



Cisco Nexus 9408 ACI-Mode Switch Hardware Installation Guide

First Published: 2023-03-01

Last Modified: 2024-01-31

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CHAPTER 1

Overview

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Overview of the Cisco Nexus 9408 Switch

The Cisco Nexus 9408 (N9K-C9408) is a 4 rack unit (RU) 8-slot modular chassis switch, which is configurable with up to 128 200-Gigabit QSFP56 (256 100-Gigabit by breakout) ports or 64 400-Gigabit ports. This switch supports port-side intake airflow. The switch requires four AC, DC, or HVAC/HVDC power supplies for operation, and offers 2+2 power grid redundancy.

This switch includes the following high power optics and MACsec:

- The N9K-X9400-16W LEM offers full MACsec (128 ports) for a full load chassis with no limitation for 200G optics.
- The N9K-X9400-8D LEM offers full MACsec (64 ports) for a full load chassis but with a limit of 400G high power optics within 32pcs among 8 slots (maximum of 32 ports of 20-W optics irrespective of MACsec), and the high power optics can go in any of the 400G ports.

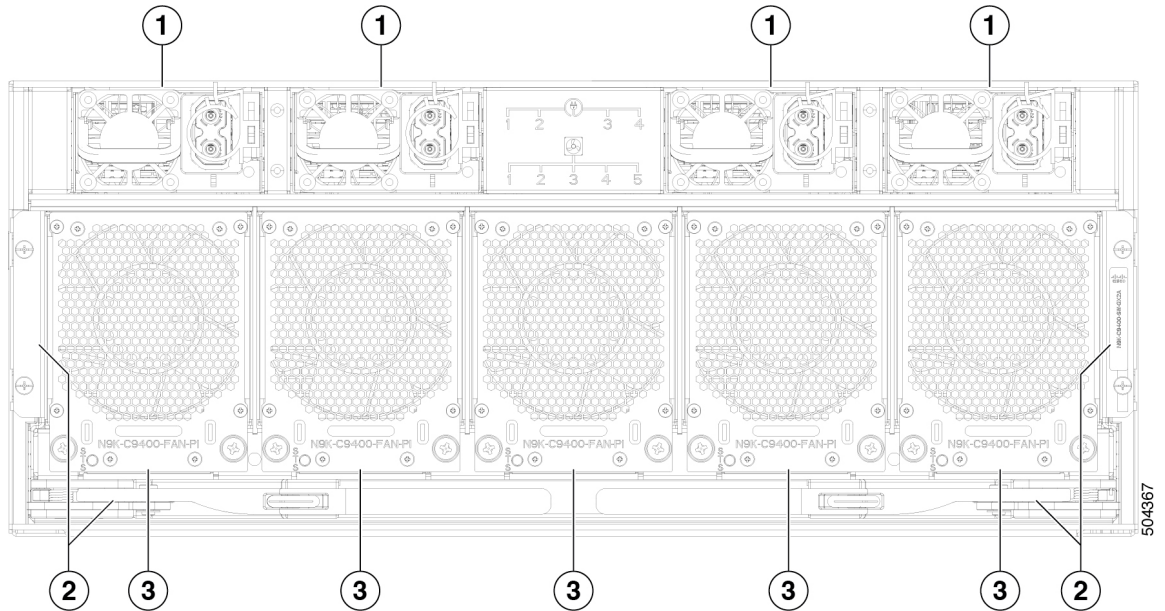
Default mode for this switch:

- This default role is as a leaf switch.
- The default fabric links (1/49-64) must be used for initial switch discovery via another switch.

Leaf/Spine role considerations:

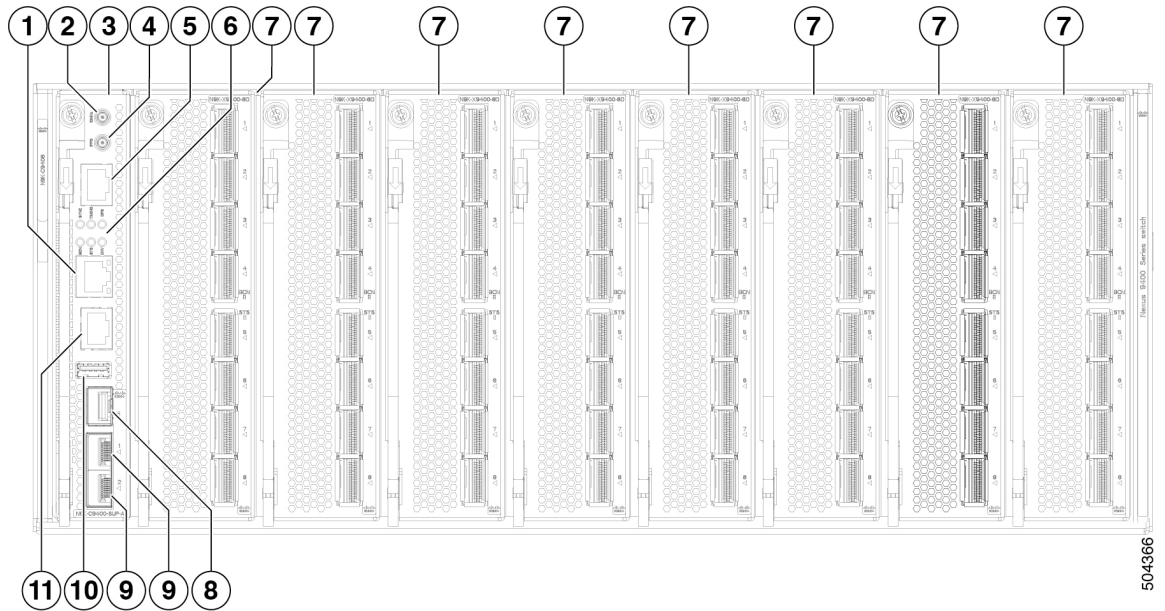
- To change the switch from the default role, you must proceed as follows: the node appears as a discovered device in the fabric inventory view, you must set the role of the switch (spine or leaf) and the switch automatically goes for reboot to come up in the configured role.
- If you connect a default spine (i.e. a dual role switch that by default is a spine, such as Nexus 9316D-GX) directly to an APIC, the change of the role to leaf is performed automatically by APIC as well as the reboot. After that, the node appears in “Nodes pending registration” and you need to register the node.

The following figure shows the fan-side chassis features that you use when installing the chassis or replacing its modules.



1	Power supply modules (4)	2	Switch card
3	Fan modules (5)		

The following figure shows the port-side chassis features that you use when installing the chassis or replacing its modules.

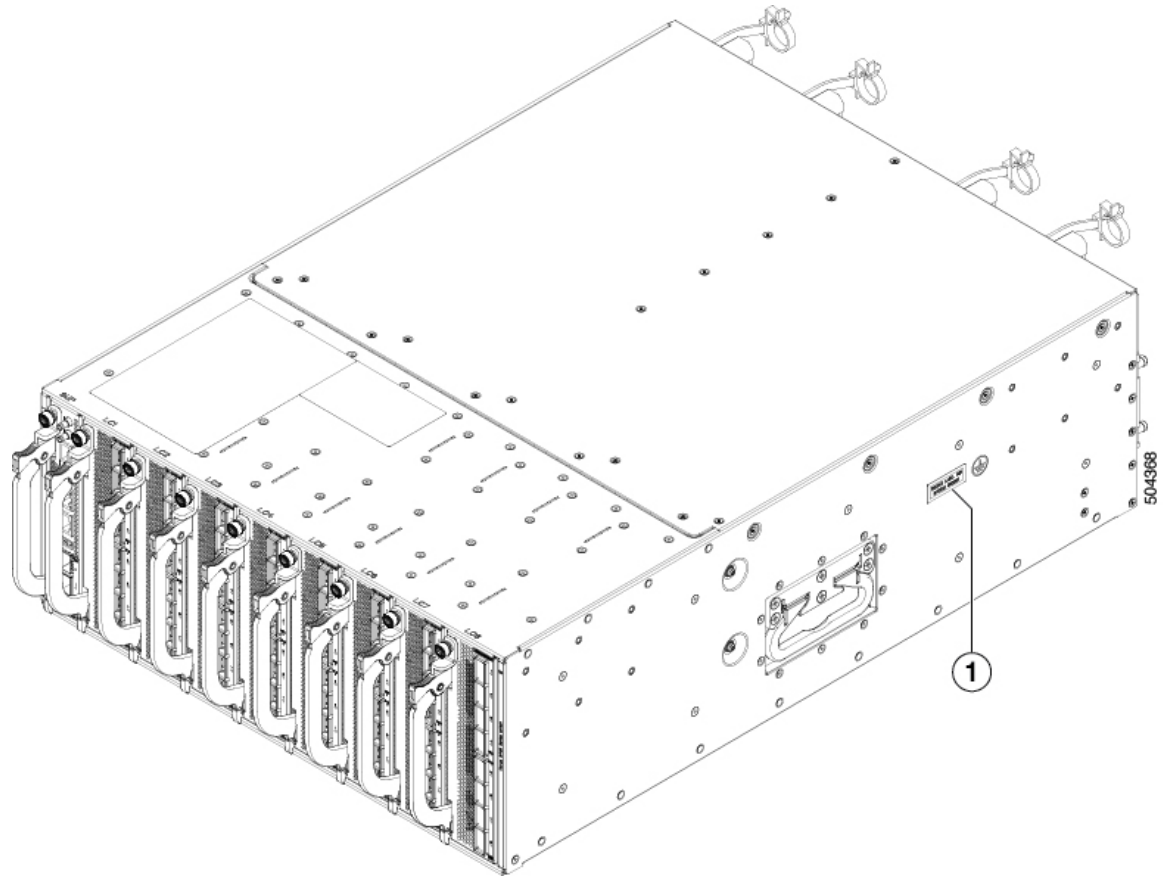


1	Management port (RJ45)	2	GPS 10 MHz
3	Supervisor module (N9K-C9408-SUP-A)	4	GPS 1PPS
5	ToD (RF-45)	6	SYNC, TIMING, GPS, BCN, STS, and ENV, LEDs

7	Cisco Nexus line-card expansion module (LEM) (up to 8) N9K-X9400-8D shown, N9K-X9400-16W also available.	8	Management port (SFP)
9	10-Gigabit SFP+ ports	10	USB 3.0 port (1) ¹
11	Console port (RS-232)		

¹ Careful when using the USB port. This component is sensitive to movement and if bumped, may cause file corruption.

The following figure shows the side chassis features that you use when installing the chassis.



1	Grounding pad		
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CHAPTER 2

Preparing the Site

- [Temperature Requirement, on page 5](#)
- [Humidity Requirement, on page 5](#)
- [Altitude Requirements, on page 5](#)
- [Dust and Contaminants, on page 6](#)
- [Minimizing Electromagnetic and Radio Frequency Interference, on page 6](#)
- [Shock and Vibration Requirements, on page 7](#)
- [Grounding Requirements, on page 7](#)
- [Rack and Cabinet Requirements, on page 7](#)
- [Clearance Requirements, on page 8](#)

Temperature Requirement

This switch is rated to operate at 32 to 104°F (0 to 40°C). It can be stored at -40 to 158°F (-40 to 70°C).

Humidity Requirement

High humidity can cause moisture to enter the switch. Moisture can cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and size. The switch is rated to withstand from 5- to 95-percent (nonoperating) and 5- to 90-percent (operating) relative humidity.

Buildings cooled with air conditioning during warm months and warmed during cold months usually maintain an acceptable level of humidity. However, if the site is unusually humid, use a dehumidifier to maintain the required humidity level.

Altitude Requirements

High-altitude (low-pressure) conditions outside of 0 to 5,000 feet (0 to 1524 m) can reduce the cooling efficiency and cause electrical problems.

Dust and Contaminants

To prevent contaminant buildup and increased internal chassis temperatures, make sure that the operating environment is as clean as possible and free of dust and other contaminants. Do not permit smoking, food, or drinks near the switch.

Minimizing Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from the switch can adversely affect other devices, such as radio and television (TV) receivers. Radio frequencies that emanate from the switch can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the switch monitor.

RFI is defined as any EMI with a frequency above 10 kHz. This type of interference can travel from the switch to other devices through the power cable and power source or through the air as transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI that are emitted by computing equipment. Each switch meets these FCC regulations.

To reduce the possibility of EMI and RFI, follow these guidelines:

- Cover all open expansion slots with a blank filler plate.
- Always use shielded cables with metal connector shells for attaching peripherals to the switch.

When wires are run for any significant distance in an electromagnetic field, interference can occur to the signals on the wires with the following implications:

- Bad wiring can result in radio interference emanating from the plant wiring.
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in the chassis and even create an electrical hazard by conducting power surges through lines into equipment.



Note To predict and prevent strong EMI, you need to consult experts in radio frequency interference (RFI).

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



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

Shock and Vibration Requirements

The switch has been shock- and vibration-tested for operating ranges, handling, and earthquake standards.

Grounding Requirements

The switch is sensitive to variations in voltage that is supplied by the power sources. Overvoltage, undervoltage, and transients (or spikes) can erase data from memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the switch. You can connect the grounding pad on the switch either directly to the earth-ground connection or to a fully bonded and grounded rack.

When you properly install the chassis in a grounded rack, the switch is grounded because it has a metal-to-metal connection to the rack. Alternatively, you can ground the chassis by using a customer-supplied grounding cable that meets your local and national installation requirements. For U.S. installations, we recommend 6-AWG wire. Connect your grounding cable to the chassis with a grounding lug (provided in the switch accessory kit) and to the facility ground.



Note You automatically ground AC power supplies when you connect them to AC power sources. For DC power supplies, you must connect a grounding wire when wiring the power supply to the DC power source.



Note An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Any paint or other non-conductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.

Rack and Cabinet Requirements

You can install the following types of racks or cabinets for your switch:

- Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom-to-top cooling)
- Standard open four-post Telco racks

To install the switch in a cabinet that is located in a hot-aisle and cold-aisle environment, fit the cabinet with baffles to prevent exhaust air from recirculating into the chassis air intake.

Work with your cabinet vendors to determine which of their cabinets meet the following requirements or see the Cisco Technical Assistance Center (TAC) for recommendations:

- Use a standard 19-inch (48.3-cm), four-post Electronic Industries Alliance (EIA) cabinet or rack with mounting rails that conform to English universal hole spacing per section 1 of the ANSI/EIA-310-D-1992 standard.
- The height of the rack or cabinet must accommodate the 7.1-RU (12.4 inches or 31.6 cm) height of the switch and its bottom support bracket.
- The depth of a four-post rack must be 24 to 32 inches (61.0 to 81.3 cm) between the front and rear mounting rails (for proper mounting of the bottom-support brackets or other mounting hardware).
- Required clearances between the chassis and the edges of its rack or the interior of its cabinet are as follows:
 - 4.5 inches (11.4 cm) between the front of the chassis and the front of the rack or interior of the cabinet (required for cabling and module handles).
 - 3.0 inches (7.6 cm) between the rear of the chassis and the interior of the cabinet (required for airflow in the cabinet if used).
 - No clearance is required between the chassis and the sides of the rack or cabinet (no side airflow).

