



Catalyst 2960-S Switch Hardware Installation Guide

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Catalyst 2960-S Switch Hardware Installation Guide

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Preface

This guide is for the networking or computer technician installing the Catalyst 2960-S switch. It documents the physical characteristics of the switch, explains how to install the switch, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch. See the switch software configuration guide, the switch command reference, and the switch system message guide on Cisco.com. For information about the standard Cisco IOS Release 12.2 commands, see the Cisco IOS documentation on Cisco.com.

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

**Caution**

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

**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

The safety warnings for this product are translated into several languages in the *Regulatory Compliance and Safety Information for the Catalyst 2960 and 2960-S Switches* that ships with the product. The EMC regulatory statements are also included in that guide.

Related Publications

These documents provide information about the switch and are available from these Cisco.com sites:

http://www.cisco.com/en/US/products/ps6406/tsd_products_support_series_home.html

- *Catalyst 2960-S Switch Getting Started Guide*
- *Regulatory Compliance and Safety Information for the Catalyst 2960 and 2960-S Switches*
- *Release Notes for the Catalyst 2960-S Switch*
- *Catalyst 2960 and 2960-S Switch Software Configuration Guide*
- *Catalyst 2960 and 2960-S Switch Command Reference*
- *Catalyst 3750, 3560, 3550, 2975, 2970, 2960, and 2960-S Switch System Message Guide*
- Device manager online help (available on the switch)

http://www.cisco.com/en/US/products/hw/routers/ps2883/prod_installation_guides_list.html

- *Cisco Redundant Power System 2300 Hardware Installation Guide*

http://www.cisco.com/en/US/products/hw/modules/ps5000/tsd_products_support_series_home.html

- *Cisco Small Form-Factor Pluggable Modules Installation Notes*

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

- *Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix*
- *Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix*
- *Cisco Small Form-Factor Pluggable Modules Compatibility Matrix*
- *Compatibility Matrix for 1000BASE-T Small Form-Factor Pluggable Modules*
- *Cisco CWDM SFP Transceiver Compatibility Matrix*

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 Catalyst 2960-S family of switches, also referred to as the *switch*, 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 technology. Unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

- [Switch Models, page 1-1](#)
- [Front Panel, page 1-2](#)
- [Rear Panel, page 1-14](#)
- [Management Options, page 1-16](#)

Switch Models

Table 1-1 *Switch Models and Descriptions*

Switch Model	Supported Software Image	Description
Catalyst 2960S-48FPD-L ¹	LAN Base	48 10/100/1000 Power over Ethernet Plus (PoE+) ports (PoE budget of 740 W) and 2 small form-factor pluggable (SFP)+ ² module slots.
Catalyst 2960S-48LPD-L ¹	LAN Base	48 10/100/1000 PoE+ ports (PoE budget of 370 W) and 2 SFP+ module slots
Catalyst 2960S-24PD-L ¹	LAN Base	24 10/100/1000 PoE+ ports (PoE budget of 370 W) and 2 SFP+ module slots
Catalyst 2960S-48TD-L ¹	LAN Base	48 10/100/1000 ports and 2 SFP+ module slots
Catalyst 2960S-24TD-L ¹	LAN Base	24 10/100/1000 ports and 2 SFP+ module slots
Catalyst 2960S-48FPS-L ¹	LAN Base	48 10/100/1000 PoE+ ports (PoE budget of 740 W) and 4 SFP ³ module slots
Catalyst 2960S-48LPS-L ¹	LAN Base	48 10/100/1000 PoE+ ports (PoE budget of 370 W) and 4 SFP module slots
Catalyst 2960S-24PS-L ¹	LAN Base	24 10/100/1000 PoE+ ports (PoE budget of 370 W) and 4 SFP module slots
Catalyst 2960S-48TS-L ¹	LAN Base	48 10/100/1000 ports and 4 SFP module slots

■ Front Panel

Table 1-1 **Switch Models and Descriptions (continued)**

Switch Model	Supported Software Image	Description
Catalyst 2960S-24TS-L ¹	LAN Base	24 10/100/1000 ports and 4 SFP module slots
Catalyst 2960S-48TS-S	LAN Lite	48 10/100/1000 ports and 2 SFP module slots
Catalyst 2960S-24TS-S	LAN Lite	24 10/100/1000 ports and 2 SFP module slots

1. Support Cisco FlexStack technology.

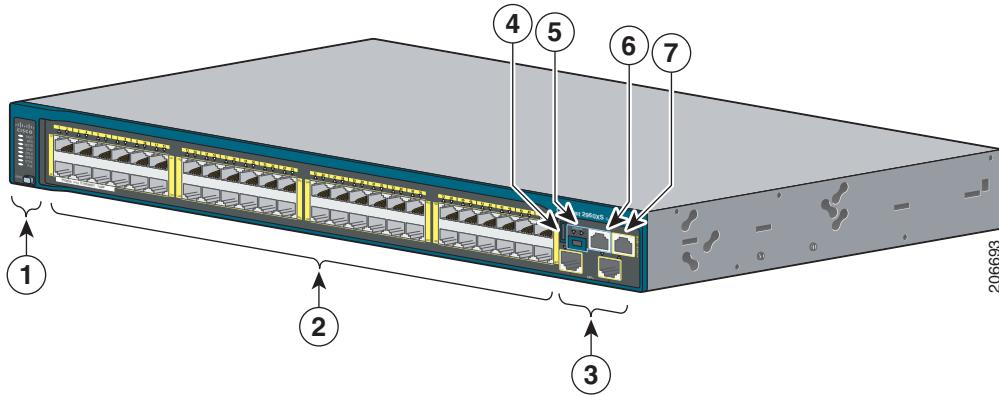
2. SFP+ = 10 Gigabit fiber uplink.

3. SFP = 1 Gigabit fiber uplink.

Front Panel

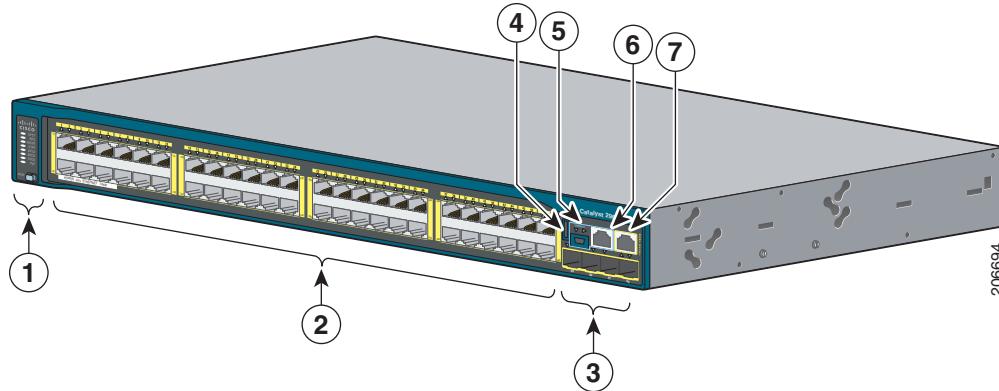
The 24- and 48-port switch front panels include the 10/100/1000 Ethernet ports or the 10/100/1000 PoE ports, SFP or SFP+ module slots, the universal serial bus (USB) ports, the console ports, and the LEDs. All the 24- and 48-port switches have similar components. See [Figure 1-1](#), [Figure 1-2](#), and [Figure 1-3](#) for examples.

Figure 1-1 **Catalyst 2960S-48FPD-L Front Panel**



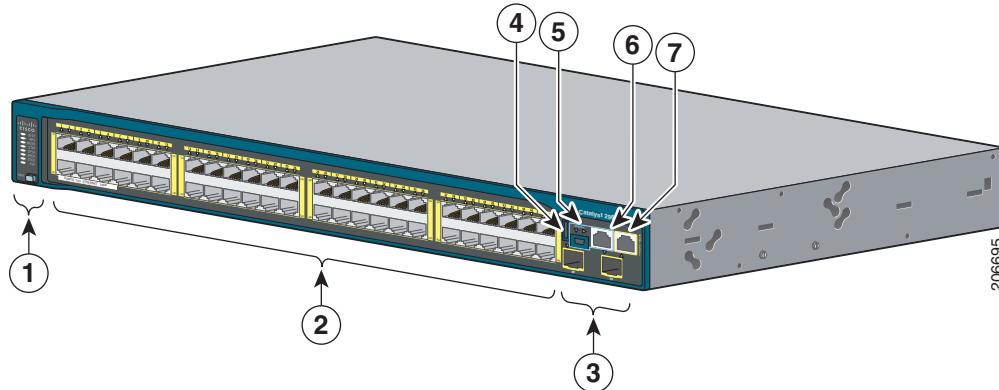
1	Mode button and switch LEDs	5	USB mini-Type B (console) port
2	10/100/1000 PoE+ ports ¹	6	RJ-45 console port
3	SFP+ or SFP module slots	7	Ethernet management port
4	USB Type A port		

1. Port numbering is from left to right, with port 1 on the far left. The first member of the pair (port 1) is above the second member (port 2). Module slot numbers are 1 and 2.

Figure 1-2 Catalyst 2960S-48TS-L Front Panel

1	Mode button and switch LEDs	5	USB mini-Type B (console) port
2	10/100/1000 ports ¹	6	RJ-45 console port
3	SFP module slots	7	Ethernet management port
4	USB Type A port		

1. Port numbering is from left to right, with port 1 on the far left. The first member of the pair (port 1) is above the second member (port 2). Module slot numbers are 49, 50, 51, and 52.

Figure 1-3 Catalyst 2960S-48TS-S Front Panel

1	Mode button and switch LEDs	5	USB mini-Type B (console) port
2	10/100/1000 ports ¹	6	RJ-45 console port
3	SFP module slots	7	Ethernet management port
4	USB Type A port		

1. Port numbering is from left to right, with port 1 on the far left. The first member of the pair (port 1) is above the second member (port 2). Module slot numbers are 1 and 2.

10/100/1000 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 either 740 W or 370 W, depending on the switch model. 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 all ports
- 30 W of PoE+ on 24 ports

For switches with a 370 W power budget, you can budget the PoE and PoE+:

- 15.4 W of PoE output on 24 ports
- 7.7 W of PoE output on 48 ports
- 30 W of PoE+ on 12 ports
- Total power budget can be allocated among the 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 10/100/1000 PoE ports use RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 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.

For information about port connections and port specifications, see the “[10/100/1000 PoE+ Port Connections](#)” section on page 2-21 and Appendix B, “[Connector and Cable Specifications](#).”



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 and 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.

For information about port connections and port specifications, see the “[10/100/1000 Port Connections](#)” section on page 2-22 and Appendix B, “[Connector and Cable Specifications](#).”

Management Ports

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

You can connect the switch to a host such as a Windows workstation or a terminal server through the Ethernet management port, the RJ-45 console port, or the USB console port (USB mini-Type B port). 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 console port, the Cisco Windows USB device driver must be installed on any PC connected to the console port (for operation with Microsoft Windows).

**Note**

For information about downloading the Cisco USB device driver, see the “[Installing the Cisco Microsoft Windows USB Device Driver](#)” section on page C-3.

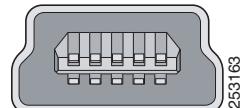
With the Cisco Windows USB device driver, you can connect and disconnect the USB cable from the console port without affecting Windows HyperTerminal operations. Mac OS X or Linux require no special drivers.

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.

**Note**

The 4-pin mini-Type B connectors resemble 5-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B. See [Figure 1-4](#).

Figure 1-4 USB Mini-Type B Port



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 period.

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 switch software guide.

USB Type A Port

The USB Type A interface provides access to external USB FLASH devices (also known as thumb drives or USB keys).

The interface supports Cisco USB flash drives with capacities from 64 MB to 1 GB.

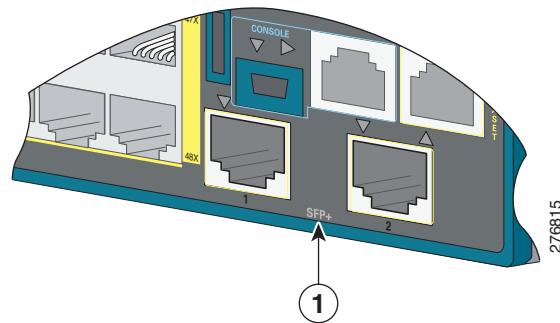
Cisco IOS software provides standard file system access to the flash device: read, write, erase, and copy, as well as the ability to format the flash device with a FAT file system.

For more information about the switch management ports, see the switch software configuration guide and the command reference on Cisco.com and the “[Connector and Cable Specifications](#)” section on page B-1.

SFP and SFP+ Module Slots

The switch has either two or four 1-Gigabit SFP or two 10-Gigabit SFP+ module slots. The slots marked *SFP+* support both SFP and SFP+ modules. The *SFP* slots support only the SFP modules. [Figure 1-5](#) shows a switch with the SFP+ slots.

