	CAB-AC-10A-EU	14 ft (4.26 m)	10A, 250 VAC
Italy	CAB-AC-10A-ITA	14 ft (4.26 m)	10A, 250 VAC
Japan	CAB-AC-10A-JPN1	14 ft (4.26 m)	10A, 250 VAC
Japan	CAB-AC-10A-JPN2	14 ft (4.26 m)	10A, 250 VAC
Korea	CAB-AC-10A-KOR	14 ft (4.26 m)	10A, 250 VAC
North America	CAB-AC-10A-NA	14 ft (4.26 m)	13A, 125 VAC
Switzerland	CAB-AC-10A-CHE	14 ft (4.26 m)	10A, 250 VAC

Table 12: AC Input Power Cord Options for Cisco 8102-28FH-DPU-O Smart Switch

Locale	Part Number	Length	Power Cord Rating
North America	CAB-7513AC	14 ft (4.27 m)	20A, 125 VAC
Italy	CAB-7513ACI	14 ft (4.27 m)	16A, 250 VAC
Australia	CAB-7513ACA	14 ft (4.27 m)	15A, 250 VAC
America	CAB-AC-TWST-C19US	14 ft (4.27 m)	16A, 250 VAC
America	CAB-L620P-C19-US	14 ft (4.27 m)	20A, 250 VAC
Argentina	CAB-7513ACR	14 ft (4.27 m)	16A, 250 VAC
International	CAB-I309-C19-INT	13.5 ft (4.13 m)	16 A, 250 VAC
Europe	CAB-CEE77-C19-EU	13.15 ft (4.01 m)	16 A, 250 VAC
US	CAB-AC-STRT-C19US	13.5 ft (4.13 m)	16 A, 250 VAC
Brazil	CAB-EL224-C19-BR	14 ft (4.27 m)	16 A, 250 VAC
China	CAB-I309-C19-CH	4.015 m	16 A, 250 VAC

Table 13: High-Voltage Input Power Cord Options for Cisco 8100 Series Router

Locale	Part Number	Length	Power Cord Rating
Argentina	CAB-AC-16A-SG-AR	14 ft (4.26 m)	16A, 250 VAC
Australia	CAB-AC-16A-SG-AZ	14 ft (4.26 m)	16A, 250 VAC
Brazil	CAB-AC-16A-SG-BR	14 ft (4.26 m)	16A, 250 VAC
China	CAB-AC-16A-SG-CH CAB-AC-16A-CN	14 ft (4.26 m)	16A, 250 VAC
Europe	CAB-AC-16A-SG-EU	14 ft (4.26 m)	16A, 250 VAC
India	CAB-AC-16A-SG-IND	14 ft (4.26 m)	16A, 250 VAC
International/UK	CAB-AC-16A-SG-IN	14 ft (4.26 m)	16A, 250 VAC
Israel	CAB-AC-16A-SG-IS	14 ft (4.26 m)	16A, 250 VAC
Italy	CAB-AC-16A-SG-IT	14 ft (4.26 m)	16A, 250 VAC
Japan	CAB-AC-16A-SG-JPN	14 ft (4.26 m)	16A, 250 VAC
South Africa	CAB-AC-16A-SG-SA	14 ft (4.26 m)	16A, 250 VAC
Switzerland	CAB-AC-16A-SG-SW	14 ft (4.26 m)	16A, 250 VAC
South Korea	CAB-AC-16A-SG-SK	14 ft (4.26 m)	16A, 250 VAC
UK	CAB-AC-16A-SG-UK	14 ft (4.26 m)	16A, 250 VAC
North America (non locking) 110 VAC operation	CAB-AC-20A-SG-US	14 ft (4.26 m)	20A, 110 VAC
North America (locking) 125 VAC operation	CAB-AC-20A-SG-US1	14 ft (4.26 m)	20A, 125 VAC
North America (non locking) 200-240 VAC operation	CAB-AC-20A-SG-US2	14 ft (4.26 m)	20A, 250 VAC

Locale	Part Number	Length	Power Cord Rating
North America (locking) 200-240 VAC operation	CAB-AC-20A-SG-US3	14 ft (4.26 m)	20A, 250 VAC
North America 277 VAC operation	CAB-AC-20A-SG-US4	14 ft (4.26 m)	20A, 277 VAC
North America Cabinet Jumper Power Distribution unit (PDU)	CAB-AC-20A-SG-C20	14 ft (4.26 m)	20A, 250 VAC
North America, Ring Terminal source plug	CAB-HV-25A-SG-US2	14 ft (4.26 m)	20A, 300 VAC/500 VDC
International IEC/EU, Ring Terminal source plug	CAB-HV-25A-SG-IN2	14 ft (4.26 m)	20A, 300 VAC/500 VDC

High-Voltage Input AC Power Illustrations for Cisco 8100 Series Router

This section contains the AC high-voltage power cord illustrations, as described in the above table.

