



Catalyst 6800IA Switch Hardware Installation Guide

First Published: 2013-09-23

Last Modified: 2014-07-28

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-30278-02

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)

© 2013 – 2014 Cisco Systems, Inc. All rights reserved.



CONTENTS

Preface

Preface vii

Document Conventions vii

Related Documentation ix

Obtaining Documentation and Submitting a Service Request ix

CHAPTER 1

Product Overview 1

Switch Models 1

Front Panel 2

PoE and PoE+ Ports 3

10/100/1000 Ports 3

Management Ports 3

SFP+ Module Slots 4

LEDs 4

System LED 6

RPS LED 6

IRPS LED 6

Master LED 7

Port LEDs and Modes 7

STACK LED 9

Console LEDs 10

Ethernet Management Port LED 11

Rear Panel 11

FlexStack-Plus Ports and LEDs 13

RPS Connector 13

Cisco RPS 2300 14

AC Power Connector 14

Power Supply Modules (Applies to the Catalyst 6800IA-48FPDR Switches) 14

CHAPTER 2**Switch Installation 17**

- Safety Warnings 17
- Tools and Equipment 20
- Installation Guidelines 20
- Verifying Switch Operation 21
- Planning and Installing a Switch Stack (Optional) 21
 - Stack Guidelines 21
 - Stack Cabling 22
 - Stack Bandwidth and Partitioning Examples 25
 - Power-On Sequence for Switch Stacks 26
- Installing the Switch 26
 - Rack-Mounting 26
 - Attaching the Rack-Mount Brackets 28
 - Mounting in a Rack 29
 - Wall-Mounting 31
 - Attaching the Brackets for Wall-Mounting 31
 - Attaching the RPS Connector Cover 31
 - Mounting on a Wall 32
 - Installing the Switch on a Table or Shelf 34
 - After Switch Installation 34
- Connecting FlexStack-Plus modules (Optional) 34
 - Removing a FlexStack Cable 35
- Installing the Power Cord Retainer (Optional) 36
- Installing SFP Modules 38
 - Installing an SFP or SFP+ Module 38
 - Removing an SFP Module 40
- Connecting to SFP and SFP+ Modules 40
 - Connecting to Fiber-Optic SFP and SFP+ Modules 40
 - Connecting to 1000BASE-T SFP 41
- 10/100/1000 PoE and PoE+Port Connections 43
- 10/100/1000 Port Connections 44
 - Auto-MDIX Connections 44
- Where to Go Next 44

CHAPTER 3**Power Supply Installation 45**

- Power Supply Module Overview 45
- Installation Guidelines 47
- Installing or Replacing an AC Power Supply 48
- Finding the Serial Number 49

CHAPTER 4**Troubleshooting 51**

- Diagnosing Problems 51
 - Switch POST Results 51
 - Switch LEDs 51
 - Switch Connections 51
 - Bad or Damaged Cable 51
 - Ethernet and Fiber-Optic Cables 52
 - Link Status 52
 - 10/100/1000 Port Connections 52
 - 10/100/1000 PoE+ Port Connections 53
 - SFP and SFP+ Module 53
 - Interface Settings 53
 - Ping End Device 54
 - Spanning Tree Loops 54
 - Switch Performance 54
 - Speed, Duplex, and Autonegotiation 54
 - Autonegotiation and Network Interface Cards 54
 - Cabling Distance 55
 - Finding the Serial Number 55

APPENDIX A**Technical Specifications 57**

- Environmental Specifications 57
- Specifications for the Catalyst 6800IA Switches 58

APPENDIX B**Connector and Cable Specifications 61**

- Connector Specifications 61
 - 10/100/1000 Ports (Including PoE) 61
 - SFP Module Connectors 62

Cables and Adapters 62

- SFP Module Cables 62
- Cable Pinouts 64
- Console Port Adapter Pinouts 65



Preface

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

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 .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
Courier font	Terminal sessions and information the system displays appear in <i>courier font</i> .
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

- Cisco SFP modules documentation, including compatibility matrixes, located at:
http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html
- Cisco Validated Designs documents at this URL:
<http://www.cisco.com/go/designzone>

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>

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 Catalyst 6800IA 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.

The switches support stacking through the Cisco FlexStack technology. Unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

This chapter contains these topics:

- [Switch Models, page 1](#)
- [Front Panel, page 2](#)
- [Rear Panel, page 11](#)

Switch Models

Table 1: Catalyst 6800IA Switch Models and Descriptions

Switch Model	Description
Catalyst 6800IA-48FPDR	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, 1025-W power supply.
Catalyst 6800IA-48FPD	48 10/100/1000 PoE+ ports (PoE budget of 740 W) and 2 SFP+ module slots.
Catalyst 6800IA-48TD	48 10/100/1000 ports and 2 SFP+ module slots.

¹ SFP+ = 10-Gigabit uplink.

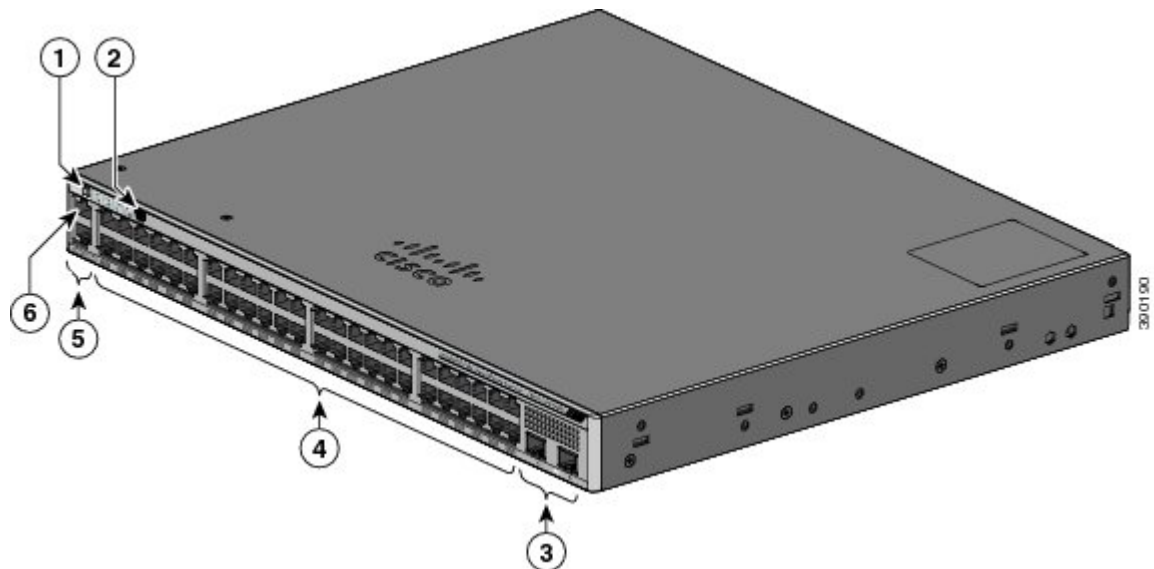
Front Panel

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 10BASE-T, 100BASE-TX, 1000BASE-T traffic requires Category 5 or Category 5e 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).

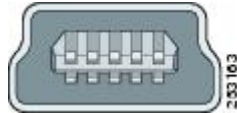
The 10/100 Ethernet management port connection uses a standard RJ-45 crossover or straight-through cable. The RJ-45 console port connection uses the supplied RJ-45-to-DB-9 female cable. The USB console port connection uses a USB Type A to 5-pin mini-Type B cable. The USB console interface speeds are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

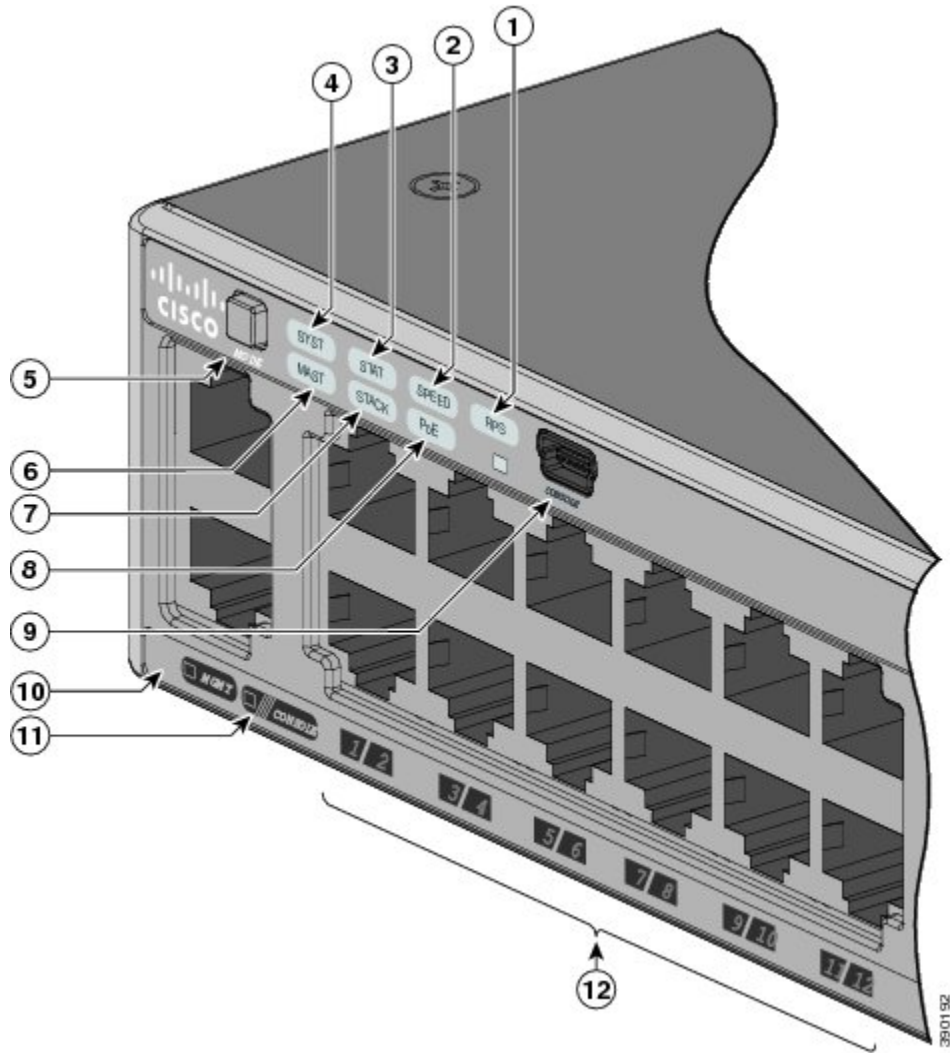
For Cisco SFP and SFP+ modules documentation, including compatibility matrixes, refer to this URL: http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

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 ² or IRPS ³ LED	7	STACK LED
2	SPEED LED	8	PoE LED ⁴
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
- ³ IRPS = inline redundant power system
- ⁴ 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 (Catalyst 6800IA-48FPD and 6800IA-48TD switches).

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).

IRPS LED

The IRPS LED is only available on the Catalyst 6800IA-48FPDR switch.

Table 4: IRPS LED

Color	RPS Status
Off	Second power supply is not present.
Green	Both power supplies are present and operating.
Amber	The second power supply is present, but the input is not connected.
Blinking amber	The second power supply is present, but the signal is faulty.

