Cisco Catalyst 6807-XL Switch Hardware Installation Guide

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Preface

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 **^D** or **Ctrl-D** 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.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier` font	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier` font	**`Bold Courier`** font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	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.

Convention	Description
{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, refer to the *Release Notes for Cisco IOS Release 15.1SY*.

- Catalyst 6807-XL Switch documentation located at: http://www.cisco.com/go/cat6800_docs
- Regulatory Compliance and Safety Information for the Catalyst 6800 Series Switches
- Catalyst 6500 Ethernet Module Installation Guide
- Catalyst 6500 Series Switch Supervisor Engine Guide
- Cisco SFP and SFP+ Transceiver Module Installation Notes
- Cisco 10-Gigabit Ethernet X2 Transceiver Modules Installation Note
- Installation Notes for the Cisco TwinGig and OneX Converter Modules

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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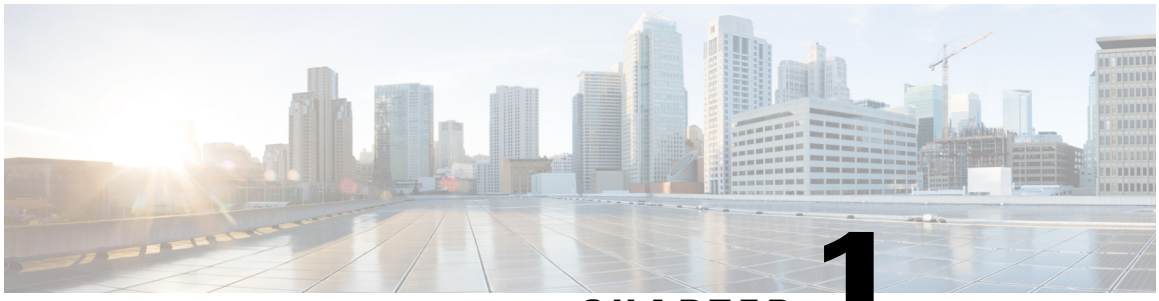


CHAPTER 1

Product Overview

Switch Models

Table 1: Switch Models

Switch Model	Description
Cisco Catalyst 6807-XL	Has a seven-slot modular chassis. The switch supports redundant power supply modules (AC input), redundant supervisor engines, fan tray, power supply converter modules, clock modules, and voltage termination - enhanced (VTT-E) modules.

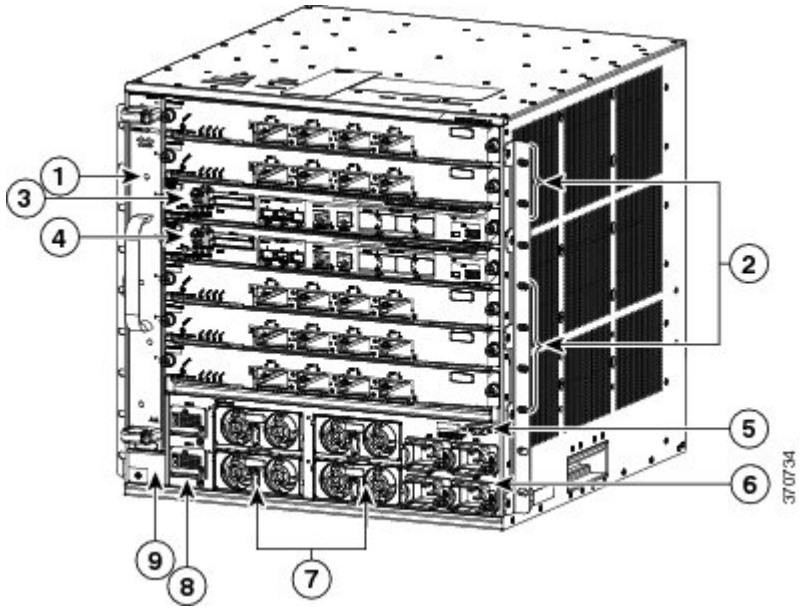
Front Panel

This section describes the front panel components:

- Fan tray
- Five Module slots
- Two supervisor engine slots
- Four power supply bays
- Four power entry modules
- Two power supply converter modules
- System On/Off switch

- System ground connector

Figure 1: Cisco Catalyst 6807-XL Front Panel



1	Fan tray	6	Power entry modules (PEMs), labeled AC1 through AC4
2	Module slots (line cards) 1, 2, 5,6, and 7	7	Power supply modules (PSMs), labeled 1 through 4
3	Supervisor engine slot	8	Power supply converter (PSC), labeled PSC1 and PSC2
4	Supervisor engine slot	9	System ground connector
5	System On/Off switch		

Chassis

The Cisco Catalyst 6807-XL switch chassis has seven horizontal slots, of which five are module slots and two are supervisor engine slots.

Related Topics

Rack-Mounting the Chassis, on page 37
Environmental Specifications, on page 62
Physical Specifications, on page 61

Finding Serial Numbers, on page 106

Supervisor Engine

The switch supports these Supervisor Engine 2T models:

- VS-S2T-10G
- VS-S2T-10G-XL

Note The term supervisor engine is used to refer to Supervisor Engine 2T.

The following requirements apply to the supervisor engines installed on the switch:

- Install a 3000 W or higher-capacity power supply.
- Install supervisor engines only in slot 3 or 4.

  If the slots are not occupied by supervisor engines, you can install service modules. However, you cannot install Ethernet modules in slot 3 and 4. Check your software release notes for any restrictions on the type of module that can be installed.
- In systems with redundant supervisor engines, both the supervisor engines must be of the same model and have the same daughter card configurations.
- Each supervisor engine must have the resources to run the switch on its own, which means that all the supervisor engine resources are duplicated. Identical supervisor engine memory configurations are recommended, but are not required, as long as the supervisor engine with the smaller memory configuration is sufficient to run the configured features of the switch. Additionally, each supervisor engine must have its own flash device and console port connections.

The uplink ports are fully functional on all redundant supervisor engine models when they are in the standby mode. For more information, see the Catalyst 6500 Series Switch Module Installation Note and the "Supervisor Engine 2T" section in the Catalyst 6500 Series Switch Supervisor Engine Guide.

Related Topics

Connecting the Supervisor Engine Console Port , on page 46

Modules

The switch supports the following Cisco Catalyst 6500 Series Ethernet modules:

- WS-X6704-10GE
- WS-X6908-10G-2T and WS-X6908-10G-2TXL
- WS-X6748-GE-TX
- WS-X6848-TX-2T and WS-X6848-TX-2TXL
- WS-X6748-SFP

- WS-X6848-SFP-2T and WS-X6848-SFP-2TXL
- WS-X6716-10T
- WS-X6816-10T-2T and WS-X6816-10T-2TXL
- WS-X6716-10G
- WS-X6816-10G-2T and WS-X6816-10G-2TXL
- WS-X6724-SFP
- WS-X6824-SFP-2T and WS-X6824-SFP-2TXL
- WS-X6904-40G-2T and WS-X6904-40G-2TXL

The switch supports the following Cisco Catalyst 6500 Series service modules:

- NAM3
- ASA-SM
- WiSM2
- ACE-30

For more information, see the Catalyst 6500 Ethernet Module Installation Guide.

Related Topics

Installing Transceivers and Module Connectors, on page 47
Pluggable Transceivers, on page 79
Module Connectors, on page 84
Cable Specifications, on page 88

Fan Tray

The switch supports a single front-serviceable and hot-swappable fan tray with nine individual fans. 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:

- Model number C6807-XL-FAN.
- A maximum cooling capacity of 850 CFM[1] (120 CFM per slot). At this capacity, the fan tray can cool seven 800 W modules.
- Four variable-speed operating modes between 3,000 and 6,000 RPM [2] for each fan.
- Up to three fan failures. The fans that are working increase RPM or CFM.
- Online Insertion and Removal (OIR) for a minimum of 120 seconds (depending on the ambient temperature).

1 Cubic feet per minute.
2 Revolutions per minute.

Note Individual fans are not field-replaceable units (FRUs). You must replace the fan tray.

Related Topics

Removing and Installing the Fan Tray, on page 54
Troubleshooting the Fan Tray, on page 105
Fan Tray LED, on page 8

Power Supply Module

The switch supports one to four field-replaceable power supply modules (PSMs) labeled 1 to 4, with a single system On/Off switch.

The PSM supports:

- Model number C6800-XL-3KW-AC.
- Redundant and combined configuration modes. The redundant mode is the default and recommended mode.
- Only AC input.
- 3000 W when powered with 240VAC, and 1300 W when powered with 120VAC.
- Only single-phase source AC. Source AC can be out of phase between multiple power supplies or multiple AC-power plugs on the same power supply because all AC power supply inputs are isolated.

This table describes the available power supply configuration modes:

Table 2: PSM Configuration Modes

	Redundant Mode (n+1)	Combined Mode (n+0)
Description	The system operates on two to four PSMs. This includes a reserve PSM that is available in case of a failure. The system power supply configuration is n[3] PSMs +1 redundant PSM.	The system operates on one to four power supplies. The power available to the system is the sum of power outputs of all the PSMs in the chassis.

	Redundant Mode (n+1)	Combined Mode (n+0)
Operating capacity	With two PSMs (1+1): • One PSM operates at 100 percent capacity. • The +1 redundant PSM operates at 0 percent of its capacity. With three PSMs (2+1): • One PSM operates at 100 percent capacity. • One PSM operates at 90 percent of its capacity. • The +1 redundant PSM operates at 0 percent of its capacity. With four PSMs (3+1): • One PSM operates at 100 percent capacity. • Two PSMs operate at 90 percent of their capacity (90 percent each). • The +1 redundant PSM operates at 0 percent of its capacity.	All available PSMs operate at 100 percent capacity.
In case of failure	The +1 redundant PSM takes over and operates at 90 percent capacity.	There is no redundant power supply in this mode. The PSMs that are still operational continue to work. If they are not able to handle the load, the necessary number of modules are shut down. The number of modules that will be shut down depends on the amount of combined power the operational PSMs are able to provide. For example, if you have installed two PSMs, they supply 6000 W, which can power a fully loaded chassis. But if one PSM fails, the power provided drops down to 3000 W, which causes some modules to shut down.
Recommendation	This is the recommended and default mode. If you have a fully loaded chassis, we recommend that you install at least three PSMs operating in a redundant mode (2+1).	Although available, we recommend that you do not use this mode. If you are implementing this mode, we recommend at least two PSMs (2+0) operating in the combined mode.

[3] Total number of operational PSMs

The PSMs provide 3000 W when powered with 240 VAC, and 1300 W when powered with 120 VAC. In systems where power supply modules provide different wattage, you may not have true redundancy. If the PSM with the higher wattage fails, the PSM with the lower wattage might not be able to handle the entire load by itself and system power management will shut down devices.

Note When shutting down devices, depending on how much power saving is needed, the system powers down modules in a descending order, starting with the highest-numbered slot. Slots containing supervisor engines are bypassed and are not powered down (Power is automatically reserved for supervisor engine slots). This shutdown order is fixed and cannot be changed.

You can change the configuration of the power supplies to redundant or combined at any time. If you switch from a redundant to a combined configuration, all the available PSMs are enabled (even a PSM that was disabled because it was of a lower wattage). If you change from a combined to a redundant configuration, all the available PSMs are initially enabled, and if they are of the same wattage, they remain enabled. If they are of different wattage, a syslog message appears and the lower wattage supply is disabled.

Related Topics

Removing and Installing Power Supplies, on page 50
Troubleshooting the Power Supply Module, on page 104
Power Supply Module LEDs, on page 9
3000 W Power Supply AC Power Cords, on page 67

Power Entry Module

The switch supports one to four AC power entry modules (PEMs) labeled AC1 to AC4. The four PEMs connect to the four corresponding PSMs (Labeled 1 to 4), for example, AC1 connects to 1 and so on.

The AC input voltage from the PEM is transmitted to the backplane, which then conducts it to the PSM. The power supply module generates the necessary amount of power.

Related Topics

Removing and Installing Power Supplies, on page 50
Troubleshooting the Power Supply Module, on page 104
Power Supply Module LEDs, on page 9
3000 W Power Supply AC Power Cords, on page 67

Power Supply Converter

The switch supports two redundant, field-replaceable 52 V converters labeled PSC1 and PSC2.

The PSC converts the 52 V supplied by the PSM to 3.3 V and conducts it to the backplane. The clock module, VTT modules, and module slots (line cards) require 3.3 V.

The PSC supports:

- Model number C6807-X-3.3V.

- Redundancy—The PSCs share power when both are installed. If one PSC fails, the chassis will still be operational.

Related Topics

Removing and Installing the Power Supply Converter, on page 57

Power Supply Converter LEDs, on page 10

LEDs

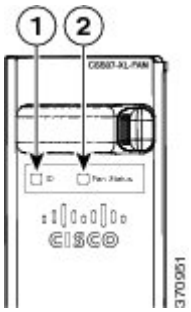
Use the switch LEDs to monitor switch activity and performance.

For information about module and supervisor engine LEDs, refer to the *Catalyst 6500 Ethernet Module Installation Guide* and the *Catalyst 6500 Series Switch Supervisor Engine Guide* available on Cisco.com.

Fan Tray LED

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

Figure 2: Fan Tray LED Locations



1	ID	2	Fan Status

Table 3: Fan ID LED and Description

LED Color	Meaning
Blue	Identifies the fan module in the chassis

Table 4: Fan Status LEDs and Descriptions

LED Color	Meaning
Green	Fan is operating normally

LED Color	Meaning
Red	One or more individual fans have failed

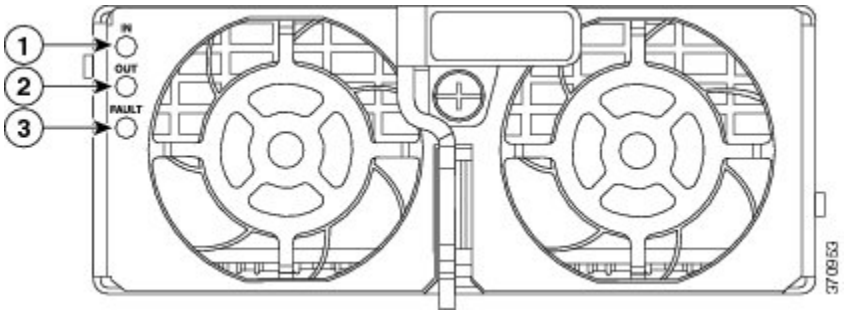
Related Topics

Removing and Installing the Fan Tray, on page 54
Troubleshooting the Fan Tray, on page 105
Fan Tray, on page 4
Air Flow, on page 15

Power Supply Module LEDs

The PSM includes an IN, OUT, and FAULT LED, as shown in the following figure. The different states of the LEDs are described in the following tables.

Figure 3: Power Supply Module LED Locations



1	IN	3	FAULT
2	OUT		

PSM LEDs and Descriptions

LED	LED Color	Meaning
IN	Green	Input AC is present and within regulation range
	Green (blinking)	Input AC is present but not within regulation range or AC power was just disconnected and the power supply internal circuitry is still charged
OUT [4]	Green	Power output is OK
	Green (blinking)	Output is in a power limit or over current condition

LED	LED Color	Meaning
FAULT	Red	Power supply module has malfunctioned

4 The system On/ Off switch turns the power supply output on and off.

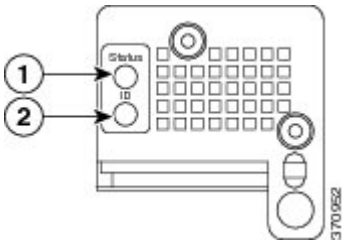
Related Topics

Removing and Installing Power Supplies, on page 50
Troubleshooting the Power Supply Module, on page 104
Power Supply Module, on page 5
Power Entry Module, on page 7

Power Supply Converter LEDs

The PSC includes a Status LED and an ID LED, as shown in the following figure. The different states of the LEDs are described in the following tables.

Figure 4: Power Supply Converter LED Locations



1	Status	2	ID

Table 5: PSC Status LED and Descriptions

LED Color	Meaning
Green	The A3.3V from the module is within normal range
Red	The A3.3V from the module is not within normal range

Table 6: ID LED and Description

LED Color	Meaning
Blue	Identifies the power supply converter module in the chassis

Related Topics

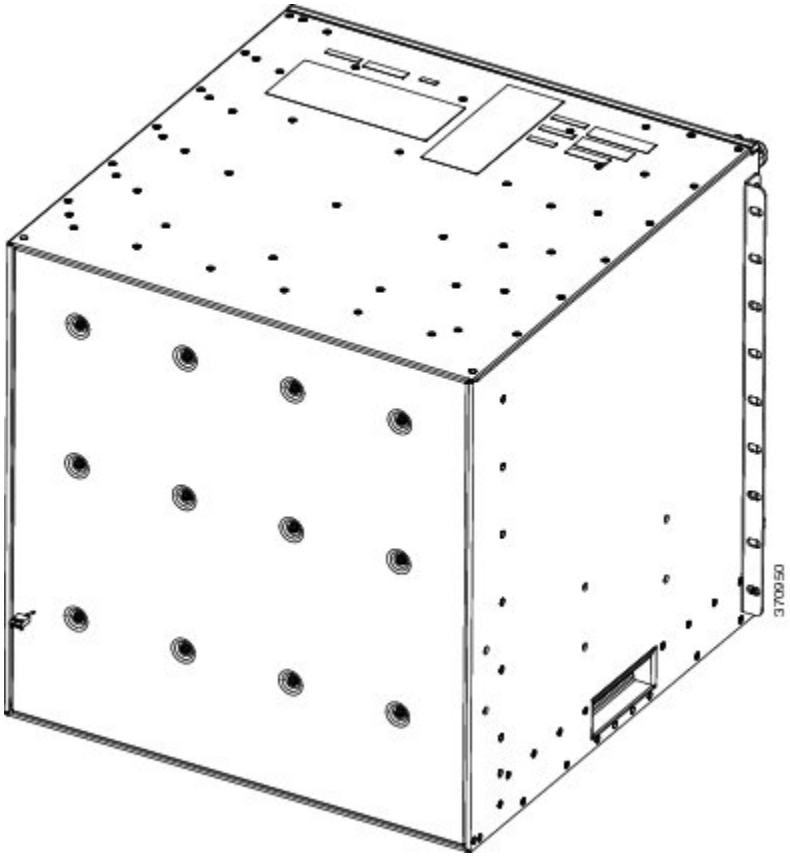
Removing and Installing the Power Supply Converter, on page 57
Power Supply Converter, on page 7

Rear Panel

These rear panel components are located behind the back plate of the chassis:

- Backplane
- Clock module
- Voltage Termination-Enhanced (VTT-E) module

Figure 5: Cisco Catalyst 6807-XL Rear Panel



Backplane Bandwidth

The backplane supports:

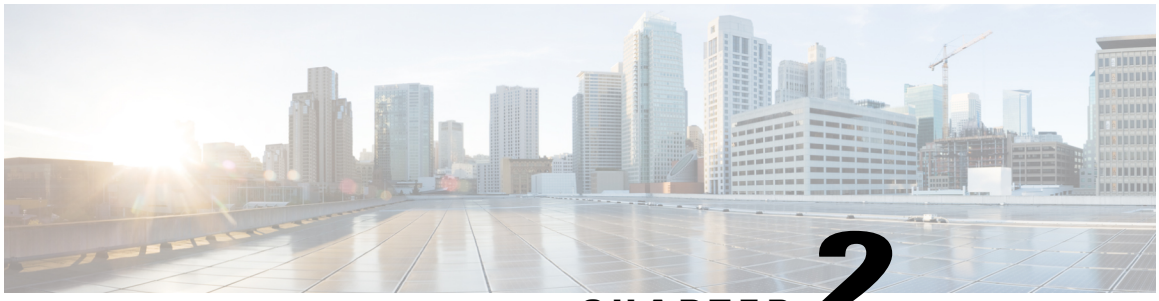
- Four channels—Each module slot has four channels connected to each supervisor-engine slot (A total of eight).
- The following clock frequencies:
  - 3.13 GHz: For up to 20 Gbps (per channel)
  - 6.25 GHz: For up to 40 Gbps (per channel)
  - 7.50 GHz: For up to 55 Gbps (per channel)
  - 15.0 GHz: For up to 110 Gbps (per channel)

Note With Supervisor Engine 2T, the switch supports 220G per slot. The chassis is capable of supporting up to 880G per slot.

