CISCO SYSTEMS

Catalyst 2970 Switch Hardware Installation Guide

November 2004

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Text Part Number: OL-6422-01

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

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

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

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

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

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

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

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

CONTENTS

Preface

Audience

This guide is for the networking or computer technician responsible for installing the Catalyst 2970 switch, hereafter known as *the switch.* We assume that you are familiar with the concepts and terminology of Ethernet and local area networking.

Purpose

This guide describes the hardware features of the Catalyst 2970 switch. It describes the physical and performance characteristics of the switch, explains how to install it, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch. For more information, refer to the switch software configuration guide, the switch command reference, and the switch system message guide on the Cisco.com Product Documentation home page. For information about the standard Cisco IOS Release 12.1 or 12.2 commands, see the Cisco IOS documentation set from the Cisco.com home page at **Service and Support > Technical Documents**. On the Cisco Product Documentation home page, select Release **12.1** or **12.2** from the Cisco IOS Software drop-down list.

Organization

This guide is organized into these chapters:

Chapter 1, "Product Overview," is a physical and functional overview of the Catalyst 2970 switch. It describes the switch ports, the standards they support, and the switch LEDs.

Chapter 2, "Switch Installation," contains the procedures on how to power the switch, how to install the switch in a rack, on a wall, on a table, or on a shelf, and how to make port connections.

Chapter 3, "Troubleshooting," describes how to identify and resolve some of the problems that might arise when installing the switch.

Appendix A, "Technical Specifications," lists the physical and environmental specifications for the switches.

Appendix B, "Connector and Cable Specifications," describes the connectors, cables, and adapters that can be used to connect to the switch.

Appendix C, "Configuring the Switch with the CLI-Based Setup Program," has an installation and setup procedure for a standalone switch.

Conventions

This document uses these conventions and symbols for notes, cautions, and warnings:

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.

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告　重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告　安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

Related Publications

You can order printed copies of documents with a DOC-xxxxxx= number. For more information, see the "Obtaining Documentation" section on page xvi.

These documents provide complete information about the switch and are available from this Cisco.com site:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat2970/index.htm

- *Catalyst 2970 Switch Getting Started Guide* (order number DOC-7816685=)
- *Regulatory Compliance and Safety Information for the Catalyst 2970 Switch* (order number DOC-7816686=)
- *Release Notes for the Catalyst 2970 Switch (not orderable but available on Cisco.com)*

Note Before installing, configuring, or upgrading the switch, refer to the release notes on Cisco.com for the latest information.

- *Catalyst 2970 Switch Software Configuration Guide* (order number DOC-7815462=)
- *Catalyst 2970 Switch Command Reference* (order number DOC-7815464=)
- *Catalyst 2970 Switch System Message Guide* (order number DOC-7815465=)
- Device manager online help (available on the switch)
- *Getting Started with Cisco Network Assistant* (not orderable but available on Cisco.com)
- *Catalyst 2970 Switch Hardware Installation Guide* (order number DOC-7815469=)
- *Cisco Small Form-Factor Pluggable Modules Installation Notes* (order number DOC-7815160=)
- *Cisco Small Form-Factor Pluggable Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Compatibility Matrix for 1000BASE-T Small Form-Factor Pluggable Modules* (not orderable but available on Cisco.com)
- *Cisco CWDM GBIC and CWDM SFP Installation Notes* (not orderable but available on Cisco.com)

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

International Cisco websites can be accessed from this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.

Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/ordering_place_order_ordering_tool_launch.html

All users can order annual or quarterly subscriptions through the online Subscription Store:

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

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can send your comments in e-mail to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance.

Cisco TAC Website

The Cisco TAC website (http://www.cisco.com/tac) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

http://tools.cisco.com/RPF/register/register.do

Opening a TAC Case

The online TAC Case Open Tool (http://www.cisco.com/tac/caseopen) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:

  http://www.cisco.com/en/US/products/products_catalog_links_launch.html

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide, and the Internetworking Design Guide. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

  http://www.ciscopress.com

- Packet magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:

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

- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:

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

- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

  http://www.cisco.com/en/US/learning/index.html

Product Overview

The Catalyst 2970 switch—also referred to as *the switch*—is an Ethernet switch to which you can connect devices like Cisco Wireless Access Point workstations, Cisco IP Phones, and other network devices such as servers, routers, and other switches. This chapter provides a functional overview of the Catalyst 2970 switch. These topics are included:

Features

The Catalyst 2970 switch can be deployed as a backbone switch, aggregating 10BASE-T, 100BASE-TX, and 1000BASE-T Ethernet traffic from other network devices. See the switch software configuration guide for examples showing how you might deploy the switch in your network.

These are the switch features:

- Hardware
  - Catalyst 2970G-24T switch—24 10/100/1000 Ethernet ports
  - Catalyst 2970G-24TS—24 10/100/1000 Ethernet ports and 4 small form-factor pluggable (SFP) module slots
- The switches support these SFP modules:
  - 1000BASE-SX
  - 1000BASE-LX
  - 1000BASE-ZX
  - 1000BASE-T
  - 100BASE-FX
  - CWDM

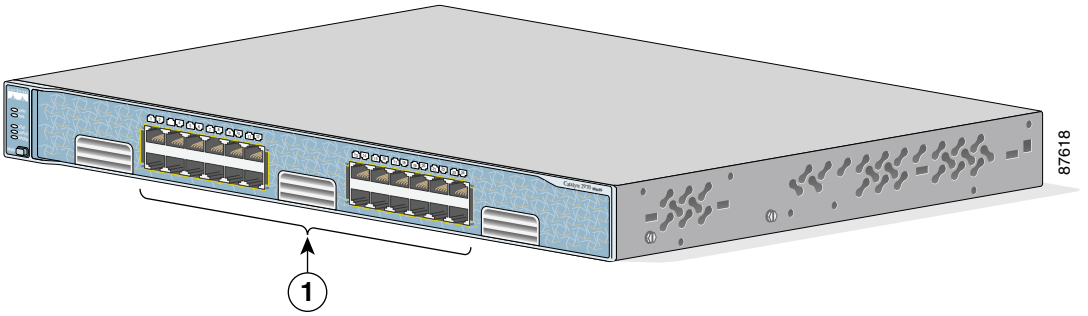
Note When installed in Catalyst 2970 switches, 1000BASE-T SFP modules can operate at 10, 100, or 1000 Mbps in full-duplex mode or at 10 or 100 Mbps in half-duplex mode.

- Configuration
  - 10/100/1000 ports autonegotiate speed and support only full-duplex mode.
- Switches are hot-swappable.
- Power redundancy
  - Connection for optional Cisco RPS 675 redundant power system that operates on AC input and supplies backup DC power output to the switch.

Front Panel Description

The 10/100/1000 ports on the Catalyst 2970G-24T switch are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left, as shown in Figure 1-1. Port 3 is above port 4, and so on.

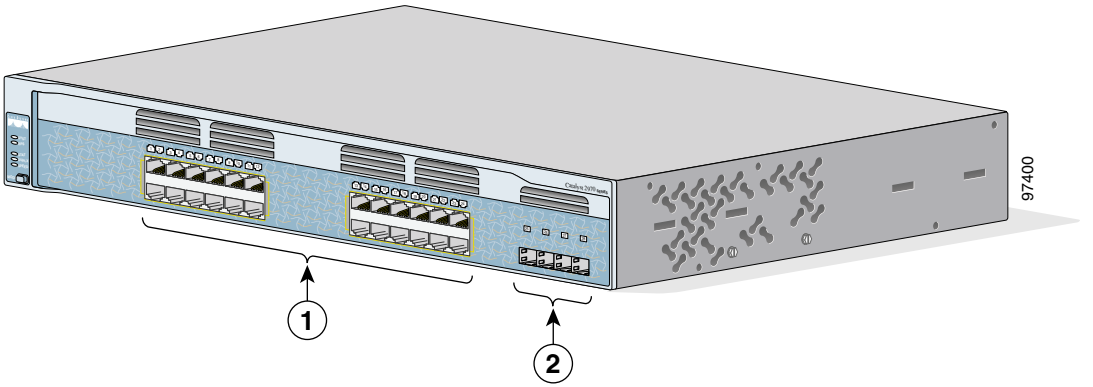
Figure 1-1 Catalyst 2970G-24T Switch Front Panel



1	10/100/1000 ports

The 10/100/1000 ports on the Catalyst 2970G-24TS switch are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left, as shown in Figure 1-2. Port 3 is above port 4, and so on. The SFP module slots are numbered 25 to 28.

