DONEWIN
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Hardware Installation Guide for Cisco 8100 Series Routers Datasheet

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C O N T E N T S

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 - It provides 6.4 Tbps of network bandwidth with dramatically lower power consumption than contemporary 10 Tbps systems. The Cisco 8102 Router is a fixed port, high density, two rack unit form-factor router. Supported ports include 64 x 100G QSFP28.

- 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 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 supports Cisco-qualified open-source network operating systems, such as SONiC (Software for Open Networking in the Cloud).

- Cisco 8101-32FH - It provides 12.8Tbps of network bandwidth. The Cisco 8101-32FH Router is a fixed port, high density, one rack unit form-factor router. Supported ports include 32 x 400G QSFP-DD. 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 8101-32FH-O - It provides 12.8Tbps of network bandwidth. The Cisco 8101-32FH 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 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 - It provides 3.2 Tbps of network bandwidth with dramatically lower power consumption than contemporary 10 Tbps systems. The Cisco 8101 Router is a fixed port, high density, one rack unit form-factor router. Supported ports include 32 x 100G QSFP28.

Figure 1: Cisco 8102-64H Router—Front View
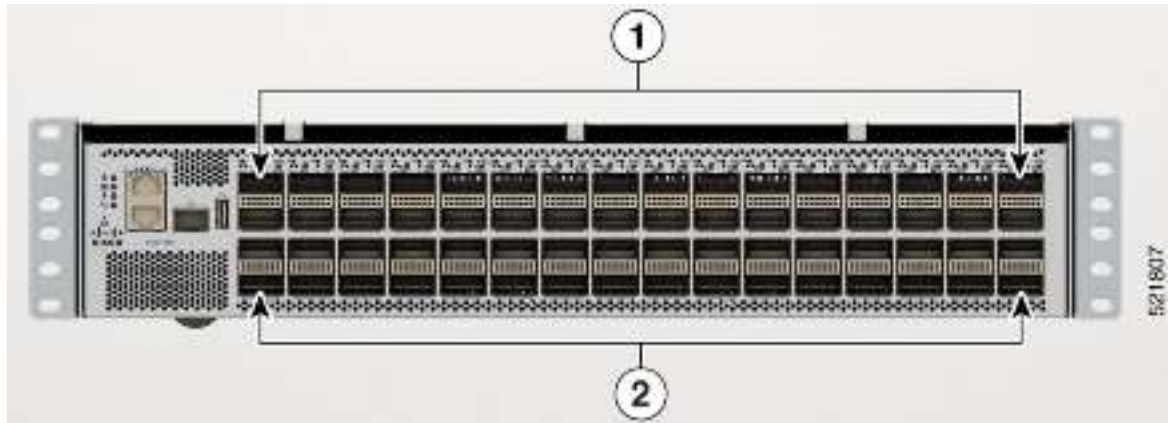
1	32 QSFP28 ports
2	32 QSPF28 ports

Figure 2: Cisco 8101-32H Router—Front View
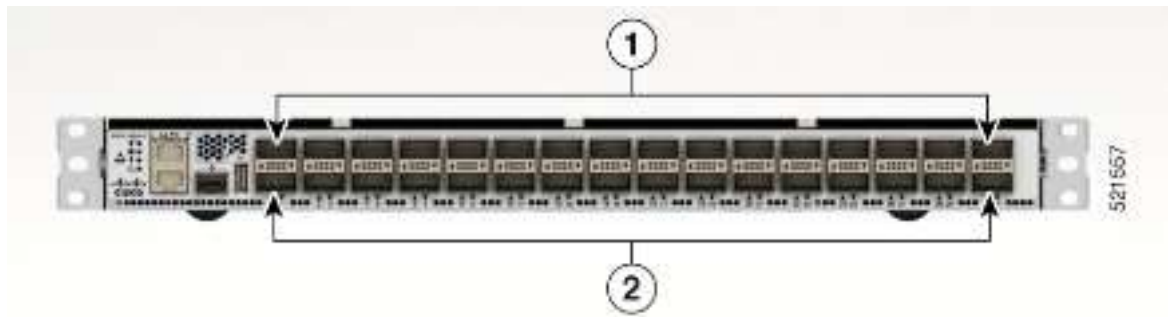
1	16 QSFP28 ports
2	16 QSPF28 ports

Figure 3: Cisco 8102-64H Router—Rear View
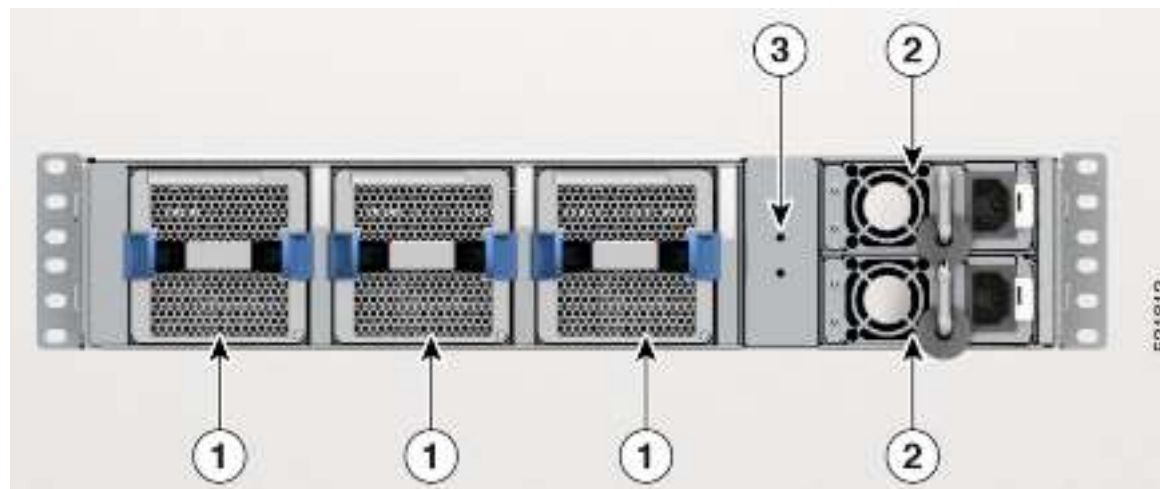
1	Fan Tray Three Fans: FT0, FT1, and FT2
2	PSU-0 and PSU-1
3	Ground Lug Location

Figure 4: Cisco 8101-32H Router—Rear View
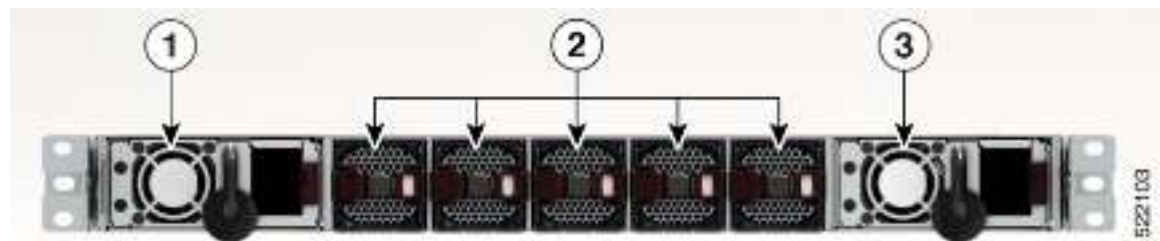
1	PSU-0
2	Fan Tray Five Fans: FT0, FT1, FT2, FT3, and FT4
3	PSU-1

Field Replaceable Units

The router has two field replaceable units (FRUs):

- Fan Module
- Power Supply Unit

Both the FRUs support OIR (Online Insertion and Removal).

Fan Module

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.

Figure 5: Fan Module - Cisco 8102-64H
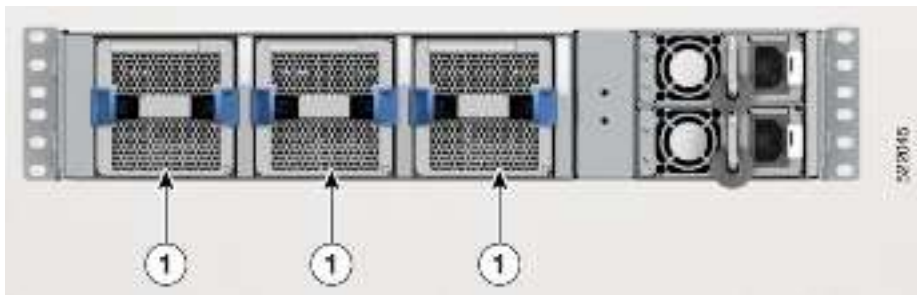
1	Fan

Table 1: Fan Module PIDs

	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 6: Fan Module - Cisco 8101-32H
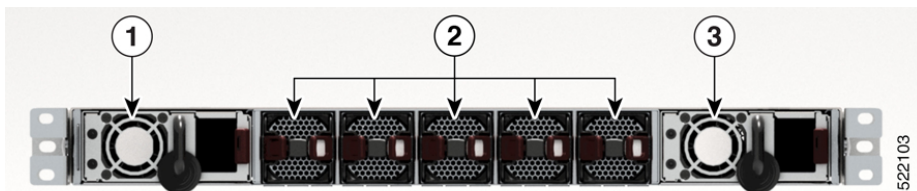
1	Fan

Table 2: Fan Module PIDs

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

	Fan Module PID
Port side exhaust	FAN-1RU-PE-V2 The color of the fan module is Blue.

