Catalyst 6800IA Switch Hardware Installation Guide

First Published: September 23, 2013

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

Text Part Number: OL-30278-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, users are encouraged to try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications to this product not authorized by Cisco could void the FCC approval and negate your authority to operate the product

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: http://www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

CONTENTS

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 **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

Related Documentation

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

- Catalyst 6800IA Switch documentation, located at:

  http://www.cisco.com/go/cat6800ia_docs

- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:

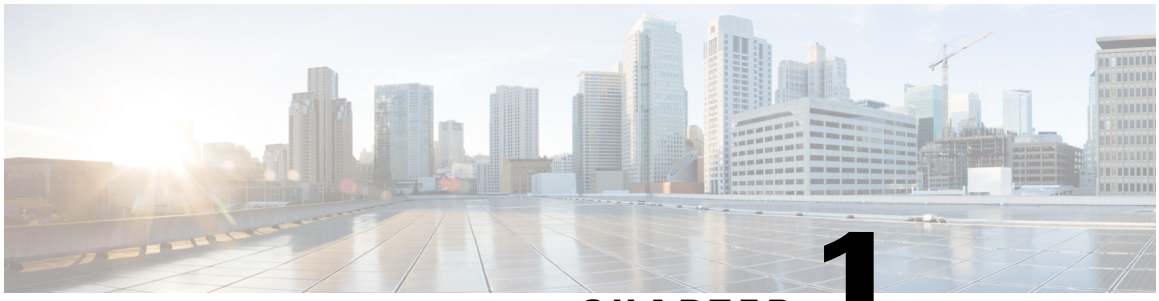
  http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html

Obtaining Documentation and Submitting a Service Request

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

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



CHAPTER 1

Product Overview

The family of switches are Ethernet switches to which you can connect devices such as Cisco IP Phones, Cisco Wireless Access Points, workstations, and other network devices such as servers, routers, and other switches.

Some models of the switches support stacking through the Cisco FlexStack-Plus technology. Unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

This chapter contains these topics:

Switch Models

Table 1: Catalyst 6800IA Switch Models and Descriptions

Switch Model	Description
Catalyst 6800IA-48FPD	48 10/100/1000 Power over Ethernet Plus (PoE+) ports (PoE budget of 740 W) and 2 small form-factor pluggable (SFP)+[1] module slots.
Catalyst 6800IA-48TD	48 10/100/1000 ports and 2 SFP+ module slots.

1 SFP+ = 10-Gigabit uplink.

Front Panel

This section describes the front panel components:

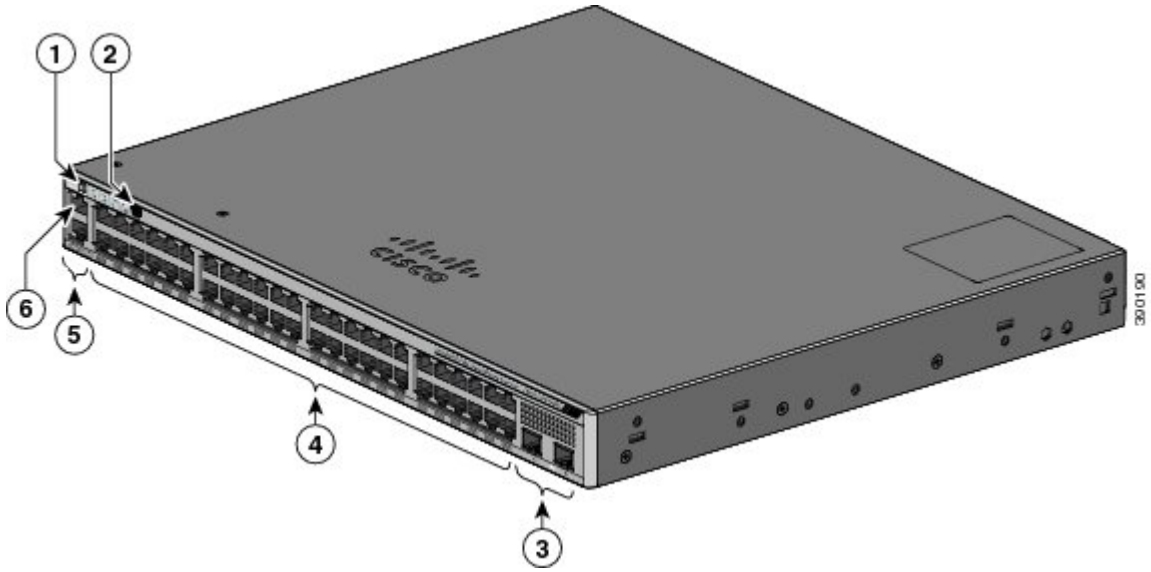
- 48 downlink ports of one of these types:

  - 10/100/1000
  - 10/100/1000 PoE+

- SFP+ ports
- USB mini-Type B (console) port
- Ethernet management port
- RJ-45 console port
- LEDs
- Mode button

The Catalyst 6800IA-48FPD switch is shown here as an example. Other switches have similar components.

Figure 1: Catalyst 6800IA-48FPD Front Panel



1	Mode button and switch LEDs	4	10/100/1000 PoE+ ports
2	USB mini-Type B (console) port	5	RJ-45 console port
3	SFP+ module slots	6	Ethernet management port

PoE and PoE+ Ports

The ports provide PoE+ support for devices compliant with IEEE 802.3af, IEEE 802.3at, and ePoE and also provide Cisco prestandard PoE support for Cisco IP Phones and Cisco Aironet Access Points.

The maximum switch power output is 740 W. Intelligent power management allows flexible power allocation across all ports.

For switches with a 740 W power budget, you can budget the PoE and PoE+:

- 15.4 W of PoE output on 48 ports
- 30 W of PoE+ on 24 ports

On a per-port basis, you control whether or not a port automatically provides power when an IP phone or an access point is connected.

The PoE ports use RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 10BASE-T, 100BASE-TX, 1000BASE-T traffic requires Category 5, Category 5e, or Category 6 unshielded twisted pair (UTP) cable. The 10BASE-T traffic can use Category 3 or Category 4 UTP cable.

Cisco intelligent power management capabilities include enhanced power negotiation, power reservation, and per-port power policing. For information about configuring and monitoring PoE ports, see the switch software configuration guide on Cisco.com.

Note The output of the PoE circuit has been evaluated as a Limited Power Source (LPS) per IEC 60950-1.

10/100/1000 Ports

The 10/100/1000 ports use RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX traffic requires Category 5, Category 5e, or Category 6 unshielded twisted pair (UTP) cable. The 10BASE-T traffic can use Category 3 or Category 4 UTP cable.

Management Ports

The management ports connect the switch to a PC running Microsoft Windows or to a terminal server.

- Ethernet management port
- RJ-45 console port (EIA/TIA-232)
- USB mini-Type B console port (5-pin connector)

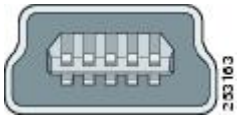
The 10/100 Ethernet management port connection uses a standard RJ-45 crossover or straight-through cable. The RJ-45 console port connection uses the supplied RJ-45-to-DB-9 female cable. The USB console port connection uses a USB Type A to 5-pin mini-Type B cable. The USB console interface speeds are the same as the RJ-45 console interface speeds.

If you use the USB mini-Type B console port, the Cisco Windows USB device driver must be installed on any PC connected to the console port (for operation with Microsoft Windows). Mac OS X or Linux do not require special drivers.

The 4-pin mini-Type B connector resembles the 5-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B.

This illustration shows a 5-pin mini-Type B USB port.

Figure 2: USB Mini-Type B Port



With the Cisco Windows USB device driver, you can connect and disconnect the USB cable from the console port without affecting Windows HyperTerminal operations.

The console output always goes to both the RJ-45 and the USB console connectors, but the console input is active on only one of the console connectors at any one time. The USB console takes precedence over the RJ-45 console. When a cable is connected into the USB console port, the RJ-45 console port becomes inactive. Conversely, when the USB cable is disconnected from the USB console port, the RJ-45 port becomes active.

You can use the command-line interface (CLI) to configure an inactivity timeout which reactivates the RJ-45 console if the USB console has been activated and no input activity has occurred on the USB console for a specified time.

After the USB console deactivates due to inactivity, you cannot use the CLI to reactivate it. Disconnect and reconnect the USB cable to reactivate the USB console. For information on using the CLI to configure the USB console interface, see the software guide.

SFP+ Module Slots

The switch has two 10-Gigabit SFP+ module slots that support both SFP and SFP+ modules.

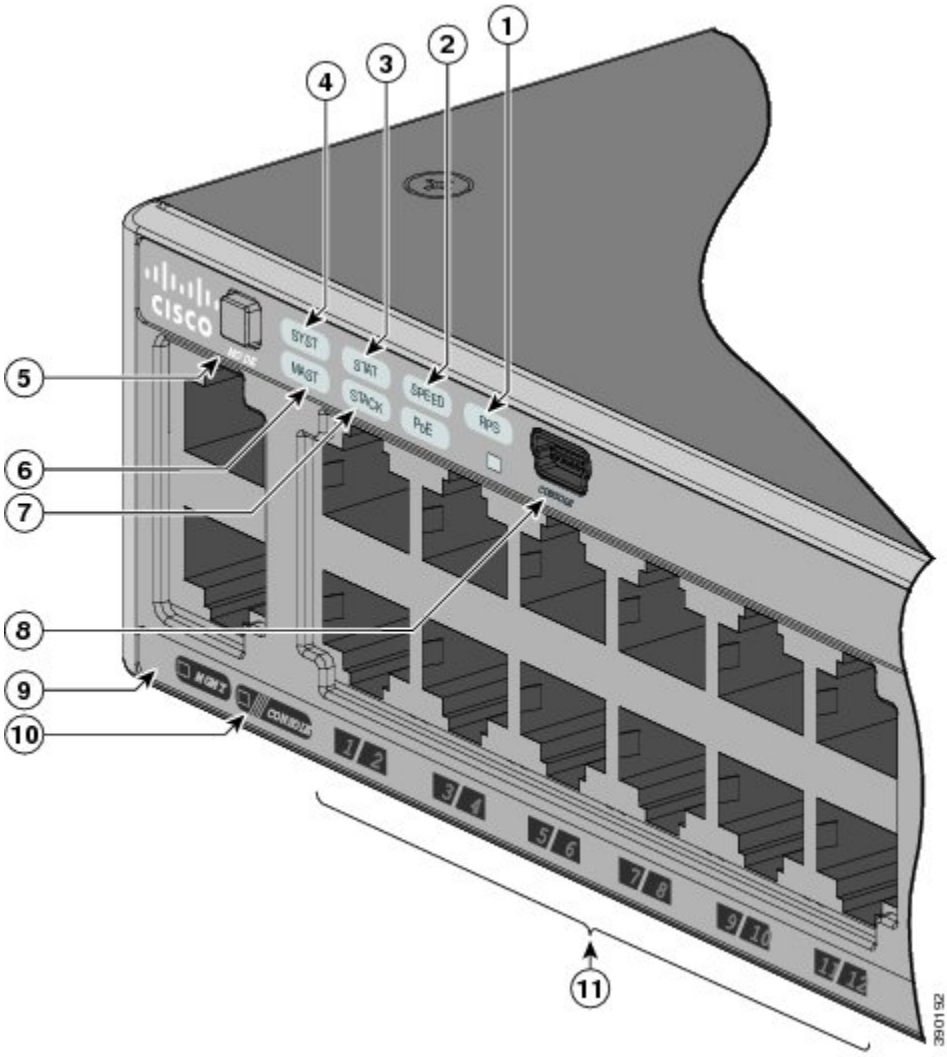
For Cisco SFP and SFP+ modules documentation, including compatibility matrixes, refer to this URL: http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

LEDs

You can use the switch LEDs to monitor switch activity and its performance.

This figure shows the switch LEDs and the Mode button that you use to select a port mode.