Figure 1-2 Catalyst 2970G-24TS Switch Front Panel



1	10/100/1000 ports	**2**	SFP module slots

10/100/1000 Ports

You can set the 10/100/1000 ports to operate at 10 Mbps, 100 Mbps, or 1000 Mbps in full-duplex mode. You can also set these ports for speed and duplex autonegotiation in compliance with IEEE 802.3AB. (The default setting is autonegotiate.) When set for autonegotiation, the port senses the speed and duplex settings of the attached device and advertises its own capabilities. If the connected device also supports autonegotiation, the switch port negotiates the best connection (that is, the fastest line speed that both devices support and full-duplex transmission if the attached device supports it) and configures itself accordingly. In all cases, the attached device must be within 328 feet (100 meters).

Note 100BASE-TX and 1000BASE-T traffic requires Category 5 cable. 10BASE-T traffic can use Category 3 or Category 4 cables.

When connecting the switch to workstations, servers, routers, and Cisco IP Phones, be sure that the cable is a straight-through cable. When connecting the switch to switches or hubs, use a crossover cable. When using a straight-through or crossover cable for 1000BASE-T connections, be sure to use a twisted four-pair, Category 5 cable for proper operation. Pinouts for the cables are described in Appendix B, "Connector and Cable Specifications."

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (Auto-MDIX) feature. When the Auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100/1000 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

The Auto-MDIX feature is enabled by default on switches running Cisco IOS Release 12.2(18)SE or later. For releases between Cisco IOS Release 12.1(14)EA1 and 12.2(18)SE, the Auto-MDIX feature is disabled by default. For configuration information for this feature, see the switch software configuration guide or the switch command reference.

SFP Module Slots

The Catalyst 2970 switch uses Gigabit Ethernet SFP modules to establish fiber-optic connections. These transceiver modules are field-replaceable, providing the uplink interfaces when inserted in an SFP module slot. You can use the SFP modules for Gigabit uplink connections to other switches. You use fiber-optic cables with LC or MT-RJ connectors to connect to a fiber-optic SFP module. You use Category 5 cable with RJ-45 connectors to connect to a copper SFP module.

The Catalyst 2970 models support these Cisco SFP modules:

- 1000BASE-LX
- 1000BASE-SX
- 1000BASE-ZX
- 1000BASE-T
- 100BASE-FX
- CWDM

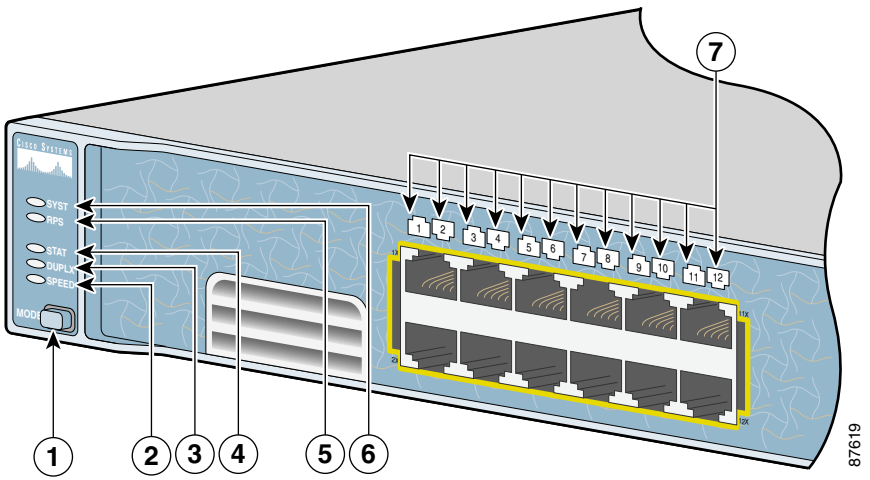
For more information about these SFP modules, see your SFP module documentation.

LEDs

You can use the switch LEDs to monitor switch activity and its performance. Figure 1-3 shows the switch LEDs and the Mode button that you use to select one of the port modes.

All LEDs are visible through the GUI management applications—the Network Assistant application for multiple switches and the device manager GUI for a single switch. The switch software configuration guide describes how to use the command-line interface (CLI) to configure and to monitor individual switches and switch clusters.

Figure 1-3 Catalyst 2970 Switch LEDs



1	Mode button	**5**	RPS LED
2	Speed LED	**6**	System LED
3	Duplex LED	**7**	Port LEDs
4	Status LED		

System LED

The System LED shows whether the system is receiving power and is functioning properly. Table 1-1 lists the LED colors and their meanings.

Table 1-1 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 the power-on self-test (POST), see the "Connecting to the 10/100/1000 Ports" section on page 2-27.

RPS LED

The RPS LED shows the RPS status. Table 1-2 lists the LED colors and their meanings.

Table 1-2 RPS LED

Color	RPS Status
Off	RPS is off or not properly connected.
Green	RPS is connected and ready to provide back-up power, if required.
Blinking green	RPS is connected but is unavailable because it is providing power to another device (redundancy has been allocated to a neighboring device).
Amber	The RPS is in standby mode or in a fault condition. Press the Standby/Active button on the RPS, and the LED should turn green. If it does not, the RPS fan could have failed. Contact Cisco Systems.
Blinking amber	The internal power supply in a switch has failed, and the RPS is providing power to the switch (redundancy has been allocated to this device).

For more information about the Cisco RPS 675, see the *Cisco RPS 675 Redundant Power System Hardware Installation Guide*.

Port LEDs and Modes

Each RJ-45 port and SFP module slot has a port LED. These port LEDs, as a group or individually, display information about the switch and about the individual ports. The port modes determine the type of information displayed through the port LEDs. Table 1-3 lists the mode LEDs and their associated port mode and meaning.

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 1-4 explains how to interpret the port LED colors in different port modes.

Table 1-3 Port Mode LEDs

Mode LED	Port Mode	Description
STAT	Port status	The port status. This is the default mode.
DUPLX	Port duplex mode	The port duplex mode: full duplex or half duplex.
SPEED	Port speed	The port operating speed: 10, 100, or 1000 Mbps.

Table 1-4 Meaning of LED Colors in Different Modes on the Switch

Port Mode	LED Color	Meaning
STAT (port status)	Off	No link, or port was administratively shut down.
	Green	Link present.
	Blinking green	Activity. Port is transmitting or receiving data.
	Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, 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. **Note** After a port is reconfigured, the port LED can remain amber for up to 30 seconds as STP checks the switch for possible loops.
	Blinking amber	Port is blocked by STP and is transmitting or receiving packets.
DUPLX (duplex)	Off	Port is operating in half duplex.
	Green	Port is operating in full duplex.

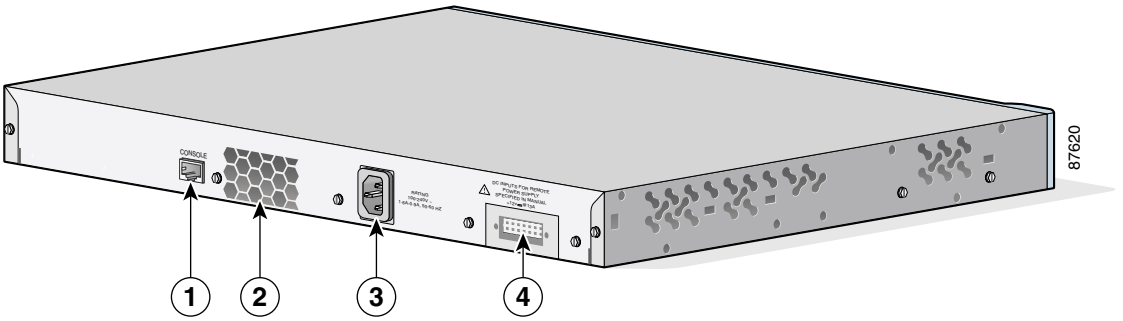
Table 1-4 Meaning of LED Colors in Different Modes on the Switch (continued)

Port Mode	LED Color	Meaning
SPEED	**10/100/1000 ports**	
	Off	Port is operating at 10 Mbps.
	Green	Port is operating at 100 Mbps.
	Blinking green	Port is operating at 1000 Mbps.
	SFP ports	
	Off	Port is operating at 10 Mbps.
	Green	Port is operating at 100 Mbps.
	Blinking green	Port is operating at 1000 Mbps. **Note** When installed in Catalyst 2970 switches, 1000BASE-T SFP modules can operate at 10, 100, or 1000 Mbps in full-duplex mode or at 10 or 100 Mbps in half-duplex mode.

