



## **Catalyst 6880-X Switch Hardware Installation Guide**

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## Preface

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This guide describes the hardware features of the Cisco Catalyst 6880-X switch . It describes the physical and performance characteristics of the switch, explains how to install a switch, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch.

See the Catalyst 6880-X software documentation on Cisco.com at this URL: [http://www.cisco.com/go/cat6800\\_docs](http://www.cisco.com/go/cat6800_docs)

- [Document Conventions, page ix](#)
- [Related Documentation, page xi](#)
- [Obtaining Documentation and Submitting a Service Request, page xi](#)

## Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination <b>^D</b> or <b>Ctrl-D</b> means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
<b>bold font</b>	Commands and keywords and user-entered text appear in <b>bold font</b> .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
Courier font	Terminal sessions and information the system displays appear in <code>courier font</code> .
<b>Bold Courier font</b>	<b>Bold Courier font</b> indicates text that the user must enter.
[x]	Elements in square brackets are optional.

Convention	Description
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x   y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x   y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y   z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
<>	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

### Reader Alert Conventions

This document may use the following conventions for reader alerts:



#### Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.



#### Tip

Means *the following information will help you solve a problem*.



#### Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



#### Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

## Related Documentation

**Note**

Before installing or upgrading the switch, refer to the switch release notes.

- Catalyst 6880-X switch documentation at: [http://www.cisco.com/go/cat6800\\_docs](http://www.cisco.com/go/cat6800_docs)
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes at: [http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html)

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>

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## Product Overview

The Catalyst 6880-X switch is an extensible fixed-aggregation switch supporting redundant power supplies and slots for up to four optional port card modules. The chassis has 16 fixed 10-Gigabit SFP+, 1-Gigabit SFP, or 100BASE-FX SFP ports. Each system can be built up to 80 ports in 16-port increments.

- [Switch Models, page 1](#)
- [Front Panel Components, page 1](#)
- [Rear Panel, page 15](#)

## Switch Models

**Table 1: Switch Models**

Switch Model	Description
Catalyst 6880-X-LE	16 10-Gigabit SFP+, 1-Gigabit SFP, or 100BASE-FX SFP ports, four port card slots, two power supply slots. It supports <i>standard</i> FIB, ACL, and NetFlow tables.
Catalyst 6880-X	16 10-Gigabit SFP+, 1-Gigabit SFP, or 100BASE-FX SFP ports, four port card slots, two power supply slots. It supports <i>larger</i> FIB, ACL, and NetFlow tables.

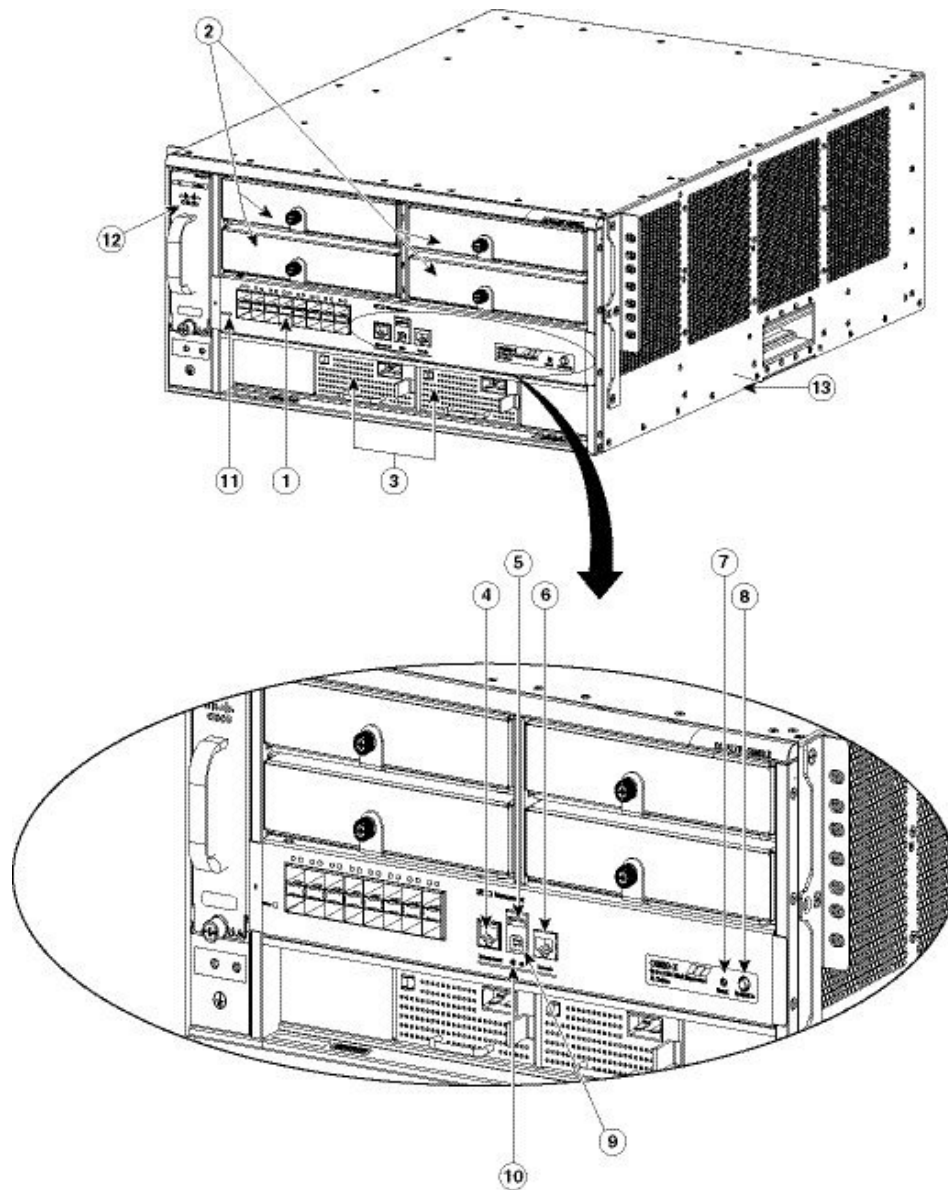
## Front Panel Components

This section describes the front panel components:

- 16 SFP+ ports or 100BASE-FX fiber-optic SFP ports
- Half-wide modular slots
- Power supply slots

- Management port
- USB ports
- Console port
- System reset button
- LEDs
- Fan tray

**Figure 1: Catalyst 6880-X Switch**



1	16 SFP+ ports or 100BaseFX fiber-optic ports	8	System ID (blue beacon LED)
2	Four half-wide port card modular slots <a href="#">1</a>	9	USB port (console port con0)
3	Two power supply slots <a href="#">2</a>	10	USB LED
4	Management port (mgmt0)	11	Status LED
5	USB port (disk0)	12	Fan tray
6	Console port (RJ-45 con0)	13	Handle to hold chassis
7	Reset button		

<sup>1</sup> The chassis is delivered with blank panels where the optional port cards can be installed.

<sup>2</sup> Power supplies that are ordered are installed in the switch. If the second power supply is not ordered, a blank panel is installed.

### Related Topics

[SFP and SFP+ Transceiver Module Ports](#), on page 3

[Half-Wide Modular Slots](#), on page 4

[Power Supply Slots](#), on page 6

[Management Port](#), on page 7

[USB Port Type B](#), on page 7

[USB Type A Port](#), on page 7

[Console Port](#), on page 8

[System Reset Button](#), on page 8

[Blue Beacon Switch](#)

[Fan Tray](#), on page 8

## SFP and SFP+ Transceiver Module Ports

The chassis contain 16 ports of 10-Gigabit Ethernet SFP+ or 100BASE-FX fiber-optic transceiver modules. All ports support 1-Gigabit SFP, 10-Gigabit SFP+, or 100BASE-FX fiber-optic SFP modules.

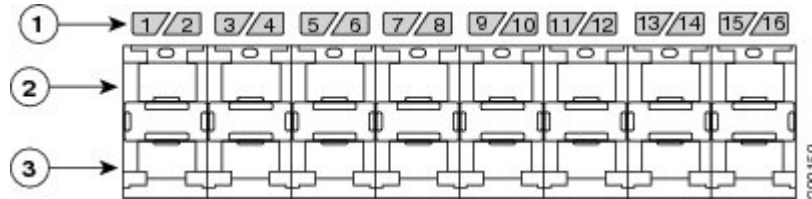
The ports also support Cisco Trust Security (CTS) and virtual switch link (VSL) and can operate as an Instant Access (AI) Parent in both 1-Gigabit and 10-Gigabit modes.

The SFP and SFP+ transceiver modules provide copper or fiber-optic connections to other devices. These transceiver modules are field-replaceable and provide the uplink interfaces when installed in an SFP module slot. The SFP transceiver modules have LC connectors for fiber-optic connections or RJ-45 connectors for copper connections.

For a list of supported SFP and SFP+ modules, see the switch data sheet: [http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data\\_sheet\\_c78-728228.html](http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data_sheet_c78-728228.html).

The ports are numbered from 1 to 16 with odd-numbered ports on the upper row and even-numbered ports on the lower row. The following figure shows how the ports and LEDs are numbered.

**Figure 2: Numbering of Ports on the Chassis**



1	LEDs	3	Even-numbered ports, left to right: 2, 4, 6, 8, 10, 12, 14, and 16
2	Odd-numbered ports, left to right: 1, 3, 5, 7, 9, 11, 13, and 15		

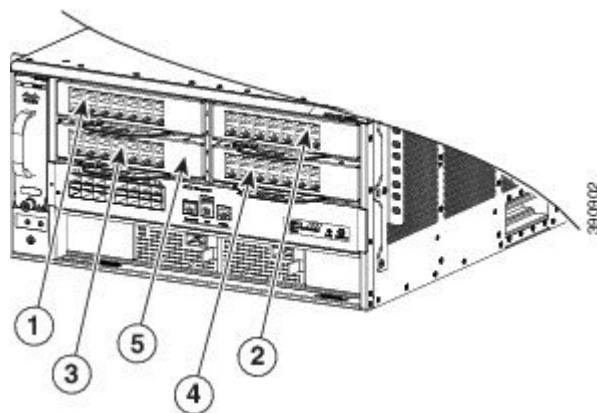
**Related Topics**

[Front Panel Components, on page 1](#)

## Half-Wide Modular Slots

The chassis has four half-wide modular slots that accept pluggable, port cards that can expand the capability of the switch. For more detailed information about the modular port cards and their installation, see the "Installing the Modular Port Card" chapter. The chassis is delivered with modular slot blank covers already installed, which must remain installed if the port cards are not used. The slots are numbered as shown in the following figure.

**Figure 3: Numbering of the Port Card Slots**



1	Half-wide module slot number 1	4	Half-wide module slot number 4
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2	Half-wide module slot number 2	5	Fixed port card (slot number 5)
3	Half-wide module slot number 3		

### Related Topics

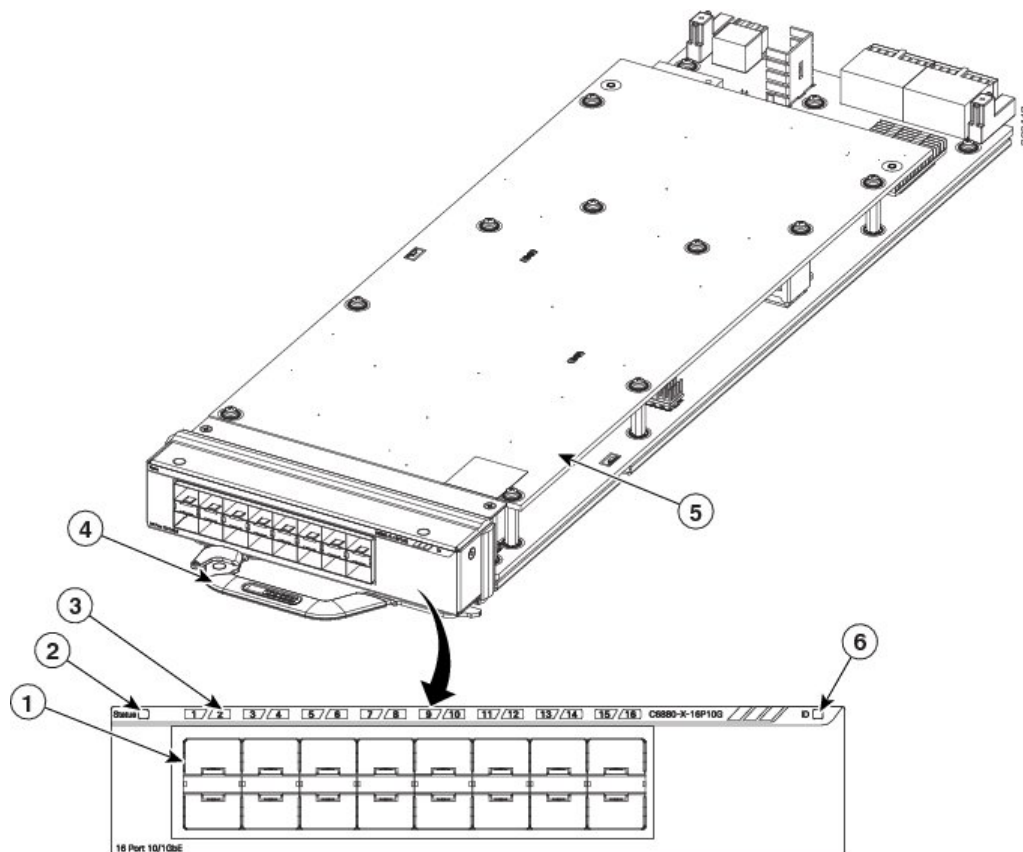
[Front Panel Components, on page 1](#)

## Port Card Overview

Each chassis supports up to four hot-swappable modular port cards that provide uplink ports to connect to other devices. The chassis should only be operated with either a modular port card installed or a blank module installed in the half-modular slots.

Port Card Model	Description
C6880-X-LE-16P10G	Multirate port card with standard tables. This module has 16 10-Gigabit, 1-Gigabit, or 100BASE-FX fiber-optic slots, which support 1-Gigabit SFPs, 10-Gigabit SFP+, or 100BASE-FX fiber-optic modules.
C6880-X-16P10G	Multirate port card with XL tables. This module has 16 10-Gigabit, 1-Gigabit, or 100BASE-FX fiber-optic slots, which support 1-Gigabit SFPs, 10-Gigabit SFP+, or 100BASE-FX fiber-optic modules.
C6880-X-CVR-E	Blank module.

Figure 4: Modular Port Card (C6880-X-LE-16P10G and C6880-X-16P10G)



1	16 SFP+ or 100BASE-FX SFP ports	4	Extraction handle
2	Status LED	5	Port card
3	Port LEDs	6	ID (blue beacon LED)

For a list of supported SFP and SFP+ modules, see the switch data sheet: [http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data\\_sheet\\_c78-728228.html](http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data_sheet_c78-728228.html).

## Power Supply Slots

The chassis has two power supply slots that accept either two 3000 W AC-input or two 3000 W DC-input power supplies, or one of each. The chassis is delivered with power supplies pre-installed in the power supply slots. If only one power supply is ordered, then a blank cover is installed in the empty power supply slot, which must remain installed if a power supply is not installed.

**Related Topics**

[Front Panel Components, on page 1](#)

## Management Port

The management port is a 10/100/1000 copper Ethernet port directly connected to the route processor. It supports TFTP image downloading, network management, SNMP, Telnet, and SSH connections. Flexible NetFlow export is not supported on the management port. The management port is isolated from other ports in the system in a dedicated management VRF; it is not part of the EARL forwarding logic. The management port provides direct access to the CPU, even when the system is heavily loaded.

The management port is a Layer 3 port in host mode, and only accepts traffic that terminates on the router. This port does not route packets between itself and other ports. The port processes only the following packet types and properly enqueues them:

- Address Resolution Protocol (ARP)
- IPv4 unicast
- IPv6 unicast
- Cisco Discovery Protocol (CDP)
- Link Layer Discovery Protocol (LLDP)

**Related Topics**

[Front Panel Components, on page 1](#)

## USB Port Type B

The USB 2.0 port Type B serves as a second console connection to the route processor. The USB console port connection uses a USB Type A to Type B cable. The USB console interface speeds are the same as the RJ-45 console interface speeds. Windows PCs need a driver for the USB port.

The USB-prefer mode is the default, but it can be overridden using the command-line interface (CLI). When this port is in USB-prefer mode, the RJ-45 console port will be disabled if both ports are connected. For more information on using the CLI to configure the USB console interface, see the Catalyst 6500 software guide.

**Related Topics**

[Front Panel Components, on page 1](#)

## USB Type A Port

The USB 2.0 Type A port (disk0) is the only external storage interface for this switch. The port is connected to the route processor, which allows the Cisco IOS software to access the port. The port supports Cisco USB flash drives with capacities from 128 MB to 8 GB (USB devices with port densities of 128 MB, 256 MB, 1 GB, 4 GB, and 8 GB are supported). Cisco IOS software provides standard file system access to the flash device: read, write, erase, and copy. The software also provides the ability to format the flash device with a FAT file system (FAT32 and FAT16).

**Related Topics**

[Front Panel Components, on page 1](#)

## Console Port

The console port is an RJ-45 port that provides universal asynchronous receiver/transmitter (UART) support to access the route processor with a serial console running at 9600 baud rate with 8 bits for data, no parity bit, and 1 stop bit.

**Related Topics**

[Front Panel Components, on page 1](#)

## System Reset Button

This recessed access button is used to reset the system. Pressing the button brings down the route processor and all port card modular slots.

**Related Topics**

[Front Panel Components, on page 1](#)

## Fan Tray

The fan tray is responsible for cooling the entire chassis and interfacing with environmental monitors to trigger alarms when conditions exceed thresholds. The fan tray supports Online Insertion and Removal (OIR).

The fan tray contains four high-efficiency fans with variable speed settings and thermal sensors. If one fan fails, the speed of the others is increased and a minor alarm is triggered. If a major fan tray failure occurs, the system is shut down. The individual fans are not field replaceable; the entire fan tray must be replaced in the event of a major fan tray failure. See [Removing the Fan Tray, on page 91](#) for additional information about the fan.

**Related Topics**

[Front Panel Components, on page 1](#)

## LED Indicators

You can use the switch LEDs to monitor switch activity and performance. You can also monitor the status of each port on the fixed slot port card, the fan tray assembly, and the power supplies.

Modules inserted in the port card module slots include their own LEDs.

**Related Topics**

[System Status LED, on page 9](#)

[System ID LED, on page 9](#)

[SFP+ Port LEDs, on page 10](#)



[Management Port LED, on page 11](#)

[Fan Tray LED, on page 12](#)

[AC-Input Power Supply LEDs, on page 13](#)

[DC-Input Power Supply LEDs, on page 14](#)

## System Status LED

The System status LED indicates the status of the system.

**Table 2: System Status LED Indicator**

Color/State	Description
Off	System is not operational.
Green	System is operating normally without alarms.
Amber	System has triggered a minor environmental alarm.
Red	System has triggered a major environmental alarm.

### Related Topics

[LED Indicators, on page 8](#)

## Status LED on the Modular Port Card

The Status LED indicates the status of the modular port card.

**Table 3: Status LED Indicator**

Color/State	Description
Off	Port card is not operational.
Green	Port card is operating normally without alarms.
Amber	Port card has triggered a minor environmental alarm.
Red	Port card has triggered a major environmental alarm, or the system is powering up.

## System ID LED

The System ID (blue beacon) LED can be provisioned by the operator to indicate that the switch needs attention.

**Table 4: System ID LED Indicator**

Color/State	Description
Blinking blue	The system needs attention.

**Related Topics**

[LED Indicators, on page 8](#)

**ID LED on the Modular Port Card**

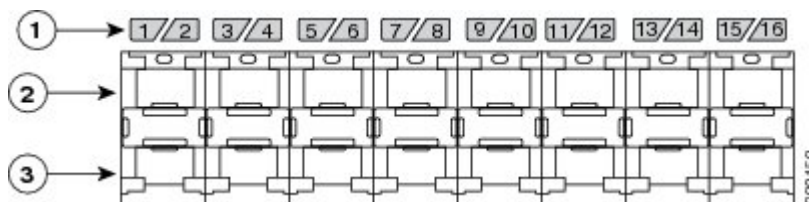
The ID (blue beacon) LED can be provisioned by the operator to indicate that the modular port card needs attention.

**Table 5: ID LED Indicator**

Color/State	Description
Blinking blue	The modular port card needs attention.

**SFP+ Port LEDs**

Each port on the port card is associated with an LED that indicates status.

**Figure 5: Numbering of Ports and LEDs on Fixed and Modular Port Cards**

1	LEDs: The first LED in each pair of LEDs indicates the status of the upper (odd-numbered) port below the LEDs, and the second LED in each pair indicates the status of the lower (even-numbered) port.	3	Even-numbered ports, left to right: 2, 4, 6, 8, 10, 12, 14, and 16
2	Odd-numbered ports, left to right: 1, 3, 5, 7, 9, 11, 13, and 15		

**Table 6: Fixed and Modular Card Ports LED Indicators**

Color/State	Description
Off	Port is not provisioned.
Amber	Port is provisioned, but administratively not operational.
Green	Port is linked up.
Alternating green and amber	A port fault is detected, or the port beacon has been provisioned by the operator.

**Related Topics**

[LED Indicators, on page 8](#)

**Management Port LED**

This table describes the management port LEDs.

**Table 7: Management Port LED Indicator**

Color/State	Description
Off	Port is not provisioned.
Amber	Port is provisioned, but administratively not operational.
Green	Port is linked up.
Alternating green and amber	A port fault is detected, or the port beacon has been provisioned by the operator.

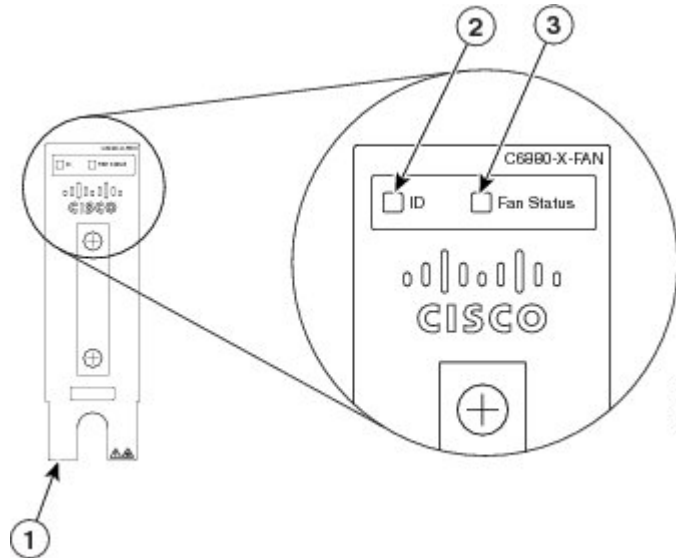
**Related Topics**

[LED Indicators, on page 8](#)

## Fan Tray LED

The fan tray includes an ID LED and a Fan Status LED. The different states of the LEDs are described in the following tables.

**Figure 6: Fan Tray LED Locations**



1	Front panel	3	Fan Status LED
2	ID LED (blue beacon)		

**Table 8: Fan Tray ID LED Indicator**

Color/State	Description
Blinking blue	The fan tray needs attention.

**Table 9: Fan Tray Fan Status LED Indicator**

Color/State	Description
Off	The fan tray is not receiving power; the fans have stopped.
Green	All fans are operating normally.
Red	The fan tray has a failure.

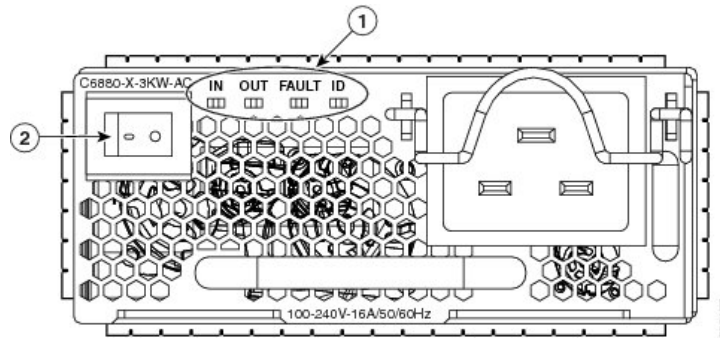
**Related Topics**

[LED Indicators, on page 8](#)

**AC-Input Power Supply LEDs**

The 3000 W AC-input power supply includes LEDs on the front of the module. The different states of the LEDs are described in the following table.

**Figure 7: AC-Input Power Supply LED Locations**



1	Location of LEDs on AC-input power supply	2	On/Off switch
---	---	---	---------------

**Table 10: AC-Input Power Supply LED Indicators**

LED	Color/State	Description
IN	Solid green	AC input current is at acceptable level.
IN	Blinking green	AC input current is outside valid range.
OUT	Solid green	DC output current is at acceptable level.
OUT	Blinking green	DC output current is outside valid range.
FAULT	Blinking red	The unit has failed self-diagnostic test or is not operational.
FAULT	Off	Power supply unit is functioning normally.
FAULT	Solid red	Malfunction has occurred.
ID	Blinking blue	The power supply needs attention, activated by operator.

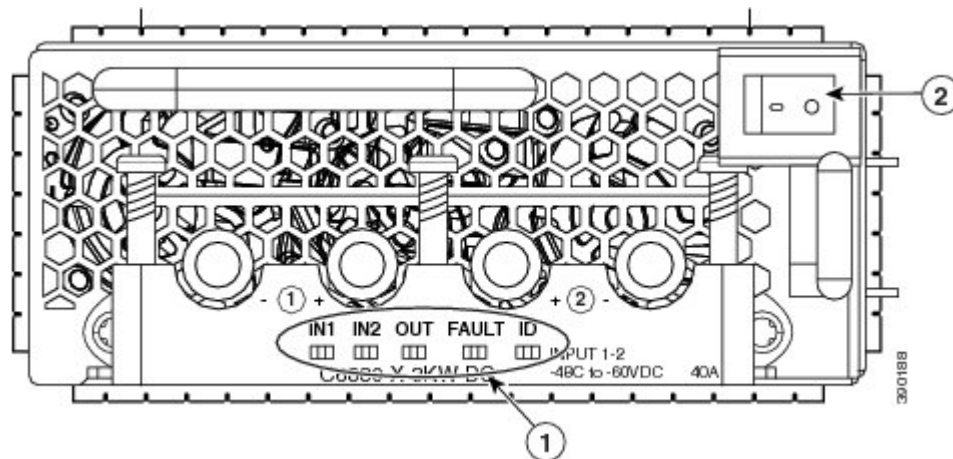
**Related Topics**

[LED Indicators, on page 8](#)

**DC-Input Power Supply LEDs**

The 3000 W DC-input power supply includes LEDs on the front of the module. The different states of the LEDs are described in the following table.

**Figure 8: DC-Input Power Supply LED Locations**



1	Location of LEDs on DC-input power supply	2	On/Off switch
---	---	---	---------------

**Table 11: DC-Input Power Supply LED Indicators**

LED	Color/State	Description
IN1	Solid green	Primary DC input current is at acceptable level.
IN1	Blinking green	Primary DC input current is outside valid range.
IN2	Solid green	Secondary DC input current is at acceptable level.
IN2	Blinking green	Secondary DC input current is outside valid range.
OUT	Solid green	Output DC current is at acceptable level.
OUT	Blinking green	Output DC current is outside valid range.

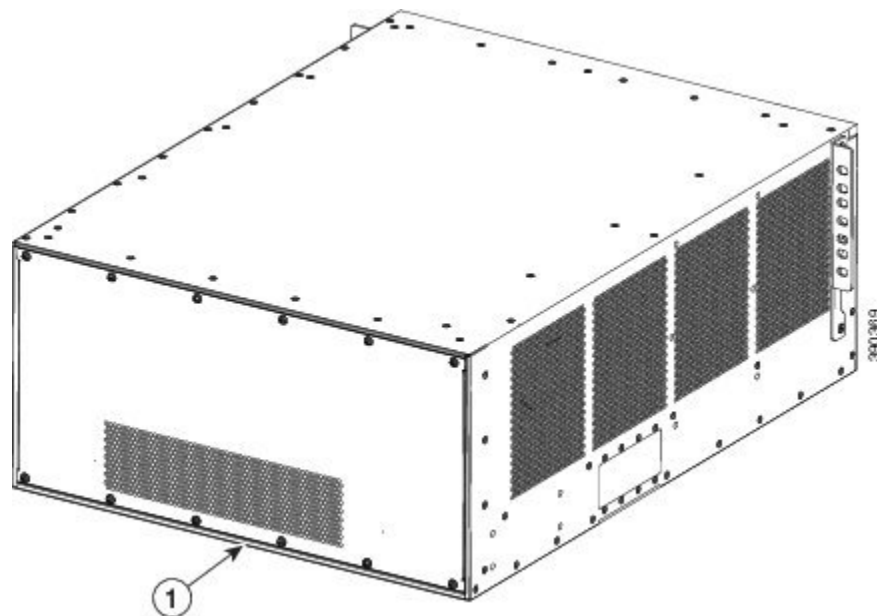
LED	Color/State	Description
FAULT	Off	Power supply unit is functioning normally.
FAULT	Blinking red	The unit has failed self-diagnostic test or is not operational.
FAULT	Solid red	Malfunction has occurred.
ID	Blinking blue	The power supply needs attention, activated by operator.