Clock and VTT Module

The switch supports one replaceable clock card with built-in redundancy. The supported model number is CLK-7600.

Three replaceable voltage termination (VTT-E) modules, which are rear-serviceable (located behind back-plate) provide reference voltage for bus signals. The supported model number is WS-C6K-VTT-E.



CHAPTER 2

Preparing for Installation

Safety Warnings

Safety warnings appear throughout this publication in procedures that may harm you if you perform them incorrectly. A warning symbol precedes each warning statement. The warnings below are general warnings that are applicable to the entire publication.

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

Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A. **Statement 1005**

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

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 50°F (10°C) or hotter than 95°F (35°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.

Air Flow

The switch is designed to be installed in an environment where there is a sufficient volume of air available to cool the supervisor engines, modules, and power supplies. If there are any constraints with regard to the free flow of air through the chassis, or if the ambient air temperature is elevated, the switch environmental monitor may then shut down the system to protect the system components.

To maintain proper air circulation through the switch chassis, we recommend that you maintain a minimum space of 6 inches (15 cm) between a wall and the chassis air intake or a wall and the chassis hot air exhaust. In situations where the switch chassis are installed in adjacent racks, you should allow a minimum space 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 may 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, in line with the chassis slot occupied by a supervisor engine.
    - 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 Determine the 10°C temperature difference between the intake and the exhaust by taking measurements using external digital temperature probes. Do not use the chassis internal temperature sensors to measure the temperature difference.

- Plan ahead. A switch that is currently installed in an enclosed or partially enclosed rack might meet ambient air temperature and air flow requirements at present. However, if you add more chassis to the rack or 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 may cause minor alarms.

Related Topics

Removing and Installing the Fan Tray, on page 54
Troubleshooting the Fan Tray, on page 105
Fan Tray LED, on page 8

Selecting Rack Enclosure Cabinets

Cisco Systems has identified the following rack-enclosures that are determined to be Cisco-compatible:

Panduit Corporation

The following Panduit Corporation racks and thermal duct are recognized as compatible with the Cisco Catalyst 6807-XL switch:

- 4-Post Racks —Part numbers R4P23, R4P, and R4P36.
- Thermal Duct (fits on the above racks)—Part number R4PAE4.

Contact Panduit Corporation for further information on these racks and thermal duct systems. Their corporate website is http://www.panduit.com. Their Customer Service and Technical Support phone number is 800 777-3300.

Chatsworth Products, Inc.

The N-Series TeraFrame Network Gen 3 cabinet product line is compatible with the Cisco Catalyst 6807-XL switch. Several product configurations are available to support your specific datacenter airflow strategy:

- For hot and cold aisle configurations including aisle containment—Part number NF1U-113C-C42-1 (or alternate sizes).
- For a vertical exhaust-ducted configuration—Part number NF1U-114C-C62-1 (or alternate sizes).

Contact Chatsworth Products, Inc. for further information on this rack enclosure. Visit http://www.chatsworth.com/n-series for complete product information or visit http://www.chatsworth.com for general information. Their Customer Service and Technical Support phone number is 800 834-4969 (Monday to Friday, 5 a.m. to 5 p.m., (0500 to 1700) Pacific Time).

Related Topics

Rack-Mounting Guidelines, on page 24

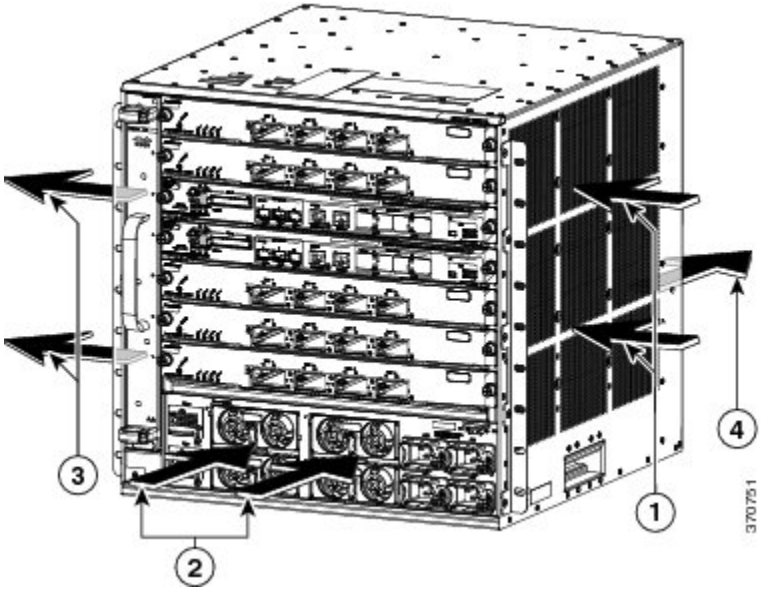
Chassis Fan Tray

The chassis fan assembly provides cooling air for the supervisor engine and the switching modules. The fan tray supports side-to-side (right-to-left) airflow. If necessary, you can use airflow baffles or specialized data center racks to redirect the airflow exhaust to the rear. The following table describes the switch-supported fan tray models and air flow architecture and requirements.

Table 7: Air Flow Specifications and Fan Tray Support

Fan Tray Model Number	Airflow Intake	Airflow Exhaust	Air Filter Available	Air Volume
C6807-XL-FAN	Right side	Left side	No	850 CFM

Figure 6: Air Flow Direction



1	Module air inlet	3	Module air exhaust
2	Power supply air inlet	4	Power supply air exhaust

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. Each system is rated to operate at altitudes from -50 to 6500 feet (-16 to 1981 meters) and can be stored at altitudes of -50 to 35,000 feet (-16 to 10,668 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 To predict and provide a remedy for strong EMI, consult experts in RFI.

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 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.

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 8: 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 may occur when modules or other FRUs are improperly handled, and result in intermittent or complete failure of the modules or FRUs. Modules consist of printed circuit boards that are fixed in metal carriers. EMI shielding and connectors are integral components of a 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 has maximum contact with bare skin. ESD grounding straps are available with banana plugs, metal spring clips, or alligator clips. The chassis is equipped with a banana plug connector (identified by the ground symbol next to the connector) on the front panel.
- 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.

Related Topics

Establishing System Ground, on page 41

Attaching an ESD Strap, on page 43

Power Requirements

Power supplies installed on the switch chassis must be AC input only. When preparing your site for switch installation, adhere to these requirements:

- In systems configured with more than one power supply, connect each of the power supplies 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 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.
- In some systems, you may decide to use an uninterrupted 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 may become unstable when operating with the switch power supplies that use power factor correction. This may 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.
- Each chassis power supply should have a separate, dedicated branch circuit.
    - North America—the 1300 W and 3000 W power supplies require a 20 A circuit.
    - International—Circuits should be sized according to local and national codes.
- If you are using a 200 or 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 level.

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.

Rack-Mounting Guidelines

The Cisco Catalyst 6807-XL Switch is designed to be installed in both open and enclosed racks. The switch can be installed on 19-inch equipment racks. If you are using a 2-post or 4-post 19-inch standard equipment rack, before rack-mounting the switch, ensure that the equipment rack complies with these guidelines:

- The width of the rack, measured between the two front-mounting 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-mounting and rear-mounting strips, must be at least 17.61 inches (44.72 cms).
- The rack must have sufficient clearance in terms of height and depth, to insert the chassis. The chassis height is 17.5 inches (44.45 cms).

Note Chassis height is sometimes measured in rack units (RU or just U) where 1 RU or 1 U equals 1.75 inches (44.45 mm). A typical server rack is 42 RU or 42 U in height. The Cisco Catalyst 6807-XL Switch chassis is 10 RU in height.

You can also use a center rack-mount kit for 23-inch, telco-style racks. The kit is not included in the accessory kit, but can be ordered separately (Part number C6800-XL-CNTR-MNT=). Installation instructions are included with the kit.

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

Note To maintain proper air circulation through the Catalyst switch chassis, we recommend that you maintain a minimum 6-inch (15-cm) separation 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. On Catalyst switch chassis in which the airflow is from front to back, you can place the chassis side-by-side.

Related Topics

Selecting Rack Enclosure Cabinets, on page 16

Accessory Kit, on page 31

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.

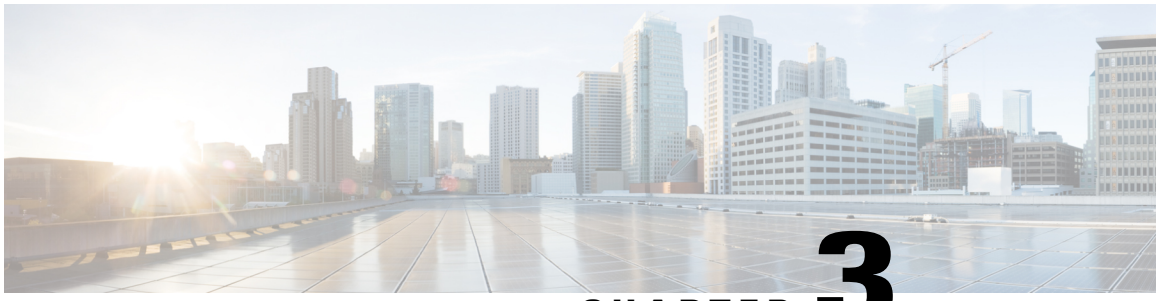
Table 9: Site Preparation Checklist

Task No.	Activity	Verified By	Time	Date
1	Space evaluation • Space and layout • Floor covering • Impact and vibration • Lighting • Maintenance access			
2	Environmental evaluation • Ambient temperature • Humidity • Altitude • Atmospheric contamination • Airflow			
3	Power evaluation • Input power type • Power receptacles (Depends on power supply)[5] • Receptacle proximity to the equipment. • Dedicated (separate) circuits for redundant power supplies. • UPS for power failures[6]			
4	Grounding evaluation • Circuit breaker size • CO ground (AC powered systems)			
5	Cable and interface equipment evaluation • Cable type • Connector type • Cable distance limitations • Interface equipment (transceivers)			

Task No.	Activity	Verified By	Time	Date
6	EMI evaluation • Distance limitations for signaling • Site wiring • RFI levels			

5 Verify that each power supply installed in the chassis has a dedicated AC source circuit.

6 Refer to the power supply'VA rating as a sizing criteria in determining the output required by the UPS. The power supply kVA rating value is listed in the specifications table for each power supply in Appendix A (power supply specifications).



CHAPTER 3

Installing the Switch

Installation Tasks

The process of installing the switch can be broken down into a series of tasks described in the following table:

Table 10: Installation Tasks

Task	Description
Unpacking the switch	Remove the switch from the packaging material. **Note** We recommend that you save the packaging material for use later if you have to move the chassis.
Installing the rack-mount shelf kit	Install the rack-mount shelves before you install the chassis in the rack. The shelf brackets help support the weight of the chassis.
Rack-mounting the chassis	Install the chassis in a standard 19-inch rack, either open or enclosed.

Task	Description
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 the supervisor engine and line cards and cabling them to the network	Modules that you order with the chassis are installed on the chassis when delivered. Blank faceplates are installed on empty module slots. • For the list of supported devices, see Supervisor Engine, on page 3 and Modules, on page 3. • For detailed installation instructions, see the *Catalyst 6500 Series Switch Supervisor Engine Guide* and the *Catalyst 6500 Ethernet Module Installation Guide* available on Cisco.com.
Installing power supplies	PSMs that you order with the chassis are installed on the chassis when delivered. Blank faceplates are installed on empty power supply module slots. For more information, see the chapter "Removing and Installing Power Supplies, on page 50".
Installing the fan tray	The fan tray that you order with the chassis is installed on the chassis when delivered. For more information, see the chapter "Removing and Installing the Fan Tray, on page 54".
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.

These warnings apply to the overall switch installation process:

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 Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

Warning This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

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

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

Accessory Kit

Each Cisco Catalyst 6807-XL Switch chassis ships with an accessory kit. The following are shipped as part of the accessory kit:

- Standard 19-inch rack-mount L brackets—The L brackets are factory installed on the left-front and right-front of the chassis. Associated rack-mounting hardware is included in the kit .

  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, install 10-32 or 12-24 clip nuts or cage nuts to secure the

rack-mount screws. The clip nuts or cage nuts are not included as part of the accessory kit; you must obtain them on your own.

- Rack-mount shelf kit—This kit is used to support the weight of the chassis while you secure the chassis L brackets to the rack enclosure. It consists of two shelf brackets and a crossbar bracket.
- Two 9-slot cable management guides—The 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.
- Power supply and module blank panels—The power supply and module blank panels must be installed on any unused power supply bays or module slots to maintain chassis airflow and EMI shielding.
- Right-angled grounding lug and disposable ESD wrist strap and clip.
- Screws

Table 11: Types of Screws Shipped with the Accessory Kit

Type	Quantity
12-24 x 0.75mm	24
10-32 x 0.75mm	24
M3 x 0.5 x 8mm	2
M4 x 8mm	2

Related Topics

Rack-Mounting Guidelines, on page 24

Unpacking the Switch

Tip Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them with the pallet. You will require these containers if you have to move or ship the switch in the future. For repacking instructions, see Repacking the Switch, on page 99.

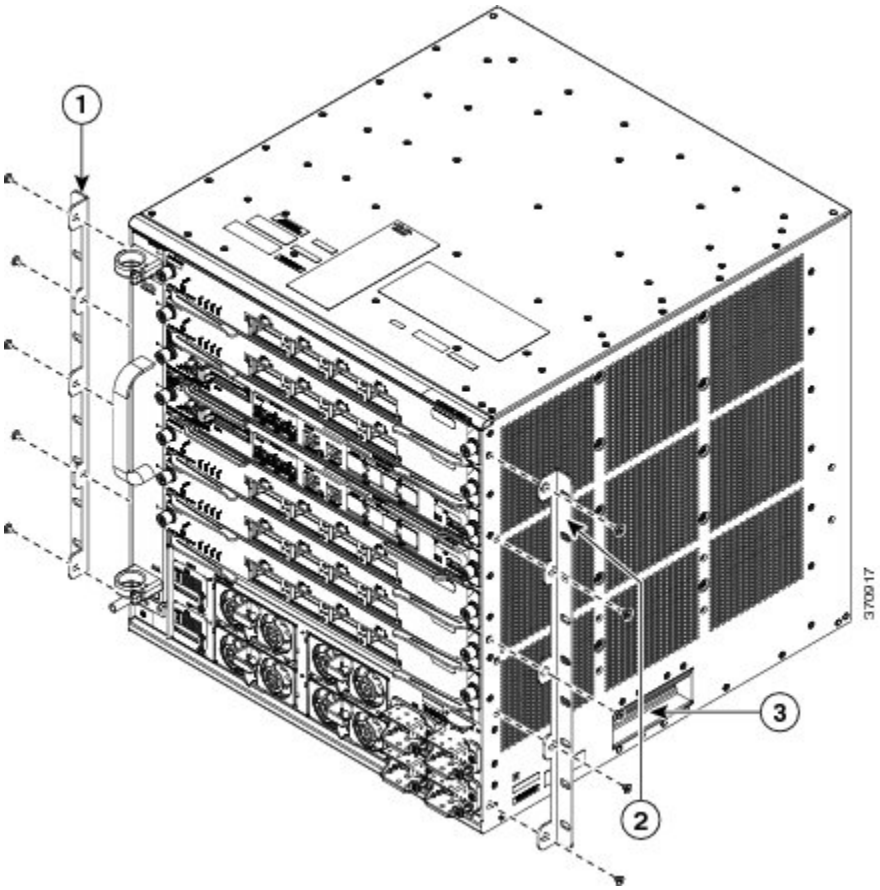
To check the contents of the shipping container, perform the following:

- Check the contents of the accessory kit. Verify that you have received all the listed equipment, including any optional equipment you may have ordered, such as, network interface cables, transceivers, or special connectors.
- Check the modules in each slot. Ensure that the configuration matches the packing list and that all of the specified interfaces are included.

L Brackets on the Chassis

The switch chassis is shipped with two L brackets installed on the front sides of the chassis. The L brackets are secured to the chassis with ten M3 Phillips-head screws (five on each side).

Figure 7: L Brackets on the Chassis



1	Right L bracket.	3	Handhold
2	Left L bracket.		

The L brackets should be installed in this position whether you perform a front rack-mount or a rear rack-mount.

Installing the Rack-Mount Shelf Kit

The rack-mount shelf kit is part of the accessory kit. Install this kit before you install the chassis in the rack. The shelf brackets attach directly to the rack and help support the weight of the chassis while you secure the L brackets to the rack enclosure.

Table 12: Rack-Mount Kit Contents and Description

Part	Quantity	Description
Shelf bracket	2	Is attached to the rack posts to form a shelf for the switch chassis to rest on.
Cross Bar bracket	1	Is attached between the two side rack-mount brackets to secure them together.
12-24 x 0.75-inch Phillips binding head screw	10	Secures the brackets to a rack that requires 12-24 screws (Five for each L bracket).
10-32 x 0.75-inch Phillips binding head screw	10	Secures the brackets to a rack that requires 10-32 screws (Five for each L bracket).
M3 x 8 mm Phillips pan head screw	2	Secures the crossbar bracket to the rack-mount side brackets.

Note

- This rack-mount shelf kit is not suitable for use with racks that have obstructions (such as power strips) because the obstructions could impair access to switch FRUs.
- 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 cage nuts are not included as part of the accessory kit and must be obtained on your own.

Determine the clearance between the insides of the left and right rails of your rack system and install the shelf brackets accordingly.

Installing the Shelf and Crossbar Brackets in a 17.5-inch (44.45 cm) Opening

Important You have to rear-mount the shelf and crossbar brackets 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

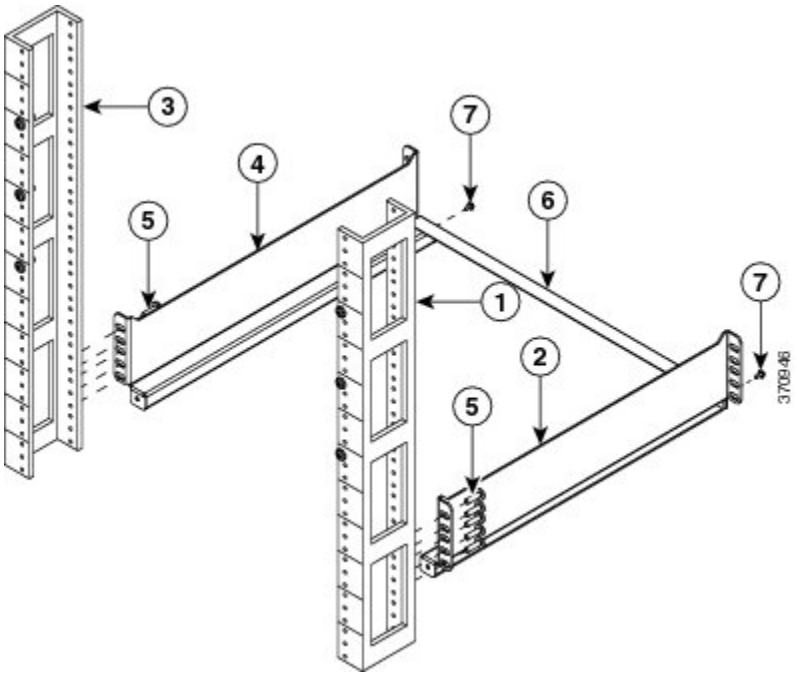
Procedure

Step 1 Position the support flange of the left shelf bracket on the rear of the left rail. Align and secure the bracket to the rack by using five EA screws.

Step 2 Position the support flange of the right shelf bracket on the rear of the right rail (make sure that it is level with the left shelf bracket). Align and secure the bracket to the rack by using five EA screws.

Step 3 Position the crossbar bracket to the rear of the shelf brackets. Align and secure the cross bar bracket to the shelf bracket with one M3 screw on each side.