Figure 1-5 *SFP+ Slots*



1	SFP+ module slots
----------	-------------------

[Table 1-2](#) lists the switches that support the SFP modules. [Table 1-3](#) lists the switches that support the SFP+ modules.

Table 1-2 Supported SFP Modules

Switch Models	Supported SFP Modules
All 2960-S models	GLC-LH-SM= GLC-SX-MM=
Catalyst 2960S-48FPS-L Catalyst 2960S-48LPS-L Catalyst 2960S-24PS-L Catalyst 2960S-48TS-L Catalyst 2960S-24TS-L Catalyst 2960S-48FPD-L Catalyst 2960S-48LPD-L Catalyst 2960S-24PD-L Catalyst 2960S-48TD-L Catalyst 2960S-24TD-L	GLC-BX-D= GLC-BX-U= GLC-ZX-SM= CWDM-SFP-1470= CWDM-SFP-1490= CWDM-SFP-1510= CWDM-SFP-1530= CWDM-SFP-1550= CWDM-SFP-1570= CWDM-SFP-1590= CWDM-SFP-1610=
Catalyst 2960S-48FPS-L Catalyst 2960S-48LPS-L Catalyst 2960S-24PS-L Catalyst 2960S-48TS-L Catalyst 2960S-24TS-L	GLC-FE-100BX-D= GLC-FE-100BX-U= GLC-FE-100LX=
Catalyst 2960S-48FPS-L Catalyst 2960S-48LPS-L Catalyst 2960S-24PS-L Catalyst 2960S-48TS-L Catalyst 2960S-24TS-L Catalyst 2960S-48TS-S Catalyst 2960S-24TS-S	GLC-GE-100FX= GLC-FE-100FX= GLC-T=
Catalyst 2960S-48TS-S Catalyst 2960S-24TS-S	GLC-ZX-SM=

Table 1-3 Supported SFP+ Modules

Switch Models	Supported SFP+ Modules
Catalyst 2960S-48FPD-L Catalyst 2960S-48LPD-L Catalyst 2960S-24PD-L Catalyst 2960S-48TD-L Catalyst 2960S-24TD-L	SFP-10G-LR= SFP-10G-SR= SFP-10G-LRM= SFP-H10GB-CU1M= SFP-H10GB-CU3M= SFP-H10GB-CU5M=

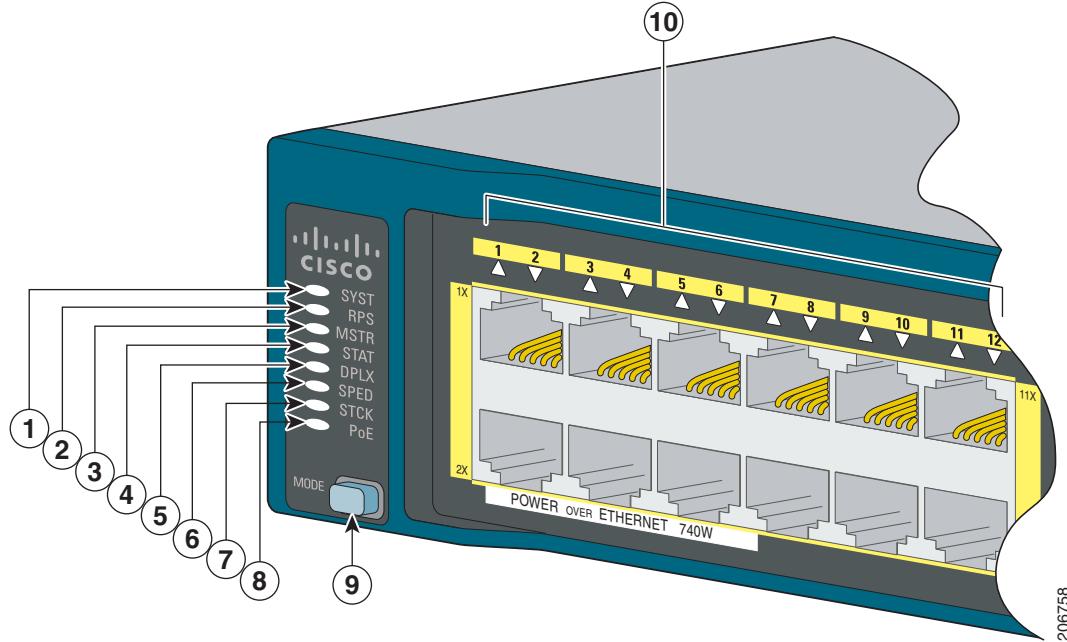
For information about SFP modules, see the SFP module documentation and the “[Installing SFP and SFP+ Modules](#)” section on page 2-17. For cable specifications, see Appendix B, “Connector and Cable Specifications.”

Front Panel

LEDs

You can use the switch LEDs to monitor switch activity and its performance. [Figure 1-6](#) shows the switch LEDs and the Mode button that you use to select a port mode.

Figure 1-6 **Switch LEDs and Mode Button**



206758

1	System LED	6	Speed LED
2	RPS ¹ LED	7	Stack LED ²
3	Master LED ²	8	PoE LED ³
4	Status LED	9	Mode button
5	Duplex LED		

1. RPS = redundant power system.

2. Only on switch models that support stacking.

3. Only on switch models that support PoE.

System LED

Table 1-4 **System LED**

Color	System Status
Off	System is not powered on.
Green	System is operating normally.
Amber	System is receiving power but is not functioning properly.

For information on the System LED colors during power-on self-test (POST), see the “[Switch POST Results](#)” section on page 3-1.

RPS LED

Table 1-5 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).

For information about the Cisco RPS 2300, see the “[Related Publications](#)” section.

Master LED

Table 1-6 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 1-7](#) lists the mode LEDs and their associated port modes and meanings.

Table 1-7 Port Mode LEDs

Mode LED	Port Mode	Description
STAT	Port status	The port status. This is the default mode.
DUPLEX	Port duplex	The port duplex mode: full duplex or half duplex. Note The ports operate only in full-duplex mode.
SPEED	Port speed	The port operating speed: 10, 100, 1000 Mb/s, or 10 Gb/s.

Table 1-7 Port Mode LEDs (continued)

Mode LED	Port Mode	Description
STACK	Stack member status	The stack member status.
	Stack port status	The stack port status. See the “Stack LED” section on page 1-12 information.
PoE	PoE port power	The PoE status.

Table 1-8 PoE Mode LED

Color	PoE Status
Off	PoE mode is not selected. No port has been denied power or is in a fault condition.
Green	PoE mode is selected, and the port LEDs show the PoE status.
Blinking amber	PoE mode is not selected. At least one port was denied power, or at least one port has a PoE fault.

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 1-9 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 370-W power capacity.
	Blinking amber	PoE is off due to a fault.
	Amber	PoE for the port is disabled. (PoE is enabled by default.)

**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.

Table 1-9 Meanings of LED Colors in Different Modes (continued)

Port Mode	Port LED Color	Meaning
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.
DUPLEX (duplex)	Off	Port is operating in half duplex.
	Green	Port is operating in full duplex.
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 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.
	Off	No stack member has that member number.
STACK (stack member)	Blinking green	Stack member number.
	Green	Member numbers of other stack member switches.

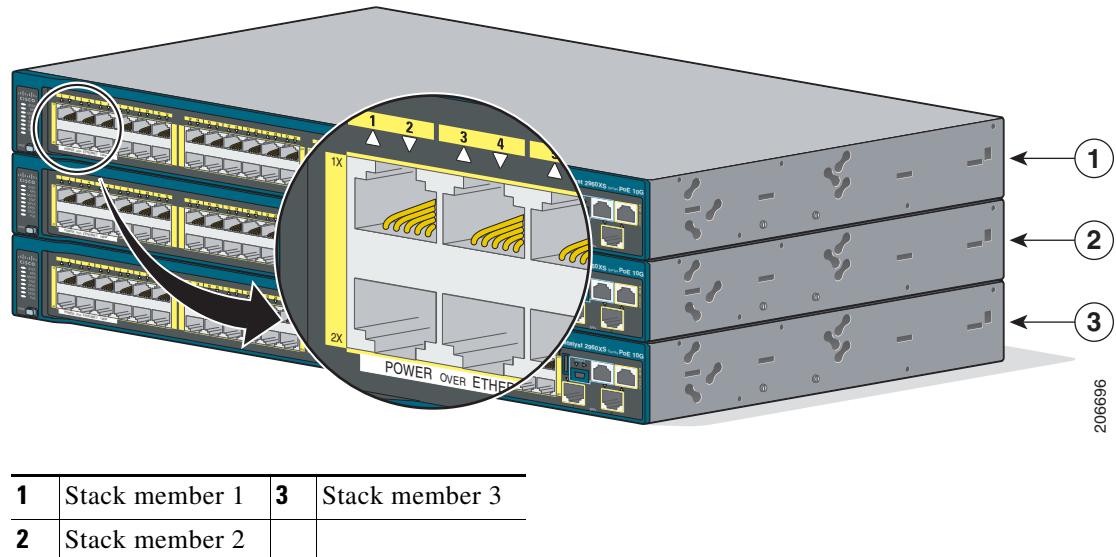
If your switches are stacked and you press the Mode button on any switch, all the switches display the same selected mode. For example, if you press the mode button on the stack master to display SPEED, all the other stack members display SPEED.

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 four switches can be members of a stack. The first four port LEDs show the switch member number. Figure 1-7 shows the LEDs on the first switch, which is stack member number 1. 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.

Figure 1-7 Stack LED



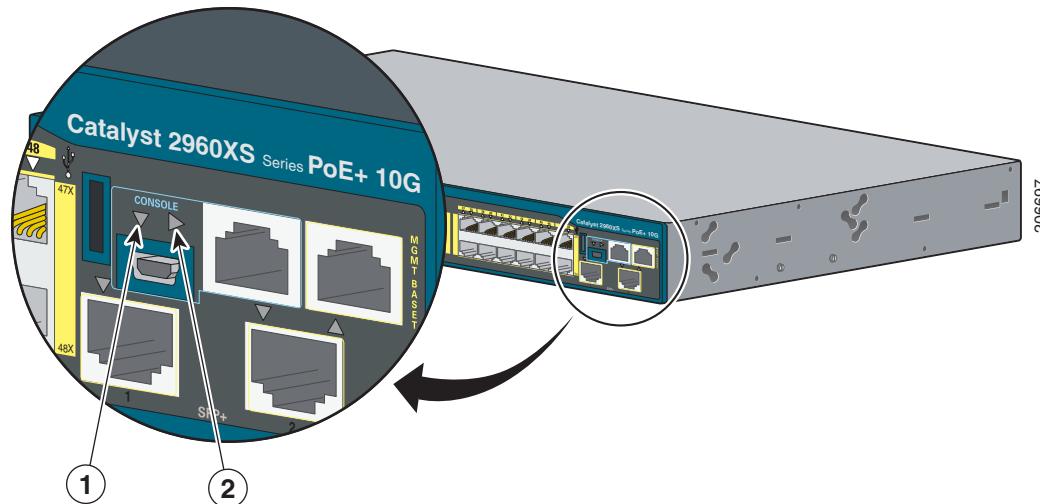
When you select the Stack LED, the respective Stack LEDs are green when the stack ports (on the switch rear panel) are up, and the respective Stack LEDs are amber when the ports are down. SFP+ module port LEDs 1 and 2 on the switch show the status for stack ports 1 and 2, respectively.

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.

Figure 1-8 **Console LEDs**



- | | |
|----------|-------------------|
| 1 | USB console LED |
| 2 | RJ-45 console LED |

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 1-10 lists the console and USB port LED colors and their meanings.

Table 1-10 **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.
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.