### Related Topics

[LED Indicators](#), on page 8

## Rear Panel

**Figure 9: Rear Panel**



1	Rear panel of the switch
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## Preparing for Installation

- [Safety Warnings, page 17](#)
- [Site Requirements, page 17](#)
- [Power Requirements, page 27](#)
- [Cabling Requirements, page 29](#)
- [Site Preparation Checklist, page 30](#)

### Safety Warnings

Safety warnings appear throughout this publication in procedures that might harm you if performed incorrectly. The warnings below are general warnings that are applicable to the entire publication.



**Warning**

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



**Warning**

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



**Warning**

Read the installation instructions before connecting the system to the power source. Statement 1004

### Site Requirements

Planning a proper location for the switch and layout of the equipment rack or wiring closet is essential for successful system operation. These sections describe some of the basic site requirements that you should be aware of as you prepare to install your switch, including the following:

- Environmental factors can adversely affect the performance and longevity of your system.

- Install the switch in an enclosed, secure area, ensuring that only qualified personnel have access to the switch and control of the environment.
- Equipment that is placed too closely together or that is inadequately ventilated may cause system over-temperature conditions, leading to premature component failure.
- Poor equipment placement can make chassis panels inaccessible and difficult to maintain.
- The switch requires a dry, clean, well-ventilated, and air-conditioned environment.
- To ensure normal operation, maintain ambient airflow. If the airflow is blocked or restricted, or if the intake air is too warm, an over-temperature condition may occur. The switch environmental monitor may then shut down the system to protect the system components.
- Multiple switches can be rack mounted with little or no clearance above and below the chassis. However, when mounting a switch in a rack with other equipment, or when placing it on the floor near other equipment, ensure that the exhaust from other equipment does not blow into the air intake vent of the switch chassis.

## Temperature

Temperature extremes may cause a system to operate at reduced efficiency and cause a variety of problems, including premature aging and failure of chips, and failure of mechanical devices. Extreme temperature fluctuations may also cause chips to become loose in their sockets. Observe the following guidelines:

- Ensure that the system is operating in an environment no colder than 32°F (0°C) or no hotter than 104°F (40°C).
- Ensure that the chassis has adequate ventilation.
- Do not place the chassis within a closed-in wall unit or on top of cloth, which can act as insulation.
- Do not place the chassis where it will receive direct sunlight, particularly in the afternoon.
- Do not place the chassis next to a heat source of any kind, including heating vents.
- Adequate ventilation is particularly important at high altitudes. Make sure that all the slots and openings on the system remain unobstructed, especially the fan vent on the chassis.
- Clean the installation site at regular intervals to avoid buildup of dust and debris, which may cause a system to overheat.
- If the system has been exposed to abnormally cold temperatures, allow a 2-hour warm-up period to bring it to normal operating temperature before turning it on.

Failure to observe these guidelines may damage the chassis' internal components.

**Note**

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The Catalyst 6880-X switches are equipped with internal air temperature sensors that trigger a minor alarm at 104°F (40°C) and trigger a major alarm at 131°F (55°C).

---

## Air Flow

The switch is designed to be installed in an environment where there is a sufficient volume of air available to cool the baseboard and other boards in the chassis, any installed modules, and power supplies. Any constraints placed on the free flow of air through the chassis or an elevated ambient air temperature can cause the switch to overheat and shut down.

To maintain proper air circulation through the switch chassis, maintain a minimum 6-inch (15 cm) separation between a wall and the chassis air intake or a wall and the chassis hot air exhaust. In situations where the switch chassis is installed in adjacent racks, you should allow a minimum of 12 inches (30.5 cm) between the air intake of one chassis and the hot air exhaust of another chassis. Failure to maintain adequate spacing between chassis can cause the switch chassis that is drawing in the hot exhaust air to overheat and fail.

If you are installing your switch in an enclosed or partially enclosed rack, we strongly recommend that you verify that your site meets the following guidelines:

- Verify that there is a minimum of 6 inches (15 cm) of clearance between the sides of the rack and both the chassis air intake grill and the chassis air exhaust grill.
- Verify that the ambient air temperature within the enclosed or partially enclosed rack is within the chassis operating temperature limits. After installing the chassis in the rack, power up the chassis and allow the chassis temperature to stabilize (approximately 2 hours). Measure the ambient air temperature at the chassis air intake grill and at the chassis air exhaust grill by positioning an external temperature probe approximately 1 inch (2.5 cm) away from the grills.
- If the ambient intake air temperature is less than 104°F (40°C), the rack meets the intake air temperature criterion.
  - If the ambient intake air temperature exceeds 104°F (40°C), the system might experience minor temperature alarms and is in danger of overheating.
  - If the ambient intake air temperature equals or is greater than 131°F (55°C), the system will experience a major temperature alarm and shut down.
- Verify that the enclosed or partially enclosed rack allows an adequate flow of air through the switch chassis as follows:
  - If the difference between the measured intake air temperature and the exhaust air temperature does not exceed 10°C, there is sufficient airflow in the rack.
  - If the difference in air temperature exceeds 10°C, there is insufficient airflow to cool the chassis.

**Note**

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The 10°C temperature differential between the intake and the exhaust must be determined by taking measurements using external digital temperature probes. Do not use the chassis internal temperature sensors to measure the temperature differential.

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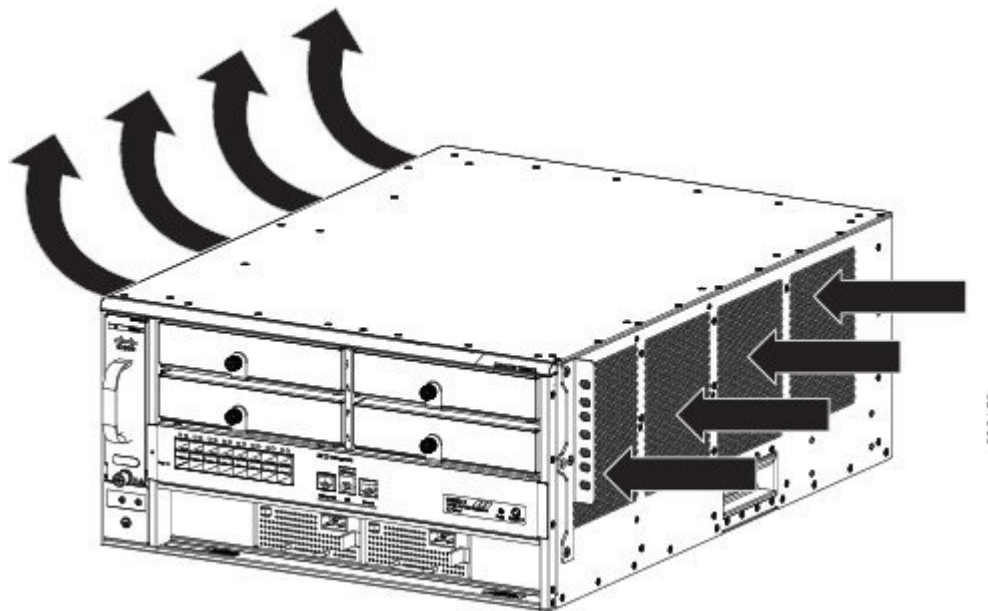
- Plan ahead. Your switch that is installed in an enclosed or partially enclosed rack might currently meet ambient air temperature and air flow requirements. However, if you add more chassis to the rack or you add more modules to a chassis in the rack, the additional heat generated might cause the ambient air temperature within the rack to exceed 104°F (40°C) and can cause minor alarms.

## Cooling with the Fan Tray

The chassis fan tray provides cooling air for the switch chassis and components. If an individual fan within the fan tray fails, the Fan Status LED turns red. Individual fans within a fan tray cannot be replaced; you must replace the entire fan tray.

Refer to your software configuration guide for information on environmental monitoring.

*Figure 10: Catalyst 6880-X Switch Internal Air Flow*



### Related Topics

[Installing the Fan Tray, on page 93](#)

## Humidity

High-humidity conditions may cause moisture to enter the system, and cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and size. Extreme moisture buildup inside the system may result in electrical short circuit, which may cause serious damage to the system. Each system is rated to operate at 5 to 90 percent relative humidity, with a humidity gradation of 10 percent per hour. In storage, a system can withstand 5 to 95 percent relative humidity. Buildings in which climate is controlled by air-conditioning in the warmer months and by heat during the colder months usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier should be used to maintain the humidity within an acceptable range.

## Altitude

Operating a system at high altitude (low pressure) reduces the efficiency of forced and convection cooling and may result in electrical problems related to arcing and corona effects. This condition may also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency. The Catalyst 6880-X switch is rated to operate at altitudes from 0 to 6500 feet (0 to 2000 meters) and can be stored at altitudes of -200 to 10,000 feet (-60 to 3000 meters).

## Dust and Particles

Fans cool power supplies and system components by drawing in room-temperature air and exhausting heated air out through various openings in the chassis. However, fans also ingest dust and other particles, causing contaminant buildup in the system and increased internal chassis temperature. A clean operating environment can greatly reduce the negative effects of dust and other particles, which act as insulators and interfere with the mechanical components in the system. The standards listed below provide guidelines for acceptable working environments and acceptable levels of suspended particulate matter:

- National Electrical Manufacturers Association (NEMA) Type 1
- International Electrotechnical Commission (IEC) IP-20

## Corrosion

Corrosion of system connectors is a gradual process that may eventually lead to intermittent failures of electrical circuits. The oil from a person's fingers or prolonged exposure to high temperature or humidity may corrode the gold-plated edge connectors and pin connectors on various components in the system. To prevent corrosion, avoid touching contacts on boards and cards, and protect the system from extreme temperatures and moist, salty environments.

## EMI and Radio Frequency Interference

EMI and radio frequency interference (RFI) from a system can adversely affect devices such as radio and television (TV) receivers operating near the system. Radio frequencies emanating from a system can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the system monitor. RFI is defined as any EMI with a frequency above 10 kilohertz (kHz). This type of interference can travel from the system to other devices through the power cable and power source, or through the air in the form of transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI emitted by computing equipment. Each system meets these FCC regulations. To reduce the possibility of EMI and RFI, follow these guidelines:

- Always operate the system with the chassis covers installed.
- Ensure that all chassis slots are covered by a metal filler bracket and that an unused power supply bay has a metal cover plate installed.
- Ensure that the screws on all peripheral cable connectors are securely fastened to their corresponding connectors on the back of the chassis.

- Always use shielded cables with metal connector shells for attaching peripherals to the system.

When wires are run for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires. This fact has two implications for the construction of plant wiring:

- Bad wiring practice 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**


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To predict and provide a remedy for strong EMI, consult experts in RFI.

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

**Caution**


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Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.

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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 caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

## Power Source Interruptions

Systems are especially sensitive to variations in voltage supplied by the AC power source. Overvoltage, undervoltage, and transients (or spikes) can erase data from memory or even cause components to fail. To protect against these types of problems, power cables should always be properly grounded. Also, place the system on a dedicated power circuit (rather than sharing a circuit with other heavy electrical equipment). In general, do not allow the system to share a circuit with any of the following:

- Copy machines
- Air conditioners
- Vacuum cleaners
- Space heaters
- Power tools
- Teletype machines
- Laser printers
- Facsimile machines
- Any other motorized equipment

Besides these appliances, the greatest threats to a system's power supply are surges or blackouts that are caused by electrical storms. Whenever possible, turn off the system and peripherals, if any, and unplug them from their power sources during thunderstorms. If a blackout occurs—even a temporary one—while the system is turned on, turn off the system immediately and disconnect it from the electrical outlet. Leaving the system on may cause problems when the power is restored; all other appliances left on in the area may create large voltage spikes that may damage the system.

## System Grounding

You must install a system ground as part of the chassis installation process. Chassis installations that rely only on the AC third-prong ground are insufficient to adequately ground the systems.

Proper grounding practices ensure that the buildings and the installed equipment within them have low-impedance connections and low-voltage differentials between chassis. When you install a system ground, you reduce or prevent shock hazards, chances of equipment damage due to transients, and the potential for data corruption.

Without proper and complete system grounding, you run the risk of increased component damage due to ESD. Additionally, you have a greatly increased chance of data corruption, system lockup, and frequent system reboot situations by not using a system ground.



**Caution**

Installations that rely solely on system grounding that uses only an AC third-prong ground run a substantially greater risk of equipment problems and data corruption than those installations that use both the AC third-prong ground and a properly installed system ground.

The following table lists some general grounding practice guidelines.

**Table 12: Grounding Practice Guidelines**

Environment	Electromagnetic Noise Severity Level	Grounding Recommendations
Commercial building is subjected to direct lightning strikes.  For example, some places in the United States, such as Florida, are prone to more lightning strikes than other areas.	High	All lightning protection devices must be installed in strict accordance with manufacturer recommendations. Conductors carrying lightning current should be spaced away from power and data lines in accordance with applicable recommendations and codes. Best grounding practices must be closely followed.
Commercial building is located in an area where lightning storms occur frequently, but is not prone to direct lightning strikes.	High	Best grounding practices must be closely followed.
Commercial building contains a mix of information technology equipment and industrial equipment, such as welding.	Medium to High	Best grounding practices must be closely followed.

Environment	Electromagnetic Noise Severity Level	Grounding Recommendations
Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment. This installation has a history of malfunction due to electromagnetic noise.	Medium	Best grounding practices must be closely followed. Determine source and cause of noise if possible, and mitigate as closely as possible at the noise source or reduce coupling from the noise source to the victim equipment.
New commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment.	Low	Best grounding practices should be followed as closely as possible. Electromagnetic noise problems are not anticipated, but installing a best-practice grounding system in a new building is often the least expensive route, and the best way to plan for the future.
Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment.	Low	Best grounding practices should be followed as much as possible. Electromagnetic noise problems are not anticipated, but installing a best-practice grounding system is always recommended.

**Note**

In all situations, grounding practices must comply with Section 250 of the National Electric Code (NEC) requirements or local laws and regulations. A 6 AWG grounding wire is preferred from the chassis to the rack ground or directly to the common bonding network (CBN). The equipment rack should also be connected to the CBN with a 6 AWG grounding wire.

**Note**

In installations where FXS modules are installed, supplemental grounding is required.

**Note**

Always ensure that all of the modules are completely installed and that the captive installation screws are fully tightened. In addition, ensure that all the I/O cables and power cords are properly seated. These practices are normal installation practices and must be followed in all installations.

**Caution**

Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.



## Maintaining Safety with Electricity

When working on electrical equipment, follow these guidelines:

- Do not work alone if potentially hazardous conditions exist anywhere in your work space.
- Never assume that power is disconnected from a circuit; always check the circuit before working on it.
- Look carefully for possible hazards in your work area, such as damp floors, ungrounded power extension cables, frayed or damaged power cords, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
  - Use extreme caution; do not become a victim yourself.
  - Disconnect power from the system.
  - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
  - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.
- Use the product within its marked electrical ratings and product usage instructions.
- Install the product in compliance with local and national electrical codes.
- If any of the following conditions occur, contact the Cisco Technical Assistance Center:
  - The power cable or plug is damaged.
  - An object has fallen into the product.
  - The product has been exposed to water or other liquids.
  - The product has been dropped or shows signs of damage.
  - The product does not operate correctly when you follow the operating instructions.
- Use the correct external power source. Operate the product only from the type of power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult the Cisco Technical Assistance Center or a local electrician.
- Use approved power cables only. You have been provided with one or more power cables with your chassis power supply that are intended for use in your country, based on the shipping location. Should you need to purchase additional power cables, ensure that they are rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the power cable should be greater than the ratings marked on the label.
- To help prevent electrical shock, plug all the power cables into properly grounded electrical outlets. These power cables are equipped with three-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a power cable.
- Observe power strip ratings. Make sure that the total current rating of all products that are plugged into the power strip does not exceed 80 percent of the power strip rating.
- Do not modify power cables or plugs yourself. Consult with a licensed electrician or your power company for site modifications. Always follow your local and national wiring codes.

## Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when modules or other FRUs are improperly handled, results in intermittent or complete failures. Modules consist of printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, always use an ESD grounding strap when handling modules.

To prevent ESD damage, follow these guidelines:

- Always use an ESD wrist strap and ensure that it makes maximum contact with bare skin. ESD grounding straps are available with banana plugs, metal spring clips, or alligator clips. All switch chassis are equipped with a banana plug connector (identified by the ground symbol next to the connector) somewhere on the front panel. If you have an older chassis equipped with a plastic banana plug connector, it is recommended that you use either the supplied ESD grounding wrist strap (with a metal clip) or an ESD grounding wrist strap equipped with an alligator clip. If you have a newer chassis that has a bare metal hole as the banana plug connector (also identified by the ground symbol next to the connector), we recommend that you use a personal ESD grounding strap equipped with a banana plug.
- If you choose to use the disposable ESD wrist strap supplied with most FRUs or an ESD wrist strap equipped with an alligator clip, you must attach the system ground lug to the chassis in order to provide a proper grounding point for the ESD wrist strap.
- If your chassis does not have the system ground attached, you must install the system ground. See [Establishing the System Ground](#), on page 60 for installation instructions and locations of the chassis system ground pads.

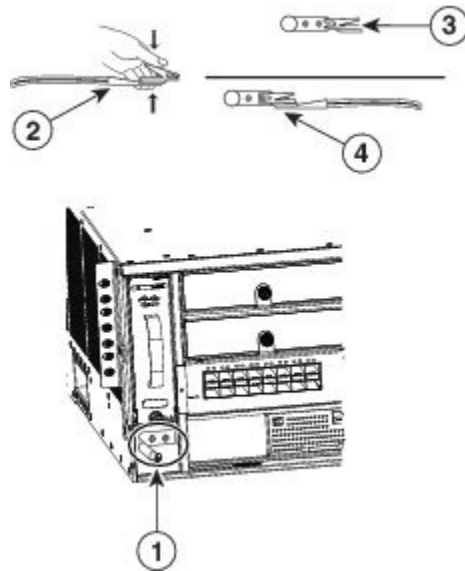
### Attaching the ESD Wrist Strap

After you install the system ground lug, follow these steps to correctly attach the ESD wrist strap:

**Procedure**

- Step 1** Secure the ESD wrist strap equipped with an alligator clip to your bare skin.
- Step 2** Grasp the spring or alligator clip on the ESD wrist strap and momentarily touch the clip to a bare metal spot (unpainted surface) on the rack. It is recommend that you touch the clip to an unpainted rack rail so that any built-up static charge is then safely dissipated to the entire rack.
- Step 3** Attach the alligator clip directly over the head of the system ground lug screw or to the system ground lug barrel.

*Figure 11: Attaching the ESD Wrist Strap to the System Ground Lug Screw*



1	System ground lug	3	Alligator clip
2	ESD wrist strap	4	Clip attached to the system ground lug

## Power Requirements

When preparing your site for the switch installation, follow these requirements:

- When installing two power supplies, connect each power supply to a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.

- To prevent a loss of input power, be sure that the total maximum load on each source circuit is within the current ratings of the wiring and breakers.
- You might decide to use an uninterruptible power supply (UPS) to protect against power failures at your site. Be aware when selecting a UPS that some UPS models that use ferroresonant technology can become unstable when operating with the switch power supplies which use power factor correction (PFC). This can cause the output voltage waveform to the switch to become distorted resulting in an undervoltage situation in the system.
- The AC-input power supply has a detachable power cord that allows you to connect each power supply to the site power source.
- You can connect the DC-input power supply to the power source with heavy-gauge wiring connected to a terminal block. The wire gauge size is determined by local electrical codes and restrictions.
- If you are using a 200/240 VAC power source in North America, the circuit must be protected by a two-pole circuit breaker.
- The source AC outlet must be within 6 feet (1.8 meters) of the system and should be easily accessible.
- The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

## Power Connection Guidelines for AC-Powered Systems

This section provides the basic guidelines for connecting the switch AC power supplies to the site power source:

- Each chassis power supply should have a separate, dedicated branch circuit.
- For North America:
  - The 3000 W power supply requires a 20 A circuit.
- For International:
  - Circuits should be sized according to local and national codes.
- If you are using a 200/240 VAC power source in North America, the circuit must be protected by a two-pole circuit breaker.
- The source AC outlet must be within 6 feet (1.8 meters) of the system and should be easily accessible.
- The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

## Power Connection Guidelines for DC-Powered Systems

This section provides the basic guidelines for connecting the switch DC-input power supplies to the site power source:

- All power connection wiring should conform to the rules and regulations in the National Electrical Code (NEC), as well as any local codes.
- The DC return must remain isolated from the system frame and the chassis (DC-I).
- For DC power cables, we recommend that you use commensurately rated, high-strand-count copper wire cable. Connection to the DC-input power supply requires one earth ground cable, one source DC (-), and one source DC return (+). The length of the cables depends on your switch location. These cables are not available from Cisco Systems. They are available from any commercial cable vendor.
- The color coding of the source DC power cable leads depends on the color coding of the site DC power source. Typically, green or green and yellow indicate that the cable is a ground cable. Because there is no color code standard for source DC wiring, you must ensure that the power cables are connected to the DC-input power supply terminal block in the proper (+) and (-) polarity. In some cases, the source DC cable leads might have a positive (+) or a negative (-) label. This label is a relatively safe indication of the polarity, but you must verify the polarity by measuring the voltage between the DC cable leads. When making the measurement, the positive (+) lead and the negative (-) lead must always match the (+) and (-) labels on the DC-input power supply terminal block.
- DC power cables must be terminated by cable lugs at the power supply end.
- The circuit breaker is considered to be the disconnect device and should be easily accessible.
- The circuit must be protected by a dedicated two-pole circuit breaker. The circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- For proper DC-input redundant power configurations on systems with multiple-input DC-input power supplies, all pairs of source DC cables for one DC-input power supply must come from the same battery system (A feed); all pairs of source DC cables for the second DC-input power supply must come from a different battery system (B feed).
- For DC-input power supplies with multiple inputs, each DC input must be protected by a dedicated circuit breaker or a fuse. The circuit breaker or the fuse must be sized according to the power supply input rating and local or national electrical codes.

## Cabling Requirements

When running power and data cables together in overhead cable trays or subfloor cable trays, be aware of the following caution:



### Caution

We strongly recommend that power cabling runs and other potential noise sources be located as far away as practical from LAN cabling that terminates on Cisco equipment. In situations where this type of long parallel cable runs exist and cannot be separated by at least 3.3 feet (1 meter), we recommend that you shield these potential noise sources. To avoid interference, the source should be shielded by housing it in a grounded metallic conduit.

Also be aware of the following caution concerning the use of Category 5e and Category 6 Ethernet cables:

**Caution**

Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.

## Site Preparation Checklist

The following table lists the site-planning activities that you should perform prior to installing the switch. Completing each activity helps ensure a successful switch installation.

**Table 13: Site-Planning Activities**

Task No.	Activity	Verified By	Time and Date
1	Space evaluation: <ul style="list-style-type: none"> <li>• Space and layout</li> <li>• Floor covering</li> <li>• Impact and vibration</li> <li>• Lighting</li> <li>• Maintenance access</li> </ul>		
2	Environmental evaluation: <ul style="list-style-type: none"> <li>• Ambient temperature</li> <li>• Humidity</li> <li>• Altitude</li> <li>• Atmospheric contamination</li> <li>• Airflow</li> </ul>		

Task No.	Activity	Verified By	Time and Date
3	Power evaluation: <ul style="list-style-type: none"> <li>• Input power type</li> <li>• Power receptacles (Depends on power supply)</li> <li>• Receptacle proximity to the equipment</li> <li>• Dedicated (separate) circuits for redundant power supplies</li> <li>• UPS for power failures</li> <li>• DC systems: Proper gauge wire and lugs</li> </ul>		
4	Grounding evaluation: <ul style="list-style-type: none"> <li>• Circuit breaker size</li> <li>• CO ground (AC- and DC-powered systems)</li> </ul>		
5	Cable and interface equipment evaluation: <ul style="list-style-type: none"> <li>• Cable type</li> <li>• Connector type</li> <li>• Cable distance limitations</li> <li>• Interface equipment (transceivers)</li> </ul>		
6	EMI evaluation: <ul style="list-style-type: none"> <li>• Distance limitations for signaling</li> <li>• Site wiring</li> <li>• RFI levels</li> </ul>		



**Note**

For power receptacles (depends on power supply), verify that each power supply installed in the chassis has a dedicated AC source or DC source circuit.

**Note**

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For UPS for power failures, refer to the power supply's kVA rating as a sizing criteria in determining the output required by the UPS.

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## Installing the Switch

This chapter describes how to install a Catalyst 6880-X switch. Pointers within the overall chassis installation procedures point to separate installation procedures that cover installing various components and assemblies.

- [Installation Tasks, page 33](#)
- [Safety Warnings, page 34](#)
- [Rack-Mounting Guidelines, page 35](#)
- [Unpacking the Switch, page 36](#)
- [Chassis Installation Kits and Cable Guides, page 36](#)
- [Installing the Switch Chassis, page 37](#)

### Installation Tasks

The process of installing the switch can be broken down into a series of tasks, which are described in the following table.

Task	Description
Unpacking the switch	Remove the switch from the packaging materials. <b>Note</b> Save the packaging material for later use if you need to move the chassis.
Installing the switch	Install the switch.
Connecting the chassis to system ground	Construct and attach a system ground wire from the building (earth) ground to the system ground point on the chassis.
Installing and cabling the power supply or supplies	Power supplies that are ordered with the switch are installed in the switch. If ordered separately, install the power supplies. Connect the power supplies.

Task	Description
Cabling the chassis and modules to the network	The various ports on the chassis must be connected to the network. This process can involve only attaching a network interface cable to the port or it can include the installation of a transceiver of some type in port and then attaching the network interface cable to the transceiver.
Powering up the chassis	After completing the network cabling and making sure that system ground is connected, the power supplies can be turned on. The system powers up and runs through a set of built-in diagnostics.

## Safety Warnings



**Warning**

Class 1 laser product. Statement 1008



**Warning**

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



**Warning**

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



**Warning**

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



**Warning**

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. Statement 1032



**Warning**

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Statement 1034



**Warning**

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

**Warning**

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

**Warning**

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

**Warning**

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

Before starting the installation procedures in this chapter, see the “Site Preparation Checklist” section on page 2-15 to verify that all site planning activities were completed.

## Rack-Mounting Guidelines

**Note**

The switch is designed to be installed in standard 19-inch racks.

Before rack-mounting the switch, ensure that the equipment rack complies with the following guidelines:

- The width of the rack, measured between the two front-mounting strips or rails, must be one of the following measurements:
  - 17.5 inches (44.45 cm)
  - 17.75 inches (45.09 cm)
- The depth of the rack, measured between the front- and rear-mounting strips, must be at least 19.25 inches (48.9 cm).
- The rack must have sufficient vertical clearance to insert the chassis: 8.75 inches (22.23 cm) (5 RU)

**Note**

Chassis height is sometimes measured in rack units (RU or just U) where 1 RU or 1 U equals 1.75 in (44.45 mm). A typical server rack is 42 RU or 42 U in height.

**Caution**

If the rack is on wheels, ensure that the brakes are engaged and that the rack is stabilized.

**Warning**

Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over. Statement 1048

**Warning**

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. Statement 1006

**Note**

To maintain proper air circulation through the Catalyst switch chassis, you should maintain a recommended separation of a minimum of 6 inches (15 cm) between a wall and the chassis air intake or a wall and the chassis air exhaust. You should also allow a minimum separation of 12 inches (30.5 cm) between the hot air exhaust on one chassis and the air intake on another chassis. Failure to maintain adequate air space can cause the chassis to overheat and the system to fail.