Rear Panel Description

The Catalyst 2970G-24T switch rear panel has an AC power connector, an RPS connector, and an RJ-45 console port. (See Figure 1-4.)

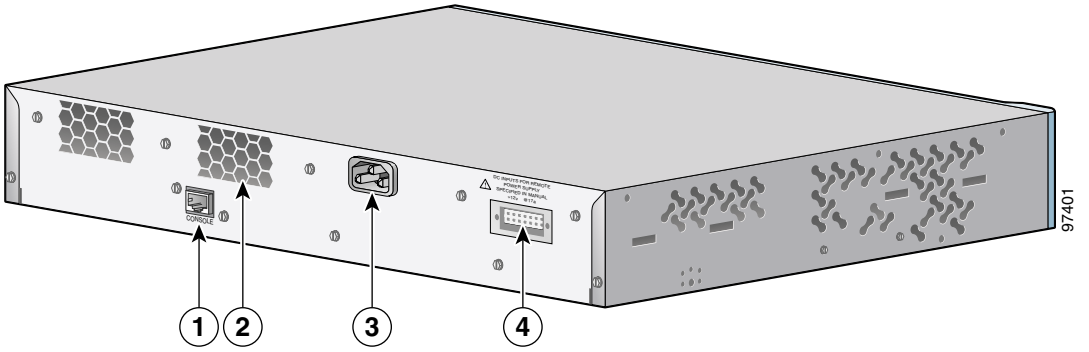
Figure 1-4 Catalyst 2970G-24T Switch Rear Panel



1	RJ-45 console port	**3**	AC power connector
2	Fan exhaust	**4**	RPS connector

The Catalyst 2970G-24TS switch rear panel has an AC power connector, an RPS connector, and an RJ-45 console port. (See Figure 1-5.)

Figure 1-5 Catalyst 2970G-24TS Switch Rear Panel



1	RJ-45 console port	**3**	AC power connector
2	Fan exhaust	**4**	RPS connector

Power Connectors

The switch is powered through the internal power supply. You can also connect the Cisco RPS 675 to provide backup power if the switch internal power supply should fail.

Note The Catalyst 2970 switch and the Cisco RPS 675 should be connected to the same AC power source.

Internal Power Supply Connector

The internal power supply is an autoranging unit that supports input voltages between 100 and 240 VAC. Use the supplied AC power cord to connect the AC power connector to an AC power outlet.

Cisco RPS Connector

The Cisco RPS 675 has two output levels: –48 V and 12 V, with a total maximum output power of 675 W. Use the supplied RPS connector cable to connect the RPS to the switch.

Warning **Attach only the Cisco RPS (model PWR675-AC-RPS-N1=) to the RPS receptacle.**

The RPS is a redundant power system that can support six external network devices and provides power to one failed device at a time. It automatically senses when the internal power supply of a connected device fails and provides power to the failed device, preventing loss of network traffic. For more information on the Cisco RPS 675, see the *Cisco RPS 675 Redundant Power System Hardware Installation Guide*.

Console Port

You can connect the switch to a PC by means of the console port and the supplied RJ-45-to-DB-9 female cable. If you want to connect the switch console port to a terminal, you need to provide an RJ-45-to-DB-25 female DTE adapter. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see the "Connector and Cable Specifications" section on page B-1.

Management Options

The Catalyst 2970 switches offer several management options:

- Network Assistant

  Cisco Network Assistant is a PC-based network management GUI application optimized for LANs of small and medium-sized businesses. Cisco Network Assistant offers centralized management of Cisco switches ranging from the Catalyst 2950 switch to the Catalyst 4506 switch. Through a user-friendly GUI, users can 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/go/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, which is in the switch memory, to manage individual and standalone switches. Device manager is an easy-to-use web interface that offers quick configuration and monitoring. You can access the device manager from anywhere in your network through a web browser. For more information, see the device manager online help.

- Cisco IOS command-line interface (CLI)

  The switch CLI is based on Cisco IOS software and is enhanced to support desktop-switching features. You can fully configure and monitor the switch and switch cluster members from the CLI. You can access the CLI either by connecting your management station directly to the switch console port or by using Telnet from a remote management station. See the *Catalyst 2970 Switch Command Reference* on Cisco.com for more information.

  For setup instructions that use the CLI, go to Appendix C, "Configuring the Switch with the CLI-Based Setup Program."

- CiscoView application

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

- SNMP network management

  You can manage switches from a 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 more information.

Network Configurations

See the switch software configuration guide on Cisco.com for an explanation of network configuration concepts. The software configuration guide also provides examples of network configurations that use the switch to create dedicated network segments that are interconnected through Gigabit Ethernet connections.

Switch Installation

This chapter describes how to start your switch and how to interpret the power-on self-test (POST) that ensures proper operation. It also describes how to install the switch and how to make connections to the switch. Read the topics and perform the procedures in this order:

Preparing for Installation

This section covers these topics:

Warnings

These warnings are translated into several languages in the *Regulatory Compliance and Safety Information for the Catalyst 2970 Switch* document that shipped with the switch.

Warning **Attach only the Cisco RPS (model PWR675-AC-RPS-N1) to the RPS receptacle.** Statement 100C

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

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

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

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

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

Warning **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.** Statement 39

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

Warning **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 work on the system or connect or disconnect cables during periods of lightning activity.** Statement 3

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

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

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

Warning **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 **To comply with safety regulations, mount switches on a wall with the front panel facing up.** Statement 266

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

Warning **Avoid direct exposure to the laser beam.** Statement 1012

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

Warning **Class 1 laser product.** Statement 1008

Installation Guidelines

When determining where to place the switch, be sure to observe these requirements:

- For 10/100/1000 ports, including 1000BASE-T SFP module ports, cable lengths from the switch to connected devices are up to 328 feet (100 meters).
- Table 2-1 lists the cable specifications for 1000BASE-SX, 1000BASE-LX, and 1000BASE-ZX fiber-optic SFP module connections. 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 for reliable communications.

Table 2-1 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
1000BASE-SX	850	MMF	62.5 62.5 50 50	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-LX/LH	1300	MMF[1] SMF	62.5 50 50 9/10	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 32,810 feet (10 km)
1000BASE-ZX	1550	SMF	9/10	—	43.4 to 62 miles (70 to 100 km)[2]
100BASE-FX	Min.: 1270 Typical: 1300 Max.: 1380	MMF	50/125 62.5/125	500	6,562 feet (2 km)

Table 2-1 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
CWDM	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	9/125	—	62 miles (100 km)

1. A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance can cause transceiver saturation, resulting in 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).
2. 1000BASE-ZX SFP modules can reach 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.

Note When using shorter lengths of single-mode fiber cable, you might need to insert an inline optical attenuator in the link to avoid overloading the receiver.

When the fiber-optic cable span is less than 15.43 miles (25 km), you should insert a 5-decibel (dB) or 10-dB inline optical attenuator between the fiber-optic cable plant and the receiving port on the 1000BASE-ZX SFP module at each end of the link.

- Operating environment is within the ranges listed in Appendix A, "Technical Specifications."
- Clearance to front and rear panels is such that
  - Front-panel indicators can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - Rear-panel power connector is within reach of an AC power receptacle.
- 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).

Note If the switch is installed in a closed or multirack assembly, the temperature around it might be greater than normal room temperature.

Verifying Package Contents

Note Carefully remove the contents from the shipping container, and check each item for damage. If any item is missing or damaged, contact your Cisco representative or reseller for support. Return all packing material to the shipping container, and save it.

The switch is shipped with these items:

- *Catalyst 2970 Switch Getting Started Guide*
- *Regulatory Compliance and Safety Information for the Catalyst 2970 Switch*
- AC power cord (AC-powered switches)
- One RJ-45-to-DB-9 adapter cable
- Mounting kit containing:
  - Four rubber feet for mounting the switch on a table
  - Two 19-inch rack-mounting brackets (also used for wall mounting)
  - Six Phillips flat-head screws for attaching the brackets to the switch
  - Four Phillips machine screws for attaching the brackets to a rack
  - One cable guide and one black Phillips machine screw for attaching the cable guide to one of the mounting brackets
  - One Redundant Power System (RPS) connector cover (for wall mounting)
  - Two Phillips pan-head screws (for attaching the RPS cover)
  - Four Phillips truss-head screws (for wall-mounting brackets)

Verifying Switch Operation

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

If your configuration has an RPS, connect the switch and the RPS to the same AC power source. See the "Power Connectors" section on page 1-12, and see the Cisco RPS documentation for more information.