Master LED

This table describes the master LEDs.

Table 5: 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 6: 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	The stack member status.
	Stack port 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 7: 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.

**Note**

If you press the Mode button for more than 3 seconds on any switch or the stack master, the switch enters the Express Setup mode which will reset and reboot the FEX or the FEX stack. Express Setup is enabled by default and you must disable it to prevent the switch from accidentally entering the Express Setup mode. To disable Express Setup, Contact Cisco TAC.

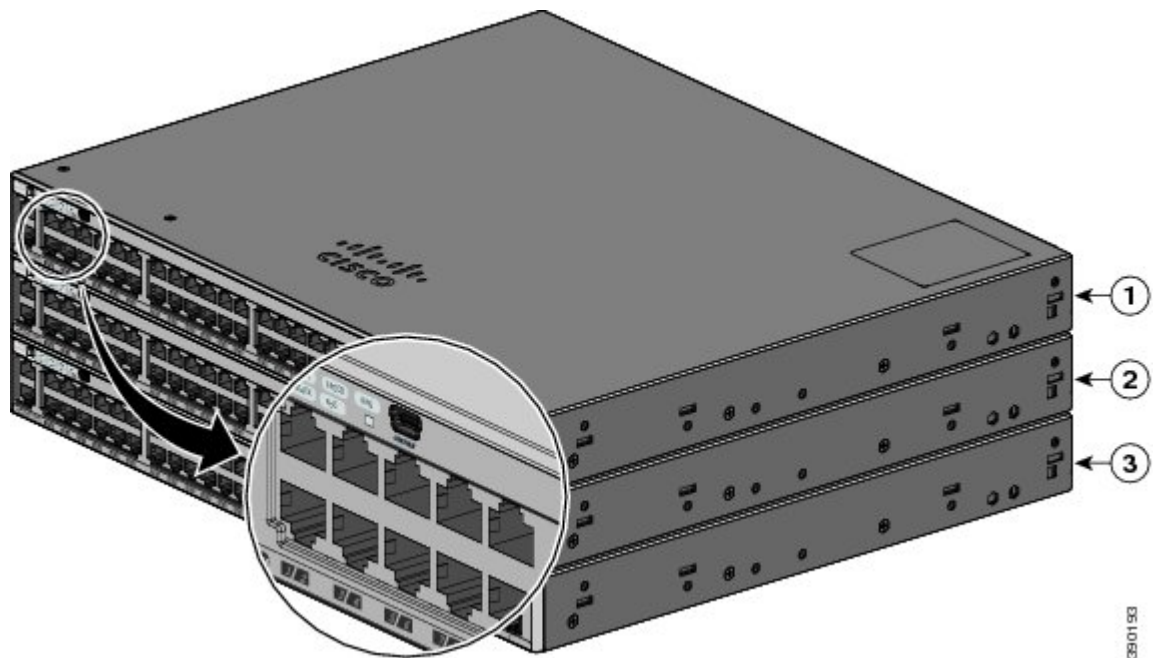
Even if PoE mode is not selected, this LED still shows PoE problems if they are detected.

STACK LED

The STACK LED shows the sequence of member switches in a stack. Up to five switches can be members of a stack. The first five 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 8: 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

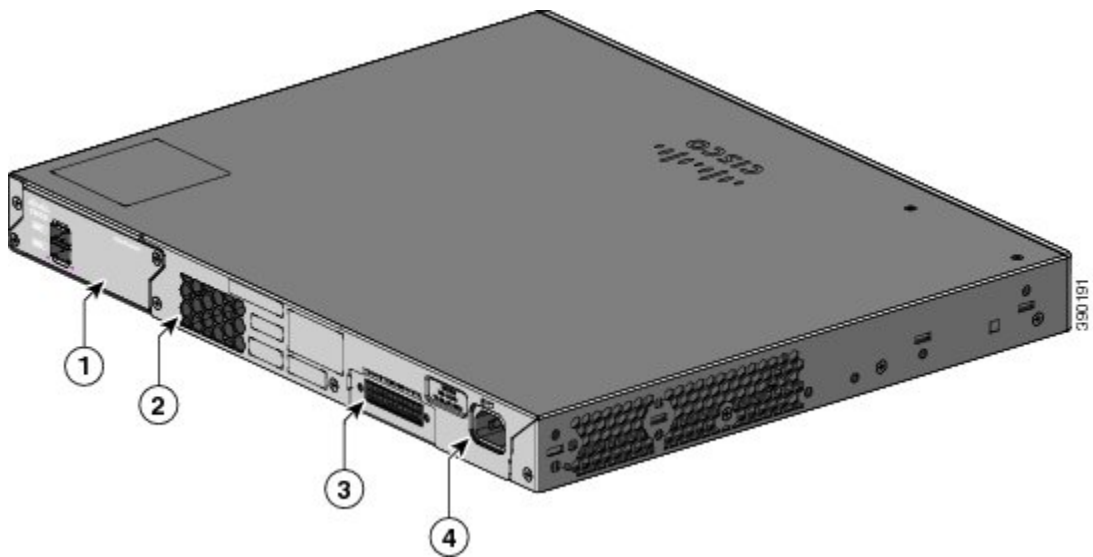
Table 9: Ethernet Management Port LED

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

Rear Panel

The rear panel of the Catalyst 6800IA-48FPD and 6800IA-48TD switches have FlexStack-Plus ports, a fan exhaust, an RPS connector, and an AC power connector.

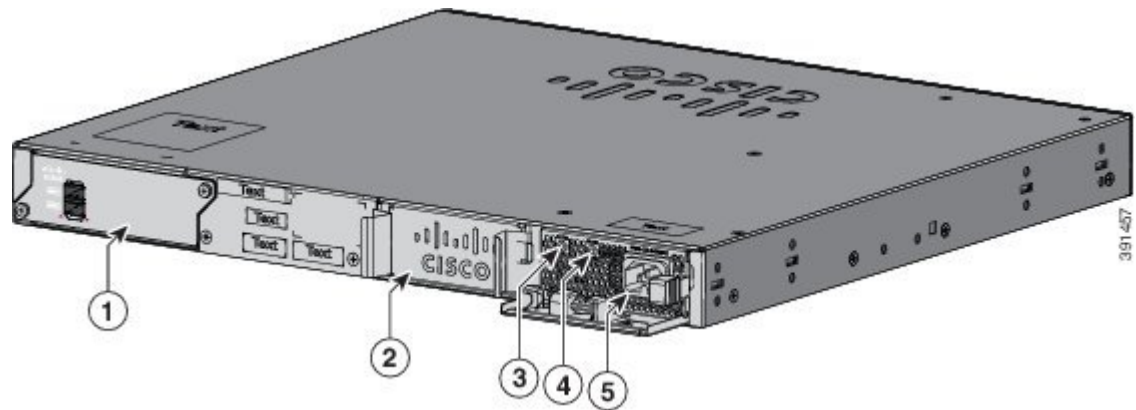
Figure 5: Catalyst 6800IA Switch Rear Panel



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

The rear panel of the Catalyst 6800IA-48FPDR switches have FlexStack-Plus ports and power supply module slots.

Figure 6: Catalyst 6800IA Switch Rear Panel

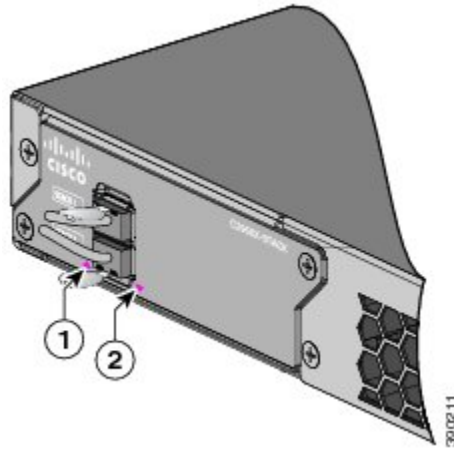


1	FlexStack-Plus ports	4	PS OK LED
2	Power supply slot (with blank module)	5	AC power connector on the power supply module
3	AC OK LED		

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 7: FlexStack-Plus Ports



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

Table 10: FlexStack-Plus Port LEDs

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

Table 11: 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-48FPD and 6800IA-48TD switches

**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**Note**

This applies to the Catalyst 6800IA-48FPD and Catalyst 6800IA-48TD switches.

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.

Power Supply Modules (Applies to the Catalyst 6800IA-48FPDR Switches)

The switch operates with either one or two active power supply modules. You can use two AC modules, or one module and a blank cover.

Table 12: Power Supply Model Numbers and Description

Part Number	Description
PWR-C2-1025WAC=	1025-W AC power supply module.

The 1025-W power supply module is an autoranging unit that supports input voltages between 115 and 240 VAC. All power supply modules have internal fans. All switches ship with a blank cover in the second power supply slot.

Table 13: Available PoE with Different Combinations of Power Supplies

Primary Power Supply	Secondary Power Supply	Available Power for PoE+	Switch Power Redundancy	Available PoE Power when One PS Fails
PWR-C2-1025WAC=	—	740 W	No	—
PWR-C2-1025WAC=	PWR-C2-1025WAC=	740 W	Yes	740 W



Switch Installation

- [Safety Warnings, page 17](#)
- [Tools and Equipment, page 20](#)
- [Installation Guidelines, page 20](#)
- [Verifying Switch Operation, page 21](#)
- [Planning and Installing a Switch Stack \(Optional\), page 21](#)
- [Installing the Switch, page 26](#)
- [Connecting FlexStack-Plus modules \(Optional\), page 34](#)
- [Installing the Power Cord Retainer \(Optional\), page 36](#)
- [Installing SFP Modules, page 38](#)
- [Connecting to SFP and SFP+ Modules, page 40](#)
- [10/100/1000 PoE and PoE+Port Connections, page 43](#)
- [10/100/1000 Port Connections, page 44](#)
- [Where to Go Next, page 44](#)

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:

- 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.
- 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 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. 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: Cisco XPS 2200 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

Stacking using FlexStack-Plus Modules

These figures show the switches stacked in a vertical rack or on a table. The connections are redundant. A Catalyst 6800IA-48FPD switch is shown in the examples, the Catalyst 6800IA-48FPDR switch can be stacked the same way.