Figure 3: Switch LEDs and Mode Button for the Catalyst 6800IA Switches



1	RPS LED[2]	7	STACK LED
2	SPEED LED	8	PoE LED[3]
3	STAT LED	9	USB mini-Type B console port LED
4	SYS LED	10	MGMT LED
5	Mode button	11	CONSOLE LED
6	Master LED	12	Port LEDs

2 RPS = redundant power system—only on switch models that support RPS.
3 only on switch models that support PoE.

System LED

Table 2: System LED

Color	System Status
Off	System is not powered on.
Green	System is operating normally.
Blinking green	POST in progress.
Amber	System is receiving power but is not functioning properly.
Blinking amber	System is sleep mode.

RPS LED

The RPS LED is only available on switch models that have an RPS port.

Table 3: RPS LED

Color	RPS Status
Off	RPS is off or not properly connected.
Green	RPS is connected and can provide back-up power.
Blinking green	RPS is connected but is unavailable. It is providing power to another device (redundancy has been allocated to the other device).
Amber	The RPS is in standby mode or in a fault condition. See the RPS documentation.
Blinking amber	The power supply in a switch has failed, and the RPS is providing power to the switch (redundancy has been allocated to this device).

Master LED

This table describes the master LEDs.

Table 4: Master LED

Port Mode	Description
Off	Switch is not the stack master.
Green	Switch is the stack master or a standalone switch.
Amber	An error occurred when the stack was electing the stack master switch, or another type of stack error occurred.

Port LEDs and Modes

The port and module slots each has a port LED. As a group or individually, the LEDs show information about the switch and about the ports.

Table 5: Port Mode LEDs

Mode LED	Port Mode	Description
STAT	Port status	The port status. This is the default mode.
SPEED	Port speed	The port operating speed: 10, 100, 1000 Mb/s, or 10 Gb/s.
STACK	Stack member status Stack port status	The stack member status. The stack port status.
PoE	PoE port power	The PoE status.

To select or change a mode, press the Mode button until the desired mode is highlighted. When you change port modes, the meanings of the port LED colors also change.

Table 6: Meanings of LED Colors in Different Modes

Port Mode	Port LED Color	Meaning
PoE	Off	PoE is off. If the powered device is receiving power from an AC power source, the port LED is off even if the powered device is connected to the switch port.
	Green	PoE is on. The port LED is green only when the switch port is providing power.
	Alternating green and amber	PoE is denied because providing power to the powered device will exceed the switch power capacity.
	Blinking amber	PoE is off due to a fault. Noncompliant cabling or powered devices can cause a PoE port fault. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points or IEEE 802.3af-compliant devices. You must remove any cable or device that causes a PoE fault.
	Amber	PoE for the port is disabled. (PoE is enabled by default.)
STAT (port status)	Off	No link or port was administratively shut down.
	Green	Link present.
	Blinking green	Activity. Interface is sending or receiving data.
	Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, cyclic redundancy check (CRC) errors, and alignment and jabber errors are monitored for a link-fault indication.
	Amber	Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED can remain amber for up to 30 seconds as STP searches the switch for possible loops.
	Blinking amber	Port is blocked by STP and is sending and receiving packets.

Port Mode	Port LED Color	Meaning
SPEED	**10/100/1000 ports**	
	Off	Port is operating at 10 Mb/s.
	Green	Port is operating at 100 Mb/s.
	Blinking green	Port is operating at 1000 Mb/s.
	SFP+ module ports	
	Off	Port is not operating.
	Blinking green	Port is operating at 10 Gb/s.
	Green	Port is operating at 1 Gb/s.
STACK (stack member)	Off	No stack member has that member number.
	Blinking green	Stack member number.
	Green	Member numbers of other stack member switches.

If your switches are stacked and you press the Mode button on any switch, all the switches display the same selected mode. For example, if you press the Mode button on the stack master to display SPEED, all the other stack members display SPEED.

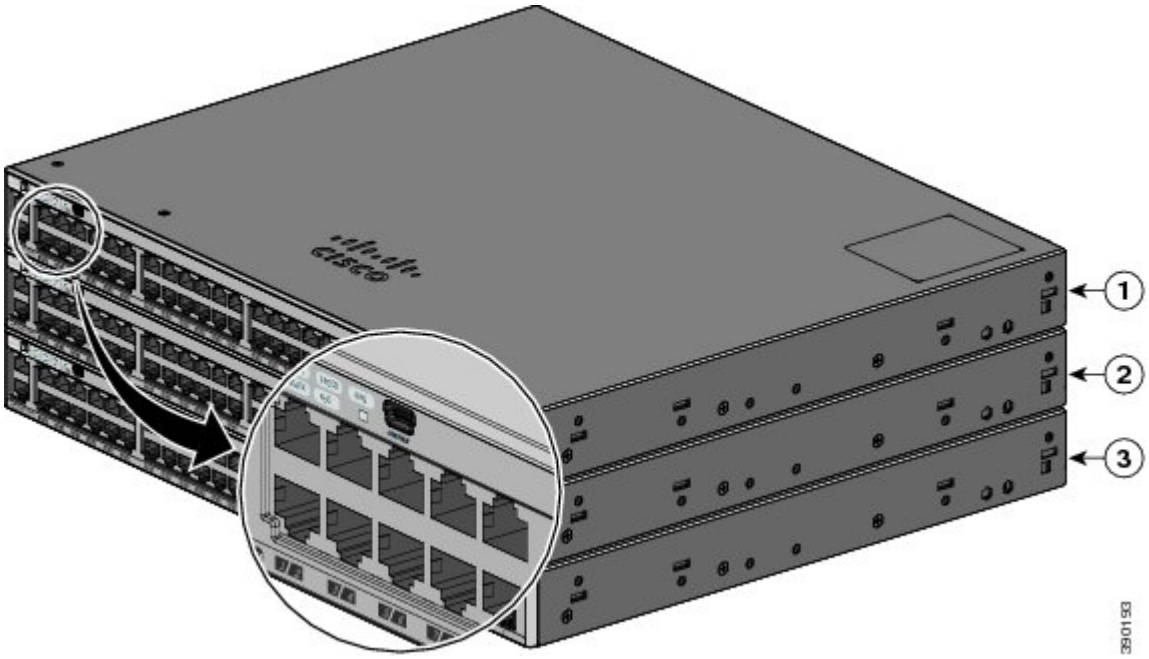
Even if PoE mode is not selected, this LED still shows PoE problems if they are detected.

STACK LED

The STACK LED shows the sequence of member switches in a stack. Up to eight switches can be members of a stack. The first eight port LEDs show the switch member number. For example, if you press the Mode button and select Stack, the port LED 1 blinks green. The LEDs for port 2 and 3 are solid green, as these represent the member numbers of other stack members. The other port LEDs are off because there are no more members in the stack.

This figure shows the LEDs on the first switch, which is stack member number 1.

Figure 4: STACK LED



1	Stack member 1	3	Stack member 3
2	Stack member 2		

When you select the STACK LED, the respective STACK LEDs are green when the stack ports (on the switch rear panel) are up, and the respective Stack LEDs are amber when the ports are down. SFP+ module port LEDs 1 and 2 on the switch show the status for stack ports 1 and 2, respectively.

If the port LEDs are green on all the switches in the stack, the stack is operating at full bandwidth. If any port LED is not green, the stack is not operating at full bandwidth.

Console LEDs

The console LEDs show which console port is in use. If you connect a cable to a console port, the switch automatically uses that port for console communication. If you connect two console cables, the USB console port has priority.

Table 7: RJ-45 and USB Console LEDs

LED	Color	Description
RJ-45 console port	Green	RJ-45 console port is active. When this LED is on, the USB console port LED is off.
	Off	The port is not active, and the USB console port is active.

LED	Color	Description
USB console port	Green	USB console port is active. When this LED is on, the RJ-45 console port LED is off.
	Off	The port is not active, and the RJ-45 console port is active.

Ethernet Management Port LED

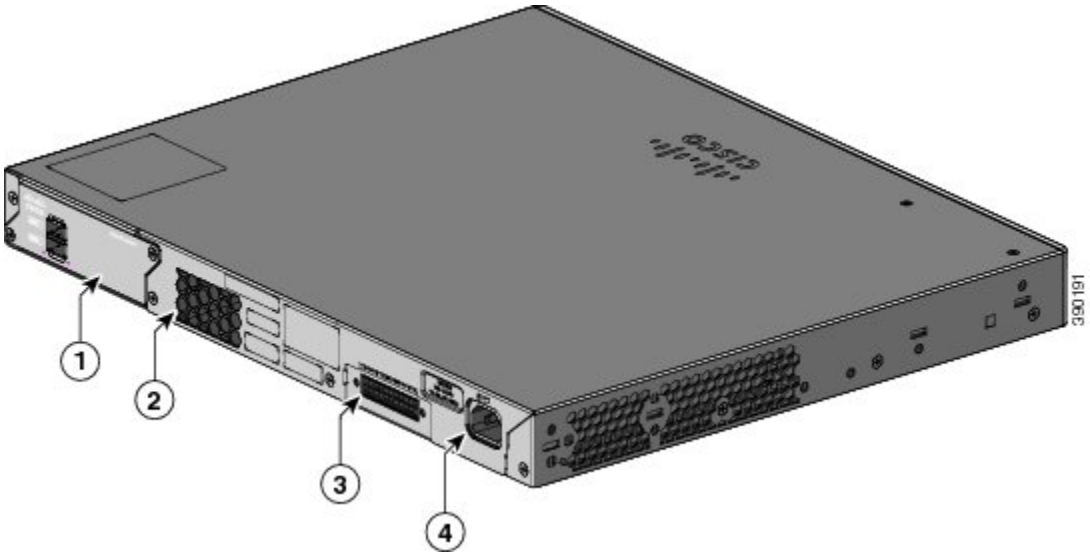
Table 8: Ethernet Management Port LED

Color	Description
Green	Active link to PC.
Off	Inactive link.
Amber	POST failure.

Rear Panel

The rear panel of the Catalyst 6800IA switches have FlexStack-Plus ports, a fan exhaust, an RPS connector, and an AC power connector.

Figure 5: Catalyst 6800IA Switch Rear Panel

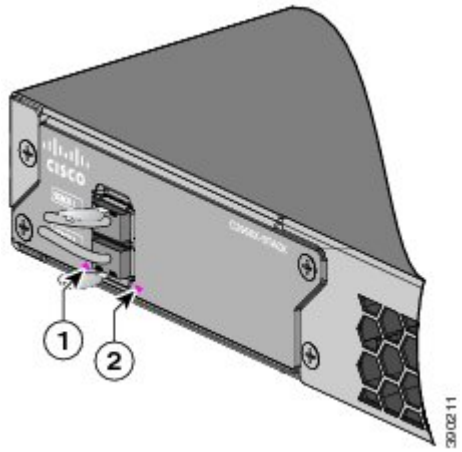


1	FlexStack-Plus ports	3	RPS Connector
2	Fan Exhaust	4	AC power connector

FlexStack-Plus Ports and LEDs

The Catalyst 6800IA switches support stacking with the FlexStack-Plus ports on the switch rear panel and a 0.5-meter FlexStack cable.

Figure 6: FlexStack-Plus Ports



1	LED for Stack port 1	2	LED for Stack port 2

Table 9: FlexStack-Plus Port LEDs

Color	Description
Green	Port is active, cable is attached.
Off	The port is not active, no cable is attached.

Table 10: Stack Configurations

Switch	Number of Switches in the Stack	Bandwidth
Stack with Catalyst 6800IA switches	3	80 G

RPS Connector

The Cisco RPS 2300 (model PWR-RPS2300) supports the Catalyst 6800IA switch.

Warning Attach only the following Cisco RPS model to the RPS receptacle: RPS2300. Statement 370

Connect the switch and the redundant power system to different AC power sources.

Use this cable for the RPS: CAB-RPS2300-E.