Rear Panel

Ethernet Management Port LED

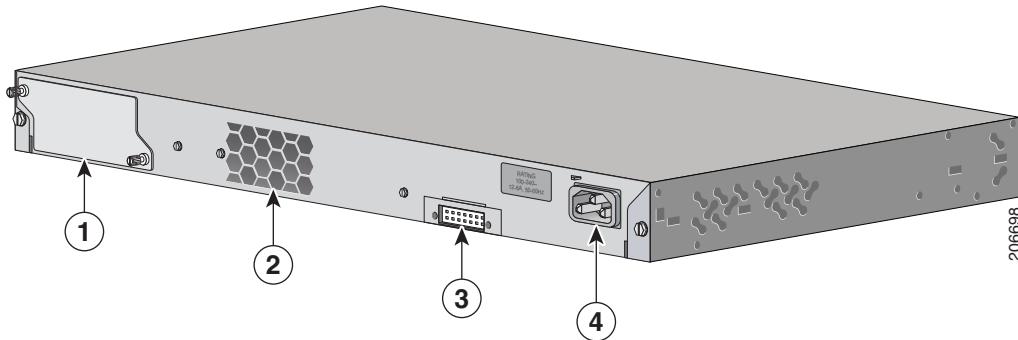
Table 1-11 Ethernet Management Port LED

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

Rear Panel

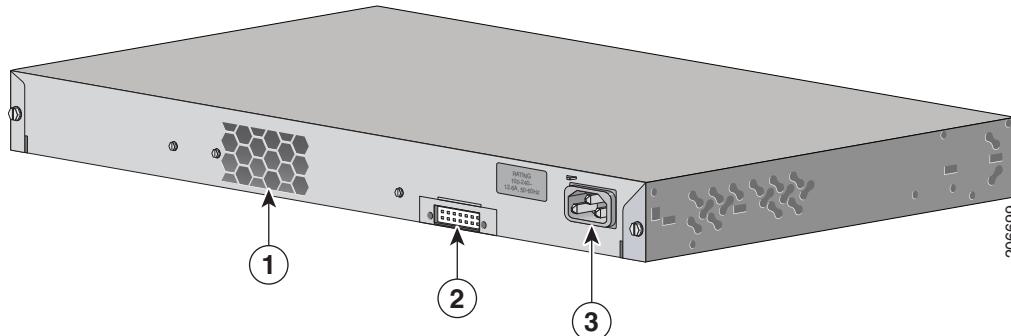
The rear panel of the stacking-capable switches have a FlexStack module slot, an RPS connector, a fan exhaust, and an AC power connector. See [Figure 1-9](#).

Figure 1-9 Catalyst 2960-S Switch Rear Panel with Stacking Module Slot



1	FlexStack module slot and cover	3	RPS connector
2	Fan exhaust	4	AC power connector

The rear panel of the nonstacking-capable switches have an RPS connector, a fan exhaust, and an AC power connector. See [Figure 1-10](#).

Figure 1-10 Catalyst 2960-S Switch Rear Panel

1	Fan exhaust	3	AC power connector
2	RPS connector		

FlexStack Ports

The stacking-capable switch models support stacking with the optional stack kit. It has the FlexStack module (hot-swappable) to insert in the slot in the switch rear panel, and a 0.5-meter FlexStack cable to connect the FlexStack module ports.

For FlexStack module installation, see “[Installing the FlexStack Module](#)” section on page 2-6. For stack cabling, see “[Connecting the FlexStack Cables](#)” section on page 2-16.


Caution

Use only approved cables, and connect only to other Catalyst 2960-S switches. Equipment might be damaged if connected to other nonapproved Cisco cables or equipment.

RPS Connector

The Cisco RPS 2300 (model PWR-RPS2300) supports the Catalyst 2960-S 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 information, see the “[Related Publications](#)” section.

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

Management Options

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.

Management Options

- Cisco Network Assistant

Cisco Network Assistant is a PC-based network management GUI application for LANs of small and medium-sized businesses. You can use the GUI to configure and manage switch clusters or standalone switches. Cisco Network Assistant is available at no cost and can be downloaded from this URL:

<http://www.cisco.com/pcgi-bin/tablebuild.pl/NetworkAssistant>

For information on starting the Network Assistant application, see the *Getting Started with Cisco Network Assistant* guide on Cisco.com.

- Device manager

You can use the device manager in the switch memory to manage individual and standalone switches. This web interface provides configuration and monitoring from anywhere in your network. For information, see the switch getting started guide and the device manager online help.

- Cisco IOS CLI

You can configure and monitor the switch and switch cluster members from the CLI. Access the CLI by connecting your management station to the switch console port or by using Telnet from a remote management station. See the switch command reference on Cisco.com for information.

- CiscoWorks application

The CiscoWorks LAN Management Solution (LMS) is a suite of management tools that simplify the configuration, administration, monitoring, and troubleshooting of Cisco networks. See the LMS documentation for information:

http://www.cisco.com/en/US/products/ps7198/tsd_products_support_series_home.html

- CiscoView application

The CiscoView device-management application displays the switch image that you can use to view switch status and performance information and set configuration parameters. The CiscoView application, which you purchase separately, can be a standalone application or part of a Simple Network Management Protocol (SNMP) platform. For information, see the CiscoView documentation at this URL:

http://www.cisco.com/en/US/products/sw/cscowork/ps4565/tsd_products_support_series_home.html

- Cisco Configuration Engine

The Cisco Configuration Engine is network management software that automates initial configurations and configuration updates. It generates device-specific configuration changes, sends them to the device, executes the configuration change, and logs the results. For information about Cisco Configuration Engine, see the software configuration guide on Cisco.com.

- SNMP network management

You can manage switches from a Simple Network Management Protocol (SNMP)-compatible management station that is running platforms such as HP OpenView or SunNet Manager. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for information.

- Cisco Security Manager

Cisco Security Manager (Security Manager) manages security policies on Cisco security devices. Security Manager supports integrated provisioning of firewall, IPS, and VPN (site-to-site, remote access, and SSL) services across devices. For information, see the *User Guide for Cisco Security Manager 3.2.2*.

- Catalyst Smart Operations

The Smart Install feature provides a single point of management (director) in a network. You can use it to provide a zero touch image and configuration upgrade of newly deployed switches and image and configuration downloads for any client switches. For information, see the *Cisco Smart Install Configuration Guide* on Cisco.com.

Auto Smartports macros dynamically configure ports based on the device type detected on the port. When the switch detects a new device, it applies the appropriate Auto Smartports macro on the port. For information about configuring Auto Smartports, see the switch software configuration guide on Cisco.com.

Network Configurations

See the switch software configuration guide on Cisco.com for network configuration concepts and examples of using the switch to create dedicated network segments and interconnecting the segments through Gigabit Ethernet connections.

■ Management Options



CHAPTER 2

Switch Installation

Read these topics and perform the procedures in this order:

- [Preparing, page 2-1](#)
- [Planning a Switch Stack, page 2-5](#)
- [Installing the Switch, page 2-9](#)
- [Installing SFP and SFP+ Modules, page 2-17](#)
- [Connecting to SFP and SFP+ Modules, page 2-18](#)
- [10/100/1000 PoE+ Port Connections, page 2-21](#)
- [10/100/1000 Port Connections, page 2-22](#)

For initial switch setup, assigning the switch IP address, and powering on information, see the switch getting started guide on Cisco.com.

Preparing

- [Safety Warnings, page 2-1](#)
- [Installation Guidelines, page 2-4](#)
- [Box Contents, page 2-4](#)
- [Tools and Equipment, page 2-4](#)

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 *Regulatory Compliance and Safety Information for the Catalyst 2960 and 2960-S Switches* guide on the documentation CD and online at Cisco.com.



To prevent the switch from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 113°F (45°C). To prevent airflow restriction, allow at least 3 inches (7.6 cm) of clearance around the ventilation openings. Statement 17B

**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**

Ethernet cables must be shielded when used in a central office environment. Statement 171

**Warning**

If a redundant power system (RPS) is not connected to the switch, install an RPS connector cover on the back of the switch. Statement 265

**Warning**

**Attach only the following Cisco RPS model to the RPS receptacle:
PWR-RPS2300** Statement 370

**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**

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.

**Warning**

Class 1 laser product. Statement 1008

**Warning**

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

**Warning**

This 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**

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

Installation Guidelines

- Clearance to front panel so that the LEDs can be easily read.
- Switch rear-panel access to connect the optional Cisco Redundant Power Supply (RPS) 2300 or to stack the switches.
- AC power cord reaches 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 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. Operating environment is within the ranges listed in [Appendix A, “Technical Specifications.”](#)
- Humidity around the switch does not exceed 85 percent.
- Altitude at the installation site is not greater than 10,000 feet.
- For 10/100/1000 fixed ports, cable lengths from the switch to connected devices are up to 328 feet (100 meters).
- For cable lengths for SFP-module connections, see the [“Cables and Adapters” section on page B-2.](#)
- 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.

Box Contents

The switch getting started guide describes the box contents. If any item is missing or damaged, contact your Cisco representative or reseller for support.

Tools and Equipment

You need to supply a number-2 Phillips screwdriver to rack-mount the switch.

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 System, RPS, Status, Duplex, and Speed LEDs turn green. The System LED blinks green, and the other LEDs remain solid green.

When the switch completes POST successfully, the System 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 System 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. Install the switch in a rack, on a wall, on a table, or on a shelf as described in the “[Installing the Switch](#)” section on page 2-9.

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 RPS model to the RPS receptacle: PWR-RPS2300 = Statement 370

Planning a Switch Stack

**Note**

This section applies only to the Catalyst 2960-S stacking-capable switches.

Stack Guidelines

- Connect only Catalyst 2960-S switches in a switch stack. You cannot stack the Catalyst 2960-S switches with Catalyst 3750-E, 3750, or 2975 switches.
- Stack only up to four switches.
- Install the FlexStack module and the FlexStack cable. You can order them from your Cisco sales representative: C2960S-STACK=.

**Note**

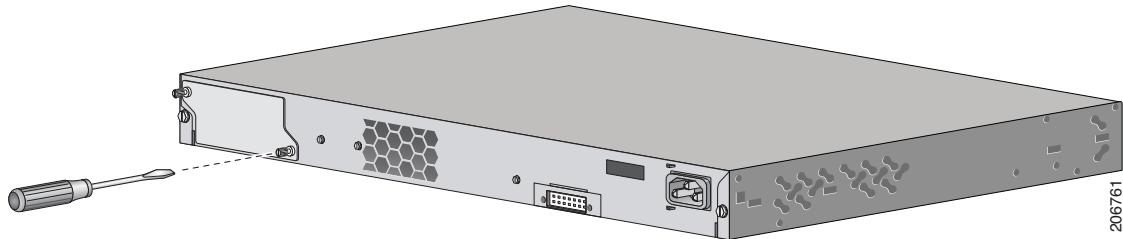
The FlexStack module is hot-swappable and can be inserted while the switch is powered on.

- 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)
- Access to the switch rear panel and to the rear of the rack.

Installing the FlexStack Module

- Step 1** Use a flat-blade screwdriver to remove the FlexStack module blank cover on the switch back panel.

Figure 2-1 *Removing the Blank Cover*



206761

- Step 2** Grasp the FlexStack module on the sides, and insert it into the module slot. Push the module in completely until you feel it snap into place.

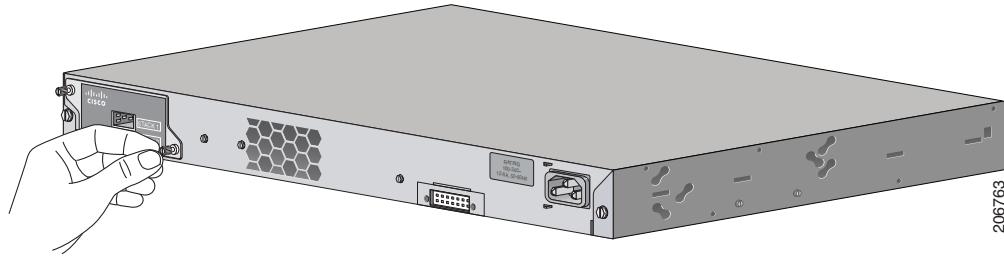
Figure 2-2 *Inserting the FlexStack Module*



206762

- Step 3** Secure the screws tightly on each side of the module.

Figure 2-3 *Securing the FlexStack Module*



206763



- Note** Make sure the screws are only finger-tight to avoid overtightening.

Stack Cabling

[Figure 2-5](#) and [Figure 2-6](#) show the switches stacked in a vertical rack or on a table. The connections are redundant.

Figure 2-4 Stacking Switches with the 0.5-meter FlexStack Cable

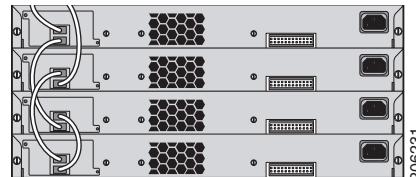


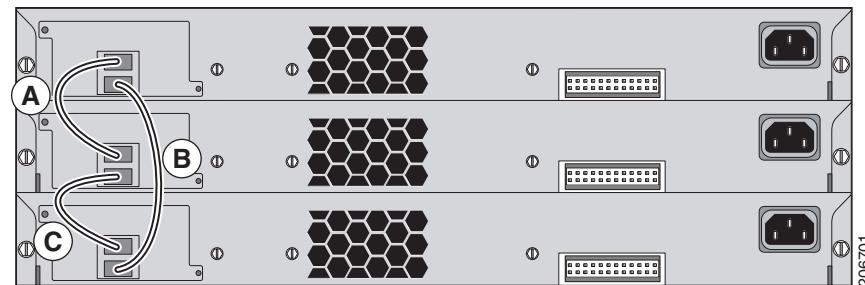
Figure 2-5 Stacking Switches with 0.5-meter and 3-meter FlexStack Cables



Stack Bandwidth and Partitioning Examples

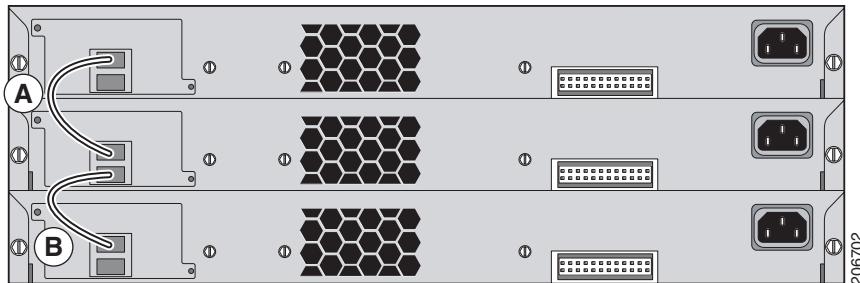
[Figure 2-6](#) shows a stack that provides full bandwidth with redundant connections.