Figure 8: Stacking Switches with the 0.5-meter FlexStack Cable

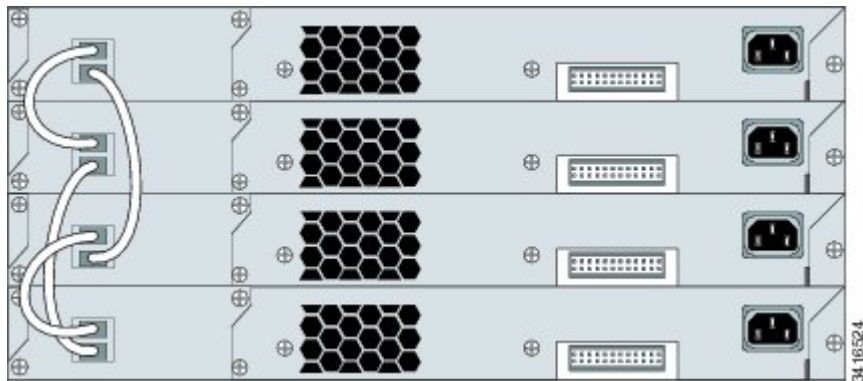
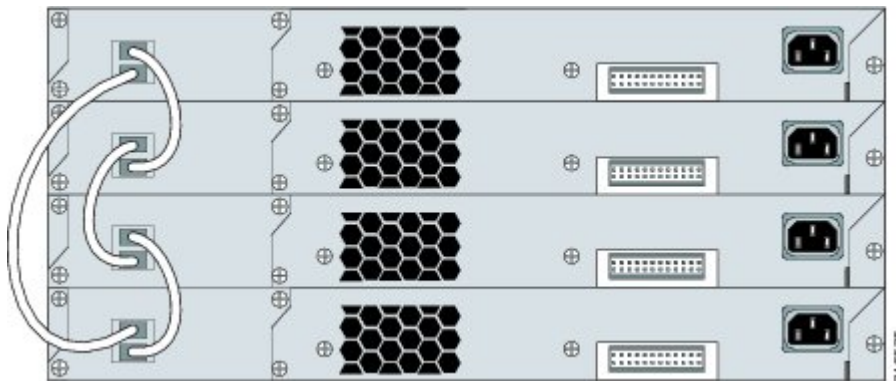


Figure 9: Stacking Switches with 0.5-meter and 3-meter FlexStack Cables

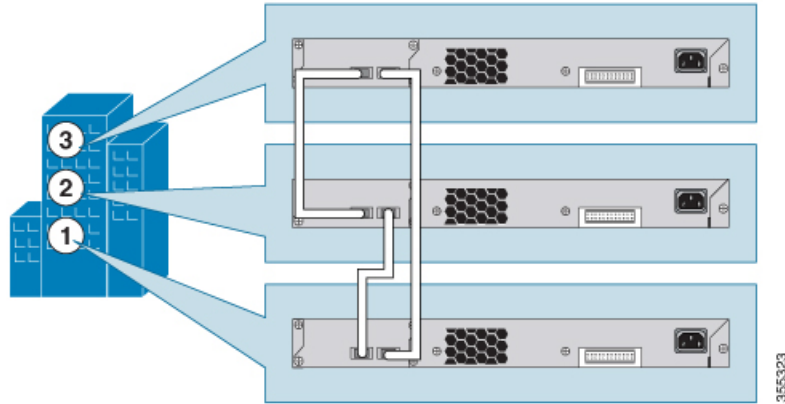


Stacking using FlexStack-Extended Modules

This section explains the supported stacking topologies using FlexStack-Extended Modules.

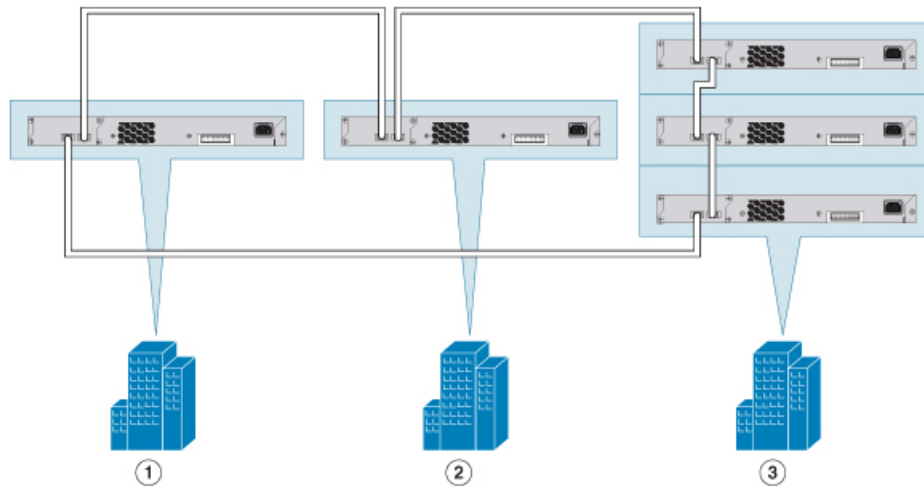
The following topology is created by stacking switches with FlexStack-Extended Fiber modules that are deployed across different floors of a building. The SFP+ module ports are connected using fiber cables.

Figure 10: Stacking with FlexStack-Extended Fiber Modules Across Floors of a Building



The following topology is created by stacking switches with FlexStack-Extended Fiber modules that are deployed across multiple buildings of a campus and different floors of a building.

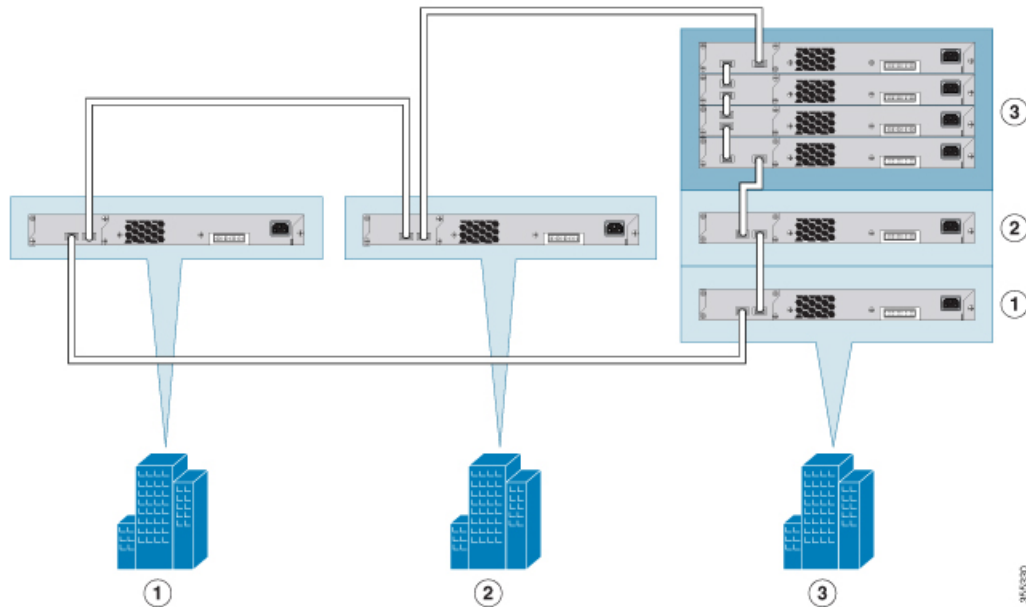
Figure 11: Stacking with FlexStack-Extended Fiber Modules Across Floors and Buildings



Using FlexStack-Extended Hybrid module, you can combine existing stack of switches and new switches spread across multiple wiring closets into one single stack. To achieve this, the copper port on the FlexStack-Extended Hybrid module should be connected to the FlexStack-Plus port on a switch in your

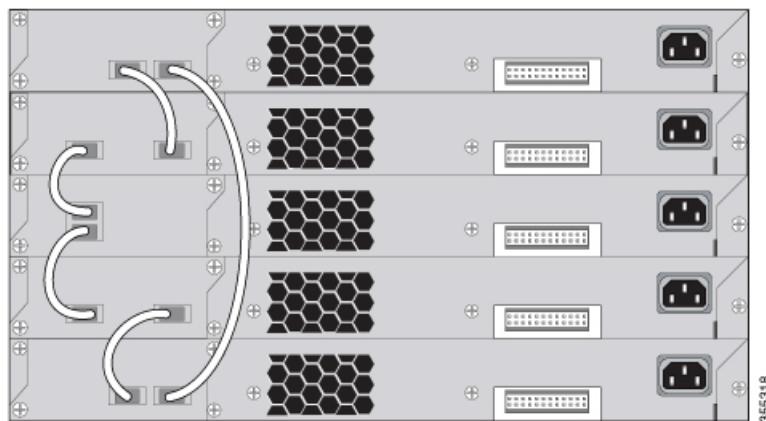
existing network. The fiber port on the Cisco FlexStack-Extended Fiber module can be used to connect switches over long distances. You can stack up to eight switches.

Figure 12: Extending Traditional FlexStack-Plus Stacks using FlexStack-Extended Modules



The following image shows a mixed stack network using FlexStack-Plus, FlexStack-Extended Fiber and Hybrid modules. This is one of the supported topologies using FlexStack modules. Typically, fiber modules are used to extend a network for long distance communication across buildings or floors in a building.

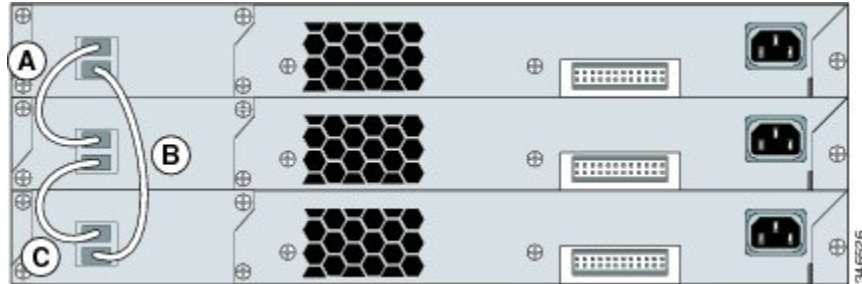
Figure 13: Mixed Stacking with FlexStack Modules



Stack Bandwidth and Partitioning Examples

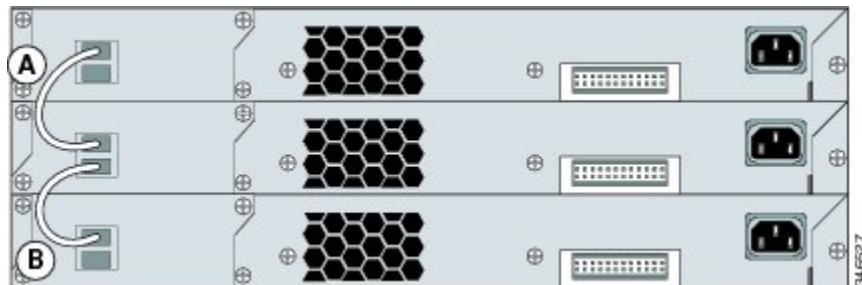
This figure shows a stack that provides full bandwidth with redundant connections.

Figure 14: Stack with Full Bandwidth Connections



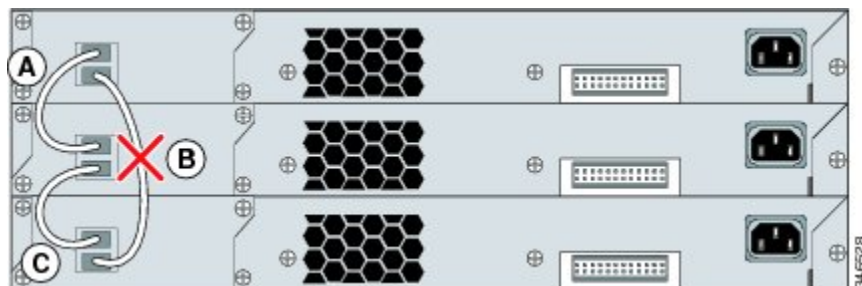
This figure shows a stack with incomplete stack cabling connections. This stack provides only half bandwidth and does not have redundant connections.