Power Supply Unit

The router has two PSUs that install into the chassis from the rear. The PSUs work with 1+1 redundancy and the router supports two AC or two power supplies. The PSUs can be:

- AC to DC type - 650W
- DC to DC type - 930W

The PSUs provide 12V power to the entire system.

Table 3: PIDs for Power Supply Unit

AC PID	DC PID
• PSU650W-ACPI • PSU650W-ACPE	• PSU930W-DCPI • PSU930W-DCPE

Figure 7: Power Supply Unit

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.

Field Replaceable Units

Figure 8: Remove the Hatch

Figure 9: SSD Card Removal Instructions

CHAPTER 2

Prepare for Installation

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

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Warning   **Statement 1071**—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry, and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied 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.

Warning   **Statement 1004**—Installation Instructions

Read the installation instructions before using, installing, or connecting the system to the power source.

Warning   **Statement 1040**—Product Disposal

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

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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.

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Warning   **Statement 371**—Power Cable and AC Adapter

When installing the product, use the provided or designated connection cables, power cables, AC adapters, and batteries. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" or "CSA" shown on the cord), not regulated with the subject law by showing "PSE" on the cord, for any other electrical devices than products designated by Cisco.

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Warning   **Statement 1030**—Equipment Installation

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

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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.

⚠️

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.

⚠️

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

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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.

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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.

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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.

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Warning   **Statement 1086**—Power Terminals

Hazardous voltage or energy may be present on power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when 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.

| Warning | 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. Statement 7003 |

| Warning | 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. Statement 7005 |

| Warning | This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC). Statement 7012 |

| Warning | This equipment is suitable for installations utilizing the Common Bonding Network (CBN). Statement 7013 |

| Warning | The battery return conductor of this equipment shall be treated as (DC-I). Statement 7016 |

| Warning | This equipment is suitable for installation in Network Telecommunications Facilities. Statement 8015 |

| Warning | This equipment is suitable for installation in locations where the NEC applies. Statement 8016 |

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), 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 ground lug (1).

- Crimping tool for lug.

• Wire-stripping tool.

Accessory Kit

The following table contains the accessory kit PID and the items present in the accessory kit of the routers. The rack mount kit present in the accessory kit contains the screws and brackets required for installation.

Router	Accessory Kit-1	Items in Accessory Kit -1
Cisco 8102 Router	8200-2RU-KIT	Rack mount kit and ground lug kit

Prepare Your Location

This section illustrates how the building that houses the chassis must be properly grounded to the earth ground.
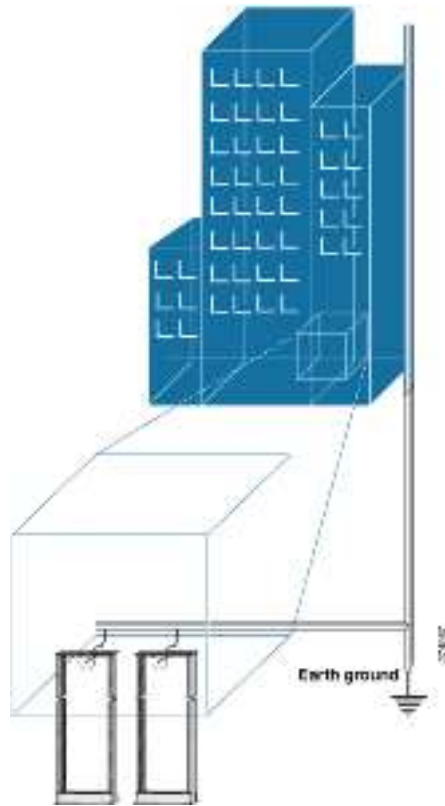
Note   Unless specified otherwise, the image is only for representational purposes. The rack's actual appearance and size may vary.

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

Figure 10: 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 11: Wearing the ESD Strap
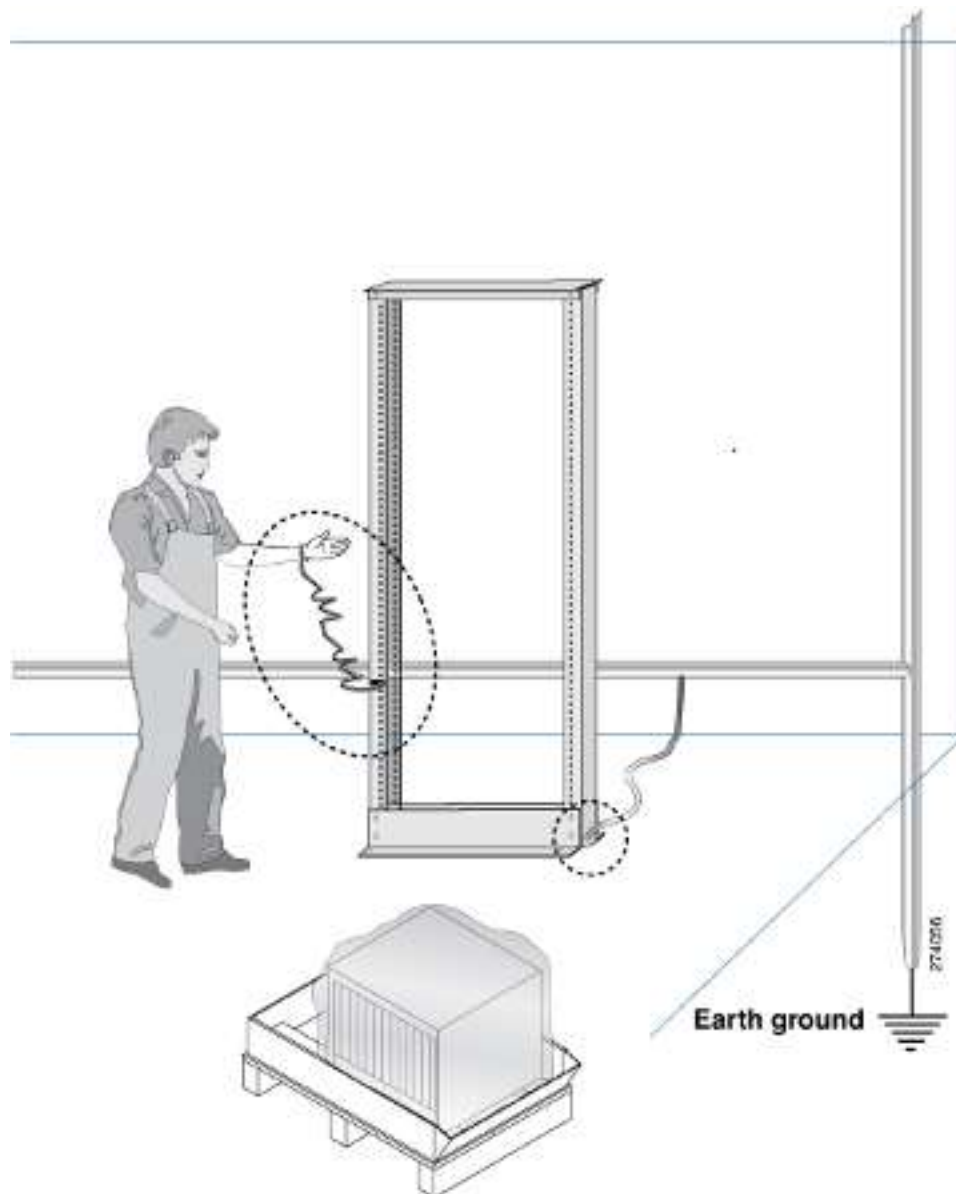
Prepare Rack for Chassis Installation

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.

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Note The Cisco 8102-64H-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:

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.