Figure 8: Installing Shelf and Crossbar Brackets in a 17.5-inch Opening



1	Left rail	5	Five EA screws on each side, to secure the shelf bracket to the rack
2	Left shelf bracket	6	Cross bar bracket
3	Right rail	7	One M3 screw on each side to secure the cross bar bracket to the shelf
4	Right shelf bracket		

Installing the Shelf and Crossbar Brackets in a 17.75 inch (45.09 cm) Opening

Important You have to front-mount the shelf and cross bar brackets for 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

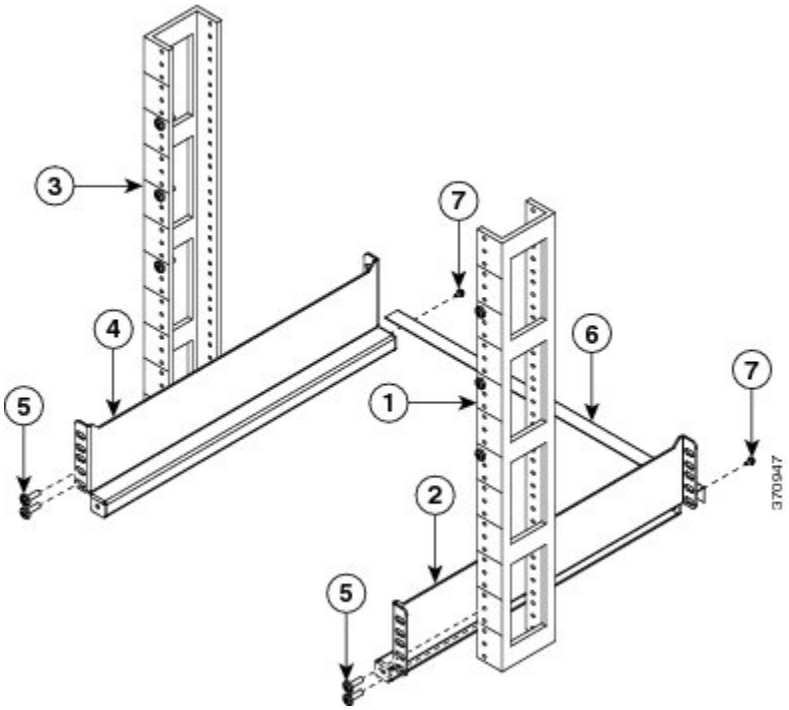
Procedure

Step 1 Position the support flange of the left shelf bracket on the front of the left rail. Align and secure the bracket to the rack by using two EA screws.

Step 2 Position the support flange of the right shelf bracket on the front of the right rail (make sure that it is level with the left shelf bracket). Align and secure the bracket to the rack by using two EA screws.

Step 3 Position the crossbar bracket to the rear of the shelf brackets Align and secure the crossbar bracket to the shelf bracket with one M3 screw on each side.

Figure 9: Installing Shelf and Crossbar Brackets in a 17.75-inch Opening



1	Left rail	5	Two EA screws on each side, to secure the shelf bracket to the rack
2	Left shelf bracket	6	Crossbar bracket
3	Right rail	7	One M3 screw on each side to secure the crossbar bracket to the shelf
4	Right shelf bracket		

Rack-Mounting the Chassis

Warning Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back. Statement 164

Tip We recommend that you have a third person to assist in this procedure.

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

Before You Begin

- Read the Rack-Mounting Guidelines, on page 24.
- Install the rack-mount shelf kit. See Installing the Rack-Mount Shelf Kit, on page 33.

Procedure

Step 1 With a person standing at each side of the chassis, insert one hand into the handhold groove and the other hand near the back of the chassis for balance. Slowly lift the chassis. Avoid sudden twists or moves to prevent injury.

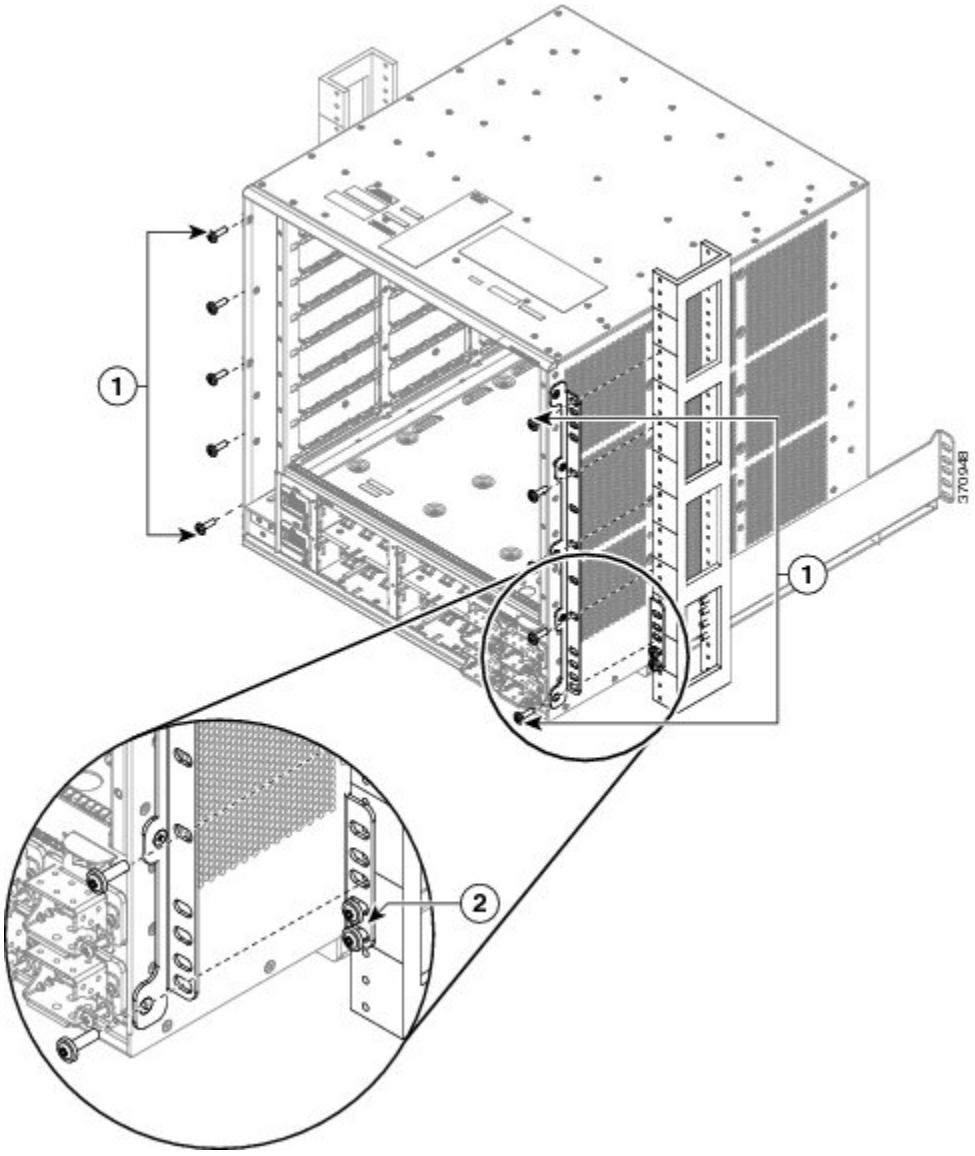
Step 2 Rest the back end of the chassis on the edges of the rack-mount shelf kit rails and carefully slide the chassis fully into the rack.

Step 3 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 and install 10 screws (five on each side).

If the rack post holes are unthreaded, install 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.

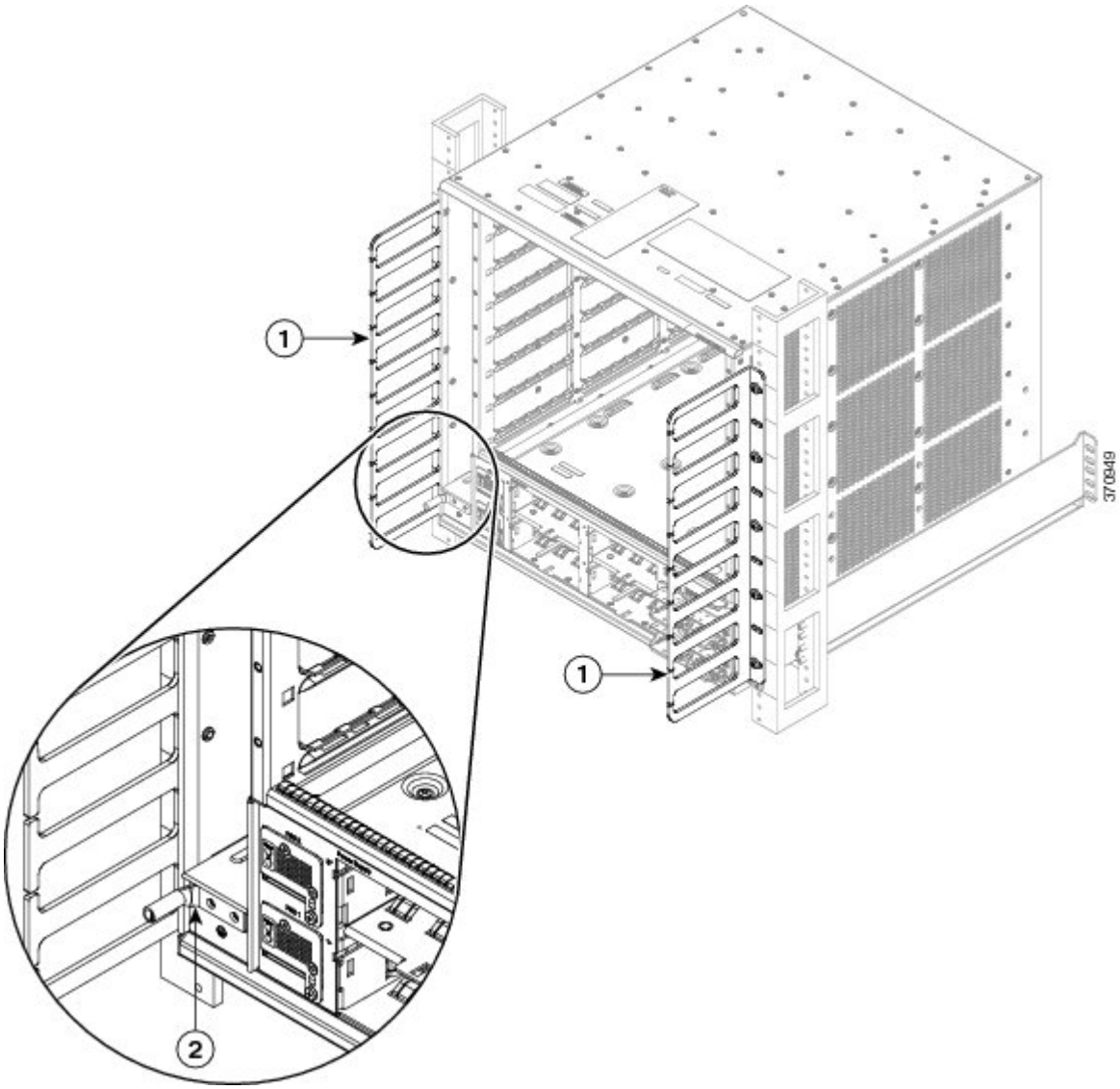
Figure 10: Installing the Chassis in a Rack with a 17.75-inch Opening



1	Five screws on each side to secure the L bracket ears to the rack	2	Shelf brackets secured to the rack using two EA screws

Step 4 (Optional) To install one or both of the optional cable guide assemblies, position the cable guides such that the cable guide mounting holes are aligned with the L bracket holes and the rack rail holes, as shown in the following figure:

Figure 11: Installing the Cable Guide in a Rack with a 17.75-inch Opening



1	Cable guide installed on each side.	2	Location and position of the right-angled ground lug with the cable guide installed.

What to Do Next

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

1 Connecting the chassis to system ground.

2 Installing and connecting the power supplies to the power source.

3 Connecting the network interface cables to the supervisor engine and modules. This may involve installing transceivers before you attach the network interface cables.

4 Powering up the chassis and verifying the installation.

Related Topics

Chassis, on page 2

Environmental Specifications, on page 62

Physical Specifications, on page 61

Finding Serial Numbers, on page 106

Establishing System Ground

To attach the grounding lug and cable to the grounding pad, perform these steps

Before You Begin

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

- Grounding lug—A two-hole right-angled 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 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.

Procedure

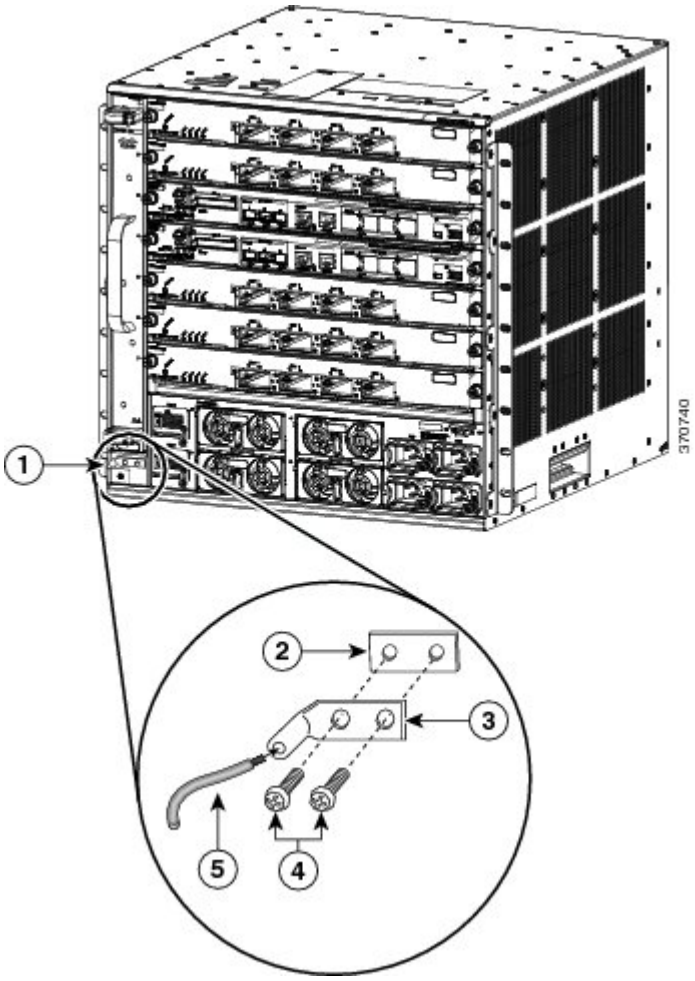
Step 1 Use a wire-stripping tool to remove approximately 0.75 inches (19 mm) of the covering from the end of the grounding wire.

Step 2 Insert the stripped end of the grounding wire into the open end of the right-angled 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 Secure the grounding lug to the system ground connector with two M4 screws. Ensure that the grounding lug and the grounding wire do not interfere with other switch hardware or rack equipment.

Figure 12: Locating and Connecting System Ground



1	System ground location	4	M4 screws to secure the lug to the connector
2	System ground connector	5	Stripped end of the grounding wire inserted into the open end of the right-angled grounding lug

3	Right-angled grounding lug		

Step 5 Prepare the other end of the grounding wire, and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the switch.

Related Topics

Preventing Electrostatic Discharge Damage , on page 23

Attaching an ESD Strap

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

Procedure

Step 1 Attach the ESD wrist strap to bare skin as follows:

a) If you are using the ESD wrist strap supplied with the FRUs, open the wrist strap package and unwrap the ESD wrist strap. Place the black conductive loop over your wrist and tighten the strap such that it touches your bare skin well.

b) If you are using an ESD wrist strap equipped with an alligator clip, open the package and remove the ESD wrist strap. Locate the end of the wrist strap that attaches to your body and secure it 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. We 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.

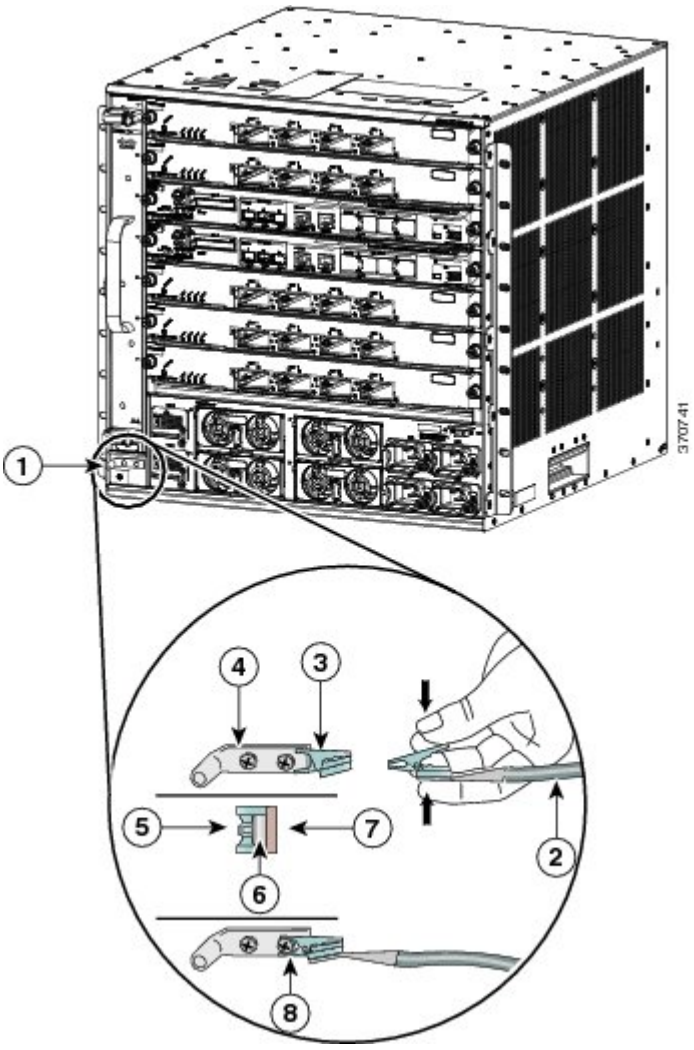
Step 3 Attach either the spring clip or the alligator clip to the ground lug screw as follows:

a) If you are using the ESD wrist strap that is supplied with the FRUs, squeeze the spring clip jaws open, position the spring clip to one side of the system ground lug screw head, and slide the spring clip over the lug screw head so that the spring clip jaws close behind the lug screw head.

Note The spring clip jaws do not open wide enough to fit directly over the head of the lug screw or the lug barrel.

b) If you are using an ESD wrist strap that is equipped with an alligator clip, attach the alligator clip directly over the head of the system ground lug screw or to the system ground lug barrel.

Figure 13: Attaching the ESD Wrist Strap Clip to the System Ground Lug Screw



1	System ground connector	5	Side clip behind the screw
2	ESD ground strap	6	Screw
3	Clip	7	Side view of grounding lug
4	Right-angled grounding lug	8	Clip installed behind the screw

When handling modules, follow these guidelines:

- Handle carriers using the available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component boardside up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
- Never attempt to remove the printed circuit board from the metal carrier.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohm (Mohm).

Related Topics

Preventing Electrostatic Discharge Damage , on page 23

Verifying the Switch Chassis Installation

To verify the switch chassis installation, perform these steps:

Procedure

Step 1 Verify that the ejector levers of each module are fully closed (parallel to the faceplate) to ensure that the supervisor engine and all the switching modules are fully seated in the backplane connectors.

Step 2 Check the captive installation screws of each module, power supply, and power supply converter. Tighten loose captive installation screws.

Step 3 Verify that all empty module slots have blank faceplates installed properly. The blank faceplates optimize the air flow through the chassis and contain EMI.

Warning Blank faceplates and cover panels serve three important functions— They prevent exposure to hazardous voltages and currents inside the chassis; they contain EMI that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system until all cards, face plates, front covers, and rear covers are in place. Statement 1029

Step 4 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.

What to Do Next

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.

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

Online Diagnostics

The Cisco Catalyst 6807-XL switches running Cisco IOS have many levels of online diagnostic capabilities. The online diagnostics are divided into the following 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.

Connecting the Supervisor Engine Console Port

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.

Note You have to order the necessary cable and adapters to connect a terminal or modem to the console port.

To connect a terminal to the console port and then connect a modem to the console port using the cable and adapters, follow these steps:

Procedure

Step 1 Connect to the port using the RJ-45-to-RJ-45 cable and the RJ-45-to-DB-25 DTE adapter or the RJ-45-to-DB-9 DTE adapter (labeled Terminal).