Figure 15: Stack with Half Bandwidth Connections



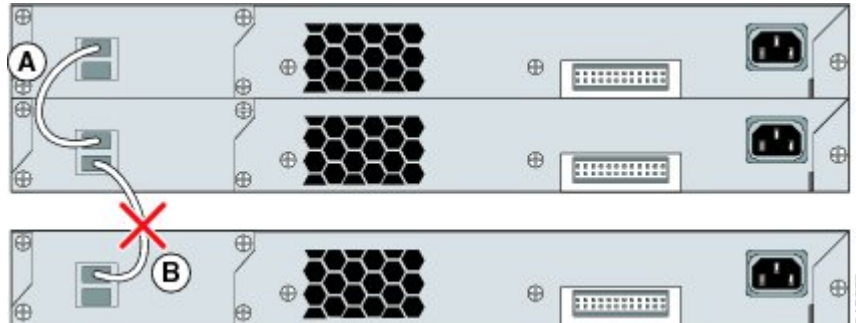
This figure shows a stack with a bad FlexStack cable in link B. This stack provides only half bandwidth and does not have redundant connections.

Figure 16: 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 17: 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

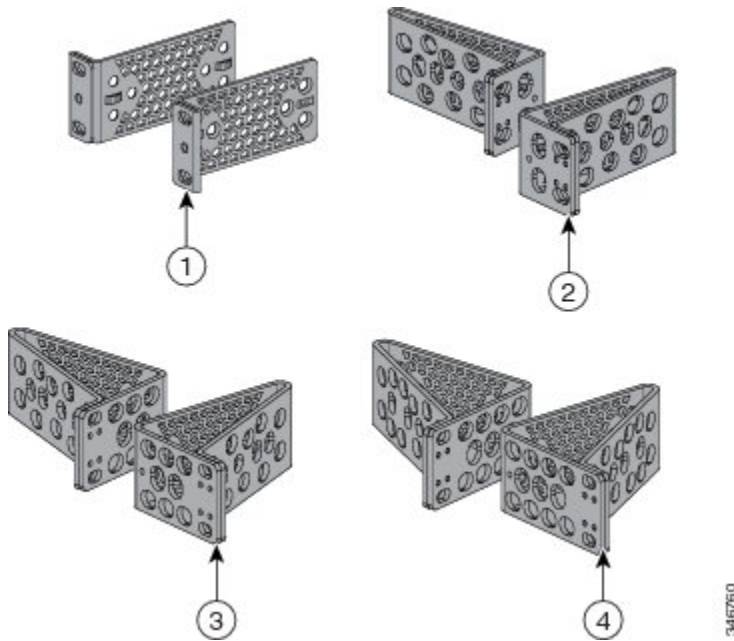
To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- 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 18: 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 (for Catalyst 6800IA-48FPD and 6800IA-48TD) or four Phillips flat-head screws (for Catalyst 6800IA-48FPDR) to attach the long side of the bracket to each side of the switch.

Figure 19: Attaching Brackets for 19-inch Racks (Catalyst 6800IA-48FPD and 6800IA-48TD)

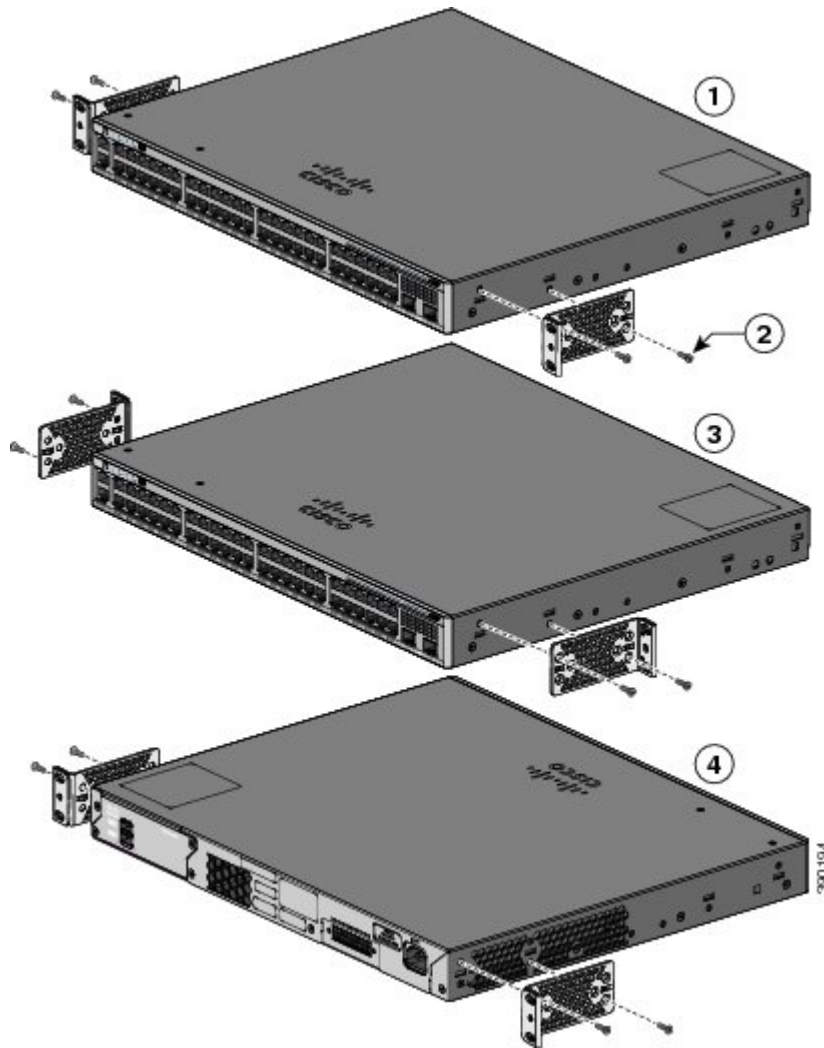
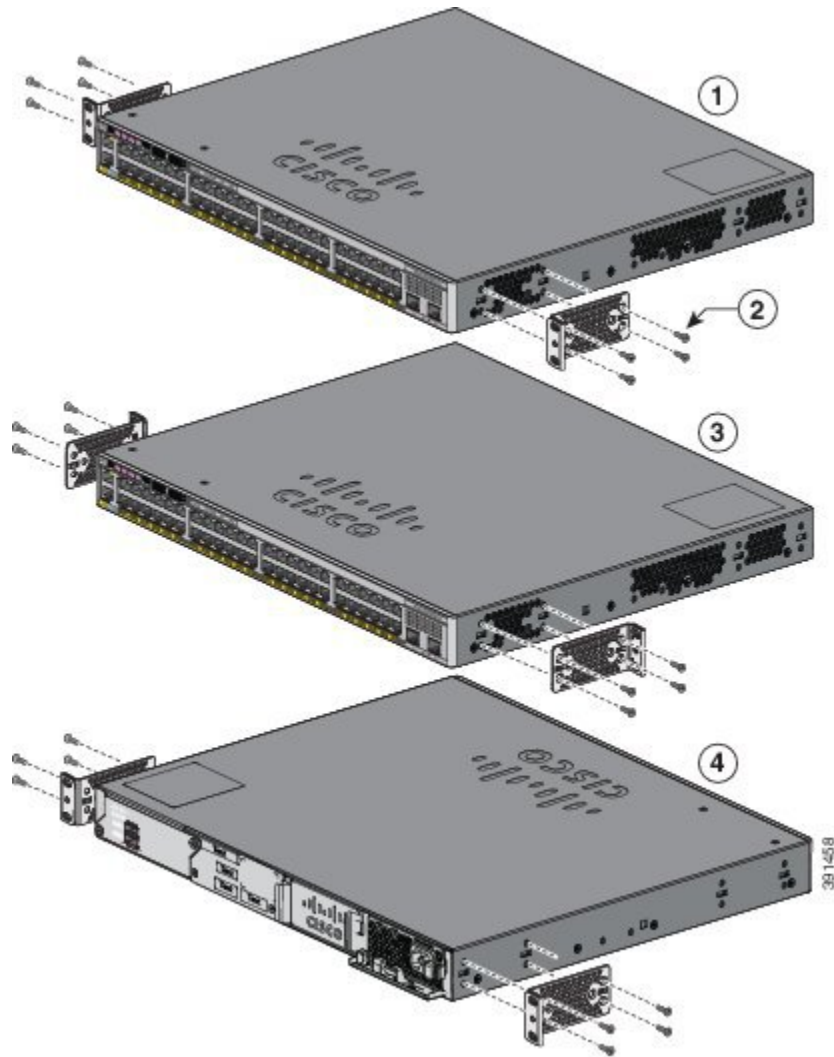


Figure 20: Attaching Brackets for 19-inch Racks (Catalyst 6800IA-48FPDR)

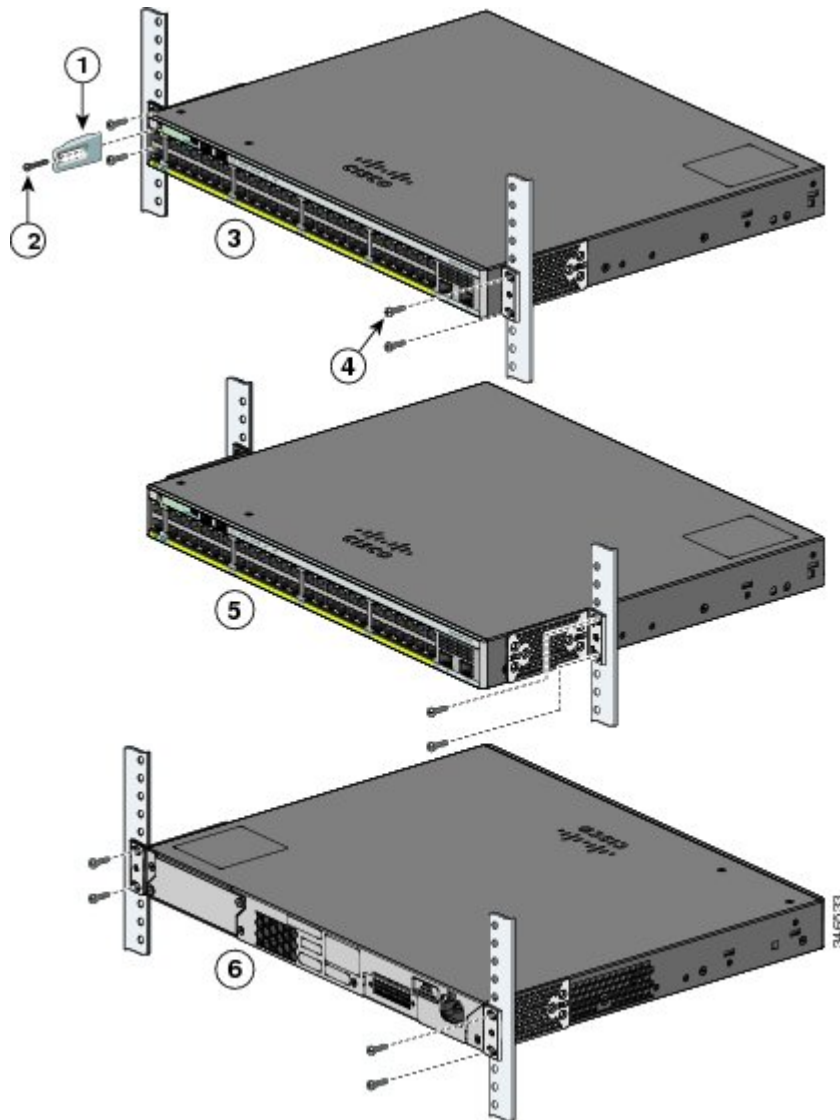


1	Front-mounting position	3	Mid-mounting position
2	Number-8 Phillips flat-head screws (48-2927-01)	4	Rear-mounting position