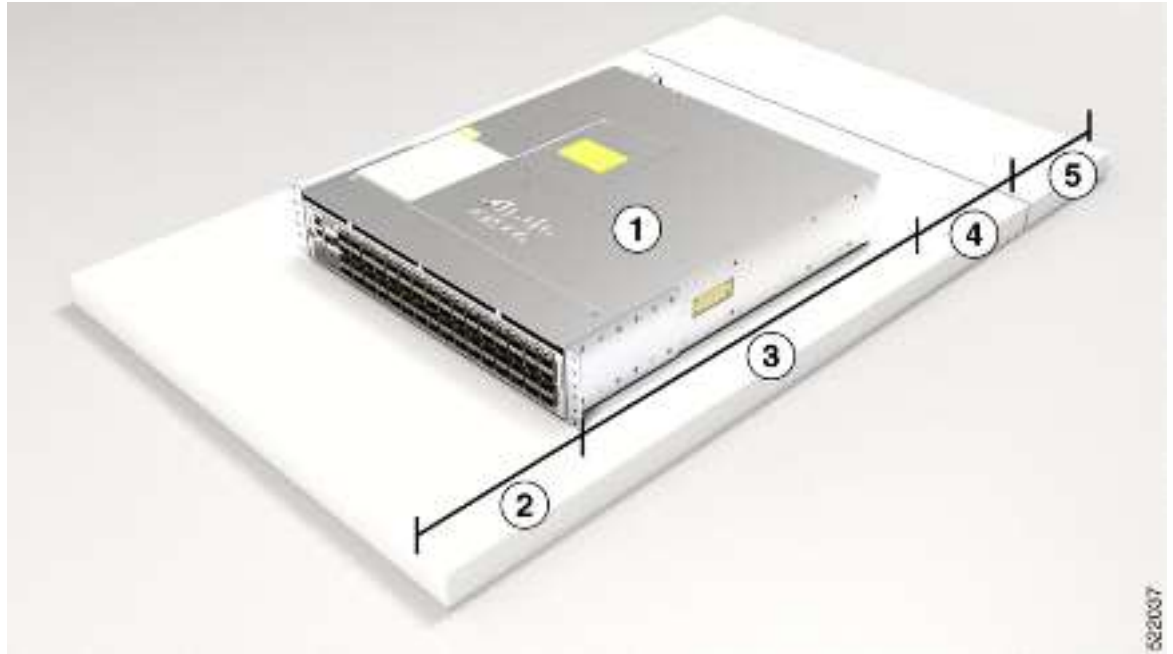Figure 12: Clearances Required Around the Chassis for Cisco 8102-64H
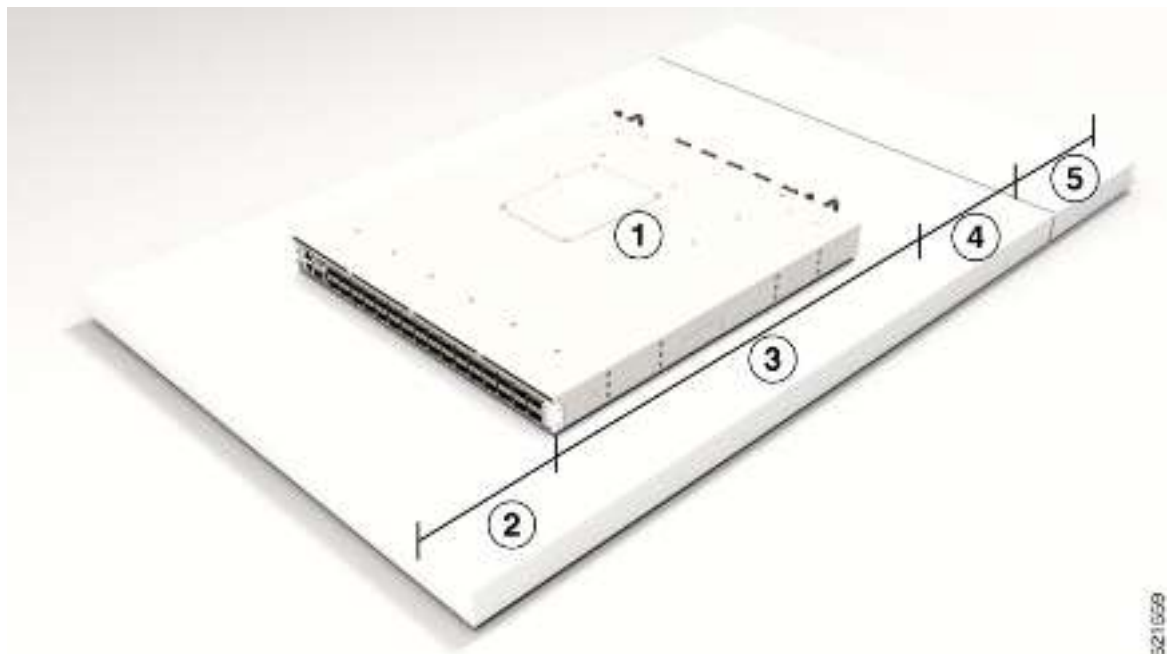

Figure 13: Clearances Required Around the Chassis for Cisco 8101-32H

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	More 6.0 in. (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.
3	20.01 in. (50.82 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.

Warning   **Statement 1047**—Overheating Prevention

To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of:

104^0F(40^0 C).

Warning   **Statement 1048**—Rack Stabilization

The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before installation or servicing. Failure to stabilize the rack can cause bodily injury.

Rack-Mount the Chassis in a 4-Post Rack

This section describes how to install the router in a 4-post rack.

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 4: 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

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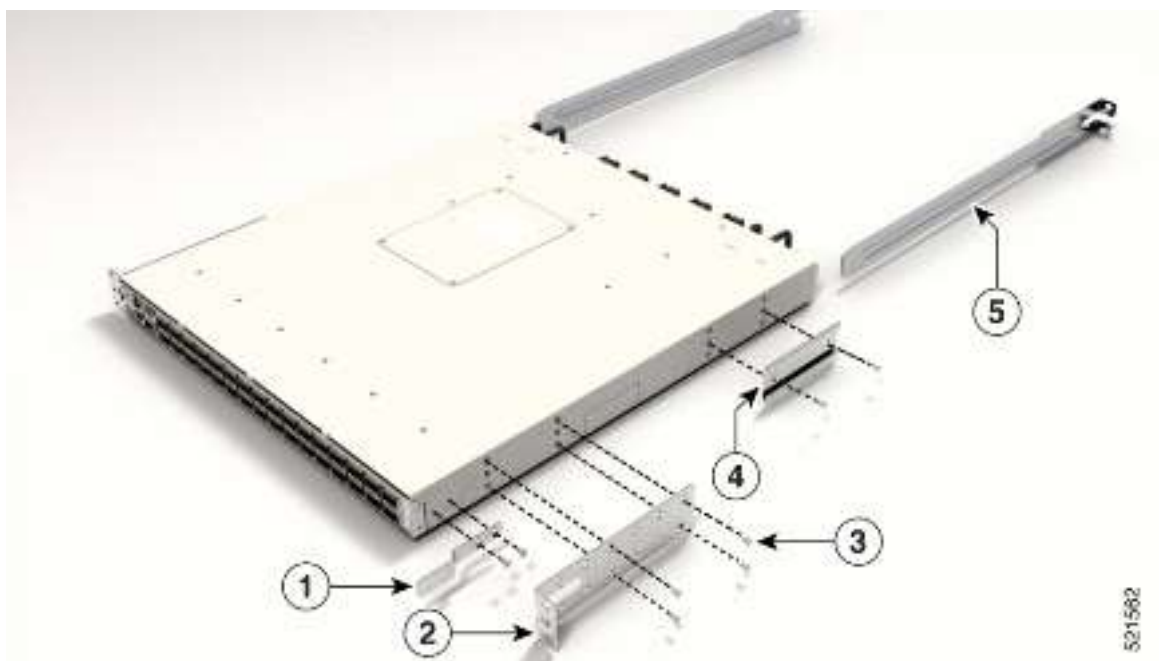
Note You can align four holes in the rack-mount bracket to four screw holes on the front side of chassis or four screw holes on the rear side of the chassis. The holes that you use depend on which end of your chassis is located in the cold aisle.