Figure 79: CAB-AC-16A-SG-AR Power Cord

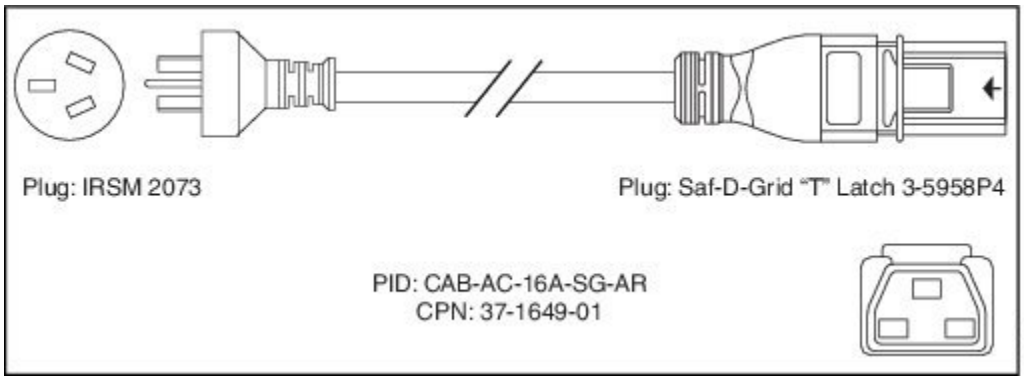


Figure 80: CAB-AC-16A-SG-AZ Power Cord

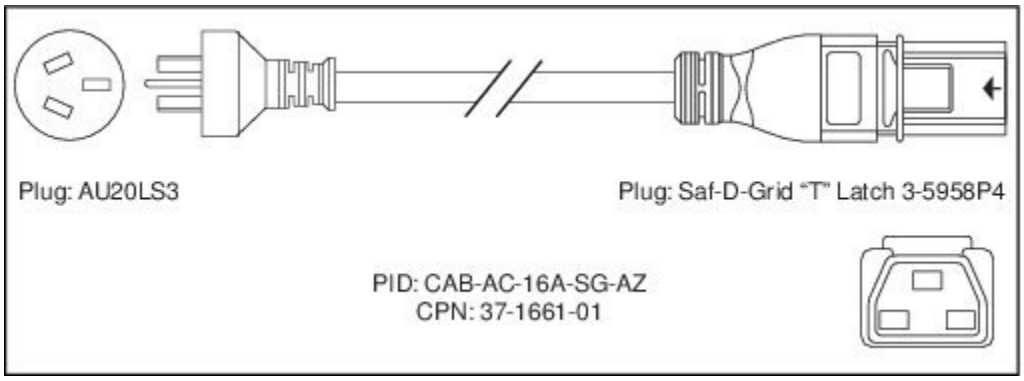


Figure 81: CAB-AC-16A-SG-BR Power Cord

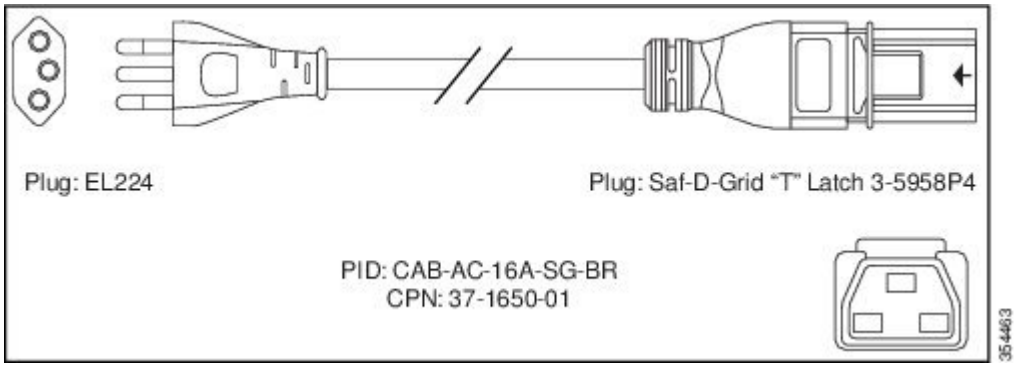


Figure 82: CAB-AC-16A-SG-CH Power Cord

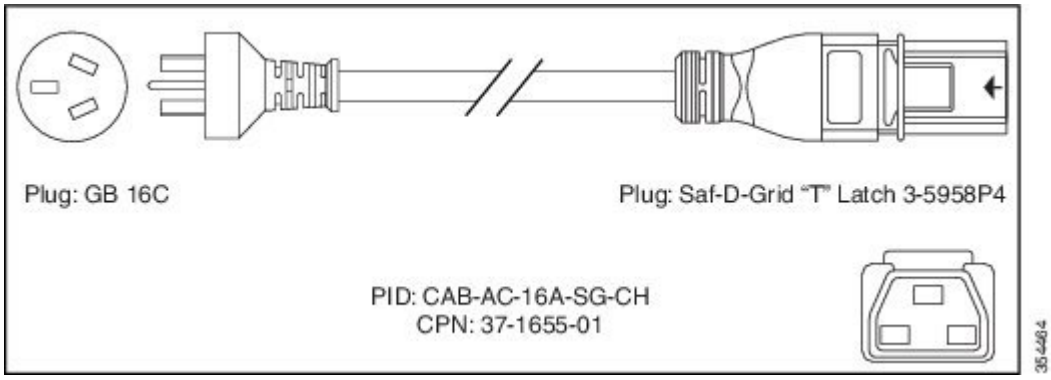


Figure 83: CAB-AC-16A-SG-EU Power Cord

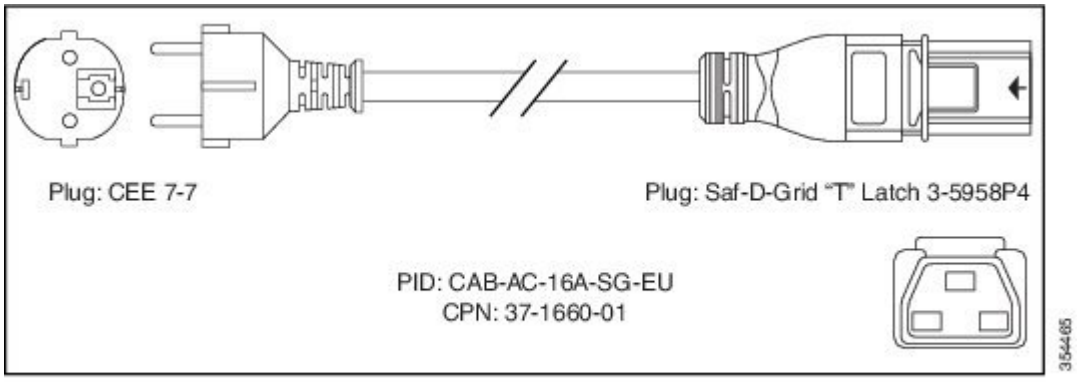


Figure 84: CAB-AC-16A-SG-IND Power Cord

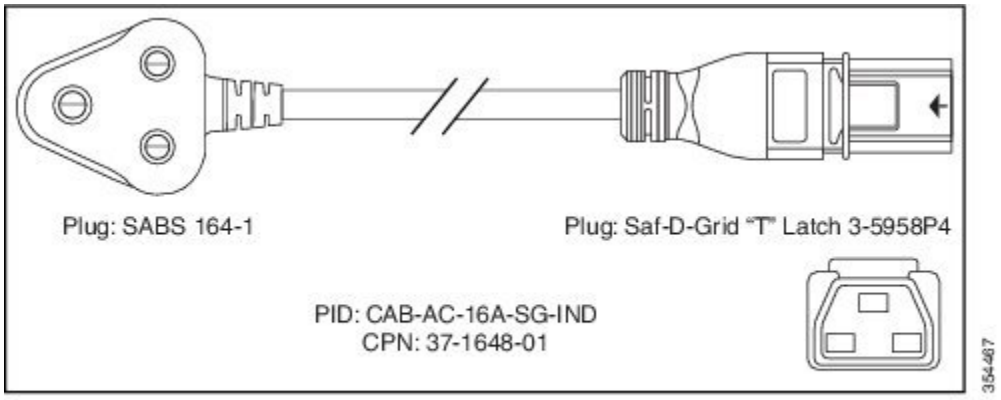


Figure 85: CAB-AC-16A-SG-IN Power Cord

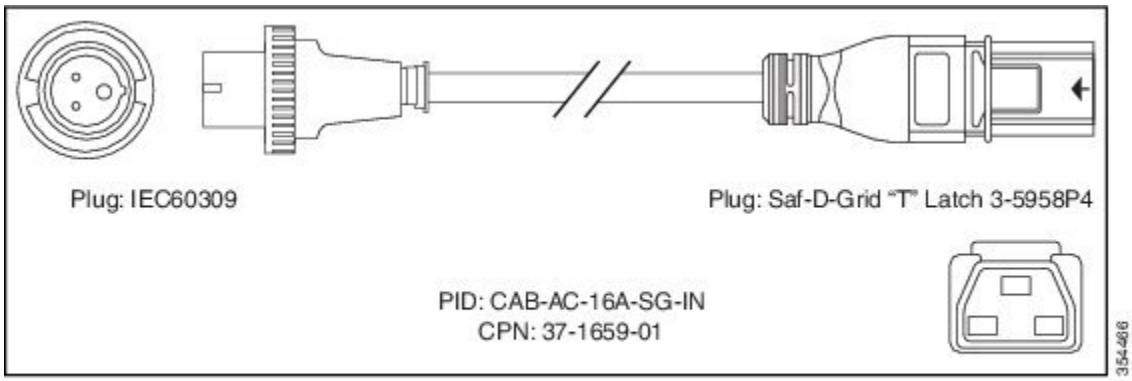


Figure 86: CAB-AC-16A-SG-IS Power Cord

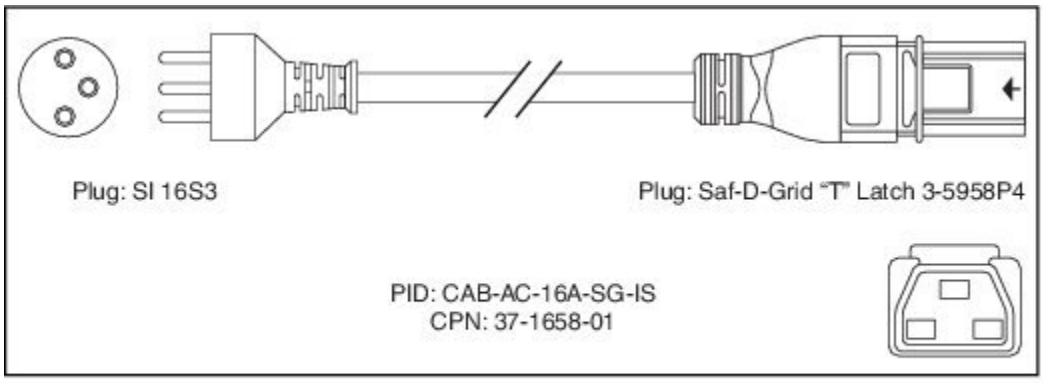


Figure 87: CAB-AC-16A-SG-IT Power Cord

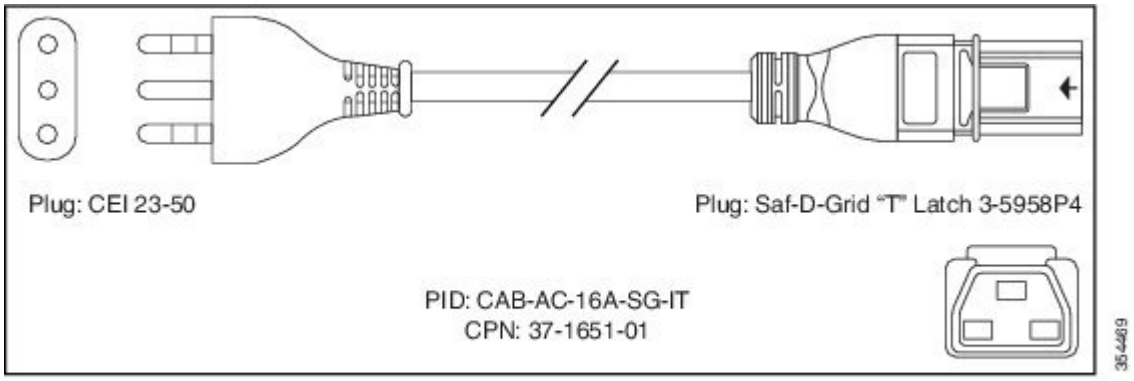


Figure 88: CAB-AC-16A-SG-JPN Power Cord

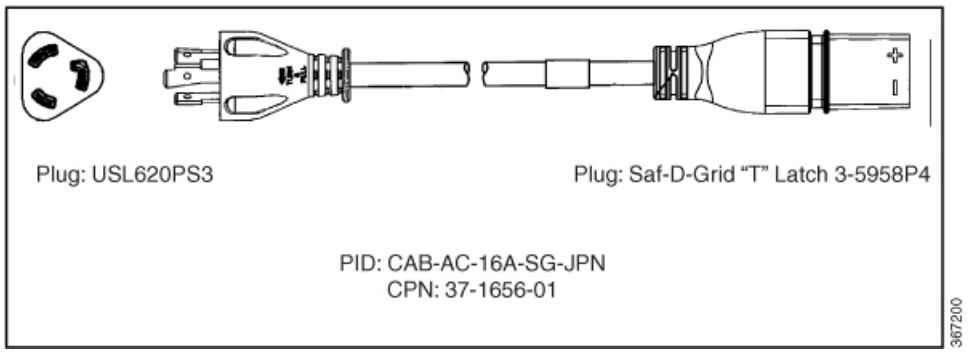


Figure 89: CAB-AC-16A-SG-SA Power Cord

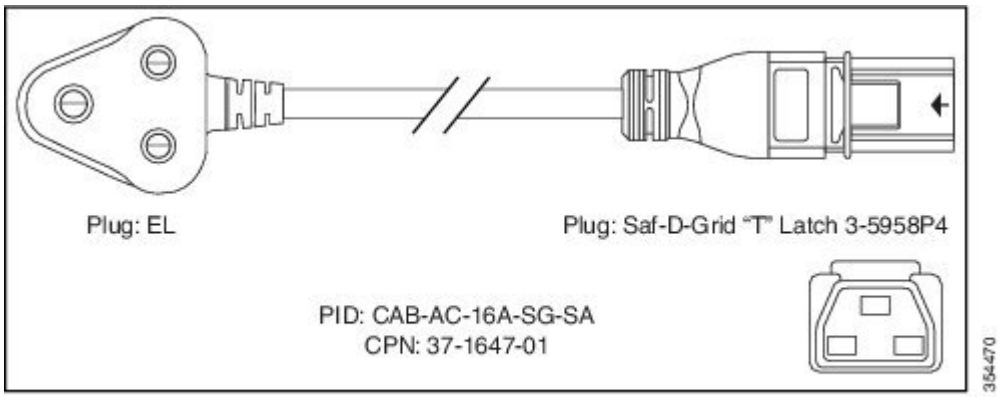


Figure 90: CAB-AC-16A-SG-SW Power Cord

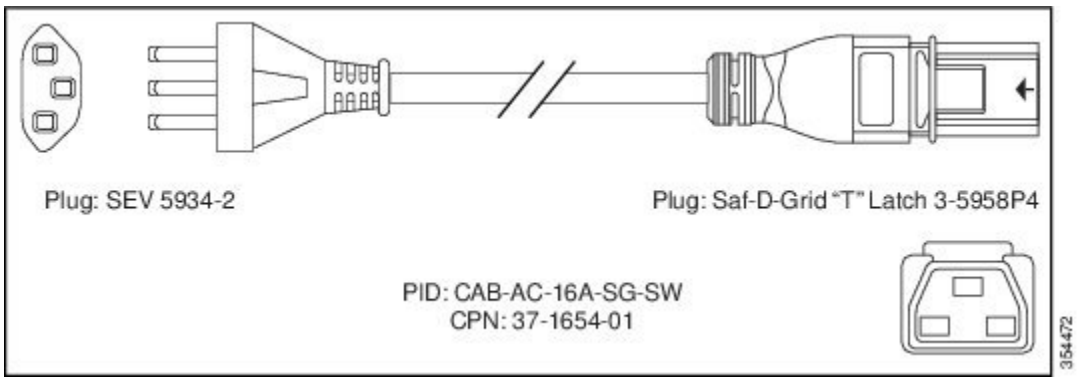


Figure 91: CAB-AC-16A-SG-UK Power Cord

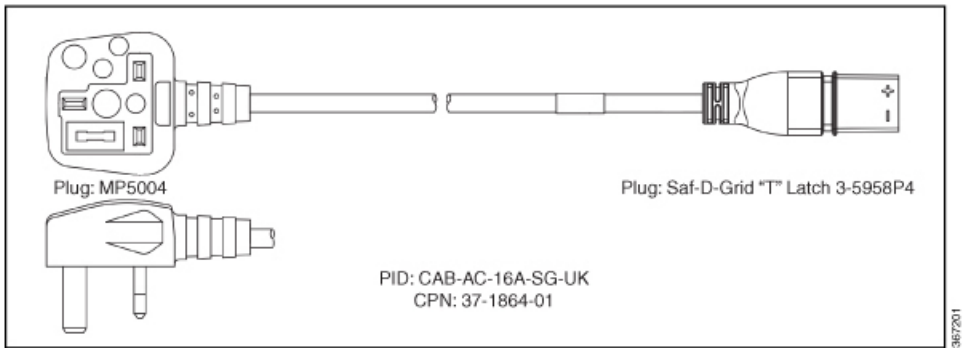


Figure 92: CAB-AC-20A-SG-US Power Cord

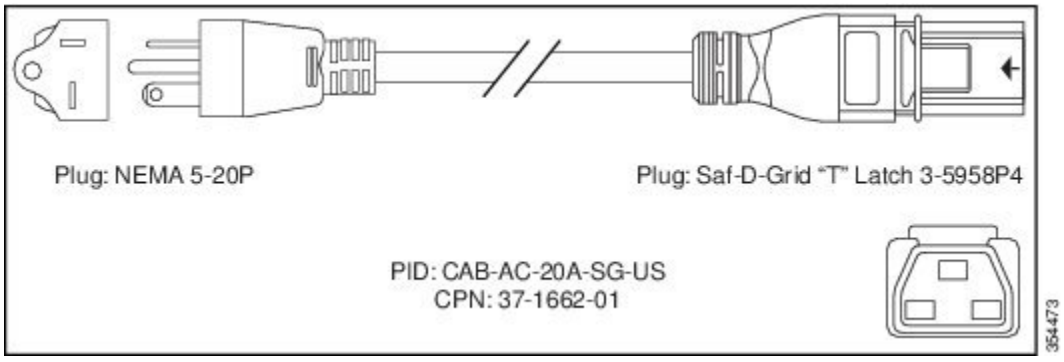


Figure 93: CAB-AC-20A-SG-US1 Power Cord

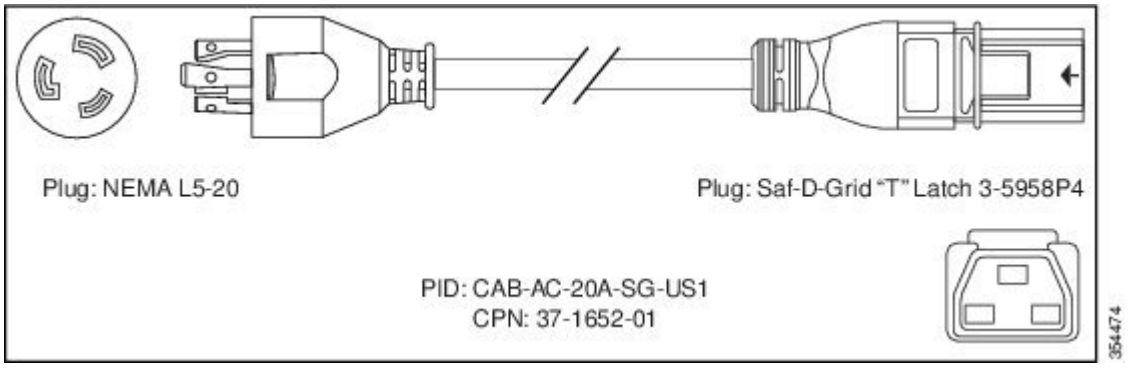


Figure 94: CAB-AC-20A-SG-US2 Power Cord

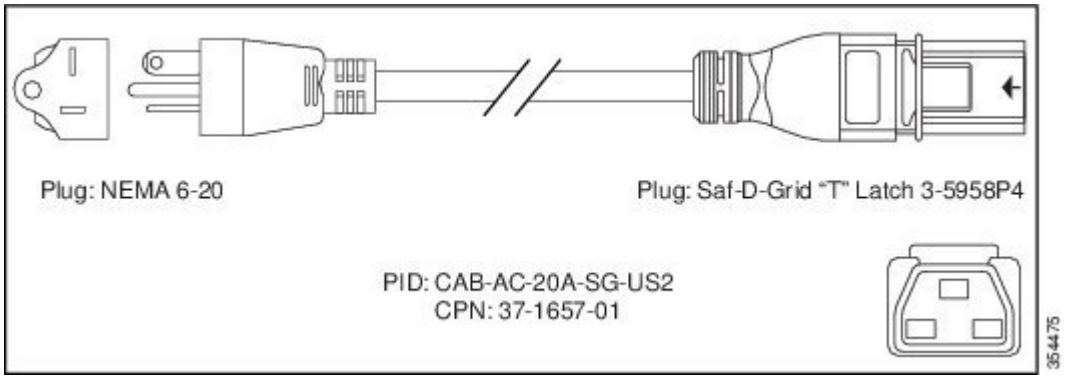


Figure 95: CAB-AC-20A-SG-US3 Power Cord

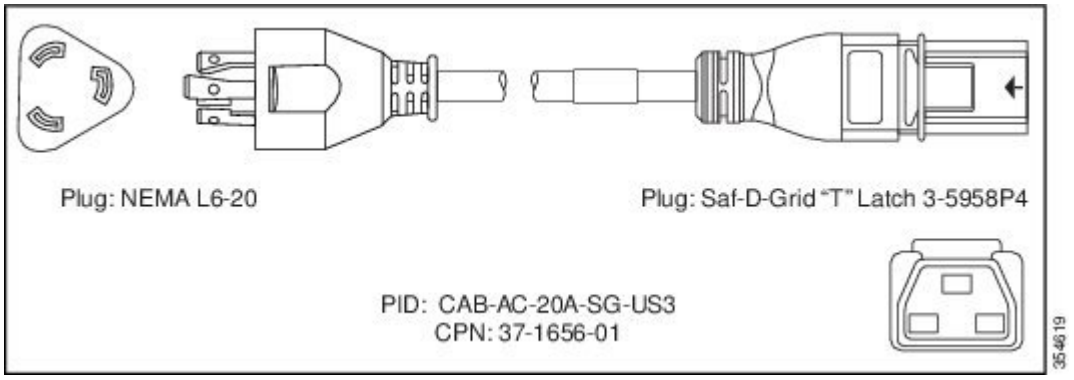


Figure 96: CAB-AC-20A-SG-US4 Power Cord

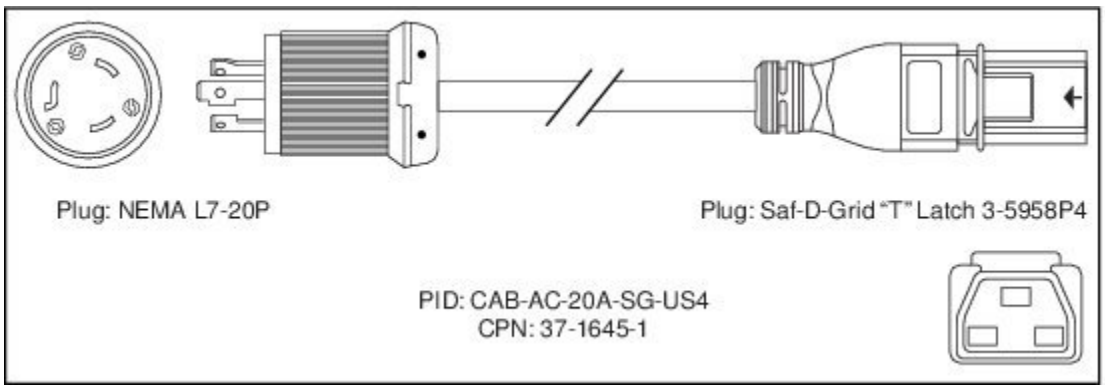


Figure 97: CAB-AC-20A-SG-C20 Power Cord

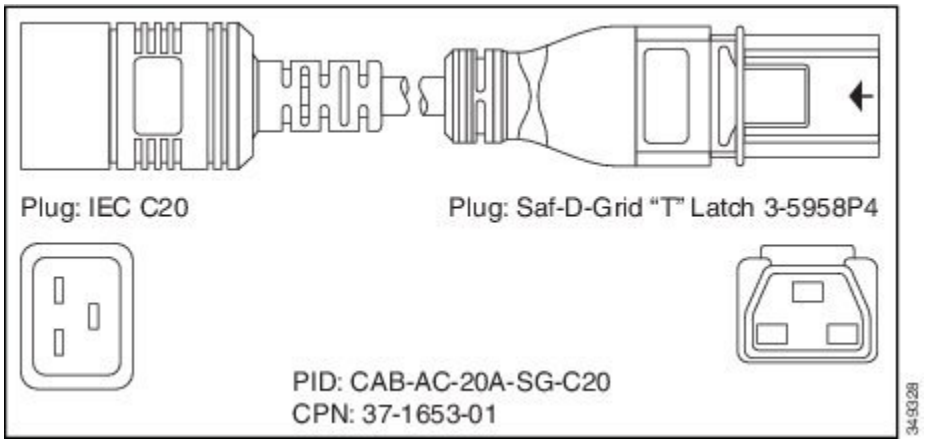


Figure 98: CAB-HV-25A-SG-US2 Power Cord

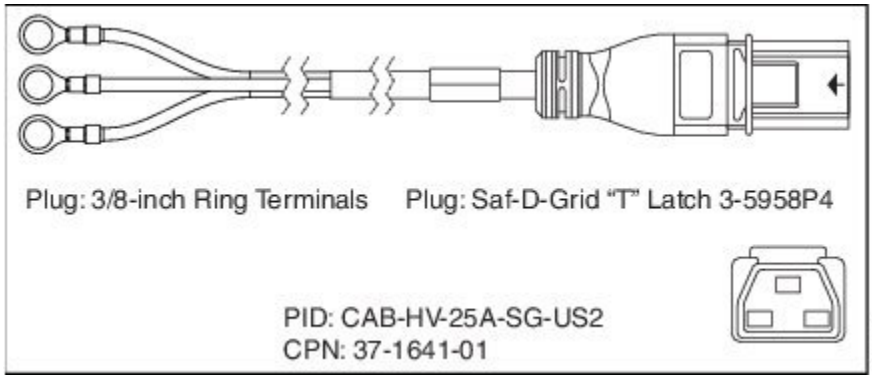


Figure 99: CAB-HV-25A-SG-IN2 Power Cord

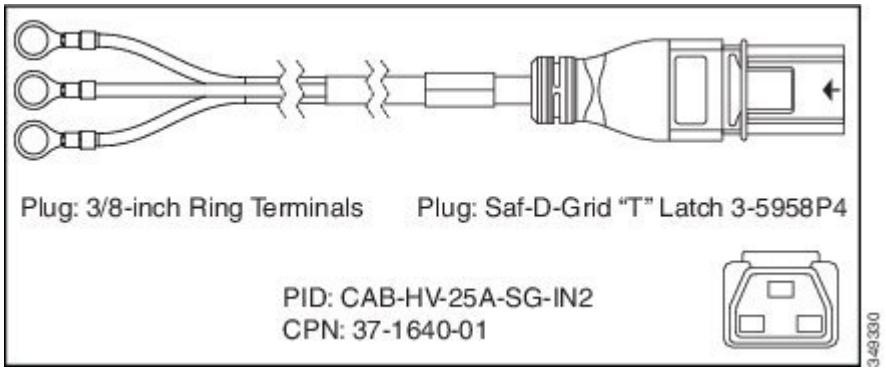
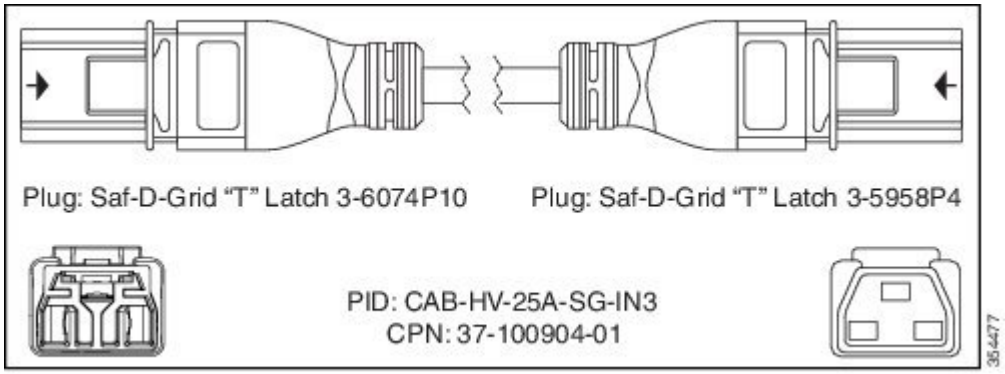


Figure 100: CAB-HV-25A-SG-IN3 Power Cord



AC Power Cord Illustrations for Cisco 8102-28FH-DPU-O Smart Switch

Figure 101: CAB-7513AC Power Cord

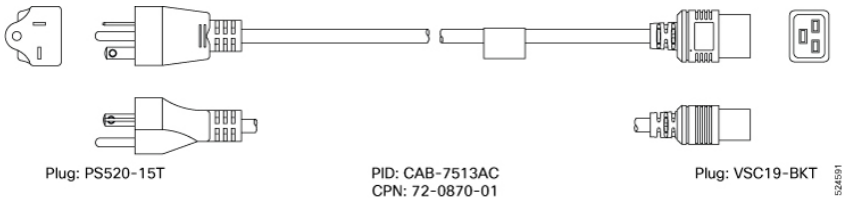


Figure 102: CAB-7513ACI Power Cord

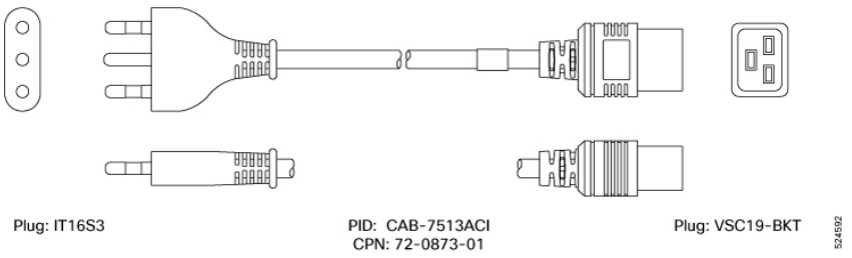


Figure 103: CAB-7513ACA Power Cord

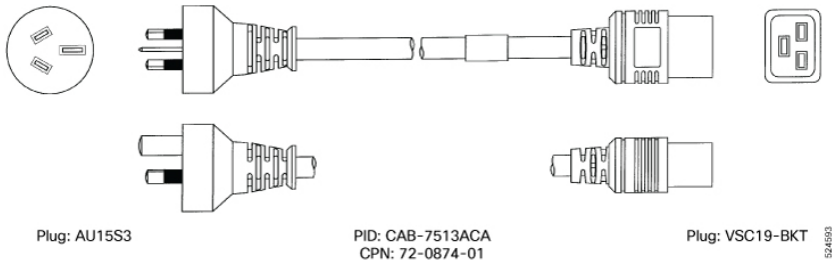


Figure 104: CAB-AC-TWST-C19US Power Cord

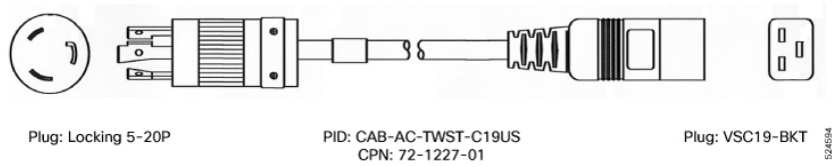


Figure 105: CAB-L620P-C19-US

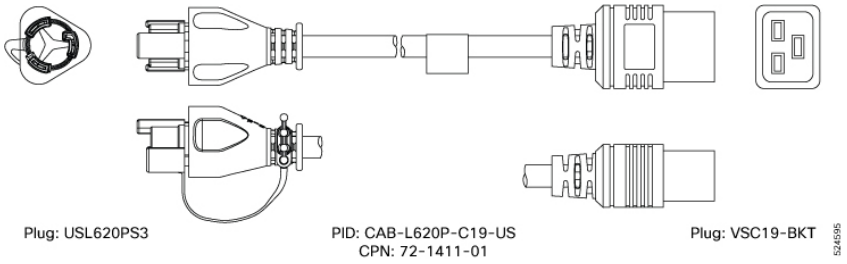


Figure 106: CAB-7513ACR

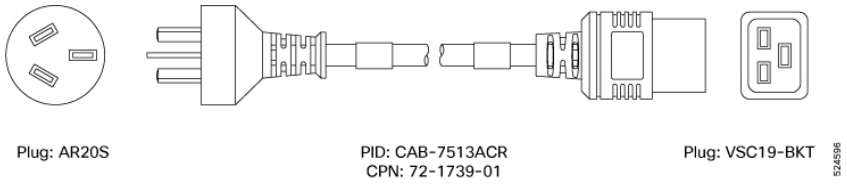


Figure 107: CAB-I309-C19-INT

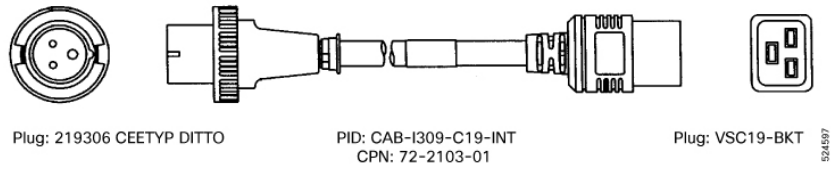


Figure 108: CAB-CEE77-C19-EU

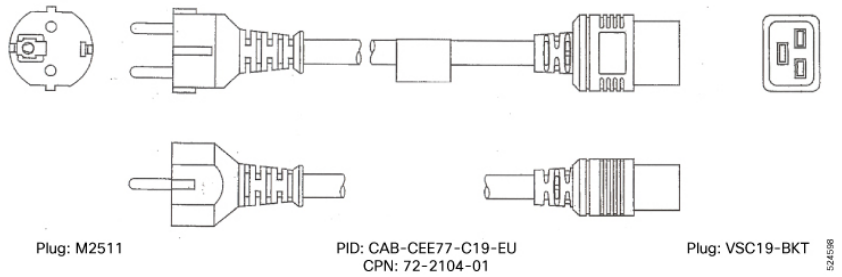


Figure 109: CAB-AC-STRT-C19US

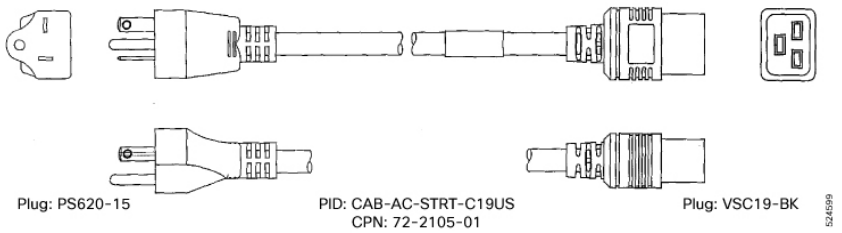


Figure 110: CAB-EL224-C19-BR

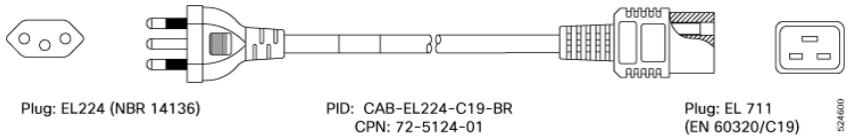
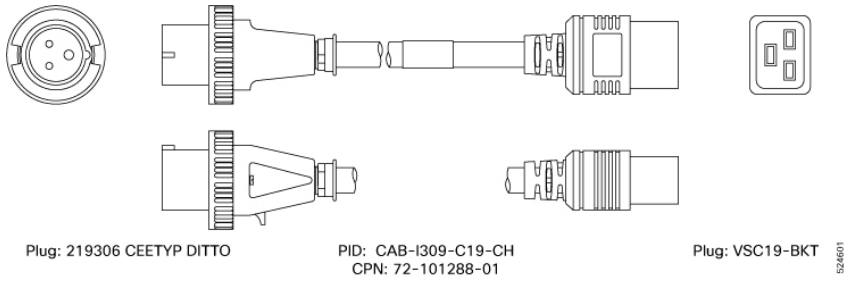
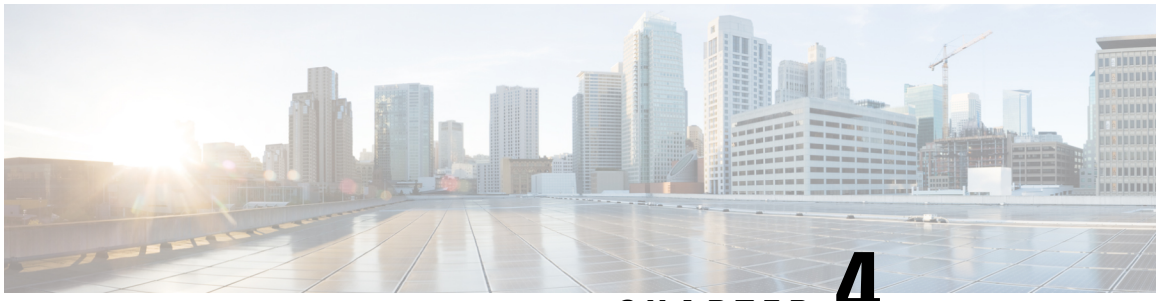


Figure 111: CAB-I309-C19-CH





CHAPTER 4

Connect Router to the Network

Port Connection Guidelines

Depending on the chassis , you can use optical modules and RJ-45 connectors to connect the ports to other network devices.