Cisco RPS 2300

The Cisco RPS 2300 is a redundant power system that can support six external network devices and provide power to one or two failed devices at a time. It senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic. For more information, see the *Cisco Redundant Power System 2300 Hardware Installation Guide* on Cisco.com at this URL: http://www.cisco.com/en/US/products/ps7148/prod_installation_guides_list.html

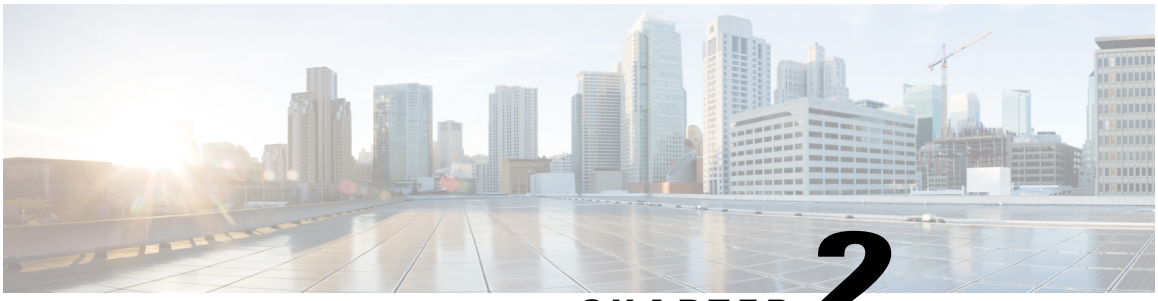
The Cisco RPS 2300 has two output levels: –52 V and 12 V with a total maximum output power of 2300 W.

All supported and connected switches can simultaneously communicate with the RPS 2300. You can configure these RPS 2300 features through the switch software:

- Enable RPS active or standby mode for each connected switch
- Configure switch priority for RPS support
- List the connected switches and the power-supply module sizes
- Obtain reports when a switch is powered by the RPS
- Obtain status reports for the RPS power-supply module
- Read and monitor backup, failure, and exception history

AC Power Connector

The switch is powered through the internal power supply. The internal power supply is an autoranging unit that supports input voltages between 100 and 240 VAC. Use the supplied AC power cord to plug it into an AC power outlet.



CHAPTER 2

Switch Installation

Safety Warnings

This section includes the basic installation caution and warning statements. Read this section before you start the installation procedure. Translations of the warning statements appear in the RCSI guide on Cisco.com.

Warning Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Statement 43

Warning Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage. Statement 48

Warning This product must be connected to a power-over-ethernet (PoE) IEEE 802.3af compliant power source or an IEC60950 compliant limited power source. Statement 353

Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 378

Warning Attach only the following Cisco external power system to the switch: PWR-RPS2300 Statement 387

Warning Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

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

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

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 The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. Statement 1019

Warning This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

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

Warning For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection: 10/100/1000 Ethernet. Statement 1044

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

Warning To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: <113°F (45°C). Statement 1047

Warning 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

Warning Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. Statement 1072

Warning No user-serviceable parts inside. Do not open. Statement 1073

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

Warning To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 3 inches (7.6 cm). Statement 1076

Warning Hot surface. Statement 1079

Tools and Equipment

Obtain these necessary tools and equipment:

- A number-2 Phillips screwdriver to rack-mount the switch.

Installation Guidelines

When determining where to install the switch, verify that these guidelines are met:

- Clearance to the switch front and rear panel meets these conditions:
  - Front-panel LEDs can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - AC power cord can reach from the AC power outlet to the connector on the switch rear panel.
  - Access to the rear of the rack is sufficient for connecting FlexStack cables to stacked switches, or connecting the optional Cisco Redundant Power Supply (RPS) 2300.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.
- Airflow around the switch and through the vents is unrestricted.

- Temperature around the unit does not exceed 113°F (45°C). If the switch is installed in a closed or multirack assembly, the temperature around it might be greater than normal room temperature.
- Humidity around the switch does not exceed 95 percent.
- Altitude at the installation site is not greater than 10,000 feet.
- For 10/100/1000 fixed ports, the cable length from a switch to a connected device cannot exceed 328 feet (100 meters).
- Cooling mechanisms, such as fans and blowers in the switch, can draw dust and other particles causing contaminant buildup inside the chassis, which can result in system malfunction. You must install this equipment in an environment as free from dust and foreign conductive material (such as metal flakes from construction activities) as is possible.

Verifying Switch Operation

Before you install the switch in a rack, on a wall, or on a table or shelf, power on the switch and verify that it passes POST.

To power on the switch, plug one end of the AC power cord into the switch AC power connector, and plug the other end into an AC power outlet.

As the switch powers on, it begins the POST, a series of tests that runs automatically to ensure that the switch functions properly. LEDs can blink during the test. POST lasts approximately 1 minute. When the switch begins POST, the SYST, RPS, STAT, and SPEED LEDs turn green. The SYST LED blinks green, and the other LEDs remain solid green.

When the switch completes POST successfully, the SYST LED remains green. The RPS LED remains green for some time and then reflects the switch operating status. The other LEDs turn off and then reflect the switch operating status. If a switch fails POST, the SYST LED turns amber.

POST failures are usually fatal. Call Cisco technical support representative if your switch fails POST.

After a successful POST, unplug the power cord from the switch and install the switch in a rack, on a wall, on a table, or on a shelf.

If your configuration has an RPS, connect the switch and the RPS to different AC power sources. See the Cisco RPS documentation for information.

Note When you connect the RPS to the switch, put the RPS in standby mode. Set the RPS to active mode during normal operation.

Warning Attach only the following Cisco external power system to the switch: PWR-RPS2300 Statement 387

Planning and Installing a Switch Stack (Optional)

Stack Guidelines

- Order the appropriate cable from your Cisco sales representative. The length of FlexStack cable depends on your configuration. These are the different sizes available:
  - CAB-STK-E-0.5M= (0.5-meter cable)
  - CAB-STK-E-1M= (1-meter cable)
  - CAB-STK-E-3M= (3-meter cable)
- Make sure that you have access to the switch rear panel and to the rear of the rack.

Stack Cabling

These figures show the switches stacked in a vertical rack or on a table. The connections are redundant.

Figure 7: Stacking Switches with the 0.5-meter FlexStack Cable

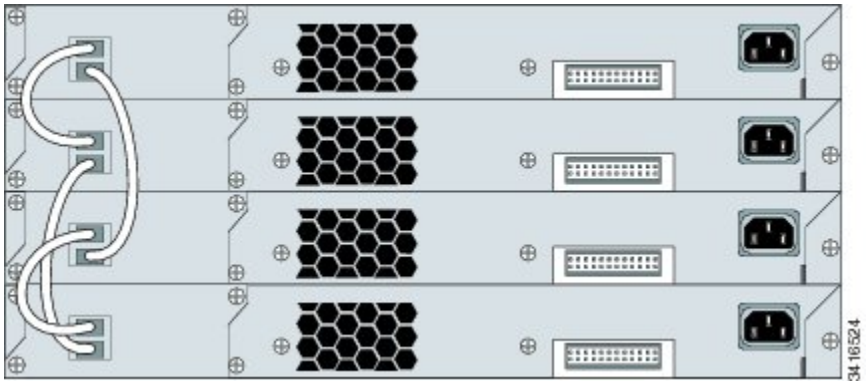
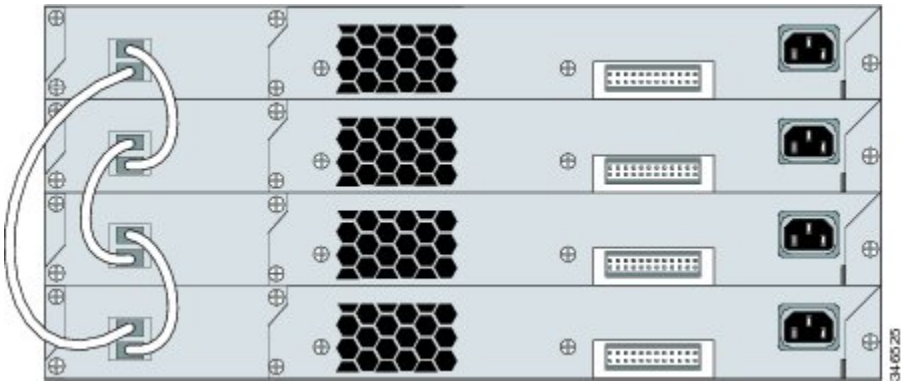


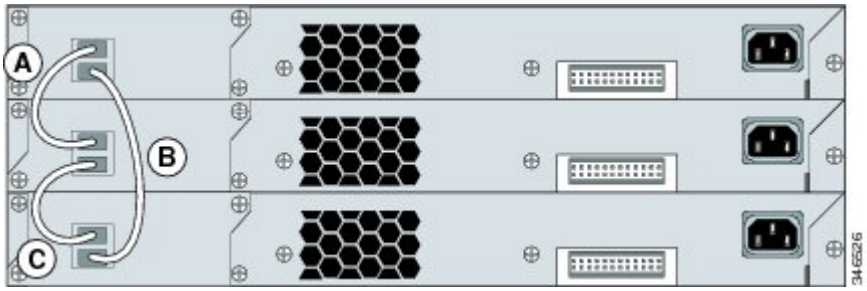
Figure 8: Stacking Switches with 0.5-meter and 3-meter FlexStack Cables



Stack Bandwidth and Partitioning Examples

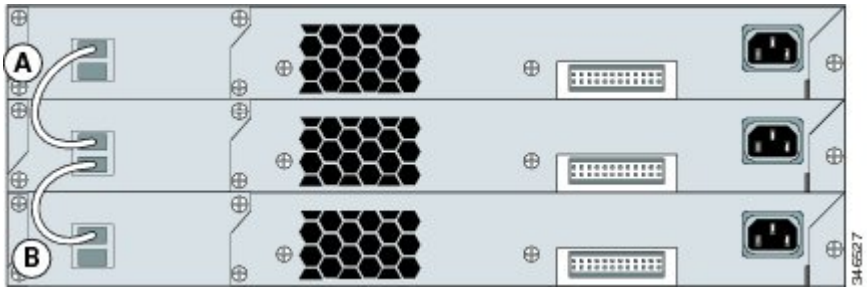
This figure shows a stack that provides full bandwidth with redundant connections.

Figure 9: Stack with Full Bandwidth Connections



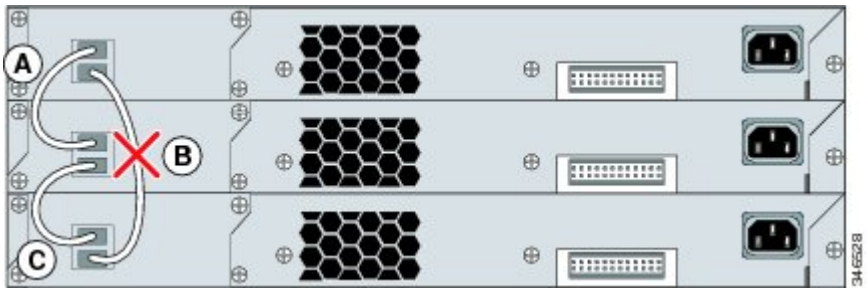
This figure shows a stack with incomplete stack cabling connections. This stack provides only half bandwidth and does not have redundant connections.

Figure 10: Stack with Half Bandwidth Connections



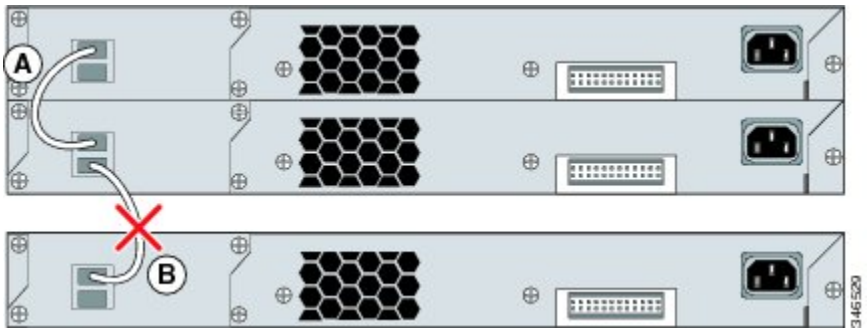
This figure shows a stack with a bad FlexStack cable in link B. This stack provides only half bandwidth and does not have redundant connections.