Figure 14: Rack-Mount Brackets on Cisco 8102 Router—Port-Side Intake
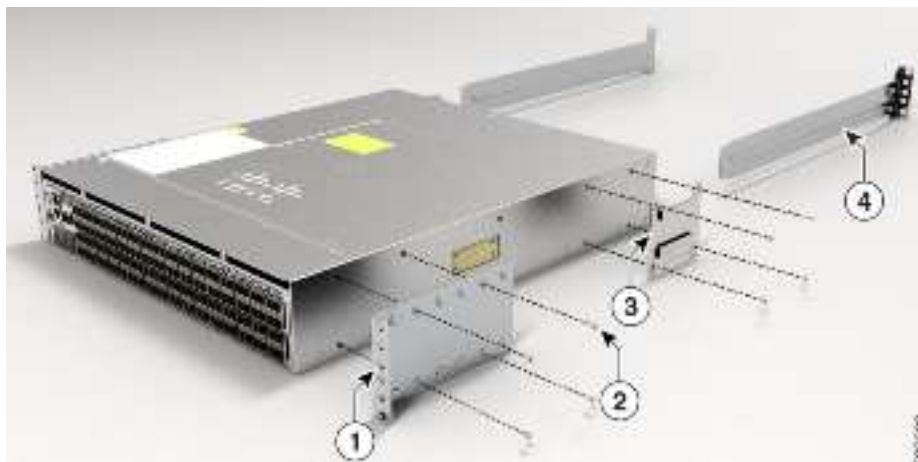
1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails

Figure 15: Rack-Mount Brackets on Cisco 8101-32H 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 16: Rack-Mount Brackets on Cisco 8101-32H Router—Port-Side Exhaust
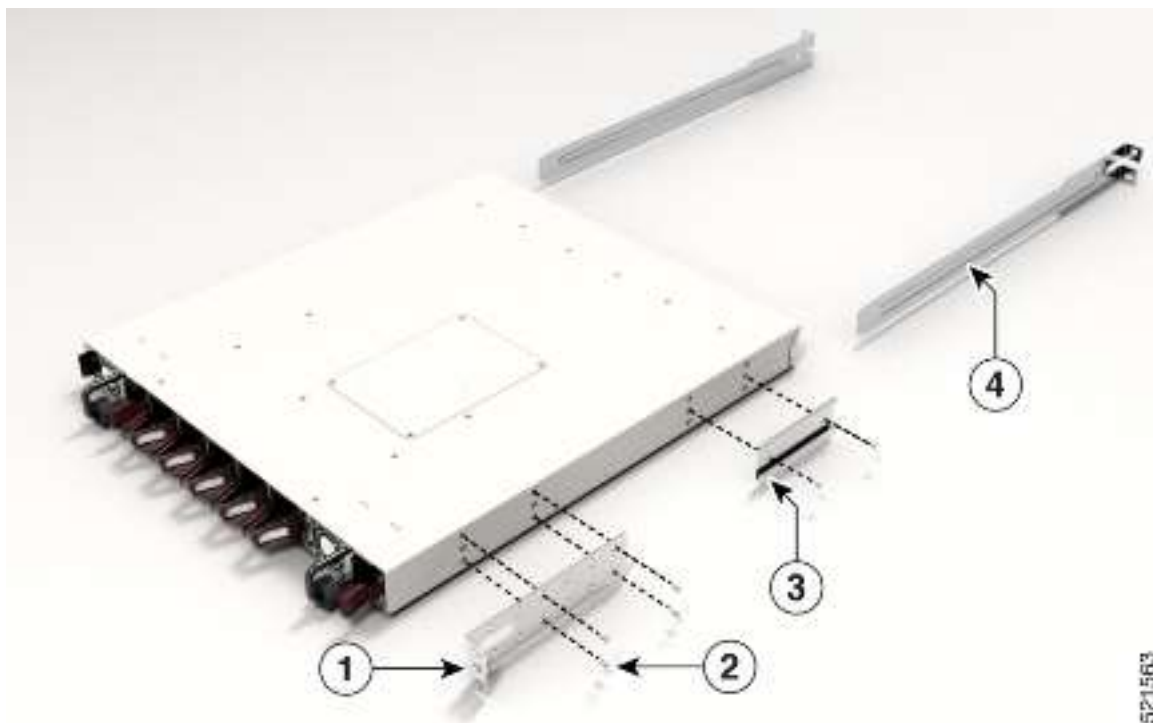
1	Rack-mount brackets	3	Rack-mount guide
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount guide rails. The orientation of the rail changes depening upon the rail that you select.

   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.

   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 the , Cisco 8101-32H router into a cabinet or 2-post rack.

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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 5: Rack-Mount Kit

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

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.

1	Rack-mount brackets	4	Ground plate mount location
2	M4 x 6-mm Phillips flat-head screws	5	M4 x 6-mm Phillips flat-head screws
3	Grounding plate		

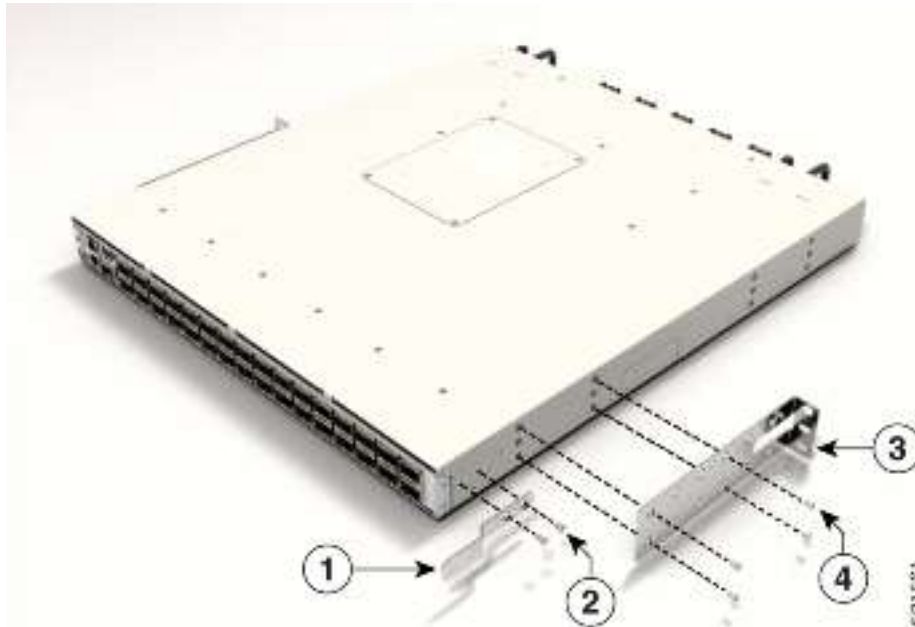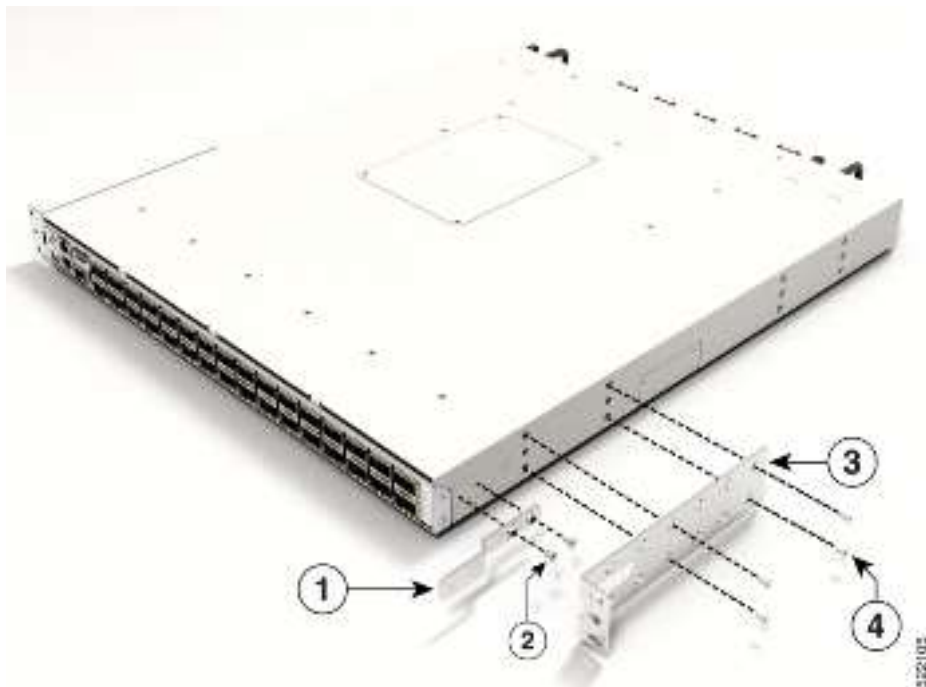*Figure 17: Rack-Mount Brackets on Cisco 8101-32H Router—Port-Side Intake*

Figure 18: Rack-Mount Brackets on Cisco 8101-32H Router—Port-Side Exhaust

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

    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.

    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).

Ground the Chassis

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Warning   **Statement 1252**—Equipment Grounding

This equipment must be grounded. To reduce the risk of electric shock, the power cord, plug, or combination must be connected to a properly grounded electrode, outlet, or terminal.

⚠ **Warning** **Statement 414**—Connected To Grounded Outlet

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

⚠ **Warning** **Statement 1024**

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

⚠ **Warning** **Statement 1046**

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

⚠ **Warning** **Statement 1025**

Use copper conductors only.

⚠ **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 grounding plate. 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.

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 in the grounding lug.