To prevent damage to the fiber-optic cables, we recommend that you keep the transceivers disconnected from their fiber-optic cables when installing the transceiver in the line card. Before removing a transceiver from the router, remove the cable from the transceiver.

To maximize the effectiveness and life of your transceivers and optical cables, ensure the following:

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever you handle transceivers.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep the transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and to prevent damage to the connectors. Attenuation (loss of light) is increased by contamination. Connector loss should be kept below 0.35 dB.
    - Clean these parts before installation to prevent dust from scratching the fiber-optic cable ends.
    - Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors when they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedures.

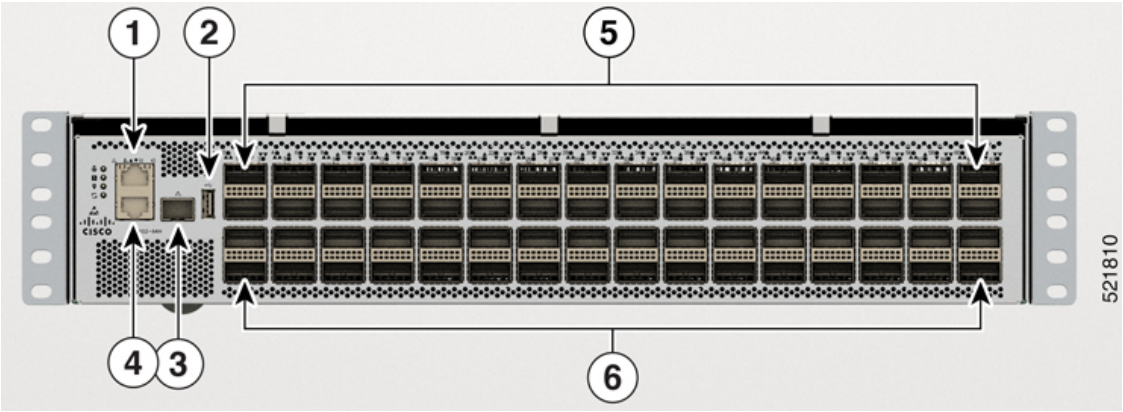
- Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.

- Inspect routinely for dust and damage. If you suspect damage, clean and then inspect fiber ends under a microscope to determine if damage has occurred.

Interfaces and Port Description

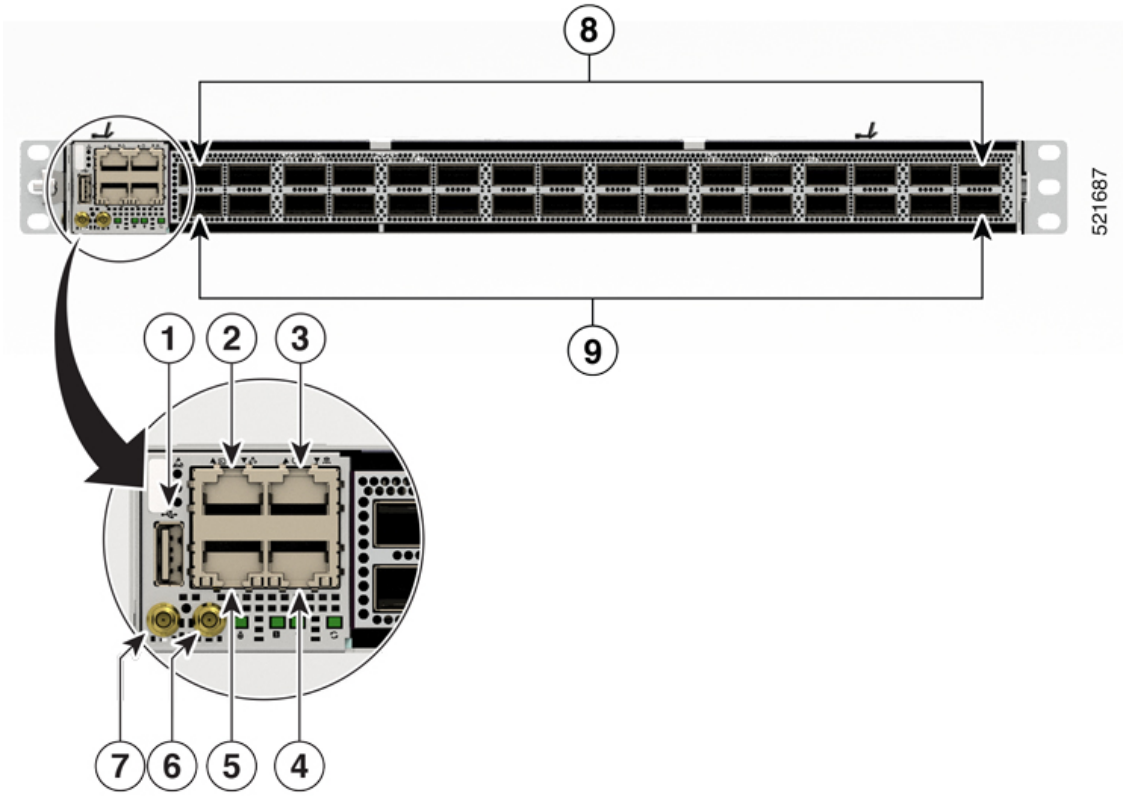
This topic explains and illustrates the interfaces and ports available on the front side of the router.

Figure 112: Cisco 8102-64H-O Router



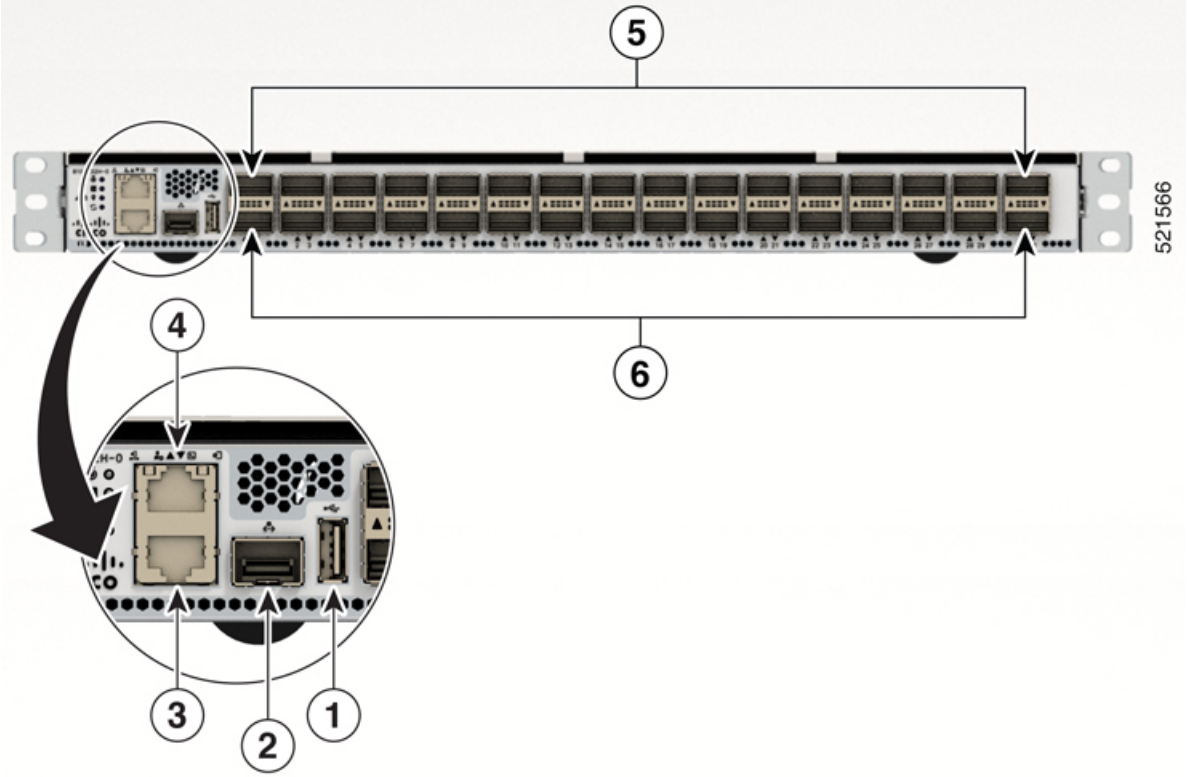
1	10GBASE-T Control Plane Expansion Port	4	Console Port
2	USB Port Type-A	5	32 QSFP-DD ports
3	10G Management Port	6	32 QSFP-DD ports

Figure 113: Cisco 8101-32FH-O Router



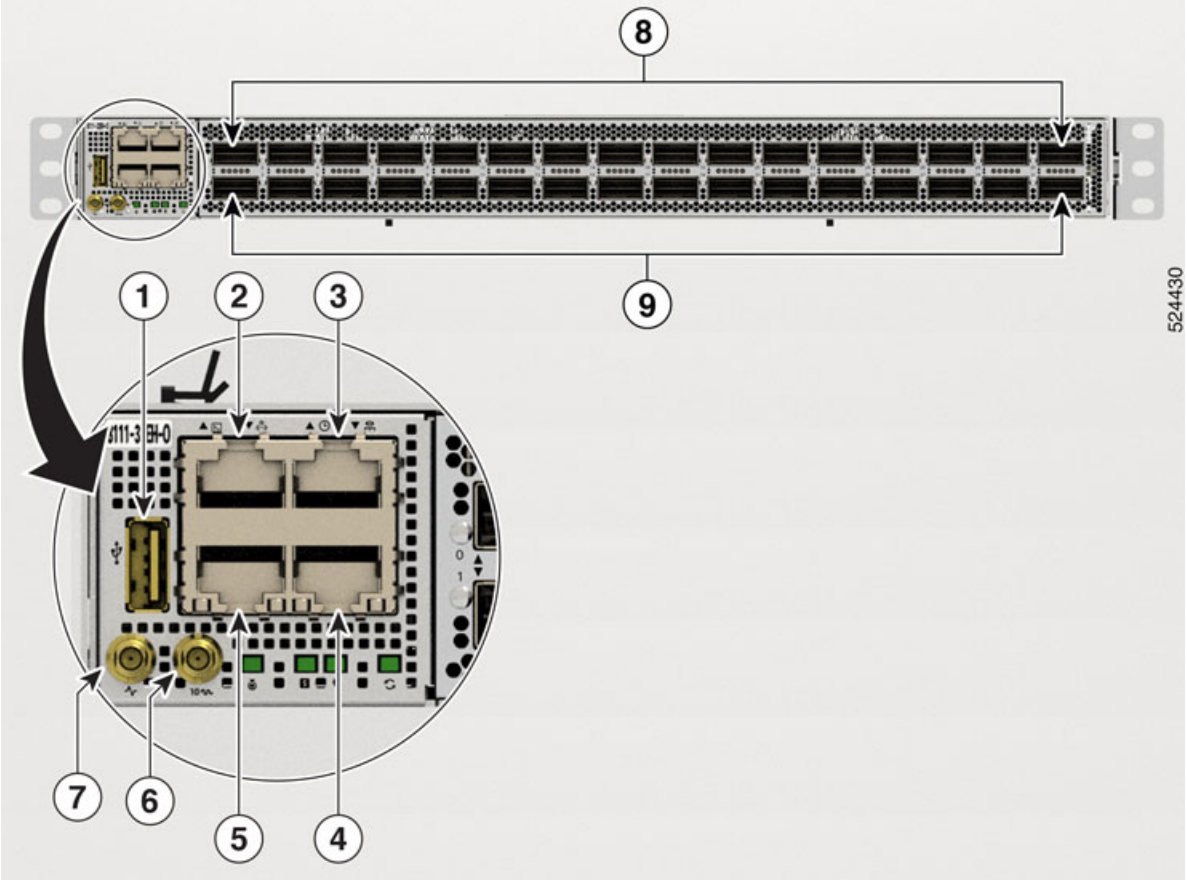
1	USB Port Type-A	6	Mini coax connector for 10MHz, input, and output
2	Console port	7	Mini coax connector for 1 PPS, input, and output.
3	RJ-45 connector for Time-of-Day (TOD) interface, input, and output	8	16 QSFP56-DD 400 GbE ports
4	1000BASE-T Management and BMC (Baseboard Management Controller) Port	9	16 QSFP56-DD 400 GbE ports
5	10GBASE-T Control Plane Expansion Port		

Figure 114: Cisco 8101-32H-O Router



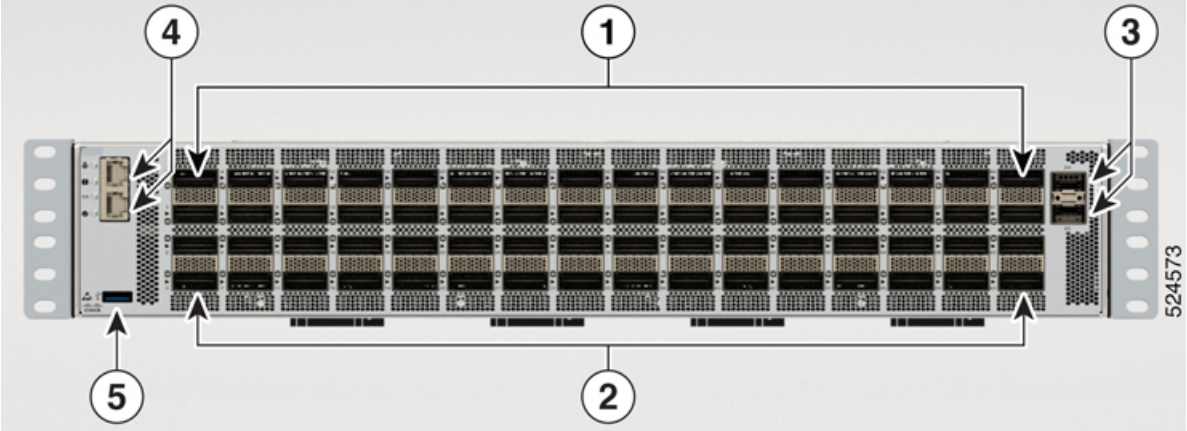
1	USB Port Type-A	4	10GBASE-T Control Plane Expansion Port
2	Control Plane Expansion SFP/SFP+ port	5	16 QSFP28 ports
3	Console Port	6	16 QSFP28 ports

Figure 115: Cisco 8111-32EH-O Router



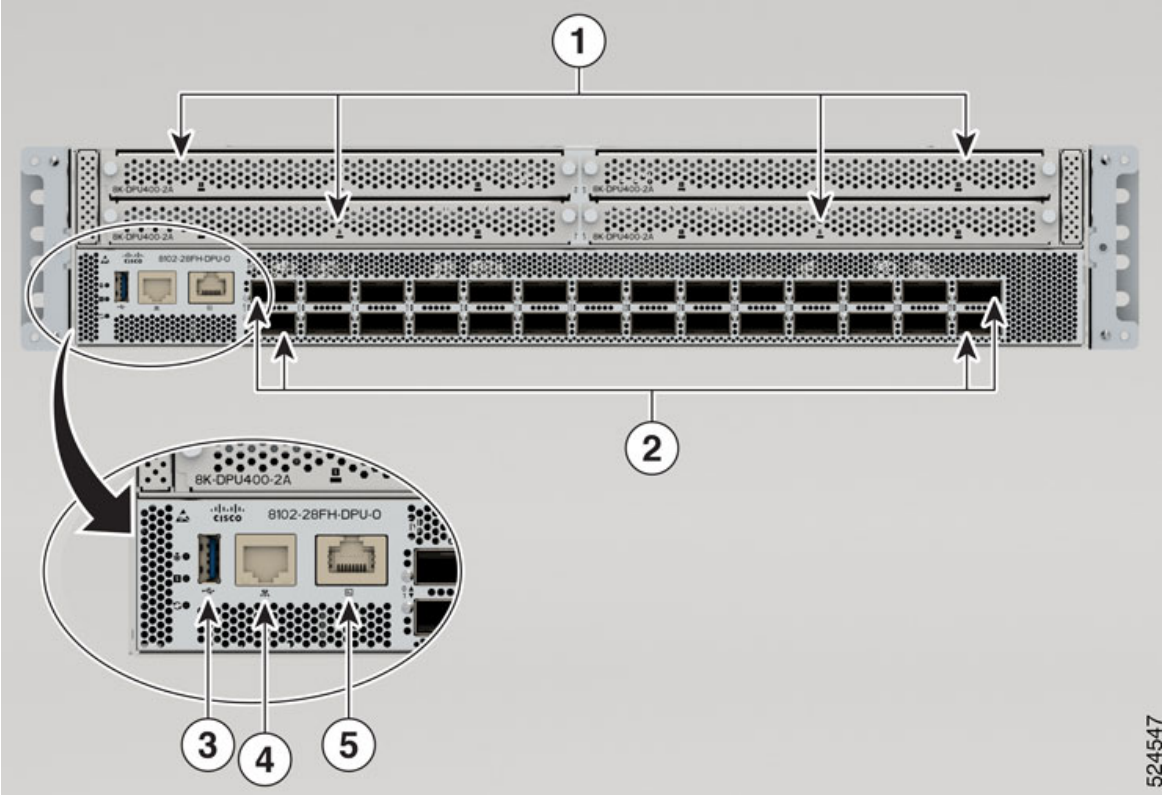
1	USB Port Type-A	5	10GBASE-T Control Plane Expansion Port
2	Console port	6	Mini coax connector for 10MHz, input, and output.
3	RJ-45 connector for Time-of-Day (TOD) interface, input, and output	7	Mini coax connector for 1 PPS, input, and output.
4	1000BASE-T Management and BMC (Baseboard Management Controller) Port	8	16 QSFP-DD ports. Supports 30W optics.
9	16 QSFP-DD ports. Supports 17W optics.		

Figure 116: Cisco 8122-64EH-O Router



1	QSFP-DD ports	4	Console port and 10GBASE-T Control Plane Expansion Port
2	QSFP-DD ports	5	USB Port Type-A
3	SFP28 ports		

Figure 117: Cisco 8102-28FH-DPU-O



1	DPU adapters	4	1000BASE-T Management and BMC (Baseboard Management Controller) port
2	28 QSFP-DD 400 GbE ports	5	Console port
3	USB port Type-A		

Figure 118: Cisco 8122-64EHF-O Router

1	QSFP28 port	4	1000BASE-T Management and BMC (Baseboard Management Controller) port
2	USB 3.0 Port Type-A	5	64 OSFP800 ports
3	Console port		

Transceiver and Cable Specifications

To determine which transceivers and cables are supported by this router, refer to the Transceiver Module Group (TMG) Compatibility Matrix Tool:

https://tmgmatrix.cisco.com

- For QSFP28 data sheets, refer to the Cisco 100GBASE QSFP-100G Modules Data Sheet.
- For QSFP+ data sheets, refer to the Cisco 40GBASE QSFP Modules Data Sheet.
- For QSFP-DD data sheets, refer to the Cisco 400G QSFP-DD High-Power (Bright) Optical Module Data Sheet.

- For QSFP-DD800 data sheets, refer to the Cisco QSFP-DD800 Transceiver Modules Data Sheet.

Connecting a Console to the Router

Before you create a network management connection for the router or connect the router to the network, you must create a local management connection through a console terminal and configure an IP address for the router. The router can be accessed using remote management protocols, such as SSH and Telnet. By default, SSH is included in the software image. But telnet is not part of the software image. You must manually install the telnet optional package to use it.

You also can use the console to perform the following functions, each of which can be performed through the management interface after you make that connection:

- configure the router using the command-line interface (CLI)
- monitor network statistics and errors
- configure Simple Network Management Protocol (SNMP) agent parameters
- initiate software download updates via console

You make this local management connection between the asynchronous serial port on a console device capable of asynchronous transmission. Typically, you can use a computer terminal as the console device.

Note Before you can connect the console port to a computer terminal, make sure that the computer terminal supports VT100 terminal emulation. The terminal emulation software makes communication between the router and computer possible during setup and configuration.

Before you begin

- The router must be fully installed in its rack. The router must be connected to a power source and grounded.
- The necessary cabling for the console, management, and network connections must be available.
  - An RJ45 rollover cable and a DB9F/RJ45 adapter.
  - Network cabling should already be routed to the location of the installed router.

Procedure

Step 1 Configure the console device to match the following default port characteristics:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity

Step 2 Connect and RJ45 rollover cable to a terminal, PC terminal emulator, or terminal server.