Figure 11: Stack with a Failover Condition



This figure shows a stack with a bad link B. This stack partitions into two stacks, and switch 1 and switch 3 are stack masters.

Figure 12: Partitioned Stack with a Failover Condition



Power-On Sequence for Switch Stacks

Consider these guidelines before you power on the switches in a stack:

- The sequence in which the switches are first powered on might affect the switch that becomes the stack master.
- If you want a particular switch to be the stack master, power on that switch first. This switch becomes the stack master and remains the stack master until a master reelection. After 2 minutes, power on the other stack switches.
- If you have no preference as to which switch becomes the stack master, power on all the switches in the stack within a 1-minute timeframe. These switches participate in the stack master election. Switches powered on after the 1-minute timeframe do not participate in the election.
- Power off a switch before you add it to or remove it from an existing switch stack.

For conditions that can cause a stack master reelection or to manually elect the stack master, see the *Catalyst 2960-X Switch Stacking Configuration Guide* on Cisco.com.

Installing the Switch

Rack-Mounting

Installation in other than 19-inch racks requires a bracket kit not included with the switch.

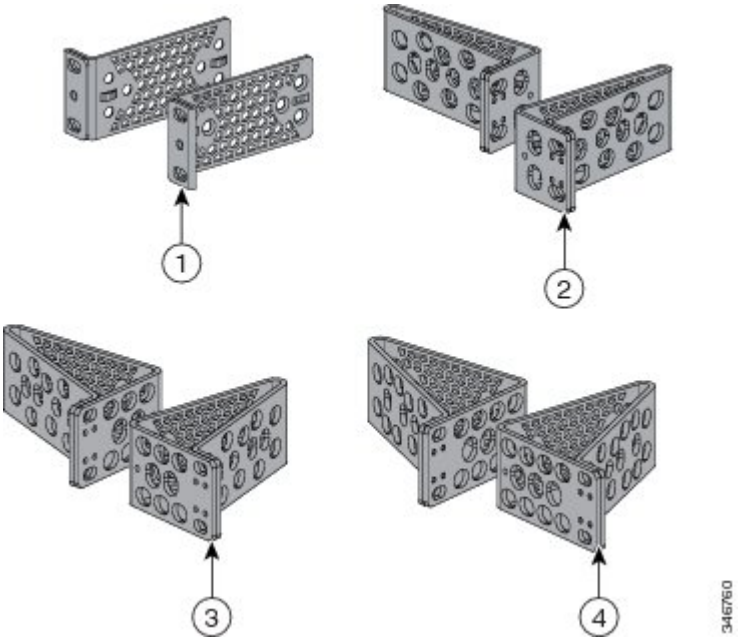
Warning To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- 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

This figure shows the standard 19-inch brackets and other optional mounting brackets. You can order the optional brackets from your Cisco sales representative.

Figure 13: Rack-Mounting Brackets



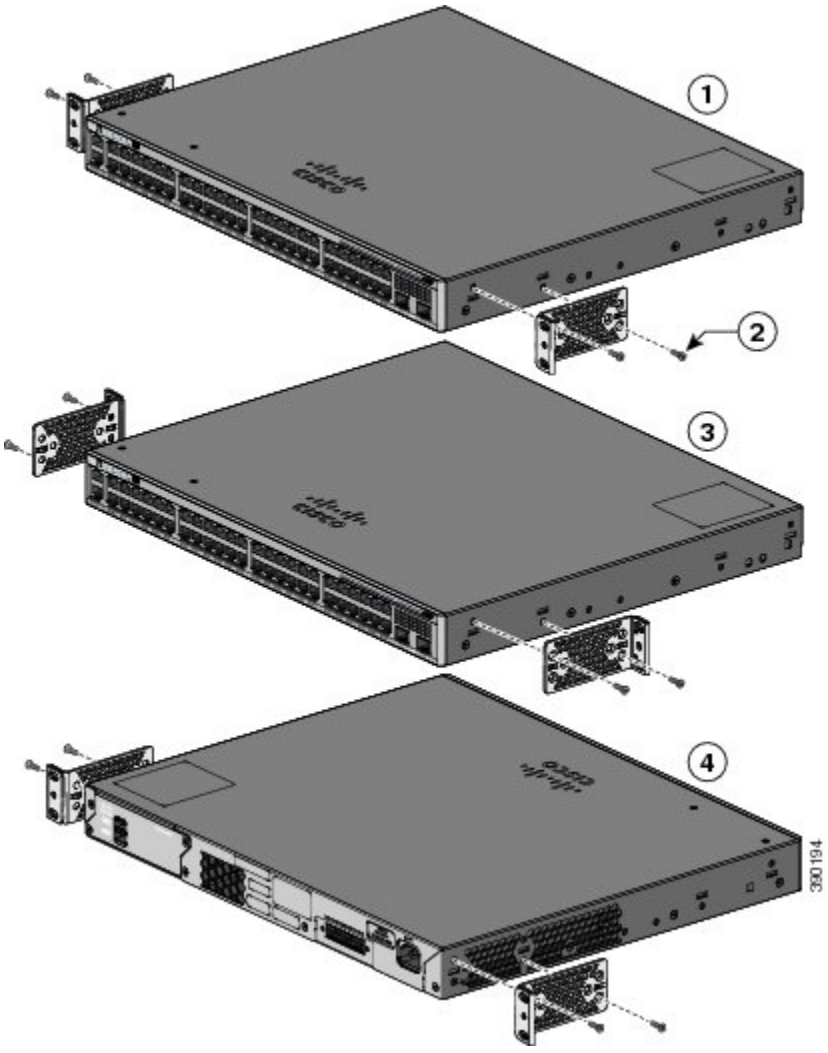
1	19-inch brackets	3	23-inch brackets
2	ETSI brackets	4	24-inch brackets

Attaching the Rack-Mount Brackets

Procedure

Use two Phillips flat-head screws to attach the long side of the bracket to each side of the switch.

Figure 14: Attaching Brackets for 19-inch Racks



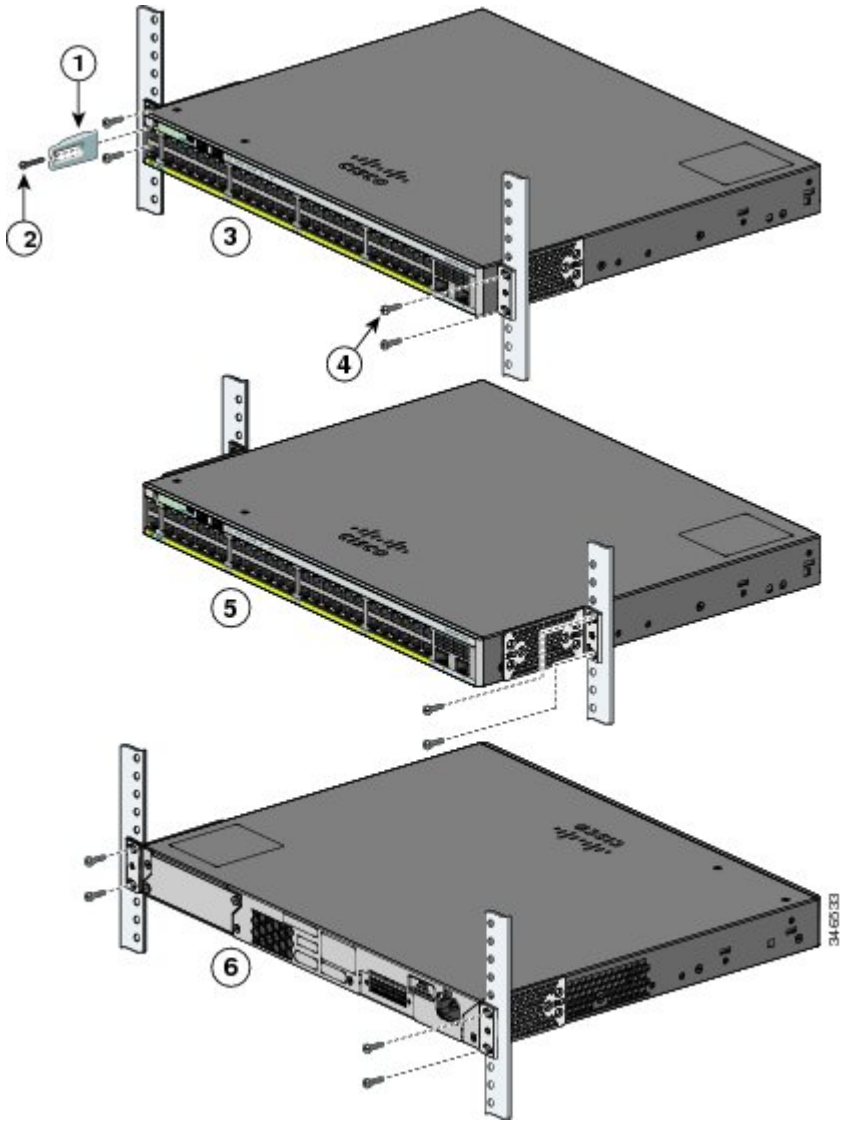
1	Front-mounting position	3	Mid-mounting position
2	Number-8 Phillips flat-head screws (48-2927-01)	4	Rear-mounting position

Mounting in a Rack

Procedure

Step 1 Use the four supplied Phillips machine screws to attach the brackets to the rack.

Step 2 Use the black Phillips machine screw to attach the cable guide to the left or right bracket.



1	Cable guide	4	Number-12 Phillips pan-head screws (48-0523-01) or Number-10 Phillips pan-head screws (48-0627-01)
2	Phillips machine screw, black (48-0654-01)	5	Mid-mounting position

3	Front-mounting position	6	Rear-mounting position

Wall-Mounting

Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 378

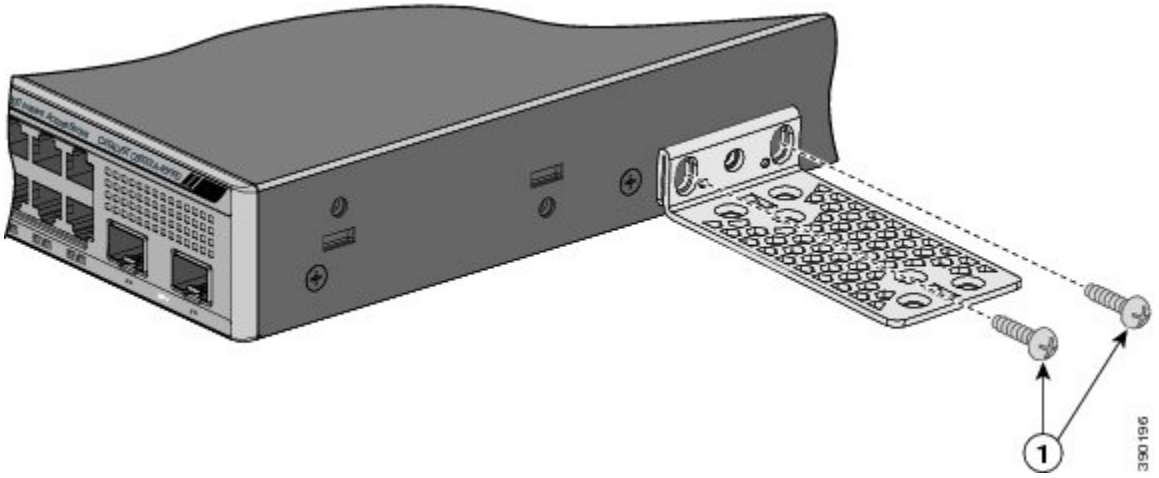
Attaching the Brackets for Wall-Mounting

Procedure

Step 1 Attach a 19-inch bracket to one side of the switch.

Step 2 Follow the same steps to attach the second bracket to the opposite side.