Also, you must consider the following site requirements for the rack:

Also, you must have power receptacles that are located within reach of the power cords that are used with the switch.

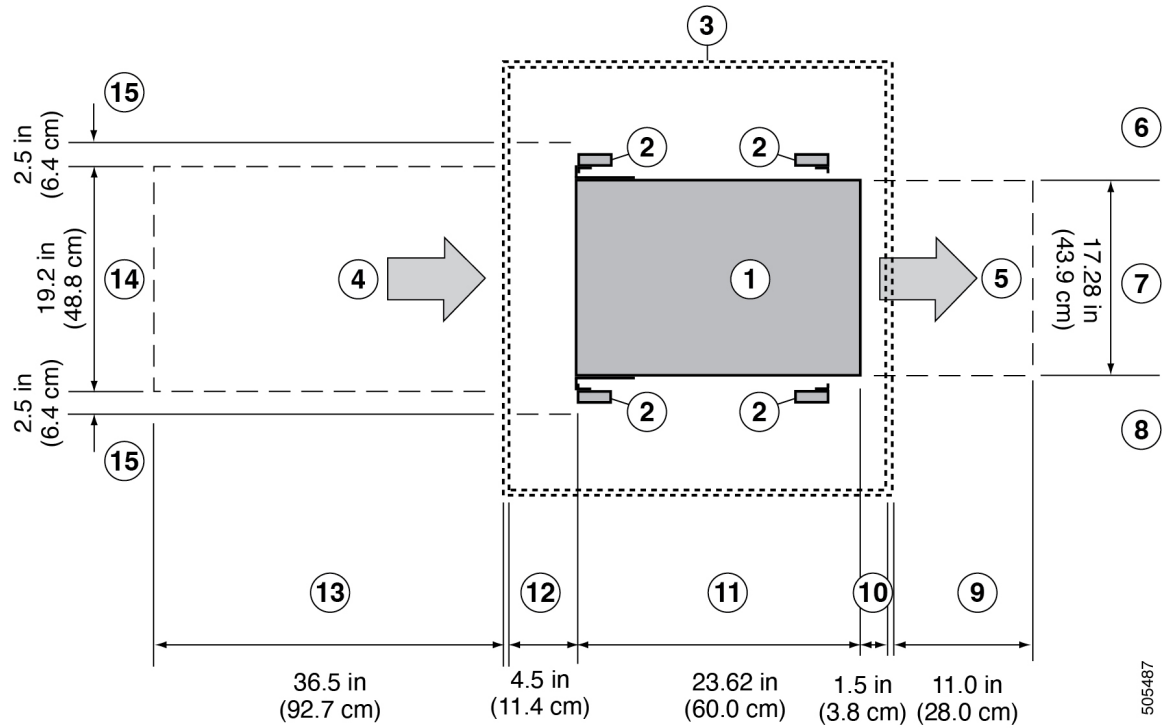


Warning **Statement 1048**—Rack Stabilization

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.

Clearance Requirements

Provide the chassis with adequate clearance between the chassis and any other rack, device, or structure so that you can properly install the chassis. Provide the chassis with adequate clearance to route cables, provide airflow, and maintain the switch. For the clearances required for an installation of this chassis, see the following figure.



1	Chassis	9	Rear service clearance required to replace fan trays and fabric modules.
2	Vertical rack-mount posts and rails	10	Minimum clearance required for module handles (up to 6 inches [15.24 cm] recommended for optimal airflow) when using cabinet doors
3	Cabinet (optional)	11	Chassis depth
4	Air intake from the cold aisle for all modules and power supplies	12	Recommended clearance for cable management and ejector handles on line cards (6 inches [15.24 cm] recommended for optimal airflow) when using cabinet doors
5	Air exhaust to the hot aisle for all modules and power supplies	13	Clearance required for installing the chassis and replacing line cards
6	No left-side clearance required (no airflow on the left side).	14	Width of the chassis plus vertical mounting brackets on each side
7	Chassis width	15	Side clearance, that is required for older line card handle rotation (not required for the current line cards which have handles that rotate differently).
8	No right-side clearance required (no airflow on the right side).		



CHAPTER 3

Installing the Chassis

- [Safety](#), on page 11
- [Network Equipment-Building System \(NEBS\) Statements](#), on page 14
- [Preparing to Install the Chassis](#), on page 17
- [Unpacking and Inspecting the Chassis](#), on page 18
- [Installing the Chassis in a Four-Post Rack](#), on page 19
- [Grounding the Chassis](#), on page 23
- [Starting the Switch](#), on page 25

Safety

Before you install, operate, or service the switch, see the *Regulatory, Compliance, and Safety Information for the Cisco Nexus 3000 and 9000 Series* for important Safety Information.



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 provided at the end of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS



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 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.

**Note Statement 407**—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

<https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html>

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品仕様における安全上の注意〉
www.cisco.com/web/JP/techdoc/index.html

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**Warning Statement 1017**—Restricted Area

This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area.

**Warning Statement 1030**—Equipment Installation

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

**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.

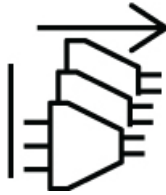
**Warning Statement 1005**—Circuit Breaker

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: 20A for AC, 60A for DC



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 1003—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 1033—Safety Extra-Low Voltage (SELV)—IEC 60950/ES1—IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit to a DC power source that complies with the SELV requirements in IEC 60950-based safety standards or ES1 and PS1 requirements in IEC 62368-based safety standards or to a Class 2 power supply.



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 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.
-



Caution

To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the switch are within the current ratings for the wiring and breakers.



Note

For AC input application, please refer to the statement below:



Warning **Statement 1005**—Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective devices is rated not greater than 20A (North America), 16A (Europe), and 13A (UK).

Network Equipment-Building System (NEBS) Statements

NEBS describes the environment of a typical United States Regional Bell Operating Company (RBOC) central office. NEBS is the most common set of safety, spatial, and environmental design standards applied to telecommunications equipment in the United States. It is not a legal or regulatory requirement, but rather an industry requirement.



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 must use shielded intrabuilding cabling/wiring that is grounded at both ends.

The following port(s) are considered intrabuilding ports on this equipment:

The copper RJ45 Ethernet Ports.



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

The intrabuilding port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the outside plant (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 to connect these interfaces metallically to OSP wiring.

This statement applies to the intrabuilding ports listed below:

The copper RJ45 Ethernet Ports.



Warning **Statement 7008**—Equipment Using Agreed Primary Protection

This product is intended to be protected by a surge protector that meets the applicable criteria of GR-974-CORE or GR-1361-CORE. Failure to use this appropriate surge protector could result in susceptibility to lightning surges or create a potential hazard due to power faults.



Note **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.



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 7014**—Installation Location Outside Plant (OSP)

This equipment is suitable for installation in OSP locations.



Note **Statement 7015**—Equipment Bonding and Grounding

When you use thread-forming screws to bond equipment to its mounting metalwork, remove any paint and nonconductive coatings and clean the joining surfaces. Apply an antioxidant compound before joining the surfaces between the equipment and mounting metalwork.



Note **Statement 7016**—Battery Return Conductor

Treat the battery return conductor of this equipment 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 7019**—Equipment Grounding Systems—Isolated Bonding Network (IBN)

This equipment is suitable for installations using the IBN.



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.

Preparing to Install the Chassis

Before you can install the switch, you must verify the following:

- The installation site meets the following requirements as stated in Chapter 2:
 - Environmental requirements for temperature, humidity, altitude, and air particulates.
 - Cabinet or rack is installed and meets the requirements for the switch.



Note Jumper power cords are available for use in a cabinet.

- The rack is positioned so that you can install the switch with its cold air intakes positioned in a cold aisle.

If the fan and power supply modules are burgundy or red colored, you must install the chassis with its port side in a cold aisle. If the modules are blue colored, you must be able to install the chassis with the fan modules in a cold aisle.

- Earth ground connection is close to the switch. You must be able to easily connect the switch directly to an earth ground or indirectly through a grounded rack.



Caution High leakage current. Earth connection essential before connecting to power supply.

- Site power meets the switch requirements. If you are using n+n redundancy, you must have two power sources within reach of the switch when it is installed in the cabinet or rack.
If available, you can use an uninterruptible power supply (UPS) to protect against power failures.



Caution Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco Nexus switches. These switches can have substantial current draw fluctuations because of fluctuating data traffic patterns.

Ensure that circuits are sized according to local and national codes. For North America, the power supply requires a 15-A or 20-A circuit.



Caution To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the switch are within the current ratings for the wiring and breakers.

- There is adequate clearance around the rack to install the switch and to allow for unimpeded airflow.
- You have the following equipment in addition to the switch and the kits shipped with the switch:

- Eight customer-supplied 12-24 or 10-32 screws (required for attaching slider rails and mounting bracket to the mounting rails)
- Number 1 and number 2 Phillips screwdrivers with torque capability
- 3/16-inch flat-blade screwdriver
- Tape measure and level
- ESD wrist strap or other grounding device (wrist strap can be found in the accessory kit)
- Antistatic surface large enough to place the switch
- Grounding cable (6 AWG recommended), sized according to local and national installation requirements; the required length depends on the proximity of the switch to proper grounding facilities
- Crimping tool large enough to accommodate the girth of the grounding lug
- Wire stripping tool

Unpacking and Inspecting the Chassis



Caution When handling switch components, such as fan or power supply modules, wear a grounded ESD strap and handle the modules by their carrier edges only. To ground the ESD strap, make sure that it is attached to an earth ground, a grounded chassis, or a grounded rack.



Tip Keep the shipping container in case the chassis requires shipping in the future.



Note The switch is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

To inspect the switch, follow these steps:

- Step 1** Compare the shipment to the equipment list provided by your customer service representative and verify that you have received all items.
- Step 2** Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:
- Invoice number of shipper (see the packing slip)
 - Model and serial number of the damaged unit
 - Description of damage

- Effect of damage on the installation
- Photos of the damaged shipping containers and damaged product

Step 3 For dual direction airflow switches, check to be sure that all of the fan and power supply modules have the same airflow direction.

- Port-side intake airflow direction indicated with burgundy coloring
- Port-side exhaust airflow direction indicated with blue coloring

Installing the Chassis in a Four-Post Rack

This section describes the installation of the Cisco Nexus 9408 platform switch, into a four-post rack, using the N9K-C9400-RMK rack-mount kit.

Before moving or lifting the chassis, follow these guidelines:

- Ensure that there is adequate space around the switch for servicing and airflow.
- Never attempt to lift an object that is too heavy for you to lift by yourself.
- Ensure that you have solid footing. Distribute the weight of the switch is evenly between your feet.
- Lift the switch slowly, keeping your back straight. Lift with your legs, not with your back. Bend at the knees, not at the waist.



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 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

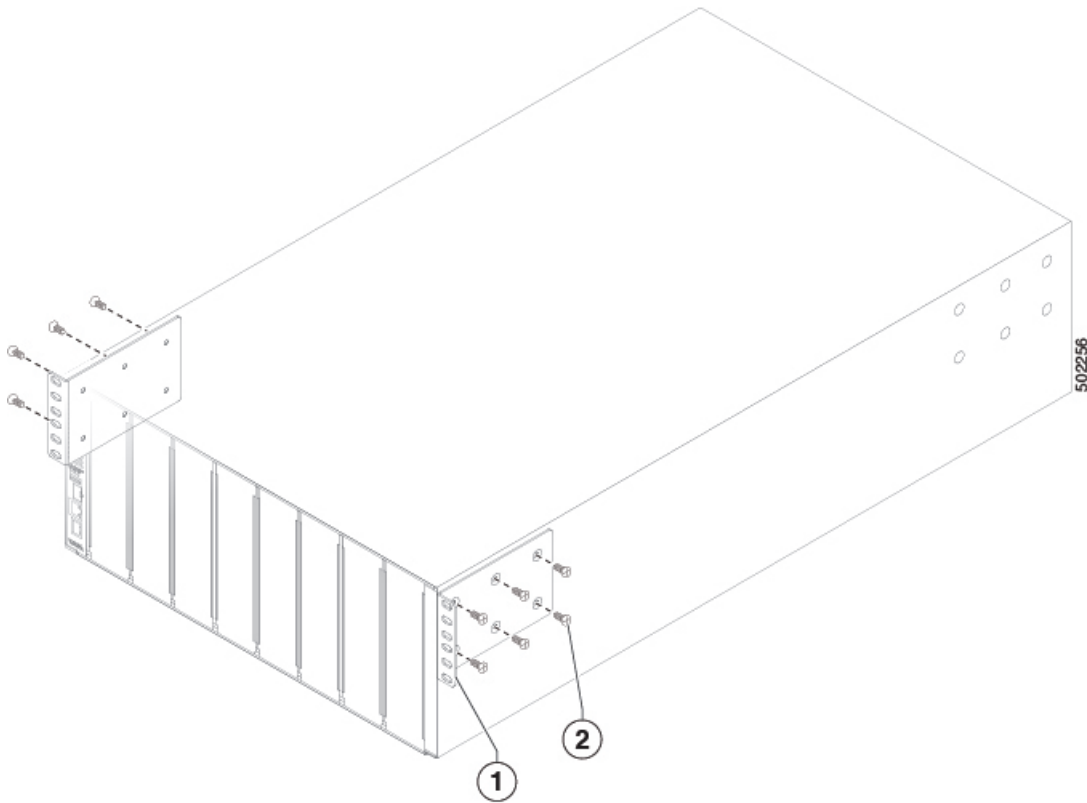
To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- 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.

Step 1 Attach two front-mount brackets to the sides of the chassis as follows:

- a) Align the two holes in one side of a front-mount bracket to the holes on the left or right side of the chassis as shown in the following figure.