Note Always put the RPS in standby mode when you are connecting devices to it and in active mode during normal operation.

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

Warning **Attach only the Cisco RPS 675 (model PWR675-AC-RPS-N1=) to the RPS receptacle.**

As the switch powers on, it begins the power-on self test (POST), a series of tests that runs automatically to ensure that the switch functions properly. 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 POST completes 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.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

After a successful POST, disconnect 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.

Installing the Switch

This section describes these installation procedures:

Rack-Mounting

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

To install the switch in a 19-inch or 24-inch rack (24-inch racks require optional mounting hardware), follow the instructions described in these procedures:

- Removing Screws from the Switch, page 2-10
- Attaching Brackets to the Catalyst 2970 Switch, page 2-11
- Mounting the Switch in a Rack, page 2-18
- Attaching the Cable Guide, page 2-19

Note Installing the switch in a 24-inch rack requires an optional bracket kit not included with the switch. You can order a kit containing the 24-inch rack-mounting brackets and hardware from Cisco. The kit part number is RCKMNT-1RU=.

Removing Screws from the Switch

If you plan to install the switch in a rack, you must first remove screws in the switch chassis so that mounting brackets can be attached. Figure 2-1 shows how to remove the chassis screws in a Catalyst 2970G-24T switch.

Figure 2-1 Removing Screws from the Catalyst 2970G-24T Switch

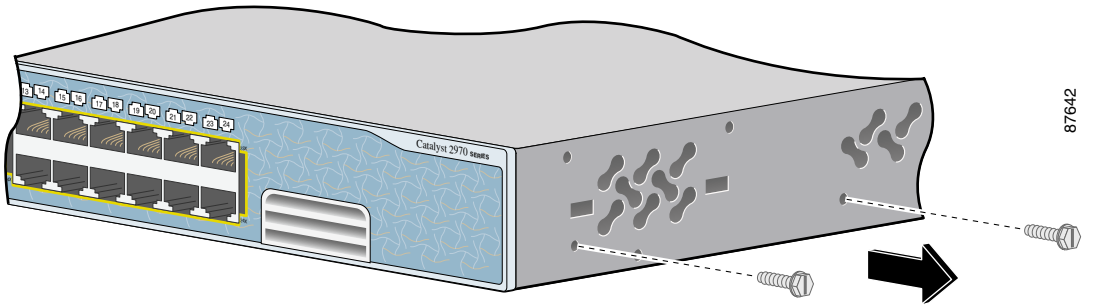
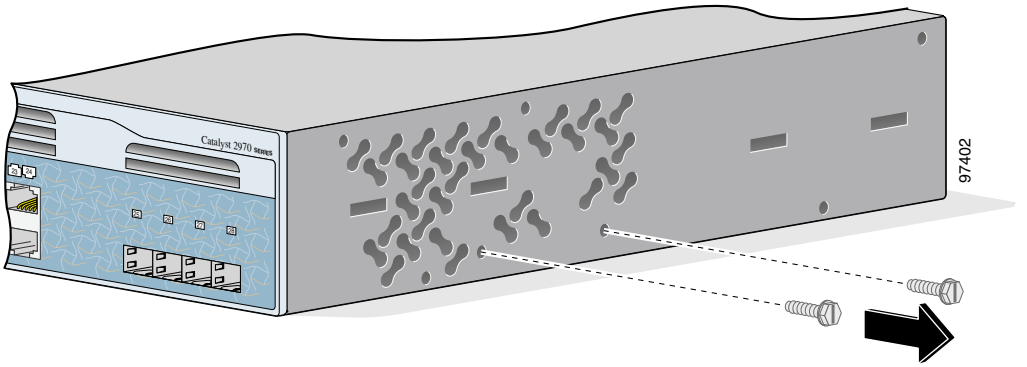


Figure 2-2 shows how to remove the chassis screws in a Catalyst 2970G-24TS switch.

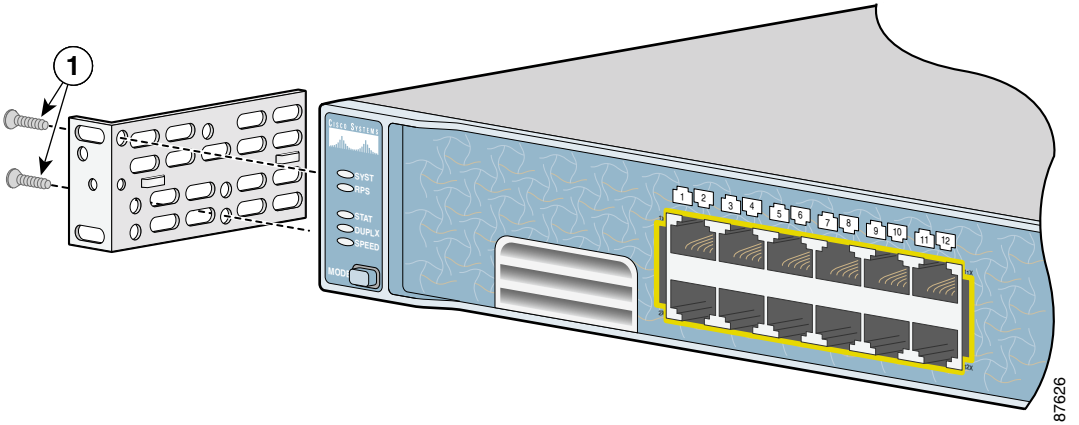
Figure 2-2 Removing Screws from the Catalyst 2970G-24TS Switch



Attaching Brackets to the Catalyst 2970 Switch

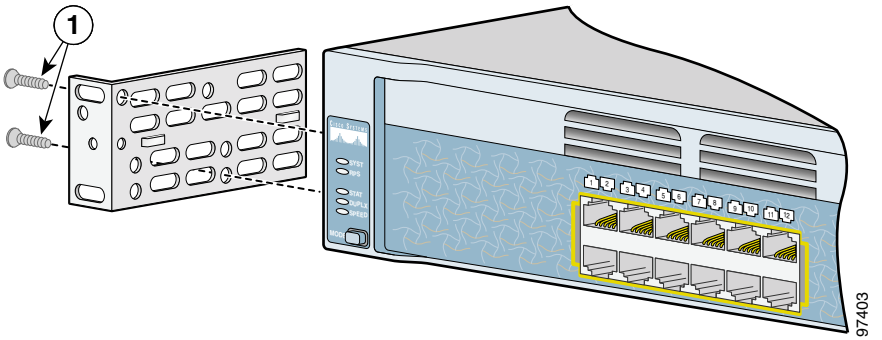
The bracket orientation and the brackets that you use depend on whether you are attaching the brackets for a 19-inch or a 24-inch rack. For 19-inch racks, use bracket part number 700-8209-01; for 24-inch racks, use bracket part number 700-13248-01. Figure 2-3 through Figure 2-14 show how to attach each type of bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side.