Figure 15: Attaching the 19-inch Brackets for Wall-Mounting



1	Number-8 phillips flat-head screws (48-2927-01)

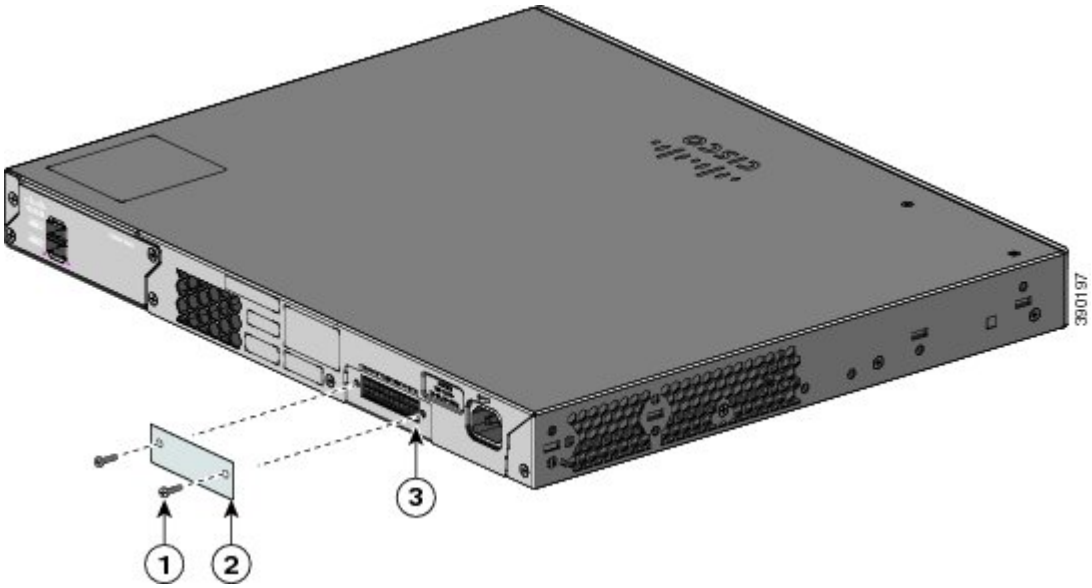
Attaching the RPS Connector Cover

Warning If an RPS is not connected to the switch, install an RPS connector cover on the back of the switch. Statement 265

Procedure

If you are not using an RPS with your switch, use the two Phillips pan-head screws to attach the RPS connector cover to the back of the switch.

Figure 16: Attaching the RPS Connector Cover



1	Phillips pan-head screws (48-0482-01)	3	RPS connector
2	RPS connector cover		

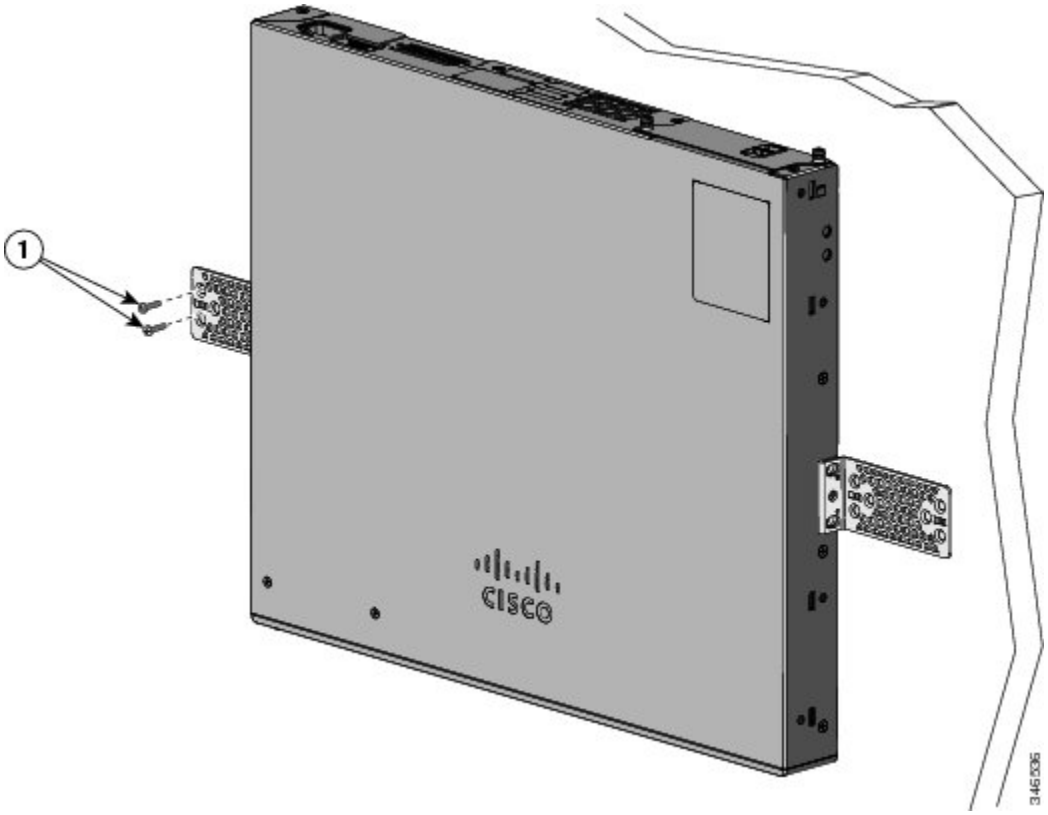
Mounting on a Wall

For the best support of the switch and cables, make sure that the switch is attached securely to wall studs or to a firmly attached plywood-mounting backboard. Mount the switch with the front panel facing down.

Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 378

Caution Following safety regulations, wall-mount the switch with its front panel facing down.

Figure 17: Mounting on a Wall



1	User-supplied screws (for example, you can use # 6 wood screws with a washer head 1-inch long).

When you complete the switch installation, see After Switch Installation, on page 30 for information on switch configuration.

Installing the Switch on a Table or Shelf

Procedure

Step 1 To install the switch on a table or shelf, locate the adhesive strip with the rubber feet in the mounting-kit envelope.

Step 2 Attach the four rubber feet to the four circular etches on the bottom of the chassis.

Step 3 Place the switch on the table or shelf near an AC power source.

Step 4 When you complete the switch installation, see the After Switch Installation, on page 30 for information on switch configuration.

After Switch Installation

- Connect to the stack ports.
- Install the power cord retainer (optional).
- Connect to the front-panel ports.

Connecting the FlexStack Cables (Optional)

Always use a Cisco-approved FlexStack cable to connect the switches.

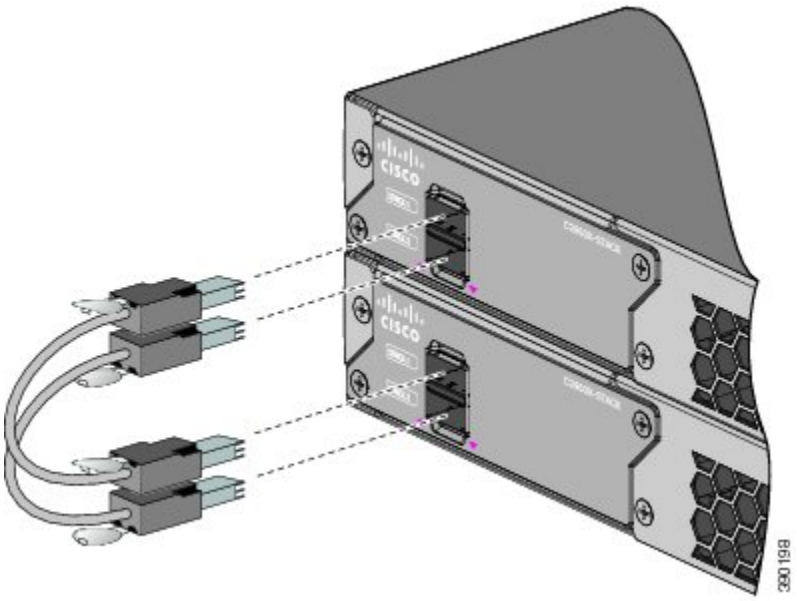
Note This is only supported on the stack-capable switches.

Caution Use only approved cables, and connect only to other Catalyst 6800IA switches. Equipment might be damaged if connected to other nonapproved Cisco cables or equipment.

Procedure

Step 1 Remove the dust covers from the FlexStack cables, and store them for future use.

Step 2 Insert one end of the FlexStack cable into the stack port of the first switch. Insert the other end of the cable into the stack port on the other switch. Make sure that you insert the cables in completely until you feel them snap into place.



Note When you connect the FlexStack cable to the STACK 1 port, the tab should be above the connector. When you connect the FlexStack cable to the STACK 2 port, the tab should be below the connector.

Step 3 Replace the dust covers when you remove the FlexStack cables from the connectors.

Caution Removing and installing the FlexStack cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary.

Removing a FlexStack Cable

Procedure

Step 1 To remove a FlexStack cable, grasp the tab on the cable connector and gently pull straight out.

Step 2 When you remove the FlexStack cables from the connectors, replace the dust covers to protect them from dust.

Caution Removing and installing the FlexStack cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary.

Installing the Power Cord Retainer (Optional)

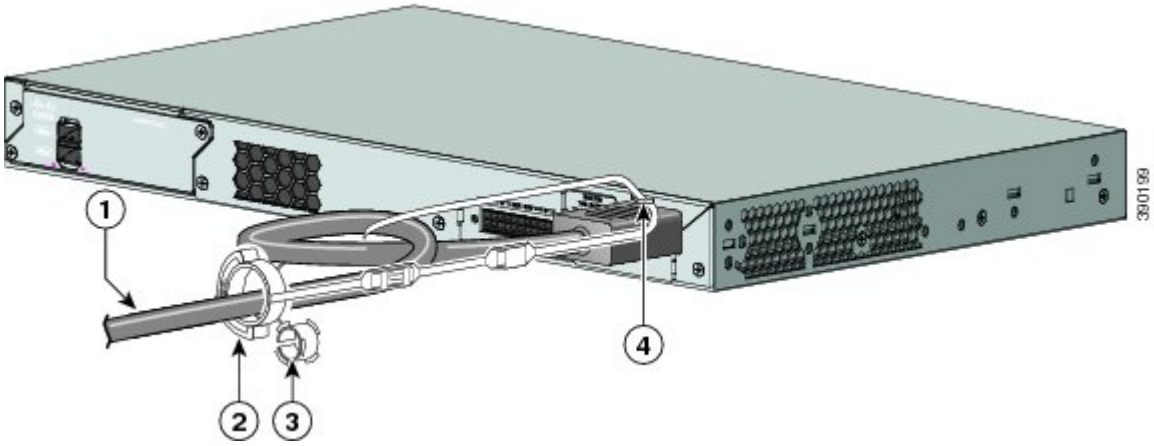
The power cord retainer is optional (part number [PWR-CLP=]). You can order it when you order your switch, or you can order it later from your Cisco representative.

Procedure

Step 1 Choose the sleeve size of the power cord retainer based on the thickness of the cord. The smaller sleeve can be snapped off and used for thin cords.

Step 2 Slide the retainer around the AC power cord, and pass it around the loop on the switch.

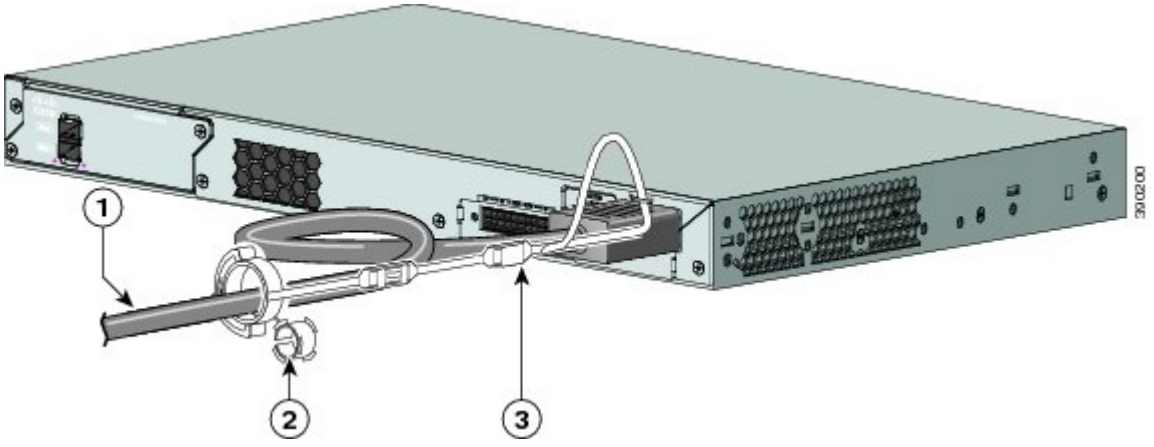
Figure 18: Inserting the Retainer Through the Lanced Loop



1	AC power cord	3	Sleeve for thinner power cords
2	Power cord retainer	4	Loop

Step 3 Slide the retainer through the first latch.