Figure 2-6 Stack with Full Bandwidth Connections

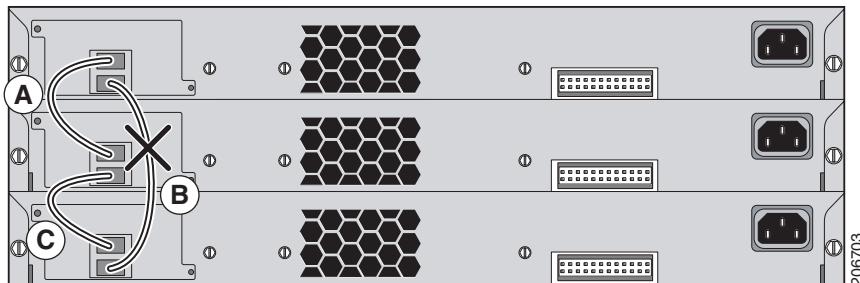


[Figure 2-7](#) shows a stack with incomplete stack cabling connections. This stack provides only half bandwidth and does not have redundant connections.

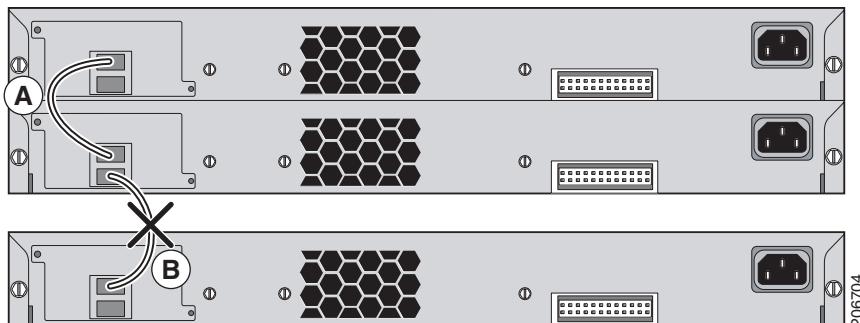
■ Planning a Switch Stack

Figure 2-7 Stack with Half Bandwidth Connections

[Figure 2-8](#) shows a stack with a bad FlexStack cable in link B. This stack provides only half bandwidth and does not have redundant connections.

Figure 2-8 Stack with a Failover Condition

[Figure 2-9](#) shows a stack with a bad link B. This stack partitions into two stacks, and switch 1 and switch 3 are stack masters.

Figure 2-9 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 re-election. 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 re-election or to manually elect the stack master, see the “Managing Switch Stacks” chapter in the switch software configuration guide on Cisco.com.

Installing the Switch

- [Rack-Mounting, page 2-9](#)
- [Wall-Mounting, page 2-13](#)
- [Table- or Shelf-Mounting, page 2-16](#)
- [After Switch Installation, page 2-16](#)

Rack-Mounting

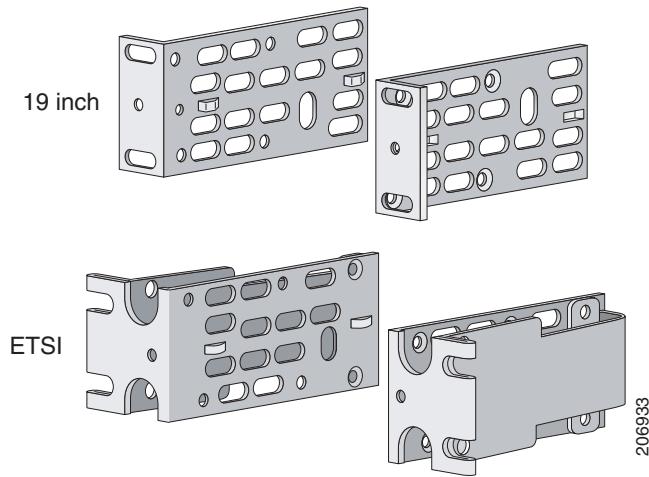
Installation in other than 19-inch racks requires a bracket kit not included with the switch. [Figure 2-10](#) shows the standard 19-inch brackets and ETSI mounting brackets. You can order the ETSI bracket from your Cisco sales representative: 700-19781XX



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:

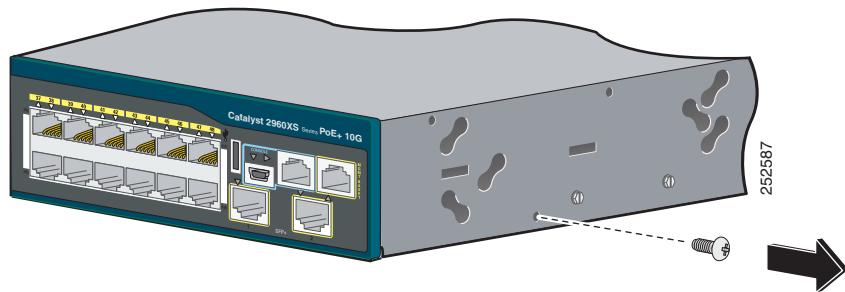
- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

■ Installing the Switch**Figure 2-10** Rack-Mounting Brackets**Attaching the Rack-Mount Brackets**

To rack-mount the switch, first remove the screws from the switch chassis so that the mounting brackets can be attached.

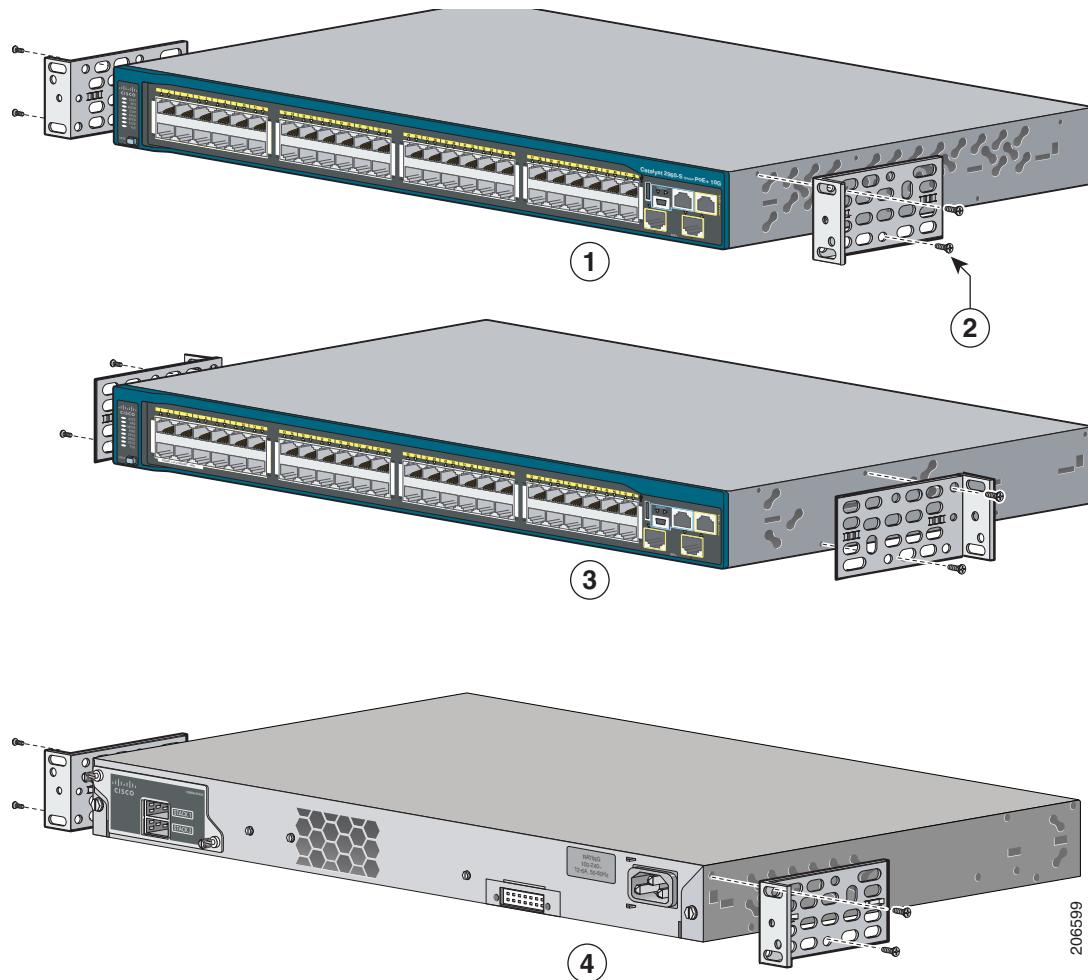


Note You do not need to remove the screws for attaching the brackets in the rear-mounting position.

Figure 2-11 Removing Screws from the Switch

Use four Phillips flat-head screws to attach the long side of the bracket to each side of the switch (Figure 2-12).

Figure 2-12 Attaching Brackets for 19-inch Racks



1	Front-mounting position	3	Mid-mounting position
2	Number-8 Phillips flat-head screws	4	Rear-mounting position

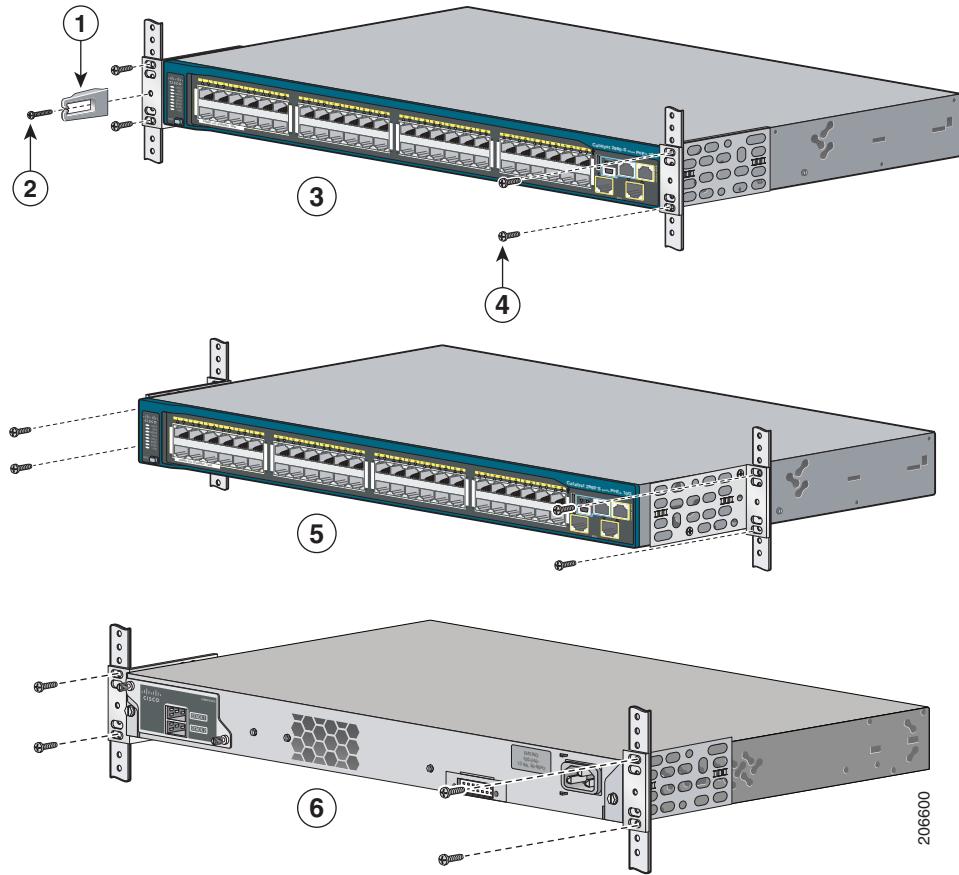
■ Installing the Switch

Mounting in a Rack

After the brackets are attached, use the four supplied Phillips machine screws to attach the brackets to the rack (Figure 2-13). Use the black Phillips machine screw to attach the cable guide to the left or right bracket.