Figure 2-3 Attaching Brackets for 19-Inch Racks to a Catalyst 2970G-24T Switch, Front Panel Forward



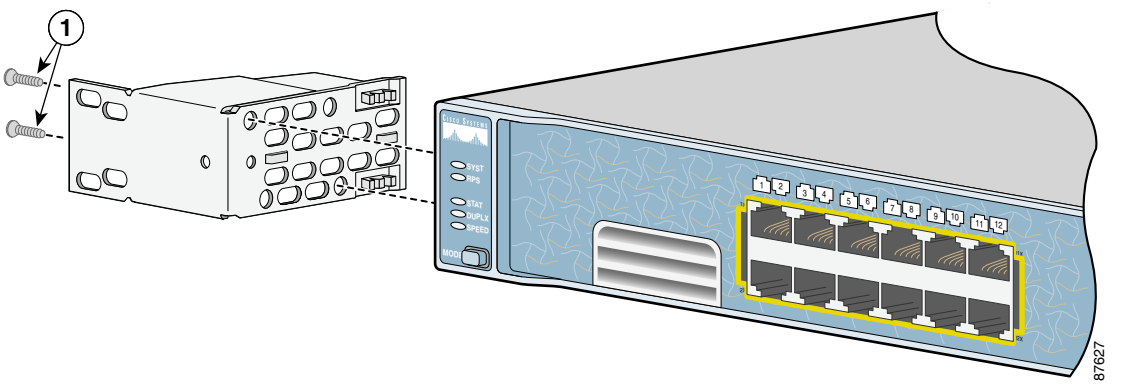
1	Phillips flat-head screws

Figure 2-4 Attaching Brackets for 19-Inch Racks to a Catalyst 2970G-24TS Switch, Front Panel Forward



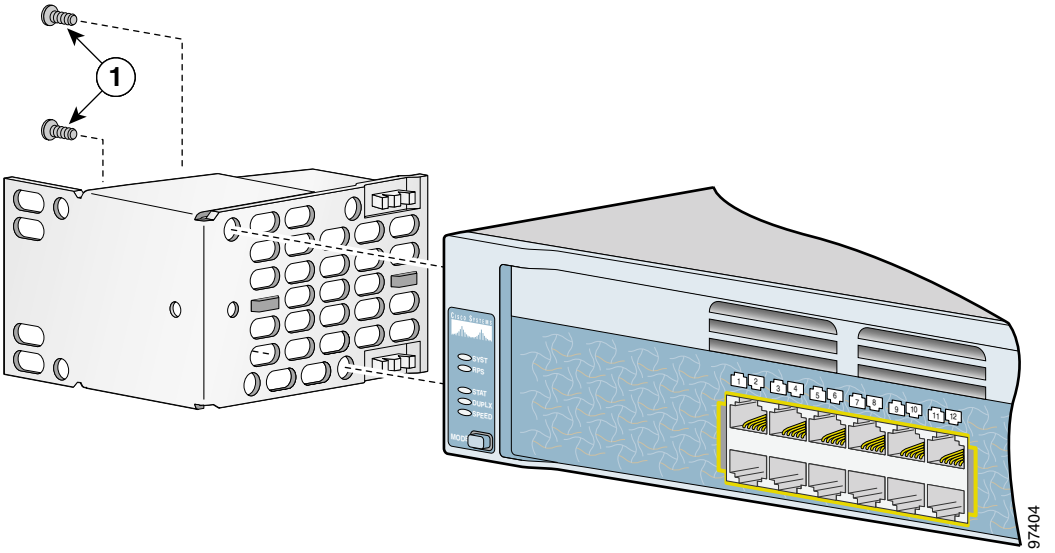
1	Phillips flat-head screws

Figure 2-5 Attaching Brackets for 24-Inch Racks to a Catalyst 2970G-24T Switch, Front Panel Forward



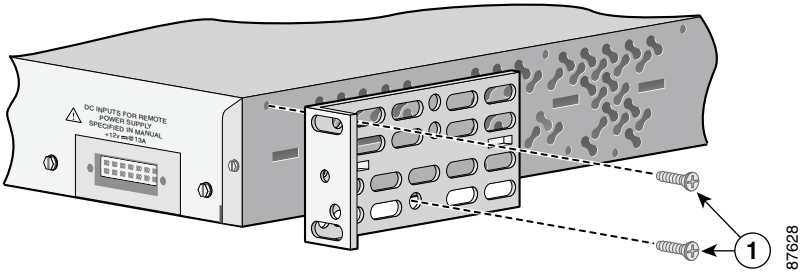
1	Phillips flat-head screws

Figure 2-6 Attaching Brackets for 24-Inch Racks to a Catalyst 2970G-24TS Switch, Front Panel Forward



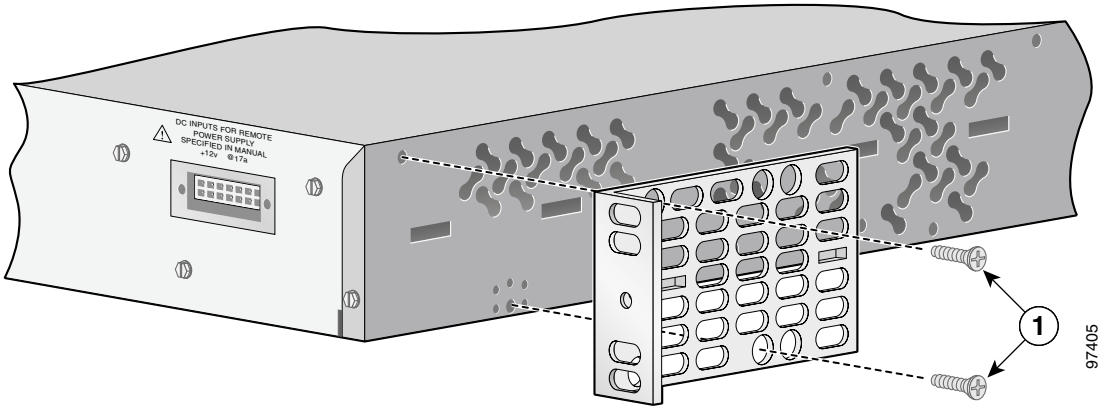
1	Phillips flat-head screws

Figure 2-7 Attaching Brackets for 19-Inch Racks to a Catalyst 2970G-24T Switch, Rear Panel Forward



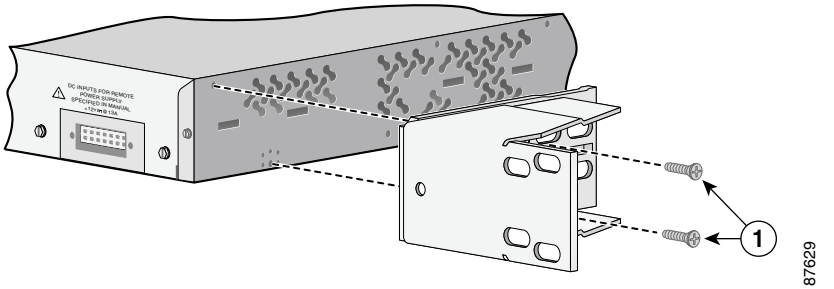
1	Phillips flat-head screws

Figure 2-8 Attaching Brackets for 19-Inch Racks to a Catalyst 2970G-24TS Switch, Rear Panel Forward



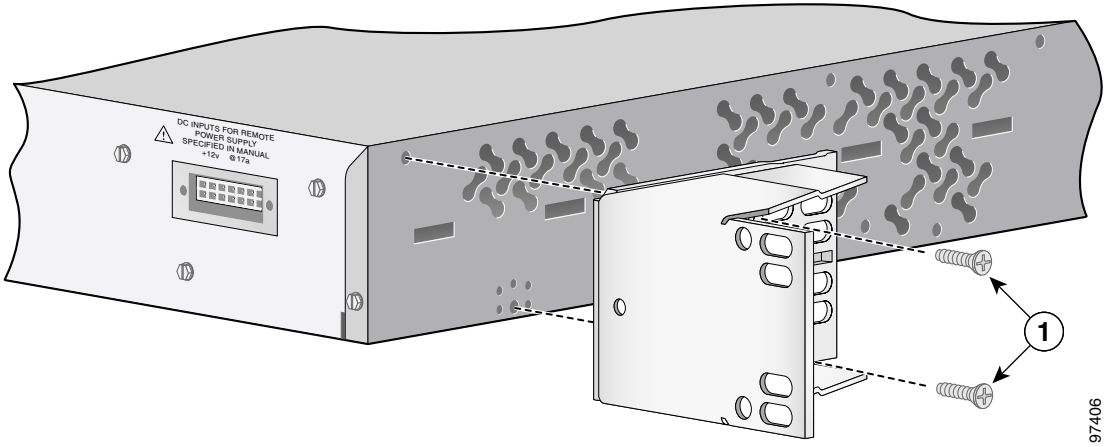
1	Phillips flat-head screws

Figure 2-9 Attaching Brackets for 24-Inch Racks to a Catalyst 2970G-24T Switch, Rear Panel Forward