Figure 19: Sliding the Retainer Through the Latch

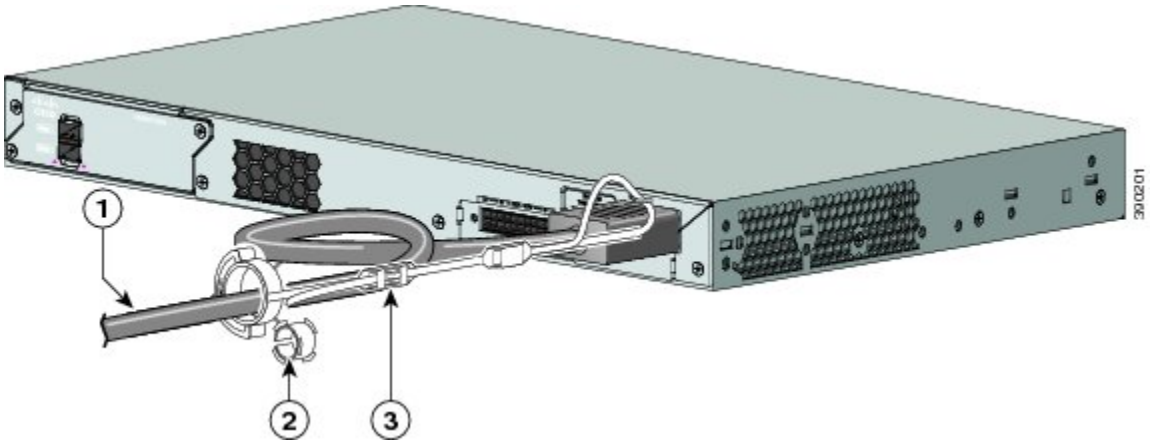


1	AC power cord	3	Latch

2	Smaller sleeve for thin power cords		

Step 4 Slide the retainer through the other latches to lock it.

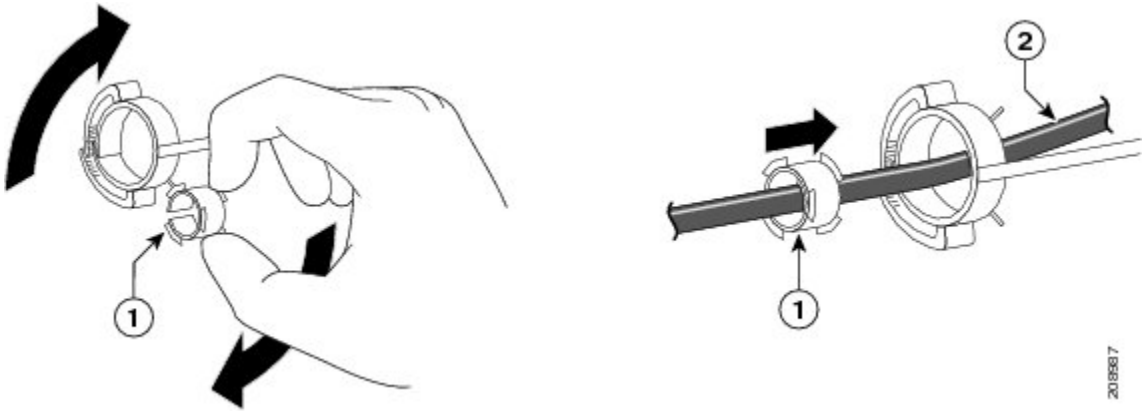
Figure 20: Locking the Retainer



1	AC power cord	3	Latches
2	Sleeve for thin power cords		

Step 5 (Optional) Use the small sleeve for thin power cords. Use the small sleeve to provide greater stability for thin cords. Detach the sleeve, and slide it over the power cord.

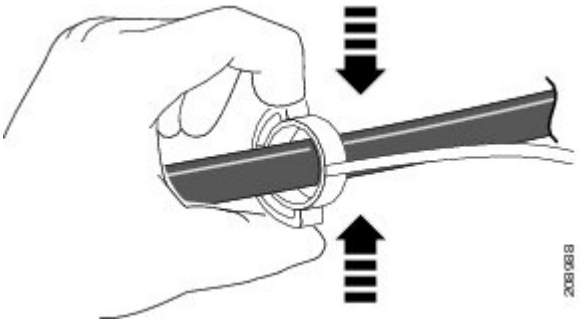
Figure 21: Sleeve Around the Power Cord



1	Sleeve for thin power cords	2	AC power cord

Step 6 Secure the AC power cord by pressing on the retainer.

Figure 22: Securing the Power Cord in the Retainer



Installing SFP and SFP+ Modules

The *SFP+* slots support both SFP and SFP+ modules.

See the switch release notes on Cisco.com for the list of supported SFP modules. Use only Cisco SFP modules on the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch.

For information about installing, removing, cabling, and troubleshooting SFP modules, see the module documentation that shipped with your device.

Installing an SFP or SFP+ Module

Before You Begin

When installing SFP or SFP+ modules, observe these guidelines:

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

Caution Removing and installing an SFP or SFP+ module can shorten its useful life. Do not remove and insert any module more often than is absolutely necessary.

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Find the send (TX) and receive (RX) markings on the module top.
On some SFP or SFP+ modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection.

Step 3 If the module has a bale-clasp latch, move it to the open, unlocked position.

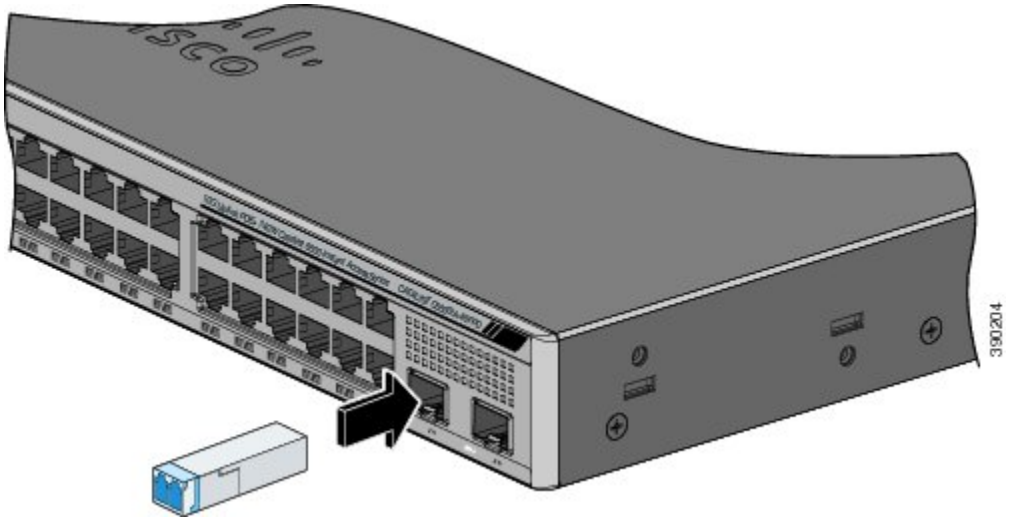
Step 4 Align the module in front of the slot opening, and push until you feel the connector snap into place.

Step 5 If the module has a bale-clasp latch, close it.

Step 6 For fiber-optic SFP or SFP+ modules, remove the dust plugs and save.

Step 7 Connect the SFP cables.

Figure 23: Installing an SFP Module



Removing an SFP or SFP+ Module

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Disconnect the cable from the SFP module. For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3 Insert a dust plug into the optical ports of the SFP or SFP+ module to keep the optical interfaces clean.

Step 4 If the module has a bale-clasp latch, pull the bale out and down to eject the module. If the latch is obstructed and you cannot use your finger, use a small, flat-blade screwdriver or other long, narrow instrument to open the latch.

Step 5 Grasp the SFP or SFP+ module, and carefully remove it from the module slot.

Step 6 Place the module in an antistatic bag or other protective environment.

Connecting to SFP and SFP+ Modules

Connecting to Fiber-Optic SFP and SFP+ Modules

Warning Class 1 laser product. Statement 1008

Caution Do not remove the rubber plugs from the SFP or SFP+ module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light. Before connecting to the SFP module, be sure that you understand the port and cabling stipulations.

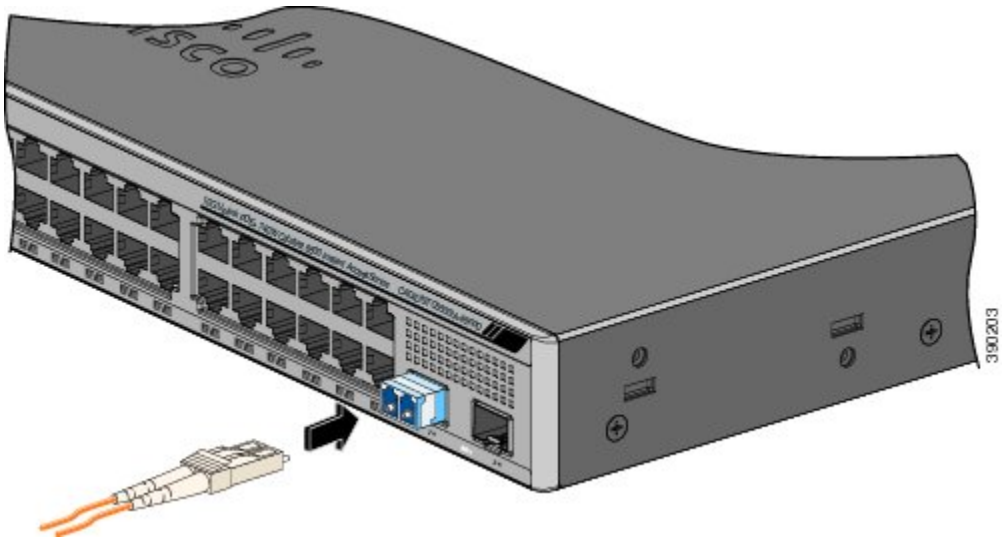
Procedure

Step 1 Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.

Step 2 Insert one end of the fiber-optic cable into the SFP or SFP+ module port.

Step 3 Insert the other cable end into a fiber-optic receptacle on a target device.

Figure 24: Connecting to a Fiber-Optic SFP Module Port



Step 4 Observe the port status LED.

The LED turns green when the switch and the target device have an established link.

The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.

If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be problem with the adapter installed in the target device.

Connecting to 1000BASE-T SFP

When connecting to a 1000BASE-T device, be sure to use a four twisted-pair, Category 5 or higher cable.

Note The automatic medium-dependent interface crossover (auto-MDIX) feature is enabled by default. For configuration information for this feature, see the switch software configuration guide or the switch command reference on Cisco.com.