Step 2 Check the corresponding 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
- 2 stop bits

Step 3 Connect to the port using the RJ-45-to-RJ-45 rollover cable and the RJ-45-to-DB-25 DCE adapter (labeled Modem).
The console port mode switch should be in the IN position (factory default).

Step 4 Position the cable in the cable guide (if installed). Make sure there are no sharp bends in the cable.

Related Topics

Supervisor Engine, on page 3
Console Cables, on page 89

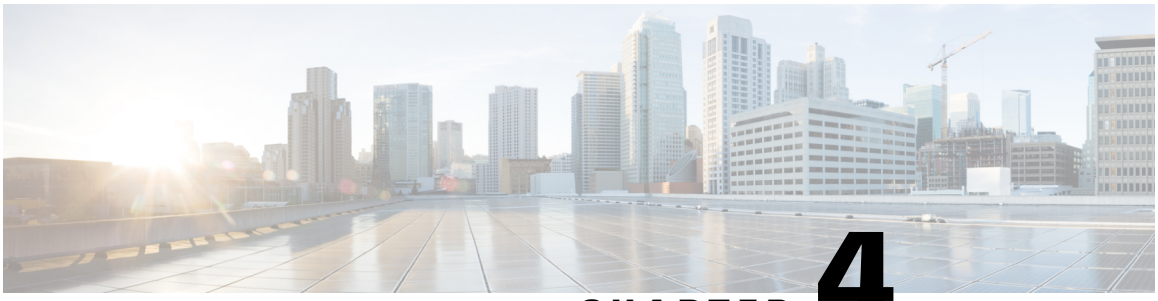
Installing Transceivers and Module Connectors

For detailed instructions about installing transceivers and module connectors, see the following:

- Cisco SFP and SFP+ Transceiver Module Installation Notes
- Cisco 10-Gigabit Ethernet X2 Transceiver Modules Installation Note
- Installation Notes for the Cisco TwinGig and OneX Converter Modules

Related Topics

Modules, on page 3
Pluggable Transceivers, on page 79
Module Connectors, on page 84
Cable Specifications, on page 88



CHAPTER 4

Removing and Replacing FRUs

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

Online Insertion and Removal

The online insertion and removal (OIR) feature allows you to remove and replace modules while the system is online. You can shut down the modules before removal and restart them after insertion, without causing other software or interfaces to shut down.

Note Do not remove or install more than one module at a time. After you remove or install a module, check the module LEDs before continuing.

When a module is removed or installed, the switch stops processing traffic for the module and scans the system for a configuration change. Each interface type is verified against the system configuration, and then the system runs diagnostics on the new module. There is no disruption of normal operation during module insertion or removal.

The switch can bring up only an identical replacement module online. To support the OIR of an identical module, the module configuration is not removed from the running-config file when you remove a module.

If the replacement module is different from the removed module, you must configure it before the switch can bring it online.

Layer 2 MAC addresses are stored in an EEPROM, which allows modules to be replaced online without requiring the system to update switching tables and data structures. Regardless of the types of modules installed, the Layer 2 MAC addresses do not change unless you replace the supervisor engine. If you do replace the

supervisor engine, the Layer 2 addresses of all the ports change to those specified in the address allocator on the new supervisor engine.

Removing and Installing Power Supplies

This section describes how to remove and install PSMs.

Note

- The PSMs installed in the switch chassis should be AC input only.
- The PSM is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system.

Caution Use both hands to install and remove power supplies.

Related Topics

Power Supply Module, on page 5
Power Entry Module, on page 7
Power Supply Module LEDs, on page 9
3000 W Power Supply AC Power Cords, on page 67

Installing AC Power Supplies

To install an AC input PSM, follow these steps:

Warning High leakage current-earth connection essential before connecting to system power supply. Statement 342

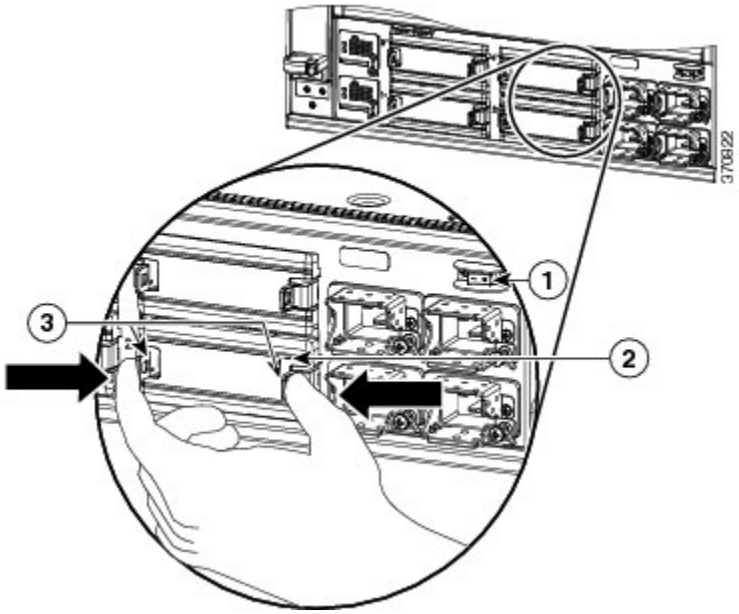
Before You Begin

- For ground connection instructions, see Establishing System Ground, on page 41
- You may require a flat-blade or Number 2 Phillips-head screwdriver to tighten the screw on the PSM.

Procedure

Step 1 Remove the blank cover from the power supply bay if there is one installed. Grasp the two retaining clips with your thumb and forefinger and squeeze to detatch the blank cover from the power supply bay.

Figure 14: Removing the Power Supply Blank



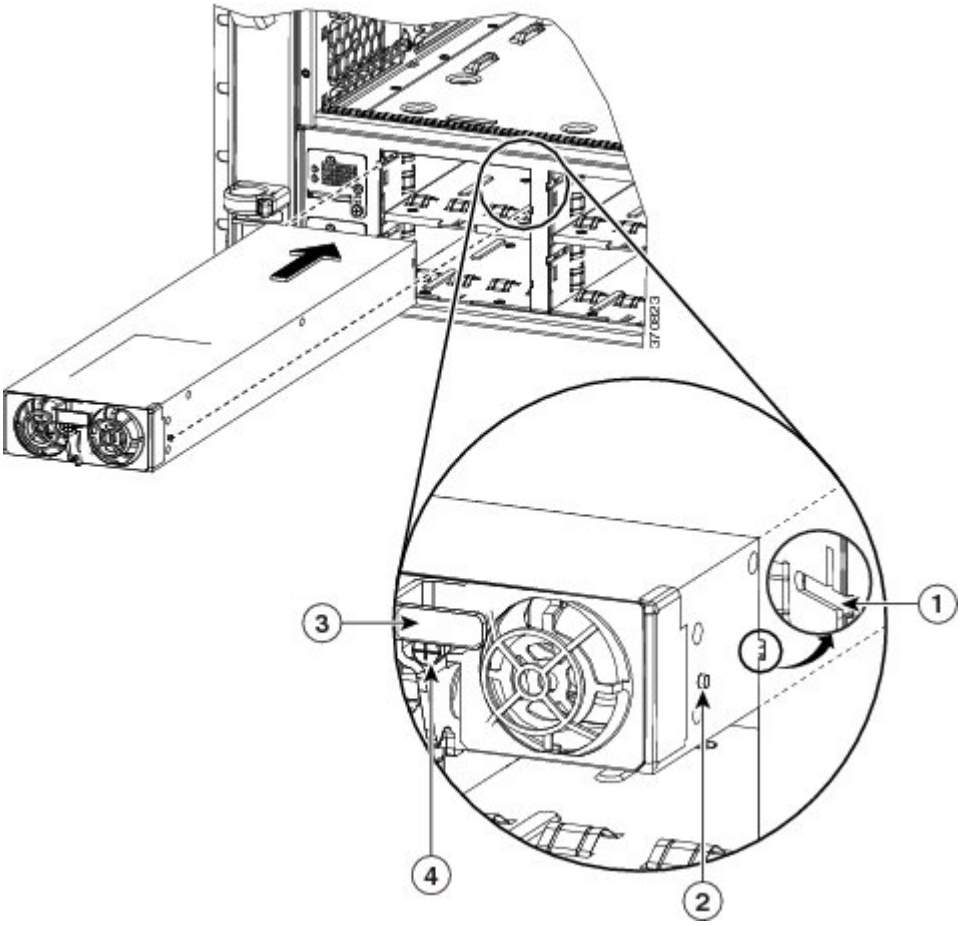
1	System On/ Off switch	3	Retaining clips on the blank cover.
2	Power supply blank		

Step 2 Remove the PSM from its shipping packaging.

Step 3 Slide the PSM into the power supply bay. Make sure that the power supply is fully seated in the bay.

Tip The slot inside the power supply bay ensures that PSM is installed in only one direction.

Figure 15: Installing the Power Supply Module



1	Slot in the power supply bay	3	Latch
2	Nub on the PSM that slides into the slot	4	Captive installation screw

Step 4 Rotate the latch up and tighten the captive installation screw to lock the latch in place.

Step 5 Plug the AC power cord (connected to a power source on one end) into the corresponding power entry module (PEM). For example, if you have installed the PSM in bay 1, plug the power cord into AC1.
For a list of supported AC power cords for your particular AC input power supply, see 3000 W Power Supply AC Power Cords, on page 67.

Step 6 Tighten the screw on the cable clamp next to the PEM. This ensures that the power cord is not accidentally pulled out. See callout (5) in Figure 16: PSM and PEM, on page 53

Removing AC Power Supplies

Each power supply module has a power hold-up time of 20 milliseconds at 100 percent load and fully supports OIR. To remove an AC-input power supply, follow these steps:

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

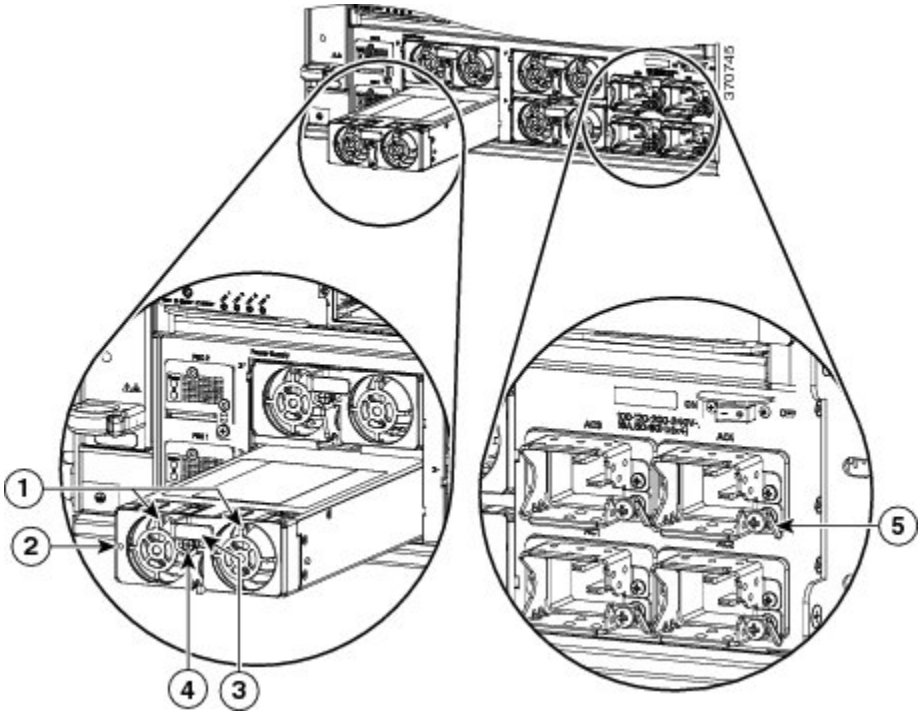
Before You Begin

You may require a flat-blade or Number 2 Phillips-head screwdriver to loosen the captive installation screw.

Procedure

Step 1 Loosen the captive installation screw on the power supply module and push the latch down.

Figure 16: PSM and PEM



1	Dual variable speed fans	4	Captive installation screw
2	PSM LEDs	5	Cable clamp next to the PEM
3	Latch		

Step 2 Grasp the power supply latch and pull to slide the power supply part of the way out of the chassis. Place your other hand underneath the power supply, and slide the power supply clear out of the chassis.

Step 3 If the power supply bay is to remain empty:

a) Install a blank (Cisco part number C6800-PS-CVR=), which is a part of the accessory kit, over the opening.

b) (Optional) Remove the corresponding power cord by loosening the cable clamp and then detaching the power cord.

Removing and Installing the Fan Tray

This section describes how to remove and install the fan tray.

Note The fan tray is designed to be removed and installed while the system is operating (powered on) without presenting an electrical hazard or damage to the system.

Related Topics

Fan Tray, on page 4

Air Flow, on page 15

Fan Tray LED, on page 8

Installing the Fan Tray

To install the new fan tray, perform these steps:

Procedure

Step 1 Remove the fan tray from its packaging.

Step 2 Hold the fan tray handle with one hand. Place your other hand underneath the fan tray. (The correct position involves the fan tray LEDs being on top).

Step 3 Place the fan module into the front of the fan tray bay so that it rests on the chassis, lift the fan module up slightly to align it with the top and bottom of the bay, and then push the fan module into the chassis until it sits in the backplane. The fan module willl snap in.

What to Do Next

Check that the new fan assembly is installed correctly. For more information, see Checking Fan Tray Installation.

Checking Fan Tray Installation

To verify that the new fan assembly is installed correctly, perform these steps:

Procedure

Step 1 If the switch is powered on, listen for the fans; you should immediately hear them operating. If you do not hear them, ensure that the fan module is inserted completely and correctly in the bay and the outside surface of the fan module is flush with the outside surface of the chassis.

Step 2 Verify that the fan status LED is green. If the LED is red, one or more fans are faulty.

Step 3 If, after several attempts, the fans do not operate, or if you experience trouble with the installation, contact a Cisco customer service representative for assistance.

Removing the Fan Tray

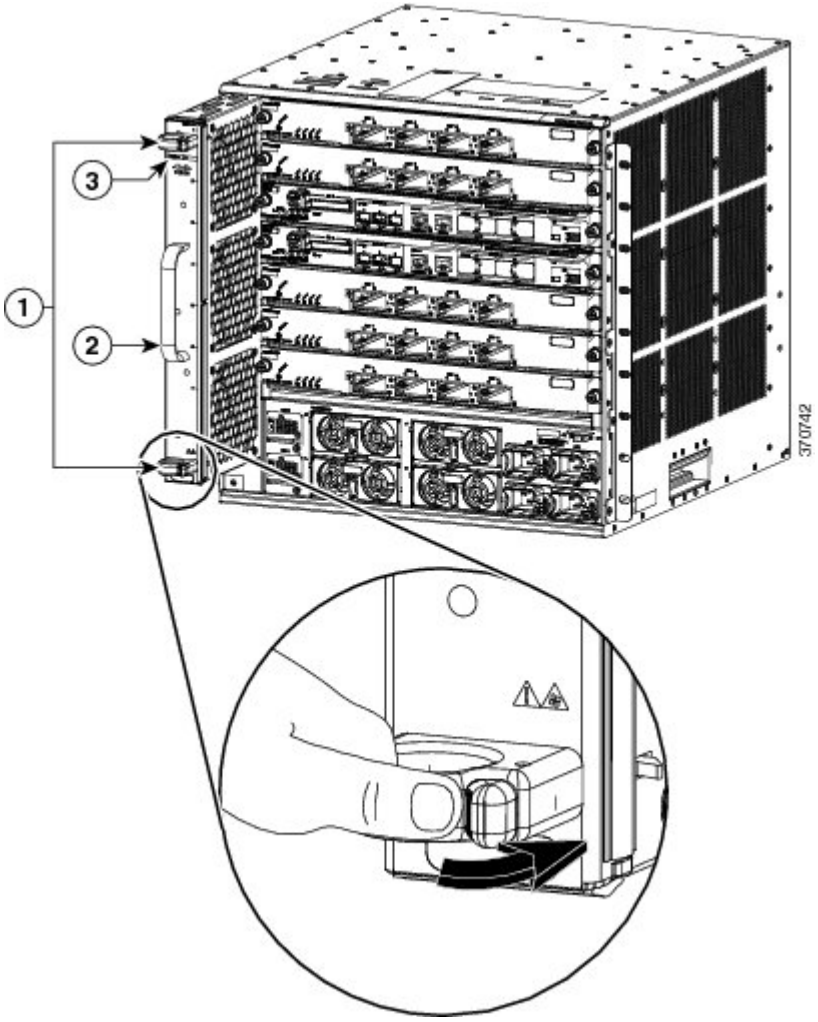
To remove the fan tray, perform these steps:

Procedure

Step 1 Locate the fan tray in the chassis.

Step 2 Grasp and simultaneously push both spring latches with your thumb in a left to right direction. Slide the fan tray half-way out of the bay. Rock it gently, if necessary, to unseat the power connector from the backplane.

Figure 17: Fan Tray Location and Spring Latch Operation



1	Spring latches and close-up view of spring latch operation	3	Fan tray LED
2	Fan tray handle		

Step 3 Grasp the handle to pull the fan assembly clear of the chassis, and set it aside.

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

Removing and Installing the Power Supply Converter

This section describes how to remove and install PSCs.

Related Topics

Power Supply Converter, on page 7

Power Supply Converter LEDs, on page 10

Installing the Power Supply Converter

To install the PSC, perform these steps:

Before You Begin

- Ensure that the system (earth) ground connection has been made. For ground connection instructions, see Establishing System Ground, on page 41
- You may require a flat-blade or Number 2 Phillips-head screwdriver to tighten the screw on the PSC.

Procedure

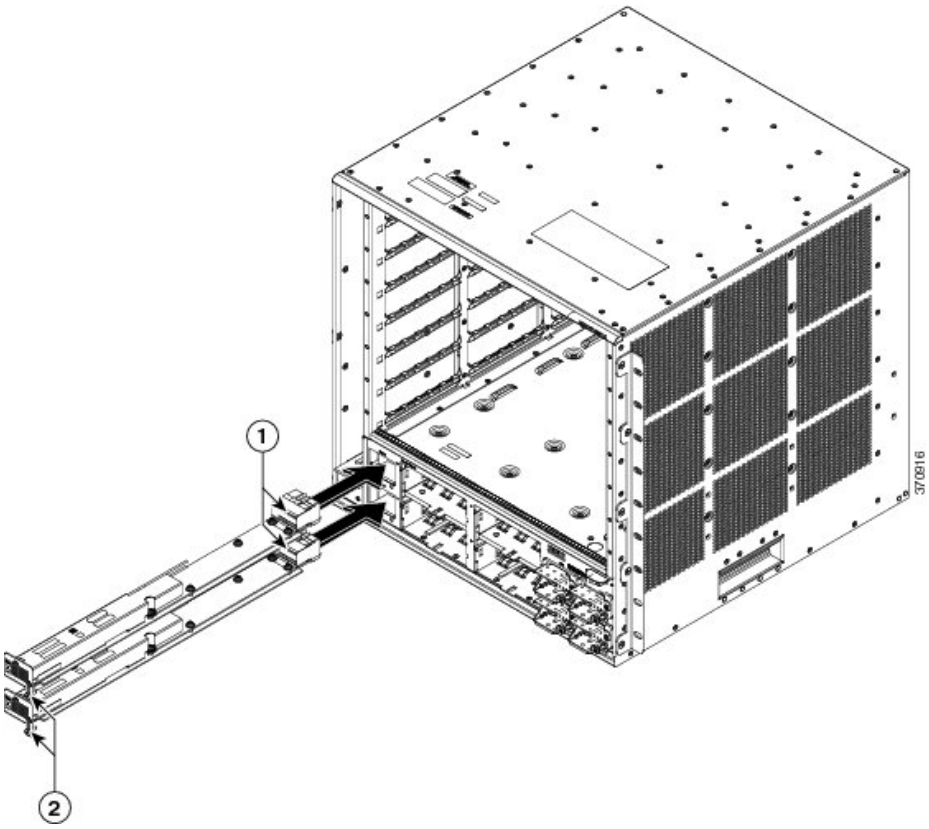
Step 1 Remove the PSC from its packaging.