Figure 1: Aligning and Attaching Front-Mount Brackets to the Chassis



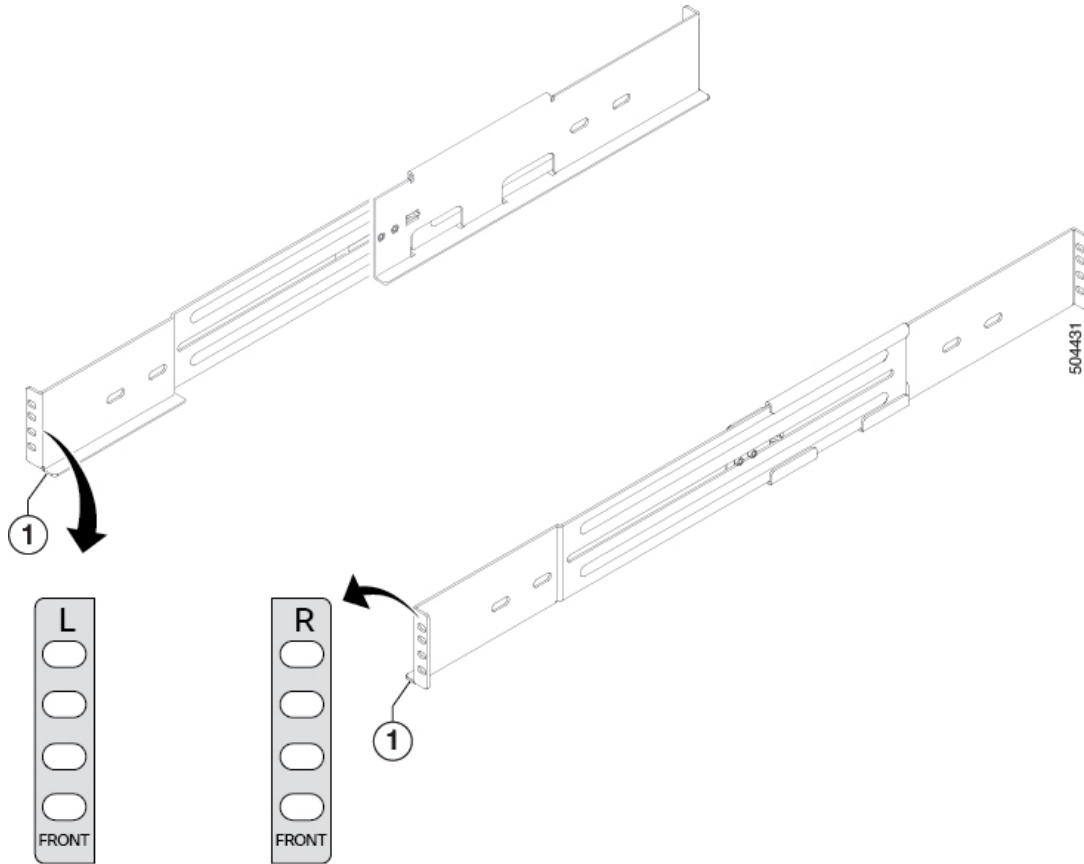
1	Front rack-mount bracket	2	M4 x 6-mm screws
---	--------------------------	---	------------------

- b) Use M4 x 6 mm screws to attach the bracket to the chassis and tighten each screw to 12 in-lb (1.36 N·m) of torque.
 c) Repeat Steps 1a and 1b to attach the other front-mount bracket to the other side of the chassis.

Step 2 Align the bottom-support rails so that they form a shelf for the chassis.

Note The bottom-support rails are not interchangeable. Use the one marked with [R] for the right, and with [L] for the left side of the rack.

Figure 2: Aligning the Bottom-Support Rails

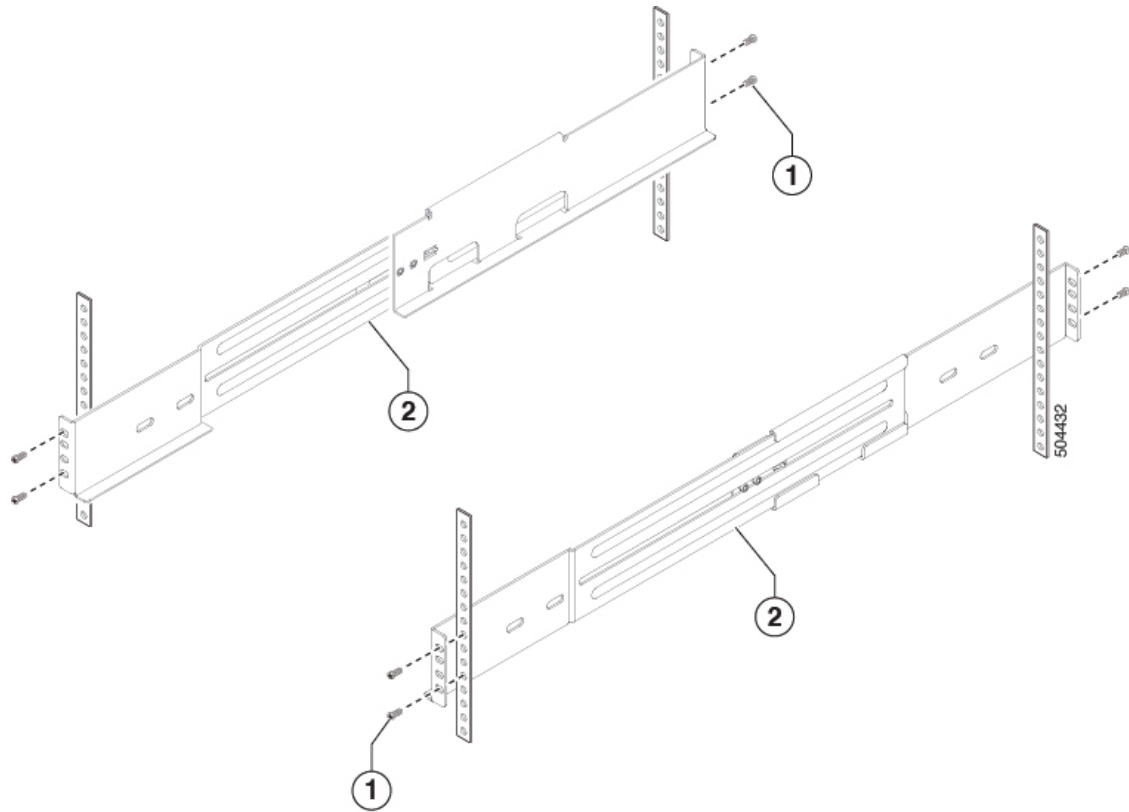


1	Bottom-support rail (2)	
---	-------------------------	--

Step 3 Attach the bottom-support rails on the rack as follows:

- a) Position an expanding set of bottom-support brackets on the rack with each end touching a vertical mounting rail on the front and rear of the rack as shown in the following figure.

Figure 3: Positioning the Bottom-Support Rails



1	Screws holding the bottom-support bracket to the rack	2	The bottom-support brackets (2)
---	---	---	---------------------------------

- b) Holding the bottom-support rail level, attach the rail to the front and rear vertical mounting rails using four customer-supplied screws that are appropriate for the rack (use two screws for each vertical mounting rail), and tighten each screw to the appropriate torque setting for that screw.

Typically, you use one of the following types of screws and the associated torque settings when tightening them:

- M4 screws—Use 12 in-lb (1.36 N·m) of torque.
- M6 screws—Use 40 in-lb (4.5 N·m) of torque.
- 10-32 screws— Use 20 in-lb (2.26 N·m) of torque.

If the rack requires another type of screw, use the appropriate torque setting for that type of screw.

- c) Repeat Steps 3a and 3b to attach the other expanding bottom-support rail to the other side of the rack at the same level as the attached bottom-support rail.

Note Verify that the two sets of bottom-support rails are level with each other before going to the next step.

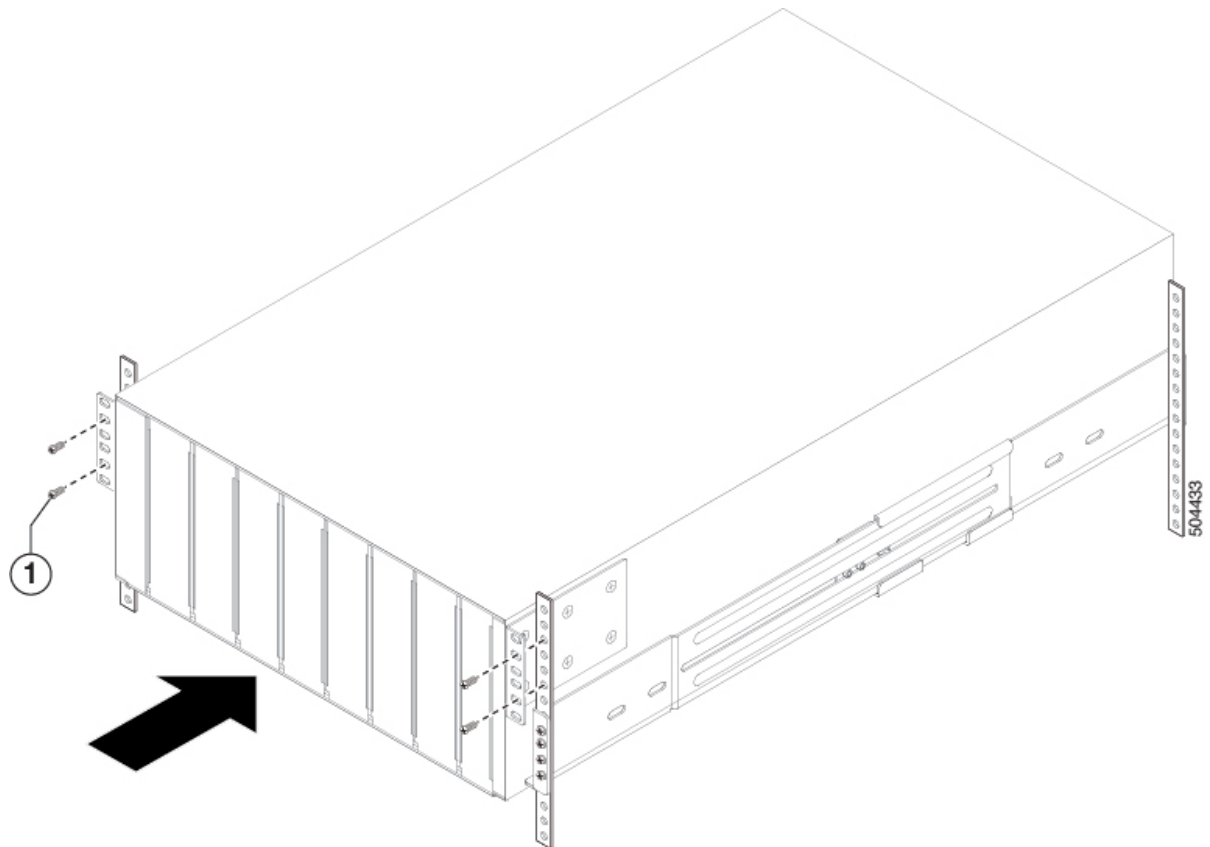
Step 4 Install the chassis in the rack as follows:

- a) Slide the power supply end of the chassis onto the installed bottom-support rails as shown in the following figure.

Note When sliding the chassis onto the bottom-support rails, proceed slowly and cautiously so that you don't damage the switch or support rails.

When you have fully pushed the chassis all the way onto the bottom-support rails, the chassis stops when the front-mount brackets touch the front vertical mounting rack.

Figure 4: Sliding the Chassis onto the Bottom-Support Rails



1	Rack-mount screw		
---	------------------	--	--

- b) Use screws that are appropriate for the rack to attach the front-mount brackets to the rack.

Typically, you use one of the following types of screws and the associated torque settings when tightening them:

- M4 screws—Use 12 in-lb (1.36 N·m) of torque.
- M6 screws—Use 40 in-lb (4.5 N·m) of torque.
- 10-32 screws— Use 20 in-lb (2.26 N·m) of torque.

If the rack requires another type of screw, use the appropriate torque setting for that type of screw.

Grounding the Chassis

The switch chassis is automatically grounded when you properly install the switch in a grounded rack with metal-to-metal connections between the switch and rack.

You can alternatively ground the chassis (this is required if the rack is not grounded) by attaching a customer-supplied grounding cable to the chassis grounding pad and the facility ground.



Note The location of the grounding pad on each switch can be found in the [Overview](#) section.



Note An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Any paint or other non-conductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.

The switch is grounded when you connect the chassis and the power supplies to the earth ground in the following ways:

- You connect the chassis (at its grounding pad) to the data center ground. If the rack is fully-bonded and grounded, you can ground the switch by connecting it to the rack.



Note The chassis ground connection is active even when the power supply modules have not been grounded or connected to the switch.



Warning Statement 1024—Ground Conductor

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—Installing or Replacing the Unit

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

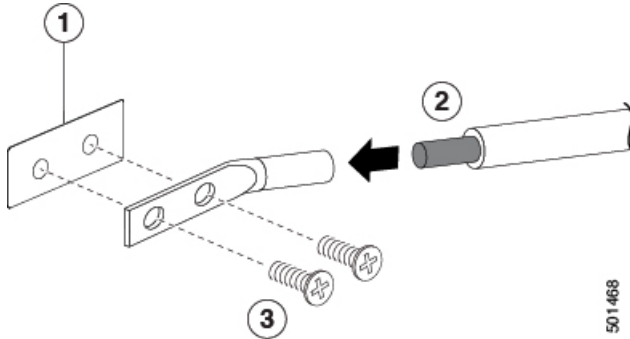
Before you begin

Before you can ground the chassis, you must have a connection to the earth ground for the data center building. If you installed the switch chassis into a bonded rack (see the rack manufacturer's instructions for more information) that now has a connection to the data center earth ground, you can ground the chassis by installing it into the rack. Otherwise, you must connect the chassis grounding pad directly to the data center ground.

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

- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug, and use a crimping tool to crimp the lug to the wire (see Callout 2 in the following figure). Verify that the ground wire is securely attached to the grounding lug by attempting to pull the wire out of the crimped lug.

Figure 5: Grounding the Chassis



1	Chassis grounding pad	3	Two M4 screws used to secure the grounding lug to the chassis
2	Grounding cable, with 0.75 in. (19 mm) of insulation stripped from one end, inserted into the grounding lug and crimped in place		

- Step 3** Secure the grounding lug to the chassis grounding pad with two M4 screws (see Callouts 1 and 3 in the previous figure), and tighten the screws to 12 in lb (1.36 N·m) of torque.
- Step 4** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure an adequate earth ground for the switch. If the rack is fully bonded and grounded, connect the grounding wire as explained in the documentation provided by the vendor for the rack.

Starting the Switch



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:



Note This device is designed to boot-up in less than 30 minutes, provided the neighboring devices are fully operational.

To power up the switch, follow these steps:

Before you begin

- Verify that the switch is fully installed and secured to a rack.
- Verify that the switch is adequately grounded to the facility earth ground or to a grounded rack.
- Verify that all of the fan and power supply modules are installed in the chassis. If the chassis has less than 4 power supplies, there must be a blank module (NXA-PS-BLANK) in the open power supply slot to maintain the designed airflow.
- If you are using a DC power source, verify that the circuit is shut off at a circuit breaker.

Step 1

If the switch has AC power supplies, connect those power supplies to an AC power source as follows:

- a) Verify that the AC power source is turned off at the circuit breaker.
- b) Plug the power cable into the power receptacle on the power supply.
- c) Attach the other end of the power cable to the AC power source.
- d) Turn on the power at the circuit breaker.
- e) Verify that the power supply is functioning by making sure that the OK LED turns green and the FAULT LED is off.