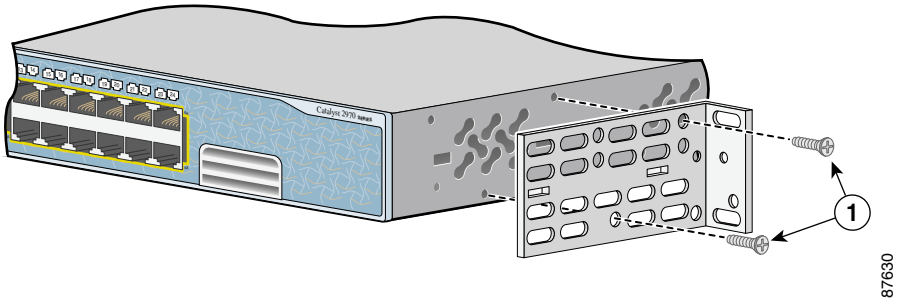
1	Phillips flat-head screws

Figure 2-10 Attaching Brackets for 24-Inch Racks to a Catalyst 2970G-24TS Switch, Rear Panel Forward



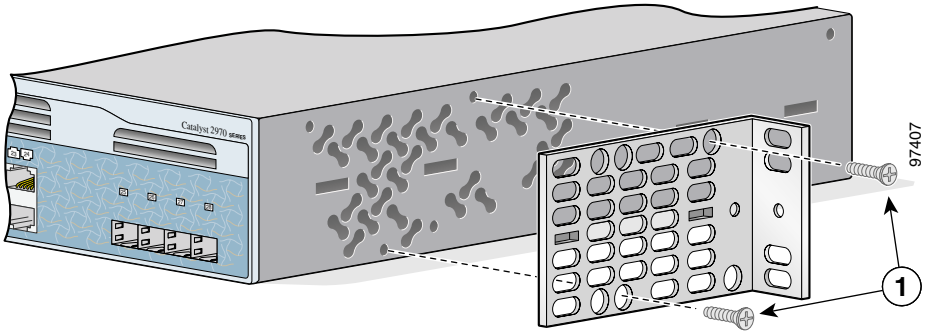
1	Phillips flat-head screws

Figure 2-11 Attaching Brackets for 19-Inch Telco Racks to a Catalyst 2970G-24T Switch



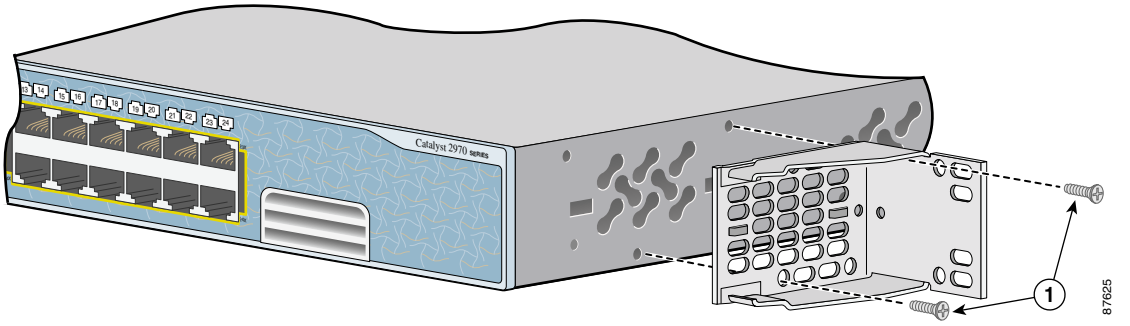
1	Phillips flat-head screws

Figure 2-12 Attaching Brackets for 19-Inch Telco Racks to a Catalyst 2970G-24TS Switch



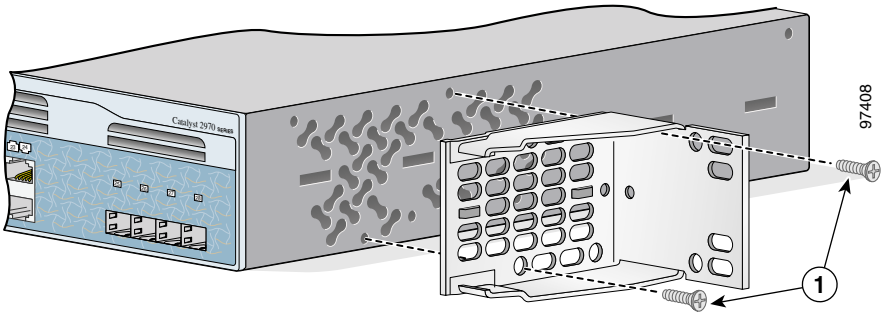
1	Phillips flat-head screws

Figure 2-13 Attaching Brackets for 24-Inch Telco Racks to a Catalyst 2970G-24T Switch



1	Phillips flat-head screws

Figure 2-14 Attaching Brackets for 24-Inch Telco Racks to a Catalyst 2970G-24TS Switch

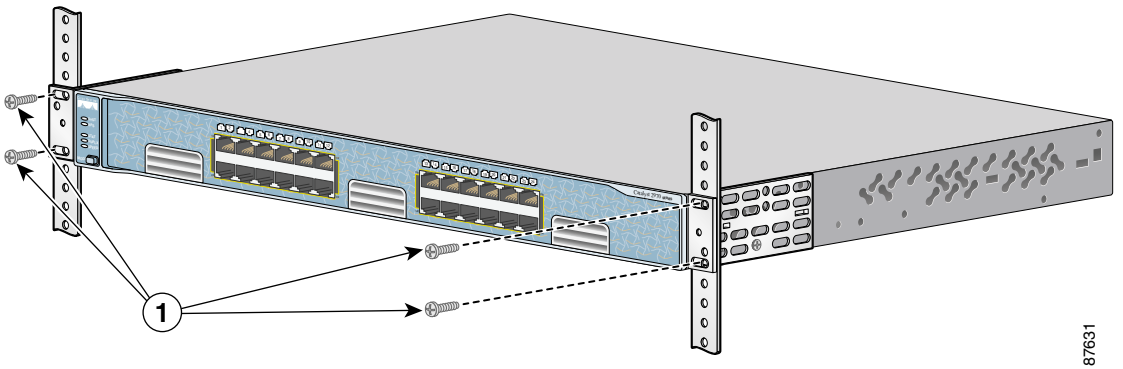


1	Phillips flat-head screws

Mounting the Switch in a Rack

After the brackets are attached to the switch, use the four supplied number-12 Phillips machine screws to securely attach the brackets to the rack, as shown in Figure 2-15.

Figure 2-15 Mounting the Catalyst 2970 Switch in a Rack



1	Phillips machine screws

After the switch is mounted in the rack, you need to do these tasks to complete the installation:

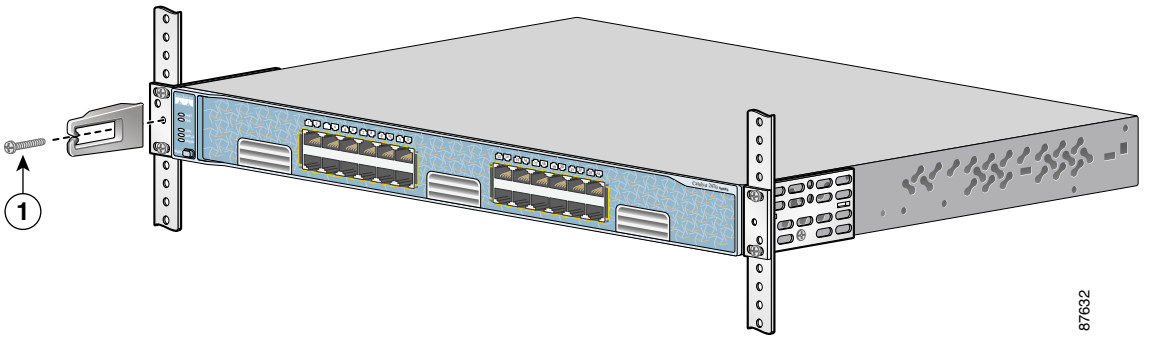
- Power on the switch. See the "Verifying Switch Operation" section on page 2-8.
- Connect to a 10/100 or 10/100/1000 port and run Express Setup. See the *Catalyst 2970 Switch Getting Started Guide* for instructions
- Connect to the front-panel ports. See the "Connecting to the 10/100/1000 Ports" section on page 2-27 and the "Connecting to SFP Modules" section on page 2-30 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix C, "Configuring the Switch with the CLI-Based Setup Program."

Attaching the Cable Guide

We recommend attaching the cable guide to prevent the cables from obscuring the front panel of the switch and the other devices installed in the rack. Use the supplied black screw shown in Figure 2-16 to attach the cable guide to the left or right bracket.