Step 2 Slide the PSC into the PSC bay. Ensure that the power supply is fully seated in the bay.

Step 3 Insert the mounting screw and tighten it to fully seat the connectors.

If the system is powered on and PSC is installed properly, the PSC STATUS LED is green.

Figure 18: Installing the PSC



1	Power rail connectors	2	Mounting screws (one for each PSC)

Removing the Power Supply Converter

To remove the PSC, perform these steps:

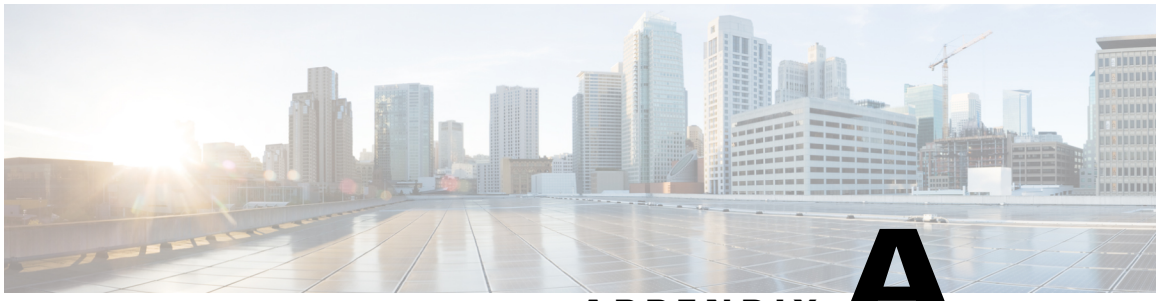
Before You Begin

- Ensure that the system (earth) ground connection has been made. For ground connection instructions, see Establishing System Ground, on page 41.
- You may require a flat-blade or Number 2 Phillips-head screwdriver to loosen the screw on the PSC.

Procedure

Step 1 Loosen the mounting screw on the PSC. This detaches the connectors.

Step 2 Slide the PSC out of the bay.



APPENDIX A

Technical Specifications

Physical Specifications

The following are the physical characteristics of the chassis:

Table 13: Physical Characteristics of the Cisco Catalyst 6807-XL Switch Chassis

Physical Characteristic	Details
Dimensions (H x W x D)	17.5 x 17.36 x 18.10 inches (44.45 x 44.09 x 45.97 cm). • Chassis depth, including the cable guide is 23 inches (58.42 cm). • Chassis requires 10 RU[7]. • You can install the chassis in: ◦ 2-post or 4-post 19-inch standard equipment racks that meet ANSI/EIA 310-D, IEC 60297, and ETS 300-119 standards. These are available in the accessory kit. ◦ 2-post 23-inch equipment racks, where you install the chassis using center-mount brackets (to be ordered separately).
Weight	Chassis only: 65 lb (29.48 kg). Chassis fully configured with 2 supervisor engines, 5 switching modules, and 4 power supplies: 195 lb (88.45 kg)

7 The 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).

Related Topics

Rack-Mounting the Chassis, on page 37
Chassis, on page 2

Environmental Specifications

The following are the environmental specifications of the chassis:

Table 14: Environmental Specifications of the Cisco Catalyst 6807-XL Switch Chassis

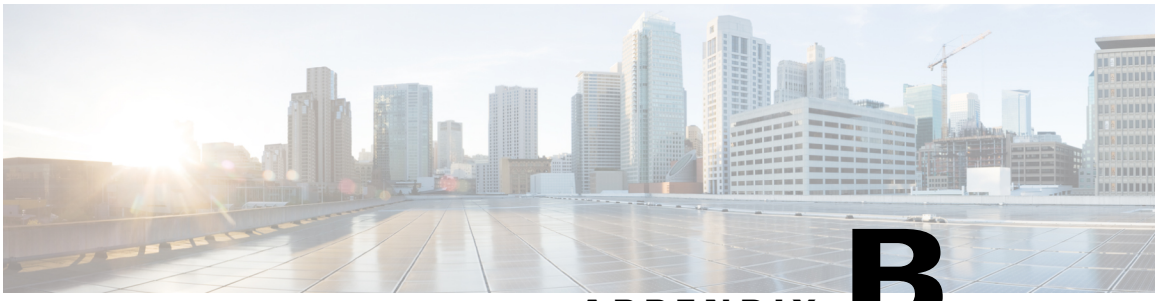
Item	Environmental Specification
Operating temperature	Certified for operation: 32 to 104 °F (0 to 40 °C). Designed and tested for operation: 32 to 131 °F (0 to 55 °C). **Note** The Cisco Catalyst 6807-XL switches are equipped with internal air temperature sensors that are triggered at 104 °F (40 °C) generating a minor alarm and at 131 °F (55 °C) generating a major alarm.
Nonoperating and storage temperature	Chassis unpackaged: -4 to 149 °F (-20 to 65 °C). Chassis in protective shipping package: -40 to 158 °F (-40 to 70 °C).
Thermal transition	0.5 °C per minute (hot to cold). 0.33 °C per minute (cold to hot).
Ambient (noncondensing) operating humidity (RH)	5 to 90 percent.
Ambient (noncondensing) nonoperating and storage humidity	5 to 95 percent.
Operating altitude	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) .
Shock and vibration	Shock • Operational—5 G 30 ms, half-sine (IEC 68-2-27). • Nonoperational—20 G, 7.5 ms, trapezoidal. Vibration • Operational—3 to 500 Hz. • Power Spectral Density (PSD)—0.0005 G2/Hz at 10 and 200 Hz. 5 dB/octave roll off at each end. 0.5 hours per axis (1.12 g).

Item	Environmental Specification
Acoustic noise	67 dB. International Organization for Standardization (ISO) 7779: Bystander position operating to an ambient temperature of 86 °F (30 °C).

Related Topics

Rack-Mounting the Chassis, on page 37

Chassis, on page 2



APPENDIX B

Power Supply Specifications

3000 W AC-Input Power Supply Specifications

The following table lists specifications for the 3000 W AC input power supply:

Table 15: 3000 W AC-Input Power Supply Specifications

Specification	Description
AC-input type	Autoranging input with power factor correction. **Note** Power factor correction is a standard feature on AC-input power supplies. Power factor correction reduces the reactive component in the source AC current, allowing higher power factors (typically 99 percent or better) and lower harmonic current components.
AC-input voltage	Low-line (120 VAC nominal)—90 VAC (min) to 132 VAC (max) High-line (230 VAC nominal)—170 VAC (min) to 264 VAC (max)
AC-input current	16 A @ 240 VAC (3000 W output) 16 A @ 120 VAC (1300 W output)
AC-input frequency	50/60 Hz (nominal) (±3% for full range)

Specification	Description
Branch circuit requirement	Each chassis power supply should have its own dedicated, fused-branch circuit: • North America—20 A. • International—Circuits sized to local and national codes. • All AC power supply inputs are fully isolated: ◦ Source AC can be out of phase between multiple power supplies in the same chassis, which means that PS1 can be operating from phase A and PS2 can be operating from phase B. ◦ For high-line operation, the power supply operates with the hot conductor wired to a source AC phase and the neutral conductor wired either to ground or to another source AC phase as long as the net input voltage is in the range of 170 to 264 VAC. ◦ Source AC can be out of phase between AC inputs on power supplies that are equipped with multiple AC inputs, which means that power cord 1 can be plugged into phase A and power cord 2 can be plugged into phase B.
Power supply output capacity	1400 W maximum (100 to 120 VAC) 3000 W maximum (200 to 240 VAC)
Power supply output	• 100 to 120 VAC operation ◦ 25.0 A @ +3.3 V ◦ 5 A @ +5 V ◦ 12 A @ +12 V ◦ 27.89 A @ +42 V • 200 to 240 VAC operation ◦ 25.0 A @ +3.3 V ◦ 5 A @ +5 V ◦ 12 A @ +12 V ◦ 65.98 A @ +42 V
Output holdup time	20 ms minimum.
kVA rating[8]	3520 W (total input power) or 3.6 kVA (high-line operation).
Heat dissipation	12,046 BTU /hour (approx.)
Weight	6 lb (2.72 kg)

8 The kVA rating listed for the power supply should be used as the sizing criteria for both UPS outputs as well as standard circuits and transformers to power a switch

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 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 16: 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	Figure 19: CAB-IR2073-C19-AR= (Argentina) , on page 69
Australia, New Zealand	AU20S3	16 A, 250 VAC	Figure 20: CAB-AC-16A-AUS= (Australia, New Zealand), on page 69
Brazil	EN60320 / C19	16 A, 250 VAC	Figure 21: UCSB-CABL-C19-BRZ= (Brazil), on page 69
People's Republic of China	GB16C	16 A, 250 VAC	Figure 22: CAB-AC16A-CH= (People's Republic of China), on page 69
Continental Europe	CEE 7/7	16 A, 250 VAC	Figure 23: CAB-AC-2500W-EU= (Continental Europe), on page 70
India	EN60320/C19	16 A, 250 VAC	Figure 24: CAB-SABS-C19-IND= (India), on page 70
International	IEC 309	16 A, 250 VAC	Figure 25: CAB-AC-2500W-INT= (International), on page 70
Israel	SI16S3	16 A, 250 VAC	Figure 26: CAB-AC-2500W-ISRL= (Israel), on page 71
Italy	CEI 23-16/7	16 A, 250 VAC	Figure 27: CAB-7513ACI= (Italy), on page 71

Locale	AC Source Plug Type	Cordset Rating	Power Cord Part Number and Reference Illustration
Japan, North America (Nonlocking Plug) 200 to 240 VAC Operation	NEMA 6-20	16 A, 250 VAC	Figure 28: CAB-AC-2500W-US1= (Japan, North America [Nonlocking Plug] 200 to 240 VAC operation), on page 71
Japan, North America (Locking Plug)200 to 240 VAC Operation	NEMA L6-20	16 A, 250 VAC	Figure 29: CAB-AC-C6K-TWLK= (Japan, North America [Locking Plug] 200 to 240 VAC operation), on page 72
Japan, North America 100 to 120 VAC operation [9]	NEMA 5-20	20 A, 125 VAC	Figure 30: CAB-7513AC= (Japan, North America100 to120 VAC operation), on page 73
North America	NEMA L5 -20	20 A, 125 VAC	Figure 31: CAB- L520P - C19 -US= (North America), on page 73
Power Distribution Unit (PDU) [10]	IEC 60320 C19 IEC 60320 C20	16 A, 250 VAC	Figure 32: CAB-C19-CBN= (PDU), on page 73
South Africa	IEC 884-1	16 A, 250 VAC	Figure 33: CAB-7513ACSA (South Africa), on page 73
Switzerland	SEV 5934-2 Type 23	16 A, 250 VAC	Figure 34: CAB-ACS-16= (Switzerland), on page 74

9 The 3000 W power supply operating on 110 VAC delivers 1400 W.

10 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 .

AC Power Cord Illustrations

Figure 19: CAB-IR2073-C19-AR= (Argentina)

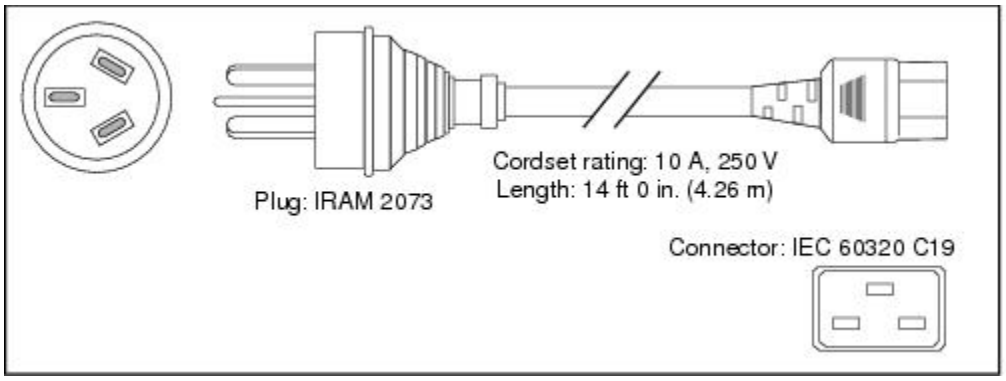


Figure 20: CAB-AC-16A-AUS= (Australia, New Zealand)

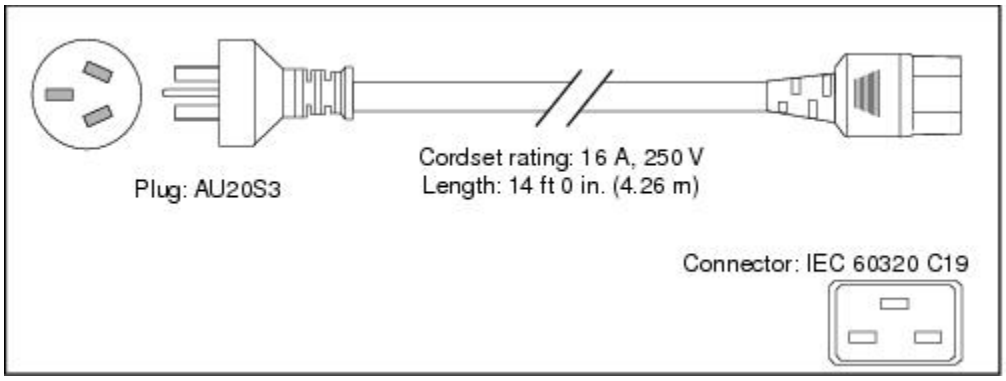


Figure 21: UCSB-CABL-C19-BRZ= (Brazil)

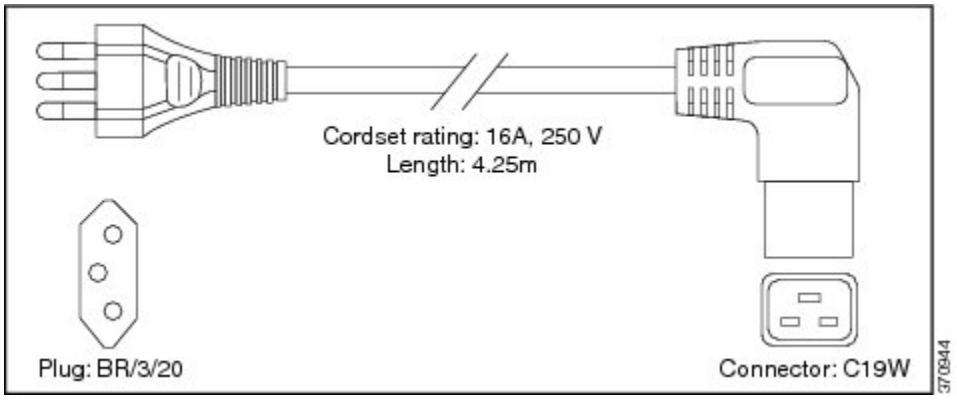


Figure 22: CAB-AC16A-CH= (People's Republic of China)

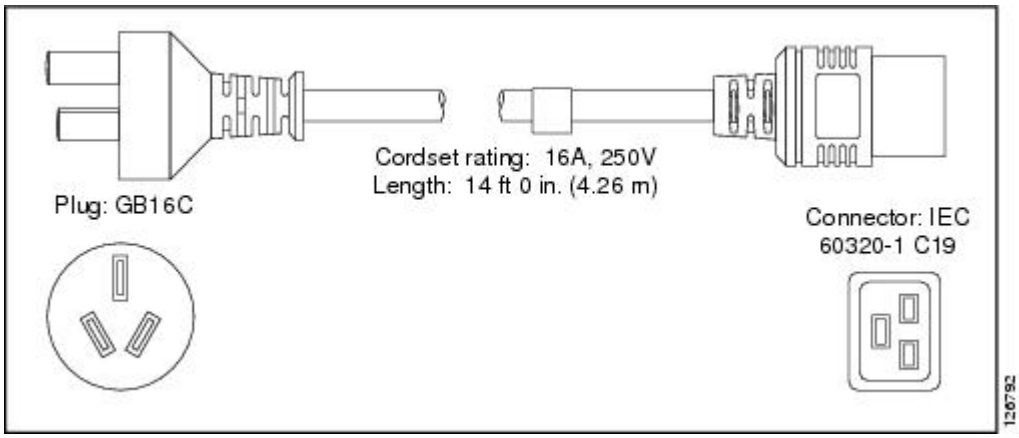


Figure 23: CAB-AC-2500W-EU= (Continental Europe)

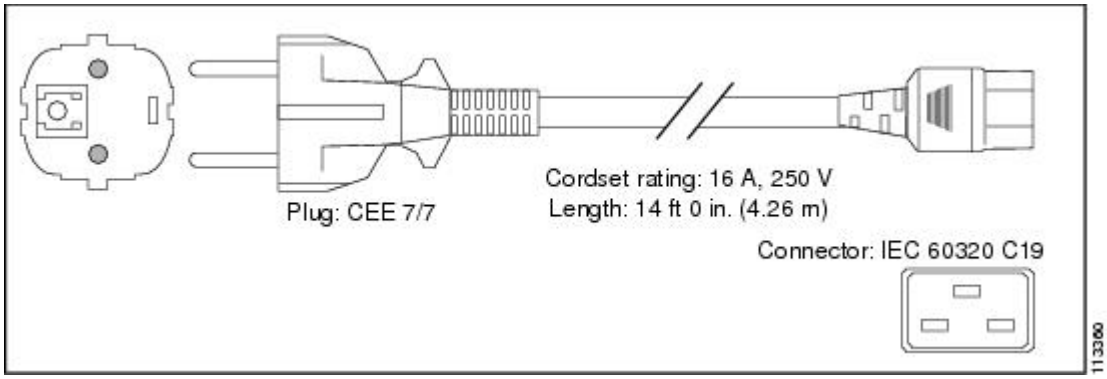


Figure 24: CAB-SABS-C19-IND= (India)

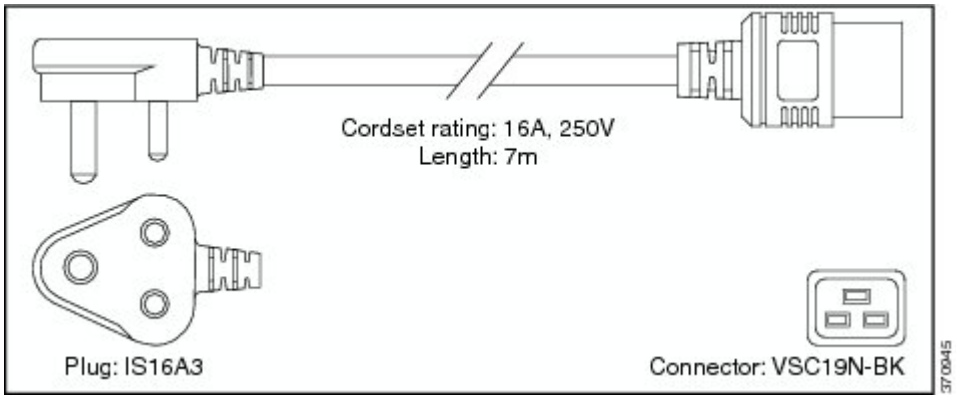


Figure 25: CAB-AC-2500W-INT= (International)

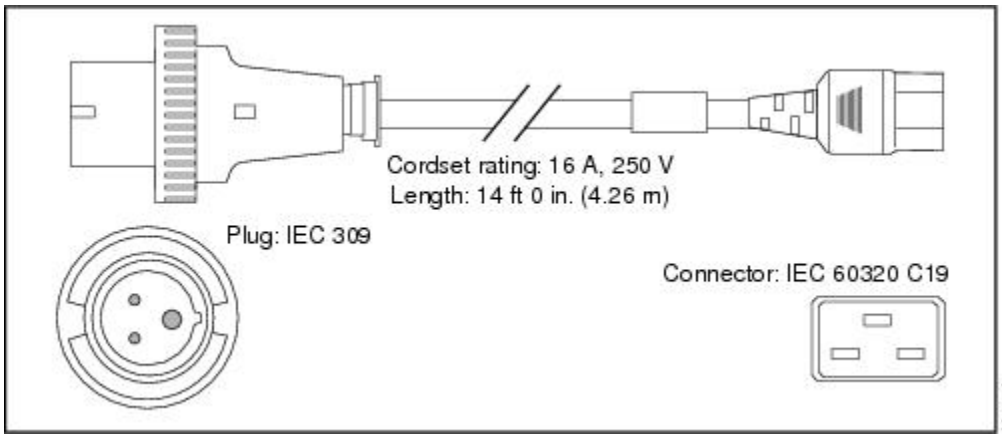


Figure 26: CAB-AC-2500W-ISRL= (Israel)