Step 4 Attach the ground cable:

- Attach one end of the shelf ground cable (#6 AWG cable) to the grounding plate using the specified dual-hole lug connector.
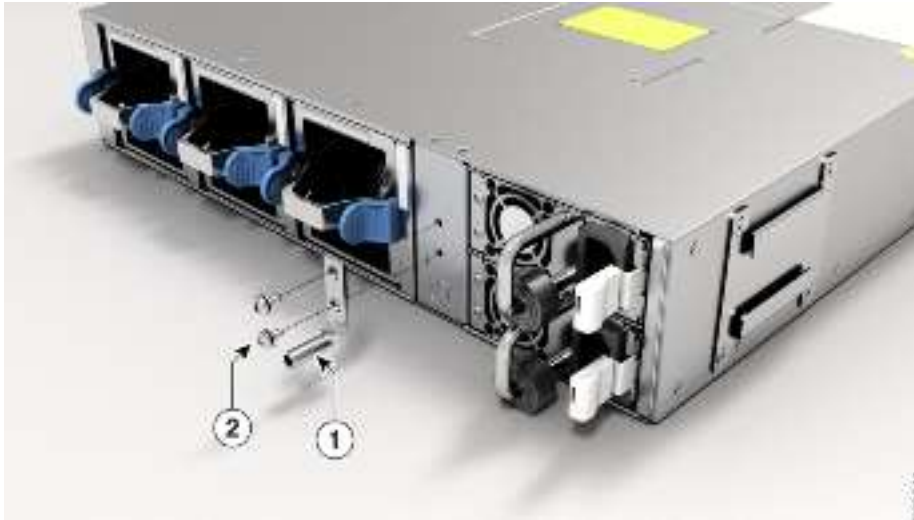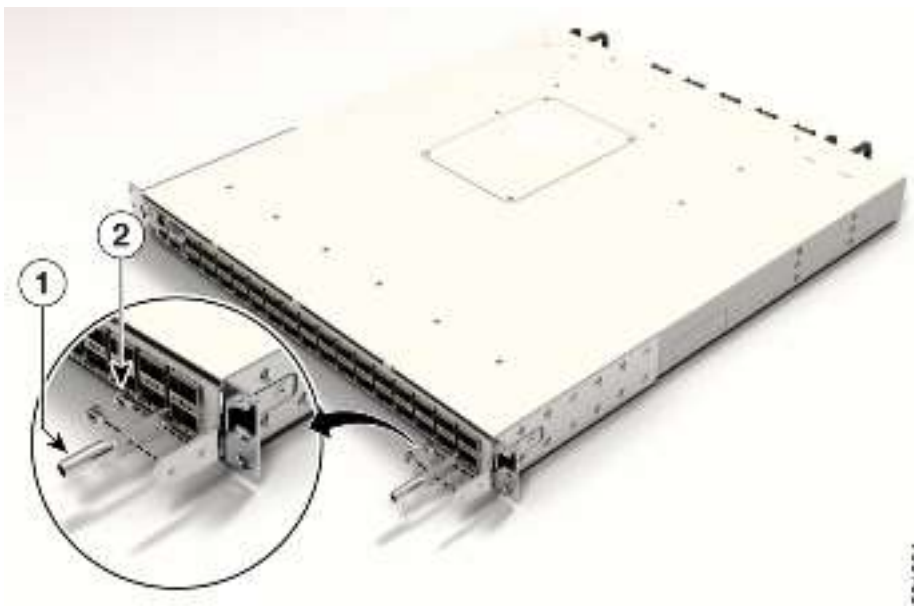
Figure 19: Cisco 8102 Router Ground Lug

Figure 20: Cisco 8101-32H Ground Lug

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

Step 5   Tighten the pan-head screws to torque value of 13.25 in-lbs (1.5 N-m).

Step 6   Ensure that the lug and cable do not interfere with other equipment.

Step 7   Prepare the other end of the grounding cable, and connect it to an appropriate grounding point in your site to ensure adequate earth ground.

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.

The following power supplies are supported:

- PSU650W-ACPI – 650W AC, port-side intake airflow
- PSU650W-ACPE – 650W AC, port-side exhaust airflow

✎

Note A dual pole breaker is needed for installation. For determining the recommended breaker size, please adhere to local and national rules and regulations. The breaker size is based on the specifications of the product for the current drawn and the specified voltage level.

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 cable connector in the AC power module.

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

Step 4 Slide the cable clamp toward the plug.

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

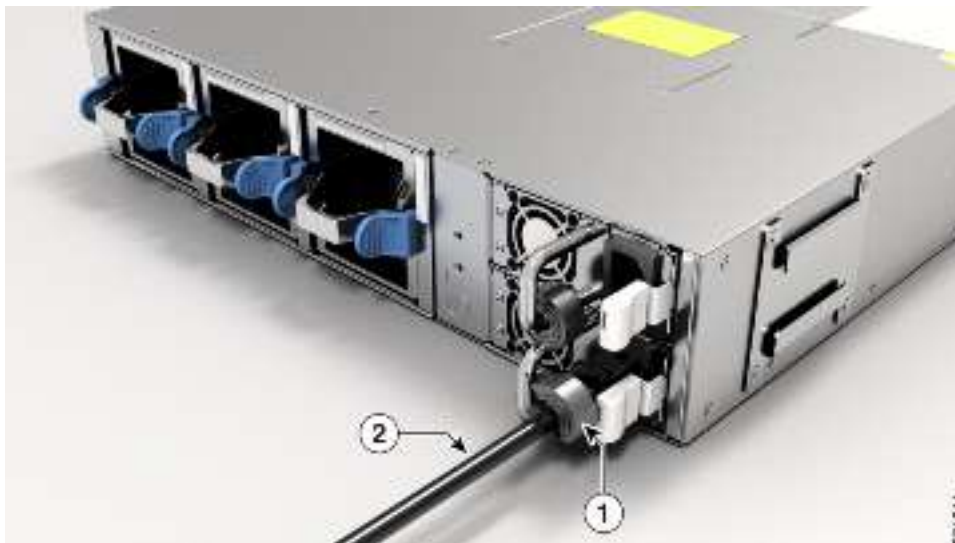*Figure 21: Connecting AC Power - Cisco 8102-64H*

Figure 22: Connecting AC Power - Cisco 8101-32H

1		Cable clamp	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.

Note The supported output DC power is 930 W. To provide full output power of 930 W, the nominal voltage rating value ranges between -48 V to -60 V, depending on the standards in various countries.

The following combinations of power supplies are supported:

- PSU930W-DCPI – 930W DC, port-side intake airflow

- PSU930W-DCPE – 930W DC, port-side exhaust airflow

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 (PID: PWR-2KW-DC-CBL) supplied with the power supply. You can purchase power supply cord separately from Cisco.

Step 3 Dress the power according to local practice.

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

Step 5 Insert the DC connector into the DC receptacle on the power supply.

Figure 23: Connecting DC Power - Cisco 8102-64H
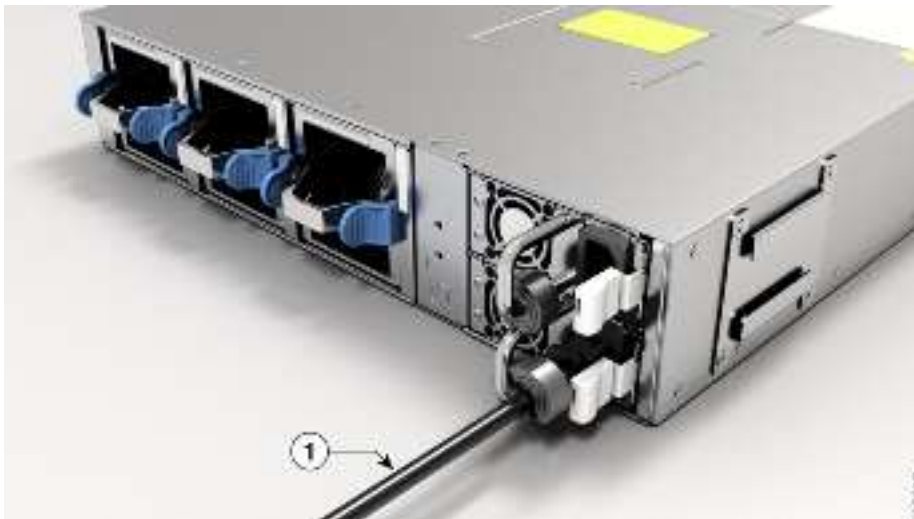
| 1 | DC power cable |

Step 6 Ensure that the locking mechanism has engaged to secure the cable.

Step 7 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 DC Power to the Chassis

C H A P T E R 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.

Transceiver and Cable Specifications

• 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.

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.

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

- 115200 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.

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.

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.