Figure 2-16 Attaching the Cable Guide on the Catalyst 2970 Switch



1	Cable guide screw

Wall-Mounting

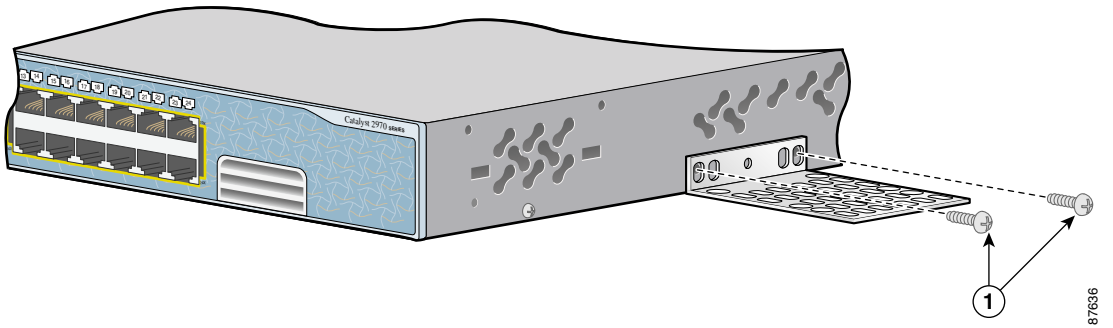
To install the switch on a wall, follow the instructions in these procedures:

- Attaching the Brackets to the Switch for Wall-Mounting, page 2-20
- Attaching the RPS Connector Cover, page 2-20
- Mounting the Switch on a Wall, page 2-21

Attaching the Brackets to the Switch for Wall-Mounting

Figure 2-17 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 2-17 Attaching the 19-inch Brackets for Wall-Mounting



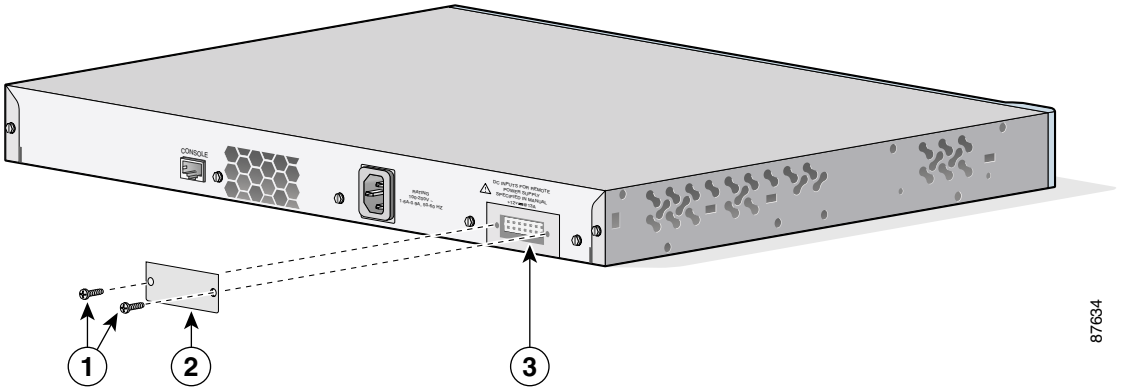
1	Phillips truss-head screws

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, as shown in Figure 2-18.

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

Figure 2-18 Attaching the RPS Connector Cover on the Catalyst 2970 Switch



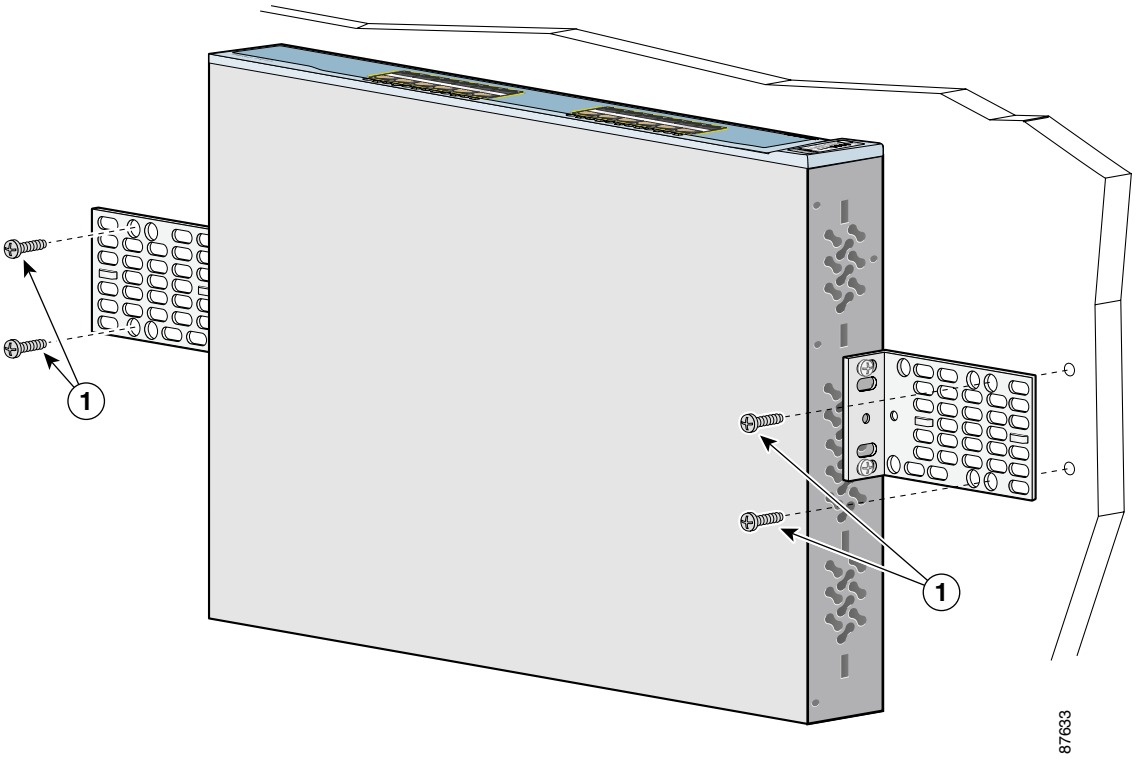
1	Phillips pan-head screws	**3**	RPS connector
2	RPS connector cover		

Mounting the Switch on a Wall

For the best support of the switch and cables, make sure 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, as shown in Figure 2-19.

Warning **To comply with safety regulations, mount the switches on a wall with the front panel facing up.**

Figure 2-19 Mounting the Switch on a Wall



1	User-supplied screws

After the switch is mounted on the wall, you need to do these tasks to complete the installation:

- Power on the switch. See the "Verifying Switch Operation" section on page 2-8.
- Connect to a 10/100 or 10/100/1000 port and run Express Setup. See the *Catalyst 2970 Switch Getting Started Guide* for instructions
- Connect to the front-panel ports. See the "Connecting to the 10/100/1000 Ports" section on page 2-27 and the "Connecting to SFP Modules" section on page 2-30 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix C, "Configuring the Switch with the CLI-Based Setup Program."

Table- or Shelf-Mounting

Follow these steps to install the switch on a table or shelf:

Step 1 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 unit.

Step 2 Place the switch on the table or shelf near an AC power source.

After the switch is mounted on the table, you need to do these tasks to complete the installation:

- Power on the switch. See the "Verifying Switch Operation" section on page 2-8.
- Connect to a 10/100 or 10/100/1000 port and run Express Setup. See the *Catalyst 2970 Switch Getting Started Guide* for instructions
- Connect to the front-panel ports. See the "Connecting to the 10/100/1000 Ports" section on page 2-27 and the "Connecting to SFP Modules" section on page 2-30 to complete the installation.

For configuration instructions about using the CLI setup program, go to Appendix C, "Configuring the Switch with the CLI-Based Setup Program."

Installing and Removing SFP Modules

These sections describe how to install and remove SFP modules. The modules are inserted into the SFP module slots on the front of the Catalyst 2970G-24TS switch. These field-replaceable modules provide uplink interfaces.

You can use any combination of SFP modules. See the Catalyst 2970 release notes for the list of SFP modules that the Catalyst 2970G-24TS switch supports. 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 for reliable communications. See the "Installation Guidelines" section on page 2-5 for cable stipulations for SFP connections.