## Unpacking the Switch

**Note**

Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them with the pallet. You will need these containers if you need to move or ship the switch in the future.

Check the contents of the accessory kit. Verify that you received all listed equipment, which should include the following:

- Grounding lug and disposable ESD strap.
- Optional equipment that you ordered, such as console cables, transceivers, or special connectors.
- Blank covers are installed for the port card slots and power supply slots on the chassis.
- Rack-mount shelf kit is provided that includes brackets and a tray to support the chassis when it is installed on a rack.

## Chassis Installation Kits and Cable Guides

The chassis ships with an accessory kit, which includes chassis installation kits and cable guides:

- Standard 19-inch rack-mount L brackets (factory-installed on the chassis). Associated rack-mounting hardware is included in the accessory kit.
- 5 RU rack-mount shelf kit is included in the accessory kit.
- Two cable management guides are included in the accessory kit.

# Installing the Switch Chassis

## Installation Accessory Kits

The switch chassis is designed to be installed in a standard 19-inch rack, either open or enclosed. The chassis is shipped with the 19-inch rack-mount L brackets that are factory installed on the left-front and right-front of the chassis. Screws are included with the accessory kit that are used to secure the chassis in the rack enclosure.



### Note

Depending on the manufacturer, the rack posts might be prethreaded to accept either 10-32 or 12-24 screws. If the rack posts are not prethreaded, you must install 10-32 or 12-24 clip nuts or cage nuts to secure the rack-mount screws. The clip nuts or the cage nuts are not included as part of the accessory kit and must be obtained on your own.

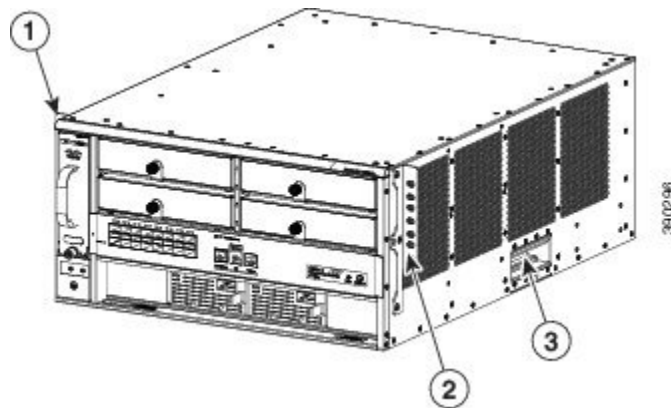
The accessory kit also contains the following chassis installation kits:

- Rack-mount shelf kit. The rack-mount shelf kit is used to support the weight of the chassis.
- Cable guides— Two cable guides can be installed on the front of the chassis using the same sets of screws that secure the chassis rack-mount brackets to the rack posts.

## L Brackets on the Chassis

The switch chassis is shipped with two L brackets installed toward the front of each side of the chassis, as shown in the following figure.

**Figure 12: Brackets on the Switch Chassis**



1	Left L bracket	3	Handhold (one on each side of chassis)
2	Right L bracket		

## Installing the Rack-Mount Shelf Kit

Before installing the chassis, you should install the rack-mount shelf kit that is included as part of the accessory kit. The rack-mount shelf kit is shipped as part of the switch accessory kit. It contains two shelf brackets, a crossbar, and screws. The shelf brackets attach directly to the rack and help support the weight of the chassis.

### Required Tools

These tools and equipment are required to install the rack-mount shelf kit:

- Number 1 and number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

### Installing the Shelf Brackets on a rack



#### Note

On many older equipment racks, the rack posts are prethreaded to accept either 10-32 or 12-24 screws. Newer rack enclosure posts might not be prethreaded. These rack enclosure posts require that you install 10-32 or 12-24 clip nuts or cage nuts to secure the rack-mount screws. The clip nuts or the cage nuts are not included as part of the accessory kit and must be obtained on your own.

Before you install the Shelf brackets, determine the clearance between the insides of the left and right rails of your rack system:

- If the distance between the insides of the rails is 17.5 inches (44.45 cm), then follow the steps in .
  - [Installing Shelf Brackets and Crossbar in a Two-Post Rack with 17.5-inch \(44.45 cm\) Opening , on page 46](#)
  - [Installing Shelf Brackets and Crossbar in a Four-Post Rack with 17.5-inch \(44.45 cm\) Opening, on page 38](#)
- If the distance between the insides of the rails is 17.75 inches (45.09 cm), then follow the steps in .
  - [Installing Shelf Brackets and Crossbar in a Two-Post Rack with 17.75 inch \(45.09 cm\) Opening, on page 49](#)
  - [Installing Shelf Brackets and Crossbar in a Four-Post Rack with 17.75 inch \(45.09 cm\) Opening, on page 42](#)

### Installing Shelf Brackets and Crossbar in a Four-Post Rack with 17.5-inch (44.45 cm) Opening



#### Important

You have to rear-mount the shelf brackets and the crossbar in a rack with a 17.5-inch rail-to-rail opening.

Perform these steps:

**Before You Begin**

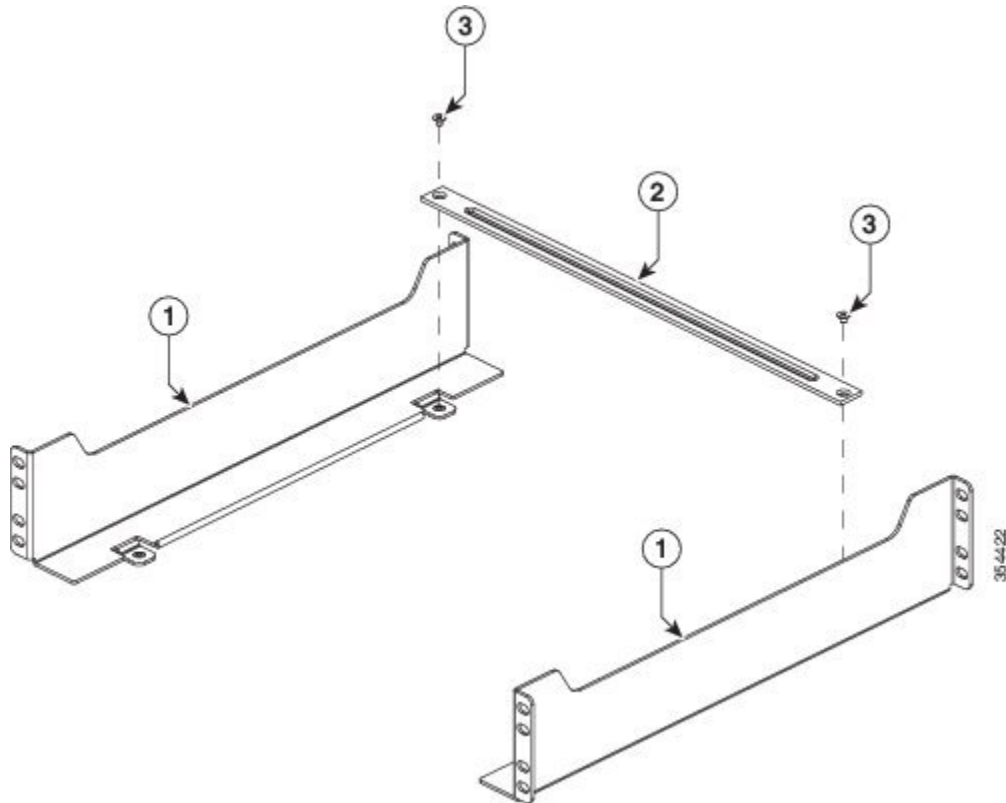
You will require:

- Number 1 and Number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

**Procedure**

**Step 1** Secure the crossbar to the shelf brackets by using two M4 screws, with one screw on each side.

*Figure 13: Securing the crossbar to the shelf brackets*

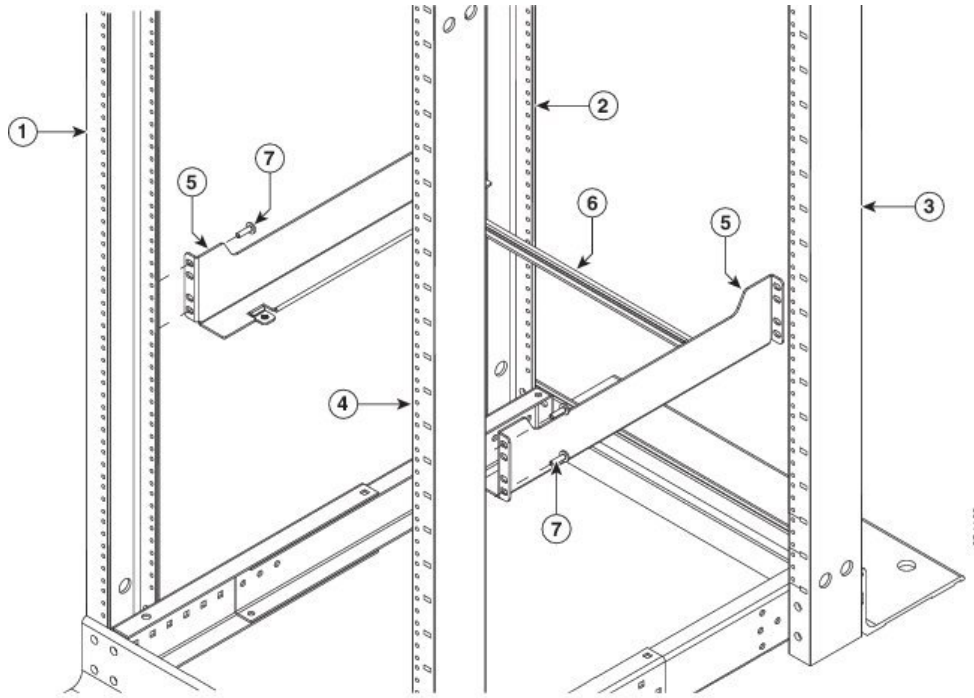


1	Shelf brackets	3	M4 x 5 mm flat-head screw
2	Crossbar		

**Step 2** Position the front side of the support flanges of the shelf brackets on the fixed front-left and front-right posts of the rack and secure them by using the four EA screws (Two EA screws on each side).

**Note** Ensure that the crossbar attached to the shelf brackets is on the rear side of the rack post.

**Figure 14: Installing Shelf Brackets and Crossbar in a 17.5-inch Opening**



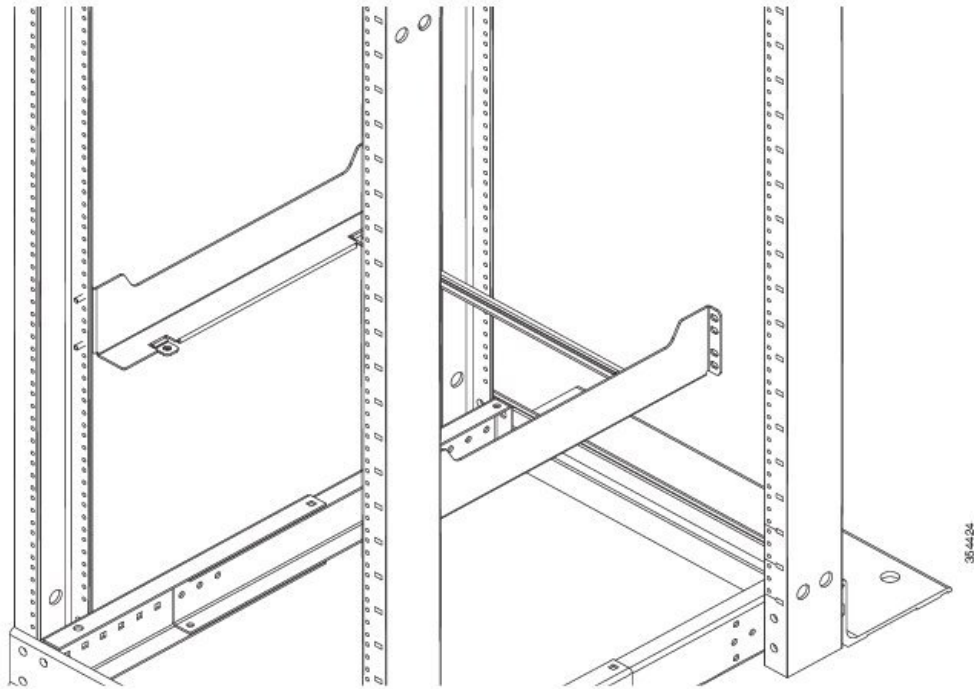
1	Fixed front-left rack post	5	Shelf brackets
2	Adjustable rear-left rack post	6	Crossbar
3	Adjustable rear-right rack post	7	Two EA screws
4	Fixed front-right rack post		

**Step 3** Adjust the adjustable rear-left and rear-right rack posts until it touches the shelf brackets flange surface and secure by using four EA screws, two EA screws on each side.



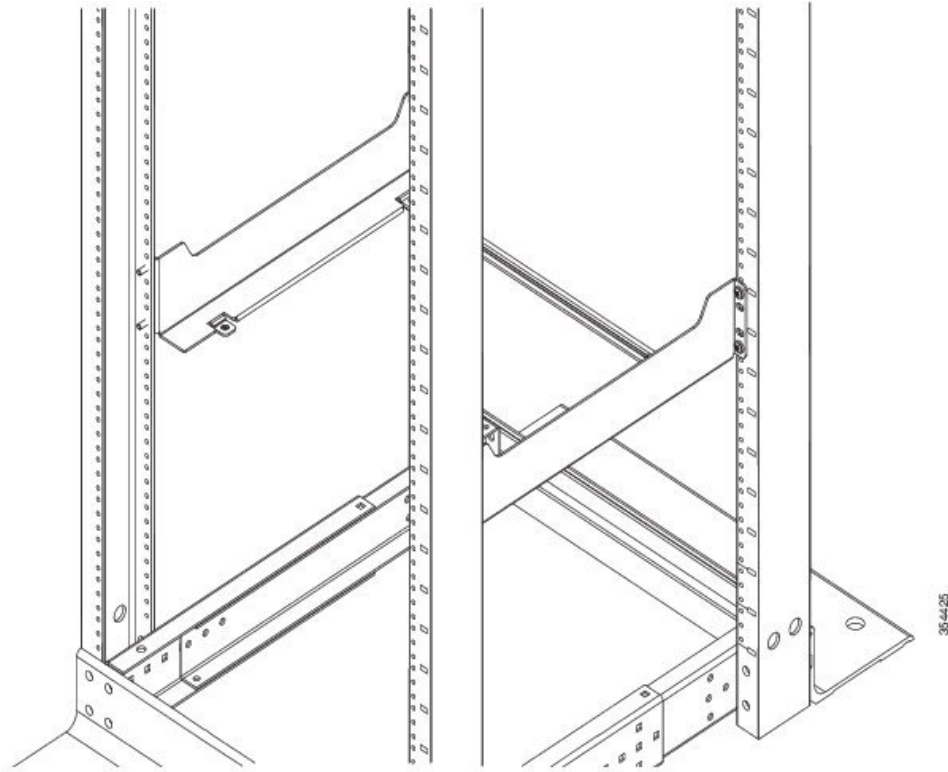
**Note** We recommend to assemble the shelf brackets rear flanges with rear rack posts by using four EA screws (two EA screws on each side) to avoid the shelf brackets from overhanging at the ends.

**Figure 15: Before adjusting the rear rack posts**



35-4424

**Figure 16: After adjusting the rear rack posts**



### Installing Shelf Brackets and Crossbar in a Four-Post Rack with 17.75 inch (45.09 cm) Opening



**Important** You have to front-mount the shelf brackets and crossbar on a rack with a 17.75-inch rail-to-rail opening.

Perform these steps:

#### **Before You Begin**

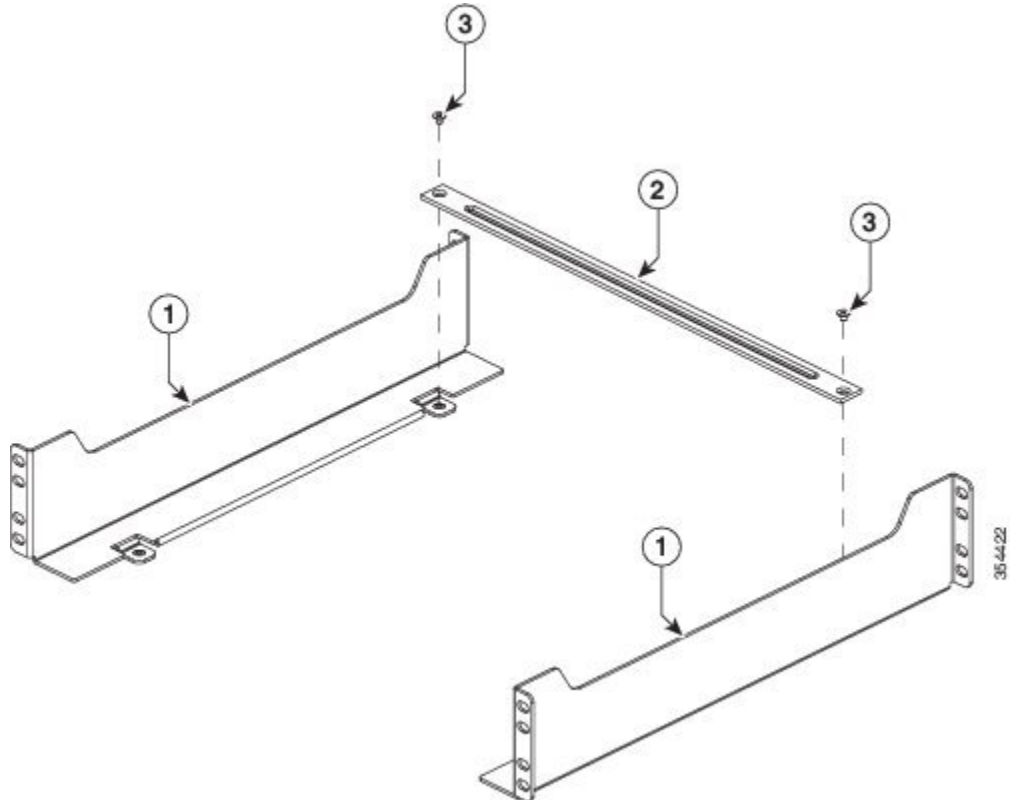
You will require:

- Number 1 and Number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

**Procedure**

**Step 1** Secure the crossbar to the shelf brackets by using two M4 screws, with one screw on each side.

*Figure 17: Securing the crossbar to the shelf brackets*

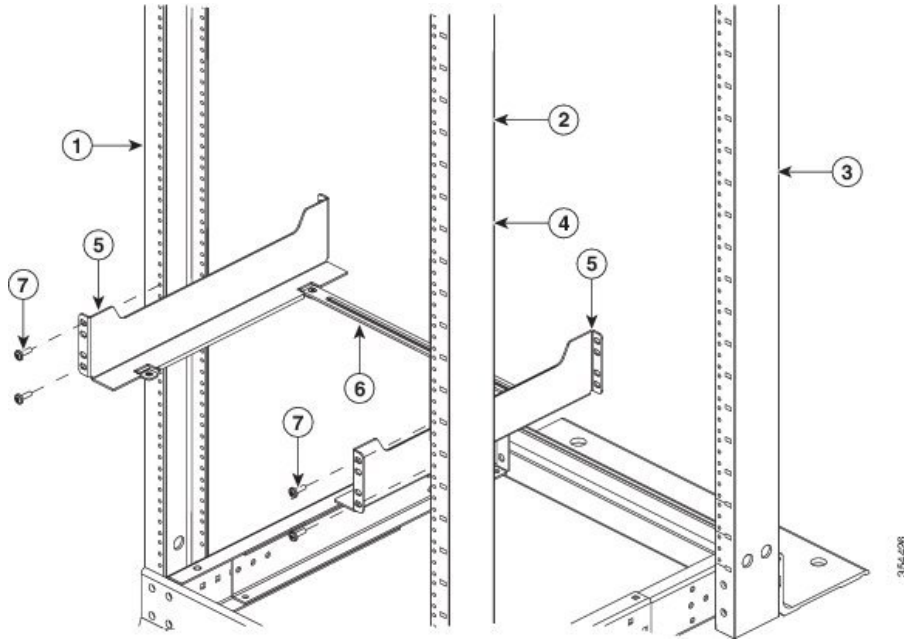


1	Shelf brackets	3	M4 x 5 mm flat-head screw
2	Crossbar		

**Step 2** Position the rear side of the support flanges of the shelf brackets on the front side of the fixed front-left and front-right posts of the rack. Align and secure the bracket to the rack by using the four EA screws (Two EA screws on each side).

**Note** Ensure that the crossbar attached to the shelf brackets is on the rear side of the rack post.

**Figure 18: Installing Shelf Brackets and Crossbar in a 17.5-inch Opening**

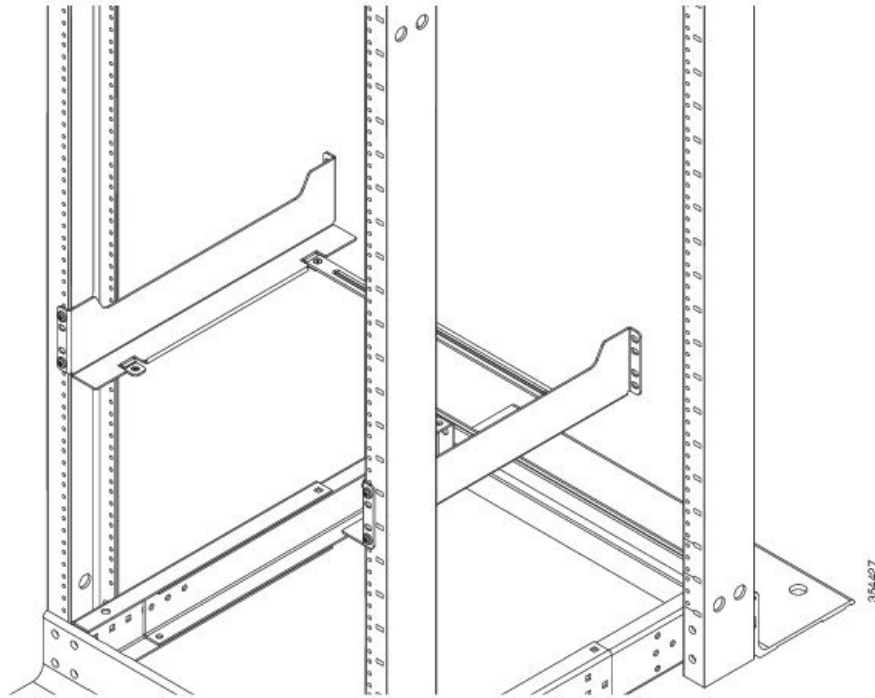


1	Fixed front-left rack post	5	Shelf brackets
2	Fixed front-right rack post	6	Crossbar
3	Adjustable rear-right rack post	7	Two EA screws
4	Adjustable rear-left rack post		

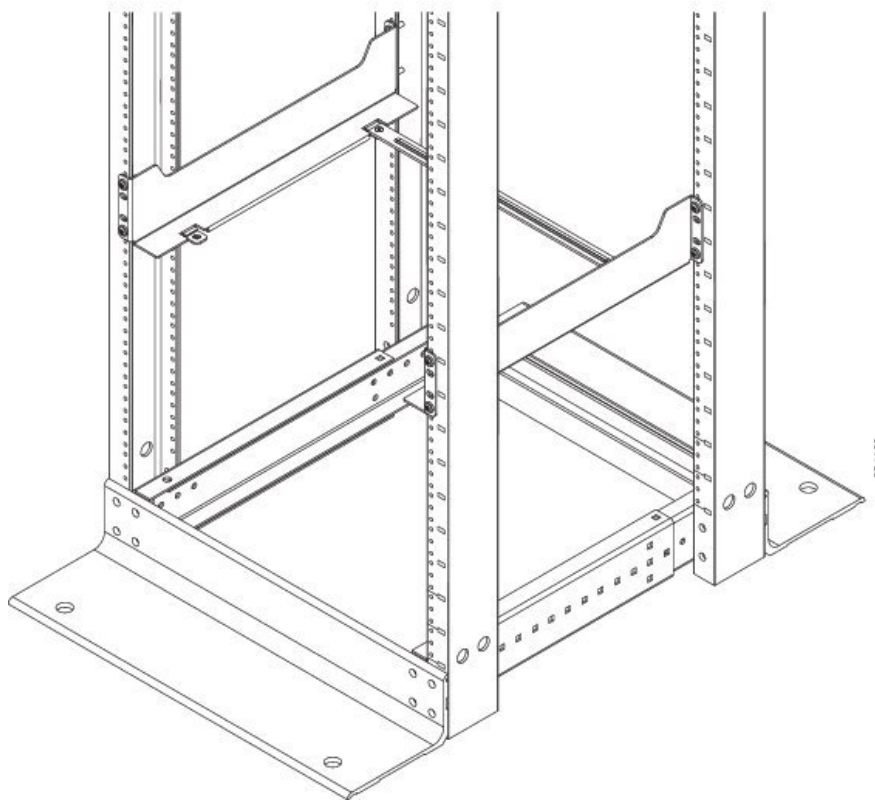
**Step 3** Adjust the adjustable rear-left and rear-right rack posts until it touches the shelf brackets flange surface and secure by using four EA screws, with two EA screws on each side.

**Note** We recommend to assemble the shelf brackets rear flanges with rear rack posts by using the four EA screws (two EA screws on each side) to avoid the shelf brackets from overhanging at the ends.

**Figure 19: Before adjusting the rear rack posts**



**Figure 20: After adjusting the rear rack posts**



### Installing Shelf Brackets and Crossbar in a Two-Post Rack with 17.5-inch (44.45 cm) Opening



**Important** You have to rear-mount the shelf brackets and the crossbar for a rack with a 17.5-inch rail-to-rail opening.

Perform these steps:

#### **Before You Begin**

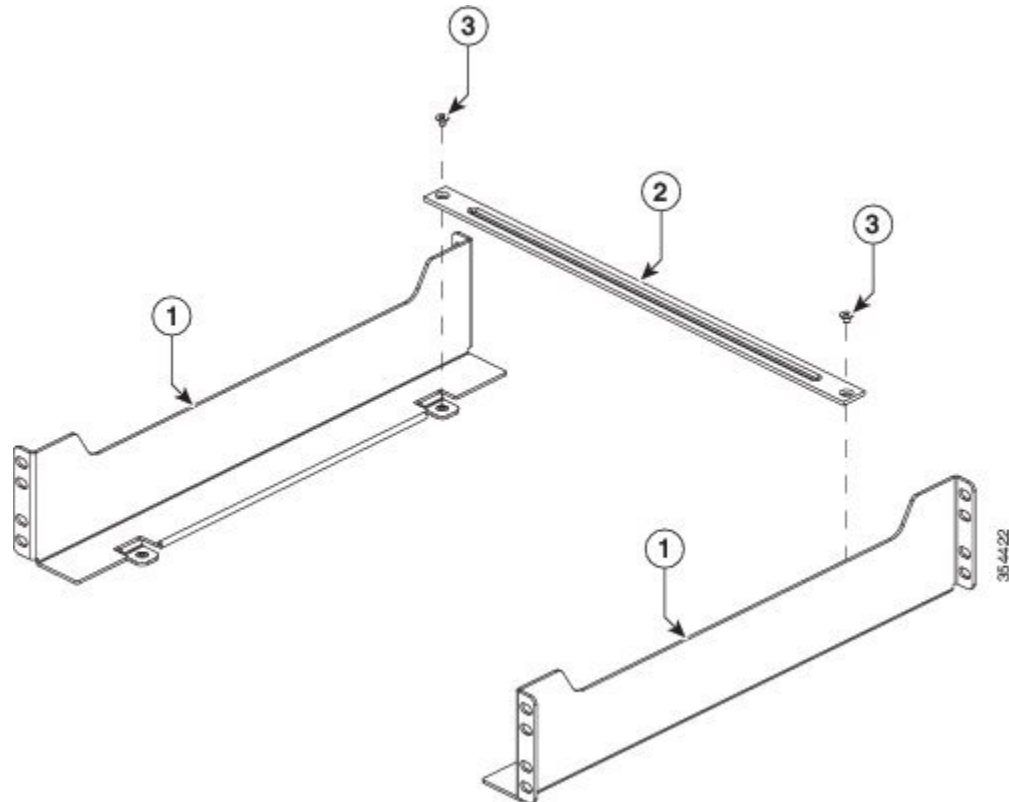
You will require:

- Number 1 and Number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

## Procedure

- Step 1** Secure the crossbar to the shelf brackets by using two M4 screws, with one screw on each side.