When you complete the switch installation, see the “[After Switch Installation](#)” section on page 2-16 for information on switch configuration.

Figure 2-13 Mounting in a Rack



1	Phillips machine screw, black	4	Number-12 Phillips machine screws
2	Cable guide	5	Mid-mounting position
3	Front-mounting position	6	Rear-mounting position

206600

Wall-Mounting

- Attaching the Brackets for Wall-Mounting, page 2-13
- Attaching the RPS Connector Cover, page 2-14
- Mounting on a Wall, page 2-15



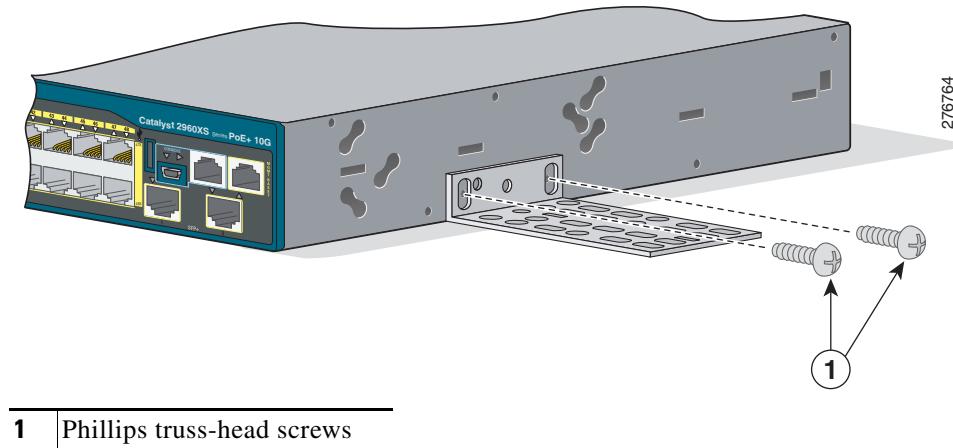
Warning

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

Figure 2-14 shows how to attach a 19-inch bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side.

Figure 2-14 Attaching the 19-inch Brackets for Wall-Mounting



1 Phillips truss-head screws

■ Installing the Switch**Attaching the RPS Connector Cover**

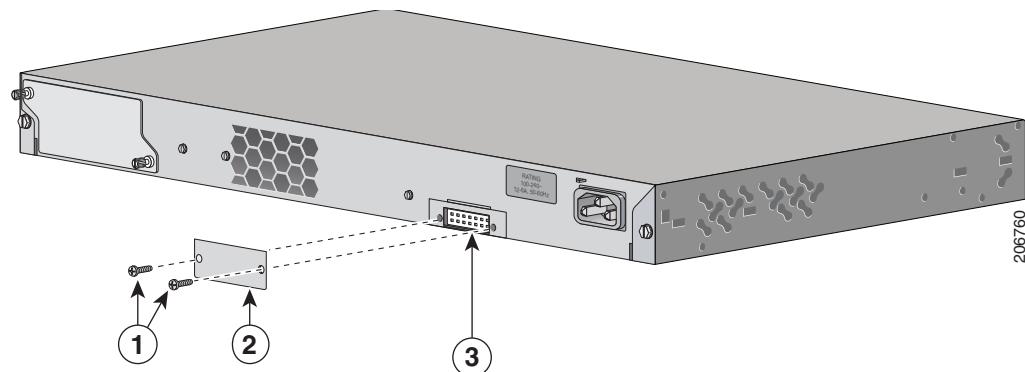
If you are not using an RPS with your switch, use the two Phillips pan-head screws to attach the RPS connector cover to the back of the switch ([Figure 2-15](#)).

**Warning**

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

Statement 265

Figure 2-15 Attaching the RPS Connector Cover



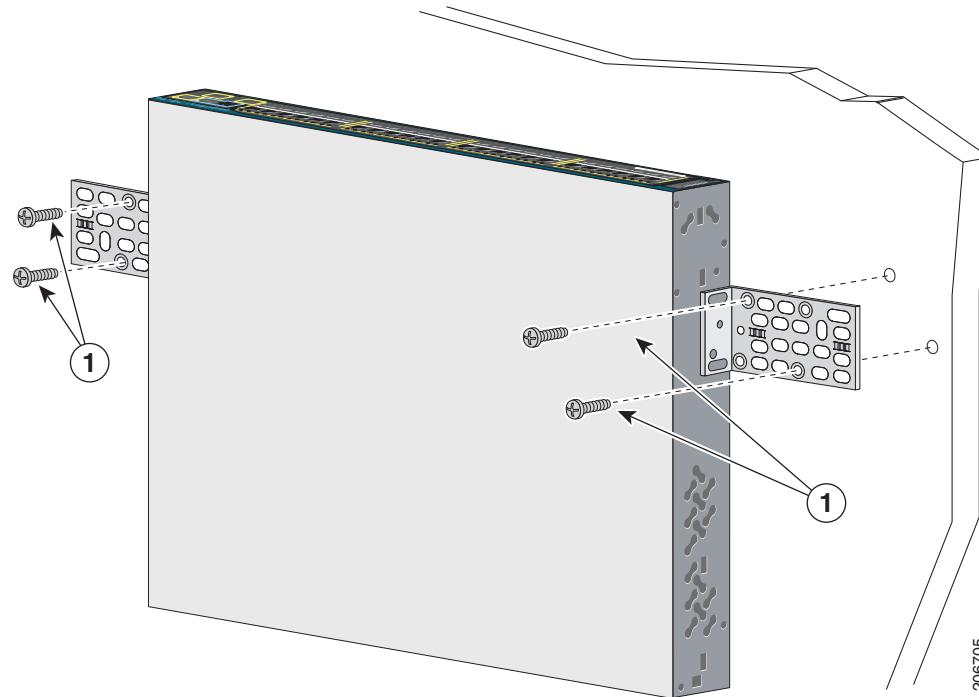
206760

1	Phillips pan-head screws	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 up or front facing down ([Figure 2-16](#)).

Figure 2-16 **Mounting on a Wall**



1 User-supplied screws

When you complete the switch installation, see the “[After Switch Installation](#)” section on page 2-16 for information on switch configuration.

■ Connecting the FlexStack Cables

Table- or Shelf-Mounting

To install the switch on a table or shelf, locate the adhesive strip with the rubber feet in the mounting-kit envelope. Attach the four rubber feet to the recessed areas on the bottom of the chassis. Place the switch on the table or shelf near an AC power source.

When you complete the switch installation, see the “[After Switch Installation](#)” section on page 2-16 for information on switch configuration.

After Switch Installation

- Configure the switch by running Express Setup to enter the initial switch configuration. See the switch getting started guide in the “[Related Publications](#)” section.
 - Use the CLI setup program to enter the initial switch configuration. See [Appendix C, “Configuring the Switch with the CLI-Based Setup Program.”](#)
 - Connect to the stack ports. See the “[Connecting the FlexStack Cables](#)” section on page 2-16.
 - Connect to the front-panel ports. See the “[Installing SFP and SFP+ Modules](#)” section on page 2-17, the “[10/100/1000 Port Connections](#)” section on page 2-22, and the “[10/100/1000 PoE+ Port Connections](#)” section on page 2-21.
-

Connecting the FlexStack Cables

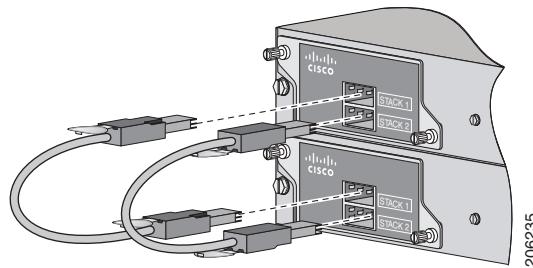
Always use a Cisco-approved FlexStack cable to connect the switches.



Note Connect only Catalyst 2960-S switches in a switch stack.

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

Figure 2-17 Connect the FlexStack Cables



- 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 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.

To remove a FlexStack cable, grasp the tab on the cable connector and gently pull straight out. 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 SFP and SFP+ Modules

Some switch models support SFP modules, SFP+ modules, or both. The *SFP* slots support only the SFP modules. The slots marked *SFP+* slots support both SFP and SFP+ modules.

See the “[SFP and SFP+ Module Slots](#)” section on page 1-6 and 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. For module cable specifications, see [Appendix B, “Connector and Cable Specifications.”](#)

Installing an SFP or SFP+ Module

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

- 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.

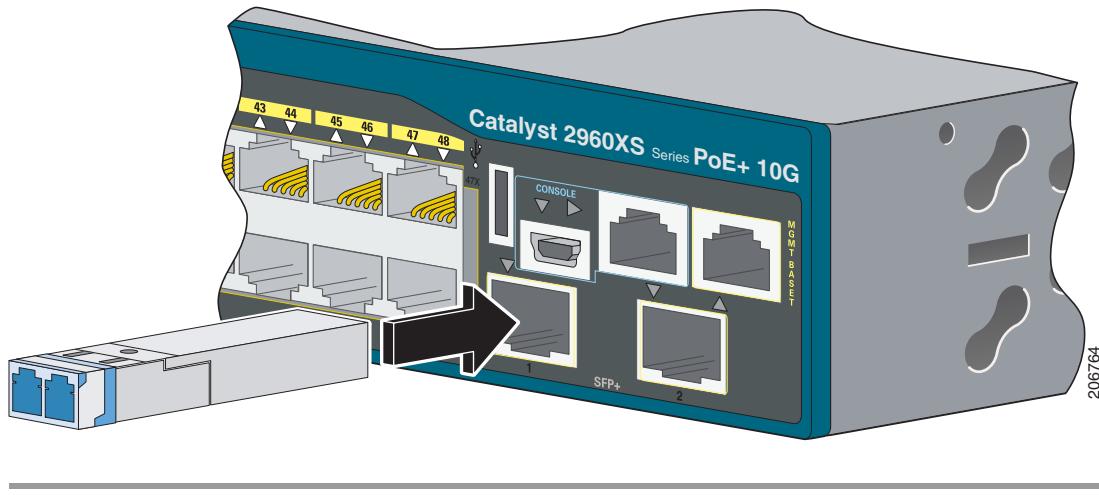
On some SFP or SFP+ modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send or receive (TX or RX).

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

■ Connecting to SFP and SFP+ Modules

- 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 2-18 *Installing an SFP Module*



Removing an SFP or SFP+ Module

- 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

For instructions on how to connect to fiber-optic SFP modules, see the “[Connecting to Fiber-Optic SFP and SFP+ Modules](#)” section. For instructions on how to connect to copper 1000BASE-T SFP modules, see the “[Connecting to 1000BASE-T SFP](#)” section.

For instructions about how to install or remove an SFP module, see the “[Installing SFP and SFP+ Modules](#)” section on page 2-17.

Connecting to Fiber-Optic SFP and SFP+ Modules


Warning

Class 1 laser product. Statement 1008


Caution

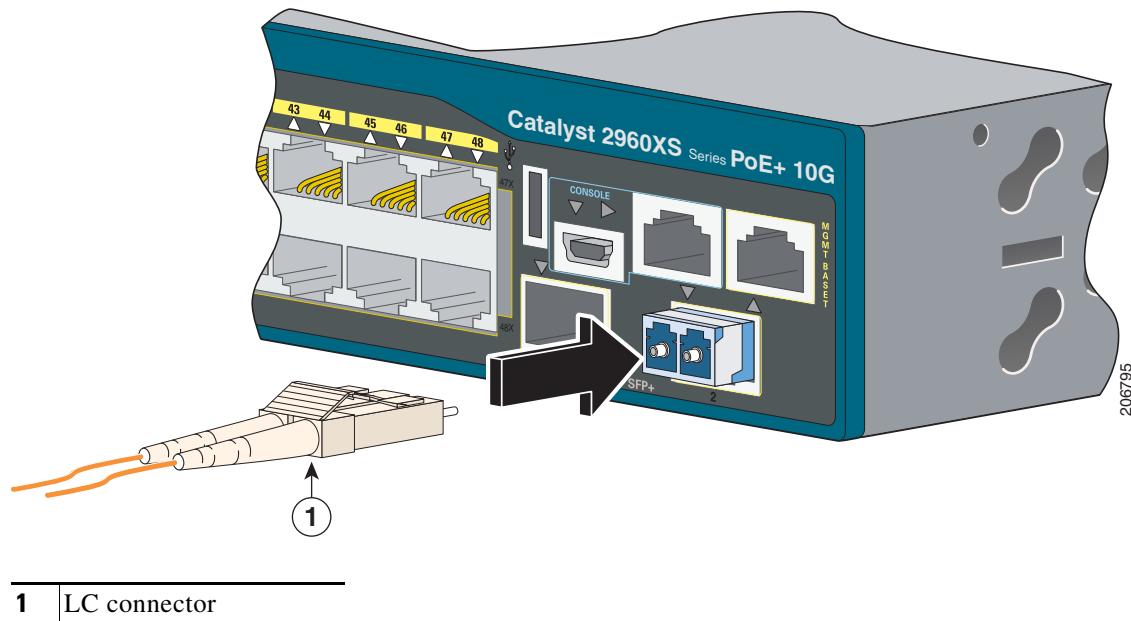
Do not remove the rubber plugs from the SFP or SFP+ module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, be sure that you understand the port and cabling stipulations in the “[Installation Guidelines](#)” section on page 2-4 and in the “[SFP and SFP+ Module Slots](#)” section on page 1-6. See [Appendix B, “Connector and Cable Specifications”](#) for information about the LC on the SFP module.