Step 2

If the switch has HVAC/HVDC power supplies, connect those power supplies to a power source as follows:

- a) Using the recommended high voltage power cable for your country or region, connect the Anderson Power Saf-D-Grid connector on the power cable to the power receptacle on the power supply. Make sure that the connector clicks when fully pushed into the receptacle.
- b) Connect the other end of the power cable to a power source.
 - When connecting to an HVAC power source, insert the C14 or LS-25 plug in a receptacle for the HVAC power source.
 - When connecting to an HVDC power source, do the following:
 1. Verify that the power is turned off at a circuit breaker for the power source terminals.
 2. Remove the nuts from each of the terminal posts for the power supply.
 3. Place the power cable negative-wire terminal ring on the negative terminal for the power source and secure them with a terminal nut.
 4. Place the power cable positive-wire terminal ring on the positive terminal for the power source and secure them with a terminal nut.
 5. Place the power cable ground-wire terminal ring on the ground terminal for the power source and secure them with a terminal nut.
 6. If there is a safety cover for the power source terminals, place and secure it over the terminals to avoid an electrical shock hazard.
 7. Turn on the power at the power source circuit breaker.

Step 3

If the switch has DC power supplies, connect those power supplies to a DC power source as follows:

- a) Verify that the DC power source is turned off at the circuit breaker.
- b) Remove the clear plastic safety cover that prevents you from touching the negative (-) and positive (+) terminals on the power supply.

- c) Connect a negative cable from the power source to the left (-) terminal on the power supply.
- d) Connect a positive cable from the power source to the right (+) terminal on the power supply.
- e) Clip on the clear plastic safety cover over the power supply terminals to prevent accidental touching of these terminals.
- f) Turn on the power at the circuit breaker.
- g) Verify that the power supply is functioning by making sure that the OK LED turns green and the FAULT LED is off.

Step 4 Listen for the fans; they should begin operating when the power cable is plugged in.

Step 5 After the switch boots, verify that the following LEDs are on:

- Power supply LED—lit and green

If not green, try removing the module part way from its slot and reinstalling it.

- Fan LED—lit and green

If not green, try removing the module part way from its slot and reinstalling it.

- System Status LED—lit and green (if this LED is orange or red, then one or more environmental monitors is reporting a problem.)
 - Link LEDs for the Ethernet connector—Off
-



CHAPTER 4

Connecting the Switch to the ACI Fabric

- [ACI Fabric Topology](#), on page 29
- [Preparing to Connect to Other Devices](#), on page 30
- [Connecting Leaf Switches to APICs](#), on page 31
- [Connecting Leaf Switches to Spine Switches](#), on page 33
- [Setting Up an Optional Console Interface](#), on page 34
- [Setting Up an Optional Management Connection](#), on page 35
- [Optic Transceiver Removal Using the Optics Extraction Tool](#) , on page 35
- [Maintaining Transceivers and Optical Cables](#), on page 36

ACI Fabric Topology

The ACI fabric topology includes the following major components:

- Application Centric Infrastructure Controller (APIC) appliance (cluster of APICs)
- Leaf switches (for switch compatibility, please see the [data sheets](#)).
- Spine switches (for switch compatibility, please see the [data sheets](#)).

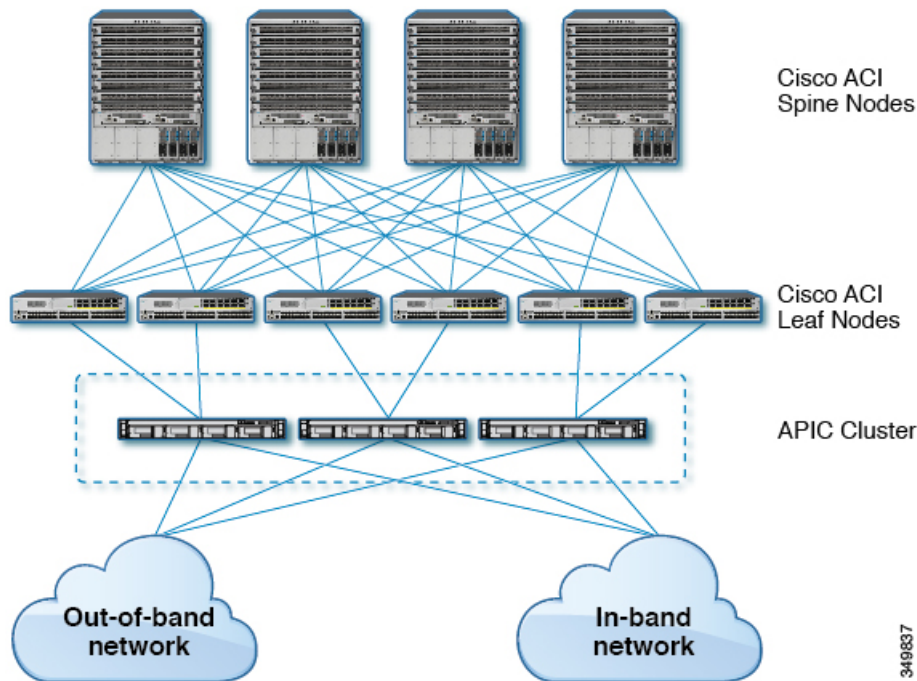
For additional information, please see the [Cisco APIC Installation, Upgrade, and Downgrade Guide](#).



Note To prevent sub-optimal forwarding between endpoints, connect every leaf switch in the fabric to every spine switch in the same fabric.

As shown in the following figure, each APIC is connected to one or two leaf switches and each leaf switch should be connected to every spine switch in the same fabric.

Figure 6: Connections Between APIC Clusters, Leaf Nodes, and Spine Nodes



Preparing to Connect to Other Devices

When preparing to connect the fabric devices, consider the following for each type of interface, and gather all of the required equipment before making the connections:

- Cabling type required for each interface type
- Distance limitations for each signal type
- Additional interface equipment required



Note When running power and data cables in overhead or subfloor cable trays, we strongly recommend that you locate power cables and other potential noise sources as far away as practical from network cabling that terminates on Cisco equipment. In situations where long parallel cable runs cannot be separated by at least 3.3 feet (1 meter), we recommend that you shield any potential noise sources by housing them in a grounded metallic conduit.

The optical transceivers that are not already assembled to their cables come separate from their cables. To prevent these transceivers and their cables from being damaged, we recommend that you keep the transceivers disconnected from their cables when installing them in ports and then insert the optical cable into the transceiver. When removing transceivers from ports, remove their cables before removing the transceivers.

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

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever handling transceivers. The switch is typically grounded when you install transceivers and provides an ESD port to which you

can connect your wrist strap. If you cannot find an ESD port, connect the wrist strap to an earth ground (such as the grounding connection for the chassis).

- Do not remove or insert a transceiver more often than 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) increases with contamination and should be kept below 0.35 dB.
 - Clean these parts before installing them 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 if 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.

Connecting Leaf Switches to APICs

You must downlink one or two (recommended for redundancy) Cisco Nexus 9300 platform ACI-mode leaf switches to each Application Policy Infrastructure Controller (APIC) in your ACI fabric. The type of virtual interface card (VIC) installed on the APIC determines the types of interface cables that you can use to connect the leaf switches to the APICs.

- The **VIC 1225T** module supports copper connectors, copper cables, and switches with copper downlink ports (such as: Cisco Nexus 93108TC-FX switch).
- The **VIC 1225** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco Nexus 93600CD-GX switch).
- The **VIC 1455** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco Nexus 93600CD-GX switch).



Note Breakout ports cannot be used for Cisco APIC connectivity.

Before you begin

The APIC and leaf switches in the fabric must be fully installed in their racks and grounded.

Step 1

Connect an interface cable to one of the two to four ports on the virtual interface card (VIC) installed on the APIC. If the cable is not already assembled to its transceivers, insert the transceiver into the VIC port and then connect the optical interface cable to the transceiver.

- For a **VIC 1225T** 10GBASE-T copper module, use 10GBASE-T cables with RJ-45 connectors.

- For a **VIC 1225** optical module, use one of the following sets of transceivers and cables:
 - Cisco 10GBASE-LR transceivers (SFP-10G-LR) supporting a link length of up to 6.1 miles (10 km)
 - Cisco 10GBASE-SR transceivers (SFP-10G-SR) supporting the following link lengths:
 - Using 2000 MHz MMF (OM3) for up to 984 feet (300 m)
 - Using 4700 MHz MMF (OM4) for up to 1312 feet (400 m)
 - Cisco SFP+ Active Optical Cables (SFP-10G-AOC x M [where $x=1, 3, 5, 7$ for lengths in meters])
 - Cisco SFP+ Twinax Cables (SFP-H10GB-CU x M [where $x=7$ for lengths in meters])
- For a **VIC 1455** SFP28 module, 10-Gigabit only, use one of the following sets of transceivers and cables:
 - Cisco 10GBASE-LR transceivers (SFP-10G-LR) supporting a link length of up to 6.1 miles (10 km)
 - Cisco 10GBASE-SR transceivers (SFP-10G-SR) supporting the following link lengths:
 - Using 2000 MHz MMF (OM3) for up to 984 feet (300 m)
 - Using 4700 MHz MMF (OM4) for up to 1312 feet (400 m)
 - Cisco SFP+ Active Optical Cables (SFP-10G-AOC x M [where $x=1, 2, 3, 5, 7, \text{ or } 10$ for lengths in meters])
 - Cisco SFP+ Twinax Cables (SFP-H10GB-CU x M [where $x=1, 2, 3, 5, 7, \text{ or } 10$ for lengths in meters])

Note The VIC 1455 has 4 ports, port-1, port-2, port-3, and port-4 from left to right.

- All ports must have the same speed, either 10-Gigabit or 25-Gigabit.
- Port-1 and port-2 is one pair, corresponding to eth2-1 on APIC and port-3 and port-4 is another pair, corresponding to eth2-2 on APIC. Only one connection is allowed for each pair. For example, you can connect one cable to either port-1 or port-2, and connect another cable to either port-3 or port-4 (**please do not connect two cables on any pair**).

To determine which transceivers, adapters, and cables support this switch, see the [Cisco Transceiver Modules Compatibility Information](#) document.

To see the transceiver specifications and installation information, see [Transceiver Module Installation Guides](#).

Step 2 Connect the other end of the interface cable to a downlink port on a leaf switch.

- For a Cisco 10GBASE-LR or -SR transceiver and cable, insert the transceiver into a downlink optical port on a leaf switch before connecting the cable to the transceiver.
- For Cisco SFP+ Active Optical Cables, insert the transceiver on the cable into a downlink optical port on a leaf switch.
- For a 10GBASE-T copper cable, insert the RJ-45 connector on the cable into a downlink BASE-T port on a leaf switch.

Note To determine which transceivers, adapters, and cables support this switch, see the [Cisco Transceiver Modules Compatibility Information](#) document.

Connecting Leaf Switches to Spine Switches

For optimal forwarding between endpoints, you must connect each leaf switch to every spine switch in the same ACI fabric.

To determine which transceivers, adapters, and cables support this switch, see the [Cisco Transceiver Modules Compatibility Information](#) document.

To see the transceiver specifications and installation information, see [Transceiver Module Installation Guides](#).



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 1056**—Unterminated Fiber Cable

Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments, for example, eye loupes, magnifiers, and microscopes, within a distance of 100 mm, may pose an eye hazard.

Before you begin

- The leaf and spine switches in the fabric (such as: N9K-C9364C, N9K-C9332C, N9K-C9316D-GX, and N9K-C9332D-GX2B) must be fully installed in their racks and grounded.
- If there are modular switches in the fabric, their ACI-mode line cards must already be installed. The line cards can be of the following types:
 - 32-port 100-Gigabit (such as: N9K-X9732C-EX)
 - 36-port 100-Gigabit (such as: N9K-X9736C-FX)
 - 16-port 400-Gigabit (such as: N9K-X9716D-GX)



Note You cannot include NX-OS line cards in the same chassis when running in ACI mode.



Note Multiple uplinks from a leaf switch to a spine switch is supported. A symmetrical topology is recommended so that all devices have equal access to resources.

-
- Step 1** For the transceivers with removable cables, make sure that the transceivers are separated from their interface cables.
- Step 2** Insert the appropriate transceiver into an active uplink port on the leaf switch.
- Step 3** Insert the same type of transceiver in the spine switch port on the line card.
- Step 4** For transceivers with removable cables, insert the interface cable into the open end of each of those transceivers.
- Step 5** Repeat Steps 1 through 4 for each spine switch in the ACI fabric.
The leaf switch is connected to each spine switch in the ACI fabric.
- Step 6** Repeat Steps 1 through 5 for each leaf switch in the ACI fabric.
Each leaf switch in the ACI fabric is connected to each spine switch in the network,
-

The fabric automatically implements Equal Cost Multi-Pathing (ECMP) and enables all links. You do not need to configure the links.

Setting Up an Optional Console Interface

You can optionally set up a console interface for performing the initial configuration of the switch. To do this, use the interface cable provided in the accessory kit to connect the switch to your console device. You can connect the console port on the switch to a modem. If you do not connect it to a modem, make the connection either before powering up the switch or after completing the boot process for the switch.

Before you begin

The console device must support VT100 terminal emulations and asynchronous transmissions.

-
- Step 1** Configure the terminal emulator program to match each of the following default port characteristics:
- 9600 baud
 - 8 data bits
 - 1 stop bit
 - No parity
- Step 2** Insert the RJ-45 connector on the interface cable found in the accessory kit into the RS-232 port on the switch and insert the DB-9 connector on the other end of the cable to the serial port on the console device.
-

What to do next

You can now perform the initial configuration for the switch (see the *Cisco ACI Getting Started Guide*).

Setting Up an Optional Management Connection

You can optionally set up an out-of-band management connection for monitoring and troubleshooting purposes. To do this, depending on your switch, you connect either the RJ-45 management port or the SFP management port on the switch to an external hub, switch, or router.

Before you begin

To prevent an IP address conflict, you must complete the initial configuration for the switch and establish an IP address before you create the management connection.