**Figure 21: Securing the crossbar to the shelf brackets**

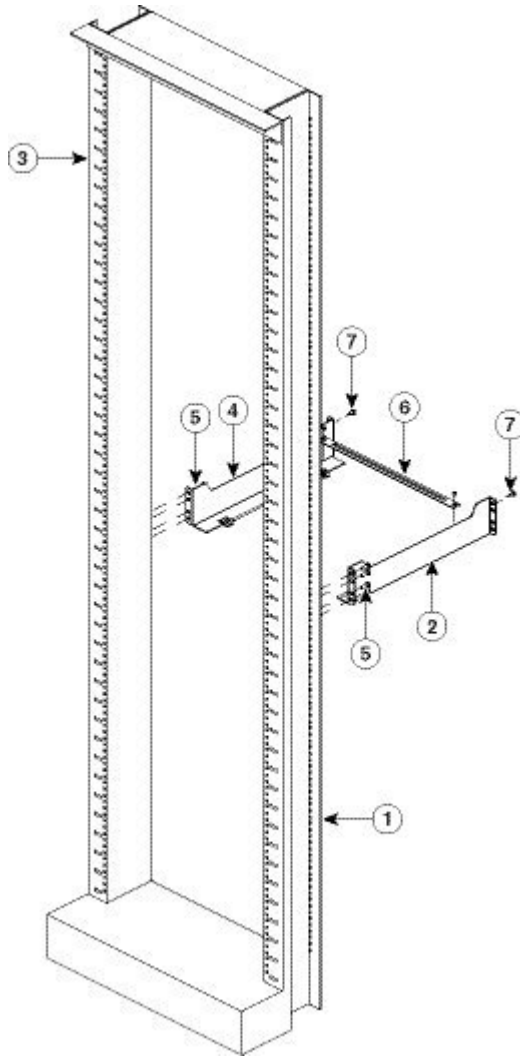


1	Shelf brackets	3	M4 x 5 mm flat-head screw
2	Crossbar		

- Step 2** Position the front side of the support flanges of the shelf brackets on the rear side of the left and the right posts of the rack. Align and secure the bracket to the rack by using the eight EA screws (four EA screws on each side).

**Note** Ensure that the crossbar attached to the shelf brackets is on the rear side of the rack post.

**Figure 22: Installing Shelf Brackets and Crossbar in a Two-Post Rack with 17.5-inch Opening**



1	Right rail	4	Crossbar
2	Left rail	5	Four EA screws on each side, to secure the shelf brackets to the rack
3	Shelf brackets		



## Installing Shelf Brackets and Crossbar in a Two-Post Rack with 17.75 inch (45.09 cm) Opening



**Important** You have to front-mount the shelf brackets and crossbar in a rack with a 17.75-inch rail-to-rail opening.

Perform these steps:

### Before You Begin

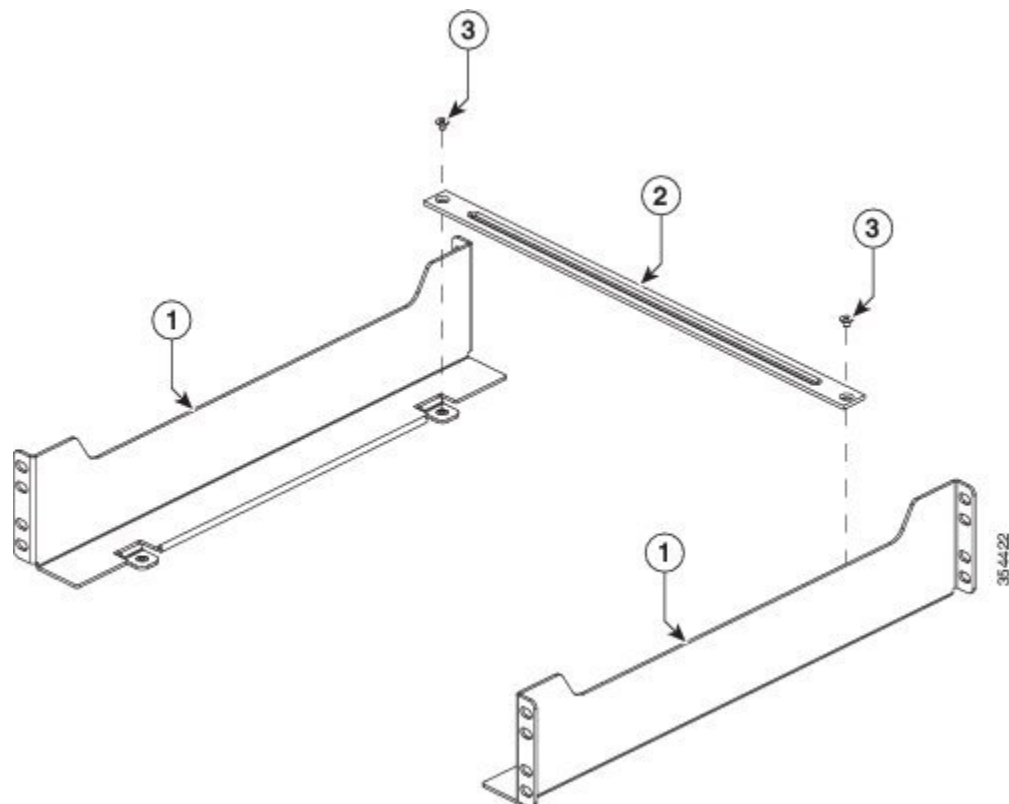
You will require:

- Number 1 and Number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

### Procedure

**Step 1** Secure the crossbar to the shelf brackets by using two M4 screws, with one screw on each side.

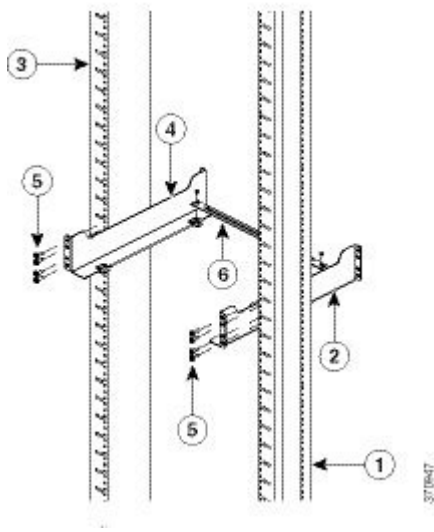
**Figure 23: Securing the crossbar to the shelf brackets**



1	Shelf brackets	3	M4 x 5 mm flat-head screw
2	Crossbar		

**Step 2** Position the rear side of the support flanges of the shelf brackets on the front side of the left and the right posts of the rack. Align and secure the bracket to the rack by using the four EA screws (two EA screws on each side).

**Figure 24: Installing Shelf Brackets and Crossbar in a 17.75-inch Opening**



1	Right rail	4	Crossbar
2	Left rail	5	Four EA screws on each side, to secure the shelf bracket to the rack
3	Shelf brackets		

## Rack Mounting the Chassis

### Installing the Chassis in a Four-Post Rack



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**Note** The chassis are designed to be mounted in equipment racks that meet ANSI/EIA 310-D and ETS 300-119 standards.

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#### Procedure

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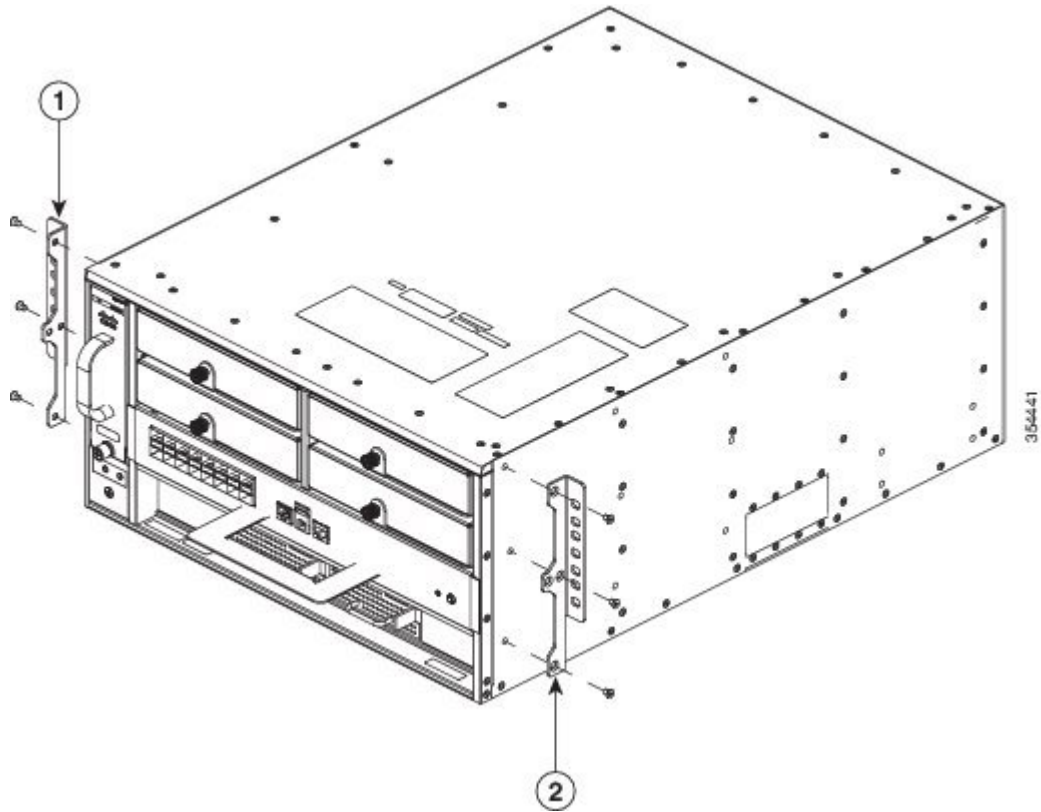
**Step 1** Based on the type of rack (closed (cabinet) rack or open rack), you can install the left and the right L brackets of the chassis in one of the following ways:

- Original position - Left L bracket on the left side of the chassis and right L bracket on the right side of the chassis.

**Note** The chassis is shipped with the L brackets installed, which is referred to as the original position.

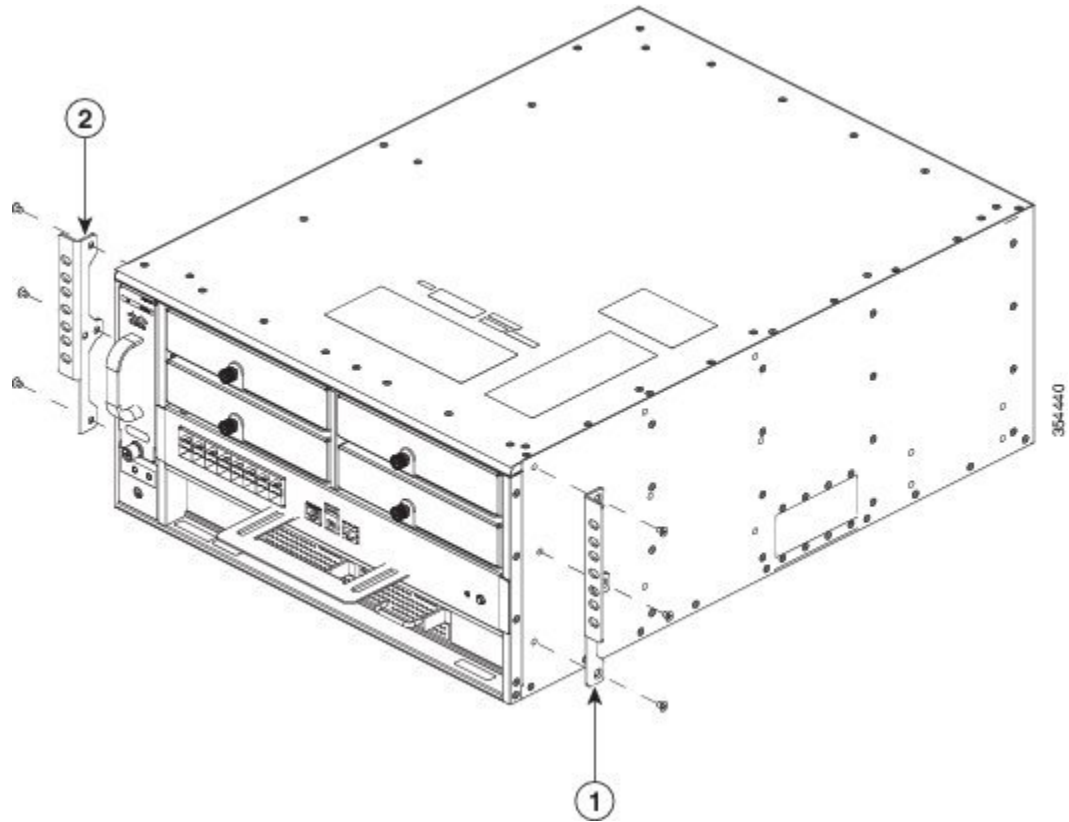
- 180° flip position - Left L bracket on the right side of the chassis and right L bracket on the left side of the chassis.

**Figure 25: Original position of L bracket**



1	Left L bracket	2	Right L bracket
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Figure 26: 180° flip position of L bracket

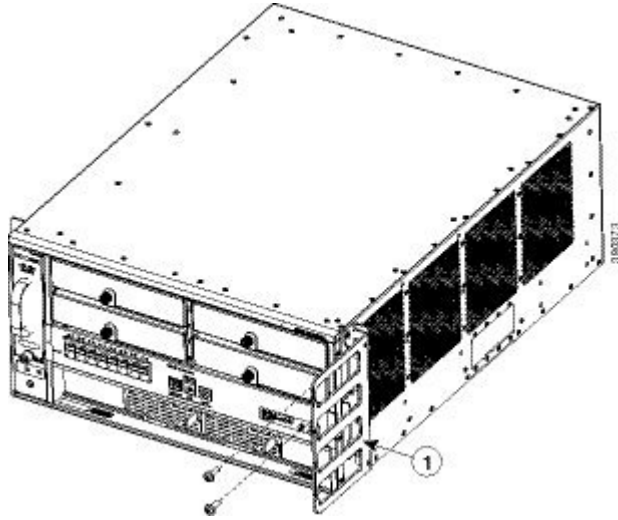


1	Left L bracket	2	Right L bracket
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- Step 2** With a person standing at each side of the chassis, each person supports the chassis by placing one hand in the handhold on the side of the chassis (see figure above) and using the other hand under the back of the chassis for balance. Slowly lift the chassis together. Avoid sudden twists or moves to prevent injury.
  - Step 3** Rest the back end of the chassis on the rack-mount shelf and carefully slide the chassis into the rack until the L brackets meet the front rails of the rack system.
  - Step 4** Locate the rack post holes that align with the chassis L bracket holes. If the rack post holes are prethreaded, determine if the threads are 10-32 or 12-24. If the rack post holes are unthreaded, install fourteen (seven on each side) either 10-32 or 12-24 clip or cage nuts over the rack post holes to accept the installation screws.
- Note** Clip nuts or cage nuts are not included as part of the accessory kit that comes with the chassis. You must obtain them yourself.

- Step 5** If you want to install one or both of the optional cable guide assemblies, position the cable guides so that the cable guide mounting holes are aligned with L bracket holes as shown in figure below.

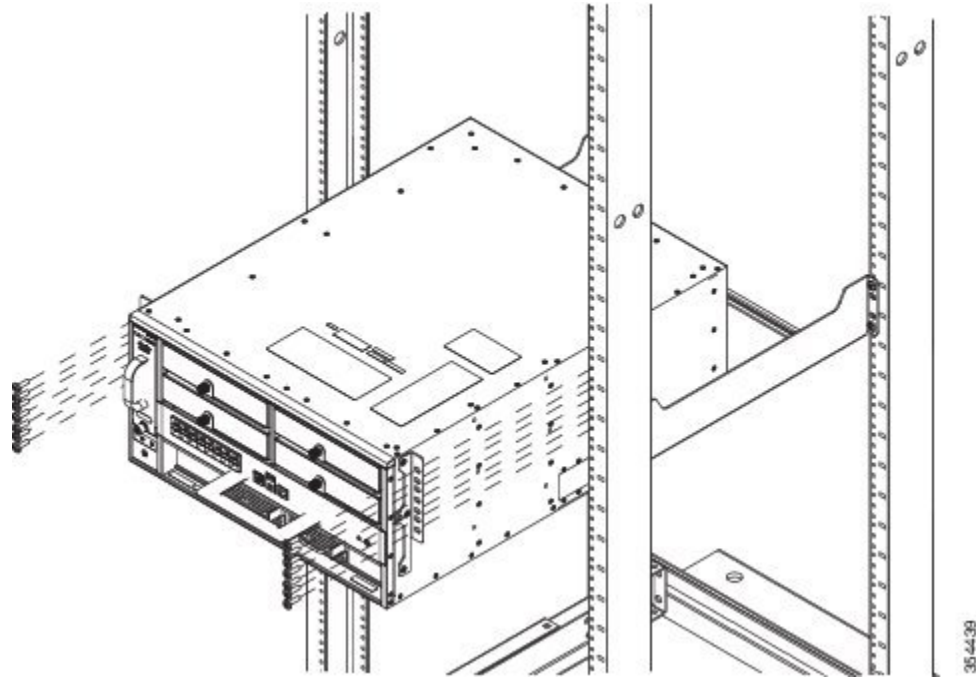
**Figure 27: Installing the Cable Mount Guides**



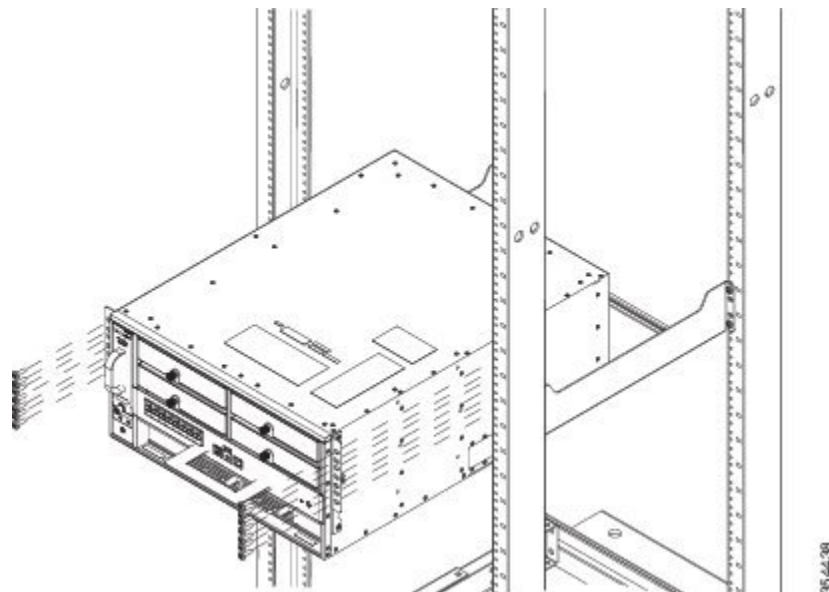
1	Cable guide
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- Step 6** Install all fourteen 10-32 or 12-24 screws (seven on each side) through the cable guide mounting holes, rack-mount L bracket holes, rack post holes, and into the clip nuts to secure the cable guides and the chassis to the rack post. Tighten the screws securely.
- Step 7** Secure the chassis using fourteen screws through the holes in the L bracket and into the rack post holes.

**Figure 28: Chassis in a rack with L brackets at original position**



**Figure 29: Chassis in a rack with L brackets at inverted position**



1	10-32 or 12-24 screws
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## Installing the Chassis in a Two-Post Rack



**Note** The chassis are designed to be mounted in equipment racks that meet ANSI/EIA 310-D and ETS 300-119 standards.

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### Procedure

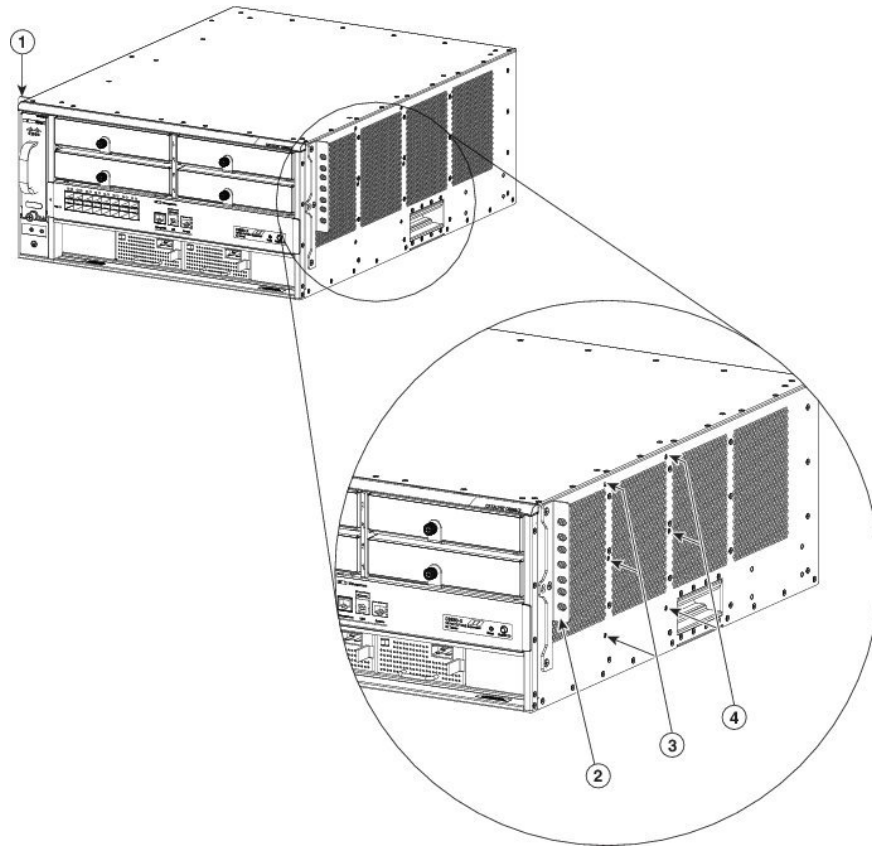
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- Step 1** Before rack-mounting the chassis, determine if you need to move the L brackets so that the chassis is installed in one of the recommended positions:
- Positioned so the front of the chassis is approximately flush with the front of the rack:
    - The chassis is shipped with the L brackets in the correct location; there is no need to move them.
  - Positioned so approximately one fourth of the chassis protrudes in front of the rack:
    - Remove the screws in the L brackets.
    - Reposition the L brackets to align with the first set of holes behind the holes where the L brackets were originally installed (see figure below).
    - Secure the brackets with the screws.
  - Positioned so approximately one half of the chassis protrudes in front of the rack:
    - Remove the screws in the L brackets.
    - Reposition the L brackets to align with the second set of holes behind the holes where the L brackets were originally installed (see figure below).



- Secure the brackets with the screws.

**Figure 30: Locations of Screw Holes for Alternate Chassis Installation Positions**



1	Left L bracket already attached. When the chassis is installed, the front of the chassis is approximately flush with the front of the rack.	3	Screw holes for reattaching the L brackets. When the chassis is installed, approximately one quarter of it protrudes in front of the rack.
2	Right L bracket already attached. When the chassis is installed, the front of the chassis is approximately flush with the front of the rack.	4	Screw holes for reattaching the L brackets. When the chassis is installed, approximately one half of it protrudes in front of the rack.

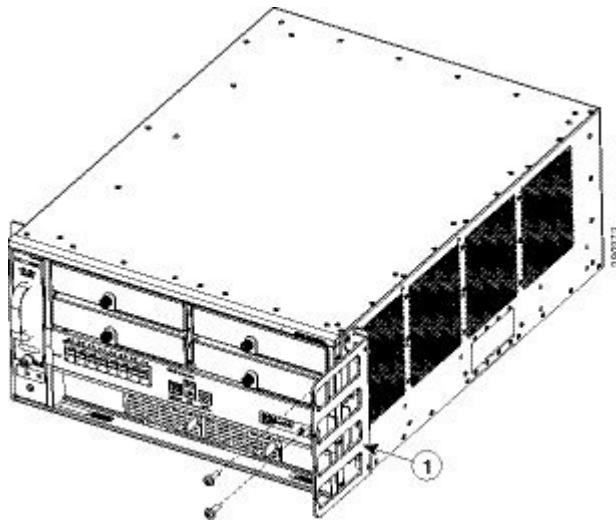
- Step 2** With a person standing at each side of the chassis, each person supports the chassis by placing one hand in the handhold on the side of the chassis (see figure above) and using the other hand under the back of the chassis for balance. Slowly lift the chassis together. Avoid sudden twists or moves to prevent injury.
- Step 3** Rest the back end of the chassis on the rack-mount shelf and carefully slide the chassis into the rack until the L brackets meet the front rails of the rack system.
- Step 4** Locate the rack post holes that align with the chassis L bracket holes. If the rack post holes are prethreaded, determine if the threads are 10-32 or 12-24. If the rack post holes are unthreaded, install eight or ten (four or

five on each side) either 10-32 or 12-24 clip or cage nuts over the rack post holes to accept the installation screws.

**Note** Clip nuts or cage nuts are not included as part of the accessory kit that comes with the chassis. You must obtain them yourself.

**Step 5** If you want to install one or both of the optional cable guide assemblies, position the cable guides so that the cable guide mounting holes are aligned with L bracket holes as shown in figure below.

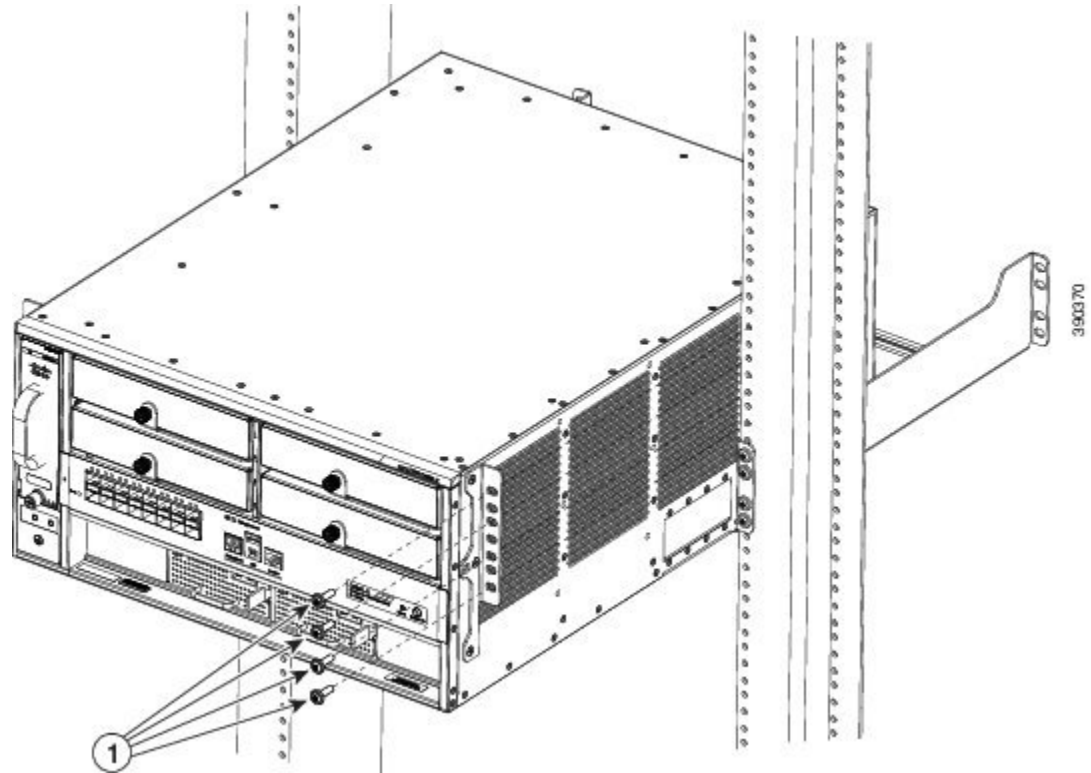
**Figure 31: Installing the Cable Mount Guides**



1	Cable guide
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- Step 6** Install all eight 10-32 or 12-24 screws (four on each side) through the cable guide mounting holes, rack-mount L bracket holes, rack post holes, and into the clip nuts to secure the cable guides and the chassis to the rack post. Tighten the screws securely.
- Step 7** Secure the chassis using four screws through the holes in the L bracket and into the rack post holes.