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 (see [Figure 2-19](#)).

Figure 2-19 *Connecting to a Fiber-Optic SFP Module Port*



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

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.

■ Connecting to SFP and SFP+ Modules

If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be a problem with the adapter installed in the target device. See [Chapter 3, “Troubleshooting,”](#) for solutions to cabling problems.

- Step 5** If necessary, reconfigure and restart the switch or target device.

Connecting to 1000BASE-T SFP



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

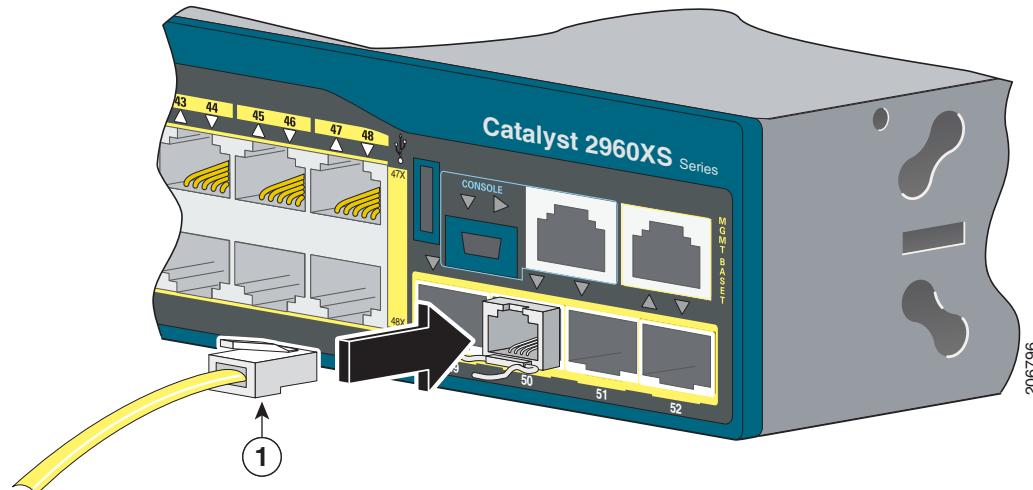
- Step 1** Connect one end of the cable to the SFP module port (see [Figure 2-20](#)). When connecting to servers, workstations, and routers, use a four twisted-pair, straight-through cable. When connecting to switches or repeaters, use a four twisted-pair, crossover cable.

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.

Figure 2-20 *Connecting to a 1000BASE-T SFP Module*



- 1** | RJ-45 connector

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

- 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. See [Chapter 3, “Troubleshooting,”](#) for solutions to cabling problems.

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

10/100/1000 PoE+ Port Connections

See the “[10/100/1000 PoE+ Ports](#)” section on page 1-4 for information on the cables and connectors.

The ports provide PoE support for devices compliant with IEEE 802.3af 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.

Step 1

Connect one end of the cable ([Table 2-1](#)) 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. See [Chapter 3, “Troubleshooting,”](#) for solutions to cabling problems.



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.

■ 10/100/1000 Port Connections

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.

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 [Table 2-1](#) to select the correct cable.

See the “[Cables and Adapters](#)” section on page [B-2](#) for pinout descriptions.

Table 2-1 Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable ¹	Straight-Through Cable ¹
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

1. 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.

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.

Use the guidelines in [Table 2-1](#) to select the correct cable for connecting the switch 10/100 and 10/100/1000 ports to other devices. See the “[Connector and Cable Specifications](#)” section on page [B-1](#) for cable-pinout descriptions.

Where to Go Next

To change the switch settings, you can use the switch default configuration or use any of the management options described in the “[Management Options](#)” section.

■ Where to Go Next



CHAPTER 3

Troubleshooting

- [Diagnosing Problems, page 3-1](#)
- [Clearing the Switch IP Address and Configuration, page 3-5](#)
- [Finding the Switch Serial Number, page 3-5](#)
- [Replacing a Failed Stack Member, page 3-7](#)

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 the device manager, from the CLI, or from an SNMP workstation. See the software configuration guide, the switch command reference guide on Cisco.com, or the documentation that came with your SNMP application for details.

Switch POST Results

See the “[Verifying Switch Operation](#)” section on page 2-4 for information on POST.



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](#)” section on page 1-8 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 or 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. See [Table 2-1](#) for recommended Ethernet cables.

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. See [Appendix B, “Connector and Cable Specifications”](#) for information.
- 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. See [Table 1-8](#) and [Table 1-9](#) for descriptions of the LEDs and their meanings.
- Use the **show interfaces** privileged EXEC command to see if the port is error-disabled, disabled, or shutdown. Re-enable 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. See [Table 1-8](#) and [Table 1-9](#) for descriptions of the LEDs and their meanings.
- Use the **show interfaces** privileged EXEC command to see if the port is in error-disabled, disabled, or shutdown. Re-enable the port if necessary.
- Verify that the power supply installed in the switch meets the power requirements of your connected devices. See the “[10/100/1000 PoE+ Ports](#)” section on page [1-4](#).
- 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. Re-enable 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 re-enable 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, re-enable 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. For information about enabling UDLD on the switch, see the “Understanding UDLD” section in the switch software configuration guide on Cisco.com.

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. See the “[Cables and Adapters](#)” section on page B-2.

Clearing the Switch IP Address and Configuration

If you have configured a new switch with a wrong IP address, or if all of the switch LEDs start blinking when you are trying to enter Express Setup mode, you can clear the configured IP address. The switch returns to the factory default settings.


Note

This procedure clears the IP address and all configuration information stored on the switch. Do not follow this procedure unless you want to completely reconfigure the switch.

1. Press and hold the Mode button ([Figure 1-1 on page 1-2](#)).
2. The switch LEDs blink after about 2 seconds. If the switch is not configured, the LEDs above the Mode button turn green. You can omit the next step.
3. Continue holding down the Mode button. The LEDs stop blinking after 8 seconds, and then the switch reboots.

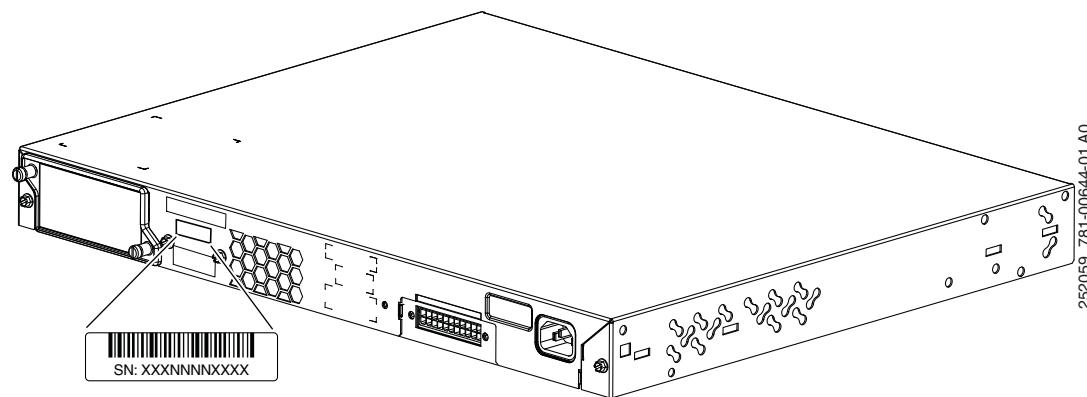
You can now configure the switch by using Express Setup as described in the switch getting started guide.

You can also configure the switch by using the CLI setup procedure described in the “[Configuring the Switch with the CLI-Based Setup Program](#)” appendix.

Finding the Switch Serial Number

If you contact Cisco Technical Assistance, you need to know the switch serial number. [Figure 3-1](#) and [Figure 3-2](#) show the serial number locations. [Figure 3-3](#) shows the FlexStack module serial number location. You can also use the **show version** privileged EXEC command to see the switch serial number.

Figure 3-1 *Serial Number Location for the Catalyst 2960S-48FPD-L, 2960S-48LPD-L, 2960S-24PD-L, 2960S-48FPS-L, 2960S-48LPS-L, and 2960S-24PS-L Switches*



Finding the Switch Serial Number

Figure 3-2 Serial Number Location for the Catalyst 2960S-48TD-L, 2960S-24TD-L, 2960S-48TS-L, 2960S-24TS-L, 2960S-48TS-S, and 2960S-24TS-S Switches

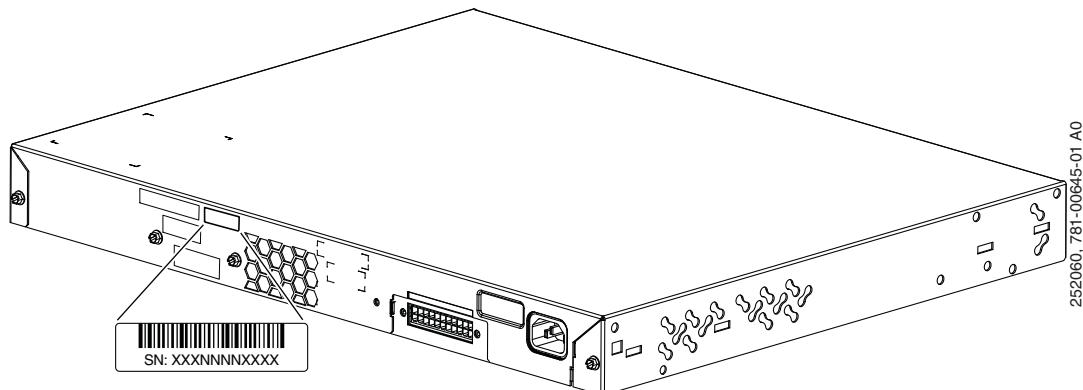
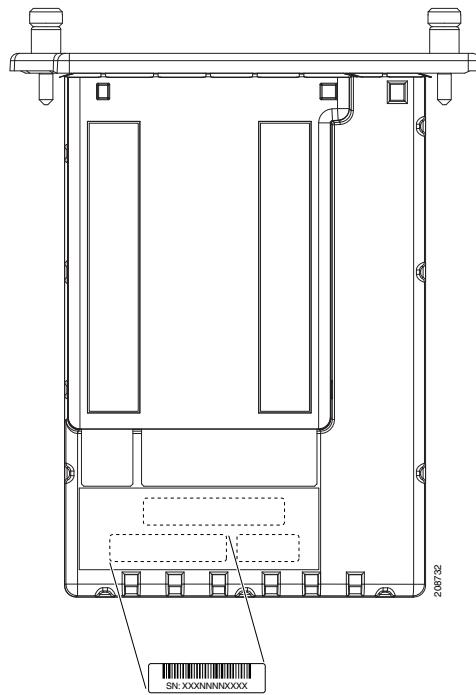


Figure 3-3 Serial Number Location for the C2960S-STACK Module



Replacing a Failed Stack Member

1. Get a replacement switch that has the same model number as the failed switch.
2. Power down the failed switch.
3. Make sure that the replacement switch is off and that the FlexStack module is installed.
4. Connect the switch to the stack.
5. Make the same connections on the replacement switch that were on the failed switch.
6. Reinstall any modules, and make cable connections.
7. Power on the replacement switch.

The replacement switch has the same configuration for all the interfaces as the failed switch and functions the same as the failed switch.

If you had manually set the member numbers for any stack members, you need to manually assign the replacement switch with the same member number as the failed switch. See the switch software configuration guide on Cisco.com.