-
- Step 1** Connect the interface cable to a management port on the switch.
- Step 2** Connect the other end of the cable to an external hub, switch, or router.
-

Optic Transceiver Removal Using the Optics Extraction Tool

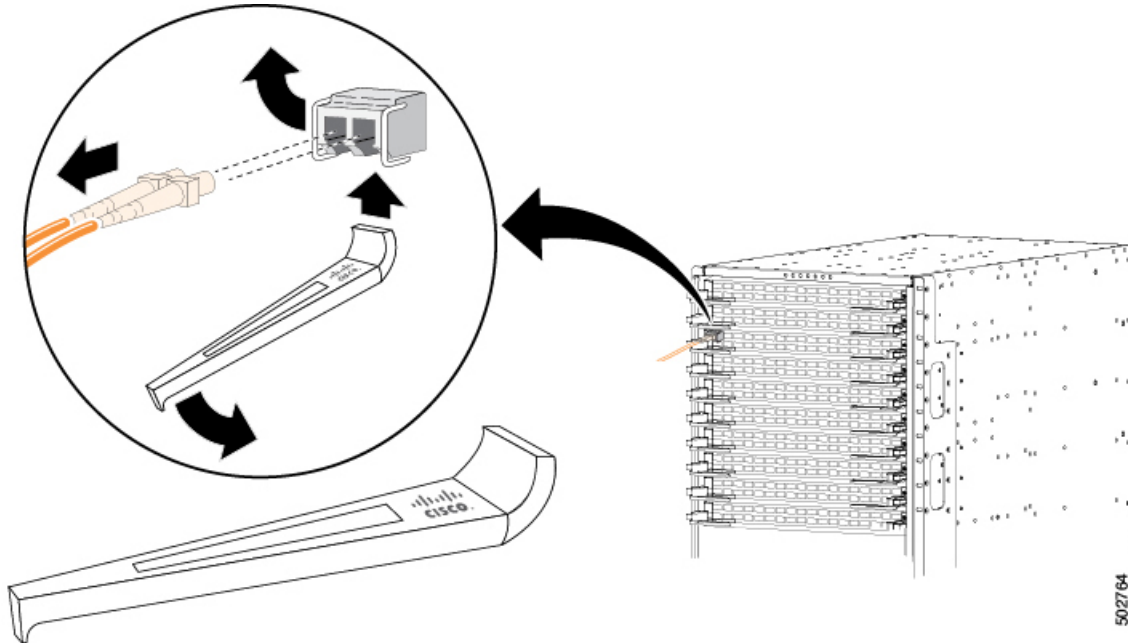
You use both ends of the optics extraction tool in this procedure. You use the wide end for releasing the bale latch, and the narrow end for removing the transceiver module.

Before you begin

Ensure that before you handle any switch components, you are wearing a grounded electrostatic discharge (ESD) strap. To ground the strap, attach it directly to earth ground or to a grounded rack or chassis. There must be a metal-to-metal connection to earth ground.

-
- Step 1** Remove the fiber-optic cables from the transceiver module before removing the transceiver module.

Step 2 Use the wide side of the optics extraction tool to release the bale latch (see the following image).



Step 3 Use the narrow end of the optics extraction tool to carefully remove the transceiver module (see the following

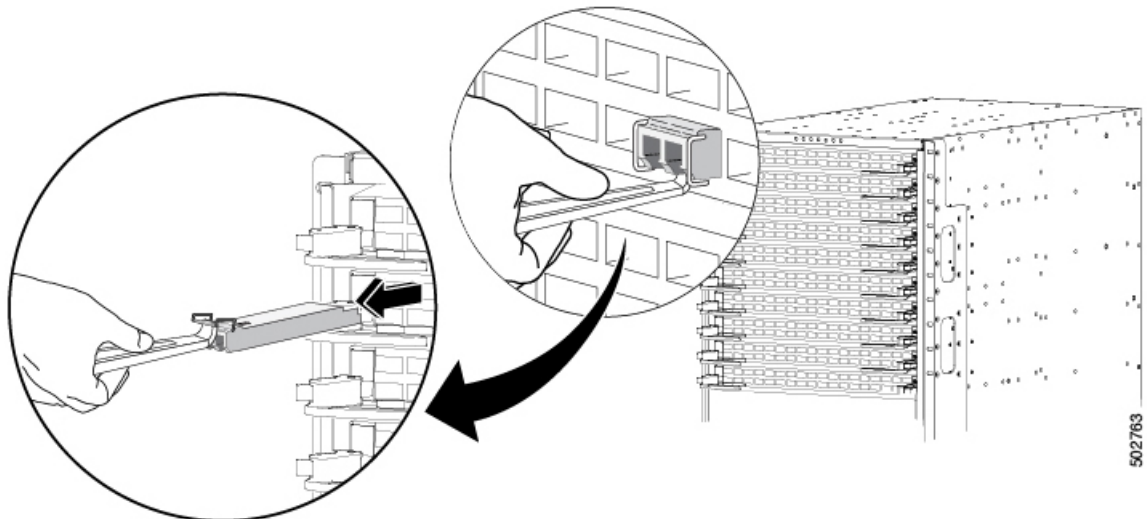


image).

Step 4 Place the transceiver module in an antistatic bag or other protective environment.

Maintaining Transceivers and Optical Cables

Transceivers and fiber-optic cables must be kept clean and dust free to maintain high signal accuracy and prevent damage to the connectors. Contamination increases attenuation (loss of light) and should be below 0.35 dB.

Consider the following maintenance guidelines:

- Transceivers are static sensitive. To prevent ESD damage, wear an ESD-preventative wrist strap that is connected to the grounded chassis.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep all optical connections covered when not in use. Clean them before using to prevent dust from scratching the fiber-optic cable ends.
- Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.
- Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors if they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to the fiber-optic connection cleaning procedures for your site.
- 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.



CHAPTER 5

Replacing Modules

- [Replacing a 4 \(RU\) Fan Module, on page 39](#)
- [Replacing an AC Power Supply, on page 40](#)
- [Replacing a DC Power Supply, on page 41](#)
- [Replacing a High Voltage \(HVAC/HVDC\) Power Supply, on page 43](#)
- [Replacing a Supervisor Module, on page 44](#)
- [Installing or Replacing a Line-Card Expansion Module \(LEM\), on page 46](#)
- [Replacing a Switch Card, on page 48](#)
- [Fiber Optic Removal Using the Optics Extraction Tool , on page 51](#)

Replacing a 4 (RU) Fan Module

The fan module is designed to be removed and replaced while the system is operating without causing an electrical hazard or damage to the system if the replacement is performed within one minute.

If you do not have the appropriate replacement fan module, leave the original fan module in its slot to preserve the designed airflow for the switch until you have the replacement fan module. The module number can be found on the chassis.



Caution The fans might be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

Before you begin

- Verify that you have an ESD wrist strap or other device to prevent ESD damage for components that you touch.
- Verify that you have an antistatic surface or bag for placing the fan module that you remove from the chassis.
- Verify that the replacement fan module has the correct direction of airflow (it has the same coloring as the other fan and power supply modules in the same chassis).

Step 1 Attach an ESD wrist strap or other ESD device to your body and an earth ground to prevent ESD damage.

You can attach the ESD device to any earth ground or grounded object, such as a grounded rack or ground connection on a chassis.

Step 2 Remove the fan module that you are replacing as follows:

- a) On the fan module that you are removing, unscrew the two captive screws on the front of the fan module until each screw is free of the chassis.
- b) Holding the handle, pull the module out of the chassis and set it on an antistatic surface or in a antistatic bag.

Caution Do not touch the electrical connectors on the back side of the module and prevent anything else from coming into contact with and damaging the connectors.

Step 3 Install the replacement fan module as follows:

- a) Hold the fan module with two hands. One hand holding its handle, and one hand supporting the weight of the fan module. Align the back of the fan module (the side with the electrical connectors) to the open fan slot in the chassis.
- b) Slide the fan module into the slot until it clicks in place.
- c) Tighten the fan module captive screws.
- d) Verify that the Status (STS) LED turns on and becomes green.

Replacing an AC Power Supply

You can replace an AC power supply during operations so long as there is another power supply installed and operating during the replacement. The switch requires two power supplies for operations, so you can hot swap the redundant power supply during operations. If there are only two power supplies installed in the chassis, you can replace one by installing the new power supply in the open power supply slot before removing the other power supply. The module number can be found on the chassis.



Note This switch supports port-side intake power supplies only (NXA-PAC-2KW-PI)

Before you begin

- Verify that you have an ESD wrist strap or other device to prevent ESD damage to the components that you touch.
- Verify that you have an antistatic surface or bag for placing the power supply module that you remove from the chassis.
- Verify that the replacement power supply module has the correct direction of airflow (it has the same coloring as the other fan and power supply modules in the same chassis). Otherwise the switch can overheat and shut down.

Step 1 Attach an ESD wrist strap or other ESD device to your body and an earth ground to prevent ESD damage.

You can attach the ESD device to any earth ground or grounded object, such as a grounded rack or ground connection on a chassis.

Step 2 Remove the power supply as follows:

- a) Pull the power cord out from the power receptacle on the power supply to be removed and verify that the OK LED turns off.
- b) Remove the power supply from the chassis by pushing and holding its thumb latch to the left and pulling the power supply part way out of the chassis.
- c) Place your other hand under the power supply to support it while you slide it out of the chassis.
Either place the power supply on an antistatic surface or pack it in its packing materials.
- d) If the power supply slot is to remain empty, install a blank power supply filler panel (part number NXA-PS-BLANK).

Step 3 Install the replacement power supply as follows:

- a) Holding the replacement power supply with one hand underneath the module and the other hand holding the handle, align the back end of the power supply (the end with the electrical connections) to the open power supply slot and slide the power supply all the way into the slot until it clicks into place.
- b) Test the installation by trying to pull the power supply out of the slot without using the release latch.
If the power supply does not move out of place, it is secured in the slot. If the power supply moves, press it all the way into the slot until it clicks in place.

Step 4 Connect the new power supply to an AC power source as follows:

- a) Attach the power cable to the electrical outlet on the front of the power supply.
- b) Connect the other end of the power cable to an AC power source.
 - For no power redundancy, connect one power supply to one power source.
 - For n+1 redundancy, connect two power supplies to one or two power sources.
 - For n+n redundancy, connect each of two power supplies to a different power source.

Note Depending on the outlet receptacle on your power distribution unit, you might need the optional jumper cable to connect the switch to your outlet receptacle.

- c) Verify that the power supply is operational by checking that the power supply OK LED is green.

Replacing a DC Power Supply

You can replace a DC power supply during operations so long as there is another power supply installed and operating during the replacement. The switch requires two power supplies for operations, so you can hot swap the redundant power supply during operations. If there are only two power supplies installed in the chassis, you can replace one by installing the new power supply in the open power supply slot and making it operational before removing the other power supply. The module number can be found on the chassis.



Note This switch supports port-side intake power supplies only (NXA-PDC-2KW-PI)

**Warning Statement 1034—Backplane Voltage**

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

Before you begin

- Verify that you have an ESD wrist strap or other device to prevent ESD damage to the components that you touch.
- Verify that you have an antistatic surface or antistatic bag for placing the power supply module that you remove from the chassis.
- Verify that the replacement power supply module has the same direction of airflow as the other modules in the same chassis. Otherwise the switch can overheat and shut down.
- Verify that the circuit breaker for the DC power source is turned off.

Step 1 Attach an ESD wrist strap or other ESD device to your body and an earth ground to prevent ESD damage.

You can attach the ESD device to any earth ground or grounded object, such as a grounded rack or ground connection on a chassis.

Step 2 Verify that the DC power source is turned off at a circuit breaker.

Step 3 Remove the DC power supply that needs to be replaced as follows:

- a) Turn off the circuit breaker for the power source to the power supply that you are replacing.

Verify that the OK LED turns off.

- b) Unclip and remove the clear plastic cover that prevents access to the positive and negative terminals on the DC power supply.
- c) Unfasten the positive power cable from the right terminal.
- d) Unfasten the negative power cable from the left terminal.
- e) Replace the clear plastic cover that prevents access to the terminals.
- f) Press the thumb latch to disengage the power supply from the chassis and use the handle to pull it part way out of the chassis.
- g) Place your other hand under the power supply to support it while you slide it out of the chassis. Place the power supply on an antistatic surface.
- h) If the power supply bay is to remain empty, install a blank power supply filler panel (NXA-PS-BLANK).

Step 4 Install the replacement DC power supply as follows:

- a) Hold the replacement power supply by the handle and position it so that the thumb latch is on the right, and then slide it all the way into the power supply bay (the thumb latch will click), ensuring that the power supply is fully seated in the bay.
- b) If there is a clear plastic cover that prevents your access to the terminals, unclip it and remove it from the chassis.
- c) Fasten the negative cable to the left terminal.
- d) Fasten the positive cable to the right terminal.
- e) Clip the clear plastic cover over the terminals to prevent accidental touching of the terminals.
- f) Turn on the power at the circuit breaker.

- g) Verify the power supply operation by checking that the OK LED is green.

Replacing a High Voltage (HVAC/HVDC) Power Supply

You can replace an HVAC/HVDC power supply during operations so long as the other power supply provides power to the switch.

Before you begin

- The replacement power supply must have the same wattage and airflow direction as the power supply being replaced.



Note You can determine the airflow direction by looking at the coloring of the latch on each power supply. The high voltage power supplies have either burgundy or red latches for port-side intake airflow or they have blue latches for port-side exhaust airflow.

- An HVAC/HVDC power source must be within reach of the power cable that will be used with the replacement power supply. If you are using $n+n$ power redundancy, there must be a separate power source for each power supply installed in the chassis.
- There must be an earth ground connection to the chassis in which you are installing the replacement power supply. HVAC/HVDC power supplies connected to AC power sources are automatically grounded by their power cable when connected to the power supply and AC power source. HVAC/HVDC power supplies connected to DC power sources have Saf-D-Grid power cables with three connectors on the power source end--you connect one of those connectors to the earth ground.

Step 1 Remove an HVAC/HVDC power supply as follows:

- a) Turn off the circuit breaker for the power feed to the power supply that you are replacing.
Be sure that the LEDs turn off on the power supply that you are removing.
- b) Remove the power cable from the power supply by pressing the tab on the top of the Anderson Power SAF-D-Grid connector and pull the cable and connector out of the power supply.
- c) Grasp the power supply handle while pressing the colored release latch towards the power supply handle.
- d) Place your other hand under the power supply to support it while you slide it out of the chassis.

Caution Do not touch the electrical connections on the back side of the module and prevent anything else from coming into contact with and damaging the connectors.

Step 2 Install the replacement power supply as follows:

- a) Holding the replacement power supply with one hand underneath the module and the other hand holding the handle, turn the power supply so that its release latch is on the right side and align the back end of the power supply (the end with the electrical connections) to the open power supply slot before carefully sliding the power supply all the way into the slot until it clicks into place.

Note If the power supply does not fit into the open slot, turn the module over before sliding it carefully into the open slot.

- b) Test the installation by trying to pull the power supply out of the slot without using the release latch.

If the power supply does not move out of place, it is secured in the slot. If the power supply moves, carefully press it all the way into the slot until it clicks in place.