The RJ45 rollover cable is not part of the accessory kit.

Step 3 Route the RJ45 rollover cable as appropriate and connect the cable to the console port on the chassis.

If the console or modem cannot use an RJ45 connection, use the DB9F/RJ45F PC terminal adapter. Alternatively, you can use an RJ45/DSUB F/F or RJ45/DSUB R/P adapter, but you must provide those adapters.

What to do next

You are ready to create the initial router configuration.

Create the Initial Router Configuration

Assign an IP address to the router management interface to connect the router to the network.

When you initially power up the router, it boots up and displays a series of configuration-related questions. You can use the default choices for each configuration except for the IP address, which you must provide.

Note These routers are designed to boot up in less than 30 mins, provided the neighboring devices are in full-operational state.

When the system is powered on and the console port is connected to the terminal, the RP CPU messages are seen. You can toggle between BMC CPU messages and RP CPU messages by pressing the hot-key sequence Ctrl-O.

To configure IP address for Ethernet port on BMC and other additional information that is related to BMC, please see the *System Setup Guide for Cisco 8000 Series Routers.*

Before you begin

- A console device must be connected with the router.
- The router must be connected to a power source.
- Determine the IP address and netmask that is needed for the Management interfaces: `MgmtEth0/RP0/CPU0/0`.

Procedure

Step 1 Power up the router.

The LEDs on each power supply light up (green) when the power supply units are sending power to the router, and the software asks you to specify a password to use with the router.

Step 2 When the system boots up for the first time, the system prompts you to create a new username and password. The following prompt appears:

```
!!!!!!!!!!!!!!!!!!! NO root-system username is configured. Need to configure root-system username.
 !!!!!!!!!!!!!!!!!!!

--- Administrative User Dialog ---


Enter root-system username:
% Entry must not be null.

Enter root-system username: cisco
Enter secret:
Use the 'configure' command to modify this configuration.
User Access Verification

Username: cisco
Password:


RP/0/RP0/CPU0:ios#
```

Step 3 Enter a new password to use for this router.

The software checks the security strength of your password and rejects your password if the system does not consider it as a strong password. To increase the security strength of your password, make sure that it adheres to the following guidelines:

- At least eight characters
- Minimizes or avoids the use of consecutive characters (such as "abcd")
- Minimizes or avoids repeating characters (such as "AAA")
- Does not contain recognizable words in the dictionary
- Does not contain proper names
- Contains both uppercase and lowercase characters
- Contains numbers and letters

Note
Cleartext passwords cannot include the dollar sign ($) special character.

Tip
If a password is trivial (such as a short, easy-to-decipher password), the software rejects that password. Passwords are case-sensitive.

When you enter a strong password, the software asks you to confirm the password.

Step 4 Reenter the password.

When you enter the same password, the software accepts the password.

Step 5 Enter the configuration mode.

Step 6 Enter the IP address for the management interface.

Step 7 Enter a network mask for the management interface.

Step 8 The software asks whether you want to edit the configuration.

- **no** - select this option if you don't want to edit your configuration.

- **yes** - select this option if you want to edit your configuration.

Note
We recommend that you configure the system location altitude for fan control. This configuration allows you to specify the chassis altitude, so the router can adjust the fan speed to compensate for lower cooling capability at higher altitudes. For more details, see the **environment altitude** command.

Connect the Management Interface

The management port (MGMT ETH) provides out-of-band management, which lets you to use the command-line interface (CLI) to manage the router by its IP address. This port uses a 10/100/1000 Ethernet connection with an RJ-45 interface.

Caution To prevent an IP address conflict, do not connect the MGMT 100/1000 Ethernet port until the initial configuration is complete.

Before you begin

You must have completed the initial router configuration.

Procedure

Step 1 Connect a modular, RJ-45, UTP cable to the MGMT ETH port.
Step 2 Route the cable through the central slot in the cable management system.
Step 3 Connect the other end of the cable to a 100/1000 Ethernet port on a network device.

What to do next

You are ready to connect the interface ports to the network.

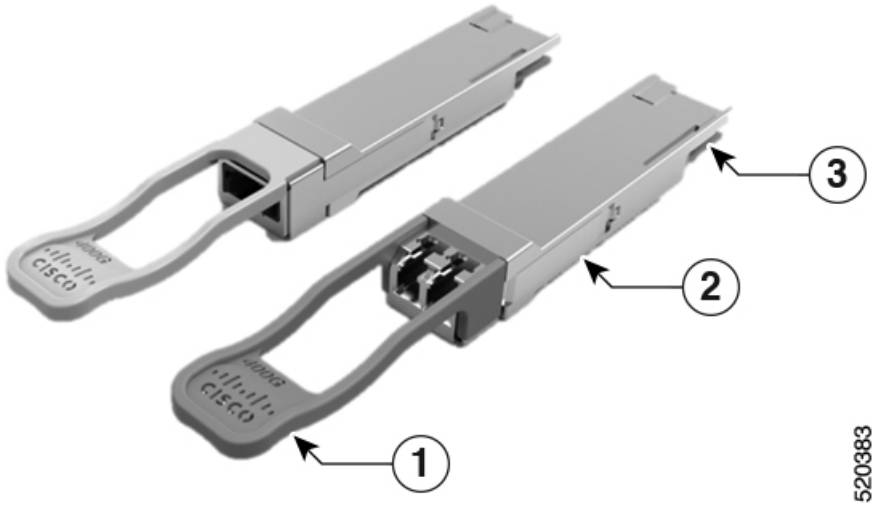
Install and Remove QSFP Transceiver Modules

This section provides the installation, cabling, and removal instructions for the Quad Small Form-Factor Pluggable transceiver modules. Refer to the *Cisco Optical Transceiver Handling Guide* for additional details on optical transceivers.

Caution When inserting optical transceiver modules into host ports, handle them carefully. Ensure that the applied force does not exceed 20 lbs (9.1kg).

The following figure shows a 400-Gigabit QSFP-DD optical transceiver.

Figure 119: 400-Gigabit QSFP-DD Transceiver Module



1	Pull-tab	2	QSFP-DD transceiver body
3	Electrical connection to the module circuitry		

Required Tools and Equipment

You need these tools to install the transceiver modules:

- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment.

Installing the Transceiver Module

Warning **Statement 1079**—Hot Surface

This icon is a hot surface warning. To avoid personal injury, do not touch without proper protection.

Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with system modules.

Caution Protect the transceiver ports by inserting clean dust caps (8000-QSFP-DCAP) into any ports not in use and do not have optical modules plugged in. If optical modules are plugged in but not in use, the dust caps that were supplied with the optical modules, should be used to protect the TX and RX surfaces of the optical module.

Be sure to clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another module.

The router ships with dust caps plugged in. We highly recommend you to keep the dust caps plugged in until you are ready to plug an optic.

The dust caps protect the ports from possible EMI interference and also avoid contamination due to dust collection.

Caution To meet the EMI interference requirements, you must use the metal dust caps when the ports are not in use by optical modules.

The following table provides the supported port details and operating temperature of the QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules when port side exhaust or port side intake fans and power supplies are used.

Table 14: Supported Ports and Operating Temperature of QDD-400G-ZR-S and QDD-400G-ZRP-S Optical Modules

Fixed-Port Routers	Port Side Intake Fans and Power Supplies	Port Side Exhaust Fans and Power Supplies	Port Side Intake Operating Temperature
8101-32FH	• QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on even-numbered 400G ports	• QDD-400G-ZR-S – not supported • QDD-400G-ZRP-S – not supported	40° C at sea level or 35° C at 1500 meter
8111-32EH-O	• QDD-400G-ZR-S – supported on all 400G ports • QDD-400G-ZRP-S – supported on even-numbered 400G ports	Not Applicable	40° C at sea level or 35° C at 1500 meter

Note

- The Cisco 8101-32FH fixed-port router must be operated only with 2kW power supplies while using the QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules. These optical modules are not supported when 1.4KW power supplies are used.
- The Cisco 8111-32EH-O fixed-port router must be operated only with 3kW power supplies while using the QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules. These optical modules are not supported when 2KW power supplies are used.

The QSFP transceiver module has a pull-tab latch. To install a transceiver module, follow these steps:

Procedure

Step 1 Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.

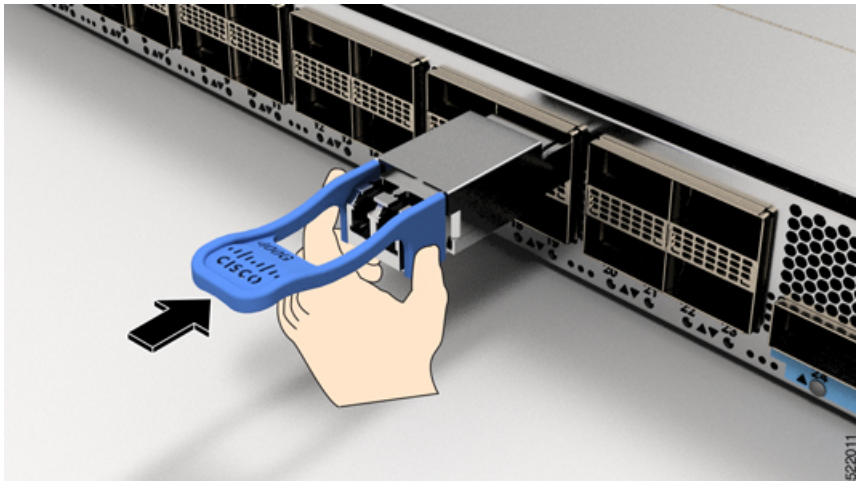
Step 2 Remove the transceiver module from its protective packaging.

Step 3 Check the label on the transceiver module body to verify that you have the correct model for your network. Do not remove the dust plug until you're ready to attach the network interface cable. Dust plug is not shown in the images.

Step 4 Hold the transceiver by the pull-tab so that the identifier label is on the top.

Step 5 Align the transceiver module in front of the module's transceiver socket opening and carefully slide the transceiver into the socket until the transceiver contact with the socket electrical connector.

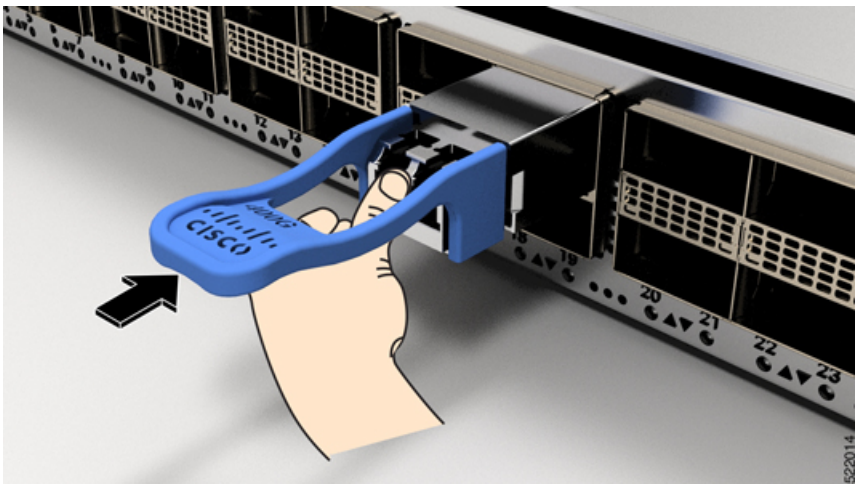
Figure 120: Installing the QSFP Transceiver Module



Step 6 Press firmly on the front of the transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see the below figure).

Caution
If the latch isn't fully engaged, you might accidentally disconnect the transceiver module.

Figure 121: Seating the QSFP Transceiver Module



Attach the Optical Network Cable

Before you begin

Before you remove the dust plugs and make any optical connections, follow these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the optical connector end faces just before you make any connections.
- Grasp the optical connector only by the housing to plug or unplug a fiber-optic cable.

Note The transceiver modules and fiber connectors are keyed to prevent incorrect insertion.

Note The multiple-fiber push-on (MPO) connectors on the optical transceivers support network interface cables with either physical contact (PC) or ultra-physical contact (UPC) flat polished face types. The MPO connectors on the optical transceivers do not support network interface cables with an angle-polished contact (APC) face type.

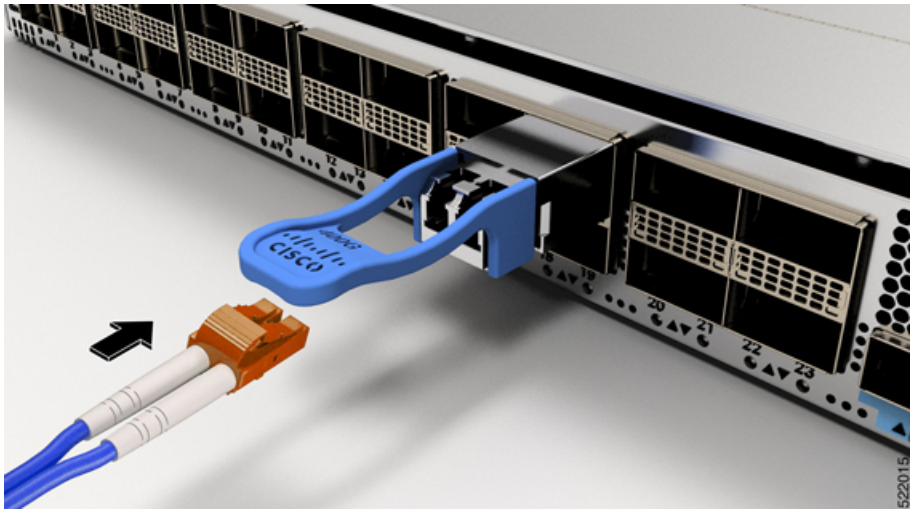
Note Inspect the MPO connector for the correct cable type, cleanliness, and any damage. For complete information on inspecting and cleaning fiber-optic connections, see the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document.

Procedure

Step 1 Remove the dust plugs from the optical network interface cable MPO connectors and from the transceiver module optical bores. Save the dust plugs for future use.

Step 2 Attach the network interface cable MPO connectors immediately to the transceiver module.

Figure 122: Cabling a Transceiver Module



Removing the Transceiver Module

Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

To remove a transceiver module, follow these steps:

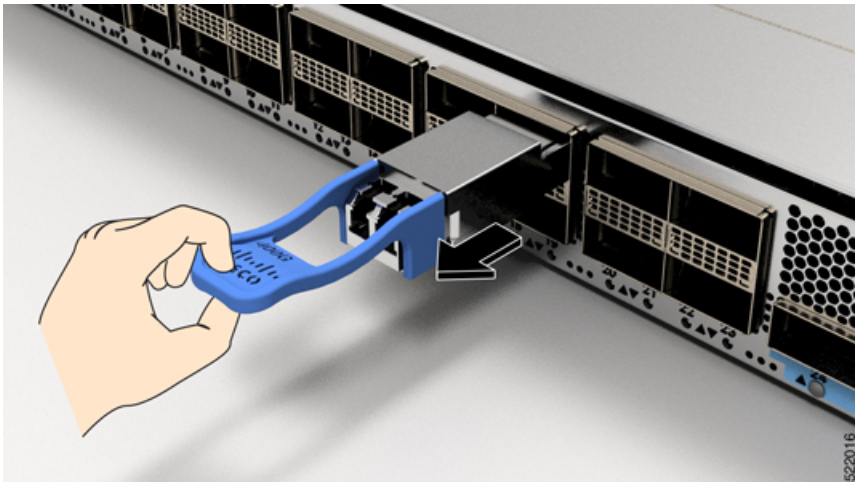
Procedure

Step 1 Disconnect the network interface cable from the transceiver connector.

Step 2 Install the dust plug immediately into the transceiver's optical bore.

Step 3 Grasp the pull-tab and gently pull to release the transceiver from the socket.

Figure 123: Removing the QSFP Transceiver Module



Step 4 Slide the transceiver out of the socket.

Step 5 Place the transceiver module into an antistatic bag.

Connect Interface Ports

You can connect optical interface ports with other devices for network connectivity.

Connect a Fiber-Optic Port to the Network

40G, 100G, 400G, and 800G transceivers are supported on Cisco 8100 series routers. Some transceivers work with fiber-optic cables that you attach to the transceivers and other transceivers work with pre-attached copper cables. You must install a transceiver in the port before installing the fiber-optic cable in the transceiver.

⚠

Caution Removing and installing a transceiver can shorten its useful life. Do not remove and insert transceivers any more than is absolutely necessary. We recommend that you disconnect cables before installing or removing transceivers to prevent damage to the cable or transceiver.

Disconnect Optical Ports from the Network

When you need to remove fiber-optic transceivers, you must first remove the fiber-optic cables from the transceiver before you remove the transceiver from the port.

Maintain Transceivers and Optical Cables

Refer to Inspection and Cleaning Procedures for Fiber-Optic Connections document for inspection and cleaning processes for fiber optic connections.

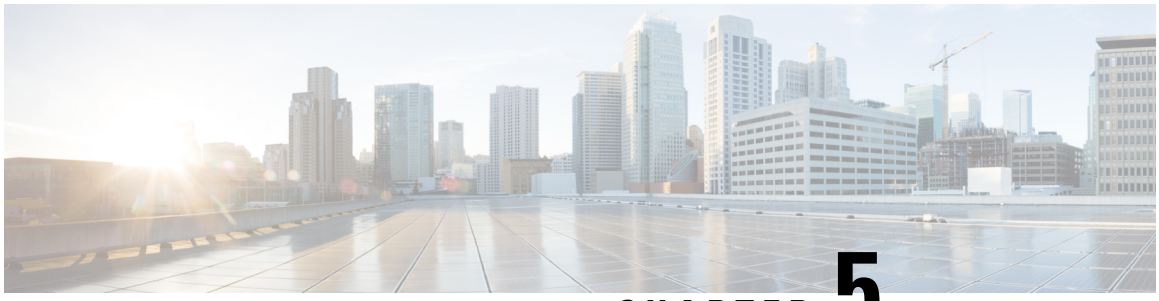
Verify Chassis Installation

After installing the chassis, use the following **show** commands to verify the installation and configuration in the EXEC mode. Any issue if detected, take corrective action before making further configurations.

Command	Description
show platform	Displays the state information of each card.
show inventory	Displays information about the field replaceable units (FRUs), including product IDs, serial numbers, and version IDs.
show environment	Displays all the environment-related router information.

show environment temperature	Displays temperature readings for card temperature sensors. Each Route Processor, line card, and fabric cards have temperature sensors with two thresholds:
	• Minor temperature threshold – When a minor threshold is exceeded, minor alarm occurs and the following actions occur for all four sensors:
	  • Displays system messages
	  • Sends SNMP notifications (if configured)
	  • Log environmental alarm event that can be reviewed by running the show alarm command.
	• Major temperature threshold – When a major threshold is exceeded, a major alarm occurs and the following actions occur:
	  • For sensors 1, 3, and 4 (outlet and on board sensors), the following actions occur:
	  • Displays system messages.
	  • Sends SNMP notifications (if configured).
	  • Logs environmental alarm event that can be reviewed by running the show alarm command.
	  • For sensor 2 (intake sensor), the following actions occur:
	  • If the threshold is exceeded in a switching card, only that card is shut down.
	  • If the threshold exceeds an active Route Processor card with HA-standby or standby present, only that Route Processor card is shut down and the standby Route Processor card takes over.
	  • If you do not have a standby Route Processor card in your router, you have up to 2 minutes to decrease the temperature. During this interval, the software monitors the temperature every 5 seconds and continuously sends system messages as configured.
	Note
	• Cisco recommends that you install dual Route Processor cards.
	• For some card temperature sensors, the temperature thresholds for both minor and major might display 'NA'. This is an expected behaviour and indicates that there are no alarms for those corresponding thresholds.

Command	Description
show environment power	Displays the power usage information for the entire router.
show environment voltage	Displays the voltage for the entire router.
show environment current	Displays the current environment status.
show environment fan	Displays the status of the fan trays.



CHAPTER 5

Replace Chassis Components

Replace Fan Modules for Cisco 8100 Series Routers

The fan module is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system. Please keep the replacement fan modules ready prior to attempting this task.

The router supports the following types of fan modules:

Table 15: Supported Fan Modules

Router	Module Configuration (Air Flow Direction)	PID
Cisco 8102-64H-O	Port-side Intake	FAN-2RU-PI-V2
	Port-side Exhaust	FAN-2RU-PE-V2
Cisco 8101-32H-O	Port-side Intake	FAN-1RU-PI-V2
	Port-side Exhaust	FAN-1RU-PE-V2
Cisco 8111-32EH-O	Port-side Intake	FAN-1RU-PI-V2
Cisco 8101-32FH-O	Port-side Intake	FAN-1RU-PI-V2
	Port-side Exhaust	FAN-1RU-PE-V2
Cisco 8122-64EH-O	Port-side Intake	FAN-2RU-PI-V3 or FAN-2RU-PI-V4
Cisco 8102-28FH-DPU-O	Port-side Intake	FAN-2RU-PI-V4
Cisco 8122-64EHF-O	Port-side Intake	FAN-PI-V4

Note Port-Side Exhaust (PSE) configuration is not supported on these routers:

- Cisco 8111-32EH-O
- Cisco 8122-64EH-O
- Cisco 8102-28FH-DPU-O
- Cisco 8122-64EHF-O

Note The airflow direction must be the same for all power supply and fan modules in the chassis. Depending upon the required airflow direction, you can change the fan type. You must then also change the power supply.