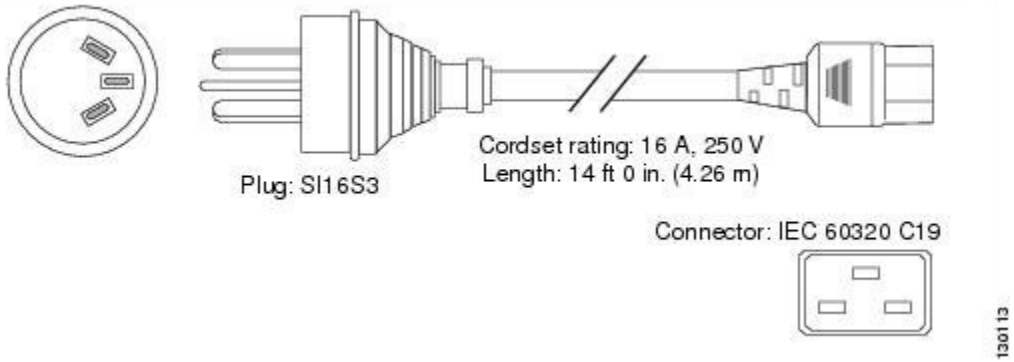


Figure 27: CAB-7513ACI= (Italy)

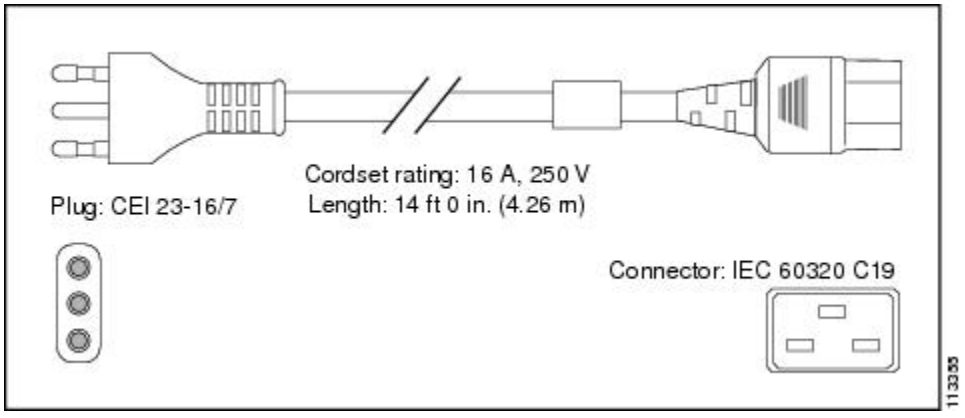


Figure 28: CAB-AC-2500W-US1= (Japan, North America [Nonlocking Plug] 200 to 240 VAC operation)

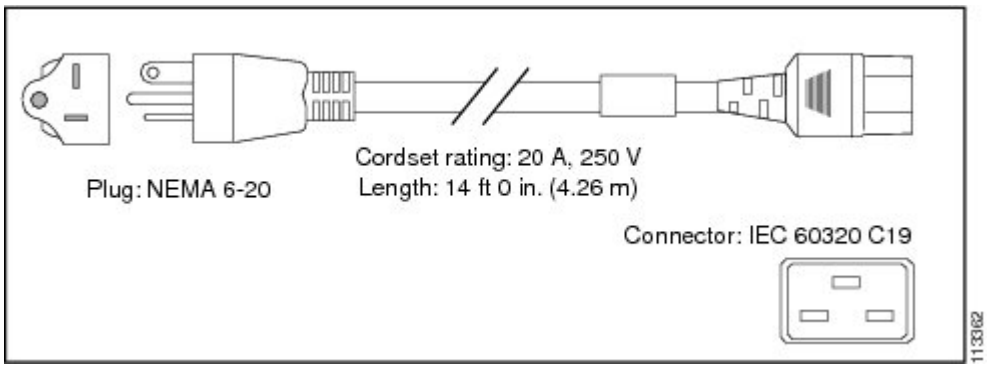
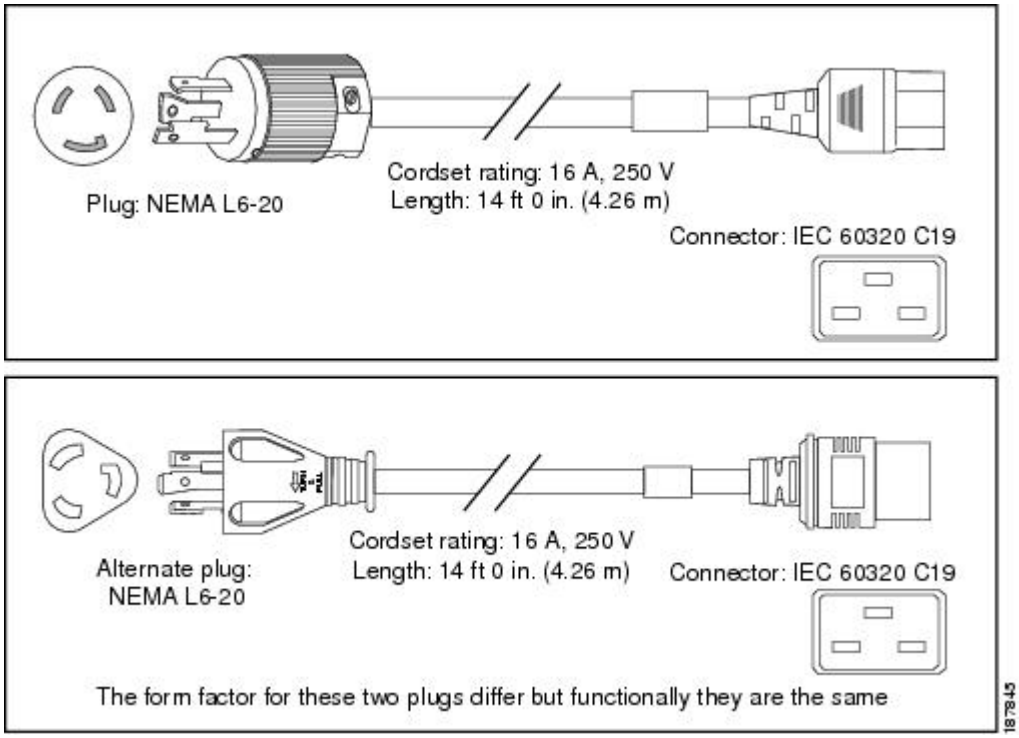


Figure 29: CAB-AC-C6K-TWLK= (Japan, North America [Locking Plug] 200 to 240 VAC operation)



Note The form factor for these two plugs differ but functionally they are the same.

Figure 30: CAB-7513AC= (Japan, North America100 to120 VAC operation)

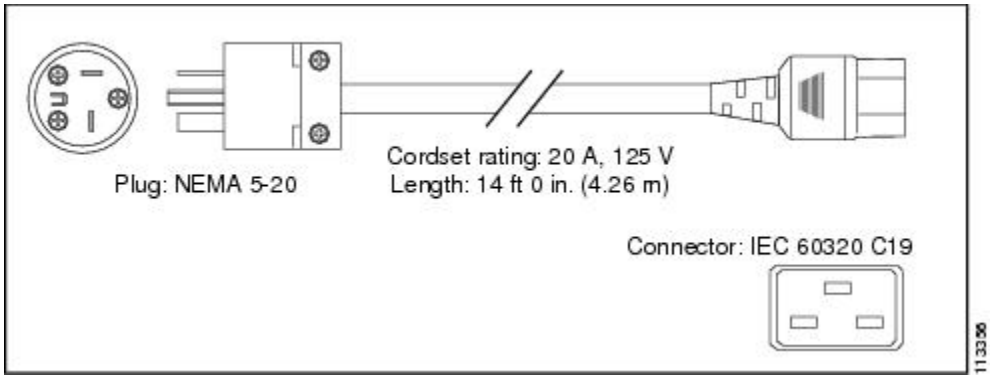


Figure 31: CAB- L520P - C19 -US= (North America)

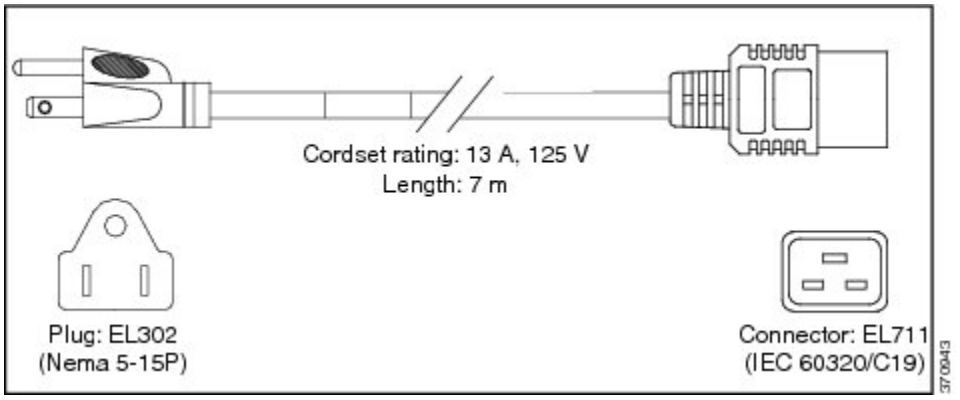


Figure 32: CAB-C19-CBN= (PDU)

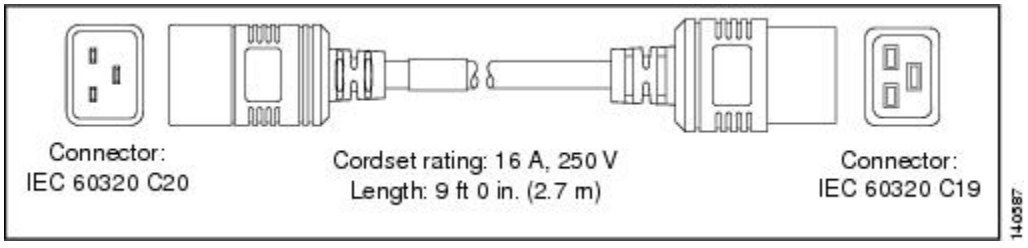


Figure 33: CAB-7513ACSA (South Africa)

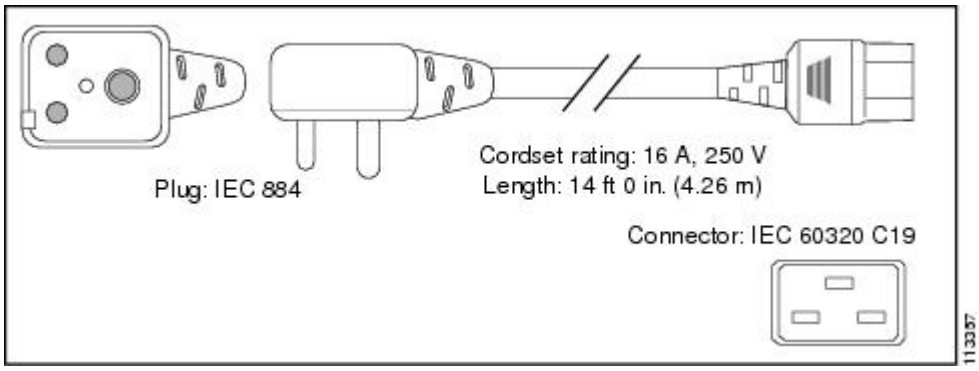
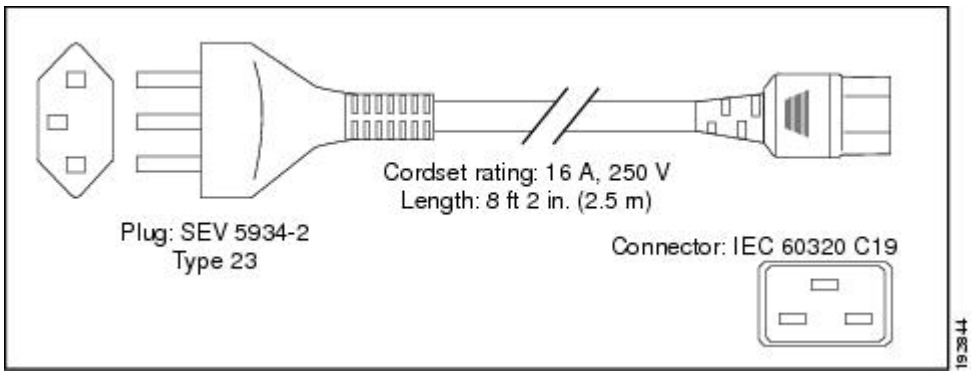


Figure 34: CAB-ACS-16= (Switzerland)



Related Topics

Removing and Installing Power Supplies, on page 50
Troubleshooting the Power Supply Module, on page 104
Power Supply Module, on page 5
Power Entry Module, on page 7

Chassis and Module Power and Heat Values

The following tables provide the power and heat dissipation data for the chassis and modules. Unless otherwise noted, the information in the tables is measured under fully loaded conditions (transceivers installed). Typical numbers are approximately 20 percent below the numbers listed in these tables.

Note Module power is the output from the power supply (internal to the system). The AC-input power is the input from the outlet to the power supply. The percentage difference between the two values is the efficiency of the power supply.

Table 17: Power Requirements and Heat Dissipation—Chassis and Fan Trays

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
C6807-XL-FAN	5	260	260	887.15

Table 18: Power Requirements and Heat Dissipation—Supervisor Engines

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
VS-S2T-10G	6.80	353.60	353.60	1206.53
VS-S2T-10G-XL	10.73	557.96	557.96	1903.83

Table 19: Power Requirements and Heat Dissipation—Policy Feature Cards

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
VS-F6K-PFC4	2.5	130	130	507.45
VS-F6K-PFC4XL	2.86	148.72	148.72	507.45

Table 20: Power Requirements and Heat Dissipation—Distributed Forwarding Cards (DFCs)

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
WS-F6K-DFC4-E Distributed Forwarding Card E	2.38	123.76	123.76	422.28
WS-F6K-DFC4-EXL Distributed Forwarding Card EXL	2.74	142.48	142.48	486.16
WS-F6K-DFC4-A Distributed Forwarding Card A	2.64	137.28	137.28	468.41

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
WS-F6K-DFC4-AXL Distributed Forwarding Card AXL	2.76	143.52	143.52	489.71

Table 21: Power Requirements and Heat Dissipation—Gigabit Ethernet Modules

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
WS-X6724-SFP	2.98	154.96	154.96	528.74
WS-X6748-SFP	6.07	315.64	315.64	1077.00
WS-X6848-SFP	8.08	420.16	420.16	1433.64

Table 22: Power Requirements and Heat Dissipation—10-Gigabit Ethernet Modules

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU /HR)
WS-X6816-10G (WS-X6816-10G = WS-X6716-10GE + DFC4E)	11.99	623.48	623.48	2127.40
WS-X6816-10G XL	12.26	637.52	637.52	2175.30
WS-X6908-10G	10.29	535.08	535.08	1828.22
WS-X6908-10 XL	10.65	553.8	553.8	1889.64
WS-X6816-10T	10.61	551.72	551.72	1882.54
WS-X6816-10TXL	10.97	570.44	570.44	1946.42

Table 23: Power Requirements and Heat Dissipation—10/100/1000 Ethernet Switching Modules

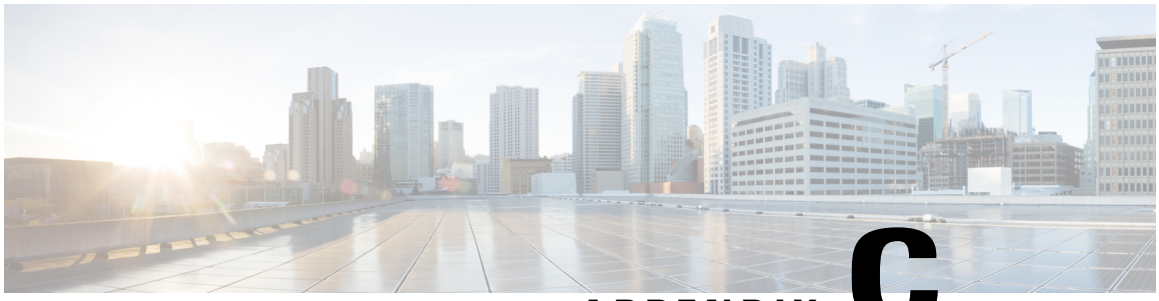
Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
WS-X6748-GE-TX	7.75	403.00	403.00	1375.09
WS-X6848-GE-TX	9.76	507.52	507.52	1731.72

Table 24: Power Requirements and Heat Dissipation—40-Gigabit Ethernet Switching Modules

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
WS-X6904-40G-2T	11.15	579.8	598.52	1978.36
WS-X6904-40G-2TXL	11.51	598.52	598.52	2042.23

Table 25: Power Requirements and Heat Dissipation—Service Modules

Model Number/ Module Type	Module Current (A) @ 52V	Module Power (Watts) (Power-Requested)	AC-Input Power (Watts) (Power-Allocated)	Heat Diss. (BTU/HR)
NAM3	8.83	370.86	370.86	1265.42
ASA-SM	8.83	370.86	370.86	1265.42
WiSM2	5.35	224.70	224.70	766.70
ACE-30	7.98	335.16	335.16	1143.61



APPENDIX C

Transceivers, Module Connectors, and Cable Specifications

Pluggable Transceivers

This section provides brief descriptions of the pluggable transceivers that can be installed in the switch modules and supervisor engines. The following safety warnings apply:

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

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

Warning Class I (CDRH) and Class 1M (IEC) laser products. Statement 1055

Warning Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure. Statement 1057

Related Topics

Installing Transceivers and Module Connectors, on page 47

Modules, on page 3

1-GB Transceivers

The switch supports the 1-GB SFP transceiver. The following table lists the modules that the SFP transceiver supports and the links that provide transceiver specifications:

Table 26: 1-GB Transceiver Types

1-GB Transceiver Type	Supported on These Modules	More Information
SFP	• WS-X6724-SFP • WS-X6748-SFP • WS-X6848-SFP-2T • WS-X6848-SFP-2TXL • VS-S2T-10G • VS-S2T-10GXL	Cisco Small Form-Factor Pluggable Modules for Gigabit Ethernet Applications Data Sheet

Note To determine if a specific SFP transceiver is compatible with the supported modules, see the Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix document that is available on Cisco.com.

10-GB Transceivers

The switch supports the 10-GB X2 and the 10-GB SFP+ transceivers. The following table lists the modules that the transceivers support and the links that provide transceiver specifications:

Table 27: 10-GB Transceiver Types

10-GB Transceiver Type	Supported on These Modules	More Information
X2 transceivers	• WS-X6816-10G-2T • WS-X6816-10G-2TXL • WS-X6908-10G-2T • WS-X6908-10G-2TXL • VS-S2T-10G • VS-S2T-10G XL	Cisco 10GBASE X2 Modules

10-GB Transceiver Type	Supported on These Modules	More Information
SFP+ transceivers	You an use these 10-GB modules with the Cisco OneX Converter Module[11] • WS-X6816-10G-2T • WS-X6816-10G-2TXL • WS-X6908-10G-2T • WS-X6908-10G-2TXL • VS-S2T-10G • VS-S2T-10G XL You can also use these 40-GB modules with the Cisco FourX Converter Module[12]: • WS-X6904-40G-2T • WS-X6904-40G-2TXL	• Cisco 10GBASE SFP+ Modules Data Sheet • Cisco OneX Converter Module • Cisco 40GBASE CFP Modules Data Sheet

11 CVR-X2-SFP10G - converter for X2 ports.
12 CVR-CFP-4SFP10G.

To determine if a specific 10-GB transceiver is compatible with the supported modules, see the 10-Gigabit Ethernet Transceiver Modules Compatibility Matrix document that is available on Cisco.com.