- c) Attach the Saf-D-Grid end of the power cable to the electrical outlet on the front of the power supply.
- d) Make sure that the other end of the power cable is attached to the appropriate power source for the power supply.
- For an HVAC power source, plug the other end of the power cable into the power source.
 - For a HVDC power source, verify that the circuit breaker is turned off and then connect each of the three cable connectors to the appropriate DC and grounding terminals on the power source. If there is a cover plate for the DC terminals, install the plate to prevent accidental contact with the terminals.
- e) If using an HVDC power source, turn on the circuit breaker for the power source.
- f) Verify that the power supply is operational by making sure that the power supply LED is green.

Replacing a Supervisor Module

This procedure can proceed without unplugging the switch.



Warning **Statement 1034**—Backplane Voltage

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.



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.

Before you begin

- Wear electrostatic discharge (ESD) wrist strap or other ESD protective device while handling modules.
- Prepare an antistatic surface or packing materials for each module that you remove from the chassis.

Step 1 Open the packaging for the new module and inspect the module for damage.

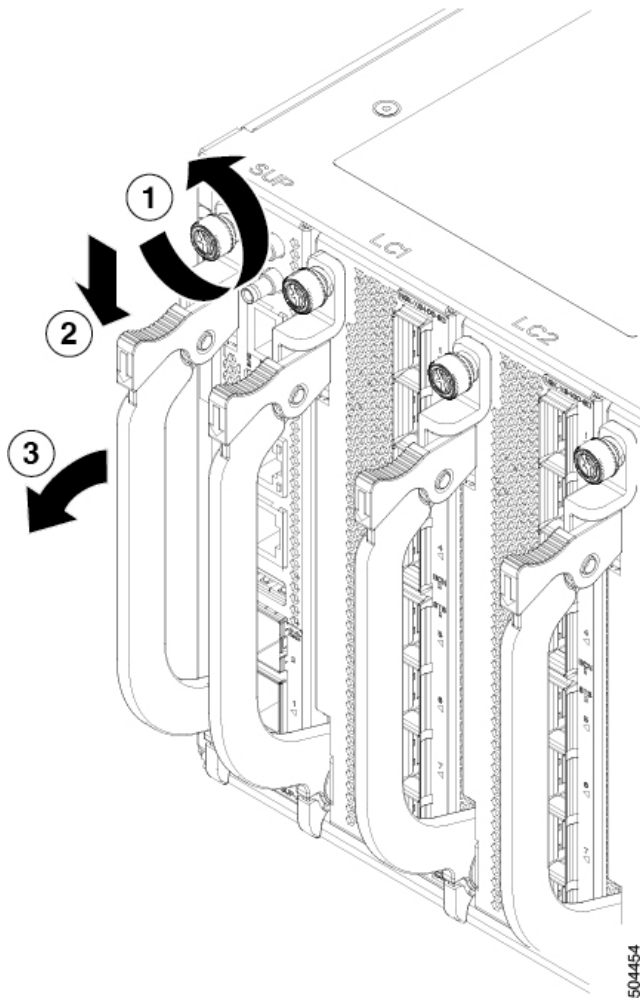
For a damaged module, contact the Technical Assistance Center (TAC).

Step 2 If you are replacing a module that is currently in the chassis, remove the existing module from the chassis by following these steps:

Note Disconnect and label each of the interface cables from the module.

- a) Loosen the thumb-screw on the module to release the module from the chassis as shown in the following figure.
- b) Press the latch down, to release the latch from the chassis as shown in the following figure.
- c) Rotate the latch away from the module to disengage from the chassis as shown in the following figure.
- d) Holding the latch release lever handle, pull the module out of the chassis as shown in the following figure.

Figure 7: Supervisor Module Latch Release Lever



1	Loosen the thumb-screw on the module.	2	Press the latch down to release the latch from the chassis.
3	Rotate the latch away from the module to disengage from the chassis.	4	Pull the module out of the chassis.

Step 3 To install the module, follow these steps:

- a) Make sure that the lever is in the fully open position.
- b) Hold the module with one hand and place your other hand under the module to support its weight.

- c) Align the module with the open slot and gently slide the module into the slot until the lever's clamp engages with the chassis. Then rotate the lever up and toward the chassis until it clicks into the fully closed position .
- d) Tighten the module thumb-screws.

Note Attach each interface cable to the appropriate port on the module. Use the label on each cable to determine to which port each cable attaches.

Installing or Replacing a Line-Card Expansion Module (LEM)

The switch can operate with one or more Line-card Expansion Modules (LEMs) installed in the chassis. If there is at least one LEM installed and operating in the chassis, you can replace another LEM or install a new LEM in an empty slot.



Note **Limitation:** N9K-X9400-16W has a limitation on link bring up for 10G/40G and 10G/100G when connecting ports that are next to each other.

if port 1 is connected with 10G, and if 40G or 100G is connected in port2 then port 2 will be `hw-disabled`. To recover port 2 from `hw-disabled`, you need to remove 10G from port 1 and you need to do OIR once on port-2

```
Eth4/3 -- hwdisabled trunk full inherit QSFP-H40G-CU5M
Eth4/4 -- connected routed full 10G SFP-H10GB-AOC1M
```

```
ifav132-leaf18-sl# show int ethernet 4/3-4 status
Eth4/3 -- out-of-ser trunk full 40G QSFP-H40G-CU5M
Eth4/4 -- hwdisabled routed full inherit SFP-H10GB-AOC1M
```

```
ifav132-leaf18-sl# show int ethernet 6/7-8 status
```

```
-----
Port Name Status Vlan Duplex Speed Type
-----
```

```
Eth6/7 -- out-of-ser trunk full 10G 10Gbase-SR
Eth6/8 -- hwdisabled trunk full inherit QSFP-100G-CWDM4
ifav132-leaf18-sl# show int ethernet 6/7-8 status
```

```
-----
Port Name Status Vlan Duplex Speed Type
-----
```

```
Eth6/7 -- hwdisabled trunk full inherit 10Gbase-SR
Eth6/8 -- out-of-ser trunk full 100G QSFP-100G-CWDM4
-----
```



Caution Once a LEM is removed, you must wait at least 10 seconds before you insert a new one. Once the LEM is inserted, the `retimer init` program will be started in MIFPGA. Any removal or disturbance would cause `retimer` cannot access LEM MIFPGA and a crash can happen.



Warning **Statement 1034**—Backplane Voltage

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.



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.

Before you begin

- Wear electrostatic discharge (ESD) wrist strap or other ESD protective device while handling modules.
- Prepare an antistatic surface or packing materials for each module that you remove from the chassis.

Step 1 Open the packaging for the new LEM and inspect the module for damage.

For a damaged module, contact the Technical Assistance Center (TAC).

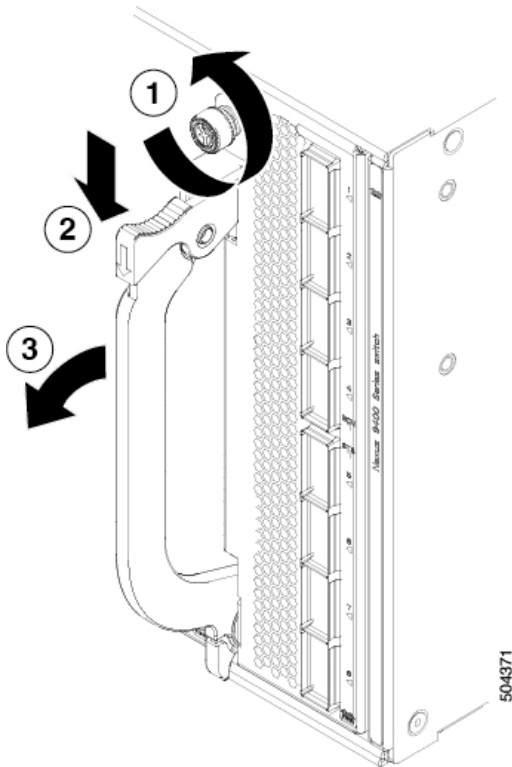
Step 2 If you are installing the module in a slot with a blank module, remove the blank module (N9K-C9400-BLK) that is already in that slot.

Step 3 If you are replacing a module that is currently in the chassis, remove the existing module from the chassis by following these steps:

Note Disconnect and label each of the interface cables from the module.

- a) Loosen the thumb-screw on the LEM to release the LEM from the chassis as shown in the following figure.
- b) Press the latch down, to release the latch from the chassis as shown in the following figure.
- c) Rotate the latch away from the module to disengage from the chassis as shown in the following figure.
- d) Holding the latch release lever handle, pull the module out of the chassis as shown in the following figure.

Figure 8: Line-Card Expansion Module Latch Release Lever



1	Loosen the thumb-screw on the LEM.	2	Press the latch down to release the latch from the chassis.
3	Rotate the latch away from the module to disengage from the chassis.	4	Pull the module out of the chassis.

Step 4 To install the module, follow these steps:

- a) Make sure that the LEM lever is in the fully open position.
- b) Hold the module with one hand and place your other hand under the module to support its weight.
- c) Align the module with the open slot and gently slide the module into the slot until the lever's clamp engages with the chassis. Then rotate the lever up and toward the chassis until it clicks into the fully closed position .
- d) Tighten the LEM thumb-screw.

Note Attach each interface cable to the appropriate port on the module. Use the label on each cable to determine to which port each cable attaches.

Replacing a Switch Card

The Switch Card is hot-swappable. It is not necessary to shut down the switch before replacing the module.



Warning Statement 1034—Backplane Voltage

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

Before you begin

- Wear electrostatic discharge (ESD) wrist strap or other ESD protective device while handling the module.
- Prepare an antistatic surface or packing materials for the module that you remove from the chassis.

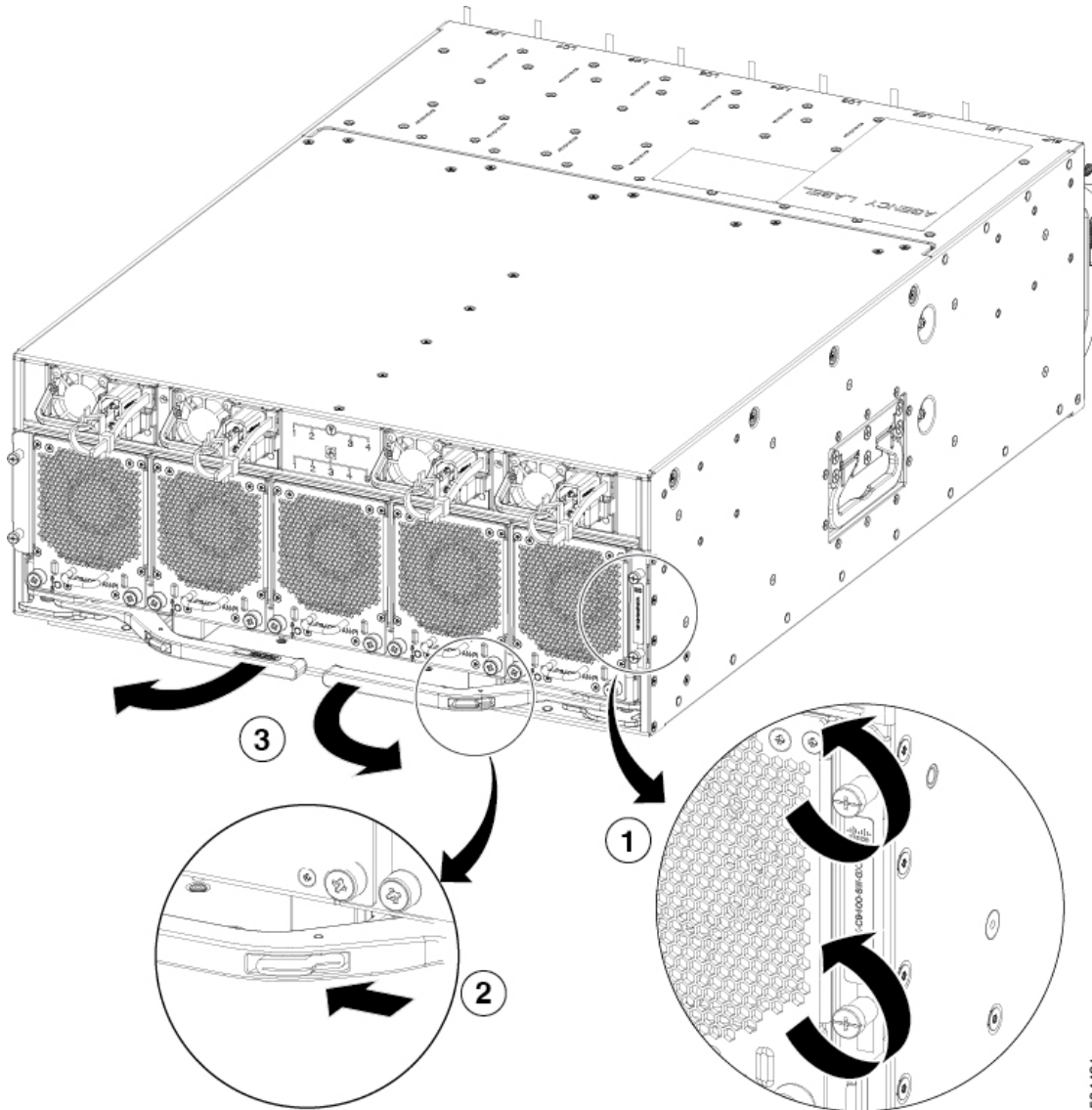
Step 1 Open the packaging for the new Switch Card and inspect the module for damage.

For a damaged module, contact the Technical Assistance Center (TAC).

Step 2 To remove the module follow these steps:

- a) Loosen the thumb screws that attach the module to the chassis (4), as shown in the following figure.
- b) Push the lever button (2) to release the lever, as shown in the following figure.
- c) Disengage the lever (2) by pulling it out and away from the chassis, as shown in the following figure.
- d) Carefully remove the module.

Figure 9: Switch Card Replacement



504421

1	Loosen the thumb screws (2 each side of the chassis)	2	Push the lever button (1 each lever)
3	Disengage the lever (2)		

Step 3

To install the module, follow these steps:

- a) Make sure that each lever is in the fully open position.
- b) Use both hands, one on the left side and one on the right side of the module, to support its weight.
- c) Align the module with the open slot and gently slide the module into the slot until the lever's clamp touches the chassis. Then engage the levers by pushing them toward the chassis until it clicks into place, reaching the fully closed position..

- d) Tightening the thumb screws.
-

Fiber Optic Removal Using the Optics Extraction Tool

Management port fiber optics cannot be removed unless the Supervisor LEM ejector is pulled out. This will cause a Supervisor reset.

Before you begin

Ensure that before you handle any switch components, you are wearing a grounded electrostatic discharge (ESD) strap. To ground the strap, attach it directly to earth ground or to a grounded rack or chassis. There must be a metal-to-metal connection to earth ground.

Step 1 Remove the fiber-optic cables from the transceiver module before removing the transceiver module.