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

Figure 24: 400-Gigabit QSFP-DD Transceiver Module
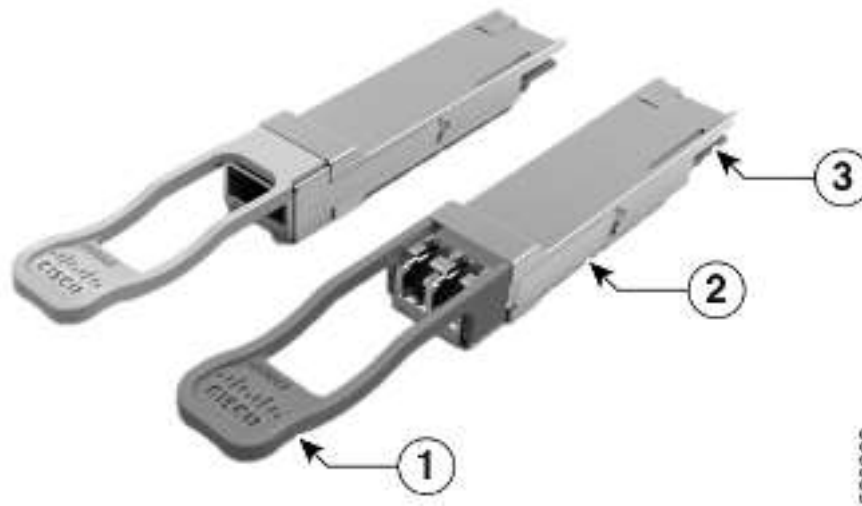
1	Pull-tab	2	QSFP-DD transceiver body
3	Electrical connection to the module circuitry		

Warning   **Statement 1079**—Hot Surface

This icon is a hot surface warning. Use precaution when working near the hot surface.

Installing the Transceiver Module

Warning

Statement 1079—Hot Surface

This icon is a hot surface warning. Use precaution when working near the hot surface.

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. 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 6: 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

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

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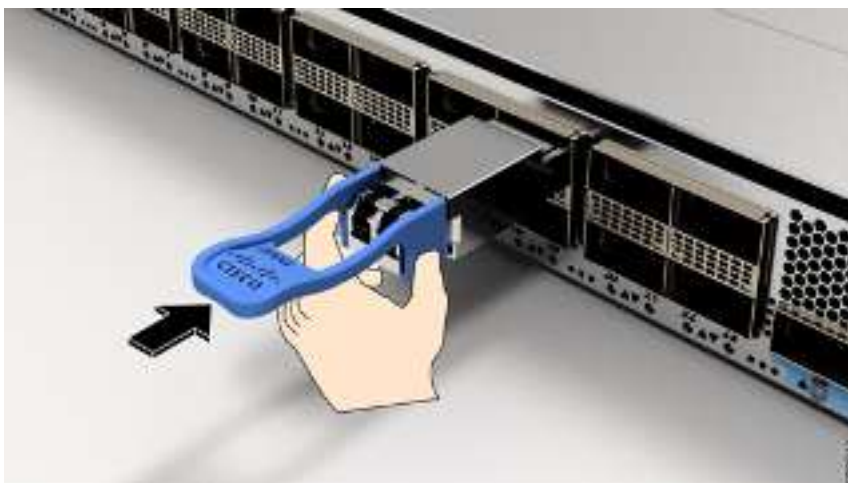
Step 6 Press firmly on the front of the transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see the below figure).

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

Figure 26: Seating the QSFP Transceiver Module

Connect Interface Ports

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

Connect a Fiber-Optic Port to the Network

40G, or 100G 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.

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:

- port-side intake airflow - FAN-2RU-PI-V2

- port-side exhaust airflow - FAN-2RU-PE-V2

- port-side intake airflow - FAN-1RU-PI-V2

- port-side exhaust airflow - FAN-1RU-PE-V2

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 27: Airflow Direction for Cisco 8102-64H Router

Figure 28: Airflow Direction for Cisco 8101-32H Router
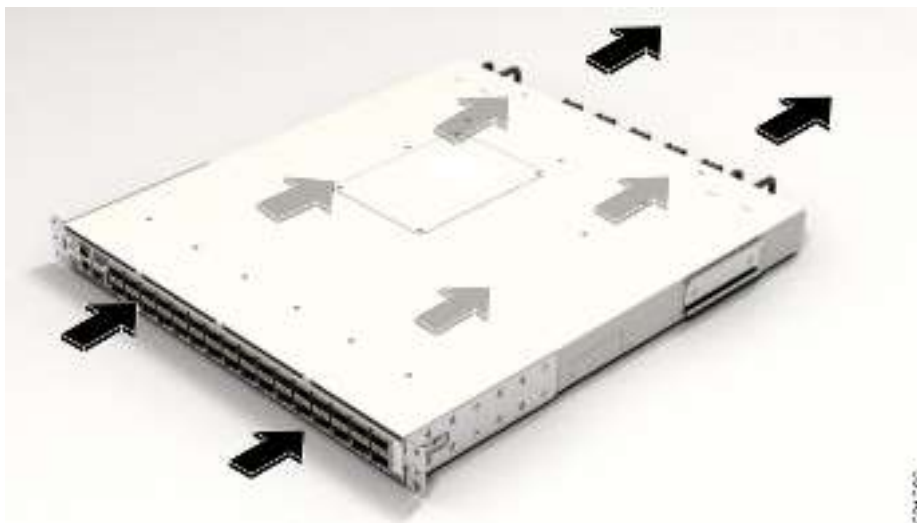
Step 1   To remove a fan module, follow these steps:

a)   Press two latches on the fan module and grasp the handle of fan module.
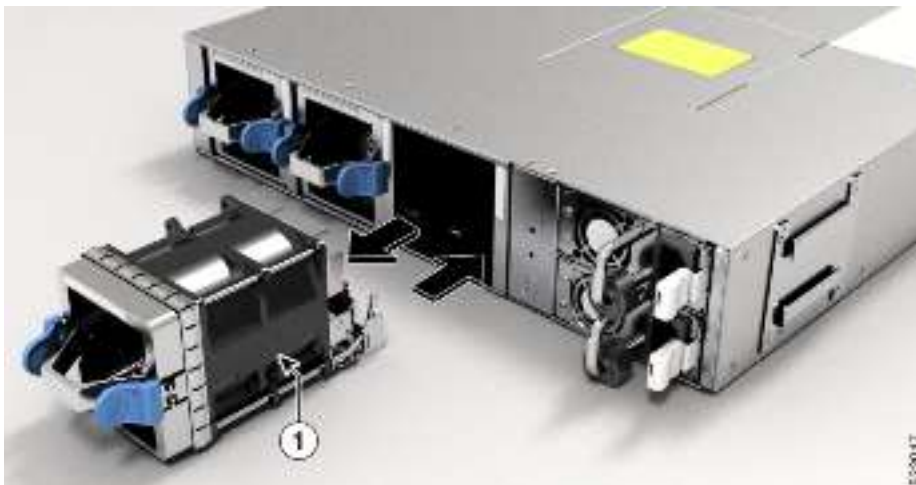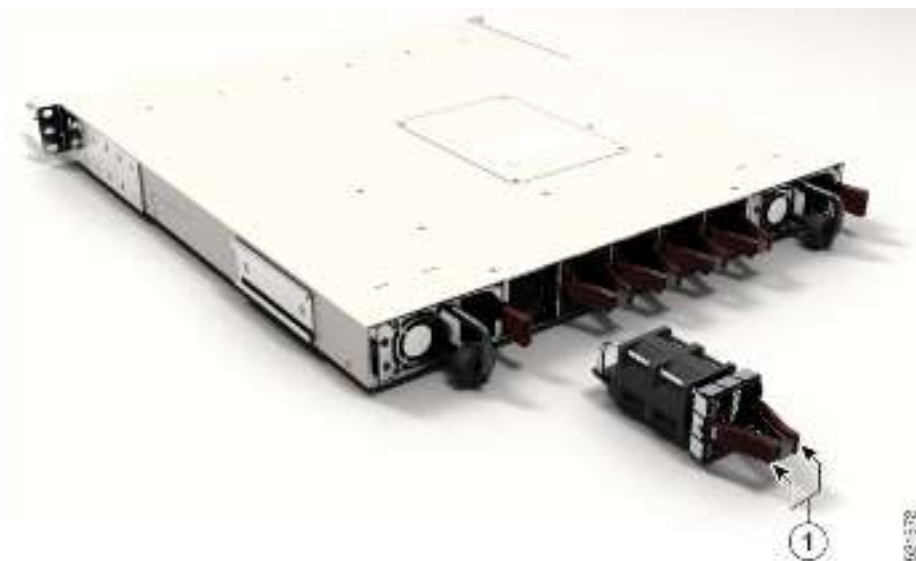
Figure 29: Cisco 8102-64H Router — Remove Fans

Figure 30: Cisco 8101-32H 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, the other fans adjust their speed to allow for proper initialization of the new module. When you insert a new fan module, the fans may run at lower or higher speeds for a few minutes.

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

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.

Use this procedure to replace the AC or DC power supply units. Be sure to power down the fixed configuration PDU (power distribution unit) before removing it from the chassis.