**Figure 32: Installing the Cable Mount Guides**



1	10-32 or 12-24 screws
---	-----------------------

### What to Do Next

After installing the chassis in its location, complete the installation process by following these procedures:

- Connecting the chassis to system ground. See [Establishing the System Ground](#), on page 60.
- Installing and connecting the power supplies to source power. For information on how to install and cable power supplies, see the [Installing Power Supplies](#), on page 69.
- Connecting to the switch console port. See [Connecting the Switch Console Port](#), on page 62.
- Connecting to the uplink ports. [Installing SFP and SFP+ Transceiver Modules](#), on page 63
- Powering-up the chassis and verifying the installation. See [Verifying Switch Chassis Installation](#), on page 65.

## Establishing the System Ground

This section describes how to connect a system ground to the switch.



### Caution

Installations that rely solely on system grounding using only an AC third-prong ground run a substantially greater risk of equipment problems and data corruption than those installations that use both the AC third-prong ground and a properly installed system ground.

The system ground provides additional grounding for EMI shielding requirements and grounding for the low voltage supplies (DC-DC converters) on the modules. You must observe the following system grounding guidelines for your chassis:

- You must install the system ground connection with any other rack or system power ground connections that you make. The system ground connection is required if FXS modules are installed or if this equipment is installed in a U.S. or European Central Office.
- You must connect both the system ground connection and the power supply ground connection to an earth ground. The system ground connection is required if FXS modules are installed or if this equipment is installed in a U.S. or European Central Office.
- When using DC-input power supplies, you must install the system (ground before you attach the source DC power cables to the DC PEM. Power down the chassis before attaching the system ground.



### Note

In all situations, grounding practices must comply with Section 250 of the National Electric Code (NEC) requirements or local laws and regulations. A 6 AWG grounding wire is preferred from the chassis to the rack ground or directly to the common bonding network (CBN). The equipment rack should also be connected to the CBN with 6 AWG grounding wire.



### Note

The system ground serves as the primary safety ground for chassis that are equipped with DC-input power supplies. The DC-input power supplies for these chassis do not have a separate ground.

## Required Tools and Equipment

To connect the system ground, you need the following tools and materials:

- Grounding lug—A two-hole standard barrel lug. Supports up to 6 AWG wire. Supplied as part of accessory kit.
- Grounding screws—Two M4 x 8 mm (metric) pan-head screws. Supplied as part of the accessory kit.
- Grounding wire—Not supplied as part of accessory kit. The grounding wire should be sized according to local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations. Commercially available 6 AWG wire is recommended. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- No. 1 Phillips screwdriver.

- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

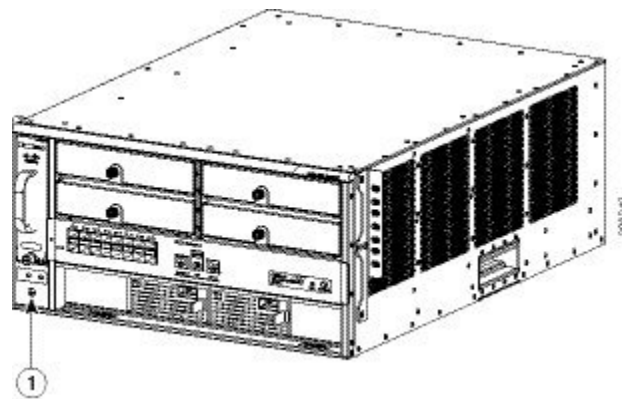
## Connecting the System Ground

To establish an earth ground for the chassis, you must attach a grounding cable from the chassis' grounding lug to the rack.

### Before You Begin

Review the following illustration and table.

**Figure 33: System Ground Location**



1	Location of system ground lug
---	-------------------------------

### Procedure

- Step 1** Use a wire-stripping tool to remove approximately 0.75 inch (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.
- Step 3** Crimp the grounding wire in the barrel of the grounding lug. Verify that the ground wire is securely attached to the ground lug.
- Step 4** Place the grounding wire lug against the grounding pad, making sure that there is solid metal-to-metal contact.
- Step 5** Secure the grounding lug to the chassis with two M4 screws. Ensure that the grounding lug and the grounding wire will not interfere with other switch hardware or rack equipment.
- Step 6** Prepare the other end of the grounding wire with a ring lug, and secure it to the rack with a screw.

## Installing the Power Supplies in the Switch Chassis

The chassis power supplies (AC or DC) might be shipped separately from the switch chassis. Remove the power supply from its shipping packaging, and then install and connect it to the site power by referring to [Installing Power Supplies](#), on page 69.



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**Note** AC-input and DC-input power supplies can be mixed in a chassis.

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## Installing the Port Card in the Switch Chassis

The modular port card is optional and might be shipped separately from the switch chassis. Remove the port card from its shipping packaging, and then install it, see the [Installing a Modular Port Card](#), on page 82 section.

## Connecting the Switch Console Port

This section describes how to connect to the supervisor engine console port from a terminal or modem. The console port on the supervisor engine allows you to perform the following functions:

- Configure the switch from the CLI.
- Monitor network statistics and errors.
- Configure SNMP agent parameters.
- Download software updates to the switch, or distribute software images residing in flash memory to attached devices.

The console port is located on the front panel of the chassis.

The accessory kit that shipped with your switch might contain the necessary cable and adapters (depending on if you ordered them) to connect a terminal or modem to the console port. To connect a terminal to the console port using the cable and adapters provided, follow these steps:

### Procedure

---

- Step 1** Connect to the port using the RJ-45-to-RJ-45 cable and RJ-45-to-DB-25 DTE adapter or RJ-45-to-DB-9 DTE adapter (labeled "Terminal").
- Step 2** Position the cable in the cable guide (if installed). Make sure there are no sharp bends in the cable.
- Step 3** Check the terminal documentation to determine the baud rate. The baud rate of the terminal must match the default baud rate (9600 baud) of the console port. Set up the terminal as follows:
  - 9600 baud
  - 8 data bits
  - No parity

- 1 stop bits
- 

## Connecting the Uplink Ports

### SFP and SFP+ Transceiver Modules

The SFP and SFP+ transceiver modules provide copper or fiber-optic connections to other devices. These transceiver modules are field-replaceable and provide the uplink interfaces when installed in an SFP module slot. The SFP modules have LC connectors for fiber-optic connections or RJ-45 connectors for copper connections.

For Cisco SFP and SFP+ transceiver modules documentation, including compatibility matrixes, refer to this URL: [http://www.cisco.com/en/US/products/hw/modules/ps5455/products\\_device\\_support\\_tables\\_list.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html)

### Installing SFP and SFP+ Transceiver Modules

#### Before You Begin

For cable specifications, see Appendix B, “Connector and Cable Specifications.”

Observe these precautions:



#### Warning

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Class 1 laser product. Statement 1008

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- Do not remove the dust plugs from the SFP transceiver modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP transceiver module can shorten its useful life. Do not remove and insert any SFP transceiver module more often than is necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.



#### Note

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For installing SFP or SFP+ modules from the modular port card, see the [Installing SFP and SFP+ Transceiver Modules in the Port Card, on page 84](#) section.

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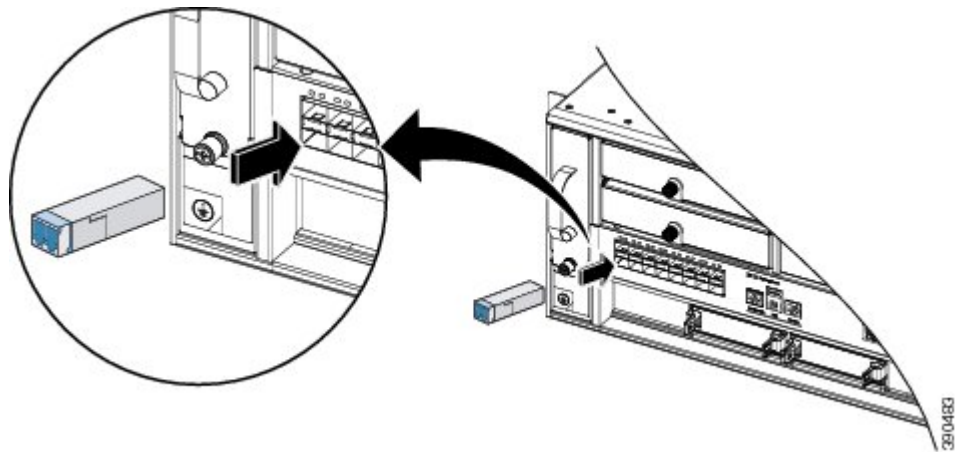
#### Procedure

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- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
- Step 2** Find the send (Tx) and receive (Rx) markings that identify the top of the SFP module. On some SFP transceiver modules, the send and receive (Tx and Rx) markings might be shown by arrows that show the direction of the connection.

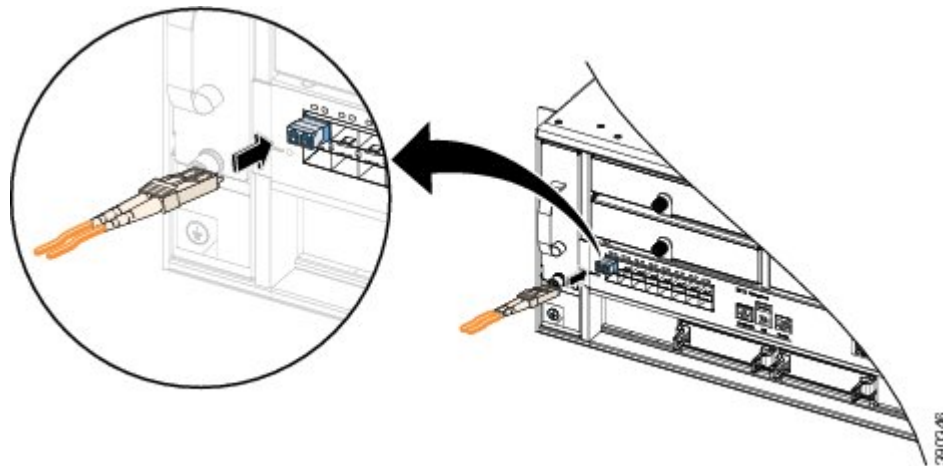
- Step 3** If the SFP transceiver module has a bale-clasp latch, move it to the open, unlocked position.
- Step 4** Align the module in front of the slot opening, and push until you feel the connector snap into place.

**Figure 34: Installing an SFP Module in the SFP Transceiver Module Port**



- Step 5** If the module has a bale-clasp latch, close it to lock the SFP transceiver module in place.
- Note** If you are inserting the SFP transceiver module in the lower ports, you need to invert the module.
- Step 6** Remove the SFP dust plugs and save.
- Step 7** Connect the SFP cables.

**Figure 35: Port with SFP Transceiver Modules Installed**





## Removing SFP or SFP+ Transceiver Modules



**Note** For removing SFP or SFP+ modules from the modular port card, see the [Removing SFP or SFP+ Modules from the Modular Port Card](#), on page 86 section.

### Procedure

- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
- Step 2** Disconnect the cable from the SFP transceiver module. For reattachment, note which cable connector plug is send (Tx) and which is receive (Rx).
- Step 3** Insert a dust plug into the optical ports of the SFP transceiver module to keep the optical interfaces clean.
- Step 4** If the module has a bale-clasp latch, pull the bale out and down to eject the module. If you cannot use your finger to open the latch, use a small, flat-blade screwdriver or other long, narrow instrument to open it.
- Step 5** Grasp the SFP transceiver module, and carefully remove it from the slot.
- Step 6** Place the SFP transceiver module in an antistatic bag or other protective environment.

## Verifying Switch Chassis Installation

### Procedure

- Step 1** Verify that all empty module slots have blank faceplates installed and that the screws holding the plates in place are tight. The blank faceplates optimize the air flow through the chassis and contain electromagnetic interference.
  - Warning** Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029
- Step 2** Ensure that the unused power supply unit has a metal cover plate installed.
- Step 3** Turn on the power supply switches to power up the system. During the power-up sequence, the system performs a series of bootup diagnostic tests.

Additional system diagnostic tests are available. These tests allow you to perform a complete sanity check on the system prior to inserting the system into your network and to monitor the health of the system while the system is running. Refer to the “Online Diagnostics” section on page 3-19 for further information.

**Tip** When prestaging systems in a nonproduction environment, we recommend that you run all diagnostic tests, including the disruptive tests, to prescreen the systems for any failures.

## Online Diagnostics

The switch running Cisco IOS has many levels of online diagnostic capabilities. The online diagnostics are divided into four categories:

- **Bootup**—Bootup diagnostics automatically run during bootup, module OIR, or switchover to a backup supervisor engine.
- **Background health**—Monitoring diagnostic tests are continuously run by the system to monitor system health.
- **On-demand online diagnostics**—On-demand online diagnostics can be used to run any test from the CLI. You can also run on-demand online diagnostics to perform a sanity check on the system hardware. Some of these tests are disruptive and will impact traffic flow. You must follow the on-demand diagnostic guidelines exactly to avoid false failures.
- **Scheduled diagnostics**—Scheduled diagnostics can be used to run any of the above tests at user-designated intervals.

For complete information on the online diagnostic tests and how to run them, refer to the software configuration guide.



## CHAPTER

# 4

# Installing and Removing Power Supplies

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- [Power Supply Overview, page 67](#)
- [Installing Power Supplies, page 69](#)
- [Removing Power Supplies, page 75](#)
- [Finding the Serial Number, page 77](#)

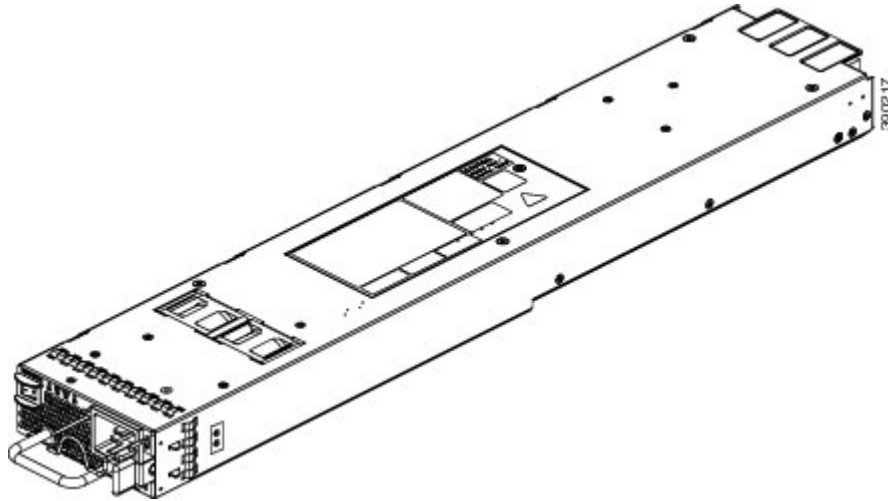
## Power Supply Overview

You can install two types of power supplies in the chassis:

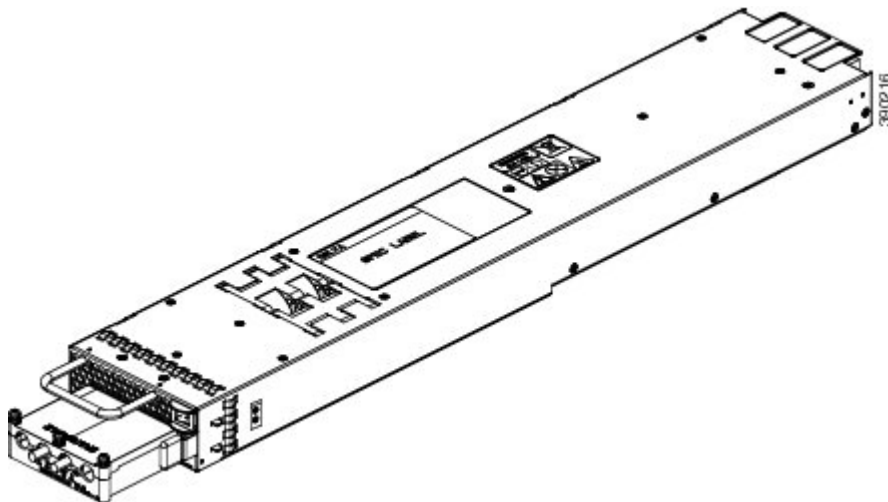
- C6880-X-3KW-AC-Input power supply

- C6880-X-3KW-DC-Input power supply

**Figure 36: C6880-X-3KW-AC-Input Power Supply**



**Figure 37: C6880-X-3KW-DC-Input Power Supply**



The switch chassis has two slots in which you can install power supplies using any of the following combinations:

- Two AC-input power supplies
- Two DC-input power supplies
- One AC-input power supply and one DC-input power supply
- One AC-input power supply (leaving the blank cover on the other slot)
- One DC-input power supply (leaving the blank cover on the other slot)

**Note**

If you leave any power supply slots empty, you must ensure that the blank cover (C6800-PS-CV) is installed in that slot to maintain the designed airflow.

This table lists the power supply models.

Part Number	Description
C6880-X-3KW-AC	3000-W AC Power Supply
C6880-X-3KW-DC	3000-W DC Power Supply
C6800-PS-CVR	Blank cover

The power supplies can work together in either of the two modes:

- **Redundant Mode**—Each power supply operates at approximately 50 percent of its capacity, no greater than 60 percent and no less than 40 percent. If one power supply fails, the other power supply can provide power for the entire system on its own. This is the default and recommended mode for production.
- **Combined Mode**—Each power supply provides approximately 83 percent of its capacity, providing a combined capacity of approximately 167 percent. If one power supply fails, the other power supply might not be able to provide power for the entire system. This is not the recommended mode for operation.

## Installing Power Supplies

You follow the same steps to install the AC-input and DC-input power supplies, but you must ground them differently.

### Before You Begin

- The switch chassis must be installed in a cabinet or rack that is secured to the data center.
- Remove the power supply from its shipping container and remove any packaging.
- You need the following additional tools and equipment:
  - Nut driver attachment for number 1 Phillips-head screwdriver or ratchet wrench with torque capability (used only for DC-input power supplies).
  - Crimping tool.
  - For the DC-input power supply, you need four power cables sized to reach the DC power source or power interface unit (PIU).
  - Grounding wire — Size this wire to meet local and national installation requirements. For U.S. installations, you must use a 6 AWG copper conductor. For installations outside the U.S., consult your local and national electrical codes. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.

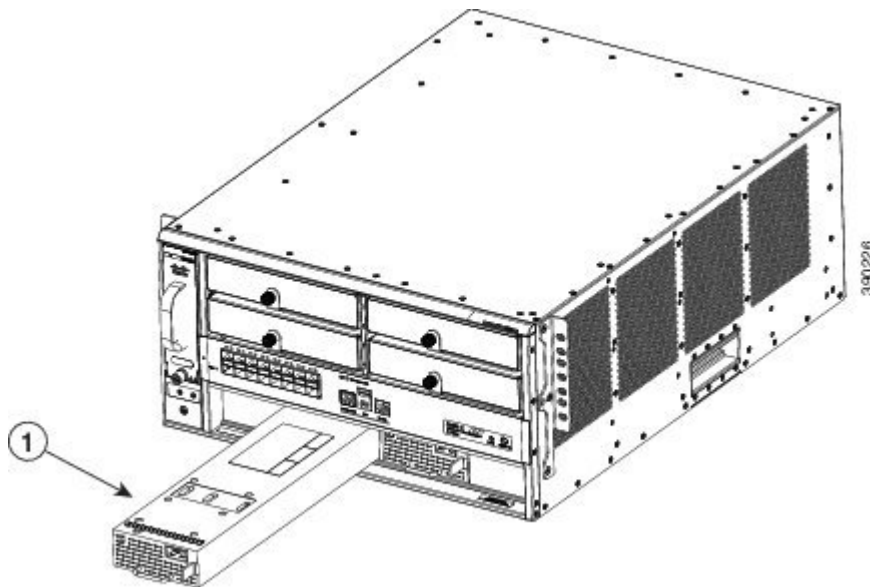
## Inserting the Power Supply

To insert the power supply into the chassis, follow these steps:

### Procedure

- Step 1** Unscrew the screws that secure the blank cover on the slot in which you want to install the power supply.
- Step 2** Remove the blank cover and store it for future use.
- Step 3** Verify that the power switch on the front of the new power supply is set to standby (labelled as 0) and that the power supply is not connected to any power sources.
- Step 4** Hold the handle on the power supply with one hand, place your other hand under the power supply to support its weight, and position the power supply with its back end at the open power supply bay. See the figure for an example (AC power supply is shown as an example, DC power supply can be installed in the same way).
- Step 5** Slide the unit all the way into the power supply bay until the release latch on the front of the power supply clicks and prevents you from moving the power supply in or out of the chassis.

**Figure 38: Installing the Power Supply**



1	AC power supply
---	-----------------

## Connecting to the Power Source

You follow the same steps to install the AC-input and DC-input power supplies, but you must ground them differently.

- AC-input power supply—It is automatically grounded when you connect its power cable to the power supply and the power source.
- DC-input power supply—You do not connect the power supply directly to the earth ground.

You use one power cord for each power supply to connect the power supply to its power source.

The number of power sources you use for your power supplies depends on the mode with which you install them:

- Combined mode (no power redundancy)—Connect both power supplies to the same power source.
- Redundancy mode—Connect each power supply to a separate power source.

### Before You Begin

Before you connect power supplies to power sources, ensure the following:

- The chassis is connected to an earth ground. See [Establishing the System Ground](#), on page 60.
- You have receptacles for the power sources within reach of the power supply cables.
- If you are connecting to a DC power, check that you are using 6-AWG power cables to connect to the power supply. The 6-AWG wire size applies to the negative [-], and positive [+] cables that connect to negative and positive slots of the terminal box respectively. You have to procure the power cable.
- If you are installing more than one DC-input power supply, each must be protected by a dedicated circuit breaker or a fuse that is sized according to the power supply input rating and the local or national electrical code requirements.
- The power sources are rated as follows:
  - For North American AC-input installations—20 A with 110 V or 220 V circuits.
  - For North American DC-input installations—(-48 VDC nominal at 37 A in North America (operating range: -40.5 to -56 VDC).
  - For international installations—Size the circuits by local and national standards.
- The power supply is already inserted into the chassis.

**Caution**

Ensure that the power source is OFF. As an added precaution, place the appropriate safety flag and lockout devices at the source power circuit breaker, or place a piece of adhesive tape over the circuit breaker handle to prevent accidental power restoration while you are working on the circuit.

**Warning**

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

## Connecting to an AC Power Source

To connect to a power source, follow these steps:

**Warning**

Take care when connecting units to the supply circuit so that wiring is not overloaded. **Statement 1018**

### Procedure

- Step 1** Ensure that the power supply switch located on the front of the power supply is set at standby (labeled as 0).
- Step 2** Plug the power cable into the power supply. Pull down the retention clip over the plug on the power cable.
- Step 3** Plug the other end of the power cable into an power source supplied by the data center.
- Note** When using redundant mode, connect each power supply to a separate power source.
- Step 4** Turn the power switch from standby to on (from 0 to 1 as labeled on the power switch).
- Step 5** Verify that the power supply is receiving power and outputting DC power by checking that the INPUT and OUTPUT power supply LEDs are on and the FAULT LED is not on or flashing. For an explanation of all the power supply LEDs and the conditions that they indicate, see [AC-Input Power Supply LEDs](#).
- Tip** When you first activate the power supply, you can verify the functionality of the LEDs by checking that each LED turns on for a couple of seconds. If the Fault LED is flashing red, turn the power switch to standby (labeled as 0), check the AC power connections on the power supply and the AC power source, and then turn the power switch back on (labeled as 1). The Input and Output LEDs for the connected power supplies should be green and the Fault LED should be off.

## Connecting to a DC Power Source

To connect the DC power supply directly to one or two DC power sources, follow these steps:

**Warning**

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

**Warning**

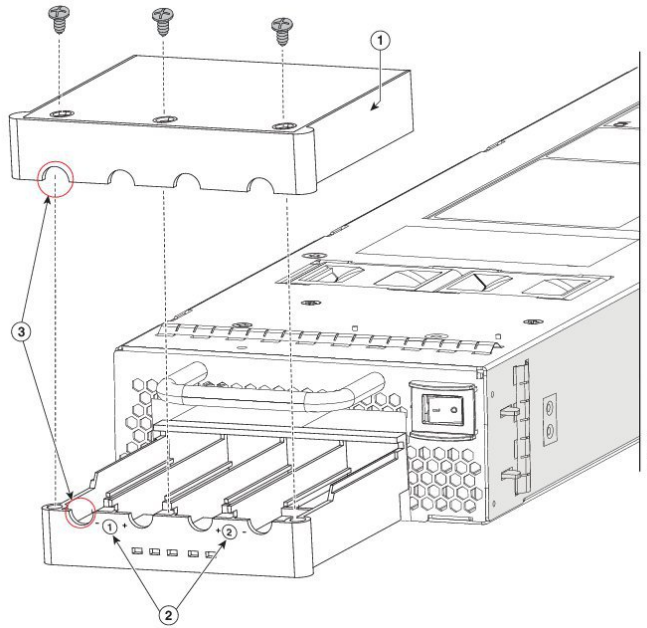
Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. **Statement 1075.**



**Procedure**

- Step 1** Ensure that the power supply switch located on the front of the power supply is set at standby (labeled as 0).
- Step 2** Turn off the power at the circuit breakers for the portions of the DC grid power that you are connecting to and verify that all of the LEDs on the power supplies are off.
- Step 3** Size the 6-AWG power cables to the distance between the power supply and the DC power grid. If you need to cut the cable, cut it at the end that connects to the DC power grid, remove 0.75 inch (19 mm) of insulation from the cut ends, and attach them to the DC power system. Be sure to connect the negative cables to negative lines and positive cables to positive lines.
  - Note** For all your power connections, if you are using cables with two different colors, use one color cable for all positive circuits and the other color for all negative circuits.
- Step 4** Remove the three screws that hold down the safety cover for the terminal box on the front of the DC power supply and remove the cover.
  - Note** The terminal box has four slots for four power terminals (ordered as negative [-], positive [+], positive [+], and negative [-]). Each terminal has two nuts that you use to fasten a power cable to the terminal.

**Figure 39: Safety Cover of the Terminal Box**

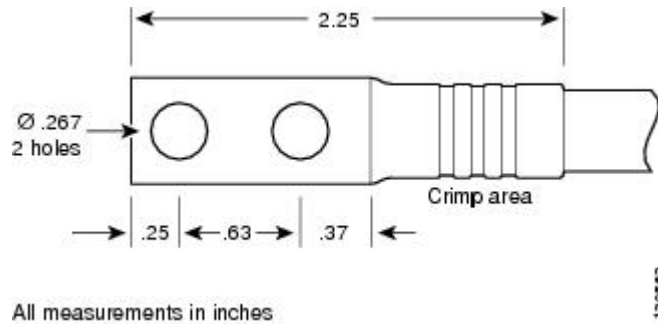


1	Safety Cover	3	Opening for the 6-AWG power cable. <b>Note</b> The diameter of the 6-AWG cable (wire + insulation + heat-shrink tubing) should be less than 10mm.
2	Terminal slots showing cable installation order (negative [-], positive [+], positive [+], and negative [-])		

**Step 5** Install four cables (two positive and two negative cables) in the four terminal slots as follows:

- a) Unscrew the two nuts in each of the four terminal slots.
- b) Attach and crimp each lug to the end of each power cable.

**Figure 40: Crimping the Cable Lug**



- c) Attach each cable lug to the two terminal posts in each slot, fasten with two nuts, and tighten to 40 in-lb (4.5 N·m).

**Note** For all your power connections, if you are using cables with two different colors, use one color cable for all positive circuits and the other color for all negative circuits.

- d) Replace the safety cover on the terminal box and fasten with three screws.

**Figure 41: Connecting Cables to the Terminal Slots**



1	The two nuts in each terminal slot	3	The two cables for the positive circuits
2	Crimped lug attached to the end of the power cable	4	The two cables for the negative circuits

**Step 6** Install the four cables from the DC power supply to a DC power sources as follows:

- a) If the unconnected end of each power cable is not stripped of its insulation for the last 0.75 inches (19 mm), use wire strippers to remove that amount of insulation.
- b) Attach the negative cables to the negative terminals of a DC power source, and attach the positive cables to the positive terminals of the same power source.