Step 2 Use the optics extraction tool to carefully disengage the latch and remove the transceiver module (see the following

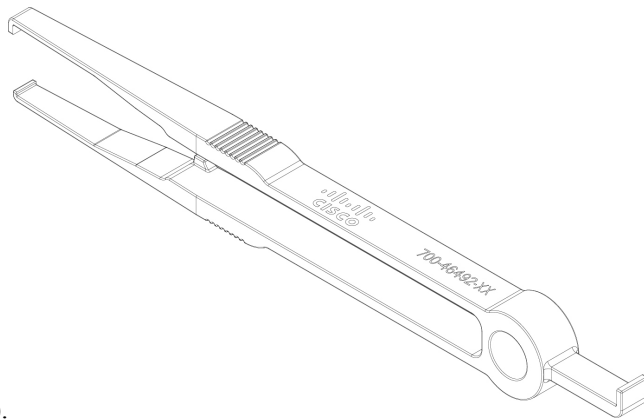


image).

Step 3 Place the transceiver module in an antistatic bag or other protective environment.



CHAPTER 6

Managing the Switch

- [Displaying Information About the Installed Hardware Modules, on page 53](#)
- [Displaying the Hardware Inventory for the Switch, on page 56](#)
- [Displaying the Modules for the Switch, on page 57](#)
- [Displaying the Serial PROM \(SPROM\) for the Switch, on page 58](#)
- [Displaying Environmental Information for the Switch, on page 59](#)
- [Displaying Environment Temperature for the Switch, on page 60](#)

Displaying Information About the Installed Hardware Modules

You can display information about the switch hardware and the hardware modules that are installed in the switch by using the **show hardware** command.

```
ASW4_QP_LEM# show hardwareCisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2022, Cisco and/or its affiliates.
All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their own
licenses, such as open source. This software is provided "as is," and unless
otherwise stated, there is no warranty, express or implied, including but not
limited to warranties of merchantability and fitness for a particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0 or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 01.09
  NXOS: version 10.3(2) [Feature Release]
  Host NXOS: version 10.3(2)
  BIOS compile time: 09/28/2022
  NXOS image file is: bootflash:///nxos64-cs.10.3.2.F.bin_24
  NXOS compile time: 11/30/2022 12:00:00 [12/16/2022 04:02:06]
  NXOS boot mode: LXC
```

Hardware

```

cisco Nexus9000 C9408 Chassis
Intel(R) Xeon(R) CPU D-1633N @ 2.50GHz with 32801260 kB of memory.
Processor Board ID FDO262208WX
Device name: ASW4_QP_LEM
bootflash: 115343360 kB

Kernel uptime is 2 day(s), 22 hour(s), 9 minute(s), 16 second(s)

Last reset at 282926 usecs after 1671239402
Reason: Reset Requested by CLI command reload
System version: 10.3(2)
Service:

plugin
  Core Plugin, Ethernet Plugin
-----
Switch hardware ID information
-----

Switch is booted up
Switch type is : Nexus9000 C9408 Chassis
Model number is N9K-C9408
H/W version is 0.1
Part Number is 73-102375-03
Part Revision is 03
Manufacture Date is Year 2022 Week 21
Serial number is FDO262100LC
CLEI code is 0

-----
Chassis has 8 Module slots
-----

Module1 ok
Module type is : "Supervisor"
0 submodules are present
Model number is
H/W version is 0.0
Part Number is
Part Revision is
Manufacture Date is Year 1996 Week 0
Serial number is
CLEI code is

LEM-Module1 empty

LEM-Module2 ok
LEM-Module type is : 8x400G Ethernet Module
0 submodules are present
Model number is N9K-X9400-8D
H/W version is 0.3
Part Number is 73-102376-03
Part Revision is 07
Manufacture Date is Year 2022 Week 22
Serial number is FDO26221BA7
CLEI code is 0

LEM-Module3 ok
LEM-Module type is : 16x200G Ethernet Module
0 submodules are present
Model number is N9K-X9400-16W
H/W version is 0.3
Part Number is 73-102377-03
Part Revision is 07
Manufacture Date is Year 2022 Week 22

```

```
Serial number is FDO262213VA
CLEI code is 0

LEM-Module4 empty

LEM-Module5 ok
LEM-Module type is : 8x400G Ethernet Module
0 submodules are present
Model number is N9K-X9400-8D
H/W version is 0.3
Part Number is 73-102376-03
Part Revision is 07
Manufacture Date is Year 2022 Week 22
Serial number is FDO26221BAK
CLEI code is 0

LEM-Module6 empty

LEM-Module7 ok
LEM-Module type is : 16x200G Ethernet Module
0 submodules are present
Model number is N9K-X9400-16W
H/W version is 0.3
Part Number is 73-102377-03
Part Revision is 07
Manufacture Date is Year 2022 Week 22
Serial number is FDO262213VQ
CLEI code is 0

LEM-Module8 empty

-----
Chassis has 4 PowerSupply Slots
-----

PS1 fail/shutdown
Power supply type is: 2000.00W 220v AC
Model number is NXA-PAC-2KW-PI
H/W version is 0
Part Number is 341-1888-01
Part Revision is A0
Manufacture Date is Year 2021 Week 47
Serial number is POG2547JACK
CLEI code is CMUPAFGCAA

PS2 fail/shutdown
Power supply type is: 2000.00W 220v AC
Model number is NXA-PAC-2KW-PI
H/W version is 0
Part Number is 341-1888-01
Part Revision is A0
Manufacture Date is Year 2021 Week 47
Serial number is POG2547JA1Q
CLEI code is CMUPAFGCAA

PS3 fail/shutdown
Power supply type is: 2000.00W 220v AC
Model number is NXA-PAC-2KW-PI
H/W version is 0
Part Number is 341-1888-01
Part Revision is A0
Manufacture Date is Year 2021 Week 47
Serial number is POG2547JAH6
CLEI code is CMUPAFGCAA
```

```

PS4 ok
Power supply type is: 2000.00W 220v AC
Model number is NXA-PAC-2KW-PI
H/W version is 0
Part Number is 341-1888-01
Part Revision is A0
Manufacture Date is Year 2021 Week 47
Serial number is POG2547JA20
CLEI code is CMUPAFGCAA

```

```

-----
Chassis has 5 Fan slots
-----

```

```
Fan1 ok
```

```
Fan2 ok
```

```
Fan3 ok
```

```
Fan4 ok
```

```
Fan5 ok
```

```
ASW4_QP_LEM#
```

Displaying the Hardware Inventory for the Switch

You can display information about the field replaceable units (FRUs), that are installed in the switch by using the **show inventory** command.

```

ASW4_QP_LEM# show inventory
NAME: "Chassis",  DESCR: "Nexus9000 C9408 Chassis"
PID: N9K-C9408      ,  VID: V00 ,  SN: FDO262100LC

NAME: "Switch Card",  DESCR: "Switch Card"
PID: N9K-C9400-SW-GX2A  ,  VID: V00 ,  SN: FDO262200E1

NAME: "Slot 1",  DESCR: "Supervisor"
PID: N9K-C9400-SUP-A    ,  VID: V00 ,  SN: FDO262208WX

NAME: "Slot 27",  DESCR: "Supervisor"
PID: N9K-C9400-SUP-A    ,  VID: V00 ,  SN: FDO262208WX

NAME: "LEM 2",  DESCR: "8x400G Ethernet Module"
PID: N9K-X9400-8D      ,  VID: V00 ,  SN: FDO26221BA7

NAME: "LEM 3",  DESCR: "16x200G Ethernet Module"
PID: N9K-X9400-16W     ,  VID: V00 ,  SN: FDO262213VA

NAME: "LEM 5",  DESCR: "8x400G Ethernet Module"
PID: N9K-X9400-8D      ,  VID: V00 ,  SN: FDO26221BAK

NAME: "LEM 7",  DESCR: "16x200G Ethernet Module"
PID: N9K-X9400-16W     ,  VID: V00 ,  SN: FDO262213VQ

NAME: "Power Supply 1",  DESCR: "Nexus9000 C9408 Chassis Power Supply"
PID: NXA-PAC-2KW-PI    ,  VID: V01 ,  SN: POG2547JACK

NAME: "Power Supply 2",  DESCR: "Nexus9000 C9408 Chassis Power Supply"
PID: NXA-PAC-2KW-PI    ,  VID: V01 ,  SN: POG2547JA1Q

```

```

NAME: "Power Supply 3",  DESCR: "Nexus9000 C9408 Chassis Power Supply"
PID: NXA-PAC-2KW-PI      ,  VID: V01 ,  SN: POG2547JAH6

NAME: "Power Supply 4",  DESCR: "Nexus9000 C9408 Chassis Power Supply"
PID: NXA-PAC-2KW-PI      ,  VID: V01 ,  SN: POG2547JA20

NAME: "Fan 1",  DESCR: "Nexus9000 C9408 Chassis Fan Module"
PID: N9K-C9400-FAN-PI    ,  VID: V01 ,  SN: N/A

NAME: "Fan 2",  DESCR: "Nexus9000 C9408 Chassis Fan Module"
PID: N9K-C9400-FAN-PI    ,  VID: V01 ,  SN: N/A

NAME: "Fan 3",  DESCR: "Nexus9000 C9408 Chassis Fan Module"
PID: N9K-C9400-FAN-PI    ,  VID: V01 ,  SN: N/A

NAME: "Fan 4",  DESCR: "Nexus9000 C9408 Chassis Fan Module"
PID: N9K-C9400-FAN-PI    ,  VID: V01 ,  SN: N/A

NAME: "Fan 5",  DESCR: "Nexus9000 C9408 Chassis Fan Module"
PID: N9K-C9400-FAN-PI    ,  VID: V01 ,  SN: N/A

ASW4_QP_LEM#
    
```

Displaying the Modules for the Switch

You can display information about the modules, that are installed in the switch by using the **show module** command.

```

switch# show module
Mod Ports      Module-Type      Model              Status
-----
1      0      Supervisor      N9K-C9408-SUP-A   active *
27     0      Virtual Supervisor Module  N9K-C9400-SUP-A   active *

Mod Sw          Hw  Slot
-----
1      10.3(2)      0.4  LC1
27     10.3(2)      0.4  SUP1

Mod  MAC-Address(es)      Serial-Num
-----
1      60-26-aa-48-c8-40 to 60-26-aa-48-c8-7f  FDO262208WX
27     60-26-aa-48-c8-40 to 60-26-aa-48-c8-7f  FDO262208WX

Mod  Online Diag Status
-----
1      Pass
27     Pass

* this terminal session
Lem Ports      Module-Type      Model              Status
-----
1      16      16x200G Ethernet Module  N9K-X9400-8D      ok
2      8       8x400G Ethernet Module  N9K-X9400-8D      ok
4      8       8x400G Ethernet Module  N9K-X9400-16W     ok

Mod Sw          Hw  Slot
-----
    
```

```

1    NA                0.1010 LC1
2    NA                0.1010 LC2
4    NA                0.1010 LC4

Lem  MAC-Address(es)                Serial-Num
---  -----
1    0c-75-bd-37-2c-fe to 0c-75-bd-37-2d-1d FOC223620GT
2    0c-75-bd-37-2d-1e to 0c-75-bd-37-2d-3d FOC224291Q8
4    0c-75-bd-37-2d-5e to 0c-75-bd-37-2d-7d FOC224291TA

Lem  Online Diag Status
---  -----
1    Pass
2    Pass
4    Pass
switch#
```

Displaying the Serial PROM (SPROM) for the Switch

You can display information about the SPROM, for the switch by using the **show sprom** command.

```

switch# show sprom backplane 1
DISPLAY backplane sprom contents:
Common block:
Block Signature : 0xABAB
Block Version   : 3
Block Length    : 160
Block Checksum  : 0x168E
EEPROM Size     : 65535
Block Count     : 3
FRU Major Type  : 0x6002
FRU Minor Type  : 0x0
OEM String      : Cisco Systems, Inc
Product Number  : N9K-C9408
Serial Number   : FOC23086N6A
Part Number     : 73-19248-01
Part Revision   : 1
Mfg Deviation   : 0
H/W Version     : 0.0
Mfg Bits        : 0
Engineer Use    : 0
snmpOID         : 9.12.3.1.3.1824.0.0
Power Consump   : -6200
RMA Code        : 0-0-0-0
CLEI Code       : 12345678
VID             : V01
Chassis specific block:
Block Signature : 0x6001
Block Version   : 3
Block Length    : 39
Block Checksum  : 0x419
Feature Bits    : 0x0
HW Changes Bits : 0x0
Stackmib OID    : 0
MAC Addresses   : 00-00-ab-cd-dc-ba
Number of MACs  : 128
OEM Enterprise  : 0
OEM MIB Offset  : 0
MAX Connector Power: 0
WWN software-module specific block:
Block Signature : 0x6005
```



```

Fan3(sys_fan3)  N9K-C9400-FAN-PI    --    front-to-back  Ok
Fan4(sys_fan4)  N9K-C9400-FAN-PI    --    front-to-back  Ok
Fan5(sys_fan5)  N9K-C9400-FAN-PI    --    front-to-back  Ok
Fan_in_PS1      --                                --    front-to-back  Ok
Fan_in_PS2      --                                --    front-to-back  Ok
Fan_in_PS3      --                                --    front-to-back  Ok
Fan_in_PS4      --                                --    front-to-back  Ok
Fan Zone Speed: Zone 1: 0x72
Fan Air Filter  : NotSupported

```

```

Power Supply:
Voltage: 12 Volts
Power
Supply      Model                Actual      Actual      Total
                Output      Input      Capacity
                (Watts )      (Watts )      (Watts )
-----
1           NXA-PAC-2KW-PI            507 W      552 W      2000 W      Ok
2           NXA-PAC-2KW-PI            555 W      603 W      2000 W      Ok
3           NXA-PAC-2KW-PI            506 W      552 W      2000 W      Ok
4           NXA-PAC-2KW-PI            507 W      552 W      2000 W      Ok

```

Power Usage Summary:

```

-----
Power Supply redundancy mode (configured)           PS-Redundant
Power Supply redundancy mode (operational)         PS-Redundant

Total Power Capacity (based on configured mode)    6000.00 W
Total Grid-A (first half of PS slots) Power Capacity 4000.00 W
Total Grid-B (second half of PS slots) Power Capacity 4000.00 W
Total Power of all Inputs (cumulative)             8000.00 W
Total Power Output (actual draw)                  2075.00 W
Total Power Input (actual draw)                   2259.00 W
Total Power Allocated (budget)                    N/A
Total Power Available for additional modules       N/A

```

Temperature:

```

-----
Module  Sensor      MajorThresh  MinorThres  CurTemp  Status
                (Celsius)   (Celsius)   (Celsius)
-----
1       FRONT      55           35          35       Ok
1       BACK       80           70          36       Ok
1       CPU        90           80          55       Ok
1       Quadpeaks 125          100         81       Ok
ASW4_QP_LEM#

```

Displaying Environment Temperature for the Switch

You can display information about the environment, for the switch by using the **show environment temperature** command.

```

ASW4_QP_LEM# show environment temperature
show environment temperature
Temperature:

```

```

-----
Module  Sensor      MajorThresh  MinorThres  CurTemp  Status
                (Celsius)   (Celsius)   (Celsius)
-----

```

1	FRONT	55	35	35	Ok
1	BACK	80	70	36	Ok
1	CPU	90	80	49	Ok
1	Quadpeaks	125	100	81	Ok

ASW4_QP_LEM#



APPENDIX A

Rack Specifications

- [General Requirements and Guidelines for Cabinets and Racks, on page 63](#)
- [About Requirements for Perforated Cabinets, on page 64](#)
- [About Requirements for Open Racks, on page 64](#)

General Requirements and Guidelines for Cabinets and Racks

The cabinet or rack must have all of the following characteristics:

- Standard 19-inch (48.3 cm) four-post EIA cabinet or rack.
- Mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992). See below.