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

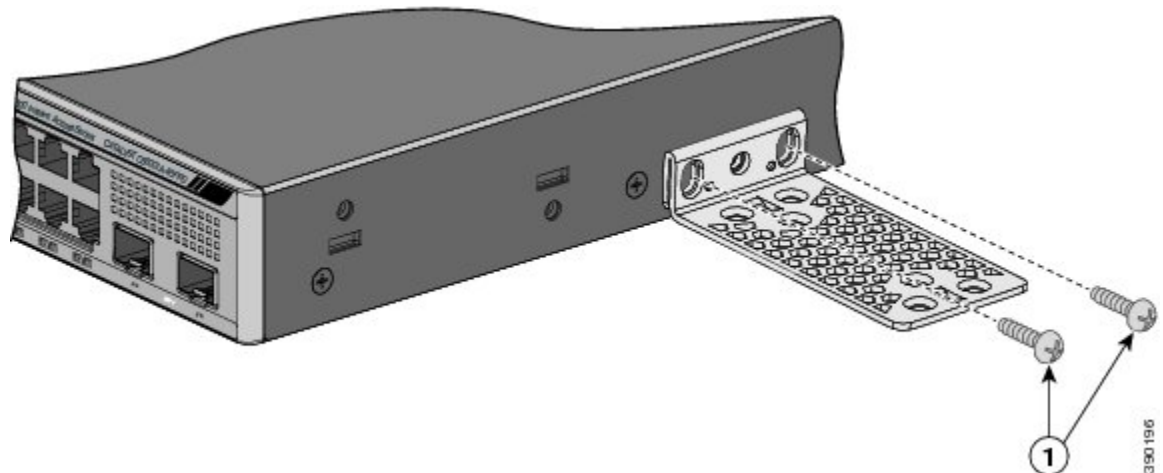
Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 378

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 21: Attaching the 19-inch Brackets for Wall-Mounting



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

Attaching the RPS Connector Cover



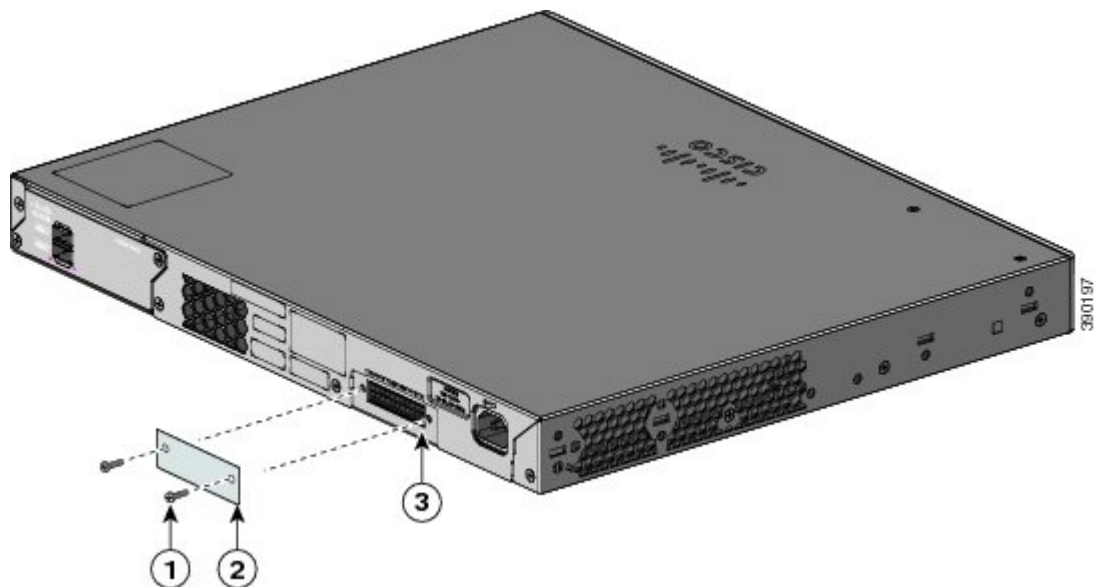
Warning

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 22: 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.



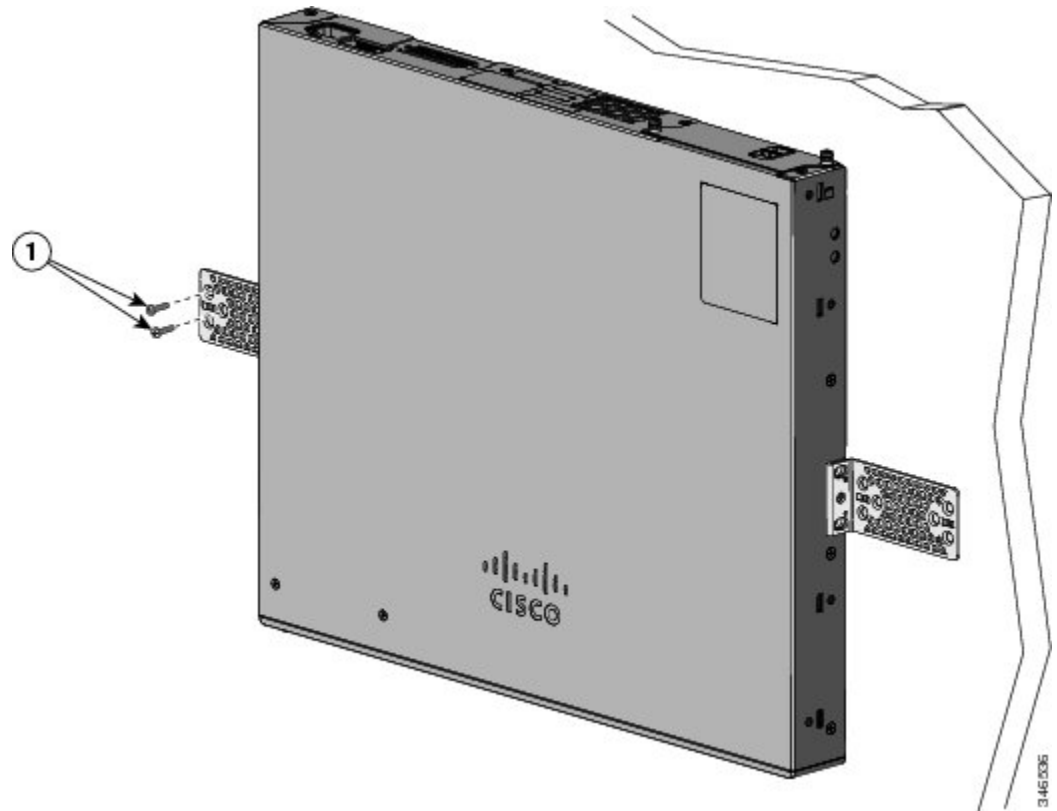
Warning

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 23: 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 34 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 [After Switch Installation, on page 34](#) for information on switch configuration.
-

After Switch Installation

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

Connecting FlexStack-Plus modules (Optional)

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



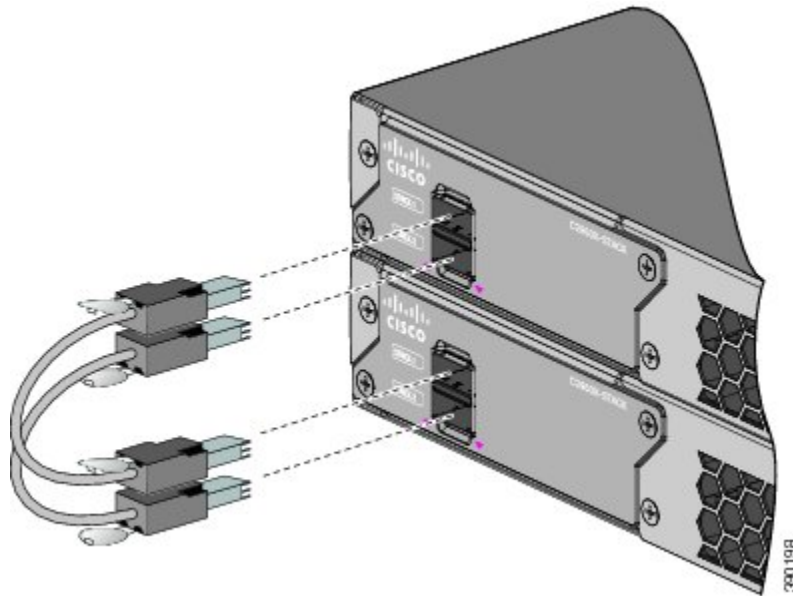
Note This is only supported on the stack-capable switches.



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)



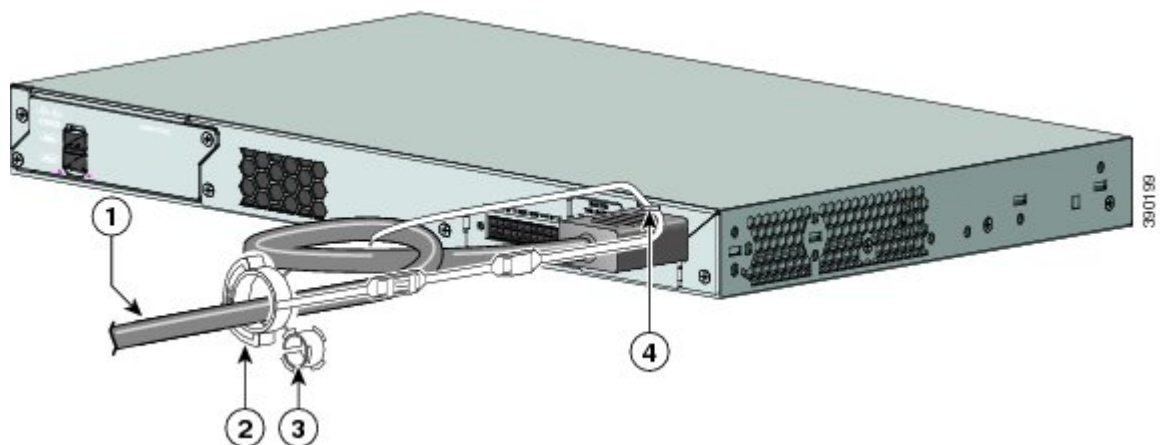
Note This section applies only to the Catalyst 6800IA-48FPD and 6800IA-48TD switches.

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.