Figure 124: Airflow Direction for Cisco 8102-64H-O Router

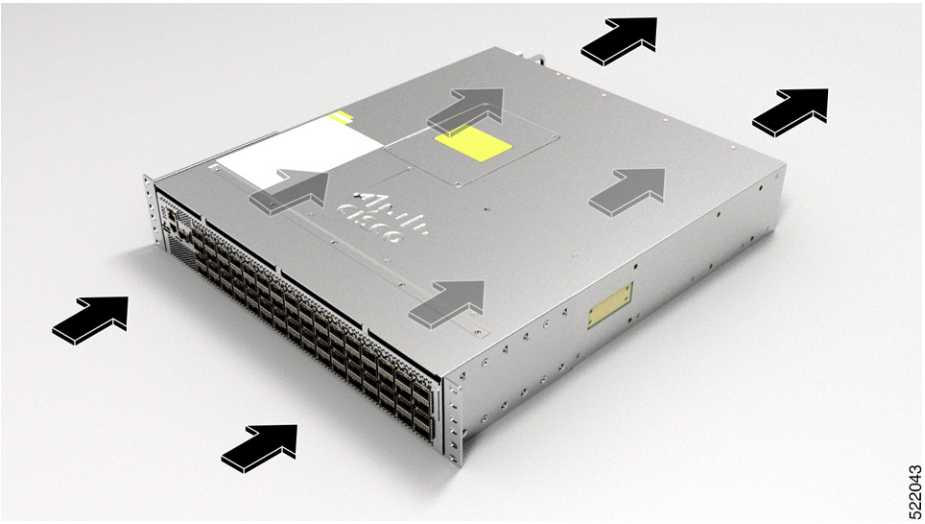


Figure 125: Airflow Direction for Cisco 8101-32H-O Router

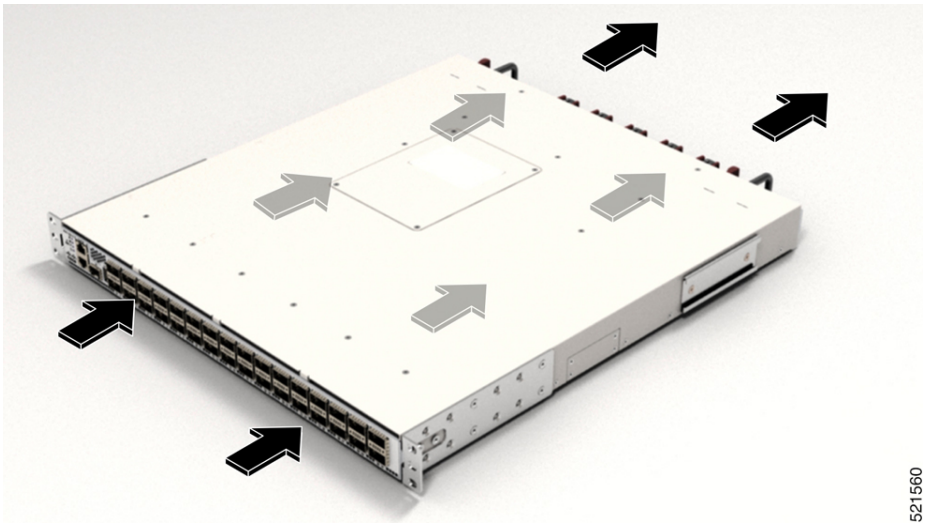


Figure 126: Airflow Direction for Cisco 8111-32EH-O Router

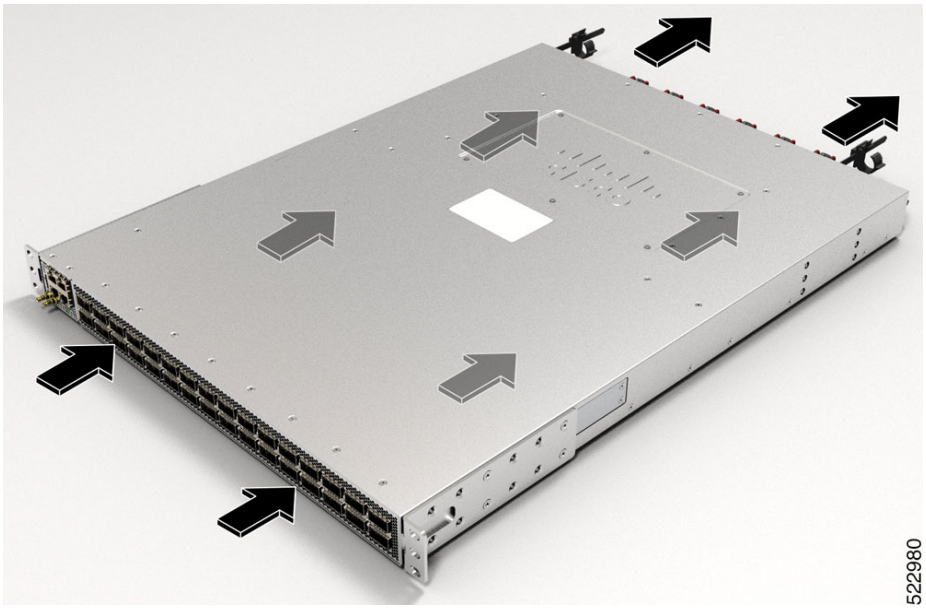


Figure 127: Airflow Direction for Cisco 8122-64EH-O Router

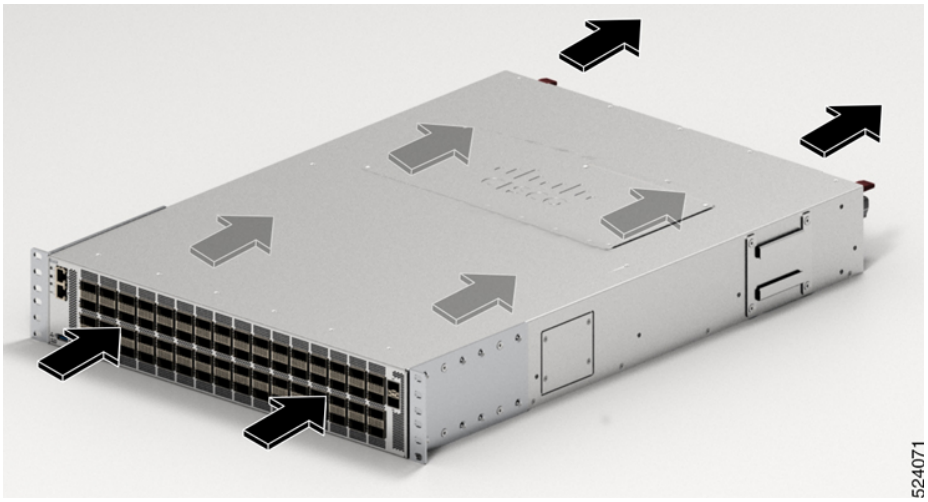
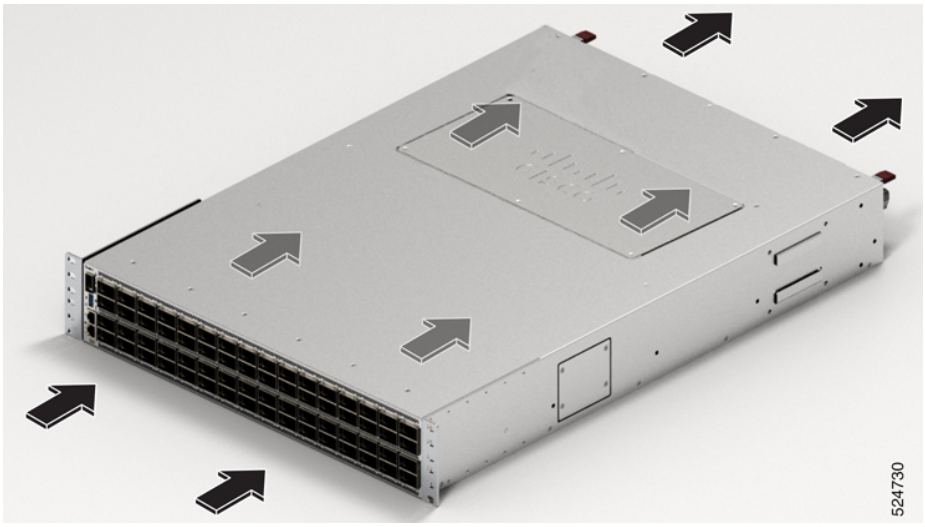


Figure 128: Airflow Direction for Cisco 8102-28FH-DPU-O Router

Figure 129: Airflow Direction for Cisco 8122-64EHF-O Router



Procedure

Step 1 To remove a fan module, follow these steps:

a) Press two latches on the fan module and grasp the handle of fan module.

Figure 130: Cisco 8102-64H-O Router — Remove Fans

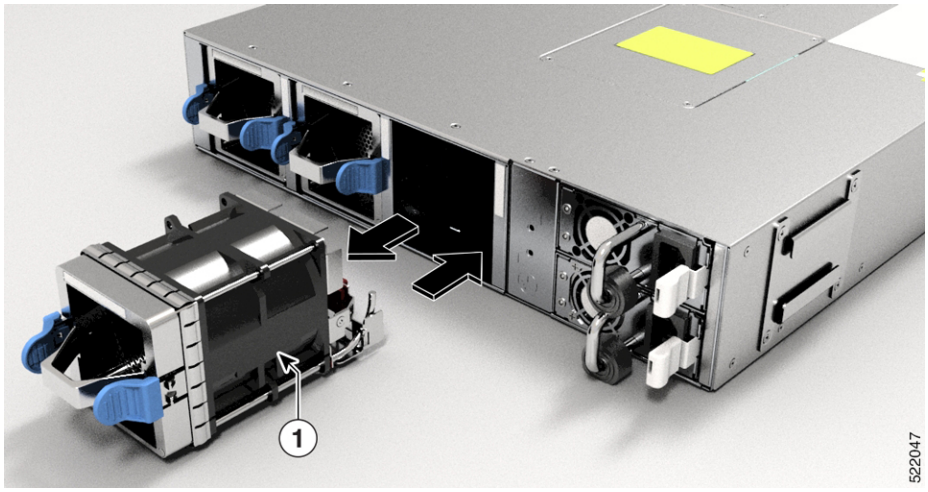


Figure 131: Cisco 8101-32H-O Router — Remove Fans

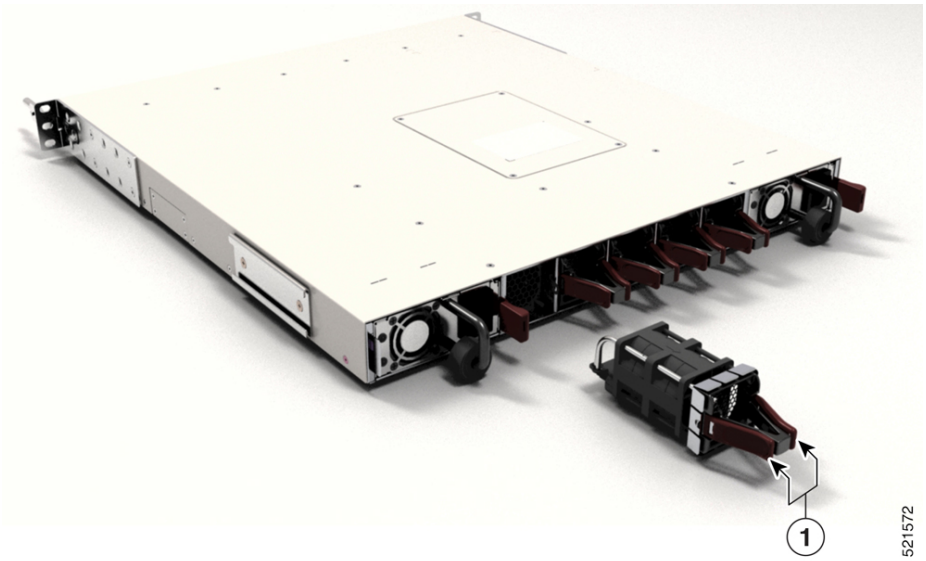


Figure 132: Cisco 8111-32EH-O Router — Remove Fans

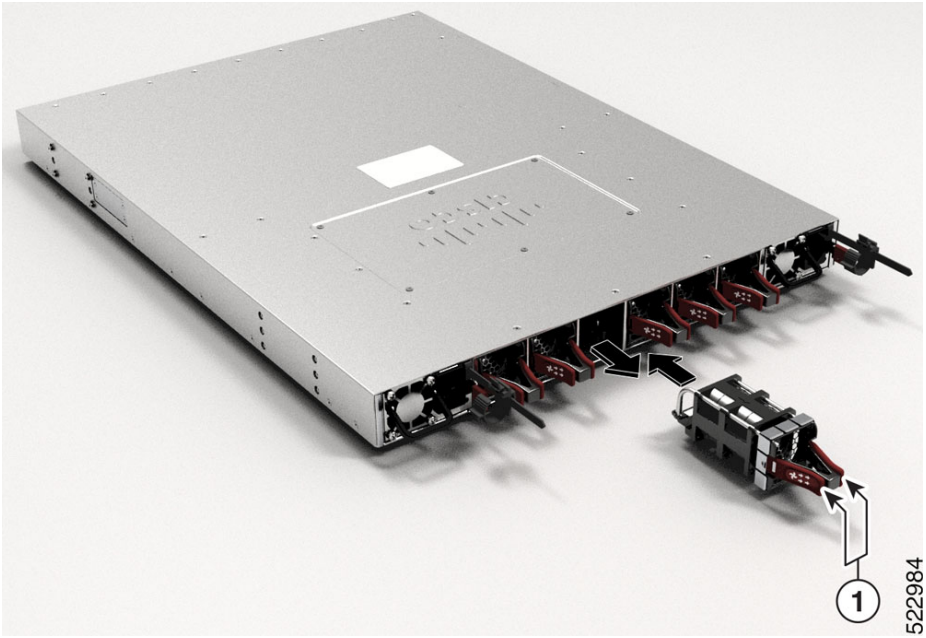


Figure 133: Cisco 8122-64EH-O Router — Remove Fans

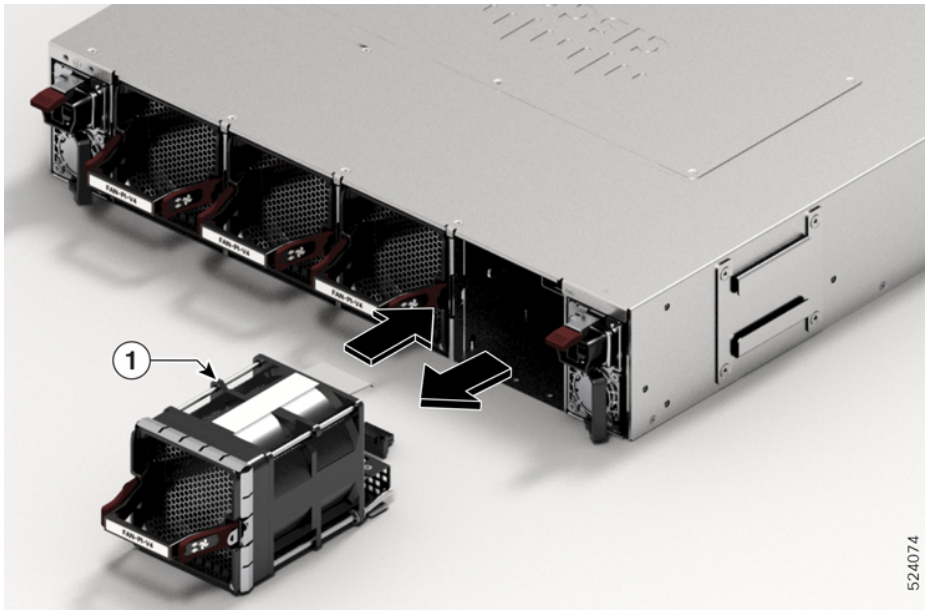


Figure 134: Cisco 8102-28FH-DPU-O — Remove Fans

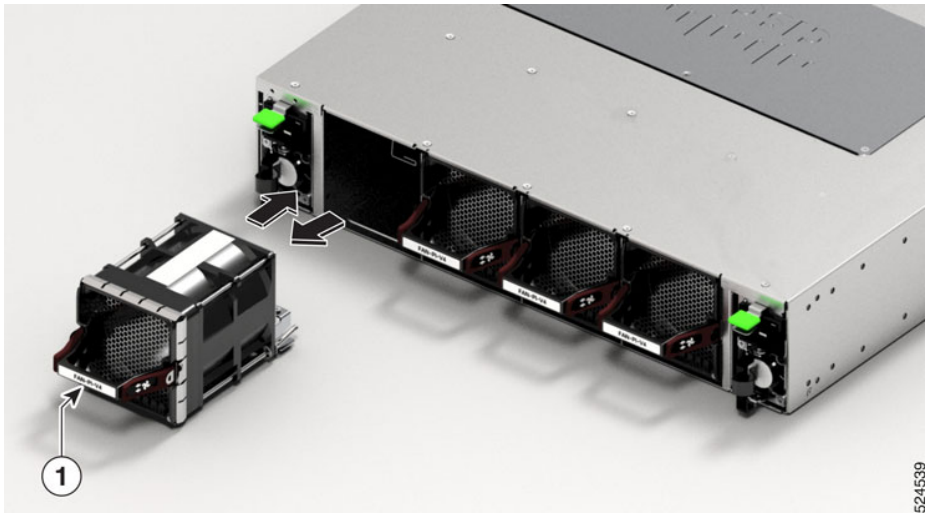


Figure 135: Cisco 8122-64EHF-O Router — Remove Fans

1	Latched fan module

b) As you simultaneously press the latches pull the fan module fully out of the chassis.

Step 2 To install a fan module, follow these steps:

a) Hold the fan module with the LED at the top.

b) Align the fan module to the open fan tray slot in the chassis, and press the module all the way into the slot until the left and right latches click and are locked on the chassis.

Note
If the fan module does not go all the way into the slot, do not force it. Remove the fan module and verify that it is the correct type for your router and in the correct orientation. To verify the status of fans and the speed, use the **show environment fan** command.

c) If the chassis is powered on, listen for the sound of the fans in operation. You should immediately hear them in operation. If you do not hear them, ensure that the fan module is inserted completely in the chassis.

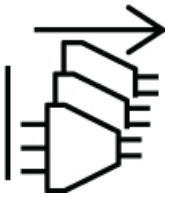
Note
During the fan module replacement, an empty fan slot causes the remaining fans to operate at higher speeds and may reach their maximum speed. This is a short-term condition that should only occur during the replacement of a fan module.

d) Verify that the fan module LED turns green. If the LED is not green, one or more fans are faulty. If this situation occurs, contact your customer service representative for replacement parts.

Replace Power Supply Units

Warning **Statement 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning **Statement 1005—**Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than:

- 20 A (North America) and 16 A (Europe) circuit breaker for an AC-input power supply module.
- 83 A DC-rated circuit breaker for each input of a DC-input power supply module, for safety purposes - irrespective of whether the inputs are power from a single or separate DC sources.

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1003—**DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC power before removing or replacing components or performing upgrades.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, 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.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

For DC power supply units:

- All power connection wiring should conform to the rules and regulations prescribed by the National Electrical Code (NEC), as well as local codes, if any.
- The DC return must remain isolated from the system frame and the chassis (DC-I).

  The color coding of the source DC power cable leads depends on the color coding of the site DC power source. Typically, green or green and yellow stripes indicate that the cable is a ground cable. Since there is no color code standard for source DC wiring, you must ensure that the power cables are connected to the DC-input power supply terminal block in the proper + and - polarity.

  In some cases, the source DC cable leads might have a positive (+) or a negative (–) label. This label is a relatively safe indication of polarity, but you must verify the polarity by measuring the voltage between the DC cable leads. When measuring, ensure that the positive lead and the negative lead always match the "+" and "-" labels on the DC-input power supply terminal block, respectively.
- DC power cables use the M-CRPS connector at the power supply end.
- The circuit must be protected by a dedicated two-pole DC-rated circuit breaker.

  The circuit breaker is considered to be the disconnect device and must be easily accessible. For DC-input power supply units with multiple inputs, each DC input must be protected by a dedicated DC-rated circuit breaker or a fuse.

  The circuit breaker or fuse should be sized according to the power supply input rating and local or national code requirements.
- If the DC inputs are powered from separate sources, the cables must be wired straight across to their respective sources and terminals.

  Crossed cables in a setup where the DC source has floating outputs means that no damage will occur, but the LEDs will not light up, and the module will not operate.

Crossed cables in a setup with a positive ground or a negative ground power system constitute a severe safety hazard that includes causing electric shock and generating excessive EMI and RFI.

Note We recommend that you occupy both the power supply slots of the fixed port routers with power supplies. In case a power module fails, it is recommended to retain the failed power module in its slot until it is replaced with a new power module. This recommendation ensures that the system airflow is not impacted adversely, which may then result in the overheating of the router and its components. Duration to replace the PSU at ambient room temperature (23-degree C to 27-degree C) is within 5 minutes.