The cabinet or rack must also meet the following requirements:

- The minimum vertical rack space per Cisco Nexus switch chassis must be one RU (rack units), equal to 1.75 inches (4.4 cm).
- The width between the rack-mounting rails must be at least 17.75 inches (45.0 cm) if the rear of the device is not attached to the rack. For four-post EIA racks, this measurement is the distance between the two front rails.

Four-post EIA cabinets (perforated or solid-walled) must meet the following requirements:

- The minimum spacing for the bend radius for fiber-optic cables should have the front-mounting rails of the cabinet offset from the front door by a minimum of 3 inches (7.6 cm).
- The distance between the outside face of the front mounting rail and the outside face of the back mounting rail should be 23.0 to 30.0 inches (58.4 to 76.2 cm) to allow for rear-bracket installation.
- A minimum of 2.5 inches (6.4 cm) of clear space should exist between the side edge of the chassis and the side wall of the cabinet. No sizeable flow obstructions should be immediately in the way of chassis air intake or exhaust vents.



Note To help with cable management, consider planning additional space in the rack or cabinet above and below the chassis to make it easier to route all of the fiber optic or copper cables through the rack.

About Requirements for Perforated Cabinets

A perforated cabinet has perforations in its front and rear doors and side walls. In addition to the requirements listed in the “General Requirements for Cabinets and Racks” section, perforated cabinets must meet the following requirements:

- The front and rear doors must have at least a 60-percent open area perforation pattern, with at least 15 square inches (96.8 square cm) of open area per rack unit of door height.
- The roof should be perforated with at least a 20-percent open area.
- The cabinet floor should be open or perforated to enhance cooling.

The Cisco R Series rack conforms to these requirements.

About Requirements for Open Racks

In addition to the requirements listed in the “General Requirements for Cabinets and Racks” section on page A-1, if you are mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets the following requirements:

- The minimum vertical rack space per chassis must be two rack units (RU), equal to 3.47 inches (8.8 cm).
- The horizontal distance between the chassis and any adjacent chassis should be 6 inches (15.2 cm), and the distance between the chassis air vents and any walls should be 2.5 inches (6.4 cm).



APPENDIX **B**

System Specifications

- [Environmental Specifications, on page 65](#)
- [Switch Dimensions, on page 65](#)
- [Switch and Module Weights, on page 66](#)
- [2000-W AC Power Supply Specifications, on page 66](#)
- [2000-W DC Power Supply Specifications, on page 66](#)
- [2000-W HVAC/HVDC Power Supply Specifications, on page 67](#)
- [AC Power Cable Specifications, on page 67](#)
- [DC Power Cable Specifications, on page 68](#)
- [HVAC/HVDC Power Cable Specifications, on page 68](#)

Environmental Specifications

Environment		Specification
Temperature	Ambient operating temperature	32 to 104°F (0 to 40°C)
	Ambient nonoperating	–40 to 158°F (–40 to 70°C)
Humidity	Ambient operating	5 to 90%
	Ambient nonoperating	5 to 95%
Altitude	Ambient operating altitude	0 to 5,000 feet (0 to 1524 m)
	Ambient nonoperating	–1000 to 30,000 feet (–304 to 15,150 m)

Switch Dimensions

Switch Component	Height	Width	Depth
Cisco Nexus 9408 chassis	6.97 inches (17.7 cm) (4 RU)	17.3 inches (43.9 cm)	23.62 inches (59.99 cm)

Switch and Module Weights

Component	Weight per Unit
Cisco Nexus 9408 Chassis (N9K-C9408)	121.25 lb (55 kg)
Fan Module	—
– Port-side intake (burgundy) (N9K-C9400-FAN-PI)	1.35 lb (0.61 kg)
Power Supplies	—
– 2000-W AC port-side intake (burgundy) (NXA-PAC-2KW-PI)	2.42 lb (1.1 kg)
– 2000-W DC port-side intake (burgundy) (NXA-PDC-2KW-PI)	
– 2000-W HVAC/HVDC port-side intake (burgundy) (NXA-PHV-2KW-PI)	

2000-W AC Power Supply Specifications

These specifications apply to the following power supplies:

- NXA-PAC-2KW-PI

Property	Specification
Power	2000 W
Input Voltage	200-240 VAC, 12A, 50/60 Hz
Frequency	50 to 60 Hz
Efficiency	90% or greater (20 to 100% load)
Redundancy Modes	Combined, $n+1$, and $n+n$
RoHS Compliance	Yes
Hot Swappable	Yes
Airflow Direction	Port-side intake airflow

2000-W DC Power Supply Specifications

These specifications apply to the following power supplies:

- NXA-PDC-2KW-PI

Property	Specification
Power	2000 W

Property	Specification
Input Voltage	Minimum to Maximum: -40 to -72 VDC Nominal: -48 to -60 VDC
Frequency	-
Efficiency	90% or greater (20 to 100% load)
Redundancy Modes	Combined, $n+1$, and $n+n$
RoHS Compliance	Yes
Hot Swappable	Yes
Airflow Direction	Port-side intake airflow

2000-W HVAC/HVDC Power Supply Specifications

These specifications apply to the following power supplies:

- NXA-PHV-2KW-PI

Property	Specification
Power	2000 W
Input Voltage	100 to 127 VAC or 200 to 277 VAC or 240 to 380 VDC
Frequency	50 to 60 Hz
Efficiency	90% or greater (20 to 100% load)
Redundancy Modes	Combined, $n+1$, and $n+n$
RoHS Compliance	Yes
Hot Swappable	Yes
Airflow Direction	Port-side intake airflow

AC Power Cable Specifications

Cable	Description	Length
SFS-250V-10A-AR (Argentina)	250 VAC 10 A, IRAM 2073 plug	8.2 feet (2.5 m)
CAB-9K10A-AU (Australia)	250 VAC 10 A, 3112 plug	8.2 feet (2.5 m)

Cable	Description	Length
SFS-250V-10A-CN (China)	250 VAC 10 A, GB 2009 plug	8.2 feet (2.5 m)
CAB-9K10A-EU (Europe)	250 VAC 10 A, M 2511 plug	8.2 feet (2.5 m)
SFS-250V-10A-ID (South Africa, United Arab Emerits, and India)	250 VAC 16 A, EL-208 plug	8.2 feet (2.5 m)
SFS-250V-10A-IS (Israel)	250 VAC 10 A, SI-32 plug	8.2 feet (2.5 m)
CAB-9K10A-IT (Italy)	250 VAC 10 A, CEI 23-16 plug	8.2 feet (2.5 m)
CAB-9K10A-SW (Switzerland)	250 VAC 10 A, MP232 plug	8.2 feet (2.5 m)
CAB-9K10A-UK (United Kingdom)	250 VAC 10 A, BS1363 plug (13-A fuse)	8.2 feet (2.5 m)
CAB-AC-250V/13A (North America)	250 VAC 13 A, NEMA L6-20 plug	6.6 feet (2.0 m)
CAB-N5K6A-NA (North America)	250 VAC 10 A, NEMA 6-15 plug	8.2 feet (2.5 m)
CAB-9K12A-NA (North America)	125 VAC 13 A, NEMA 5-15 plug	8.2 feet (2.5 m)
CAB-C13-CBN	250 VAC 10 A, SS 10-A plug	8.2 feet (2.5 m)
CAB-C13-C14-2M	Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	6.6 feet (2 m)
CAB-C13-C14-AC	Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	9.8 feet (3 m)
CAB-C13-C14-JMPR	Cabinet Jumper Power Cord 250 VAC 13 A, C13-C14 Connectors	2.2 feet (0.7 m)
CAB-IND-10A	250 VAC 10 A, EL-208B plug	8.2 feet (2.5 m)

DC Power Cable Specifications

Power Supply	Power Cord	Cord Set Description
All except Argentina, Brazil, and Japan	NO-POWER-CORD	No power cord included with switch

HVAC/HVDC Power Cable Specifications

Power Cord Part Number	Cord Set Description
CAB-AC-16A-SG-IS	Power cord, SI 16S3/Saf-D-Grid, 250 VAC 16A, Israel
CAB-AC-20A-SG-C20	Cabinet jumper power cord, 250 VAC, 20A, IEC C20/Saf-D-Grid, North America

Power Cord Part Number	Cord Set Description
CAB-AC-20A-SG-US	Power cord, 110 VAC 20A, Straight Blade, NEMA 5-20P/Saf-D-Grid, North America
CAB-AC-20A-SG-US1	Power cord, 125 VAC 20A, twist lock, NEMA L5-20/Saf-D-Grid, North America
CAB-AC-20A-SG-US2	Power cord, 250 VAC 20A, straight-blade, NEMA 6-20/Saf-D-Grid, North America
CAB-AC-20A-SG-US3	Power cord, 250 VAC 20A, twist lock, NEMA L6-20/Saf-D-Grid, North America
CAB-AC-16A-SG-IN	Power cord, IEC60309/Saf-D-Grid, 250 VAC 16A, International
CAB-AC-16A-SG-IT	Power cord, CEI 23-50/Saf-D-Grid to IEC-C19 250 VAC 16A, Italy
NO-POWER-CORD	No power cord included with switch



APPENDIX **C**

LEDs

- [CPU Card LEDs, on page 71](#)
- [LEM LEDs, on page 72](#)
- [Fan LEDs, on page 73](#)
- [Power Supply LEDs, on page 74](#)

CPU Card LEDs

This table provides information about CPU Card LEDs for Cisco Nexus 9400 Series switches.

Component	LED	Status	Description
CPU Card (N9K-C9400-SUP-A)	BCN	Blinking (blue)	The operator has activated this LED to identify the chassis.
		Off	This module is not being identified.
	STS	Solid on (green)	All diagnostics pass. The module is operational.
		Blinking (amber)	The module is booting up.
		On (amber)	The module is not receiving power.
		Solid on (red)	Temperature exceeds the minor alarm threshold.
	ENV	Solid on (green)	Temperature exceeds the major alarm threshold.
		Solid on (amber)	Fans and power supply modules are operational.
	SYNCE	Solid on (green)	At least one fan or power supply module is not operational.
		Solid on (amber)	Synchronization of the frequency to external interface could be (GPS, Recovered RX clk).
		Off	Freerun/holdover- Time core is in freerun or holdover.
	TIMING	Solid on (green)	Time core clock synchronization is disabled.
		Solid on (amber)	Synchronization of the time and phase to external interface could be (GPS, FP).
		Off	Freerun/holdover- Time core is in freerun or holdover.
	GPS	Solid (green)	Time core clock synchronization is disabled.
		Off	GPS interface provisioned and ports are turned on. ToD, 1PPS, 10MHz are all valid.
	MGMT link	Solid (green)	Either the interface is not provisioned, or the ports are not turned on. ToD, 1PPS, 10MHz are not valid.
		Off	The MGMT port is link up.
	MGMT activity	Blinking (green)	The MGMT port is not link up.
		Off	The MGMT port is transmitting or receiving.

LEM LEDs

This table provides information about Line Expansion Module (LEM) LEDs for Cisco Nexus 9400 Series switches.

Component	LED	Status	Description
LEM	STS	Solid on (green)	All diagnostics pass. This module is operational.
		Solid on (amber)	<ol style="list-style-type: none"> 1. This module has detected a slot ID parity error and will not power on or boot up. 2. The module is not fully inserted. 3. The diagnostic test has failed.
		Blinking (amber)	<ol style="list-style-type: none"> 1. This module has just been powered on, and the module is resetting. 2. The module is resetting and both ejector levers are out. 3. The module has been inserted during the initialization process (transition state). 4. The module could not power up because of insufficient power. 5. An over-temperature condition has occurred. A major temperature threshold has been exceeded.
		Off	This module is not receiving power.
	BCN	Blinking (blue)	The operator has activated this LED to identify this module in the chassis.
		Off	This module is not being identified
	Port	Solid on (green)	The port is active and the link is up.
		Solid on (yellow)	The port is disabled by the operator or is not initializing.
		Blinking (yellow)	The port is faulty and disabled.
		Off	The port is not active or the link is not connected.

Fan LEDs

This table provides information about fan LEDs for Cisco Nexus 9400 Series switches.

Component	LED	Status	Description
Fan	Status	Solid on (green)	All diagnostics pass. The module is operational.
		Off	The module is not receiving power.
		Solid on (amber)	The module is booting or running diagnostics.
		Blinking (amber)	If the module fails during an initial reset, the LED continues to blink and the module does not come online. The module has a runtime failure and is brought offline.

Power Supply LEDs

This table provides information about power supply LEDs for Cisco Nexus 9400 Series switches.

Component	LED	Status	Description
Power supply	OK (green)	Solid on	Power supply is on and okay.
		Blinking	3.3 voltage standby (VSB) is on but the power supply unit is not powering the other modules.
		Off	No power to the power supply.
	FAULT (amber)	Solid on	Power supply failure, overvoltage, overcurrent, or overheating.
		Blinking	Power is present, 3.3 VSB on, and the power supply is off. PSU fan rotor is not functioning normally.
		Off	Operating normally.



APPENDIX **D**

Spare Parts Table

- [Spares Support Table, on page 75](#)

Spares Support Table

Product	Chassis Height (Rack Units)	Power Supply Options	Fan Options	Module Options	Accessory Kits
Nexus 9408	4 RU	AC port-side intake (NXA-PAC-2KW-PI) DC port-side intake (NXA-PDC-2KW-PI) HVAC/HVDC port-side intake (NXA-PHV-2KW-PI)	Port-side intake (N9K-C9400-FAN-PI)	CPU Card (N9K-C9400-SUP-A) Switch Card (N9K-C9400-SW-GX2A) LEM 8p 400G (N9K-X9400-8D) LEM 16p 200G (N9K-X9400-16W)	Accessory Kit (N9K-C9400-ACK) Rack mount kit (N9K-C9400-RMK) LEM Blank (N9K-C9400-BLK)