**Note** If you are using combined power mode or power supply redundancy mode, connect all the power supplies in the chassis to the same power source. If you are using input source redundancy mode or full redundancy mode, connect half the power supplies to one DC power source and the other half of the power supplies to another DC power source.

**Step 7** For the powered down circuits connected to the power supplies, turn on the power at the circuit breaker. The Input 1 (IN1) and Input 2 (IN2) LEDs turn on each connected power supply.

**Step 8** Turn the power switch on the connected DC power supplies from standby to on (from 0 to 1 as labelled on the power switch for each power supply). The LEDs should flash and then the Output LED should turn on in addition to the Input LEDs. If the FAULT LED is on or flashing, call Cisco TAC for assistance.

## Removing Power Supplies

### Procedure

**Step 1** Turn off the power to the power supply that you are removing, as follows:

- a) Ensure that the power switch on the front of the power supply is set to standby (labeled as 0).
- b) Verify that the OUTPUT LED has turned off. If the LED is still on, return to Step 1.
- c) If you are removing a DC-input power supply, ensure that the power is turned off at the power source by turning off the power for that circuit, and then verify that the INPUT LEDs turn off.

**Step 2** Detach the power and ground cables, as follows:

- For the AC-input power supply, unplug the power cables that are attached to the power supply and the power source.
- For the DC-input power supply, open the terminal box, and use a Phillips screwdriver to remove the power cables from their terminals. Replace the terminal box cover and then remove the power cables from the power source.

**Step 3** Remove the power supply from the chassis, as follows:

- a) Press the ejector latch on the left of the power supply.
- b) Pull the power supply partially out of the slot by its handle.

- c) Place your other hand under the unit to support its weight.
- d) Pull the power supply fully from the slot.

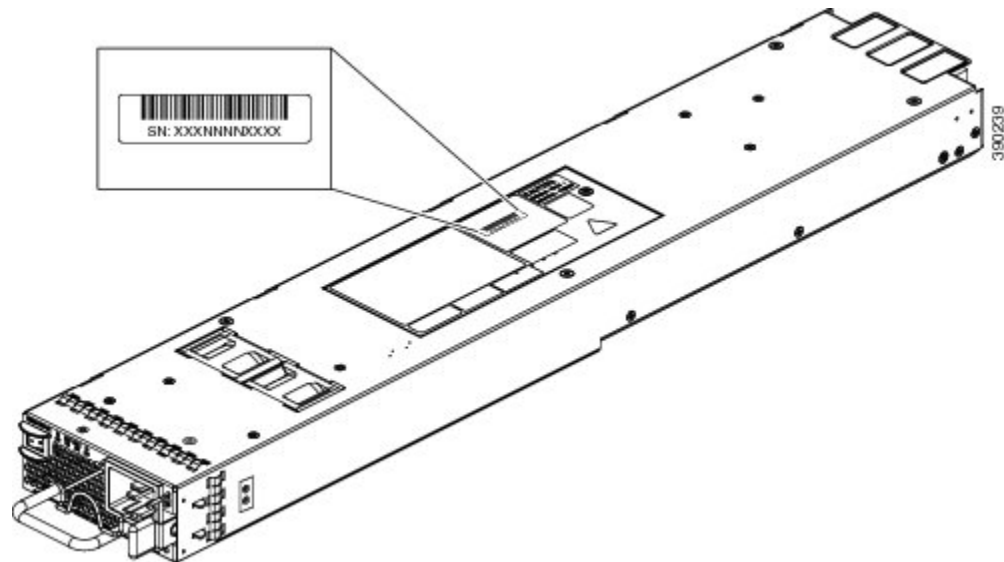
**Caution** If you intend to operate the switch without installing another power supply in the empty slot, then you must reinstall the blank cover over the empty power supply slot to ensure proper air flow in the system and for safety reasons.

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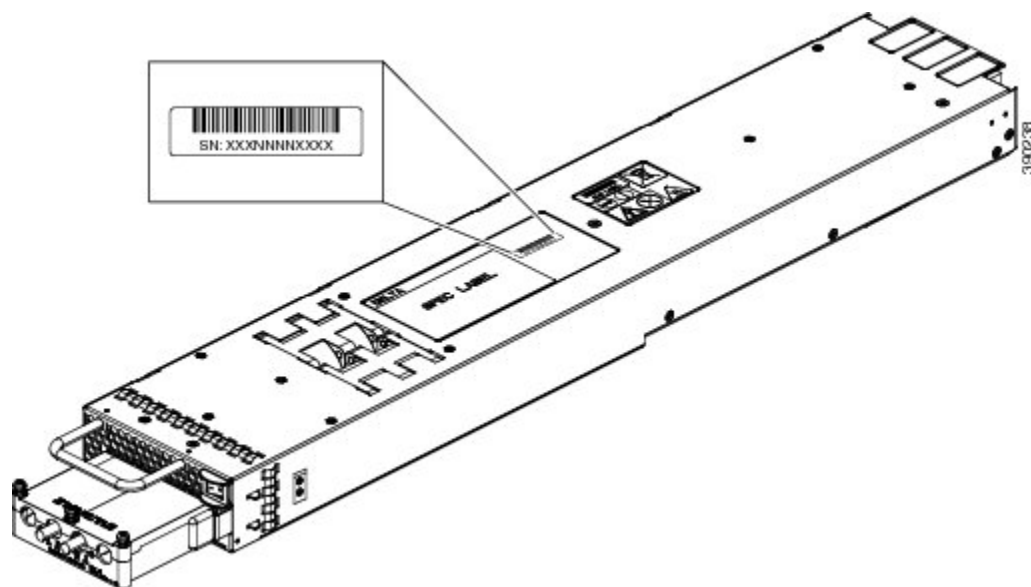
## Finding the Serial Number

If you contact Cisco Technical Assistance, you need to know the serial number. These figures show where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number.

*Figure 42: Serial Number on the AC Power Supply*



*Figure 43: Serial Number on the DC Power Supply*







## Installing the Modular Port Card

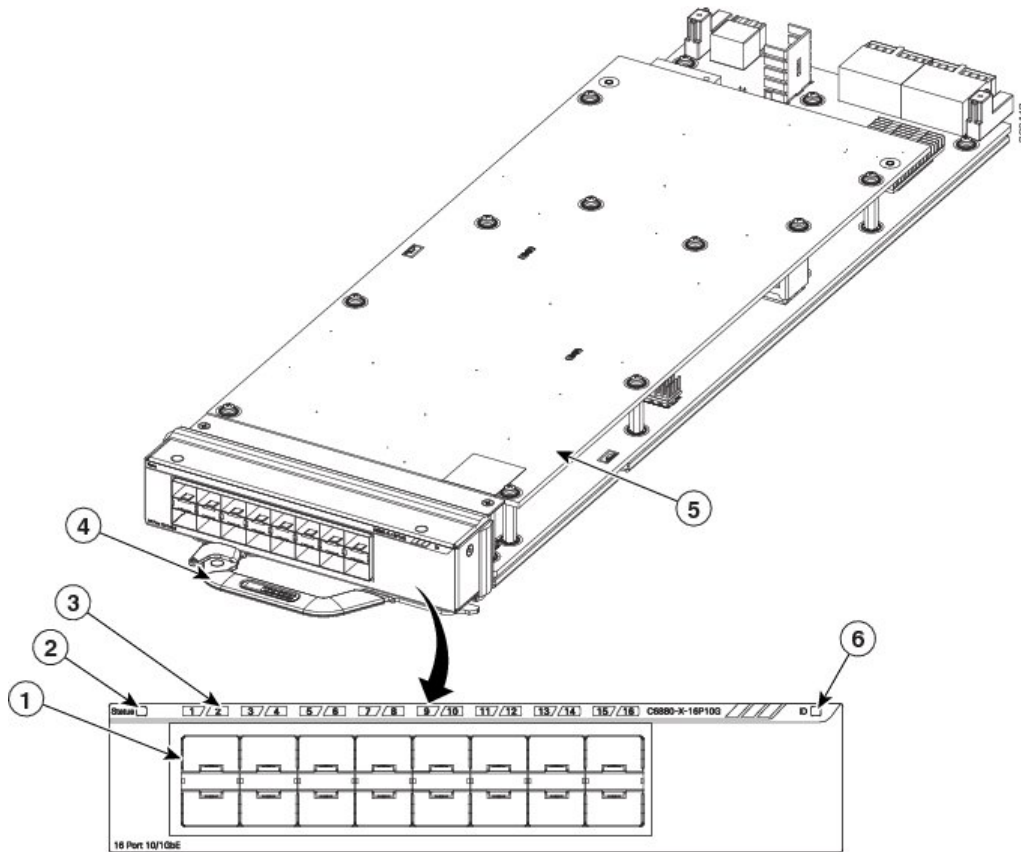
- [Port Card Overview](#), page 79
- [Modular Port Card LEDs](#), page 80
- [Modular Port Card Installation](#), page 81
- [Installing a Modular Port Card](#), page 82
- [Installing SFP and SFP+ Transceiver Modules in the Port Card](#), page 84
- [Removing SFP or SFP+ Modules from the Modular Port Card](#), page 86
- [Removing a Modular Port Card](#), page 88
- [Finding the Modular Port Card Serial Number](#), page 90

### Port Card Overview

Each chassis supports up to four hot-swappable modular port cards that provide uplink ports to connect to other devices. The chassis should only be operated with either a modular port card installed or a blank module installed in the half-modular slots.

Port Card Model	Description
C6880-X-LE-16P10G	Multirate port card with standard tables. This module has 16 10-Gigabit, 1-Gigabit, or 100BASE-FX fiber-optic slots, which support 1-Gigabit SFPs, 10-Gigabit SFP+, or 100BASE-FX fiber-optic modules.
C6880-X-16P10G	Multirate port card with XL tables. This module has 16 10-Gigabit, 1-Gigabit, or 100BASE-FX fiber-optic slots, which support 1-Gigabit SFPs, 10-Gigabit SFP+, or 100BASE-FX fiber-optic modules.
C6880-X-CVR-E	Blank module.

Figure 44: Modular Port Card (C6880-X-LE-16P10G and C6880-X-16P10G)



1	16 SFP+ or 100BASE-FX SFP ports	4	Extraction handle
2	Status LED	5	Port card
3	Port LEDs	6	ID (blue beacon LED)

For a list of supported SFP and SFP+ modules, see the switch data sheet: [http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data\\_sheet\\_c78-728228.html](http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-6880-x-switch/data_sheet_c78-728228.html).

## Modular Port Card LEDs

For information on the modular port card LEDs, see these sections :

- [SFP+ Port LEDs, on page 10](#)
- [Status LED on the Modular Port Card, on page 9](#)
- [ID LED on the Modular Port Card, on page 10](#)



# Modular Port Card Installation

Use only supported modular port cards and SFP or SFP+ modules.

**Note**

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The switch can operate without a port card, but a blank port card module (with no ports or SFP slots) is available and must be installed when the port card module is not installed.

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**Caution**

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When installing the port cards, observe these precautions:

- Do not remove the dust plugs from the fiber-optic SFP or SFP+ modules or the rubber caps from the fiber-optic cable until you connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
  - To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.
-

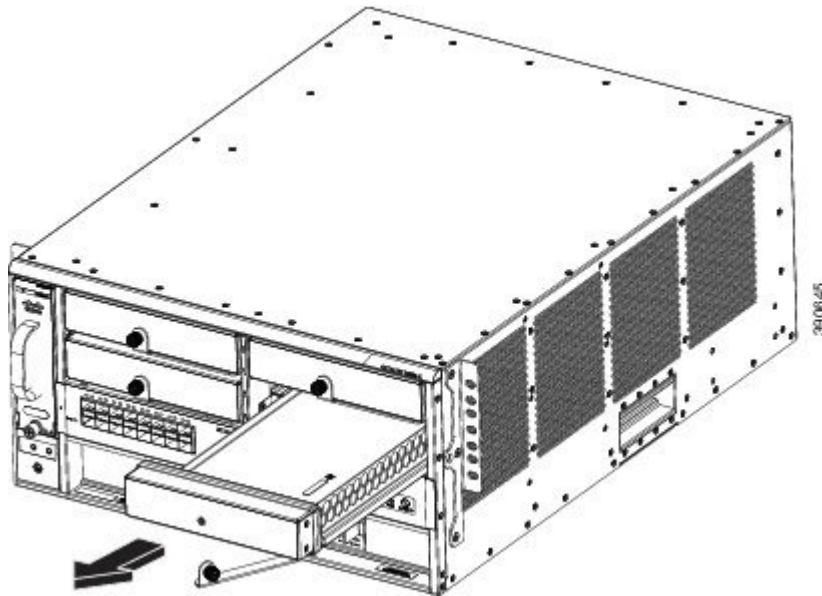
# Installing a Modular Port Card

## Procedure

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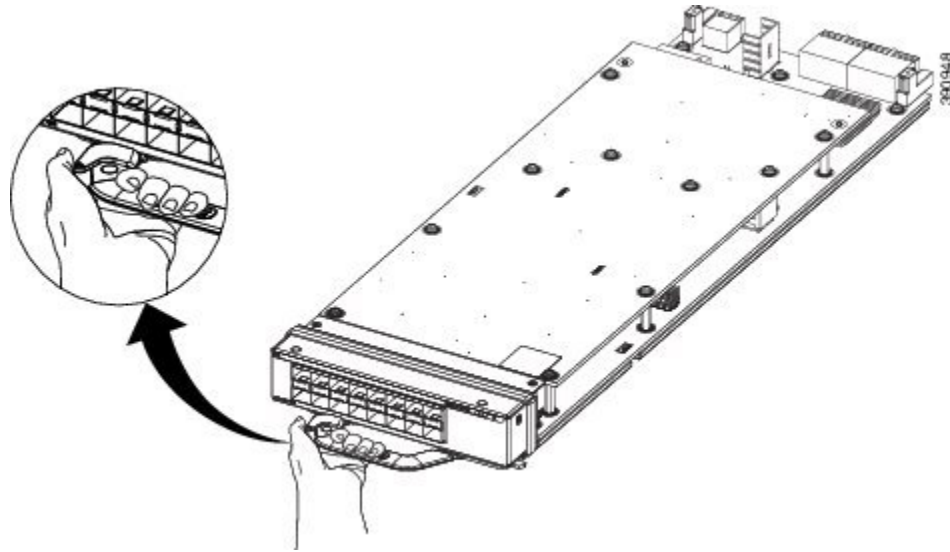
- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
- Step 2** Loosen the screw counter-clockwise on the blank module, and pull out the blank module from the chassis.

*Figure 45: Removing the Blank Module*



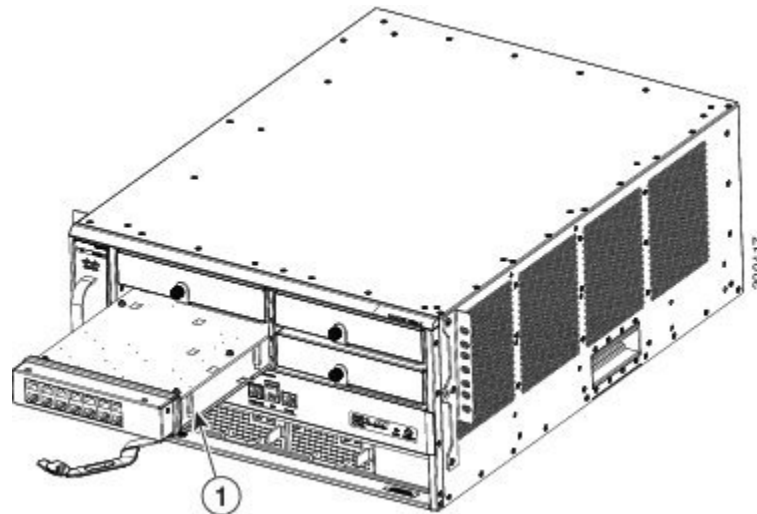
- Step 3** Remove the modular port card from the protective packing.
- Step 4** Press the lever on the extraction handle to release the latch, and rotate the handle outwards.

**Figure 46: Pressing the Lever on the Port Card**



- Step 5** Insert the port card into the chassis. Slide the port card into the slot until the back of the port card faceplate is flush with the chassis faceplate.

**Figure 47: Installing the Modular Port Card**



- Step 6** Close the latch on the extraction handle by pressing the lever until you hear a click, and it latches.

# Installing SFP and SFP+ Transceiver Modules in the Port Card

## Before You Begin

You must have the port card installed to use SFP and SFP+ transceiver modules.



### Warning

Class 1 laser product. Statement 1008

Observe these precautions:

- Do not remove the dust plugs from the SFP or SFP+ transceiver modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP or SFP+ transceiver module can shorten its useful life. Do not remove and insert any SFP or SFP+ transceiver module more often than is necessary.



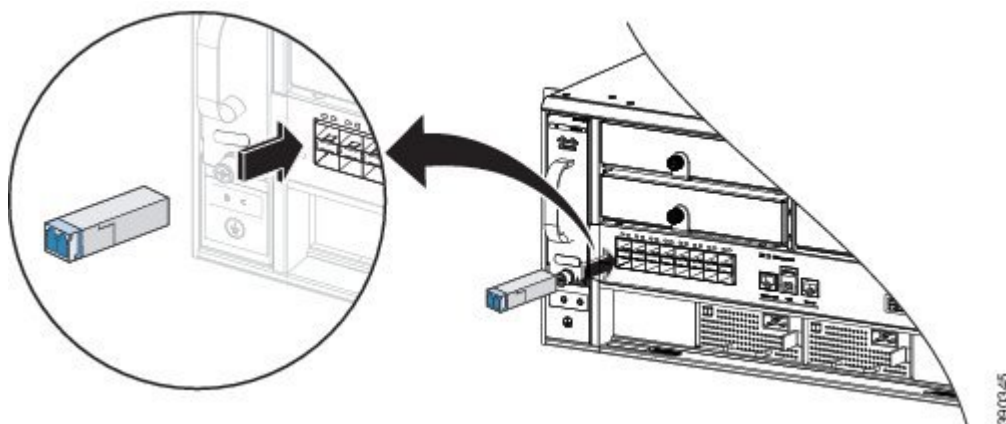
### Caution

To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.

## Procedure

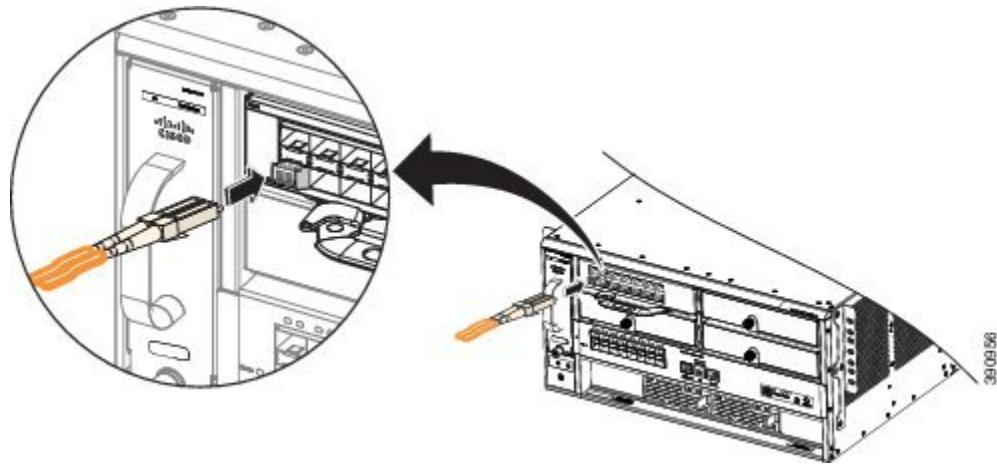
- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
- Step 2** Find the send (Tx) and receive (Rx) markings that identify the top of the SFP or SFP+ module. On some SFP transceiver modules, the send and receive (Tx and Rx) markings might be represented by arrows that show the direction of the connection.
- Step 3** If the SFP or SFP+ transceiver module has a bale-clasp latch, move it to the open, unlocked position.
- Step 4** Align the module in front of the slot opening, and push until you feel the connector snap into place.

**Figure 48: Installing an SFP Module**



- Step 5** If the module has a bale-clasp latch, close it to lock the SFP transceiver module in place.
- Note** If you are inserting the SFP transceiver module in the lower ports, you need to invert the module as shown above.
- Step 6** Remove the SFP or SFP+ dust plugs and save for future use.
- Step 7** Connect the SFP cables.

**Figure 49: Connecting the SFP Cable**

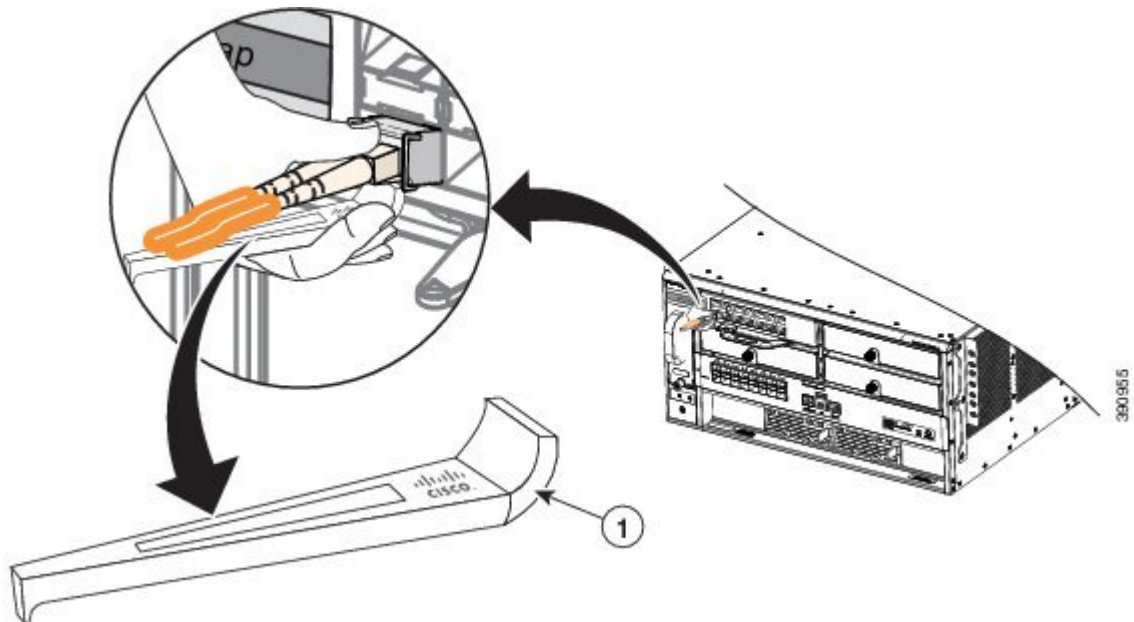


# Removing SFP or SFP+ Modules from the Modular Port Card

## Procedure

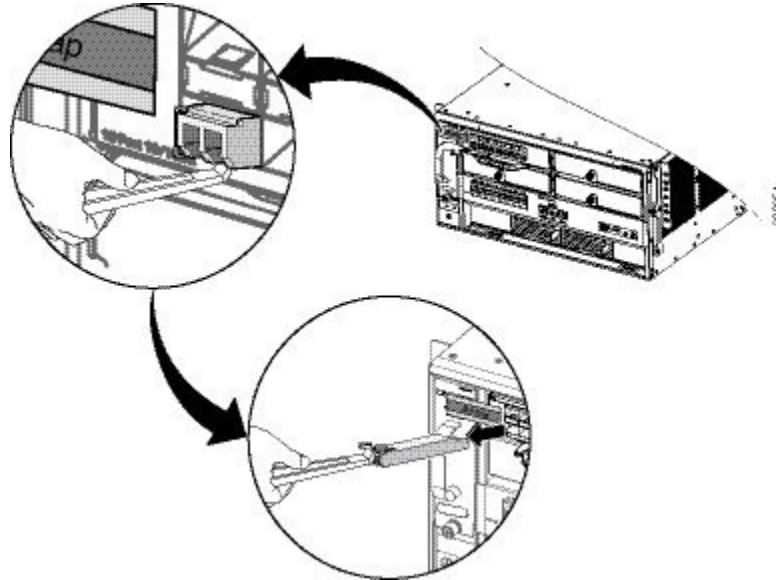
- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
- Step 2** If the module has a bale-clasp latch, use the SFP removal tool. Use the optical cable release side of the tool and apply pressure to release the cable latch, and disconnect the cable from the SFP transceiver module.

*Figure 50: Removing the Cable from the SFP Module*



- Step 3** Use the bale-release latch side of the tool to lift the bale up, and remove the SFP or SFP+ module.

**Figure 51: Removing the SFP Module from the Port Card**



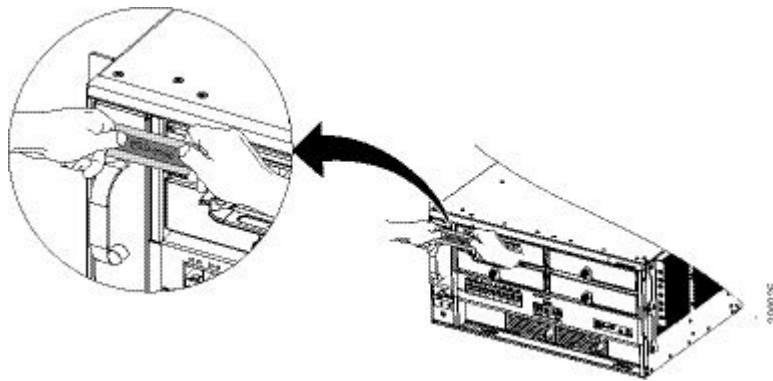
- Step 4** Grasp the SFP or SFP+ transceiver module, and carefully remove it from the slot.
- Step 5** Place the SFP or SFP+ transceiver module in an antistatic bag or other protective environment.
-

# Removing a Modular Port Card

## Procedure

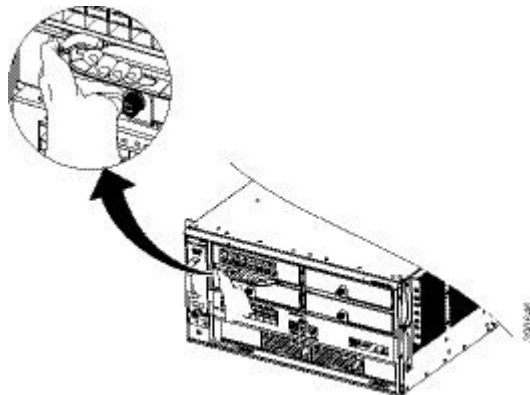
- Step 1** Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.

*Figure 52: Attaching an ESD Strap*



- Step 2** Always remove any cables before removing the port card from the slot. Disconnect the cables from the SFP+ transceiver modules.
- Step 3** (Optional) Remove the SFP+ transceiver modules from the port card.
- Step 4** Press on the extraction handle to release the latch and rotate the handle outwards to extract the card.

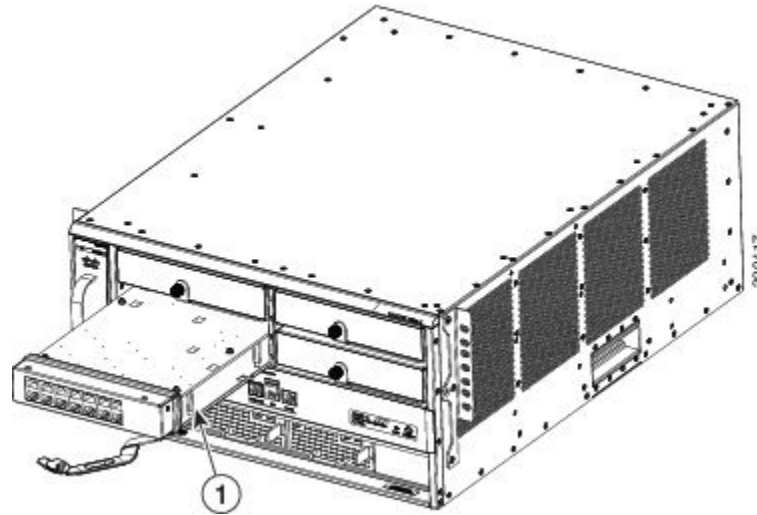
*Figure 53: Releasing the Latch*





**Step 5** Grasp the port card, and carefully slide it out of the slot. You can use the other hand too.

**Figure 54: Removing the Port Card**



**Step 6** Install a replacement port card or a blank module in the slot.

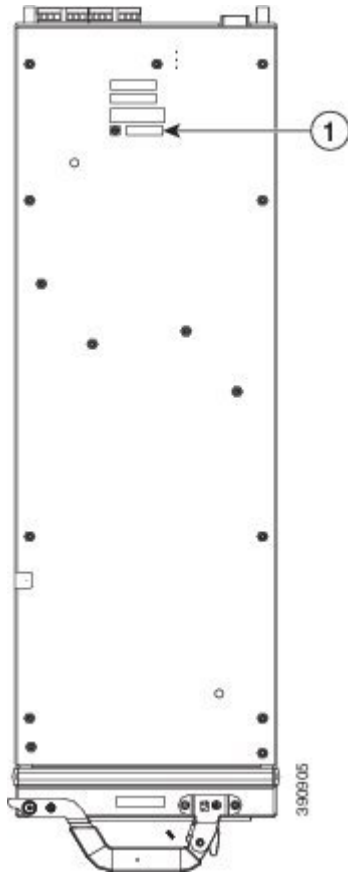
**Step 7** Place the port card that you removed in an antistatic bag or other protective environment.