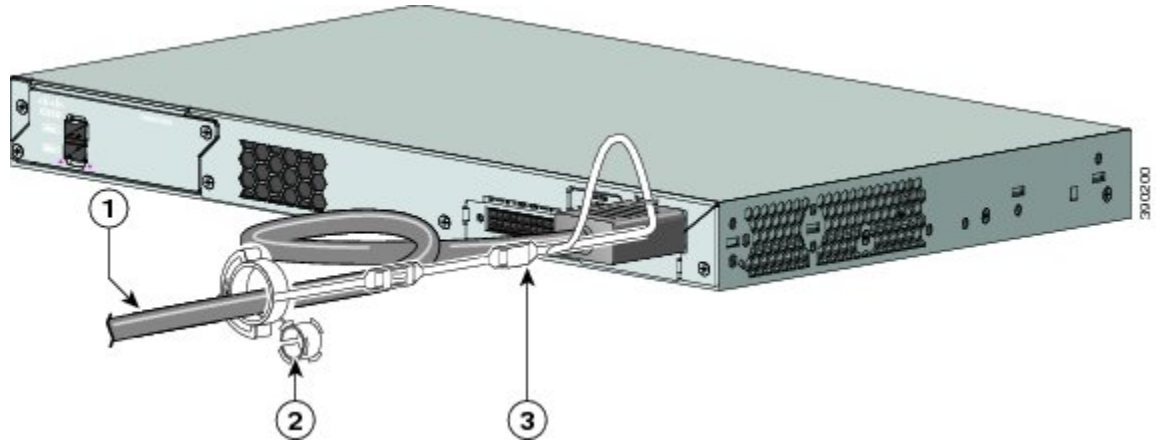
Figure 24: Inserting the Retainer Through the Lanced Loop



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.

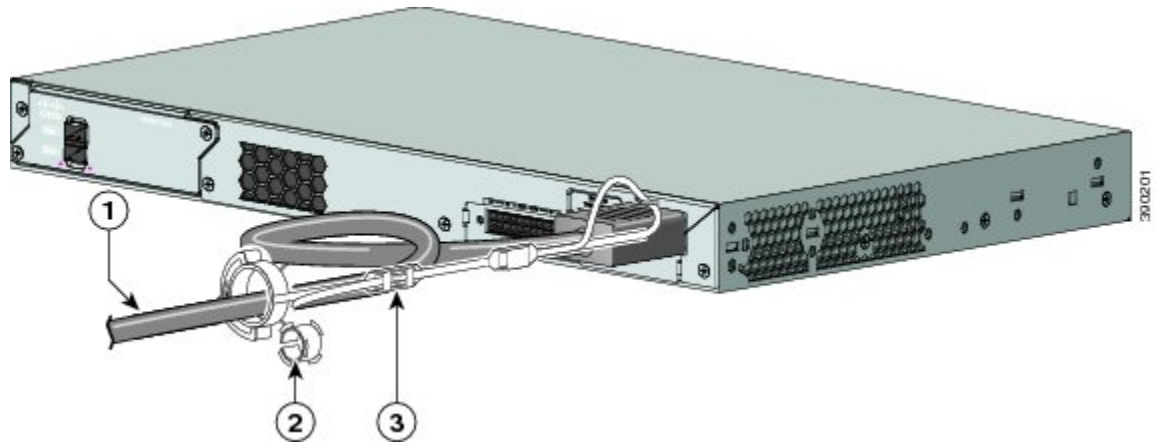
Figure 25: Sliding the Retainer Through the Latch



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.

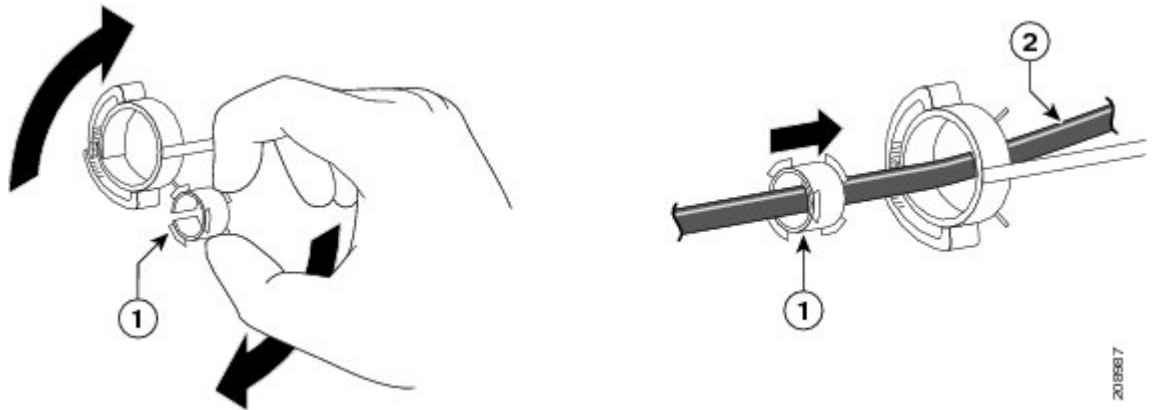
Figure 26: Locking the Retainer



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.

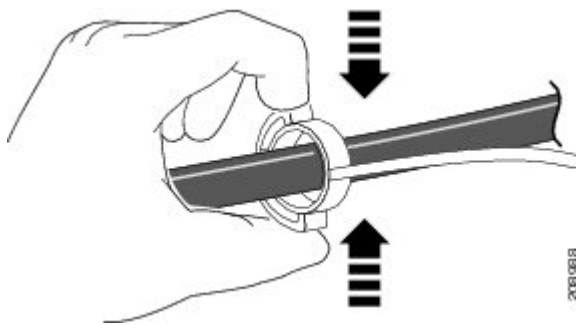
Figure 27: Sleeve Around the Power Cord



1	Sleeve for thin power cords	2	AC power cord
---	-----------------------------	---	---------------

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

Figure 28: Securing the Power Cord in the Retainer



Installing SFP Modules

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.

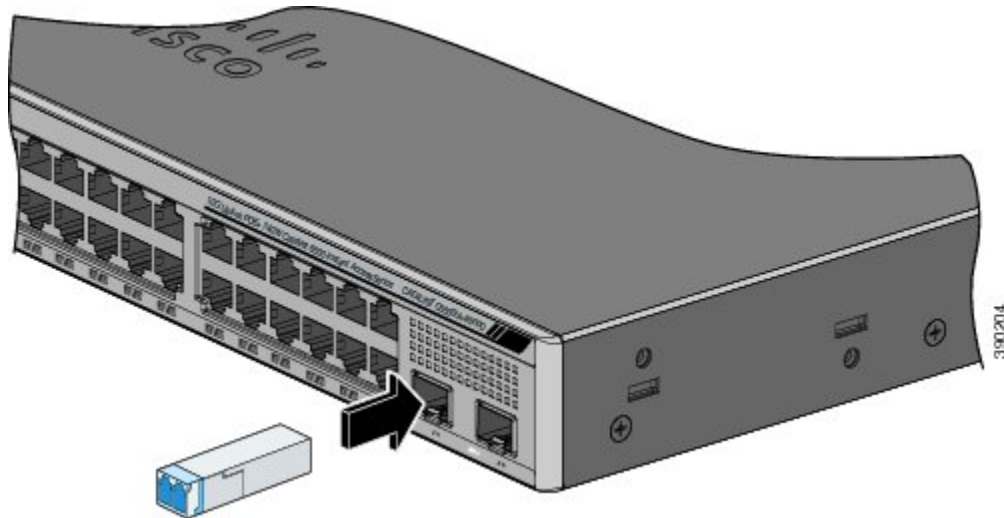
**Caution**

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 29: Installing an SFP Module



Removing an SFP Module

Connecting to SFP and SFP+ Modules

Connecting to Fiber-Optic SFP and SFP+ Modules


Warning

Class 1 laser product. Statement 1008

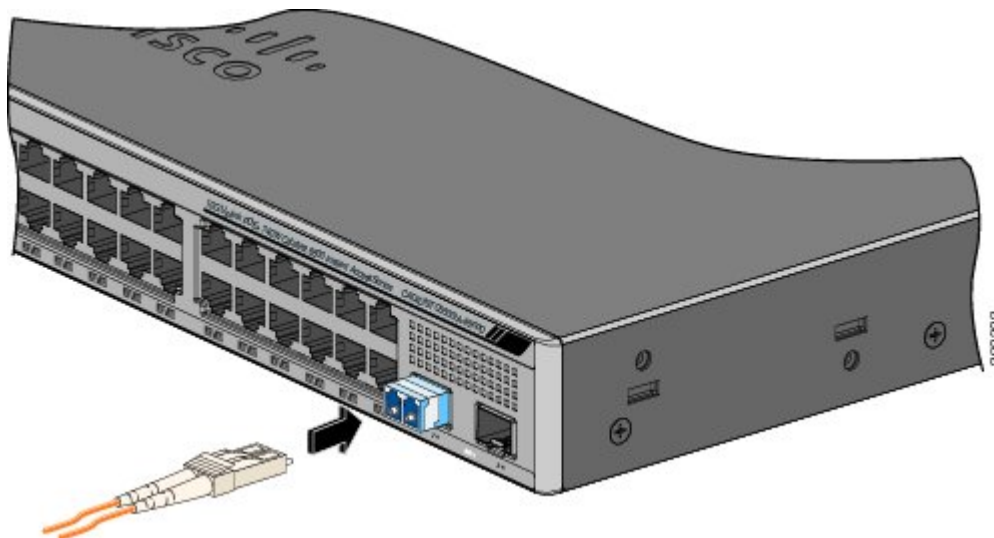

Caution

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 30: 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.

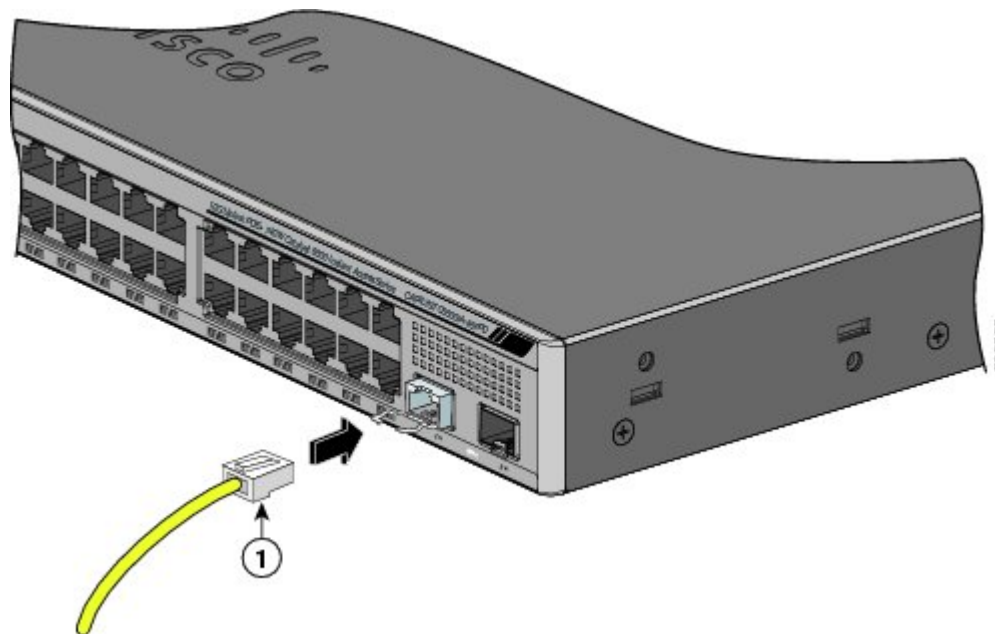
**Caution**

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 31: 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 and 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 14: Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable ⁵	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

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

Where to Go Next

Refer to the "Instant Access" chapter in the [Release 15.1SY Supervisor Engine 2T Software Configuration Guide](#).