40-GB Transceivers

The switch supports 40-Gigabit CFP transceiver modules that are hot-swappable I/O devices that plug into 40-Gigabit Ethernet module ports. The CFP transceiver module connects the electrical circuitry of the platform with an optical network. The following table lists the modules that the transceiver supports and the links that provide transceiver specifications:

Table 28: 40-GB Transceiver Types

40-GB Transceiver Type	Supported on These Modules	More Information
CFP transceiver	• WS-X6904-40G-2T • WS-X6904-40G-2TXL	Cisco 40GBASE CFP Modules Data Sheet

Note To determine if a specific 40-GB transceiver is compatible with the supported modules, see the Cisco 40-Gigabit Ethernet Transceiver Modules Compatibility Matrix document that is available on Cisco.com.

WDM Transceivers

The following table lists the supported modules, applicable illustrations, and the specification tables for WDM transceivers.

Table 29: WDM Transceiver Types

WDM Transceiver Type	Description	Supported on These Modules	More Information
CWDM SFP	The Coarse Wavelength Division Multiplexing (CWDM) SFP is a hot-swappable device that you can plug into SFP-compatible modules and supervisor engines. The CWDM SFP transceiver uses an LC optical connector to connect to a single-mode fiber-optic (SMF) cable. You can connect the CWDM SFPs to the CWDM passive optical system optical add/drop multiplexer (OADM) modules or multiplexer/demultiplexer plug-in modules using single-mode fiber-optic cables.	• WS-X6724-SFP • WS-X6748-SFP • WS-X6848-SFP • VS-S2T-10G • VS-S2T-10G XL	Cisco CWDM GBIC and SFP Solution

WDM Transceiver Type	Description	Supported on These Modules	More Information
DWDM SFP	The Cisco DWDM SFP is a hot-swappable I/O transceiver module that you can plug into Gigabit Ethernet SFP ports or slots. It supports the ITU 100-GHz wavelength grid and matches the wavelength plan for the Cisco 100-GHz ONS product family. It is a fixed-wavelength SFP, with 40 different SFP models. It uses standard SFP interface network: dual LC/PC connector. **Note** Only connections with patch cords having PC or UPC connectors are supported. Patch cords having APC connectors are not supported.	• WS-X6724-SFP • WS-X6748-SFP • WS-X6848-SFP • VS-S2T-10G • VS-S2T-10G XL	Cisco Dense Wavelength-Division Multiplexing Small Form-Factor Pluggable Module
DWDM SFP+	The Cisco DWDM SFP+ transceiver module is a hot-swappable I/O device that you can plug into an Ethernet SFP+ port of a Cisco switch or router to link the port with the network. It supports 40 nontunable ITU 100-GHz wavelengths. It also supports digital optical monitoring capability and the Cisco quality identification (ID) feature, which enables a Cisco switch or router to identify whether or not the module is an SFP+ module certified and tested by Cisco.	You an use these 10-GB modules with the Cisco OneX Converter Module[13] • WS-X6816-10G • WS-X6816-10G XL • WS-X6908-10 • WS-X6908-10 XL • VS-S2T-10G • VS-S2T-10G XL You can also use these 40-GB modules with the Cisco FourX Converter Module[14]: • WS-X6904-40G-2T • WS-X6904-40G-2TXL	• Cisco 10GBASE Dense Wavelength-Division Multiplexing SFP+ Modules Data Sheet • Cisco OneX Converter Module • Cisco 40GBASE CFP Modules Data Sheet

WDM Transceiver Type	Description	Supported on These Modules	More Information
DWDM X2	The Cisco DWDM X2 transceiver is a hot-swappable I/O module that you can plug into an Ethernet X2 port of the switch, to link the port with the network. The module supports 32 nontunable ITU 100-GHz wavelengths compatible with the Cisco ONS DWDM channel plan. The Cisco DWDM X2 supports digital optical monitoring capability.	• WS-X6816-10G • WS-X6816-10G XL • WS-X6908-10 • WS-X6908-10 XL • VS-S2T-10G • VS-S2T-10G XL	Cisco 10GBASE DWDM X2 Modules

13 CVR-X2-SFP10G —Converter for X2 ports.
14 CVR-CFP-4SFP10G.

Note To determine if a specific WDM transceiver is compatible with the supported modules, see the Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix document that is available on Cisco.com.

Module Connectors

This section provides brief descriptions of the module connectors that the switch supports.

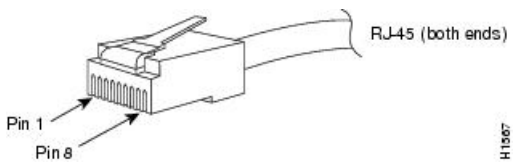
Related Topics

Installing Transceivers and Module Connectors, on page 47
Modules, on page 3

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 35: 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.

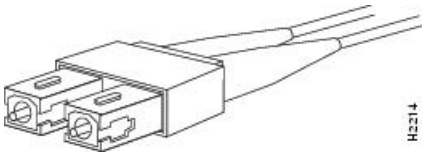
SC Connector

The SC connector is used to connect fiber-optic module ports or transceivers with the external SMF or MMF network.

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 36: SC Fiber-Optic Connector



Always insert the network connector completely into the socket. A secure connection is especially important when you are establishing a connection between a module and a long-distance (1.24 miles) (2 km) network, or a module and a suspected highly attenuated network. If the link LED does not light up, try removing the network cable plug and reinserting it firmly into the module socket. It is possible that dirt or skin oils have accumulated on the plug faceplate (around the optical-fiber openings), generating significant attenuation and reducing the optical power levels below threshold levels so that a link cannot be established.

Caution 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.

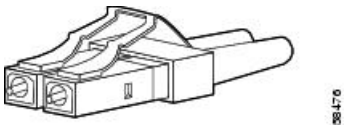
LC Connector

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.

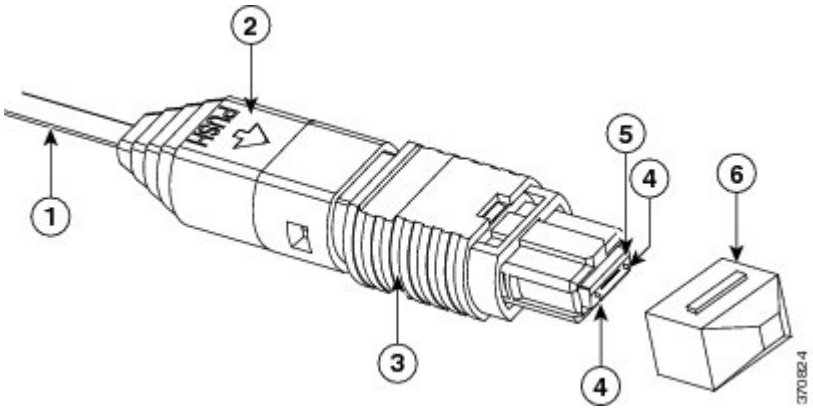
Figure 37: LC Fiber-Optic Connector



MTP-12 Connector

The MTP connector is 12-fiber optical connector with a footprint similar to the SC simplex connector. The MTP connector conforms to the TIA/EIA-604-5 intermateability standard.

Figure 38: MTP-12 Fiber-Optic Connector



1	12-fiber ribbon	4	Guide pins
2	Boot	5	Ferrule

3	Housing assembly	6	Dust cap

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

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

- Cleans the connectors using either a CLETOP cassette cleaner (Type A for SC connectors and Type B for MT-RJ connectors) or lens tissues before connecting to the adapters; uses pure alcohol to remove contamination.
- 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 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.

To clean optical connectors, use a CLETOP cassette cleaner (type A for SC connectors or type B for MT-RJ connectors) and follow the product directions.

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

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.

Cable Specifications

This section describes the cables supported on the switch.

Related Topics

Installing Transceivers and Module Connectors, on page 47

Modules, on page 3

SFP Module Cables

For cabling specifications, refer to the Cisco SFP and SFP+ Transceiver Module Installation Notes at this URL on Cisco.com: http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/installation/note/78_15160.html

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).

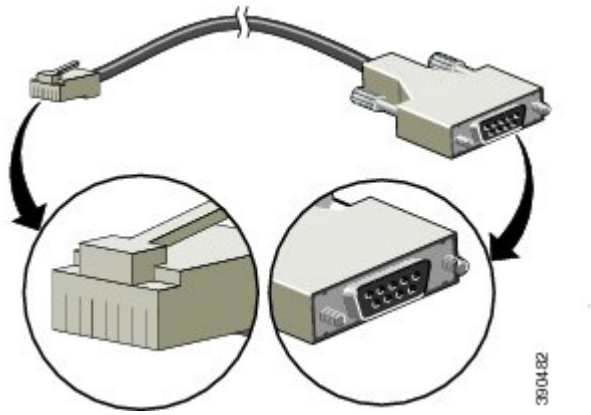
Console Cables

The supervisor engine's front-panel console ports allow you to connect a terminal or modem to the console port.

- You can connect a terminal to the console port using one of these options:
  - The RJ45 console port—Uses an 8-pin RJ-45 connector, and has built-in DTE capability.

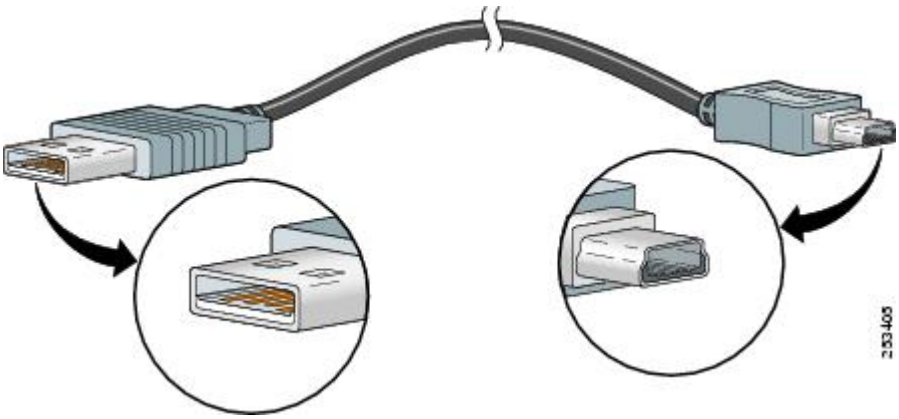
    If the RJ-45 port does not have built-in DTE capability, use the RJ-45-to-RJ-45 rollover cable and DTE adapter, such as the DB-9 adapter. You can use the 6-ft DB9 Female-to-RJ45 console cable (to be ordered separately; Part Number: 72-3383-01).

Figure 39: DB9 Female-to-RJ45 Cable



  - The USB console port—Uses a USB Type A to 5-pin mini Type B cable (to be ordered separately; Part Number: 37-1090-01).

Figure 40: USB Type A-to-USB 5-Pin Mini-Type B Cable



- You can connect a modem to the console port by using the RJ-45-to-RJ-45 roll over cable and DTE adapter.

Related Topics

Connecting the Supervisor Engine Console Port , on page 46

DB-9 Adapter (To Connect to a PC)

Use the RJ-45-to-RJ-45 rollover cable and the RJ-45-to-DB-9 female DTE adapter (labeled "Terminal") to connect the console port to a PC running terminal emulation software.

This table lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter.

Table 30: Port Mode 1 Signaling and Pinouts (DB-9 Adapter)

Console Port	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-9 Pin**	**Signal**
RTS	1[15]	8	8	CTS
DTR	2	7	6	DSR
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND
RxD	6	3	3	TxD
DSR	7	2	4	DTR
CTS	8[16]	1	7	RTS

15 Pin 1 is connected internally to Pin 8.
16 Pin 1 is connected internally to Pin 8.

DB-25 Adapter (To Connect to a Terminal)

Use the RJ-45-to-RJ-45 rollover cable and the RJ-45-to-DB-25 female DTE adapter (labeled "Terminal") to connect the console port to a terminal.

This table lists the pinouts for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 female DTE adapter.

Table 31: Port Mode 1 Signaling and Pinouts (DB-25 Adapter)

Console Port	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-25 Pin**	**Signal**
RTS	1[17]	8	5	CTS
DTR	2	7	6	DSR
TxD	3	6	3	RxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	20	DTR
CTS	8[18]	1	4	RTS

17 Pin 1 is connected internally to Pin 8.
18 Pin 1 is connected internally to Pin 8.

Modem Adapter

Use the RJ-45-to-RJ-45 rollover cable and the RJ-45-to-DB-25 male DCE adapter (labeled "Modem") to connect the console port to a modem.

This table lists the pinouts for the asynchronous serial auxiliary port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-25 male DCE adapter.

Table 32: Port Mode 1 Signaling and Pinouts (Modem Adapter)

Console Port	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Modem Adapter Adapter	Console Device
Signal	**RJ-45 Pin**	**RJ-45 Pin**	**DB-25 Pin**	**Signal**
RTS	1[19]	8	4	CTS
DTR	2	7	20	DSR
TxD	3	6	3	RxD
GND	4	5	7	GND

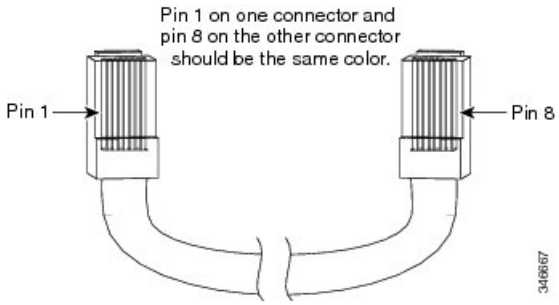
Console Port	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-25 Modem Adapter Adapter	Console Device
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	8	DTR
CTS	8[20]	1	5	RTS

19 Pin 1 is connected internally to Pin 8.
20 Pin 1 is connected internally to Pin 8.

Identifying a Rollover Cable

You can identify a rollover cable by comparing the two ends of the cable. Holding the cables side by side, with the tab at the back, the wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. If your cable was purchased from Cisco, pin 1 will be white on one connector, and pin 8 will be white on the other. (A rollover cable reverses pins 1 and 8, 2 and 7, 3 and 6, and 4 and 5.)

Figure 41: Identifying a Rollover Cable



Cable Pinouts

The following tables and figures describe the pinouts and schematics for cables that the switch supports.

Table 33: 10 BASE-T and 100 BASE-T Crossover Cable Pinout (MDI-X)

Side 1 Pin (Signal)	Side 2 Pin (Signal)
1 (RD+)	3 (TD+)
2 (RD–)	6 (TD–)

Side 1 Pin (Signal)	Side 2 Pin (Signal)
3 (TD+)	1 (RD+)
6 (TD–)	2 (RD–)
4 (Not used)	4 (Not used)
5 (Not used)	5 (Not used)
7 (Not used)	7 (Not used)
8 (Not used)	8 (Not used)

Figure 42: Twisted-Pair Crossover 10 BASE-T and 100 BASE-T Cable Schematic

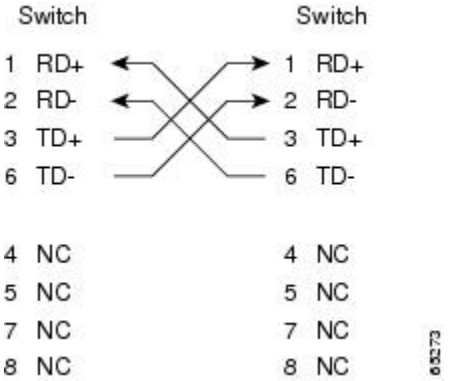
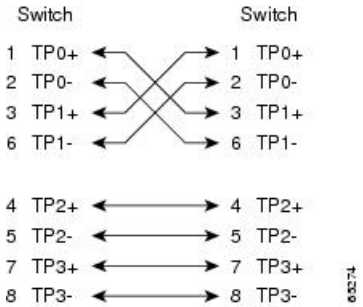


Table 34: 1000 BASE-T Crossover Cable Pinout (MDI-X)

Side 1 Pin (Signal)	Side 2 Pin (Signal)
1 (TP0+)	3 (TP1+)
2 (TP0–)	6 (TP1–)
3 (TP1+)	1 (TP0+)
6 (TP1–)	2 (TP1–)
4 (TP2+)	7 (TP3+)
5 (TP2–)	8 (TP3–)
7 (TP3+)	4 (TP2+)
8 (TP3–)	5 (TP2–)

Figure 43: Twisted-Pair Crossover 1000BASE-T Cable Schematic



The accessory kit contains the cable and adapters that you will need to connect a console (an ASCII terminal or PC running terminal emulation software) or modem to the console port. The accessory kit includes these items:

- RJ-45-to-RJ-45 rollover cable
- RJ-45-to-DB-9 female DTE adapter (labeled “Terminal”)

Table 35: MTP-12 Fiber-Optic Cable Pinout

Side 1 Pin (Signal)	Side 2 Pin (Signal)
1 (Tx)	12 (Rx)
2 (Tx)	11 (Rx)
3 (Tx)	10 (Rx)
4 (Tx)	9 (Rx)
5 (Not used)	8 (Not used)
6 (Not used)	7 (Not used)
7 (Not used)	6 (Not used)
8 (Not used)	5 (Not used)
9 (Rx)	4 (Tx)
10 (Rx)	3 (Tx)
11 (Rx)	2 (Tx)
12 (Rx)	1 (Tx)

Mode-Conditioning Patch Cord

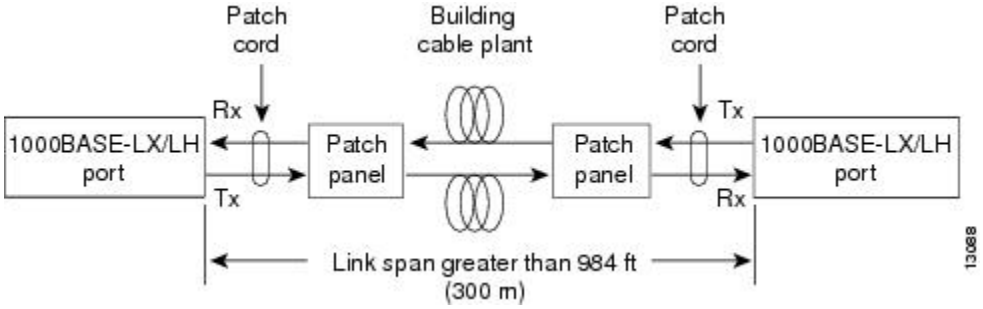
When using the long-wavelength and long-haul (LX and LH) GBIC with 62.5-micron diameter multimode fiber (MMF), you must install a mode-conditioning patch cord (Cisco product number CAB-GELX-625 or equivalent) between the GBIC and the MMF cable on both the transmit and receive ends of the link. A mode-conditioning patch cord is required for 1000BASE-LX and LH applications over FDDI-grade, OM1, and OM2 fiber-cable types. Mode-conditioning patch cords should not be used for applications over OM3 fiber cable (laser-optimized fiber cable). For more information about mode-conditioning patch cords, see the Use of Mode Conditioning Patch Cables in Gigabit Ethernet and 10 Gigabit Ethernet Laser-Based Transmissions bulletin available on Cisco.com.

Note We recommend that you use the LX and LH GBIC and MMF with the patch cord for short link distances of 33 to 328 feet (10 to 100 meters) because not using the patch could result in an elevated bit error rate (BER).

The patch cord is required to comply with IEEE standards. IEEE found that link distances could not be met with certain types of fiber-optic cable due to a problem in the center of some fiber-optic cable cores. The solution is to launch light from the laser at a precise offset from the center by using the patch cord. At the output of the patch cord, the LX and LH GBIC complies with the IEEE 802.3z standard for 1000BASE-LX.

Example: Patch Cord Configuration

Figure 44: Patch Cord Configuration



Installing the Patch Cord

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

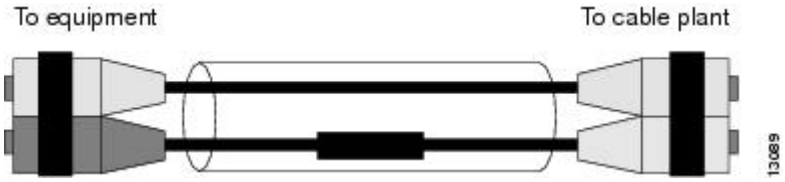
To install the patch cord, perform these steps:

Procedure

Step 1 Plug the end of the patch cord labeled To Equipment into the GBIC. See Figure 45: Patch Cord Installation, on page 96.