**Note** You can close the latch so it locks, and use the handle to carry the port card module.

## Finding the Modular Port Card Serial Number

If you contact Cisco Technical Assistance, you need to know the port card serial number. This figure shows where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number.

**Figure 55: Serial Number on the Modular Port Card**





## Replacing the Fan Tray

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- [Required Tools, page 91](#)
- [Removing the Fan Tray, page 91](#)
- [Installing the Fan Tray, page 93](#)
- [Checking the Installation, page 93](#)
- [Finding the Fan Serial Number, page 94](#)

### Required Tools

You might need a flat-blade or number 2 Phillips-head screwdriver to loosen or tighten the captive installation screws on the fan tray.

### Removing the Fan Tray

The fan tray is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system.



**Note**

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You have 120 seconds to remove and insert of the fan-tray, under specified ambient operating temperatures.

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**Warning**

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The fans might still be turning when you remove the fan from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan's housing. **Statement 263**

---

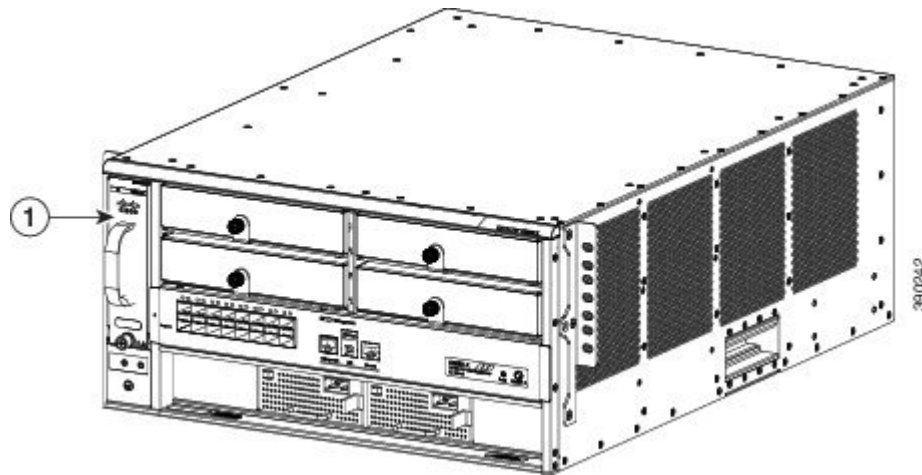
#### Procedure

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- Step 1** Locate the fan tray as shown in the figure.

**Note** Make sure there is adequate slack in the network interface cables to allow the cable guide to pivot down far enough to access the fan tray. If there is insufficient slack in the cables, the cable guide will not pivot far enough to give you access to the fan trays.

**Figure 56: Fan Tray Location**



1	Location of fan tray
---	----------------------

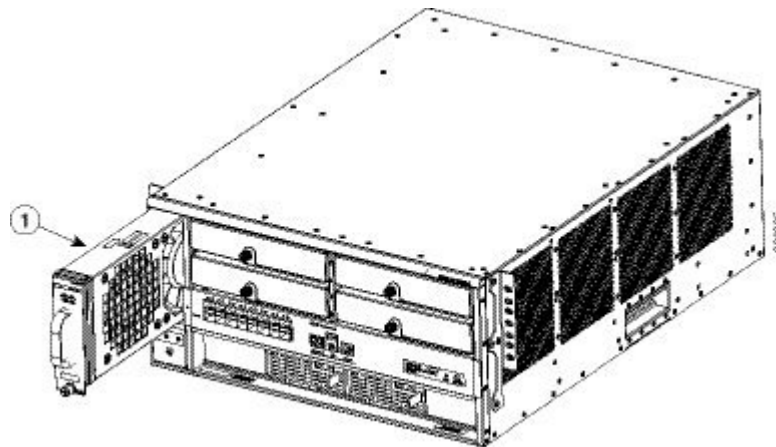
**Step 2** Loosen the fan tray captive installation screw by turning it counterclockwise.

**Step 3** Grasp the fan tray, and pull it outward; gently move side to side, if necessary, to unseat the fan tray power connector from the backplane.

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

**Step 4** Pull the fan tray clear of the chassis, and set it aside.

**Figure 57: Removing the Fan Tray**



# Installing the Fan Tray

## Procedure

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- Step 1** Position the fan tray with the captive installation screws in front of the fan tray cavity.
  - Step 2** Place the fan tray into the chassis cavity so that it rests on the chassis, and then lift the fan tray up slightly, aligning the top and bottom chassis guides.
  - Step 3** Push the fan tray into the chassis until the power connector seats in the backplane and the captive installation screw make contact with the chassis.
  - Step 4** Tighten the captive installation screws.
- 

## Related Topics

[Cooling with the Fan Tray](#) , on page 20

# Checking the Installation

## Procedure

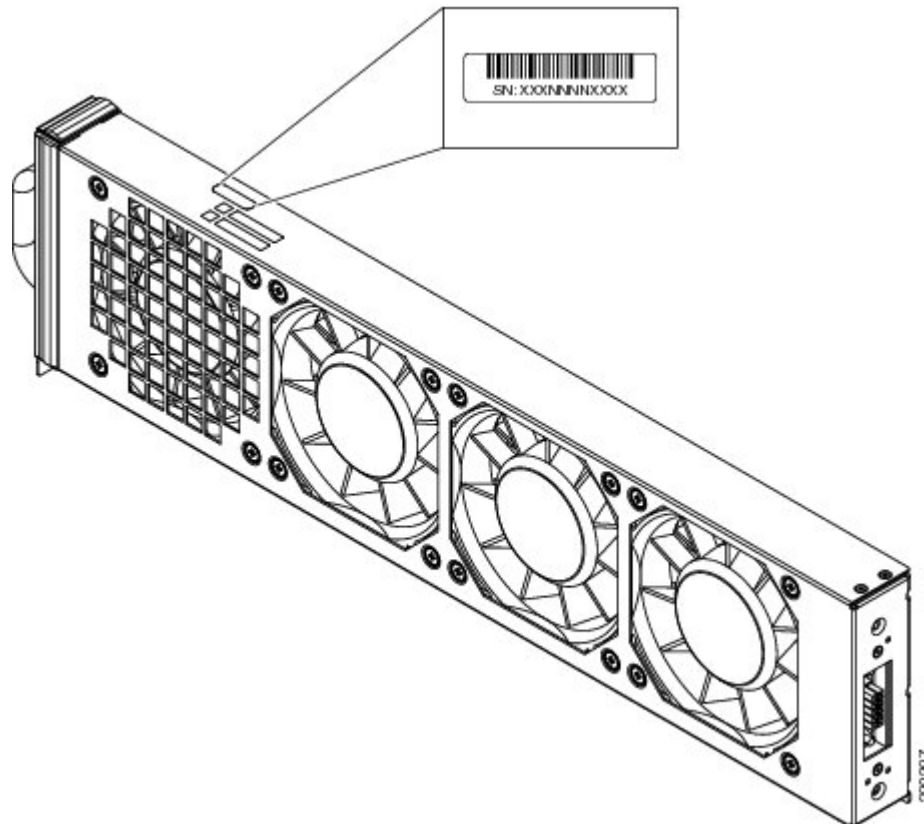
---

- Step 1** Listen for the fans; you should immediately hear them operating. If you do not hear them, ensure that the fan tray is inserted completely in the chassis and that the faceplate is flush with the switch back panel.
  - Step 2** Verify that the FAN STATUS LED is green. If the LED is red, one or more of the fans are faulty. If after several attempts the fans do not operate or if you experience trouble with the installation (for instance, if the captive installation screws do not align with the chassis holes), contact a Cisco customer service representative for assistance.
-

## Finding the Fan Serial Number

If you contact Cisco Technical Assistance, you need to know the fan serial number. This figure shows where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number. For more information, refer to [Fan Tray LED](#)

*Figure 58: Serial Number on the Fan*





## APPENDIX **A**

# Technical Specifications

- [Switch Specifications, page 95](#)
- [Power Supply Module Specifications, page 97](#)
- [3000 W Power Supply AC Power Cords, page 98](#)
- [Fan Module Specifications, page 104](#)
- [Chassis and Module Power and Heat Values , page 105](#)

## Switch Specifications

Environmental	Specification
Temperature, operating	<p>Certified for operation: 32° to 104°F (0° to 40°C)            Designed and tested for operation: 32° to 131°F (0° to 55°C)</p> <p><b>Note</b> The Catalyst 6880-X switch is equipped with internal air temperature sensors that generate a minor alarm when triggered at 104°F (40°C) and generate a major alarm when triggered at 131 °F (55°C).</p>
Temperature, nonoperating and storage	<p>Chassis unpackaged: -4° to 149°F (-20° to 65°C)            Chassis in protective shipping package: -40° to 158°F (-40° to 70°C)</p>
Thermal transition	<p>0.9°F (0.5°C) per minute (hot to cold)            0.59°F (0.33°C) per minute (cold to hot)</p>
Humidity (RH), ambient (noncondensing operating)	5% to 90%
Humidity (RH), ambient (noncondensing nonoperating and storage)	5% to 95%

Environmental	Specification
Altitude, operating	Certified for operation: 0 to 6500 ft (0 to 2000 m) Designed and tested for operation: -200 to 10,000 ft (-60 to 3000 m)
<b>Shock and vibration</b>	<b>Shock</b> <ul style="list-style-type: none"> <li>• Operational — 5 G 30 ms, half-sine (IEC 68-2-27)</li> <li>• Nonoperational — 20 G, 7.5 ms, trapezoidal</li> </ul> <b>Vibration</b> <ul style="list-style-type: none"> <li>• Operational — 3 Hz to 500 Hz</li> <li>• Power Spectral Density (PSD) — 0.0005 G<sup>2</sup>/Hz at 10 Hz and 200 Hz. 5 dB/octave roll off at each end. 0.5 hours per axis (1.12 Grms).</li> </ul>
<b>Acoustic noise</b>	67 dB. International Organization for Standardization (ISO) 7779: Bystander position operating to an ambient temperature of 86°F (30°C).
<b>Physical characteristics</b>	
Dimensions	<ul style="list-style-type: none"> <li>• Height = 8.75 in. (22.23 cm)</li> <li>• Width = 17.35 in. (44.07 cm)</li> <li>• Depth= 23 in. (58.42 cm)</li> <li>• Chassis requires 5 rack units (RUs)</li> <li>• The Catalyst 6880-X switch is designed to install in standard 19-inch equipment racks that meet ANSI/EIA 310-D, IEC 60297, and ETS 300-199 standards.</li> </ul>
Weight	Chassis only: 48 lb (21.77 kg) Chassis fully configured with 1 fan tray and 2 power supplies: 88 lb (39.92 kg)



Environmental	Specification
<p><b>Airflow</b></p>	<p>C6880-X-FAN</p> <p><b>Note</b> The airflow in the Catalyst 6880-X switch chassis is from right to left. See <a href="#">Site Requirements, on page 17</a> for recommended separations between walls and the chassis air intake and air exhaust and between the air exhaust of one chassis with the air intake of another chassis. Failure to maintain adequate air space can cause the chassis to overheat and the system to fail.</p>

## Power Supply Module Specifications

	C6880-X-3KW-AC	C6880-X-3KW-DC
Physical specifications	<ul style="list-style-type: none"> <li>• (H x W x D): 1.6 x 3.95 x 22 in. (4.1 x 10 x 55.9 cm)</li> <li>• Weight: 5 lb (2.27 kg)</li> </ul>	<ul style="list-style-type: none"> <li>• (H x W x D): 1.75 x 3.95 x 22 in. (4.45 x 10 x 55.9 cm)</li> <li>• Weight: 11 lb (5 kg)</li> </ul>
Input voltage range	85 to 264 VAC	<ul style="list-style-type: none"> <li>• -48 VDC nominal at 37 A in North America (operating range: -40.5 to -56 VDC)</li> <li>• -60 VDC nominal at 30 A for international (operating range: -55 to -72 VDC)</li> </ul>
Input frequency range	47 to 63 Hz	
Input current (each input)	20 A maximum at nominal line voltage (110 or 220 VAC)	<ul style="list-style-type: none"> <li>• 40 A maximum at -48 VDC input voltage (total of two inputs)</li> <li>• 45 A maximum at -40V input</li> </ul>
Rush-in current	55 A maximum for one cycle	50A maximum cold, and 70A maximum hot
Power supply input receptacles	International Electrotechnical Commission (IEC) 320-C20	Dual M6 studs for cable terminal lugs (per KS TCLH!16-6-2AS; 4 each)
Power cord rating	16A	—

	<b>C6880-X-3KW-AC</b>	<b>C6880-X-3KW-DC</b>
British thermal units (BTUs)	<ul style="list-style-type: none"> <li>• 10,410 BTU/hour at 3051W output</li> <li>• 5292 BTU/hour at 1551 W output</li> </ul>	<ul style="list-style-type: none"> <li>• 10,410 BTU/hour at 3051W output</li> <li>• 5292 BTU/hour at 1551 W output</li> </ul>
Output holdup time	20 milliseconds (ms) minimum	<ul style="list-style-type: none"> <li>• 8 milliseconds (ms) for half load</li> <li>• 4 milliseconds (ms) for full load</li> </ul>
Environmental conditions	<ul style="list-style-type: none"> <li>• Operating temperature: 32 to 104°F (0 to 40°C)</li> <li>• Storage temperature: -40 to 185°F (-40C to 85°C)</li> <li>• Relative humidity operating, noncondensing: 10 to 90%</li> <li>• Relative humidity nonoperating, noncondensing: 10 to 95%</li> </ul>	

## 3000 W Power Supply AC Power Cords

The following table lists the specifications for the AC power cords that are available for the 3000 W AC-input power supply. The table also includes references to power cord illustrations.



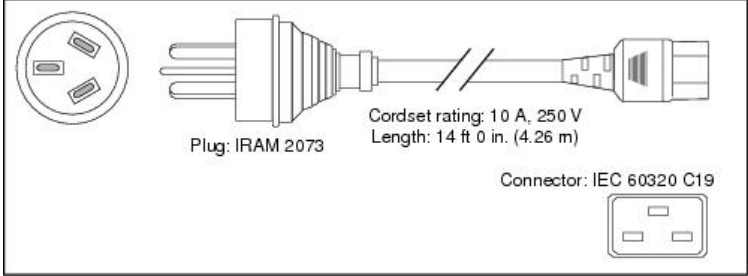
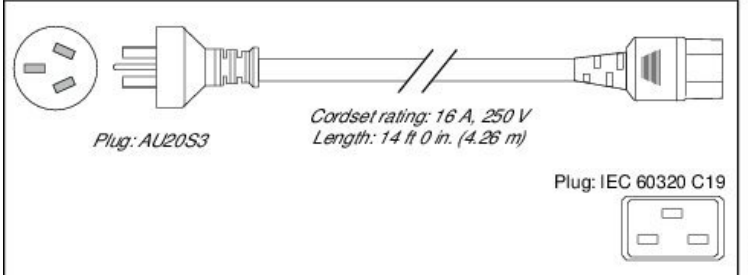
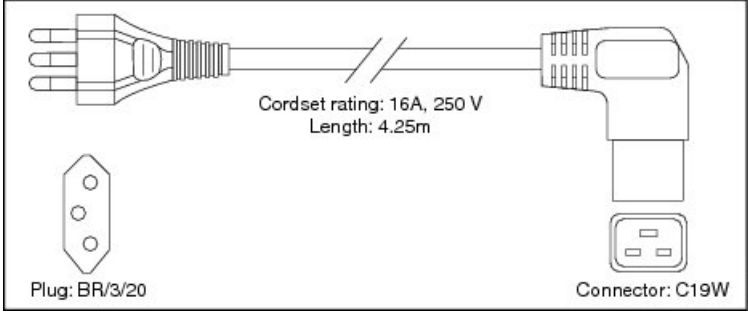
**Note**

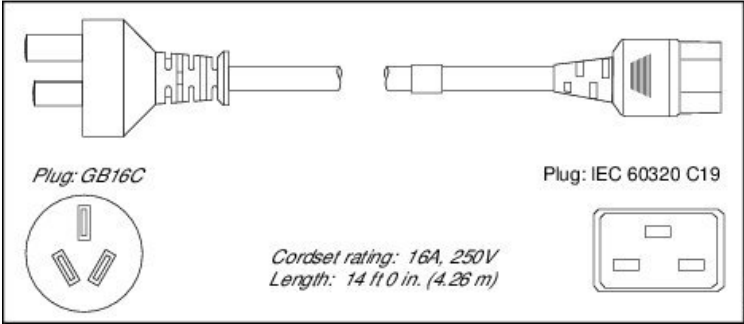
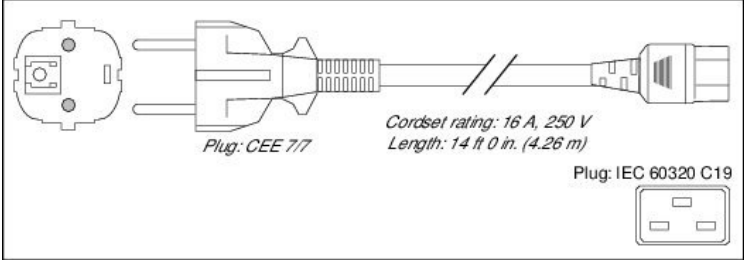
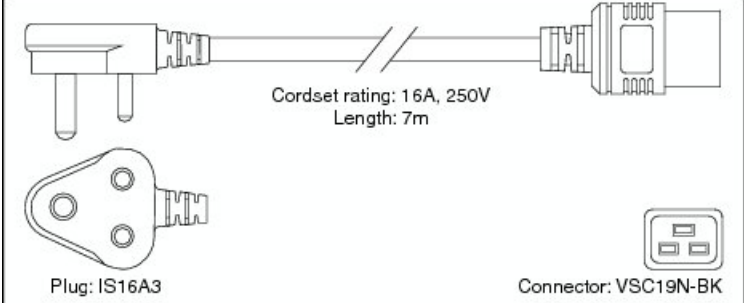
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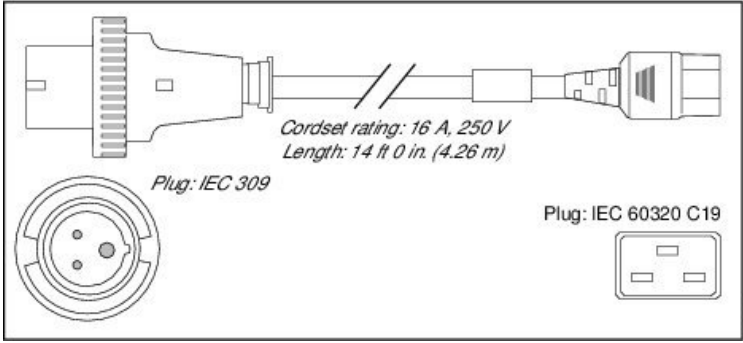
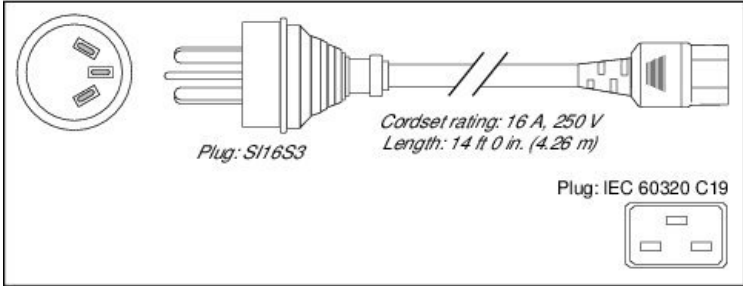
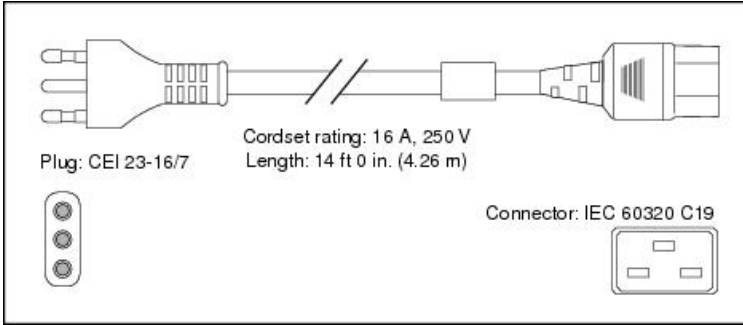
All 3000 W power supply power cords:

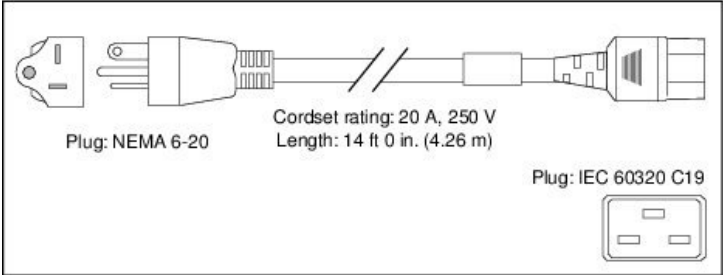
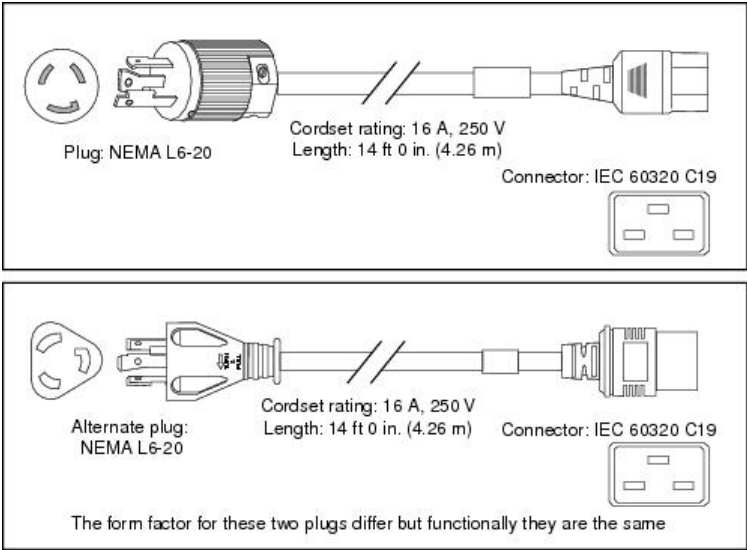
- Are 14 feet (4.3 meters) in length.
  - Have an IEC60320/C19 appliance connector at one end.
-

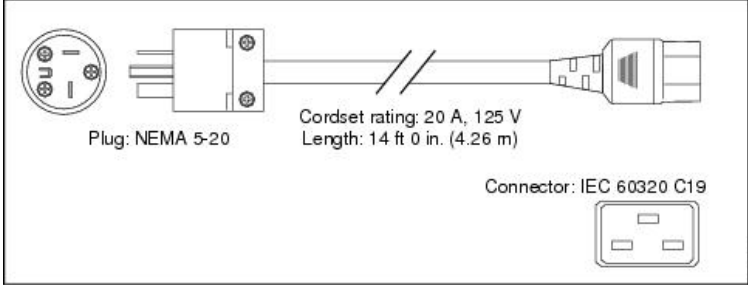
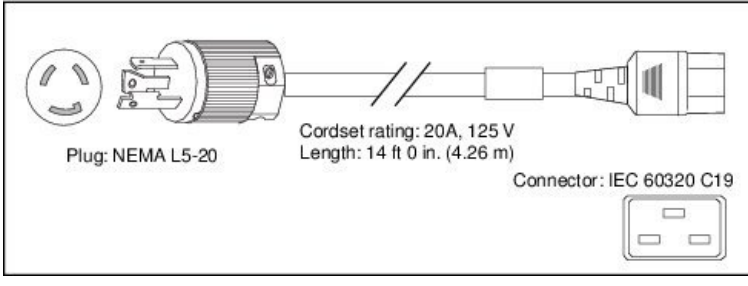
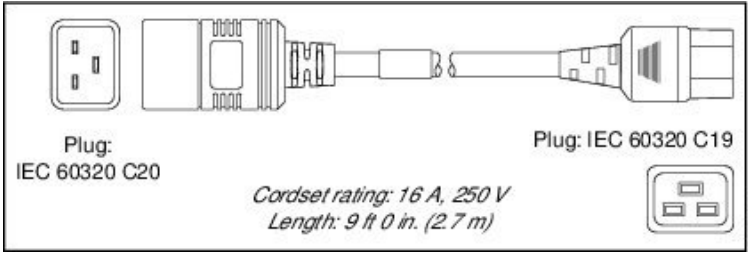
Table 14: 3000 W Power Supply AC Power Cords

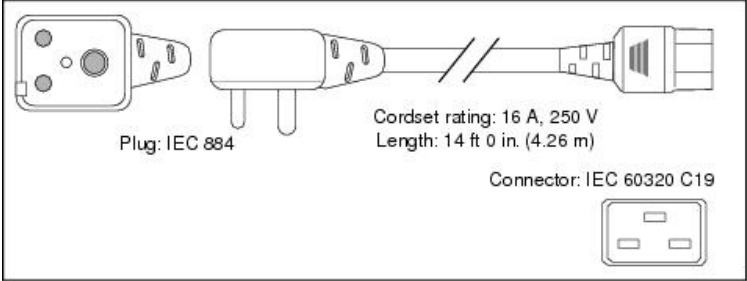
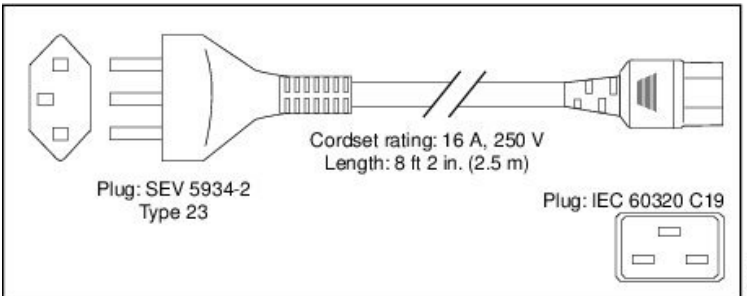
Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
Argentina	IRAM 2073	16 A, 250 VAC	<p><b>Figure 59: CAB-IR2073-C19-AR= (Argentina)</b></p>  <p>The diagram shows a power cord with an IRAM 2073 plug on the left, a cordset in the middle, and an IEC 60320 C19 connector on the right. A circular inset shows the IRAM 2073 plug details. Text labels include: Plug: IRAM 2073, Cordset rating: 10 A, 250 V, Length: 14 ft 0 in. (4.26 m), and Connector: IEC 60320 C19. A vertical reference number 113332 is on the right side of the diagram.</p>
Australia, New Zealand	AU20S3	16 A, 250 VAC	<p><b>Figure 60: CAB-AC-16A-AUS= (Australia, New Zealand)</b></p>  <p>The diagram shows a power cord with an AU20S3 plug on the left, a cordset in the middle, and an IEC 60320 C19 plug on the right. A circular inset shows the AU20S3 plug details. Text labels include: Plug: AU20S3, Cordset rating: 16 A, 250 V, Length: 14 ft 0 in. (4.26 m), and Plug: IEC 60320 C19. A vertical reference number 140598 is on the right side of the diagram.</p>
Brazil	EN60320 / C19	16 A, 250 VAC	<p><b>Figure 61: UCSB-CABL-C19-BRZ= (Brazil)</b></p>  <p>The diagram shows a power cord with a BR/3/20 plug on the left, a cordset in the middle, and a C19W connector on the right. A rectangular inset shows the BR/3/20 plug details. Text labels include: Plug: BR/3/20, Cordset rating: 16A, 250 V, Length: 4.25m, and Connector: C19W. A vertical reference number 370844 is on the right side of the diagram.</p>
People's Republic of China	GB16C	16 A, 250 VAC	