Power Supply Installation

This chapter applies only to the Catalyst 6800IA-48FPDR switch. It contains these topics:

- [Power Supply Module Overview, page 45](#)
- [Installation Guidelines, page 47](#)
- [Installing or Replacing an AC Power Supply, page 48](#)
- [Finding the Serial Number, page 49](#)

Power Supply Module Overview

The switch operates with either one or two active power supply modules. You can use two AC modules, or one module and a blank cover.

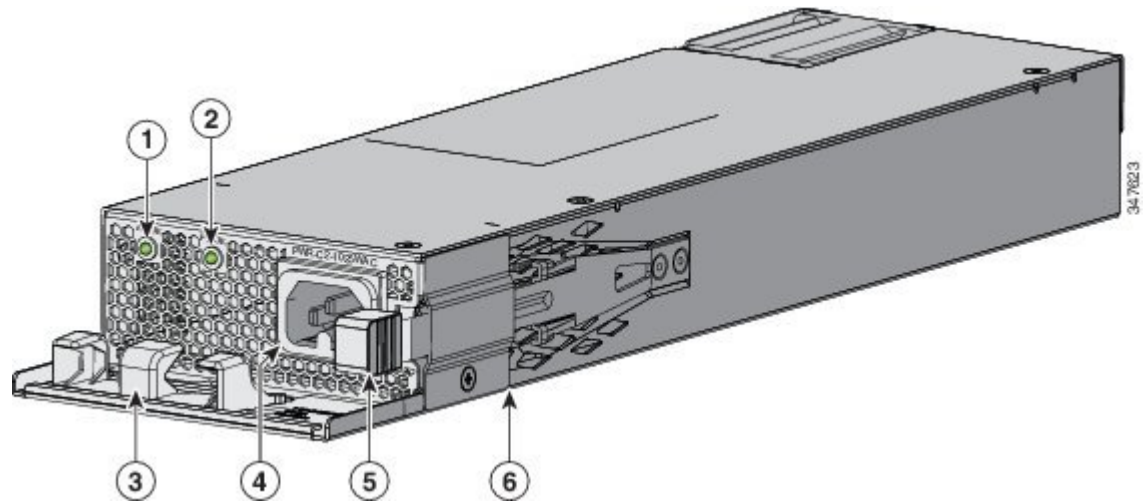
Table 15: Power Supply Model Numbers and Description

Part Number	Description
PWR-C2-1025WAC=	1025-W AC power supply module

The 1025-W power supply module is an autoranging unit that supports input voltages between 115 and 240 VAC. All power supply modules have internal fans. All switches ship with a blank cover in the second power supply slot.

Each AC power supply module has a power cord for connection to an AC power outlet.

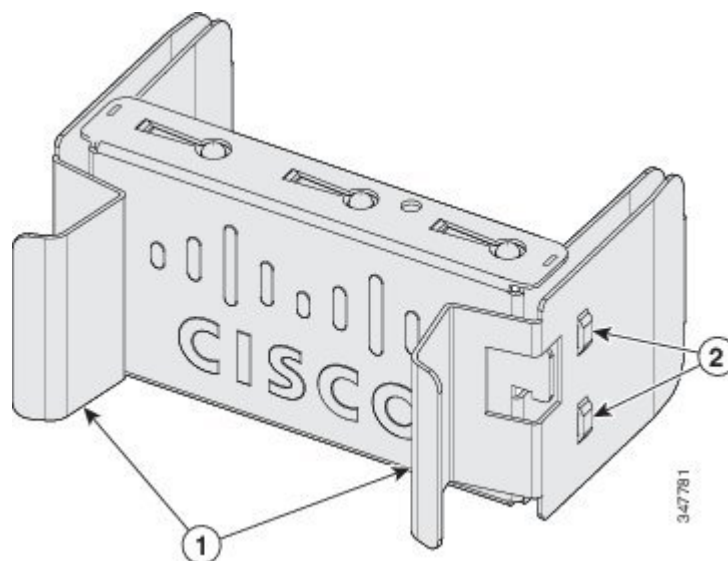
Figure 32: PWR-C2-1025WAC Power Supply



1	AC OK LED	4	AC power cord connector
2	PS OK LED	5	Release latch
3	AC power cord retainer	6	Power supply

If no power supply is installed in a power supply slot, install a power supply slot cover.

Figure 33: Power Supply Slot Cover



1	Release handles	2	Retainer clips
---	-----------------	---	----------------

The power supply modules have two status LEDs.

AC OK	Description	PS OK	Description
Off (AC LED is off)	No AC input power.	Off	Output is disabled, or input is outside operating range.
Green	AC input power is present.	Green	Power output to switch.
		Red	Output has failed.

Installation Guidelines

Observe these guidelines when removing or installing a power supply module:

- Do not force the power supply module into the slot. This can damage the pins on the switch if they are not aligned with the module.
- A power supply that is only partially connected to the switch can disrupt the system operation.
- Remove power from the power-supply module before removing or installing the module.
- The power supply is hot-swappable.



Caution

Do not operate the switch with one power-supply module slot empty. For proper chassis cooling, both module slots must be populated, with either a power supply or a blank module.



Warning

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1024



Warning

Do not reach into a vacant slot or chassis while you install or remove a module. Exposed circuitry could constitute an energy hazard. Statement 206



Warning

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

**Warning**

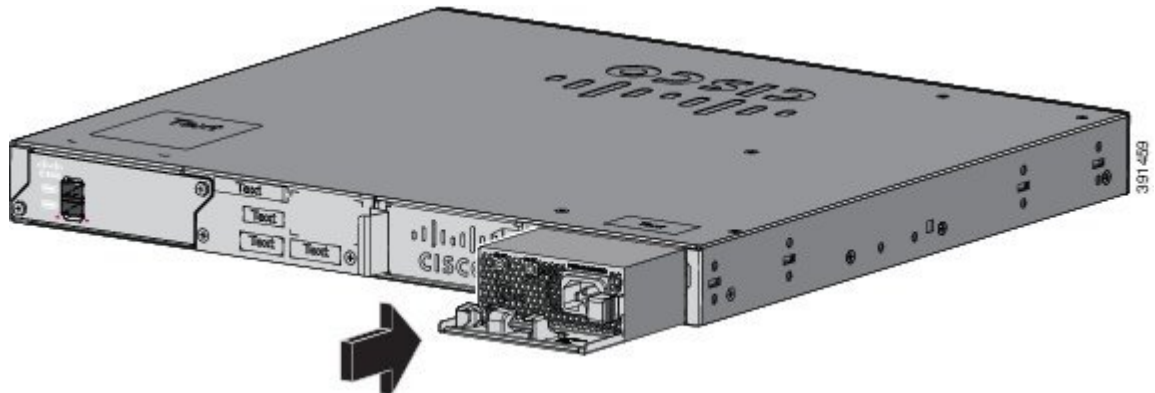
If a Cisco external power system is not connected to the switch, install the provided connector cover on the back of the switch. Statement 386

Installing or Replacing an AC Power Supply

Procedure

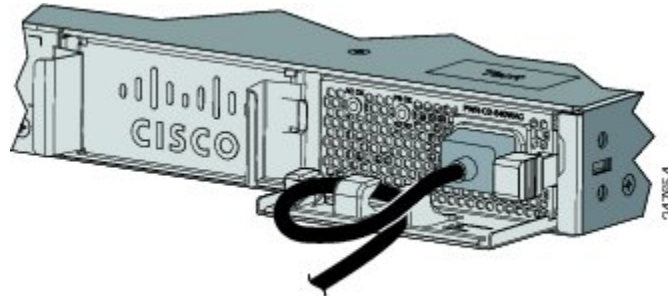
- Step 1** Turn off the power at its source.
- Step 2** Remove the power cord from the power cord retainer.
- Step 3** Remove the power cord from the power connector.
- Step 4** Press the release latch at the right side of the power supply module inward and slide the power supply out.
Note Do not leave the power-supply slot open for more than 90 seconds while the switch is operating.
- Warning** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028
- Step 5** Insert the new power supply into the power-supply slot, and gently push it into the slot. The 1025-W power-supply module extends inches from the switch rear panel.

Figure 34: Inserting the AC-Power Supply in the Switch



- Step 6** (Optional) Make a loop in the power cord and thread it through the power cord retainer.

Figure 35: AC-Power Supply with Power Cord Retainer

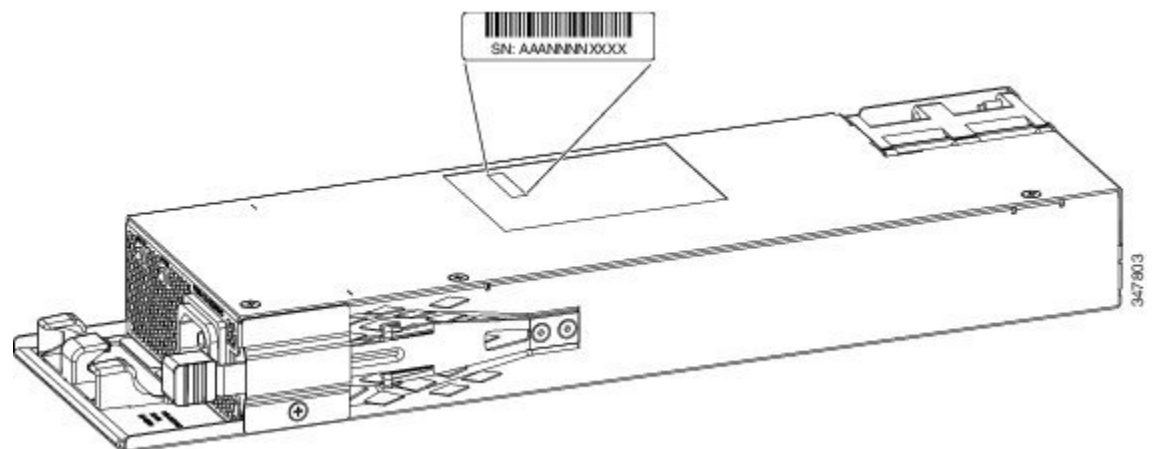


- Step 7** Connect the power cord to the power supply and to an AC power outlet. Turn on the power at the power source.
- Step 8** Confirm that the power supply AC OK and PS OK LEDs are green.
- Step 9** Repeat the steps to install a second power supply.
- Note** When you install the second power supply the LEDs on the power supply might blink momentarily.