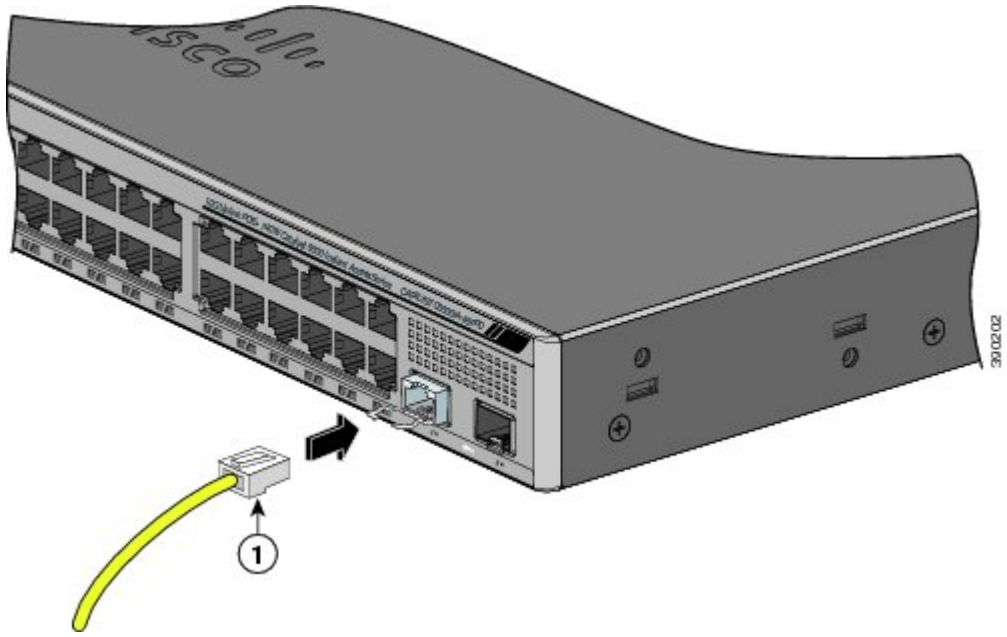
Caution To prevent ESD damage, follow your normal board and component handling procedures.

Procedure

Step 1 Connect one end of the cable to the SFP module port. Insert a four twisted-pair, straight-through cable when you connect to servers, workstations, and routers. Insert a four twisted-pair, crossover cable when you connect to switches or repeaters.

Step 2 Connect the other end of the cable to an RJ-45 connector on the other device.

Figure 25: Connecting to a 1000BASE-T SFP Module



1	RJ-45 connector

Step 3 Observe the port status LED.

- The LED turns green when the switch and the other device have an established link.
- The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.
- If the LED is off, the other device might not be turned on, there might be a cable problem, or there might be a problem with the adapter in the other device.

Step 4 If necessary, reconfigure and restart the switch or other device.

10/100/1000 PoE+ Port Connections

The ports provide PoE support for devices compliant with IEEE 802.3af and 802.3at (PoE+), and also provide Cisco prestandard PoE support for Cisco IP Phones and Cisco Aironet Access Points.

On a per-port basis, you can control whether or not a port automatically provides power when an IP phone or an access point is connected.

To access an advanced PoE planning tool, use the Cisco Power Calculator available on Cisco.com at this URL: http://tools.cisco.com/cpc/launch.jsp

You can use this application to calculate the power supply requirements for a specific PoE configuration. The results show output current, output power, and system heat dissipation.

Warning Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. Statement 1072

Caution Category 5e and Category 6 cables can store high levels of static electricity. Always ground the cables to a suitable and safe earth ground before connecting them to the switch or other devices.

Caution Noncompliant cabling or powered devices can cause a PoE port fault. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points, IEEE 802.3af, or 802.3at (PoE+)-compliant devices. You must remove any cable or device that causes a PoE fault.

Procedure

Step 1 Connect one end of the cable to the switch PoE port.

Step 2 Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both devices have established link.
The port LED is amber while STP discovers the topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green. If the LED is off, the other device might not be turned on, there might be a cable problem, or there might be a problem with the adapter in the other device.

Step 3 Reconfigure and reboot the connected device if needed.

Step 4 Repeat Steps 1 through 3 to connect each device.

Note Many legacy powered devices, including older Cisco IP phones and access points that do not fully support IEEE 802.3af, might not support PoE when connected to the switches by a crossover cable.

10/100/1000 Port Connections

The switch 10/100/1000 port configuration changes to operate at the speed of the attached device. If the attached ports do not support autonegotiation, you can manually set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have the speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the interface speed and duplex parameters on both ends of the connection.

Auto-MDIX Connections

The autonegotiation and the auto-MDIX features are enabled by default on the switch.

With autonegotiation, the switch port configurations change to operate at the speed of the attached device. If the attached device does not support autonegotiation, you can manually set the switch interface speed and duplex parameters.

With auto-MDIX, the switch detects the required cable type for copper Ethernet connections and configures the interface accordingly.

If auto-MDIX is disabled, use the guidelines in this table to select the correct cable.

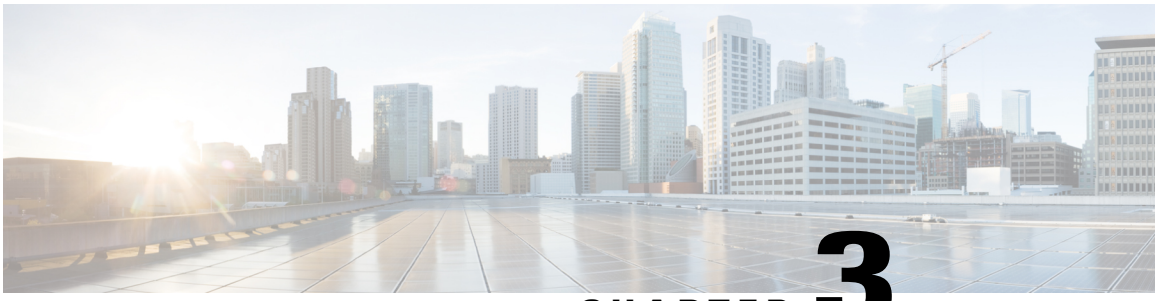
Table 11: Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable[4]	Straight-Through Cable
Switch to switch	Yes	No
Switch to hub	Yes	No
Switch to computer or server	No	Yes
Switch to router	No	Yes
Switch to IP phone	No	Yes

4 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, Category 5, Category 5e, or Category 6 cable. 10BASE-T traffic can use Category 3 or Category 4 cable.

Where to Go Next

Refer to the "Instant Access" chapter in the Release 15.1SY Supervisor Engine 2T Software Configuration Guide.



CHAPTER 3

Troubleshooting

This chapter contains these topics:

Diagnosing Problems

The LEDs on the front panel provide troubleshooting information about the switch. They show POST failures, port-connectivity problems, and overall switch performance. You can also get statistics from Device Manager, from the CLI, or from an SNMP workstation.

Switch POST Results

Note POST failures are usually fatal. Contact your Cisco technical support representative if your switch does not pass POST.

Switch LEDs

If you have physical access to the switch, look at the port LEDs for troubleshooting information about the switch. See the LEDs for a description of the LED colors and their meanings.

Switch Connections

Bad or Damaged Cable

Always examine the cable for marginal damage or failure. A cable might be just good enough to connect at the physical layer, but it could corrupt packets as a result of subtle damage to the wiring or connectors. You

can identify this situation because the port has many packet errors or the port constantly flaps (loses and regains link).

- Examine or exchange the copper or fiber-optic cable with a known, good cable.
- Look for broken or missing pins on cable connectors.
- Rule out any bad patch panel connections or media convertors between the source and the destination. If possible, bypass the patch panel, or eliminate faulty media convertors (fiber-optic-to-copper).
- Try the cable in another port or interface, if possible, to see if the problem follows the cable.
- Remove and inspect the stack cable and stack port for bent pins or damaged connectors. If the cable is bad, replace it with a known good cable.

Ethernet and Fiber-Optic Cables

Make sure that you have the correct cable for the connection.

- For Ethernet, use Category 3 copper cable for 10 Mb/s UTP connections. Use either Category 5, Category 5e, or Category 6 UTP for 10/100/1000 Mb/s connections.
- For fiber-optic cables, verify that you have the correct cable for the distance and port type. Make sure that the connected device ports both match and use the same type encoding, optical frequency, and fiber type.
- For copper connections, determine if a crossover cable was used when a straight-through was required or the reverse. Enable auto-MDIX on the switch, or replace the cable.

Link Status

Verify that both sides have link. A single broken wire or a shutdown port can cause one side to show link even though the other side does not have link.

A port LED that is on does not guarantee that the cable is fully functional. The cable might have encountered physical stress that causes it to function at a marginal level. If the port LED does not turn on:

- Connect the cable from the switch to a known good device.
- Make sure that both ends of the cable are connected to the correct ports.
- Verify that both devices have power.
- Verify that you are using the correct cable type.
- Look for loose connections. Sometimes a cable appears to be seated, but is not. Disconnect the cable and then reconnect it.

10/100/1000 Port Connections

A port appears to malfunction:

- Use the Mode button to show the status for all ports.
- Use the **show interfaces** privileged EXEC command to see if the port is error-disabled, disabled, or shutdown. Reenable the port if necessary.

10/100/1000 PoE+ Port Connections

A powered device connected to PoE port does not receive power:

- Use the Mode button to show the PoE status for all ports.
- Use the **show interfaces** privileged EXEC command to see if the port is in error-disabled, disabled, or shutdown. Reenable the port if necessary.
- Verify that the power supply installed in the switch meets the power requirements of your connected devices.
- Verify that there is sufficient PoE power budget to provide power to the attached device. Use the **show power inline** global configuration command to check on the available PoE power budget.
- Verify the cable type. Many legacy powered devices, including older Cisco IP phones and access points that do not fully support IEEE 802.3af, might not support PoE when connected to the switch by a crossover cable. Replace the crossover cable with a straight-through cable.

Caution Noncompliant cabling or powered devices can cause a PoE port fault. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points or IEEE 802.3af-compliant devices. You must remove any cable or device that causes a PoE fault.

SFP and SFP+ Module

Use only Cisco SFP or SFP+ modules in the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch.

- Inspect the SFP module. Exchange the suspect module with a known good module. Verify that the module is supported on this platform. (The switch release notes on Cisco.com list the SFP modules that the switch supports.)
- Use the **show interfaces** privileged EXEC command to see if the port or module is error-disabled, disabled, or shutdown. Reenable the port if needed.
- Make sure that all fiber-optic connections are properly cleaned and securely connected.

Interface Settings

Verify that the interface is not disabled or powered off. If an interface is manually shut down on either side of the link, it does not come up until you reenable the interface. Use the **show interfaces** privileged EXEC command to see if the interface is error-disabled, disabled, or shutdown on either side of the connection. If needed, reenable the interface.

Ping End Device

Ping from the directly connected switch first, and then work your way back port by port, interface by interface, trunk by trunk, until you find the source of the connectivity issue. Make sure that each switch can identify the end device MAC address in its Content-Addressable Memory (CAM) table.

Spanning Tree Loops

STP loops can cause serious performance issues that look like port or interface problems.

A unidirectional link can cause loops. It occurs when the traffic sent by the switch is received by its neighbor, but the traffic from the neighbor is not received by the switch. A broken fiber-optic cable, other cabling problems, or a port issue could cause this one-way communication.

You can enable UniDirectional Link Detection (UDLD) on the switch to help identify unidirectional link problems.

Switch Performance

Speed, Duplex, and Autonegotiation

If the port statistics show a large amount of alignment errors, frame check sequence (FCS), or late-collisions errors, this might mean a speed or duplex mismatch.

A common issue with speed and duplex occurs when duplex and speed settings are mismatched between two switches, between a switch and a router, or between the switch and a workstation or server. Mismatches can happen when manually setting the speed and duplex or from autonegotiation issues between the two devices.

To maximize switch performance and to ensure a link, follow one of these guidelines when changing the duplex or the speed settings.

- Let both ports autonegotiate both speed and duplex.
- Manually set the speed and duplex parameters for the interfaces on both ends of the connection.
- If a remote device does not autonegotiate, use the same duplex settings on the two ports. The speed parameter adjusts itself even if the connected port does not autonegotiate.

Autonegotiation and Network Interface Cards

Problems sometimes occur between the switch and third-party network interface cards (NICs). By default, the switch ports and interfaces autonegotiate. Laptops or other devices are commonly set to autonegotiate, yet sometimes autonegotiation issues occur.

To troubleshoot autonegotiation problems, try manually setting both sides of the connection. If this does not solve the problem, there could be a problem with the firmware or software on your NIC. You can resolve this by upgrading the NIC driver to the latest version.