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
			<p data-bbox="537 359 1078 386"><b>Figure 62: CAB-AC16A-CH= (People's Republic of China)</b></p> 
Continental Europe	CEE 7/7	16 A, 250 VAC	<p data-bbox="537 842 1036 869"><b>Figure 63: CAB-AC-2500W-EU= (Continental Europe)</b></p> 
India	EN60320/C19	16 A, 250 VAC	<p data-bbox="537 1262 911 1289"><b>Figure 64: CAB-SABS-C19-IND= (India)</b></p> 
International	IEC 309	16 A, 250 VAC	

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
			<p><b>Figure 65: CAB-AC-2500W-INT= (International)</b></p> 
Israel	SI16S3	16 A, 250 VAC	<p><b>Figure 66: CAB-AC-2500W-ISRL= (Israel)</b></p> 
Italy	CEI 23-16/7	16 A, 250 VAC	<p><b>Figure 67: CAB-7513ACI= (Italy)</b></p> 
	NEMA 6-20	16 A, 250 VAC	

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
Japan, North America (Nonlocking Plug) 200 to 240 VAC Operation			<p><b>Figure 68: CAB-AC-2500W-US1= (Japan, North America [Nonlocking Plug] 200 to 240 VAC operation)</b></p>  <p>Plug: NEMA 6-20      Cordset rating: 20 A, 250 V Length: 14 ft 0 in. (4.26 m)      Plug: IEC 60320 C19</p> <p>113062</p>
Japan, North America (Locking Plug) 200 to 240 VAC Operation	NEMA L6-20	16 A, 250 VAC	<p><b>Figure 69: CAB-AC-C6K-TWLK= (Japan, North America [Locking Plug] 200 to 240 VAC operation)</b></p>  <p>Plug: NEMA L6-20      Cordset rating: 16 A, 250 V Length: 14 ft 0 in. (4.26 m)      Connector: IEC 60320 C19</p> <p>Alternate plug: NEMA L6-20      Cordset rating: 16 A, 250 V Length: 14 ft 0 in. (4.26 m)      Connector: IEC 60320 C19</p> <p>The form factor for these two plugs differ but functionally they are the same</p> <p>187845</p> <p><b>Note</b>      The form factor for these two plugs differ but functionally they are the same.</p>
Japan, North America 100 to 120 VAC operation <sup>3</sup>	NEMA 5-20	20 A, 125 VAC	

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
			<p><b>Figure 70: CAB-7513AC= (Japan, North America 100 to 120 VAC operation)</b></p>  <p>Plug: NEMA 5-20      Cordset rating: 20 A, 125 V Length: 14 ft 0 in. (4.26 m)</p> <p>Connector: IEC 60320 C19</p> <p style="text-align: right;">113396</p>
North America	NEMA L5 -20	20 A, 125 VAC	<p><b>Figure 71: CAB- L520P - C19 -US= (North America)</b></p>  <p>Plug: NEMA L5-20      Cordset rating: 20 A, 125 V Length: 14 ft 0 in. (4.26 m)</p> <p>Connector: IEC 60320 C19</p> <p style="text-align: right;">354417</p>
Power Distribution Unit (PDU) <a href="#">4</a>	IEC 60320 C19 IEC 60320 C20	16 A, 250 VAC	<p><b>Figure 72: CAB-C19-CBN= (PDU)</b></p>  <p>Plug: IEC 60320 C20      Plug: IEC 60320 C19</p> <p>Cordset rating: 16 A, 250 V Length: 9 ft 0 in. (2.7 m)</p> <p style="text-align: right;">740587</p>
South Africa	IEC 884-1	16 A, 250 VAC	

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
			<p><b>Figure 73: CAB-7513ACSA (South Africa)</b></p> 
Switzerland	SEV 5934-2 Type 23	16 A, 250 VAC	<p><b>Figure 74: CAB-ACS-16= (Switzerland)</b></p> 

<sup>3</sup> The 3000 W power supply operating on 110 VAC delivers 1400 W.

<sup>4</sup> The PDU power cable is designed for users who power their switch from a PDU. The end of the cable that plugs into the chassis power supply has a C19 connector; the other end of the cable that connects to the PDU has a C20 connector .

## Fan Module Specifications

Physical Specification	
Dimensions (H x D x W)	5.75 x 23.28 x 1.65 in. (14.60 x 59.13 x 4.19 cm)
Weight	6.39 lb (2.90 kg)
Operating Specification	
Airflow	250 cfm



## Chassis and Module Power and Heat Values

Module Type	Module Current (A)	Module Power (Watts)	AC-Input Power (Watts)	AC Heat Diss (BTU/HR)	DC Input Power (Watts)	DC Heat Diss (BTU/HR)
C6880-X-FAN	4 A	200 W	216 W	737	216	737
Catalyst 6880-X <sup>5</sup>	13.2 A	660 W	713 W	2432 BTU/HR	697 W	2432 BTU/HR
Catalyst 6880-X-LE <sup>6</sup>	12.6 A	630 W	680 W	2321 BTU/HR	680 W	2321 BTU/HR

<sup>5</sup> Includes fan tray

<sup>6</sup> Includes fan tray





# Module Connectors and Cable Specifications

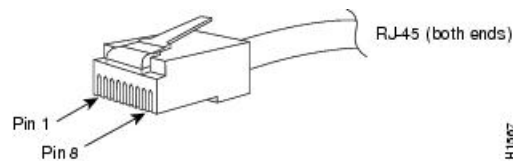
- [Module Connectors, page 107](#)
- [Cables and Adapters, page 108](#)
- [Cleaning the Fiber-Optic Connectors, page 112](#)

## Module Connectors

### RJ-45 Connector

The RJ-45 connector is used to connect a Category 3, Category 5, Category 5e, or Category 6 foil twisted-pair or unshielded twisted-pair cable from the external network to the module interface connector.

**Figure 75: RJ-45 Interface Cable Connector**



**Caution**

Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.



**Caution**

To comply with GR-1089 intrabuilding and lightning immunity requirements, you must use a foil twisted-pair (FTP) cable that is properly grounded at both ends.

## LC Connector

The LC fiber optic connector is a small form-factor fiber-optic connector that provides high-density fiber connectivity. The LC connector can be used with either MMF cable or SMF cable. The LC connector uses a latching clip mechanism that is similar to the one used on the RJ-45 copper connector.



### Warning

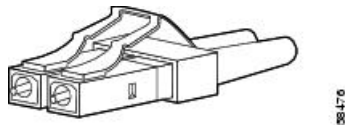
Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051



### Note

Make sure that the optical connectors are clean before making the connections. Contaminated connectors can damage the fiber and cause data errors.

**Figure 76: LC Fiber-Optic Connector**



## Cables and Adapters

### SFP Module Cables

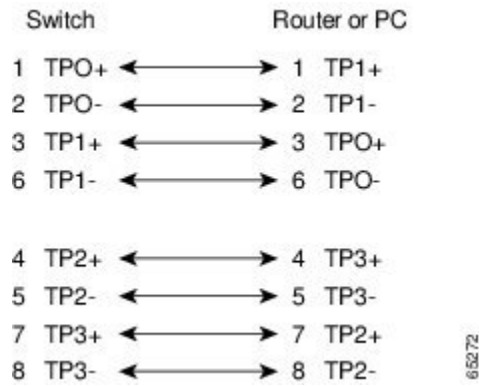
For cabling specifications, refer to the following notes:

- [Cisco SFP and SFP+ Transceiver Module Installation Notes](#)
- [Cisco 40-Gigabit QSFP+ Transceiver Modules Installation Note](#)

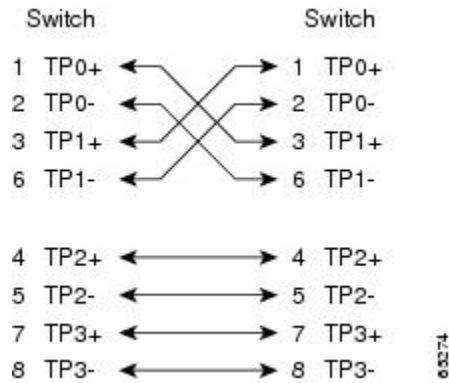
Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the stipulated cable length. Copper 1000BASE-T SFP module transceivers use standard four twisted-pair, Category 5 cable at lengths up to 328 feet (100 meters).

# Cable Pinouts

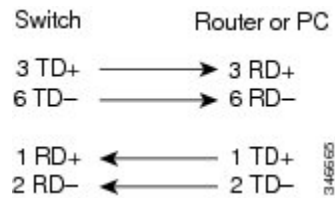
**Figure 77: Four Twisted-Pair Straight-Through Cable Schematic**



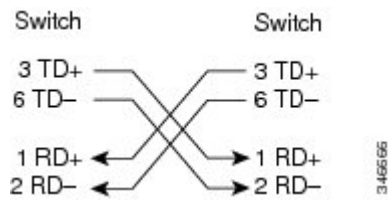
**Figure 78: Four Twisted-Pair Semi-Cross Cable Schematic**



**Figure 79: Two Twisted-Pair Straight-Through Cable Schematic**



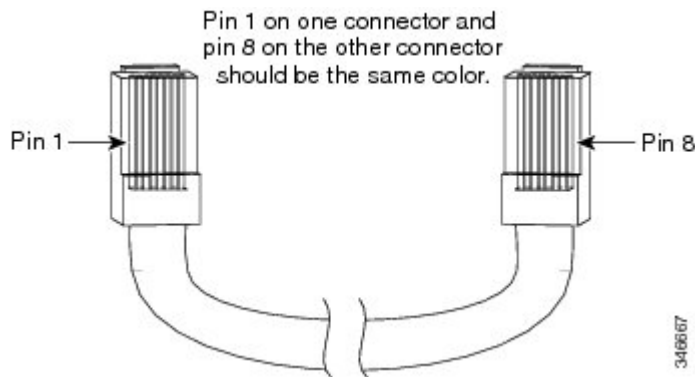
**Figure 80: Two Twisted-Pair Crossover Cable Schematic**



### Identifying a Crossover Cable

To identify a crossover cable, compare the two modular ends of the cable. Hold the cable ends side-by-side, with the tab at the back. The wire connected to the pin on the outside of the left plug should be a different color from the wire connected to the pin on the inside of the right plug.

**Figure 81: Identifying a Crossover Cable**



## Console Port Adapter Pinouts

The RS-232 console port uses an 8-pin RJ-45 connector. Use an RJ-45-to-DB-9 adapter cable to connect the switch console port to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter to connect the switch console port to a terminal.

**Table 15: Console Port Signaling with a DB-9 Adapter**

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	DB-9 Pin	Signal
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	DB-9 Pin	Signal
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

**Table 16: Console Port Signaling with a DB-25 Adapter**

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	DB-25 Pin	Signal
RTS	5	CTS
DTR	6	DSR
TxD	3	RxD
GND	7	GND
GND	7	GND
RxD	2	TxD
DSR	20	DTR
CTS	4	RTS

## Console Port Mode 2 Signaling and Pinouts

This section provides the signaling and pinouts for the console port in mode 2. (The port mode switch in the *out* position.)

**Table 17: Port Mode 2 Signaling and Pinouts (Port Mode Switch Out)**

Console Port	Console Device
Pin (signal)	Input/Output
1 (RTS) <sup>7</sup>	Output
2 (DTR)	Output
3 (RxD)	Input

Console Port	Console Device
4 (GND)	GND
5 (GND)	GND
6 (TxD)	Output
7 (DSR)	Input
8 (CTS) <sup>8</sup>	Input

<sup>7</sup> Pin 1 is connected internally to Pin 8.

<sup>8</sup> Pin 1 is connected internally to Pin 8.

## Cleaning the Fiber-Optic Connectors

Fiber-optic connectors are used to connect two fibers together. When these connectors are used in a communications system, proper connection becomes a critical factor.

Fiber-optic cable connectors can be damaged by improper cleaning and connection procedures. Dirty or damaged fiber-optic connectors can result in communication that is not repeatable or is inaccurate.

Fiber-optic connectors differ from electrical or microwave connectors. In a fiber-optic system, light is transmitted through an extremely small fiber core. Because fiber cores are often 62.5 microns or less in diameter, and dust particles range from a tenth of a micron to several microns in diameter, dust and any contamination at the end of the fiber core can degrade the performance of the connector interface where the two cores meet. The connector must be precisely aligned, and the connector interface must be absolutely free of trapped foreign material.

Connector loss or insertion loss is a critical performance characteristic of a fiber-optic connector. Return loss is also an important factor. Return loss specifies the amount of reflected light; the lower the reflection, the better the connection. The best physical-contact connectors have return losses greater than -40 dB, although -20 to -30 dB is more common.

The connection quality depends on two factors: the type of connector and the proper cleaning and connection techniques. Dirty fiber connectors are a common source of light loss. Keep the connectors clean at all times, and keep the dust covers installed when the connectors are not in use.

Before installing any type of cable or connector, use a lint-free alcohol pad from a cleaning kit to clean the ferrule, the protective white tube around the fiber, and the end-face surface of the fiber.

As a general rule, whenever there is a significant, unexplained loss of light, clean the connectors.

## Guidelines

Connectors that are used inside the system are cleaned by the manufacturer and connected to the adapters in a proper manner. The operation of the system will be error free if the customer provides clean connectors on the application side and follows these guidelines:

- Does not clean the inside of the connector adapters.



- Does not use force or quick movements when connecting the fiber-optic connectors in the adapters.
- Covers the connectors and adapters to keep the inside of the adapters or the surface of the connectors from getting dirty when not using the connectors or while cleaning the chassis.

## How to Clean the Fiber-Optic Connectors



### Caution

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Use extreme care when removing or installing connectors so that you do not damage the connector housing or scratch the end-face surface of the fiber. Always install protective covers on unused or disconnected components to prevent contamination. Always clean fiber connectors before installing them.

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### Warning

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Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. **Statement 1051**

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### Procedure

- 
- Step 1** Use a lint-free tissue soaked in 99 percent pure isopropyl alcohol to gently wipe the faceplate. Wait five seconds for the surfaces to dry, and repeat.
- Step 2** Remove any residual dust from the faceplate with clean, dry, oil-free compressed air.
- Step 3** Use a magnifying glass or inspection microscope to inspect the ferrule at an angle. Do not look directly into the aperture. Repeat the process if any contamination is detected.
-





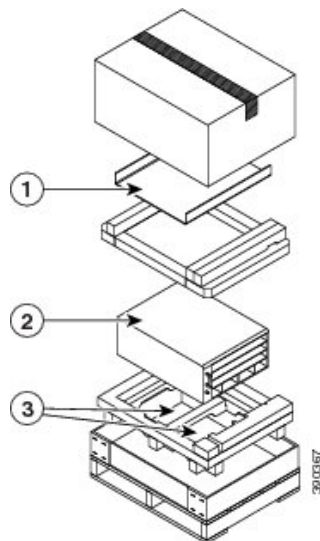
## Repacking the Switch

If you need to return or move the switch chassis, follow these steps to repack the switch using the original packaging material.

### Procedure

- Step 1** Set the chassis in the bottom pallet.

*Figure 82: Packing Material*

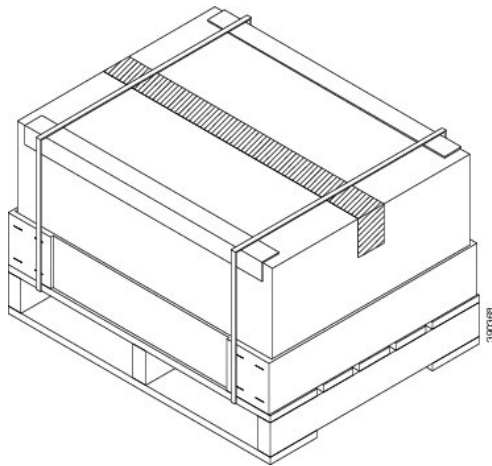


- Step 2** Place the packing bag over the chassis.
- Step 3** Place the front-packing material and power supply packing material around the chassis.
- Step 4** Place the power supplies in the spaces provided in the power supply packing material.
- Step 5** Place the top-packing material over the top of the chassis and power supplies.
- Step 6** Place the rack-mount kit and the accessory kit on the top-packing material.

**Note** You must include the accessory kit for the final packaging to fit properly.

- Step 7** Place the outside carton over the entire package.
- Step 8** Fold the outside carton down over the top and seal with packing tape.
- Step 9** Wrap three packing straps tightly around the top and bottom of the package to hold the outside carton and the bottom pallet together.

**Figure 83: Final Package**





## Troubleshooting



### Note

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The information in this chapter applies to all Catalyst 6880-X switches unless otherwise noted.

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Problems with the initial startup are often caused by a switching module that has become dislodged from the backplane or a power supply that has been disconnected from the power cord connector. Although temperature conditions above the maximum acceptable level rarely occur at initial startup, you might encounter these conditions during extended operation. Long-term monitoring functions also include independent reporting of DC-output voltage problems.

- [Getting Started, page 117](#)
- [Solving Problems at the System Component Level, page 118](#)
- [Identifying Startup Problems, page 118](#)
- [Troubleshooting the Power Supply, page 118](#)
- [Troubleshooting the Fan Tray, page 119](#)
- [Status LED Indicators, page 120](#)
- [Contacting Cisco Customer Service, page 120](#)
- [Finding the Serial Number, page 121](#)

## Getting Started

When the initial system startup is complete, verify the following:

- Power supplies are supplying power to the system.
- The fan tray assembly is operating.
- System software boots successfully.

If one or more of the above conditions are not met, use the procedures described in this chapter to isolate and, if possible, resolve the problem. If all of the above conditions are met, and the hardware installation is complete, refer to your software release notes for hardware support information and software caveats.

## Solving Problems at the System Component Level

The key to success when troubleshooting the system is to isolate the problem to a specific system component. The first step is to compare what the system *is doing* to what it *should be doing*. Because a startup problem can usually be attributed to a single component, it is more efficient to isolate the problem to a subsystem rather than troubleshoot each separate component in the system.

The switch consists of these subsystems:

- Power supplies
- Fan tray assembly

The chassis fan tray assembly should operate whenever system power is on. You should see the FAN LED turn green and hear the fan tray assembly operating. A red FAN LED indicates that one or more fans in the fan tray assembly is not operating. You should immediately contact a Customer Service representative if the fan tray assembly is not functioning properly. There are no installation adjustments that you can make if the fan tray assembly does not function properly at initial startup.

## Identifying Startup Problems

LEDs indicate all system states in the startup sequence. By checking the LEDs, you can determine when and where the system failed in the startup sequence.

### Procedure

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- Step 1** Turn on the power supplies. You should immediately hear the system fan tray assembly begin to operate.
- If you do not hear the fans operating, see the [Troubleshooting the Power Supply](#), on page 118 section.
  - If you determine that the power supplies are functioning normally and that the fan tray assembly is faulty, contact a customer service representative.
  - If the fan tray assembly does not function properly at initial startup, there are no installation adjustments that you can make. To replace the fan tray assembly, see [Troubleshooting the Fan Tray](#), on page 119 section.
- Step 2** If the startup information and system banner do not display at startup, verify that the terminal is set correctly and that it is connected properly to the console port.
- 

## Troubleshooting the Power Supply

If the INPUT OK LED does not light after you turn on the power switch, follow these steps to isolate a power subsystem problem:

## Procedure

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- Step 1** Verify that the INPUT OK LED on the power supply is green.
- If the INPUT OK LED is green, the AC or DC source is good and the power supply is functional.
  - If the INPUT OK LED remains off, there might be a problem with the AC source, the DC source, or the power cable.
  - Turn off the power to the switch, connect the power cord to another power source if one is available, and turn on the power.
  - If the INPUT OK LED is green, the problem is the first power source.
  - If the INPUT OK LED fails to light after you connect the power supply to a new power source, replace the power cord, and turn on the switch.
  - If the INPUT OK LED then goes on, return the first power cord for replacement.

If this unit has more than one power cord, repeat Step 1 for each power supply.

If the INPUT OK LED still fails to light when the switch is connected to a different power source with a new power cord, the power supply is probably faulty.

If a second power supply is available, install it in the second power supply bay, and contact a customer service representative for further instructions.

- Step 2** If you have a second power supply, repeat Step 1 for this power supply.
- 

## What to Do Next

If you are unable to resolve the problem or if you determine that either a power supply or backplane connector is faulty, see [Contacting Cisco Customer Service, on page 120](#).

# Troubleshooting the Fan Tray

To isolate a fan tray problem, follow these steps:

## Procedure

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- Step 1** Verify that the FAN LED on the fan tray is green.  
If the FAN LED is not green, see [Contacting Cisco Customer Service, on page 120](#) to determine whether or not the power subsystem is functioning properly.
- Step 2** Check to determine if the FAN LED is red. If the FAN LED is red, the fan tray is not seated in the backplane or has malfunctioned.  
Do the following:
- To ensure that the fan tray is seated properly, loosen the captive installation screws, remove the fan tray, and reinstall it.
  - Tighten all captive installation screws, and then restart the system.

- If the FAN LED is still red, the system detects an individual fan failure. Contact a customer service representative for instructions.

## Status LED Indicators

Status LED Indication	Alarm Type	Component	Action
Red	Major	Chassis temperature sensor exceeds major threshold.	<p>Syslog message and SNMP trap generated.</p> <p>If redundancy is configured, the system switches to the redundant supervisor engine and the active supervisor engine shuts down.</p> <p>If there is no redundancy and the overtemperature condition is not corrected, the system shuts down after 5 minutes.</p>
Orange	Minor	Chassis temperature sensor exceeds minor threshold.	<p>Syslog message and SNMP trap generated.</p> <p>Monitor the condition.</p>
Red Orange	Major Minor	Redundant supervisor engine temperature sensor exceeds major or minor threshold.	<p>Syslog message and SNMP trap generated.</p> <p>If major alarm and the overtemperature condition is not corrected, the system shuts down after 5 minutes.</p> <p>If minor alarm, monitor the condition.</p>

## Contacting Cisco Customer Service

If you are unable to solve a startup problem after using the troubleshooting suggestions in this chapter, contact a Cisco customer service representative for assistance and additional instructions. Before you call, have the following information ready to help your service provider assist you as quickly as possible:

- Date on which you received the switch
- Chassis serial number
- Type of software and release number

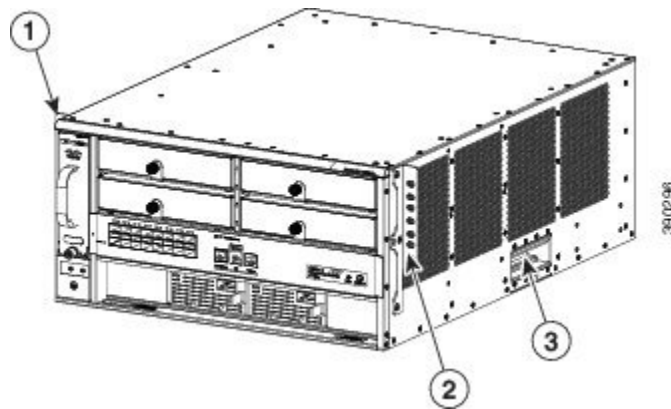


- Maintenance agreement or warranty information
- Brief description of the problem
- Brief explanation of the steps you have already taken to isolate and resolve the problem

## Finding the Serial Number

If you contact Cisco Technical Assistance, you need to know the switch serial number. The figure shows where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number.

**Figure 84: Serial Number on the Chassis**







## Installing the USB Drivers

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- [Installing the Cisco Microsoft Windows USB Device Driver, page 123](#)
- [Uninstalling the Cisco Microsoft Windows USB Driver, page 124](#)

## Installing the Cisco Microsoft Windows USB Device Driver

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

- [Installing the Cisco Microsoft Windows XP USB Driver](#)
- [Installing the Cisco Microsoft Windows 2000 USB Driver](#)
- [Installing the Cisco Microsoft Windows Vista and Windows 7 USB Driver](#)

## Installing the Cisco Microsoft Windows XP USB Driver

### Procedure

---

- Step 1** Obtain the Cisco USB console driver file from the Cisco.com web site and unzip it.
- Note** You can download the driver file from the Cisco.com site for downloading the switch software.
- Step 2** If using 32-bit Windows XP, double-click the setup.exe file in the Windows\_32 folder. If using 64-bit Windows XP, double-click the setup(x64).exe file in the Windows\_64 folder.
- Step 3** The Cisco Virtual Com InstallShield Wizard begins.
- Step 4** The Ready to Install the Program window appears. Click **Install**.
- Step 5** The InstallShield Wizard Completed window appears. Click **Finish**.
- Step 6** Connect the USB cable to the PC and the switch console port. The USB console port LED turns green, and the Found New Hardware Wizard appears. Follow the instructions to complete the driver installation.
-

## Installing the Cisco Microsoft Windows 2000 USB Driver

### Procedure

---

**Step 1** Obtain the Cisco USB console driver file from the Cisco.com web site and unzip it.

**Note** You can download the driver file from the Cisco.com site for downloading the switch software.

**Step 2** Double-click the setup.exe file.

**Step 3** The Cisco Virtual Com InstallShield Wizard begins. Click **Next**.

**Step 4** The Ready to Install the Program window appears. Click **Install**.

**Step 5** The InstallShield Wizard Completed window appears. Click **Finish**.

**Step 6** Connect the USB cable to the PC and the switch console port. The USB console port LED turns green, and the Found New Hardware Wizard appears. Follow the instructions to complete the driver installation.

---

## Installing the Cisco Microsoft Windows Vista and Windows 7 USB Driver

### Procedure

---

**Step 1** Obtain the Cisco USB console driver file from the Cisco.com web site and unzip it.

**Note** You can download the driver file from the Cisco.com site for downloading the switch software.

**Step 2** If using 32-bit Windows Vista or Windows 7, double-click the setup.exe file in the Windows\_32 folder. If using 64-bit Windows Vista or Windows 7, double-click the setup(x64).exe file in the Windows\_64 folder.

**Step 3** The Cisco Virtual Com InstallShield Wizard begins. Click **Next**.

**Step 4** The Ready to Install the Program window appears. Click **Install**.

**Note** If a User Account Control warning appears, click **Allow - I trust this program** to proceed.

**Step 5** The InstallShield Wizard Completed window appears. Click **Finish**.

**Step 6** Connect the USB cable to the PC and the switch console port. The USB console port LED turns green, and the Found New Hardware Wizard appears. Follow the instructions to complete the driver installation.

---

## Uninstalling the Cisco Microsoft Windows USB Driver

### Uninstalling the Cisco Microsoft Windows XP and 2000 USB Driver

Use the Windows Add or Remove Programs utility or the setup.exe file.

## Using the Setup.exe Program

### Before You Begin

Disconnect the switch console terminal before uninstalling the driver.

### Procedure

---

- Step 1** Run setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click **Next**.
  - Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
  - Step 3** When the Program Maintenance window appears, select the Remove radio button. Click **Next**.
  - Step 4** When the Remove the Program window appears, click **Remove**.
  - Step 5** When the InstallShield Wizard Completed window appears, click **Finish**.
- 

## Using the Add or Remove Programs Utility

### Before You Begin

Disconnect the switch console terminal before uninstalling the driver.

### Procedure

---

- Step 1** Click **Start > Control Panel > Add or Remove Programs**.
  - Step 2** Scroll to Cisco Virtual Com and click **Remove**.
  - Step 3** When the Program Maintenance window appears, select the **Remove** radio button. Click **Next**.
- 

## Uninstalling the Cisco Microsoft Windows Vista and Windows 7 USB Driver

### Before You Begin

Disconnect the switch console terminal before uninstalling the driver.

### Procedure

---

- Step 1** Run setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click **Next**.
- Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
- Step 3** When the Program Maintenance window appears, select the Remove radio button. Click **Next**.
- Step 4** When the Remove the Program window appears, click **Remove**.

**Note** If a User Account Control warning appears, click **Allow - I trust this program to proceed**.

**Step 5** When the InstallShield Wizard Completed window appears, click **Finish**.

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