Note Routers can operate normally only with the same type of PSU in both the power slots. During replacement of PSU from one type to another (AC to DC or vice-versa (or) 2KW to 3KW or vice-versa), the router exhibits unexpected behaviour and the Cisco IOS XR software raises the PID mismatch alarm due to the presence of different types of PSUs. You must therefore replace the PSUs in both slots with the same type.

Note When installing or replacing power supplies, ensure that input voltage and power supply capacity remain the same for both the power supplies. If changing to a different power supply capacity (that is, 2KW to 3KW) or input type (AC to DC), the system must be powered down, and both power supplies must be replaced while the system is still powered down.

To swap from one type of PSU to the other (AC to DC or vice-versa), follow the instructions outlined in these procedures as appropriate—

- To uninstall an AC/HVPI PSU, follow steps 1 through 3 in the "Replace AC, HVAC, or HVDC Power Supply" procedure.
- To uninstall a DC PSU, follow steps 1 and 2 in the "Replace Low Voltage DC Power Supply" procedure.
- To install an AC/HVPI PSU, follow steps 4 through 8 in the "Replace AC, HVAC, or HVDC Power Supply" procedure.
- To install a DC PSU, follow steps 3 through 6 in the "Replace Low Voltage DC Power Supply" procedure.
- To connect power to an AC PSU, follow the steps outlined in the "Connect AC Power to the Chassis" procedure.
- To connect power to a DC PSU, follow the steps outlined in the "Connect DC Power to the Chassis" procedure.
- To connect power to an HVPI PSU, follow the steps outlined in the "Connect High Voltage Power Supply Unit to Power Source, on page 69" procedure.

Replace AC, HVAC, or HVDC Power Supply

This procedure below applies to the following power supply units (PSUs):

Table 16: PIDs for Power Supply Units

AC PID	HVPI PID
• PSU650W-ACPI • PSU650W-ACPE • PSU2KW-ACPI • UCSC-PSU1-2300W	• PSU3KW-HVPI • PSU2KW-HVPI

Note We recommend that you occupy both the power supply slots of the fixed port routers with power supplies. In case a power module fails, it is recommended to retain the failed power module in its slot until it is replaced with a new power module. This recommendation ensures that the system airflow is not impacted adversely, which may then result in the overheating of the router and its components. Duration to replace the PSU at ambient room temperature (23-degree C to 27-degree C) is within 5 minutes.

Note When there are two PSUs in the router, use the following steps to replace the PSUs (AC to DC or vice-versa (or) 2KW to 3KW or vice-versa) to a different type. Routers can operate normally only with the same type of PSU in both the power slots. During replacement of PSU from one type to another, the router exhibits unexpected behaviour and the Cisco IOS XR software raises the PID mismatch alarm due to the presence of different types of PSUs. You must therefore replace the PSUs in both slots with the same type.

Note When installing or replacing power supplies, ensure that input voltage and power supply capacity remain the same for both the power supplies. If changing to a different power supply capacity (that is, 2KW to 3KW) or input type (AC to DC), the system must be powered down, and both power supplies must be replaced while the system is still powered down.

To replace a single PSU (for example, due to PSU failure), follow the procedure below.

To replace both PSUs (for example, to change type or output of PSU), disconnect power from both PSUs and follow the procedure below.

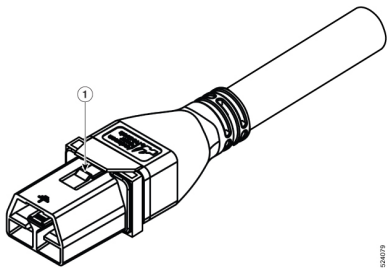
Procedure

Step 1 Ensure that the PSUs are powered off.

Step 2 Disconnect the power cord of the PSU that must be replaced.

If you use the Saf-D-Grid power cord, then press the latch before pulling the power cord out from the power supply.

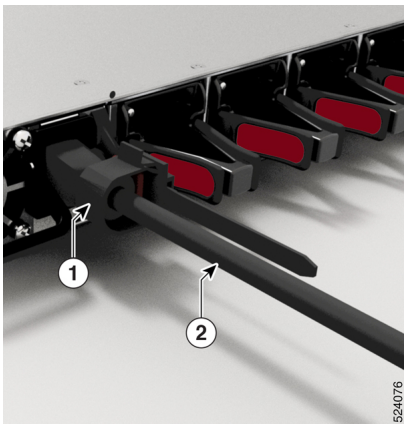
Figure 136: Latch on Saf-D-Grid Power Cord



1	Latch

Note
In case of an AC PSU, remove the power cord retention clamp from the AC PSU before disconnecting the AC power cord.

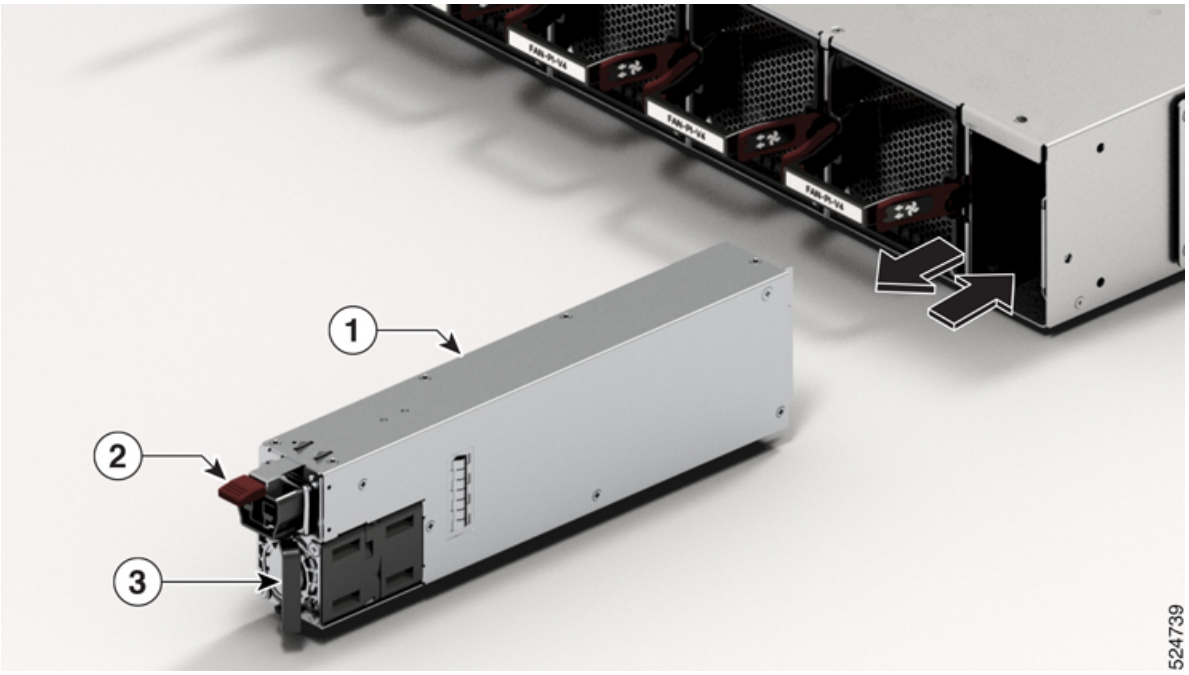
Figure 137: Disconnect AC Power Cable



1	Power cord retention clamp	2	AC power cable

Step 3 Press the tab inward to unlatch the PSU, and pull the handle to remove the PSU.

Figure 138: Remove the PSU



1	PSU	3	Handle
2	Tab		

Note
On the Cisco 8101-32H-O and Cisco 8102-64H-O Router, when you remove one of the PSUs, the fan speed for the following fan modules becomes very high:

- FAN-1RU-PE-V2
- FAN-2RU-PE-V2

Step 4 Insert the new PSU.

a) Grasp the PSU and insert it into the empty slot.
b) Slide the PSU into the slot until the release lever locks.

Note
If the PSU does not go all the way into the slot, do not force it. Remove the PSU and verify that it is the correct type for your router and in the correct orientation. Ensure that the PSU is latched completely into the slot.

Step 5 Connect the power cord to the PSU. Ensure that the power cord is completely fixed.

Note
For an AC PSU that has an IEC connector (example, 2KW PSU), fix the power cord retention clamp to the power supply.

For an AC/HVDC PSU (example, 3KW PSU) that has Saf-D-Grid power cord, ensure that power cord is latched.

Step 6 Turn on the power at source.

Step 7 Wait till the PSU LED color turns green. Verify the power using the **show environment power** command after the router boots up.

Step 8 Repeat steps 1 through 7 to replace the PSU in the second slot.

Replace Low Voltage DC Power Supply

This procedure below applies to the following power supply units:

- PSU930W-DCPI
- PSU930W-DCPE
- PSU2KW-DCPI

Note When installing or replacing power supplies, ensure that input voltage and power supply capacity remain the same for both the power supplies. If changing to a different power supply capacity or input type (AC to DC), the system must be powered down, and both power supplies must be replaced while the system is still powered down.

To replace a single PSU (for example, due to PSU failure), follow the procedure below.

To replace both PSUs (for example, to change type or output of PSU), disconnect power from both PSUs and follow the procedure below.

Note We recommend that you occupy both the power supply slots of the fixed port routers with power supplies. In case a power module fails, it is recommended to retain the failed power module in its slot until it is replaced with a new power module. This recommendation ensures that the system airflow is not impacted adversely, which may then result in the overheating of the router and its components. Duration to replace the PSU at ambient room temperature (23-degree C to 27-degree C) is within 5 minutes.

Procedure

Step 1 Disconnect the power cable of the PSU that must be replaced.

In case of the PSU2KW-DCPI and PSU930W-DCPI/DCPE PSUs, press the latch before pulling the power cord out from the PSU.

Step 2 Press the tab inward to unlatch the PSU and pull the PSU.

Step 3 Insert the new PSU.

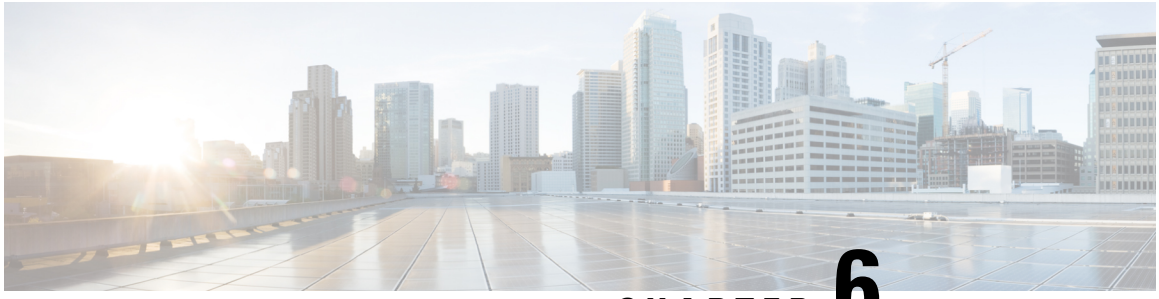
Note
If the PSU does not go all the way into the slot, do not force it. Remove the PSU and verify that it is the correct type for your router and in the correct orientation.

Step 4 Connect the PSU cable.

In case of PSU2KW-DCPI, PSU930W-DCPI/DCPE PSU, insert the power cord into the PSU.

Step 5 Turn on the power at source.

Step 6 Wait till the PSU LED color turns green. Verify the power using the **show environment power** command after the router boots up.



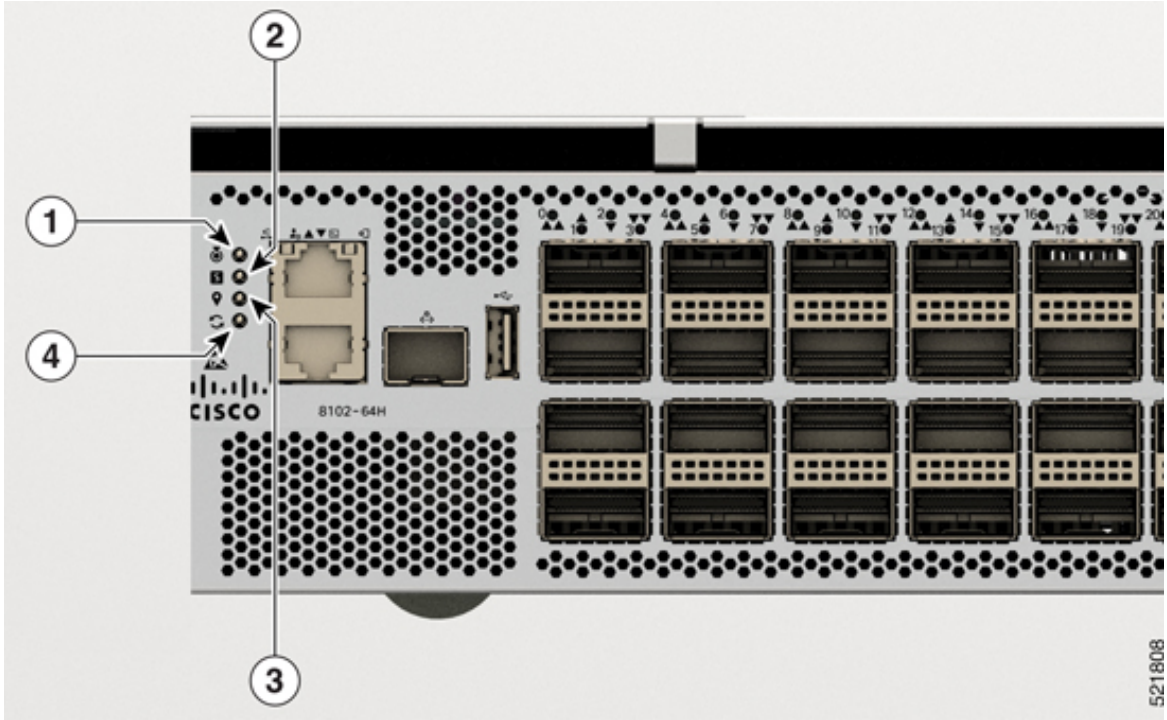
CHAPTER 6

LEDs

Chassis LEDs

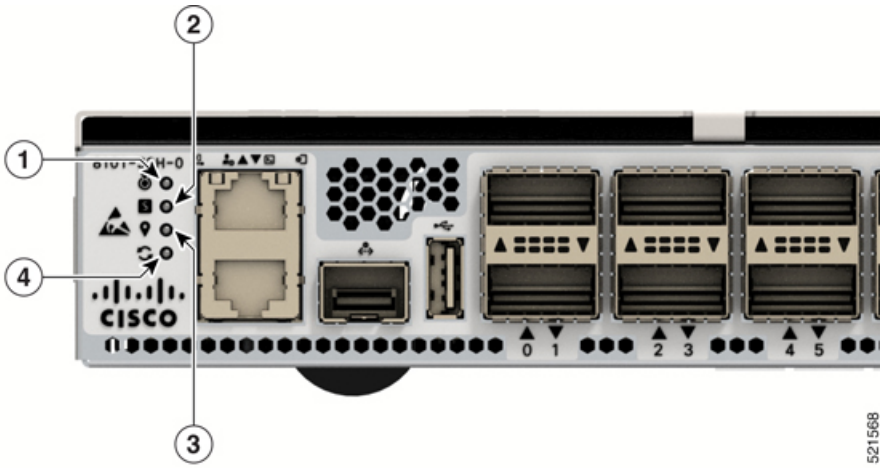
Attention, Status, Synchronization, and GPS LEDs are located both at the far left of the front of the chassis and also on the back of the chassis:

Figure 139: Chassis LEDs - Front View of Cisco 8102-64H-O



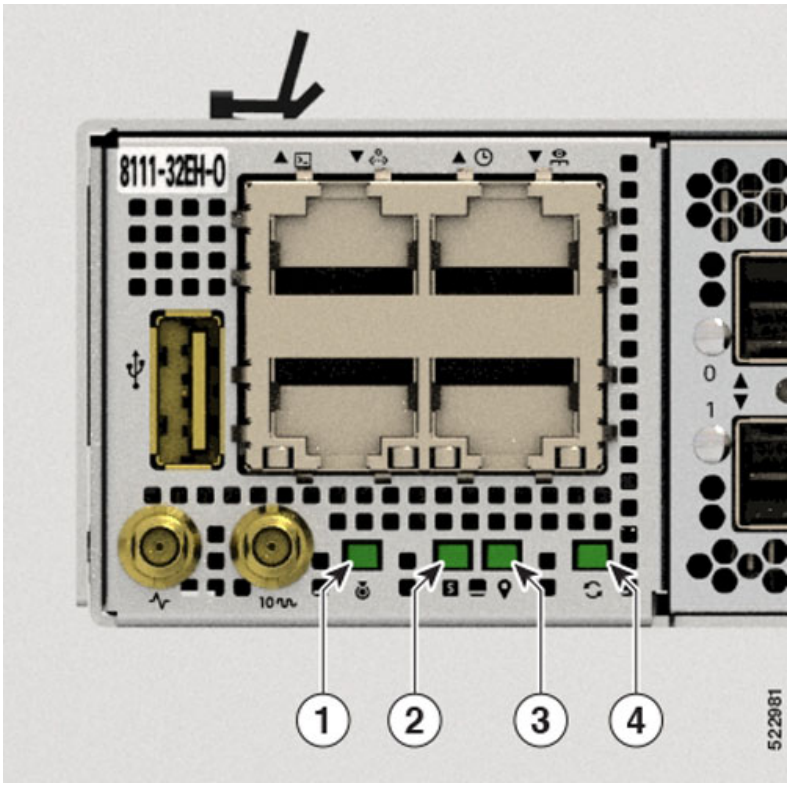
1	Attention
2	Status
3	GPS
4	Synchronization

Figure 140: Chassis LEDs - Front View of Cisco 8101-32H-O



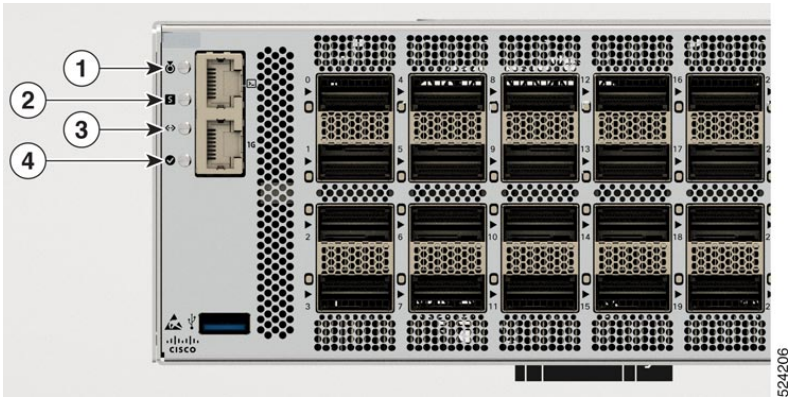
1	Attention
2	Status
3	GPS
4	Synchronization

Figure 141: Chassis LEDs - Front View of Cisco 8111-32EH-O



1	Attention
2	Status
3	GPS
4	Synchronization

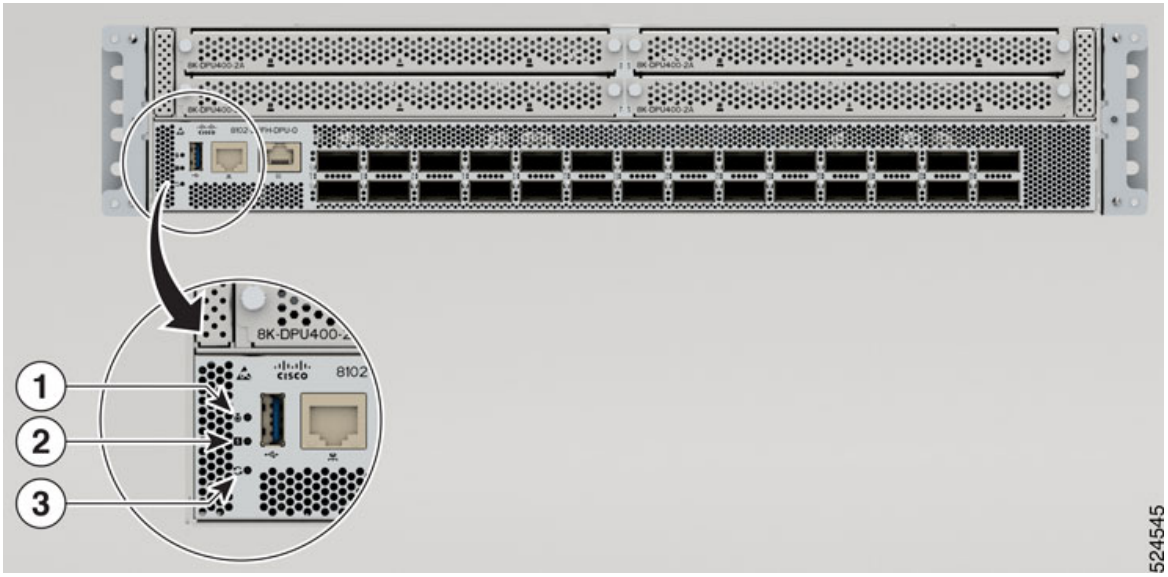
Figure 142: Chassis LEDs - Front View of Cisco 8122-64EH-O



1	Attention

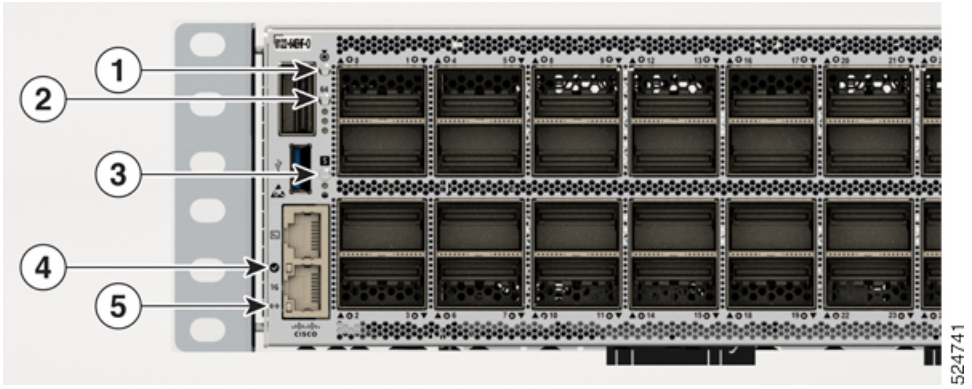
2	Status
3	Activity
4	Link

Figure 143: Chassis LEDs - Front View of Cisco 8102-28FH-DPU-O



1	Attention
2	Status
3	Synchronization

Figure 144: Chassis LEDs - Front View of Cisco 8122-64EHF-O



1	Attention
2	QSFP28 Port 64 Status
3	Status

4	Link
5	Activity

Table 17: Management Port LED

Link 	Activity 	Description
OFF	Yellow	1000Mbps link with no activity
OFF	Flashing yellow	1000Mbps link with activity
Green	Yellow	100Mbps link with no activity
Flashing green	Flashing yellow	100Mbps link with activity
Green	OFF	10Mbps link with no activity
Flashing green	OFF	10Mbps link with activity
OFF	OFF	No link

Table 18: Chassis LED Descriptions

LED	Color	Status
Attention 	Flashing blue	The operator has activated this LED to identify this chassis.
	Off	This chassis is not being identified.
Status 	Green	The module is operational and has no active major or critical alarms.
	Flashing Green	The auto or manual FPD upgrade is in progress.
	Amber	The module is in one of the following states: • Power cycle • Reload or reimage • Shutdown
	Flashing Amber	The module has minor alarm.
	Red	Power-up failure which prevents the CPU from booting.
	Flashing Red	The module has active major or critical alarms.
	Off	The module is powered-off.