Step 1 If the power supply is connected to a AC or DC circuit, shut off the circuit at the circuit breaker.

Step 2 Disconnect the PSU cable.

Note To remove the Saf-D-Grid power cord (AC or HVDC) or the low voltage DC power cord from the power supply, press the latch before pulling the power cord out.

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

Step 4 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.
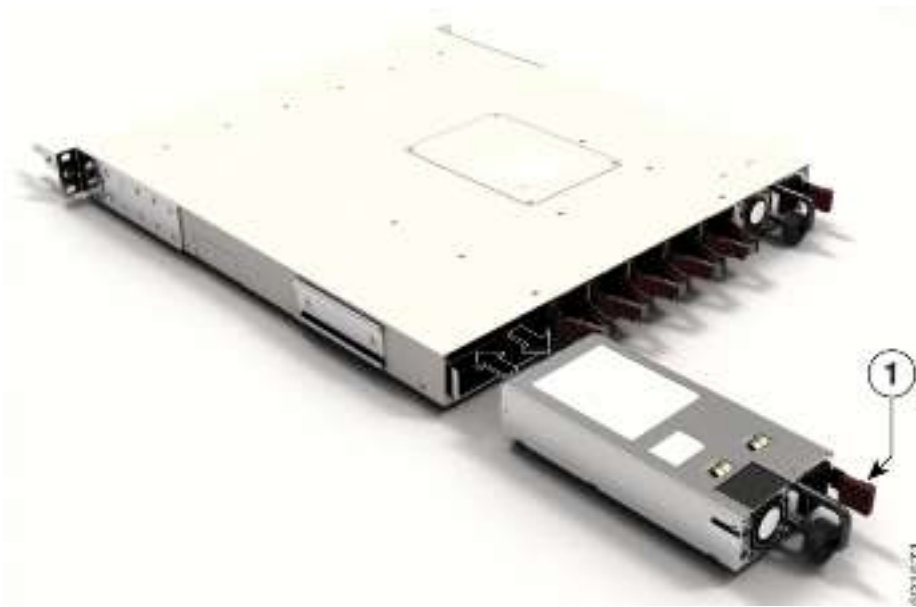
Step 5 Connect the PSU cable.

Step 6 If the power supply is connected to a AC or DC circuit, turn on the circuit breaker for the AC or DC power source. After replacing the PSU, verify the power using the **show environment power** command.

Figure 31: Cisco 8102-64H Router — Remove Power Supply

Figure 32: Cisco 8101-32H Router — Remove Power Supply

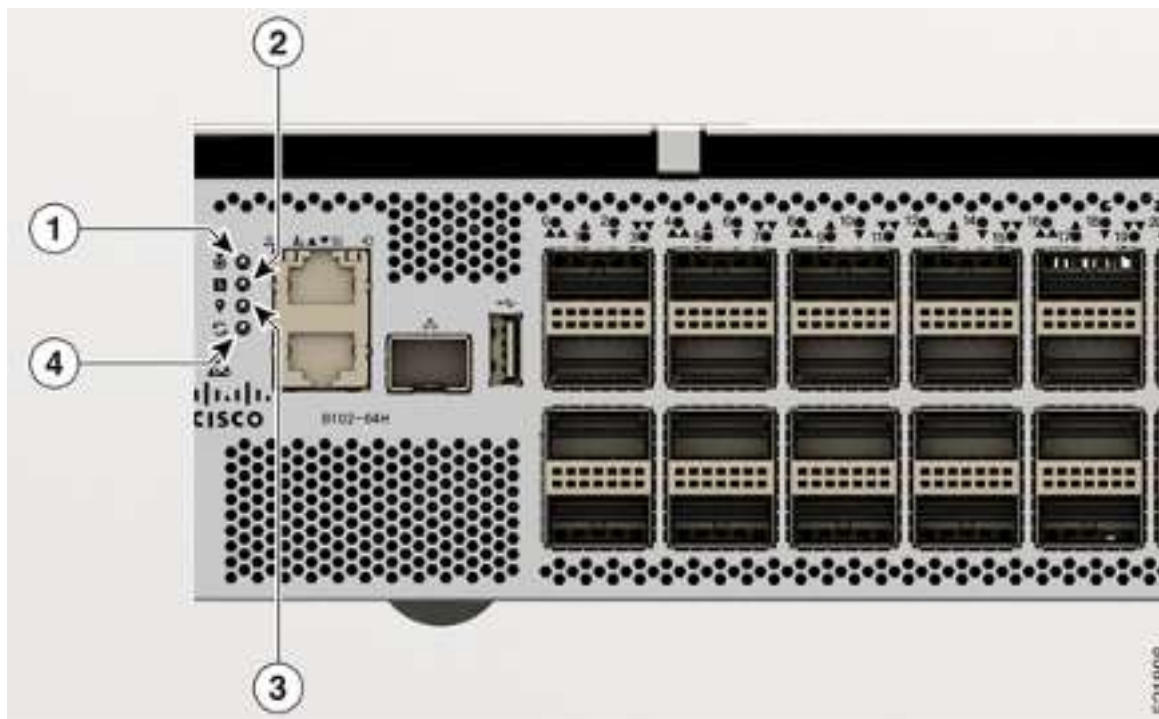| 1	Remove power supply

Replace Power Supply
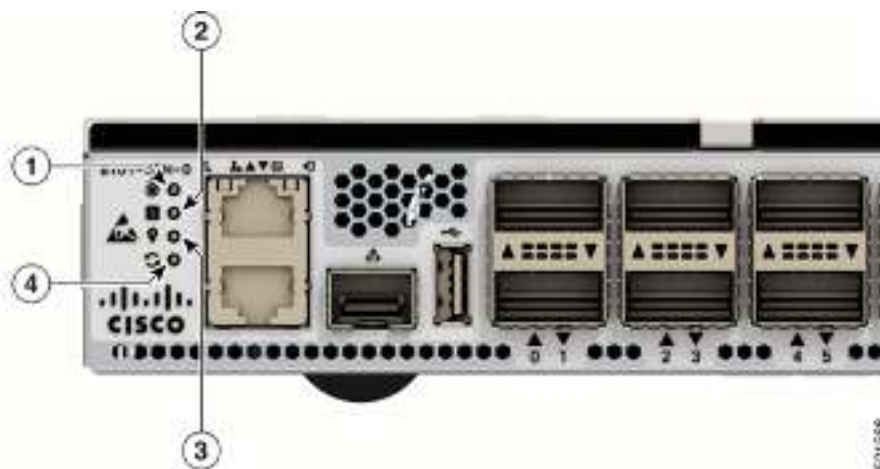
CHAPTER 6

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 33: Chassis LEDs - Front View of Cisco 8102-64H

Figure 34: Chassis LEDs - Front View of Cisco 8101-32H

1	Attention
2	Status
3	GPS
4	Synchronization

Table 7: 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.

Fan Tray LED

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

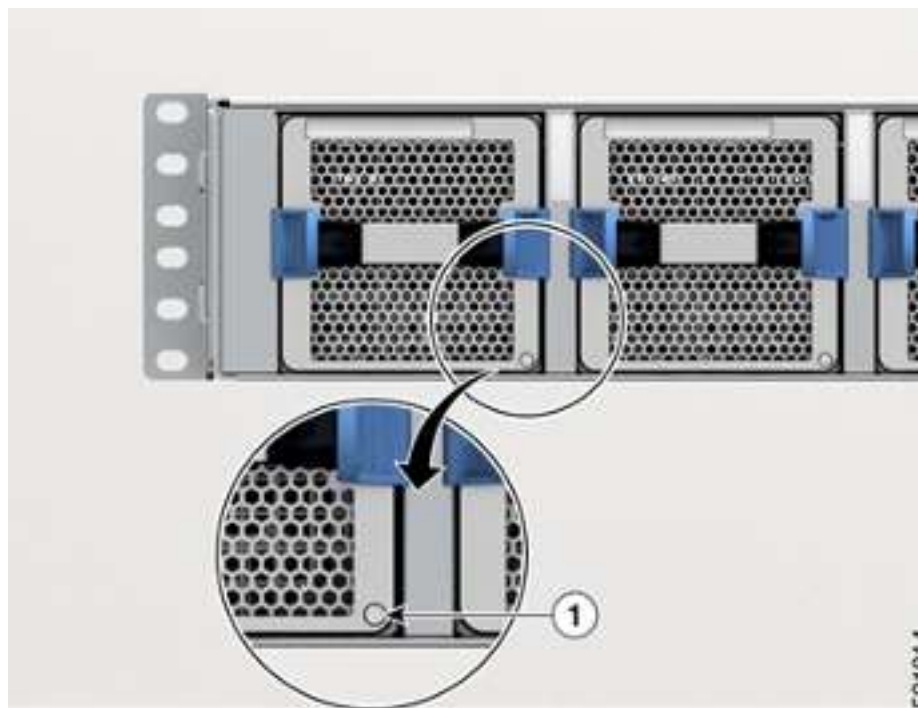*Figure 35: Fan Tray LED - Cisco 8102-64H Chassis*

Figure 36: Fan Tray LED - Cisco 8101-32H Chassis

1	Fan Status LED

Table 8: 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.