■ Replacing a Failed Stack Member



APPENDIX A

Technical Specifications

Table A-1 Environmental Specifications for All Catalyst 2960-S Switches

Environmental Ranges	
Operating temperature	0 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	-13 to 158°F (-25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Storage altitude	Up to 15,000 ft (4573 m)

Table A-2 Catalyst 2960S-48FPD-L, 2960S-48LPD-L, 2960S-24PD-L, 2960S-48FPS-L, 2960S-48LPS-L, and 2960S-24PS-L Switch Specifications

Power Requirements	
AC input voltage	100 to 240 VAC (autoranging) 9 to 4 A, 50 to 60 Hz (Catalyst 2960S-48FPD-L) 5 to 2 A, 50 to 60 Hz (Catalyst 2960S-48LPD-L) 5 to 2 A, 50 to 60 Hz (Catalyst 2960S-24PD-L) 9 to 4 A, 50 to 60 Hz (Catalyst 2960S-48FPS-L) 5 to 2 A, 50 to 60 Hz (Catalyst 2960S-48LPS-L) 5 to 2 A, 50 to 60 Hz (Catalyst 2960S-24PS-L)
DC input voltage for RPS 2300	+12 V---@ 4 A, -52 V---@ 15A (Catalyst 2960S-48FPD-L) +12 V---@ 4 A, -52 V---@ 8 A (Catalyst 2960S-48LPD-L) +12 V---@ 3 A, -52 V---@ 8 A (Catalyst 2960S-24PD-L) +12 V---@ 4 A, -52 V---@ 15 A (Catalyst 2960S-48FPS-L) +12 V---@ 4 A, -52 V---@ 8 A (Catalyst 2960S-48LPS-L) +12 V---@ 3 A, -52 V---@ 8 A (Catalyst 2960S-24PS-L)
Power consumption ¹	129 W, 440 BTUs per hour (Catalyst 2960S-48FPD-L) 100 W, 341 BTUs per hour (Catalyst 2960S-48LPD-L) 84 W, 286 BTUs per hour (Catalyst 2960S-24PD-L) 131 W, 447 BTUs per hour (Catalyst 2960S-48FPS-L) 100 W, 341 BTUs per hour (Catalyst 2960S-48LPS-L) 84 W, 286 BTUs per hour (Catalyst 2960S-24PS-L)
Power rating ²	0.89 KVA (Catalyst 2960S-48FPD-L) 0.48 KVA (Catalyst 2960S-48LPD-L) 0.46 KVA (Catalyst 2960S-24PD-L) 0.89 KVA (Catalyst 2960S-48FPS-L) 0.48 KVA (Catalyst 2960S-48LPS-L) 0.46 KVA (Catalyst 2960S-24PS-L)
PoE+	
15.4 W-per-port maximum, 740-W switch maximum (Catalyst 2960S-48FPD-L and 2960S-48FPS-L switches)	
15.4-W-per-port maximum, 370-W switch maximum (Catalyst 2960S-48LPD-L, 2960S-24PD-L, 2960S-48LPS-L, and 2960S-24PS-L switches)	
Physical Dimensions	
Weight	13 lb (5.89 kg) (Catalyst 2960S-48FPD-L) 12.5 lb (5.66 kg) (Catalyst 2960S-48LPD-L) 12.5 lb (5.66 kg) (Catalyst 2960S-24PD-L) 13 lb (5.89 kg) (Catalyst 2960S-48FPS-L) 12.5 lb (5.66 kg) (Catalyst 2960S-48LPS-L) 12.5 lb (5.66 kg) (Catalyst 2960S-24PS-L)
Dimensions (H x D x W)	1.75 x 15.19 x 17.5 in. (4.45 x 38.6 x 44.5 cm). Applies to all PoE switches.

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

Table A-3 Catalyst 2960S-48TD-L, 2960S-24TD-L, 2960S-48TS-L, 2960S-24TS-L, 2960S-48TS-S, and 2960S-24TS-S Switch Specifications

Power Requirements	
AC input voltage	100 to 240 VAC (autoranging) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-48TD-L) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-24TD-L) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-48TS-L) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-24TS-L) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-48TS-S) 1 to 0.5 A, 50 to 60 Hz (Catalyst 2960S-24TS-S)
DC input voltage for RPS 2300	+12 V---@ 4 A, (Catalyst 2960S-48TD-L) +12 V---@ 3 A, (Catalyst 2960S-24TD-L) +12 V---@ 4 A, (Catalyst 2960S-48TS-L) +12 V---@ 4 A, (Catalyst 2960S-24TS-L) +12 V---@ 4 A, (Catalyst 2960S-48TS-S) +12 V---@ 3 A, (Catalyst 2960S-24TS-S)
Power consumption ¹	55 W, 188 BTUs per hour (Catalyst 2960S-48TD-L) 40 W, 136 BTUs per hour (Catalyst 2960S-24TD-L) 52 W, 177 BTUs per hour (Catalyst 2960S-48TS-L) 40 W, 136 BTUs per hour (Catalyst 2960S-24TS-L) 53 W, 181 BTUs per hour (Catalyst 2960S-48TS-S) 36 W, 123 BTUs per hour (Catalyst 2960S-24TS-S)
Physical Dimensions	
Weight	9.5 lb (4.30 kg) (Catalyst 2960S-48TD-L, Catalyst 2960S-24TD-L, and 2960S-48TS-S) 10.5 lb (4.76 kg) (Catalyst 2960S-48TS-L) 10 lb (4.53 kg) (Catalyst 2960S-24TS-L and 2960S-24TS-S)
Dimensions (H x D x W)	1.75 x 11.77 x 17.50 in. (4.45 x 29.9 x 44.5 cm). All non-PoE switches.

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

2. Power rating values for the switch input power.



APPENDIX B

Connector and Cable Specifications

Connector Specifications

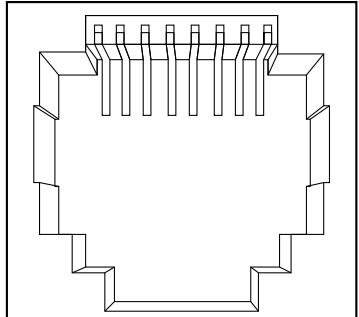
- 10/100/1000 Ports (Including PoE), page B-1
- SFP Module Connectors, page B-1

10/100/1000 Ports (Including PoE)

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

Figure B-1 **10/100/1000 Port Pinouts**

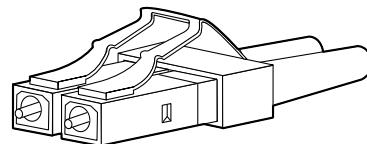
Pin	Label	1	2	3	4	5	6	7	8
1	TP0+								
2	TP0-								
3	TP1+								
4	TP2+								
5	TP2-								
6	TP1-								
7	TP3+								
8	TP3-								



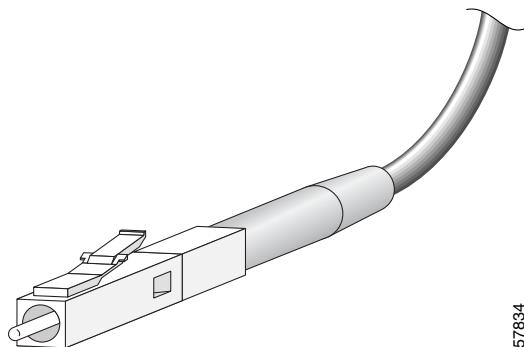
60915

SFP Module Connectors

Figure B-2 **Duplex LC Cable Connector**



58476

Figure B-3 Simplex LC Cable Connector

57834

Figure B-4 Copper SFP Module RJ-45 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-								

A diagram of an 8-pin RJ-45 connector showing the pinout. The pins are numbered 1 through 8 around the perimeter. Pin 1 is at the top, followed by 2, 3, 4, 5, 6, 7, and 8 at the bottom. The internal structure shows four pairs of wires: TP0+ (pins 1, 2), TP0- (pins 3, 4), TP1+ (pins 5, 6), and TP1- (pins 7, 8).

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Cables and Adapters

- [SFP Module Cables, page B-2](#)
- [Cable Pinouts, page B-4](#)
- [Console Port Adapter Pinouts, page B-6](#)

SFP Module Cables

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).

Table B-1 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Cable Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)¹	Cable Distance
100BASE-BX (GLC-FE-100BX-D GLC-FE-100BX-U)	1310 TX 1550 RX	SMF	G.652 ²	—	32,810 feet (10 km)
100BASE-FX (GLC-GE-100FX)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
100BASE-FX (GLC-FE-100FX)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
100BASE-LX (GLC-FE-100LX)	1310	SMF	G.652 ²	—	32,810 feet (10 km)
1000BASE-BX10-D (GLC-BX-D)	1490 TX 1310 RX	SMF	G.652 ²	—	32,810 feet (10 km)
1000BASE-BX10-U (GLC-BX-U)	1310 TX 1490 RX	SMF	G.652 ²	—	32,810 feet (10 km)
1000BASE-SX (GLC-SX-MM)	850	MMF	62.5/125 62.5/125 50/125 50/125	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1,640 feet (500 m) 1,804 feet (550 m)
1000BASE-T (GLC-T)	Standard 4 twisted-pair Category 5 cable	—	—	—	328 feet (100 m)
1000BASE-LX/LH (GLC-LH-SM)	1310	MMF ³ SMF	62.5/125 50/125 50/125 G.652 ²	500 400 500 —	1,804 feet (550 m) 1,804 feet (550 m) 1,804 feet (550 m) 32,810 feet (10 km)
1000BASE-ZX (GLC-ZX-SM)	1550	SMF	G.652 ²	—	43.4 to 62 miles (70 to 100 km) ⁴
CWDM	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652 ²	—	62 miles (100 km)
10GBASE-LR (SFP-10G-LR)	1310	SMF	G.652 ²	—	6.21 miles (10 km)
10GBASE-SR (SFP-10G-SR)	850	MMF	62.5/125 62.5/125 50/125 50/125 50/125	160 200 400 500 2000	85 feet (26 m) 108 feet (33 m) 216 feet (66 m) 269 feet (82 m) 6,561 feet (2000 m)

Table B-1 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Cable Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km) ¹	Cable Distance
10GBASE-LRM (SFP-10G-LRM)	850	MMF	62.5/125	160	722 feet (220 m)
			62.5/125	200	722 feet (220 m)
			50/125	400	328 feet (100 m)
			50/125	500	722 feet (220 m)
			50/125	2000	722 feet (220 m)
10GBASE-CX1 (SFP-H10GB-CU1M)	—	Twinax cable, 30-AWG cable assembly	—	—	3 feet (1 m)
					9 feet (3 m)
					16 feet (5 m)

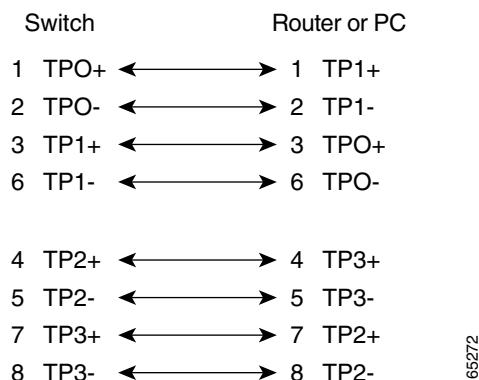
1. Modal bandwidth applies only to multimode fiber.

2. A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers.

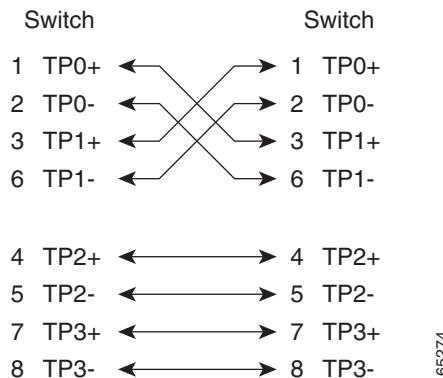
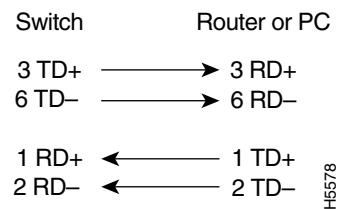
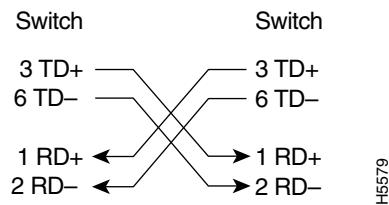
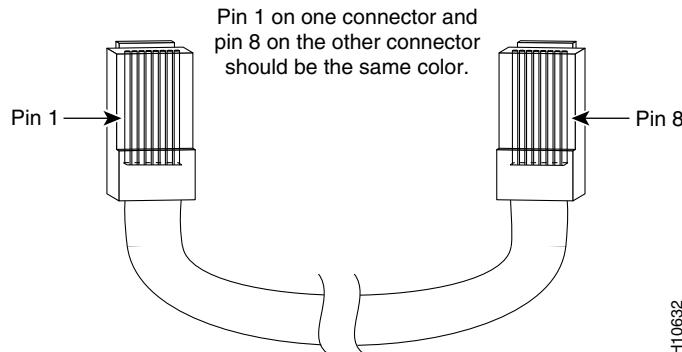
3. A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, or 1000BASE-LX/LH SFP modules and a short link distance can cause transceiver saturation, and an elevated bit error rate (BER). When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).