LED	Color	Status
Synchronization 	Green	Time core is synchronized to an external source including IEEE1588.
	Amber	The system is running in holdover or free-run mode and it is not synchronized to an external interface.
	Off	The centralized frequency or time and phase distribution is not enabled.
GPS 	Green	The GPS interface is provisioned and frequency, time of day and phase inputs are all operating correctly.
	Off	The GPS interface is not provisioned, or the GPS inputs are not working correctly.
QSFP28 Port 64 Status 	Green	The port is in operational state.
	Off	The port is in off state.

Fan Tray LED

Fan tray modules are located on the back of the chassis. Each fan tray module has a Status LED.

Figure 145: Fan Tray LED - Cisco 8102-64H-O Chassis

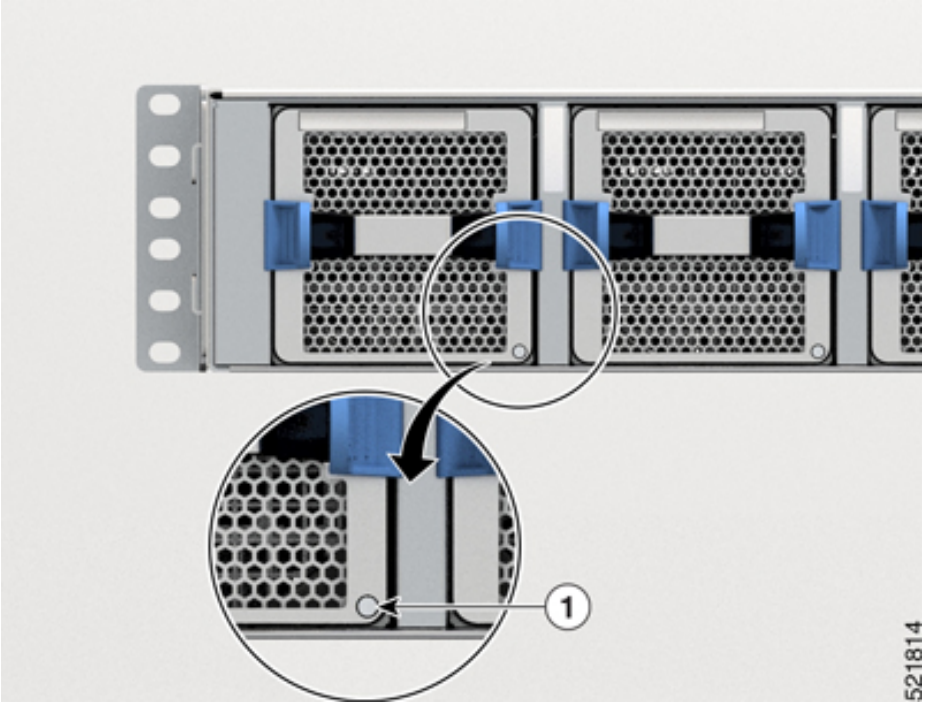
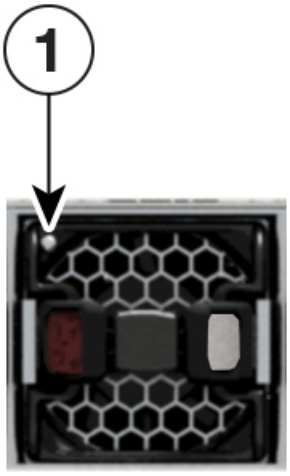


Figure 146: Fan Tray LED - Cisco 8101-32H-O and Cisco 8111-32EH-O Chassis



1	Fan Status LED

Figure 147: Fan Tray LED - Cisco 8102-28FH-DPU-O

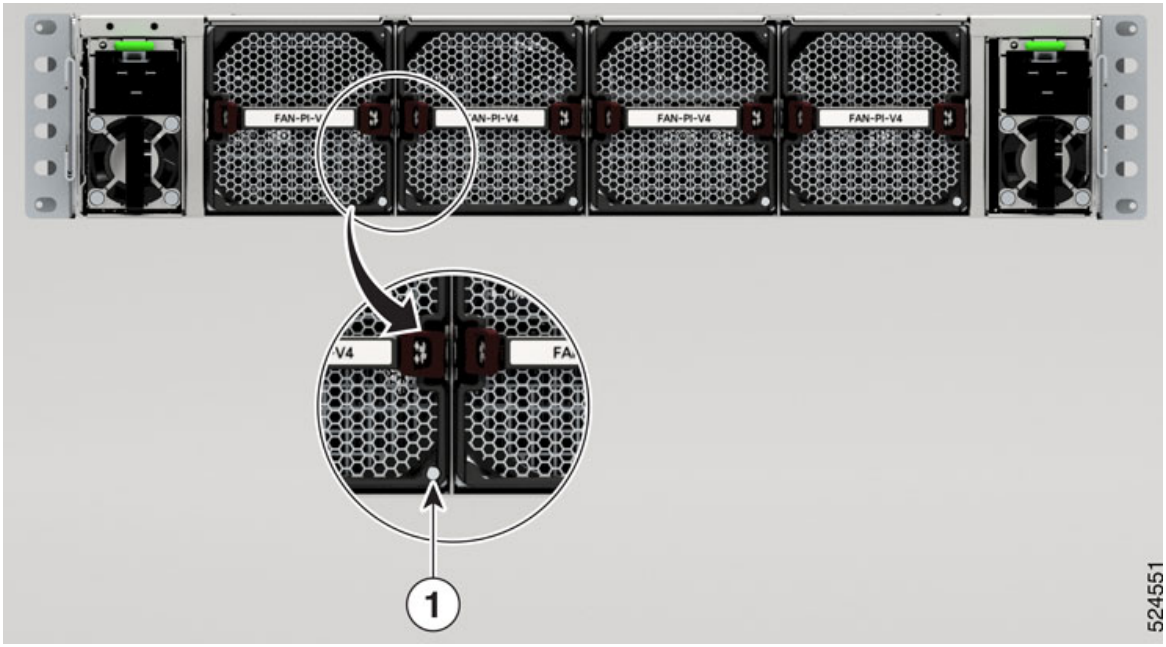


Figure 148: Fan Tray LED - Cisco 8122-64EH-O

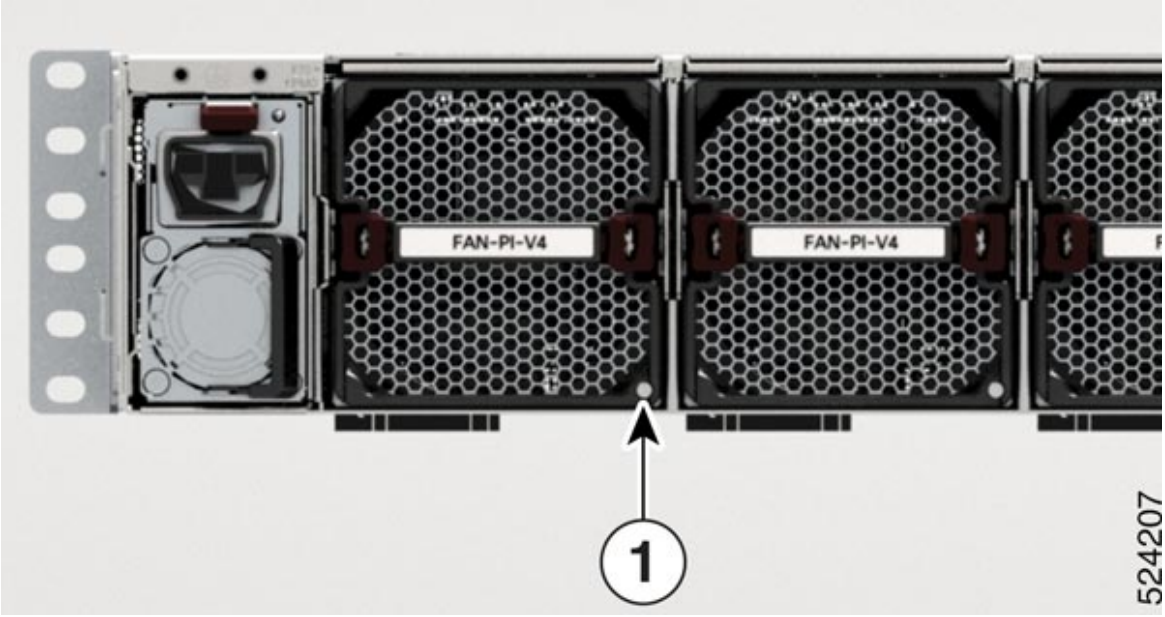
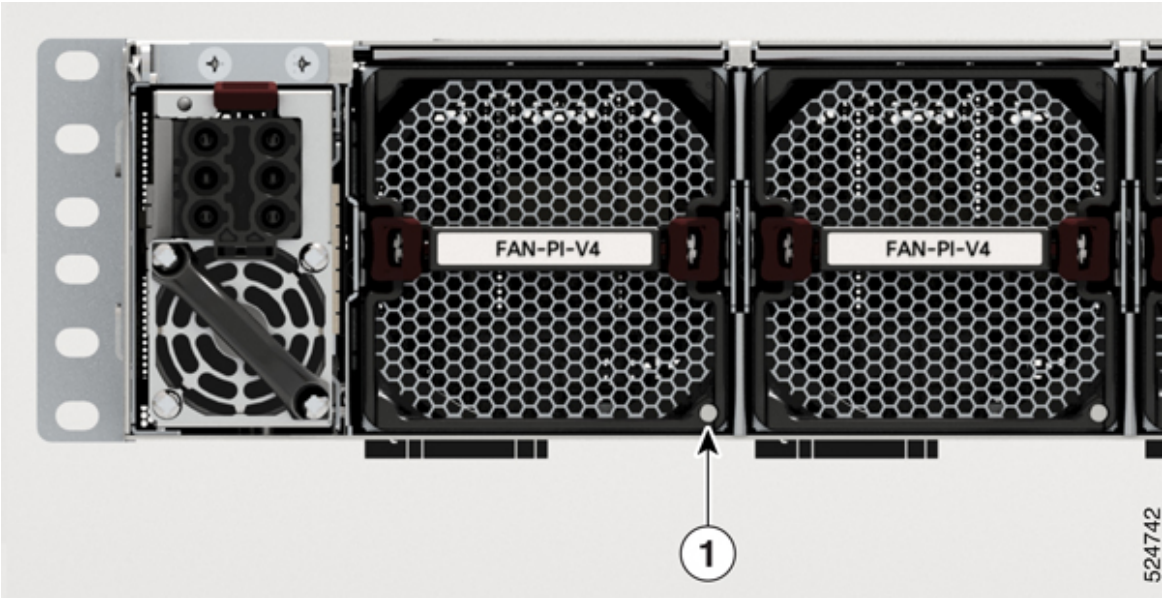


Figure 149: Fan Tray LED - Cisco 8122-64EHF-O



1	Fan Status LED

Table 19: Fan Tray LED Descriptions

LED	Color	Status
STATUS	Green	Fan is operating normally.
	Amber	Fan tray is inserted and pending to come online.
	Flashing Amber	Fan has failed.
	Off	Fan is not receiving power.

Power Supply LEDs

Power modules are located on the back side of the chassis. Each power module has a Status LED.