Step 2 Plug the end labeled To Cable Plant into the patch panel. See Figure 45: Patch Cord Installation, on page 96. The patch cord is 9.8-feet (3-meters) long and has duplex SC male connectors at each end.

Figure 45: Patch Cord Installation



Differential Mode Delay

When an unconditioned laser source designed for operation on an SMF cable is directly coupled with an MMF cable, differential mode delay (DMD) might occur. DMD may degrade the modal bandwidth of the fiber-optic cable. This degradation causes a decrease in the link span (the distance between the transmitter and the receiver) that can be reliably supported.

The Gigabit Ethernet specification (IEEE 802.3z) outlines parameters for Ethernet communications at a gigabit-per-second rate. The specification offers a higher-speed version of Ethernet for backbone and server connectivity using existing deployed MMF cable by defining the use of laser-based optical components to propagate data over MMF cable.

Lasers function at the baud rates and longer distances required for Gigabit Ethernet. The 802.3z Gigabit Ethernet Task Force has identified the DMD condition that occurs with particular combinations of lasers and MMF cable. The results create an additional element of jitter that can limit the reach of Gigabit Ethernet over MMF cable.

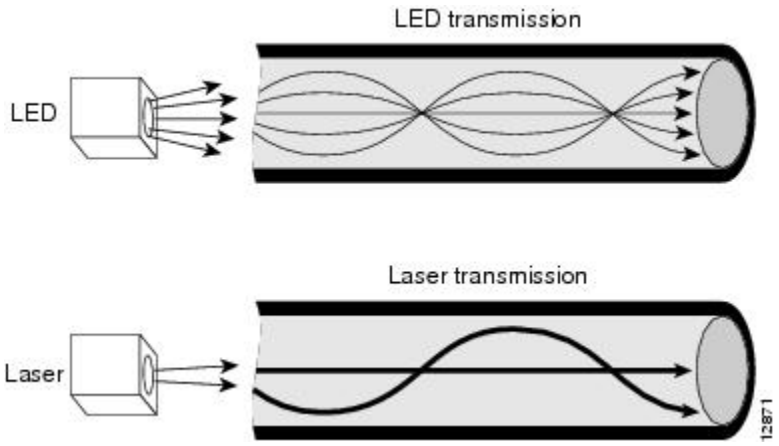
With DMD, a single laser light pulse excites a few modes equally within an MMF cable. These modes, or light pathways, then follow two or more different paths. These paths might have different lengths and transmission delays as the light travels through the cable. With DMD, a distinct pulse propagating down the cable no longer remains a distinct pulse, or in extreme cases, might become two independent pulses. Strings of pulses may interfere with each other making it difficult to recover data.

DMD does not occur in all deployed fibers; it occurs with certain combinations of worst-case fibers and worst-case transceivers. Gigabit Ethernet experiences this problem because of its very high baud rate and its long MMF cable lengths. SMF cable and copper cable are not affected by DMD.

MMF cable has been tested for use only with LED sources. LEDs can create an overfilled launch condition within the fiber-optic cable. The overfilled launch condition describes the way LED transmitters couple light into the fiber-optic cable in a broad spread of modes. Similar to a light bulb radiating light into a dark room,

the generated light that shines in multiple directions can overfill the existing cable space and excite a large number of modes.

Figure 46: LED Transmission Compared to Laser Transmission



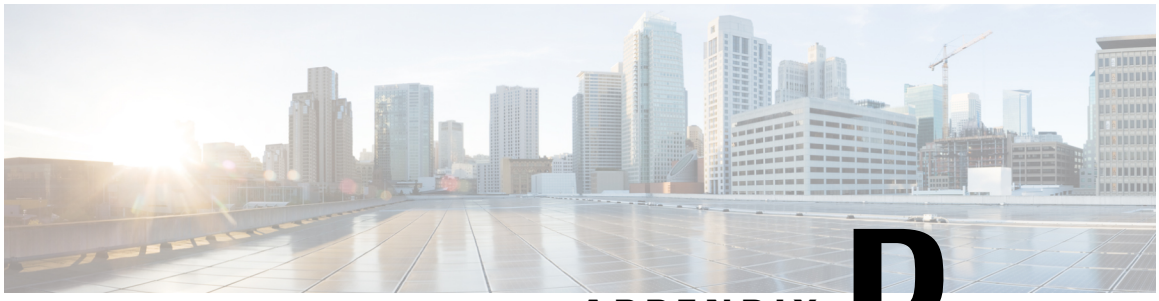
Lasers launch light in a more concentrated fashion. A laser transmitter couples light into only a fraction of the existing modes or optical pathways present in the fiber-optic cable. See Figure 46: LED Transmission Compared to Laser Transmission , on page 97

The solution is to condition the laser light launched from the source (transmitter) so that it spreads the light evenly across the diameter of the fiber-optic cable making the launch look more like an LED source to the cable. The objective is to scramble the modes of light to distribute the power more equally in all the modes and prevent the light from being concentrated in just a few modes.

An unconditioned launch, in the worst case, might concentrate all of its light in the center of the fiber-optic cable, exiting only two or more modes equally.

A significant variation in the amount of DMD is produced from one MMF cable to the next. No reasonable test can be performed to survey an installed cable plant to assess the effect of DMD. Therefore, you must use the mode-conditioning patch cords for all uplink modules using MMF when the link span exceeds 984 feet (300 meters).

For link spans less than 984 feet (300 meters), you can omit the patch cord. We recommend that you do no use the LX and LH GBIC and MMF without the patch cord for very short link distances of 33 to 328 feet (10 to 100 meters) because it may result in an elevated BER.



APPENDIX D

Repacking the Switch

To return or move the switch chassis, follow these steps and repack the switch using the original packaging material:

Procedure

Step 1 Place the chassis in the packing bag (not shown here).

Step 2 Place foam caps over the chassis.

Step 3 Slide the components arranged in step 2 into the carton.

Step 4 Place the accessory kit and cables in the compartments provided in the padding material (Callout 5).

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

Step 5 Place the padding material (shown in callout 5) over the top of the chassis.

Step 6 Place the carton over the pallet.

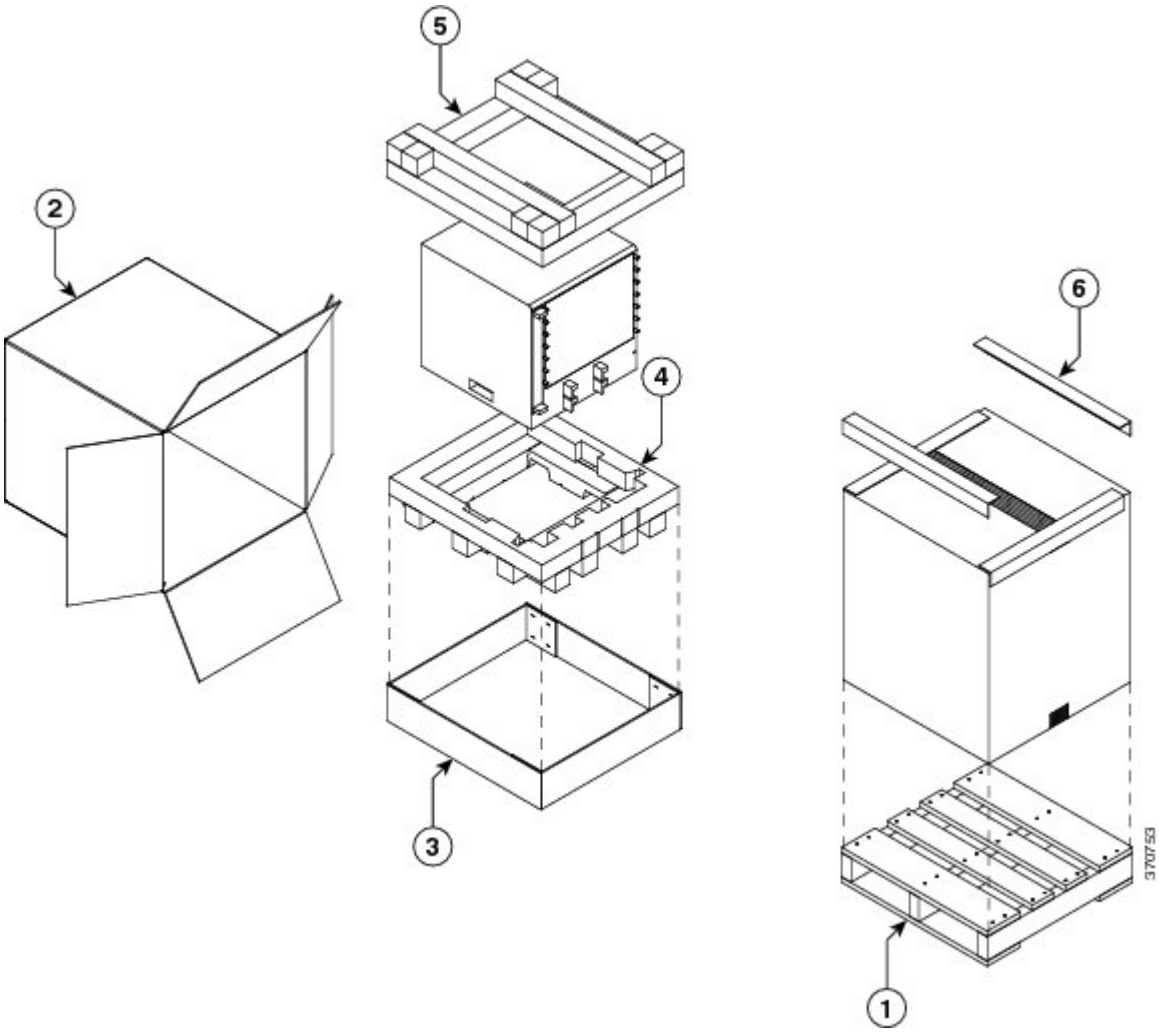
Step 7 Fold the carton flaps down over the top and seal with packing tape.

Use an appropriate amount of 3M 373 3-inch-wide pressure-sensitive carton-sealing tape (the Cisco logo is displayed on the tape).

Step 8 Place the Cisco-approved poly-banding and edge protectors.

Step 9 Strech-wrap the unit to hold the carton and the bottom pallet together.

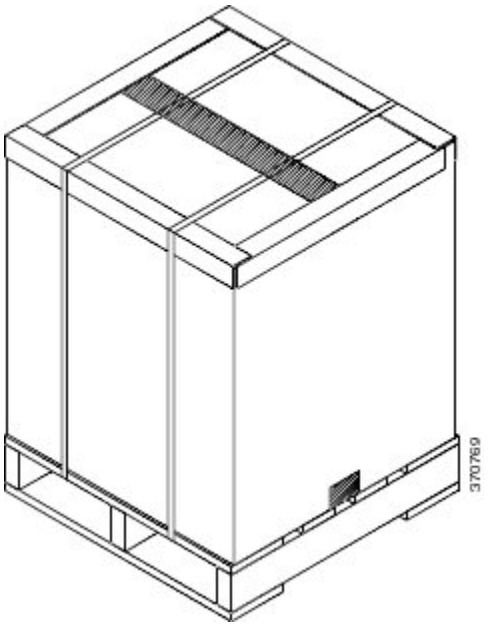
Figure 47: Repacking the Switch

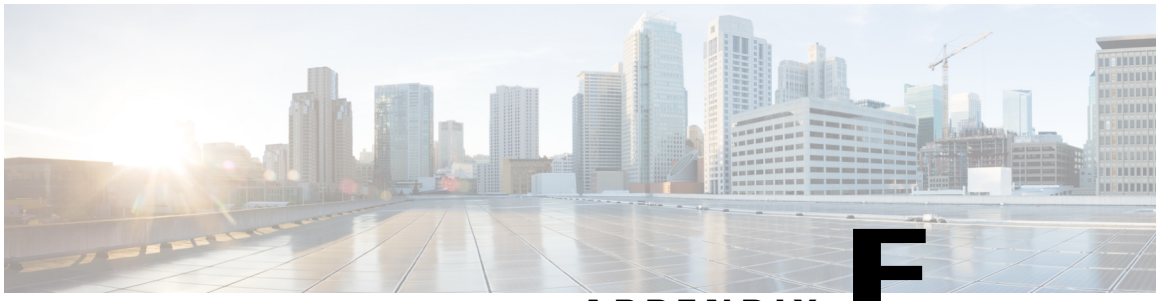


1	Bottom pallet	2	Carton
3	Foam cap	4	Foam cap
5	Padding material that also contains the accessory kit, cables, and documentation.)	6	Edge protectors

The package is now secure and ready for shipment.

Figure 48: Final Assembled Package





APPENDIX E

Troubleshooting

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

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 Module, on page 104 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. Troubleshooting the Fan Tray, on page 105 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 Module

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

Procedure

Step 1 Verify that the INPUT OK LED on the PSM is green.

a) If the IN LED is green, the AC source is good and the power supply is functional.
b) If the IN LED is off, ensure that the PSM is flush with the back of the chassis. Turn off the power switch, tighten the captive installation screw, and then turn on the power switch.
c) If the IN LED remains off, there might be a problem with the AC source or the power cord.
d) Turn off the power to the switch, connect the power cord to another power source if one is available, and turn on the power.
e) If the IN LED is green, the problem is the first power source.

f) If the IN LED fails to light up after you connect the power supply to a new power source, replace the power cord, and turn on the switch.
g) If the IN LED then lights up, return the first power cord for replacement.

If this unit has more than one power cord, repeat Step 1 (and all the substeps) for each PSM.

For information about PSM LEDs, see Power Supply Module LEDs, on page 9.

Step 2 If the INPUT OK LED still fails to light up when the switch is connected to a different power source with a new power cord, the PSM is probably faulty.
If a second PSM is available, install it in the second power supply bay, and contact a Cisco customer service representative for further instructions.

Step 3 Verify that you have installed the power cord in the correct PEM.
Each PSM and corresponding PEM is numbered.

Step 4 Repeat Step 1, Step 2 , and Step 3 for all the PSMs that you have installed.

If you are unable to resolve the problem, or if you have determined that either a power supply or a backplane connector is faulty, contact a Cisco customer service representative for instructions.

Related Topics

Power Supply Module, on page 5
Power Entry Module, on page 7
Power Supply Module LEDs, on page 9
3000 W Power Supply AC Power Cords, on page 67

Troubleshooting the Fan Tray

To isolate a fan tray problem, follow these steps:

Procedure

Step 1 Verify that the FAN LED on the fan tray is green.
If the FAN LED is not green, see Solving Problems at the System Component Level, on page 103 to determine whether or not the power subsystem is functioning properly.

For information about fan tray LEDs, see Fan Tray LED, on page 8.

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. Perform the following tasks:

a) To ensure that the fan tray is seated properly, remove the fan tray, and reinstall it. See Removing and Installing the Fan Tray, on page 54.
b) Restart the system.
c) If the FAN LED is still red, the system detects one or more fan failures. Contact a Cisco customer service representative for instructions.

Related Topics

Fan Tray, on page 4
Air Flow, on page 15
Fan Tray LED, on page 8

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 Serial Numbers

If you contact Cisco Technical Assistance, you should know the serial number of the part you are having a problem with. You can also use the **show version** privileged EXEC command to see the serial number.

Table 36: Serial Number Illustrations

Item	Serial Number Illustration
Chassis	Figure 49: Chassis Serial Number Location, on page 107
Fan Tray	Figure 50: Fan Tray Serial Number Location, on page 107
Power Supply Module	Figure 51: Power Supply Module Serial Number Location, on page 107
Power Supply Converter	Figure 52: Power Supply Converter Serial Number Location, on page 108

Figure 49: Chassis Serial Number Location

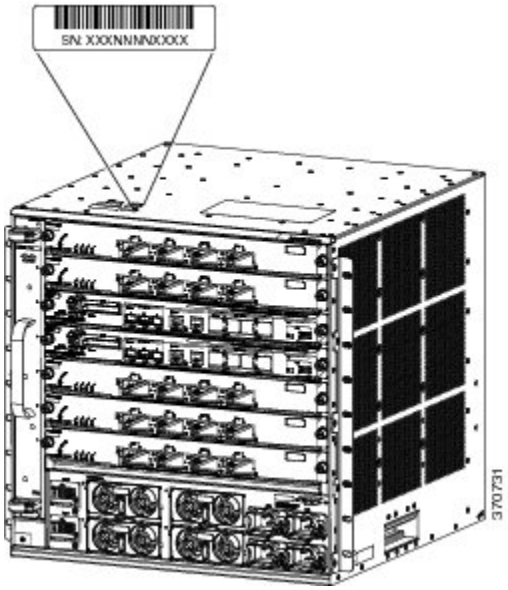


Figure 50: Fan Tray Serial Number Location

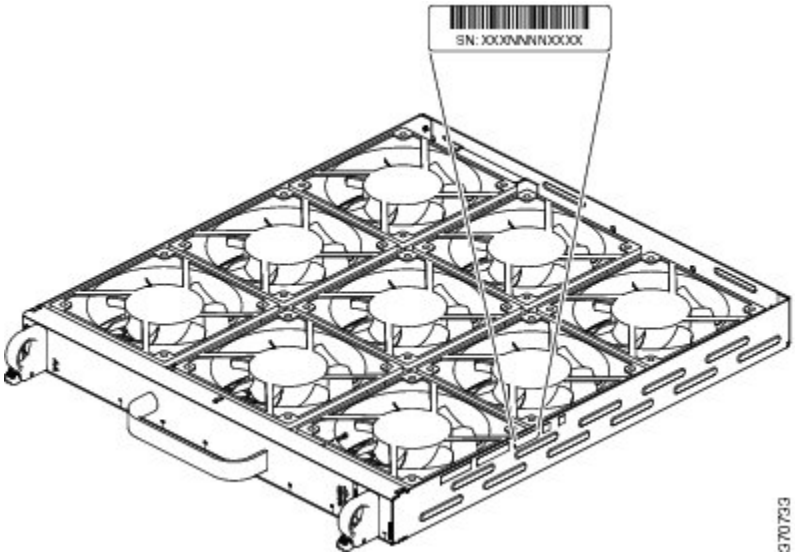


Figure 51: Power Supply Module Serial Number Location

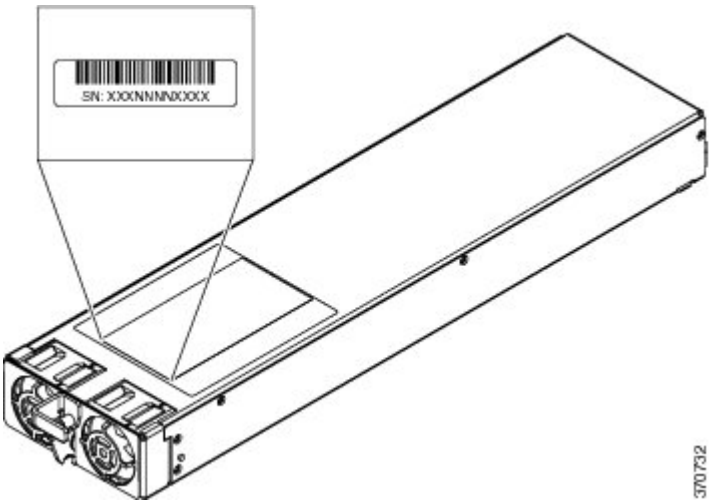
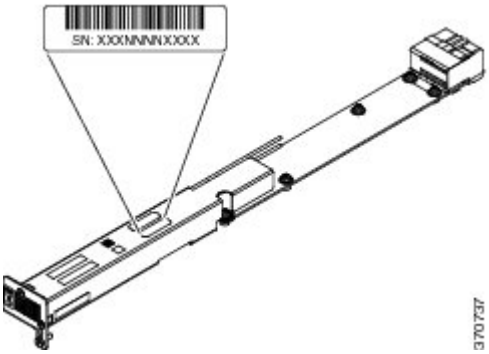


Figure 52: Power Supply Converter Serial Number Location



Related Topics

Rack-Mounting the Chassis, on page 37
Chassis, on page 2