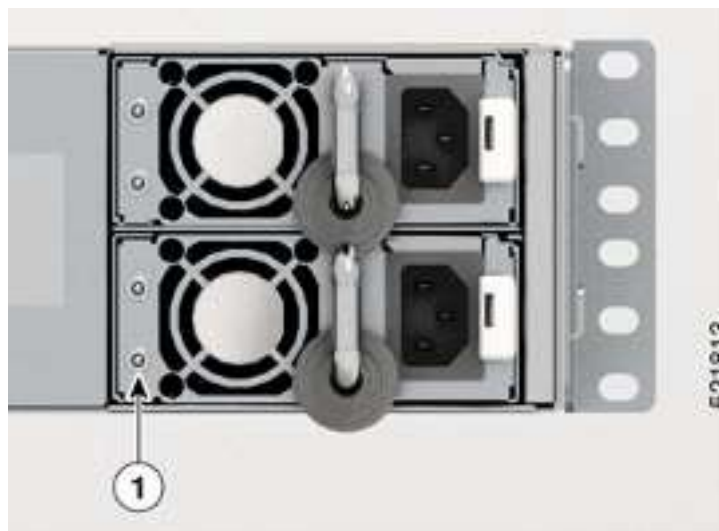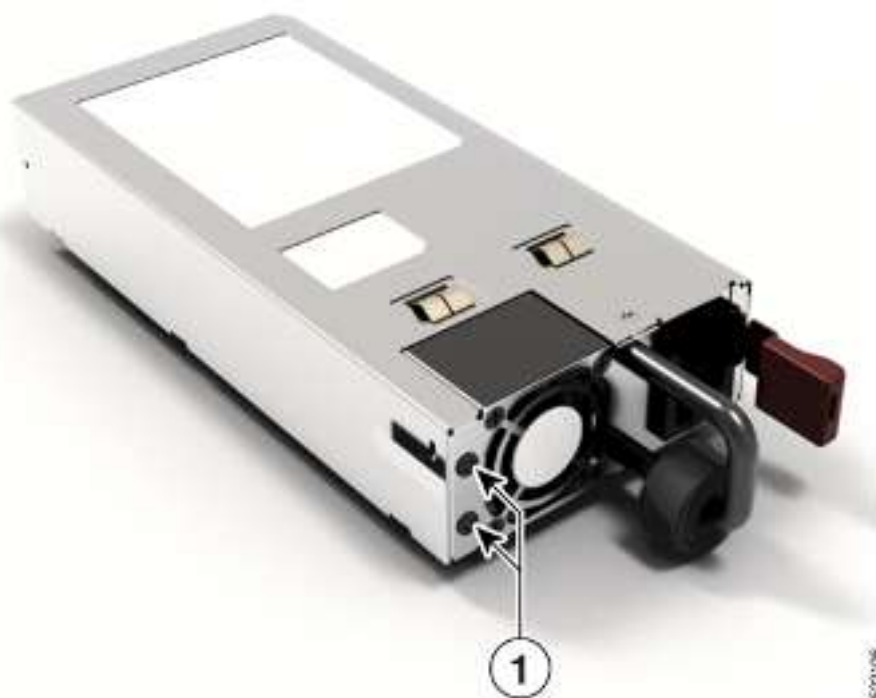*Figure 37: Cisco 8102-64H Power Supply LED*

Figure 38: Cisco 8101-32H Power Supply LED
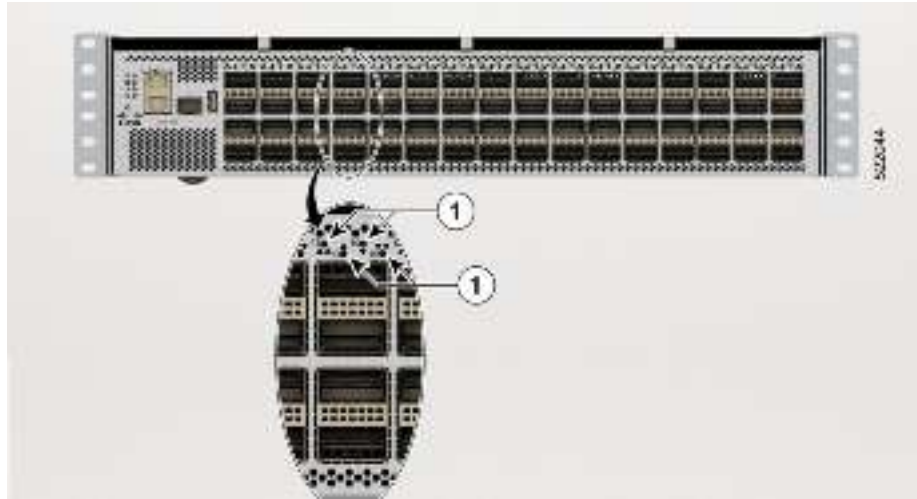

1	Status LED

Table 9: 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	Power supply failure, due to one of the following conditions: • Over voltage • Over current • Over Temperature • 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.
Attention	Flasing Blue	The operator has activated this LED to identify this PSU.
	Off	This PSU is not being identified.

Port Status LEDs

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

Figure 39: Port Status LED - Cisco 8102-64H Chassis

1	Port Status LED		

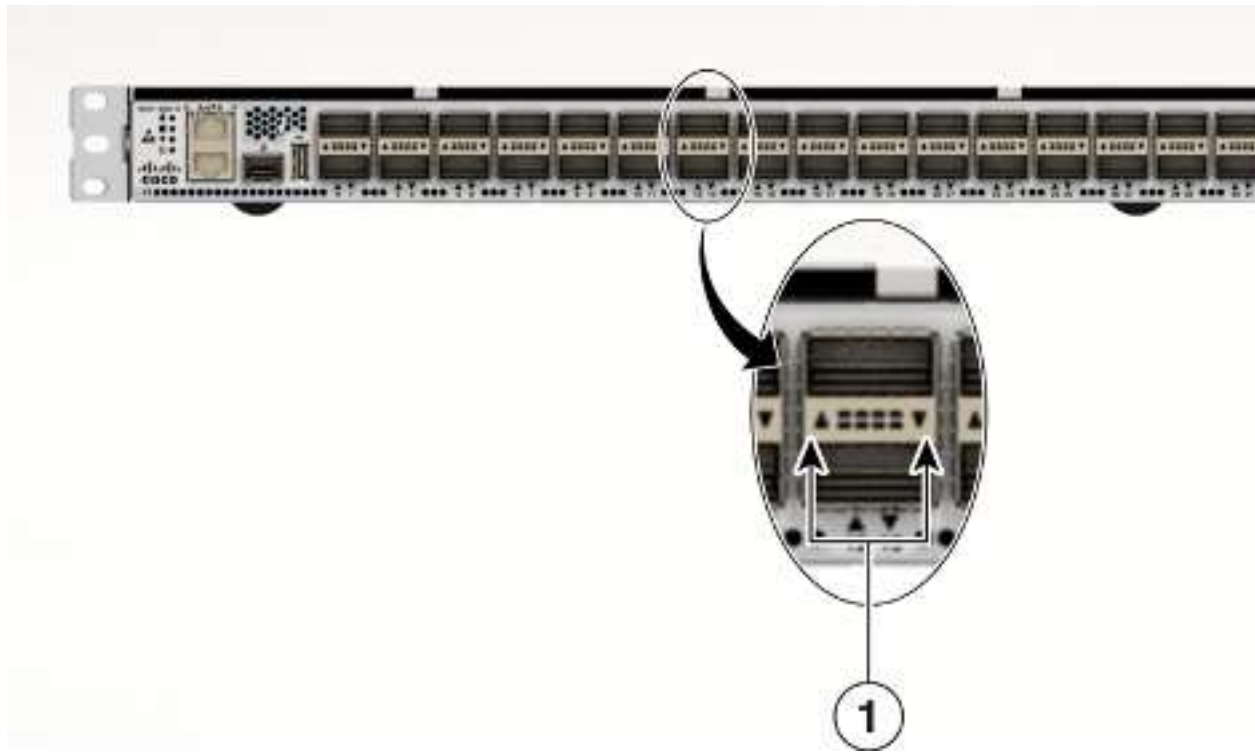*Figure 40: Port Status LED - Cisco 8101-32H Chassis*

Table 10: Port Status LEDs (one per port)

LED Color	Description
Off	Port is administratively shut down.

Port Status LEDs

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

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