Figure 150: Cisco 8102-64H-O Power Supply LED

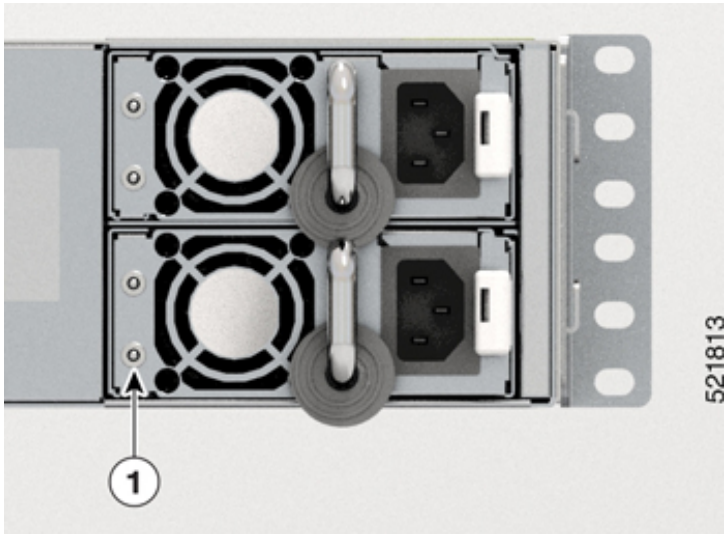


Figure 151: Cisco 8101-32H-O Power Supply LED

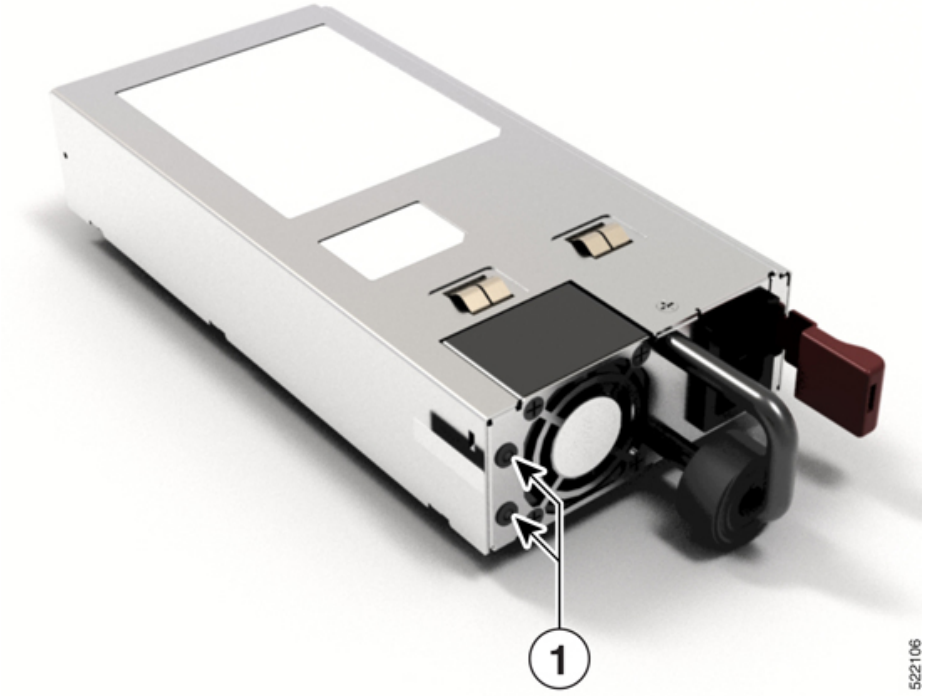


Figure 152: Cisco 8111-32EH-O Power Supply LED

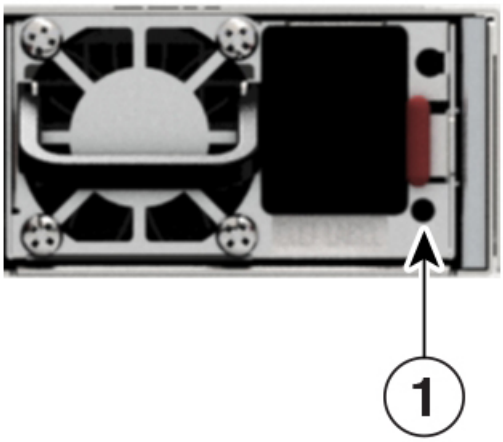


Figure 153: Cisco 8102-28FH-DPU-O Power Supply LED

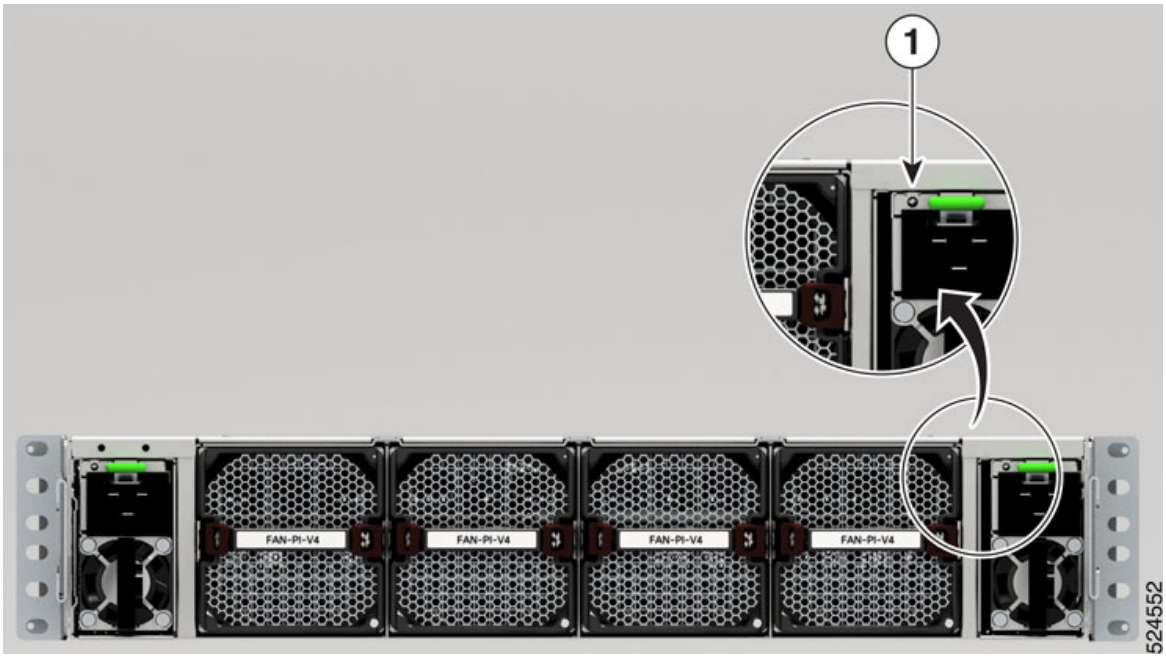


Figure 154: Cisco 8122-64EH-O Power Supply LED

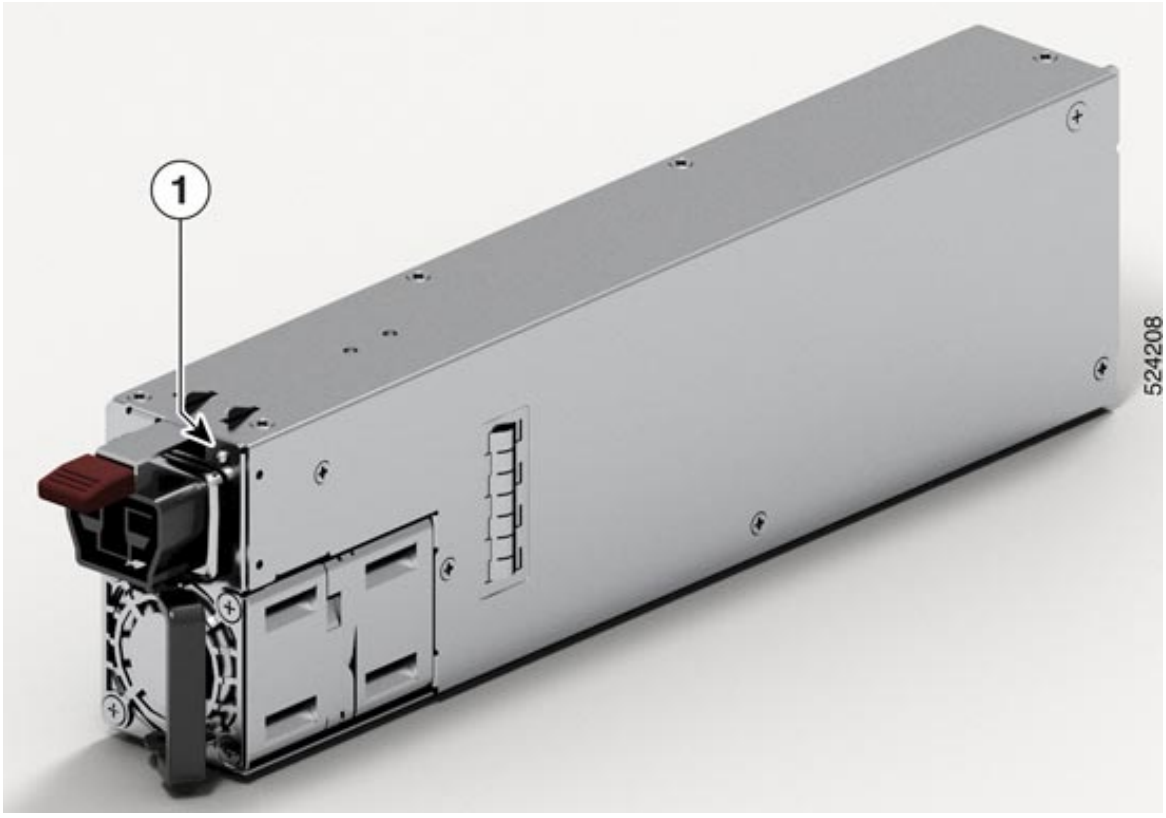
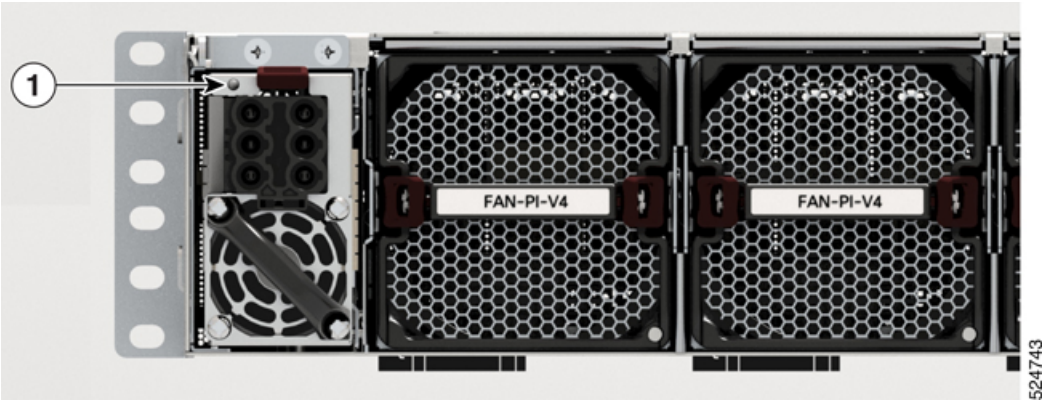


Figure 155: Cisco 8122-64EHF-O Power Supply LED



1	Status LED

Table 20: Power Supply LED Descriptions

LED	Color	Status
Status	Green	Power supply is on and transmitting power to the router.
	Flashing Green	Power supply is connected to input power source but not transmitting power to the router.
	Amber	Critical Power supply failure, due to one of the following conditions: • The 12 V main power is switched off • AC input is absent • Over-voltage, over-current, over-temperature, or over-temperature due to fan failure
	Flashing Amber	Power supply is operating but a warning condition has occurred, due to one of the following conditions: • High temperature • High power • Slow fan
	Off	Power supply units are not receiving power.

Port Status LEDs

Each port has an LED. The following table describes port status LEDs.

Figure 156: Port Status LED - Cisco 8102-64H-O Router

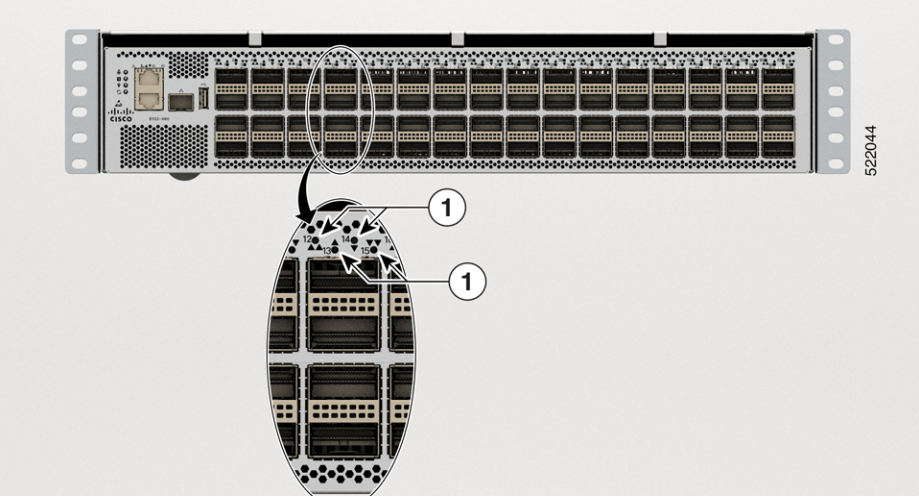


Figure 157: Port Status LED - Cisco 8101-32H-O Router

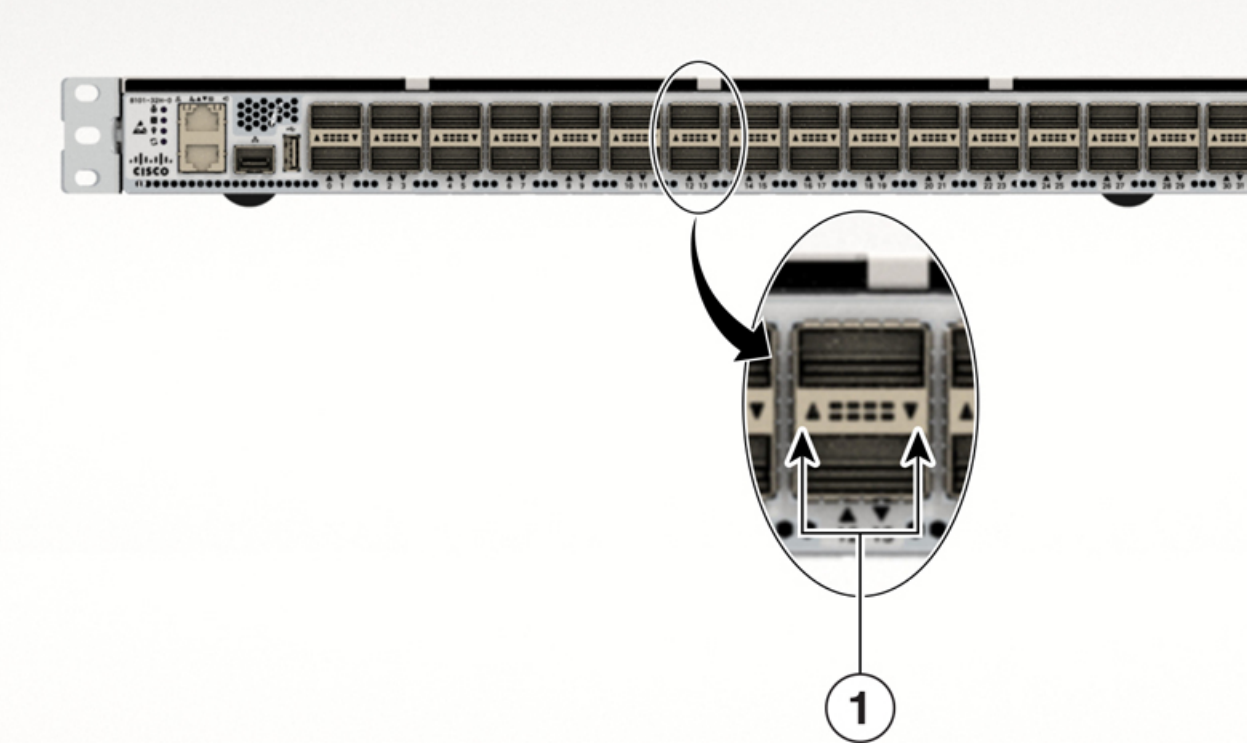


Figure 158: Port Status LED - Cisco 8111-32EH-O Router

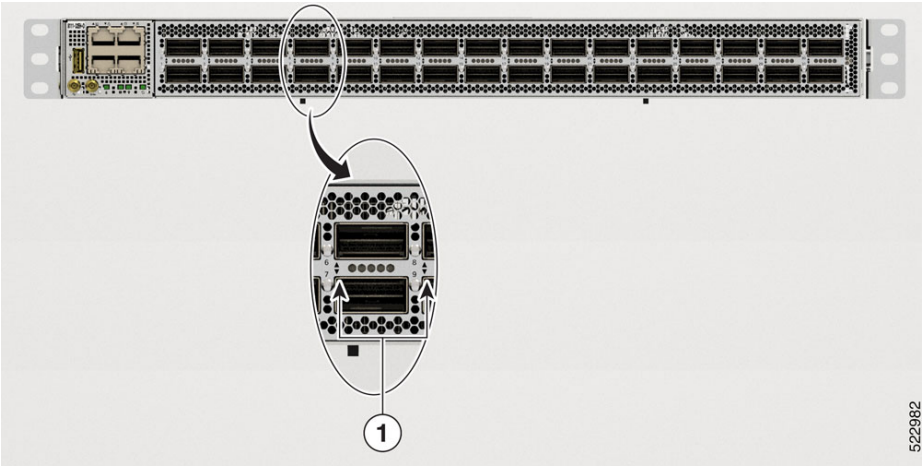


Figure 159: Port Status LED - Cisco 8122-64EH-O Router

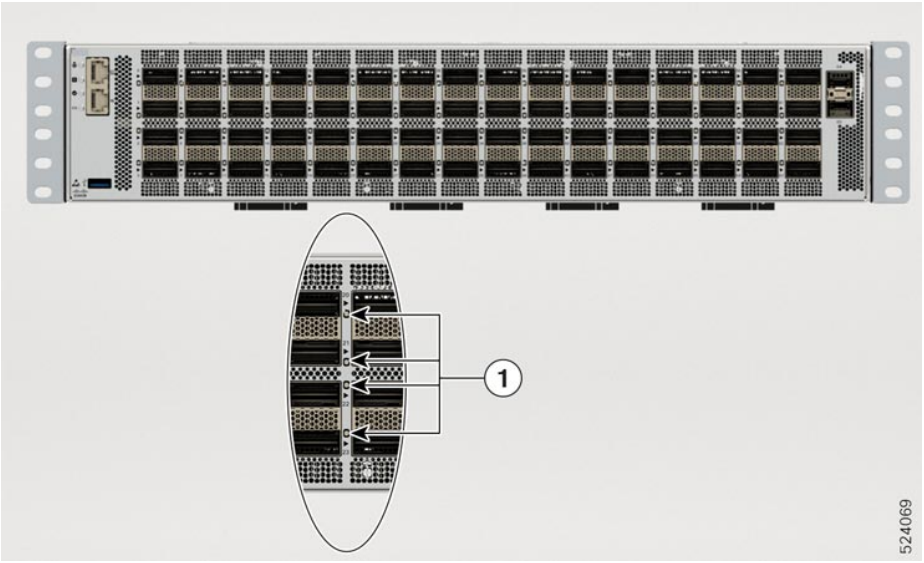
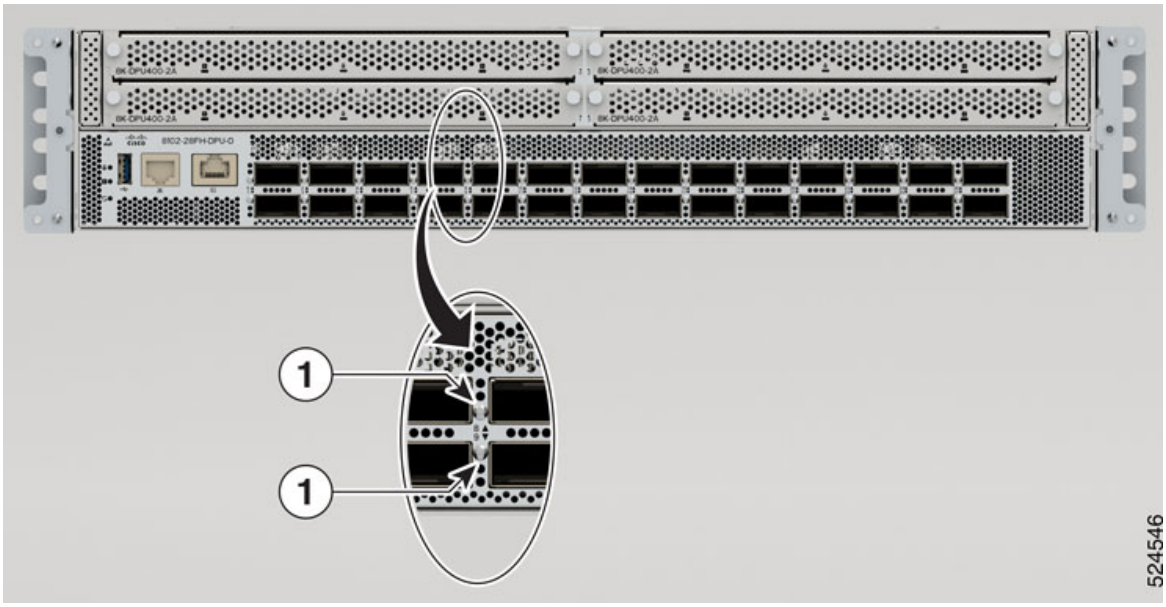


Figure 160: Port Status LED - Cisco 8102-28FH-DPU-O Router

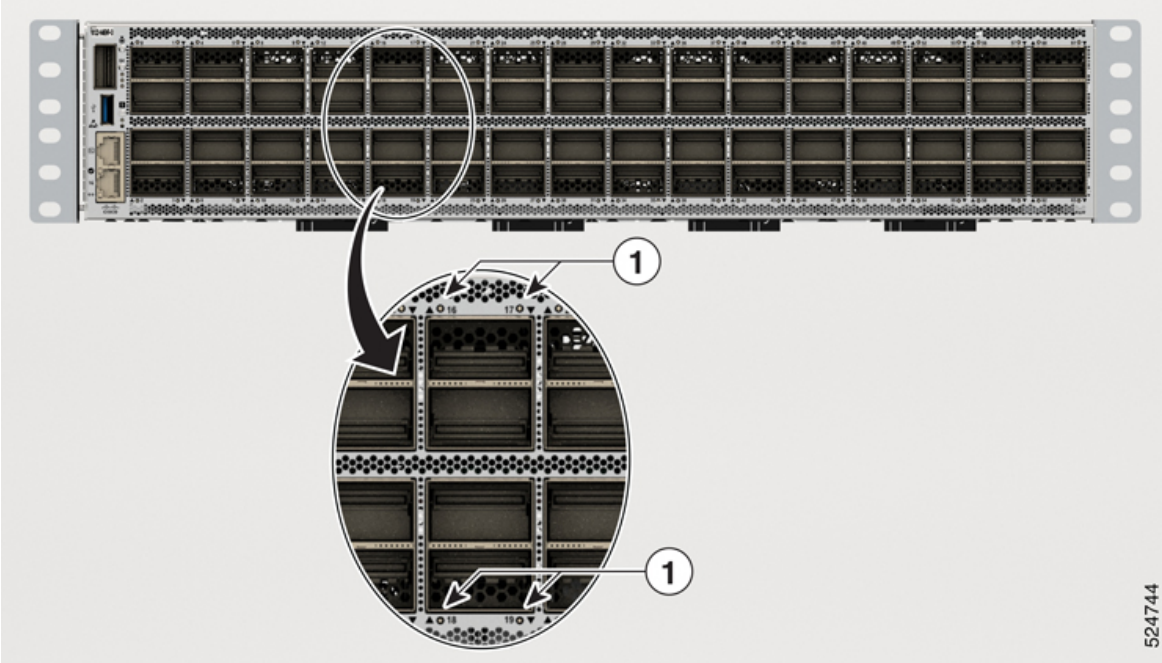


1	Port Status LED

Table 21: Port Status LEDs (one per port)

LED Color	Description
Off	Port is administratively shut down.
Amber	Port is administratively enabled and the link is down.
Green	Port is administratively enabled and the link is up.

Figure 161: Port Status LED - Cisco 8122-64EHF-O Router



1	OSFP Port Status LED

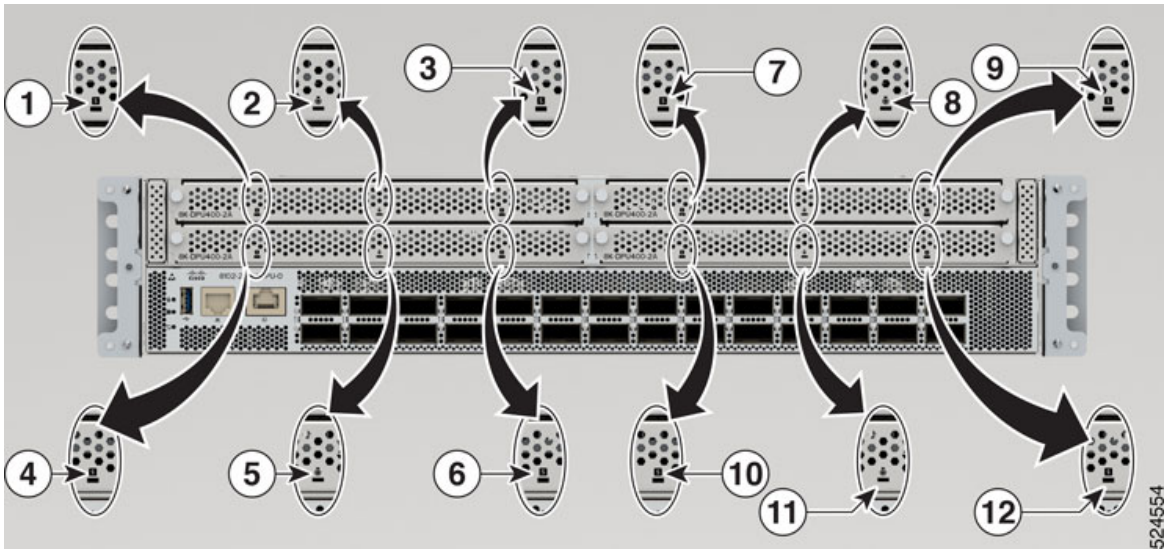
Table 22: OSFP Port Status LEDs (one per port)

LED Color	Description
Off	Port is administratively shut down.
Green	Port is administratively enabled and the link is up.

DPU Adapter LEDs

The DPU adapters are located at the front of the chassis. Each adapter includes one attention LED and two status LEDs. The attention LED signals the state of the adapter, while the status LEDs display the respective statuses of the DPU complexes on the adapter.

Figure 162: DPU Adapter LEDs



1	DPU0-Status (DPU complex 1 of adapter 1)	4	DPU2-Status (DPU complex 1 of adapter 2)	7	DPU4-Status (DPU complex 1 of adapter 3)	10	DPU6-Status (DPU complex 1 of adapter 4)
2	DPU0-Attention (DPU adapter 1)	5	DPU1-Attention (DPU adapter 2)	8	DPU2-Attention (DPU adapter 3)	11	DPU3-Attention (DPU adapter 4)
3	DPU1-Status (DPU complex 2 of adapter 1)	6	DPU3-Status (DPU complex 2 of adapter 2)	9	DPU5-Status (DPU complex 2 of adapter 3)	12	DPU7-Status (DPU complex 1 of adapter 4)

Table 23: DPU Adapter LED Descriptions

LED	Color	Status
Attention 	Flashing blue	The operator has activated this LED to identify this DPU adapter.
	Off	This DPU adapter is not being identified.

LED	Color	Status
Status 	Green	The module is operational and has no active major or critical alarms.
	Flashing Green	The auto or manual FPD upgrade is in progress.
	Amber	The module is in one of the following states: • Power cycle • Reload or reimage • Shutdown
	Flashing Amber	The module has minor alarm.
	Red	Power-up failure which prevents the CPU from booting.
	Flashing Red	The module has active major or critical alarms.
	Off	The module is powered-off.