4. 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, the number of splices, and the connectors.

Cable Pinouts

Figure B-5 Four Twisted-Pair Straight-Through Cable Schematic

65272

Figure B-6 Four Twisted-Pair Crossover Cable Schematic**Figure B-7 Two Twisted-Pair Straight-Through Cable Schematic****Figure B-8 Two Twisted-Pair Crossover Cable Schematic****Figure B-9 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 B-2 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 B-3 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



Configuring the Switch with the CLI-Based Setup Program

This appendix provides a CLI-based setup procedure for a Catalyst 2960-S standalone switch or a switch stack. Before you turn on the switch power, review the safety warnings in [Chapter 2, “Switch Installation.”](#)

Accessing the CLI Through Express Setup

You can access the CLI on an unconfigured switch. Set the switch in Express Setup mode and connect a switch Ethernet port to an Ethernet port on your PC or workstation. Follow the steps described in the getting started guide for turning on the switch and using Express Setup.

When the switch is in Express Setup mode, open a Telnet session to the switch by entering the IP address **10.0.0.1**. Enter the **setup** user EXEC command. Enter the information described in the [“IP Settings” section on page C-6](#) and the [“Completing the Setup Program” section on page C-6](#).

After you have entered the configuration information for the switch, save it to flash memory by using the **write memory** privileged EXEC command.

**Note**

In Express Setup mode, the IP address **10.0.0.1** remains active on the switch until you enter the **write memory** command. You lose the Telnet connection after entering the **write memory** command.

For information about using the CLI, see the switch command reference for this release.

Accessing the CLI Through the Console Port

You can access the CLI on a configured or unconfigured switch by connecting the RJ-45 console port or USB console port of the switch to your PC or workstation and accessing the switch through a terminal emulation program.

**Note**

If you have stacked your switches, connect to the console port of one of the switches in the stack. You can initially configure the entire stack from any member switch.

Connecting the RJ-45 Console Port or USB Console Port

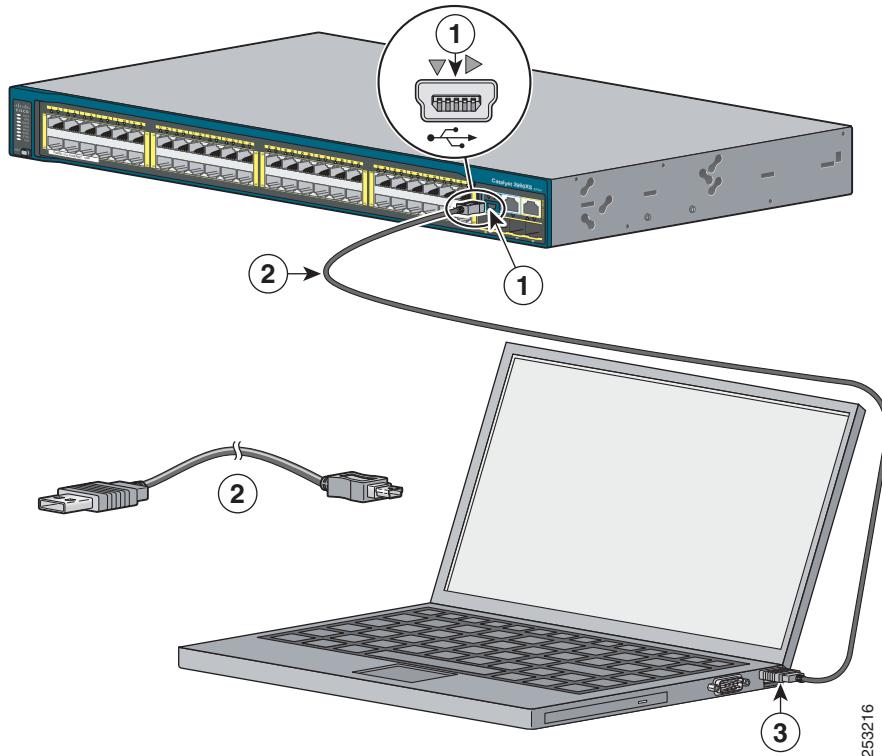
Step 1 If you are connecting the switch USB console port to a Windows-based PC for the first time, install the USB driver according to these instructions. See [Figure C-1](#).

- “[Installing the Cisco Microsoft Windows XP USB Driver](#)” section on page C-3
- “[Installing the Cisco Microsoft Windows 2000 USB Driver](#)” section on page C-4
- “[Installing the Cisco Microsoft Windows Vista USB Driver](#)” section on page C-4



Note If you do not want to use the switch USB console port, you can use an RJ-45-to-DB-9 adapter cable to connect the switch RJ-45 console port to a PC or terminal port.

Figure C-1 *Connecting the USB Console Cable to the Catalyst 2960-S Switch*



1	USB console port (5-pin mini-Type B)
2	USB Type A to 5-pin mini-Type B cable
3	USB Type A connection on laptop

Step 2 Start the terminal-emulation program on the PC or the terminal. The program, frequently a PC application such as HyperTerminal or ProcommPlus, makes communication between the switch and your PC or terminal possible.

Step 3 Configure the baud rate and character format of the PC or terminal to match the console port default characteristics:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- None (flow control)

Step 4 Power on the switch as described in the switch getting started guide.

Step 5 The PC or terminal displays the bootloader sequence. Press **Enter** to display the setup prompt. Follow the steps in the “[Completing the Setup Program](#)” section on page [C-6](#).

Installing the Cisco Microsoft Windows USB Device Driver

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

Installing the Cisco Microsoft Windows XP USB Driver

Step 1 Obtain the file Cisco_usbconsole_driver.zip from the Cisco.com web site and unzip it.



Note You can download the driver file from the Cisco.com site where you download the switch software.

Step 2 If using 32-bit Windows XP, double-click the file setup.exe from the Windows_32 folder. If using 64-bit Windows XP, double-click the file setup(x64).exe from the Windows_64 folder.

Step 3 The Cisco Virtual Com InstallShield Wizard begins.

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

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

Step 6 Connect the USB cable to the PC and switch console port. The LED for the USB console port turns green (see [Table 1-10](#)), and within a few seconds a series of Found New Hardware Wizard windows appear. Follow the instructions to complete the driver installation.

The USB console is ready for use.

Installing the Cisco Microsoft Windows 2000 USB Driver

-
- Step 1** Obtain the file Cisco_usbconsole_driver.zip from the Cisco.com web site and unzip it.

**Note**

You can download the driver file from the Cisco.com site where you download the switch software.

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

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

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

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

- Step 6** Connect the USB cable to the PC and switch console port. The LED for the USB console port turns green (see [Table 1-10](#)), and within a few seconds a series of Found New Hardware Wizard windows appear. Follow the instructions to complete the driver installation.

The USB console is ready for use.

Installing the Cisco Microsoft Windows Vista USB Driver

-
- Step 1** Obtain the file Cisco_usbconsole_driver.zip from the Cisco.com web site and unzip it.

**Note**

You can download the driver file from the Cisco.com site where you download the switch software.

- Step 2** If using 32-bit Windows Vista, double-click the file setup.exe from the Windows_32 folder. If using 64-bit Windows Vista, double-click the file setup(x64).exe from the Windows_64 folder.

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

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

**Note**

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

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

- Step 6** Connect the USB cable to the PC and the switch console port. The LED for the USB console port turns green (see [Table 1-10](#)), and within a few seconds a series of Found New Hardware Wizard windows appear. Follow the instructions to complete the driver installation.

The USB console is ready for use.

Uninstalling the Cisco Microsoft Windows USB Driver

Uninstalling the Cisco Microsoft Windows XP and 2000 USB Driver

The driver can be removed using the Windows Add or Remove Programs utility or the setup.exe program.

Using the Add or Remove Programs Utility

**Note**

Disconnect the switch console terminal before uninstalling the driver.

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

Using the Setup.exe Program

**Note**

Disconnect the switch console terminal before uninstalling the driver.

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

Uninstalling the Cisco Microsoft Windows Vista USB Driver

**Note**

Disconnect the switch console terminal before uninstalling the driver.

-
- Step 1** Run the setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click **Next**.
 - Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
 - Step 3** When the Program Maintenance window appears, select the **Remove** radio button. Click **Next**.
 - Step 4** When the Remove the Program window appears, click **Remove**.
 - Step 5** If a User Account Control warning appears, click “Allow - I trust this program...” to proceed.
 - Step 6** When the InstallShield Wizard Completed window appears, click **Finish**.

Entering the Initial Configuration Information

To set up the switch, you need to complete the setup program, which runs automatically after the switch is powered on. You must assign an IP address and other configuration information necessary for the switch to communicate with the local routers and the Internet. This information is also needed to use the device manager or Cisco Network Assistant to configure and manage the switch.

IP Settings

Obtain this information from your network administrator before you start the setup program:

- Switch IP address
- Subnet mask (IP netmask)
- Default gateway (router)
- Enable secret password
- Enable password
- Telnet password

Completing the Setup Program

If your switches are stacked and there are multiple console connections to individual switches in the stack, the initial setup dialog appears at the console where you first press **Enter**.

Step 1 Enter **Yes** at these two prompts.

```
Would you like to enter the initial configuration dialog? [yes/no]: yes
```

```
At any point you may enter a question mark '?' for help.  
Use ctrl-c to abort configuration dialog at any prompt.  
Default settings are in square brackets '[]'.
```

```
Basic management setup configures only enough connectivity  
for management of the system, extended setup will ask you  
to configure each interface on the system.
```

```
Would you like to enter basic management setup? [yes/no]: yes
```

Step 2 Enter a host name for the switch, and press **Return**.

On a command switch, the host name is limited to 28 characters; on a member switch to 31 characters. Do not use *-n*, where *n* is a number, as the last character in a host name for any switch.

```
Enter host name [Switch]: host_name
```

Step 3 Enter an enable secret password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, can start with a number, is case sensitive, allows spaces, but ignores leading spaces. The secret password is encrypted, and the enable password is in plain text.

```
Enter enable secret: secret_password
```

- Step 4** Enter an enable password, and press **Return**.

```
Enter enable password: enable_password
```

- Step 5** Enter a virtual terminal (Telnet) password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, is case sensitive, allows spaces, but ignores leading spaces.

```
Enter virtual terminal password: terminal-password
```

- Step 6** (Optional) Configure Simple Network Management Protocol (SNMP) by responding to the prompts. You can also configure SNMP later through the CLI, the device manager, or the Network Assistant application. To configure SNMP later, enter **no**.

```
Configure SNMP Network Management? [no]: no
```

- Step 7** Enter the interface name (physical interface or VLAN name) of the connection to the management network, and press **Return**. For this release, always use **vlan1** as that interface.

```
Enter interface name used to connect to the  
management network from the above interface summary: vlan1
```

- Step 8** Configure the interface by entering the switch IP address and subnet mask and pressing **Return**. The IP address and subnet masks shown are examples.

```
Configuring interface vlan1:  
Configure IP on this interface? [yes]: yes  
IP address for this interface: 10.4.120.106  
Subnet mask for this interface [255.0.0.0]: 255.0.0.0
```

- Step 9** Enter **Y** to configure the switch as the cluster command switch. Enter **N** to configure it as a member switch or as a standalone switch.

If you enter **N**, the switch appears as a candidate switch in the Network Assistant GUI. You can configure the switch as a command switch later through the CLI, the device manager, or the Network Assistant application. To configure it later, enter **no**.

```
Would you like to enable as a cluster command switch? [yes/no]: no
```

You have now completed the initial configuration of the switch and the switch. This is an example of the configuration output that appears:

```
The following configuration command script was created:  
hostname switch1  
enable secret 5 $1$U1q8$D1A/OiaEb190WcBPd9cOn1  
enable password enable_password  
line vty 0 15  
password terminal-password  
no snmp-server  
!  
no ip routing  
  
!  
interface Vlan1  
no shutdown  
ip address 10.4.120.106 255.0.0.0  
!  
interface GigabitEthernet1/0/1  
!  
interface GigabitEthernet1/0/2  
  
interface GigabitEthernet1/0/3  
!  
...<output abbreviated>
```

■ Entering the Initial Configuration Information

```
!  
  
interface GigabitEthernet1/0/23  
!  
end
```

Step 10 These choices appear:

- [0] Go to the IOS command prompt without saving this config.
- [1] Return back to the setup without saving this config.
- [2] Save this configuration to nvram and exit.

Choose (2) to save the configuration to NVRAM to use it the next time the switch reboots.

Enter your selection [2]:**2**

Make your selection, and press **Return**.

The switch now runs this default configuration. If you want to change this configuration or perform other management tasks, see the “[Management Options](#)” section on page 1-16.



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