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 36: 1025-W AC Power Supply Serial Number





Troubleshooting

This chapter contains these topics:

- [Diagnosing Problems, page 51](#)
- [Finding the Serial Number, page 55](#)

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

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 LED section 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 converters between the source and the destination. If possible, bypass the patch panel, or eliminate faulty media converters (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 distance and port type. Ensure that the connected device ports match and use the same type of 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.
- Ensure 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.
- Check 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 a 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 37: Serial Number Location for the Catalyst 6800IA-48FPD and 6800IA-48TD Switches

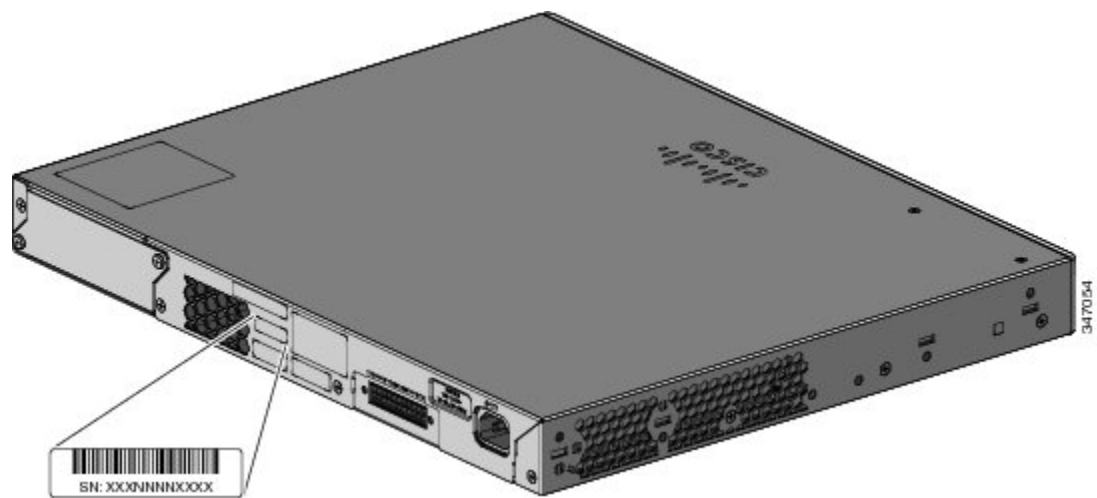
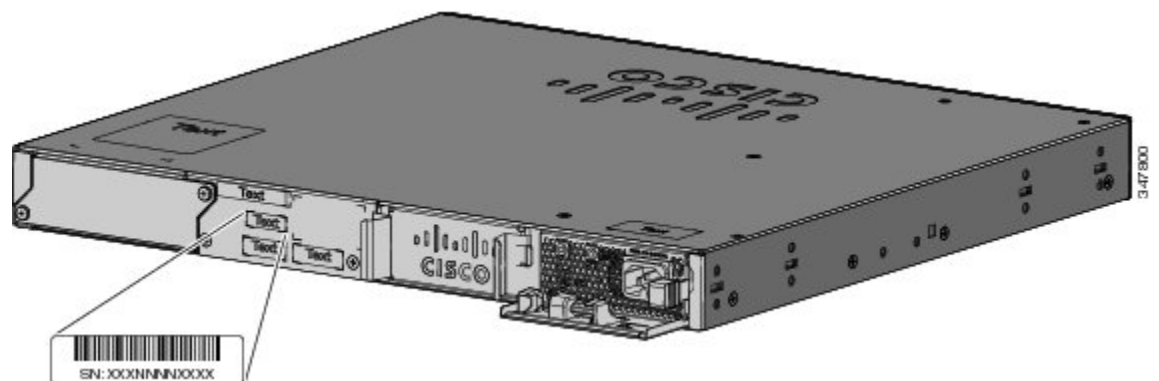


Figure 38: Serial Number Location for the Catalyst 6800IA-48FPDR Switches





Technical Specifications

This appendix contains these topics:

- [Environmental Specifications, page 57](#)
- [Specifications for the Catalyst 6800IA Switches, page 58](#)

Environmental Specifications

This table describes the environmental specifications.

Table 16: Environmental Specifications for All Switches

Environmental Ranges	
Operating temperature ⁶	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)

⁶ Minimum ambient temperature for cold start is 32°F (0°C)

Table 17: Environmental and Physical Specification for the AC Power Supply for the Catalyst 6800IA-48FPDR Switches

Power Requirements	
Operating temperature	23 to 113°F (–5 to 45°C)
Storage temperature	–40 to 158°F (–40 to 70°C)

Relative humidity	10-95% (non-condensing)
Altitude	Up to 10,000 ft (3,000 m)
Weight	PWR-C2-1025WAC: 3.4 lb (1.6 kg)
Dimensions	PWR-C2-1025WAC: 1.58 x 11.72 x 3.75 in. (3.5 x 29.8 x 9.53 cm) Note Dimensions shown exclude the extraction handle, which measures 1.55 in. (3.9 cm).

Specifications for the Catalyst 6800IA Switches

Table 18: Physical Specifications for the Catalyst 6800IA-48FPDR Switches

Physical Dimensions	
Weight	11.3 lb (5.1 kg) Note Weight does not include power supplies.
Dimensions (H x D x W)	1.75 x 16.05 x 17.5 in. (4.45 x 40.77 x 44.5 cm)

Table 19: Power Specifications for the PWR-C2-1025WAC (Catalyst 6800IA-48FPDR Switches)

Power Requirements	
Maximum output power	1025 W
Input voltage and Frequency	1025 W, 115-240 VAC, (autoranging) 50-60 Hz
Input current	12-6 A
Output ratings	+12 V @ 20.83 A, -54 V@14.6 A
Total input BTU ⁷	3801 BTUs per hour, 1114 W
Total output BTU	3497 BTUs per hour, 1025 W

⁷ The total input and total output BTU ratings refer to input power to the power supply and output power to the switch. The BTU ratings are based on 115 VAC for the 1025-W power supply.

Table 20: 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 ⁸	149 W, 508 BTUs per hour
Power rating ⁹	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)

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.

Table 21: 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 ¹⁰	47 W, 161 BTUs per hour
Power rating ¹¹	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)

¹⁰ Power consumption values for the power consumed internally by the switch at 120 VAC 60 Hz.

¹¹ Power rating values for the switch input power.



Connector and Cable Specifications

This appendix contains these topics:

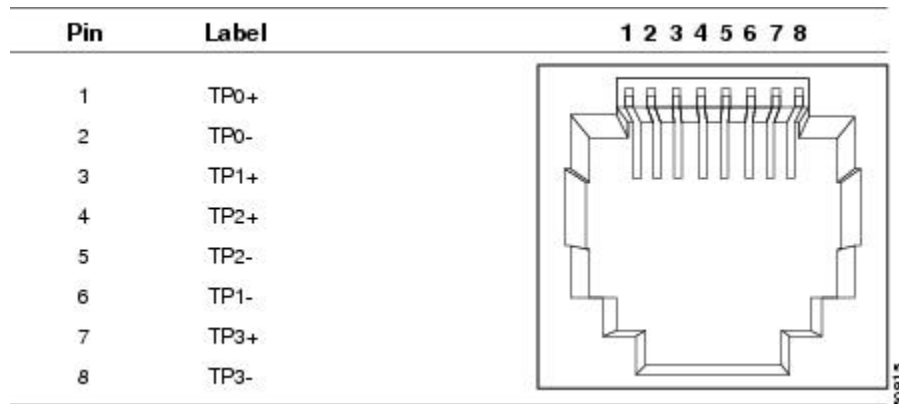
- [Connector Specifications, page 61](#)
- [Cables and Adapters, page 62](#)

Connector Specifications

10/100/1000 Ports (Including PoE)

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

Figure 39: 10/100/1000 Port Pinouts



SFP Module Connectors

Figure 40: Duplex LC Cable Connector



Figure 41: Simplex LC Cable Connector

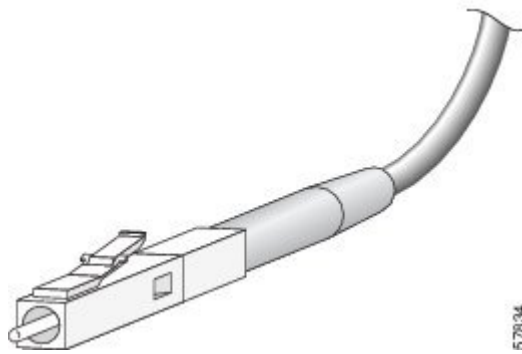


Figure 42: Copper SFP Module LC Connector

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-								

Cables and Adapters

SFP Module Cables

For cabling specifications, refer to the following notes:

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

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

Cable Pinouts

Figure 43: Four Twisted-Pair Straight-Through Cable Schematic

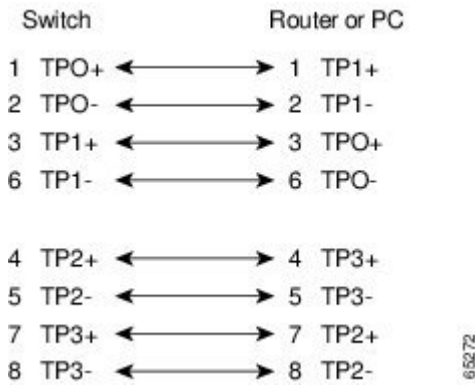


Figure 44: Four Twisted-Pair Semi-Cross Cable Schematic

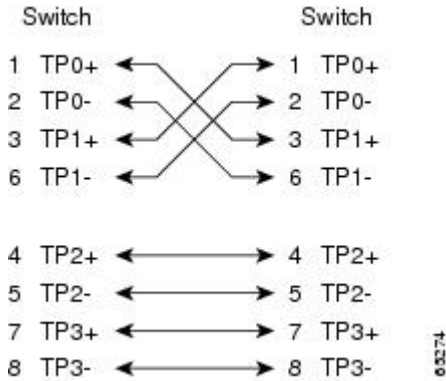


Figure 45: Two Twisted-Pair Straight-Through Cable Schematic

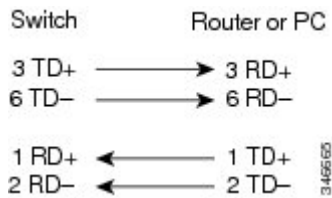
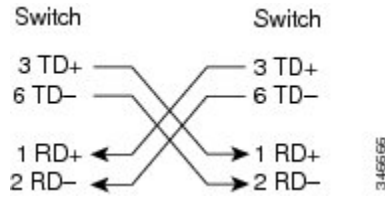


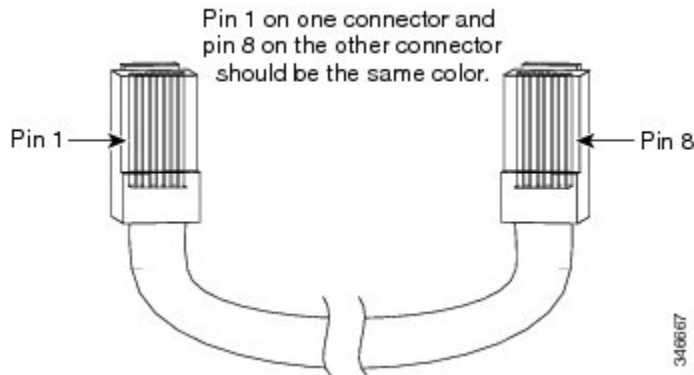
Figure 46: Two Twisted-Pair Crossover Cable Schematic



Identifying a Crossover Cable

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

Figure 47: Identifying a Crossover Cable



Console Port Adapter Pinouts

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

Table 22: Console Port Signaling with a DB-9 Adapter

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

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

Table 23: 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