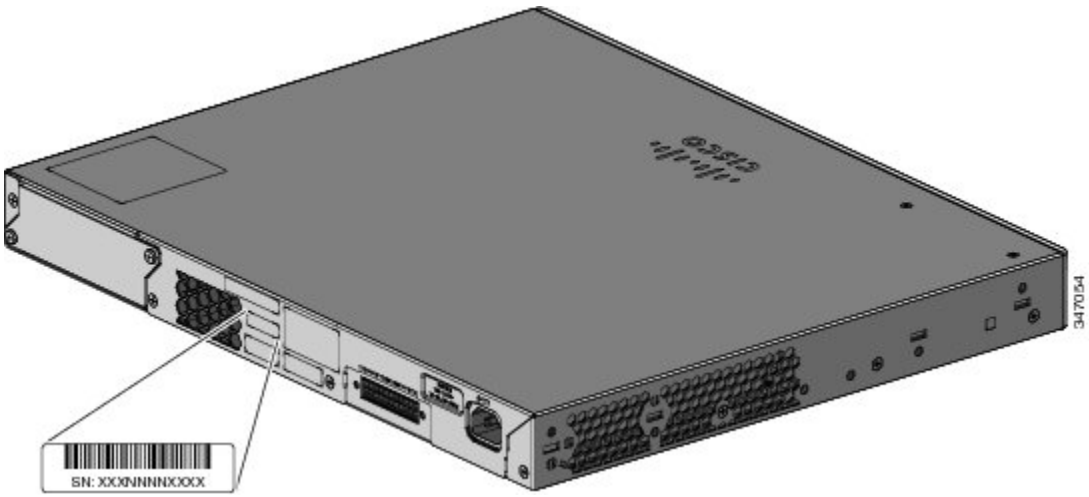
Cabling Distance

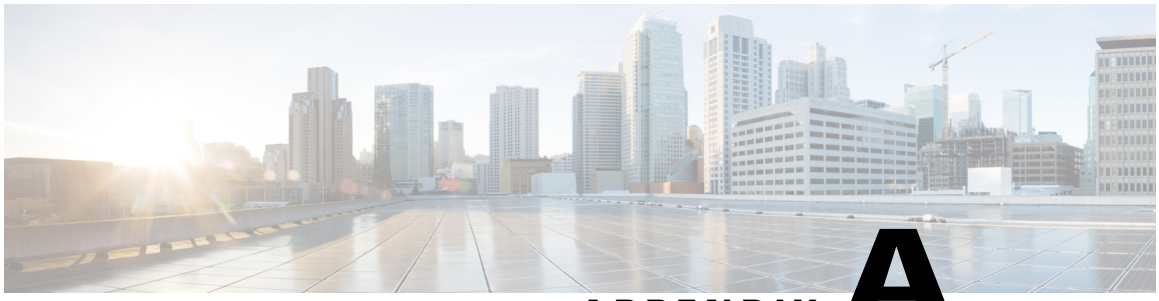
If the port statistics show excessive FCS, late-collision, or alignment errors, verify that the cable distance from the switch to the connected device meets the recommended guidelines.

Finding the Serial Number

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

Figure 26: Serial Number Location for the Catalyst 6800IA Switches





APPENDIX A

Technical Specifications

This appendix contains these topics:

Environmental Specifications

This table describes the environmental specifications.

Table 12: Environmental Specifications for All Switches

Environmental Ranges	
Operating temperature [5]	23 to 113°F (–5 to 45°C) up to 5,000 ft (1500 m) 23 to 104°F (–5 to 40°C) up to 10,000 ft (3000 m)
Storage temperature	–40 to 158°F (–40 to 70°C) up to 15,000 ft (4500 m)
Relative humidity	10 to 95% (noncondensing)
Storage altitude	Up to 15,000 ft (4500 m)

5 Minimum ambient temperature for cold start is 32°F (0°C)

Specifications for the Catalyst 6800IA Switches

Table 13: Catalyst 6800IA-48FPD Switch Specifications

Power Requirements	
AC input voltage	9 to 4 A, 50 to 60 Hz, 100 to 240 VAC (autoranging)

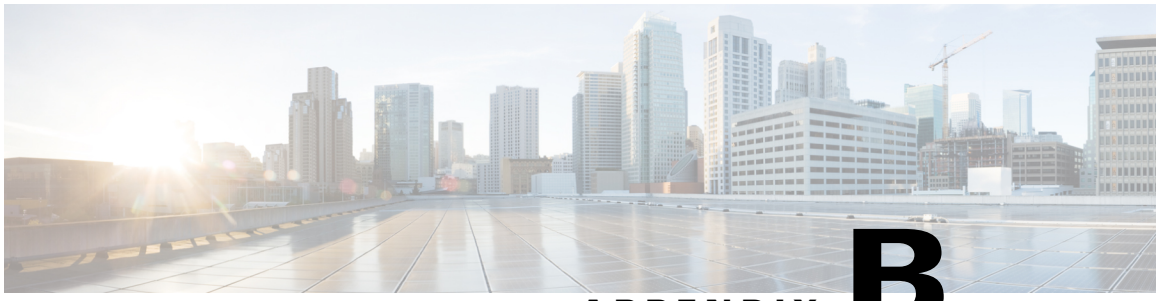
DC input voltage for RPS 2300	+12 V @ 4 A, –53 V @ 15 A
Power consumption[6]	149 W, 508 BTUs per hour
Power rating[7]	0.89 KVA
PoE+	30 W-per-port maximum, 740-W switch maximum
Physical Dimensions	
Weight	12.9 lb (5.8 kg)
Dimensions (H x D x W)	1.75 x 14.50 x 17.5 in. (4.45 x 36.83 x 44.5 cm)

6 Power consumption values for the power consumed internally by the switch at 120 VAC 60 Hz.
7 Power rating values for the switch input power.

Table 14: Catalyst 6800IA-48TD Switch Specifications

Power Requirements	
AC input voltage	1 to 0.5 A, 50 to 60 Hz, 100 to 240 VAC (autoranging)
DC input voltage for RPS 2300	+12 V @ 4 A, –53 V @ 8 A
Power consumption [8]	47 W, 161 BTUs per hour
Power rating[9]	0.049 KVA
Physical Dimensions	
Weight	9.6 lb (4.3 kg)
Dimensions (H x D x W)	1.75 x 11 x 17.50 in. (4.45 x 27.94 x 44.5 cm)

8 Power consumption values for the power consumed internally by the switch at 120 VAC 60 Hz.
9 Power rating values for the switch input power.



APPENDIX B

Connector and Cable Specifications

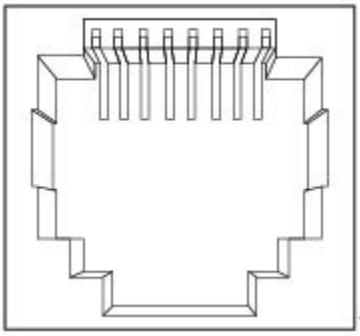
This appendix contains these topics:

Connector Specifications

10/100/1000 Ports (Including PoE)

All 10/100/1000 ports use standard RJ-45 connectors and Ethernet pinouts.

Figure 27: 10/100/1000 Port Pinouts

Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

SFP Module Connectors

Figure 28: Duplex LC Cable Connector

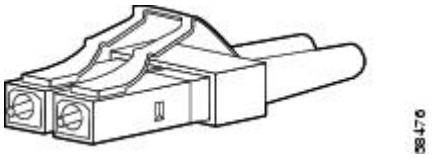


Figure 29: Simplex LC Cable Connector

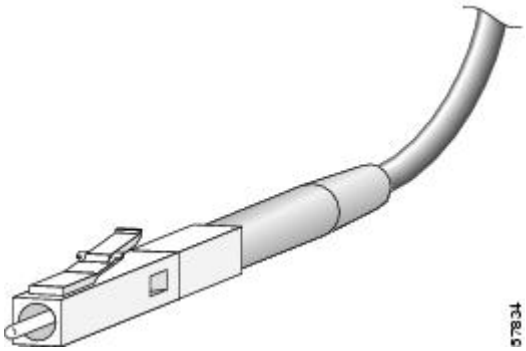
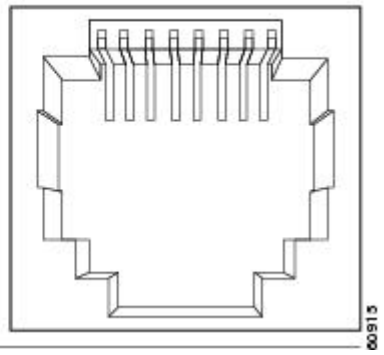


Figure 30: Copper SFP Module RJ-45 Connector

Pin	Label
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-



Cables and Adapters

SFP Module Cables

For cabling specifications, refer to the Cisco SFP and SFP+ Transceiver Module Installation Notes.

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

Cable Pinouts

Figure 31: Four Twisted-Pair Straight-Through Cable Schematic

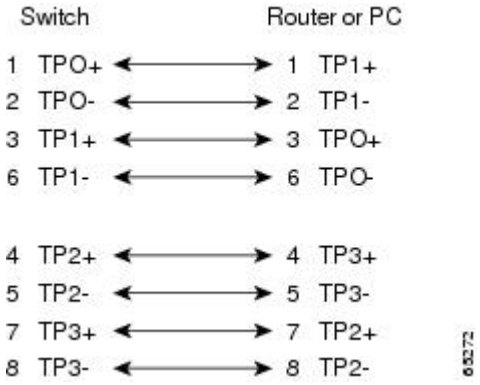


Figure 32: Four Twisted-Pair Crossover Cable Schematic

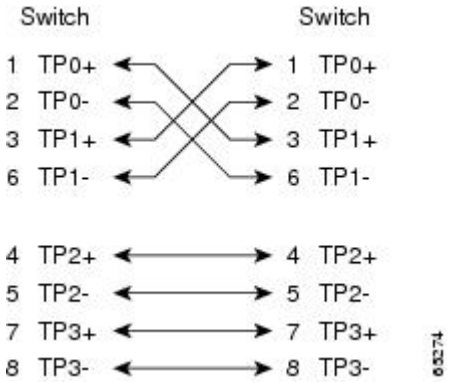


Figure 33: Two Twisted-Pair Straight-Through Cable Schematic

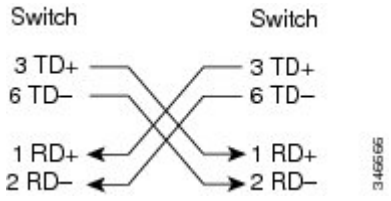


Figure 34: Two Twisted-Pair Crossover Cable Schematic

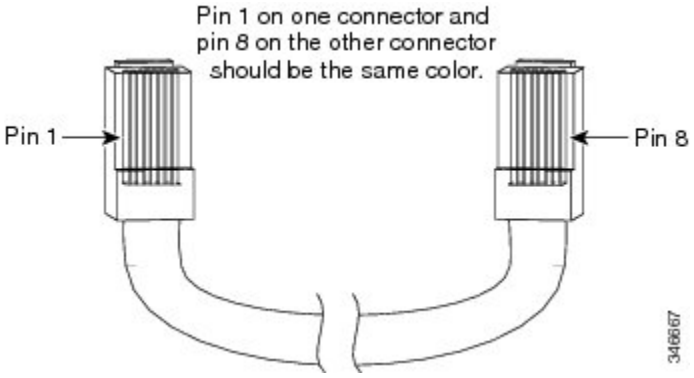
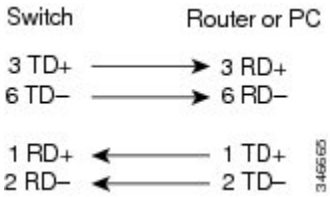


Figure 35: Identifying a Crossover Cable



Console Port Adapter Pinouts

The RS-232 console port uses an 8-pin RJ-45 connector. Use an RJ-45-to-DB-9 adapter cable to connect the switch console port to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter to connect the switch console port to a terminal. You can order the kit (part number ACS-DSBUASYN=) from Cisco.

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

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**DB-9 Pin**	**Signal**
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

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

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