Use only Cisco SFP modules on the Catalyst 2970 switch. Each SFP 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 SFP module meets the requirements for the switch.

For detailed instructions on installing, removing, and cabling the SFP module, see your SFP module documentation.

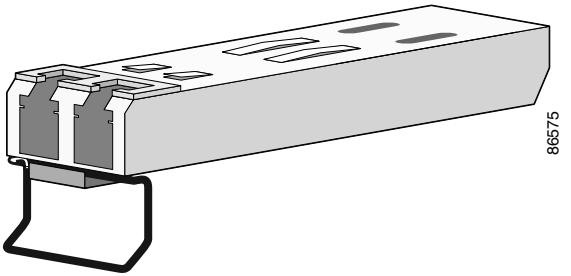
Installing SFP Modules into SFP Module Slots

Figure 2-20 shows an SFP module that has a bale-clasp latch.

Caution We strongly recommend that you do not install or remove fiber-optic SFP modules with cables attached because of the potential damage to the cables, the cable connector, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing an SFP module.

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

Figure 2-20 SFP Module with a Bale-Clasp Latch



To insert an SFP module into the module slot, follow these steps:

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

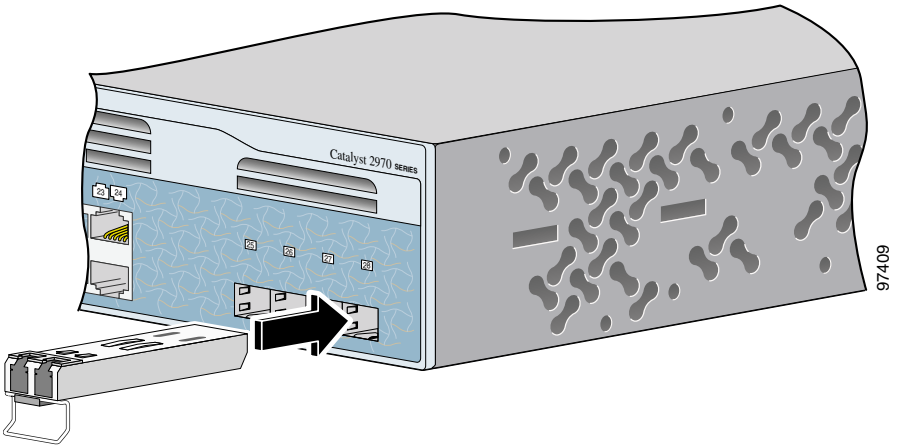
Step 2 Find the send (TX) and receive (RX) markings that identify the top side of the SFP module.

Note On some 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 Align the SFP module in front of the slot opening.

Step 4 Insert the SFP module into the slot until you feel the connector on the module snap into place in the rear of the slot.

Figure 2-21 Installing an SFP Module into an SFP Module Slot



Step 5 For fiber-optic SFP modules, remove the dust plugs from the optical ports, and store them for later use.

Caution Do not remove the dust plugs from the fiber-optic 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.

Step 6 Insert the cable connector into the SFP module:

- For fiber-optic SFP modules, insert the LC or MT-RJ cable connector into the SFP module.
- For copper SFP modules, insert the RJ-45 cable connector into the SFP module.

Note When connecting to 1000BASE-T SFP modules, be sure to use a twisted four-pair, Category 5 cable.

Removing SFP Modules from SFP Module Slots

To remove an SFP module from a module receptacle, follow these steps:

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

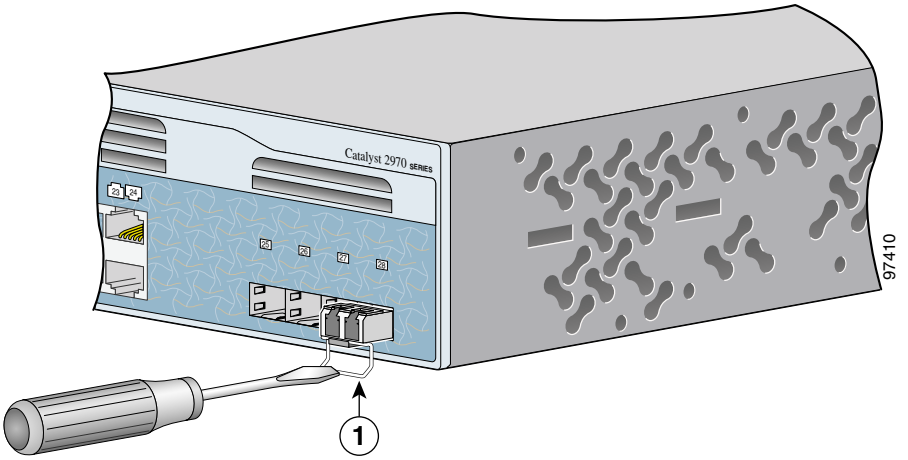
Step 2 Disconnect the cable from the SFP module.

Tip For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3 Unlock and remove the SFP module, as shown in Figure 2-22.

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

Figure 2-22 Removing a Bale-Clasp Latch SFP Module by Using a Flat-Blade Screwdriver



1	Bale clasp

Step 4 Grasp the SFP module between your thumb and index finger, and carefully remove it from the module slot.

Step 5 For fiber-optic SFP modules, insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.

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

Connecting to the 10/100/1000 Ports

The switch 10/100/1000 ports configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their 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 port speed and duplex parameters on both ends of the connection.

Follow these steps to connect to 10BASE-T, 100BASE-TX or 1000BASE-T devices:

Caution To prevent electrostatic-discharge (ESD) damage, follow your normal board and component handling procedures.

Step 1 When connecting to workstations, servers, routers, and Cisco IP Phones, connect a straight-through cable to an RJ-45 connector on the front panel. (See Figure 2-23.) When connecting to switches or repeaters, use a crossover cable. (See the "Cable and Adapter Specifications" section on page B-5 for cable-pinout descriptions.)

Note When connecting to 1000BASE-T-compatible devices, be sure to use a twisted four-pair, Category 5 cable.

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (Auto-MDIX) feature. When the Auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100/1000 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

The Auto-MDIX feature is enabled by default on switches running Cisco IOS Release 12.2(18)SE or later. For releases between Cisco IOS Release 12.1(14)EA1 and 12.2(18)SE, the Auto-MDIX feature is disabled by default. For configuration information for this feature, see the switch software configuration guide or the switch command reference.

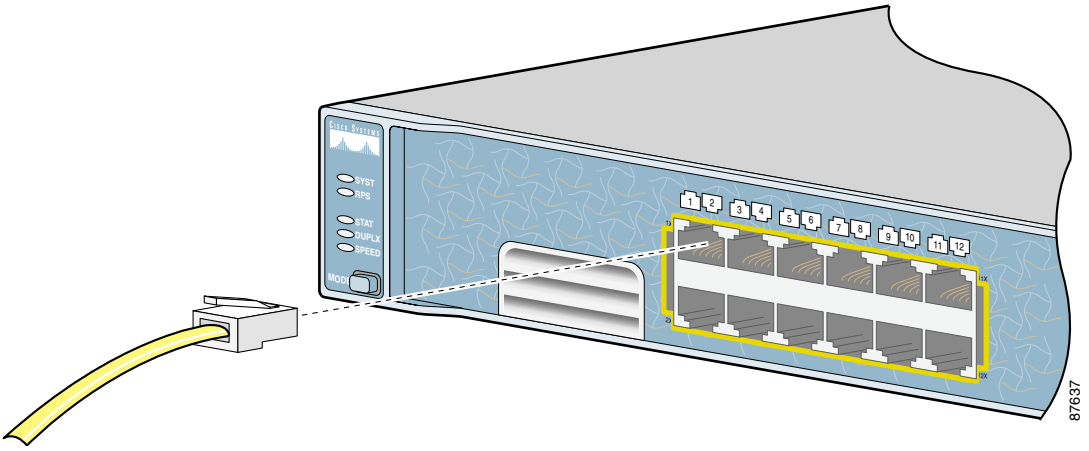
Step 2 Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both the switch and the connected device have established link.

The port LED is amber while Spanning Tree Protocol (STP) discovers the topology and searches for loops. This takes about 30 seconds, and then the port LED turns green. If the port LED does not turn on, the device at the other end might not be turned on, or there might be a cable problem or a problem with the adapter installed in the attached device. See Chapter 3, "Troubleshooting," for solutions to cabling problems.

Step 3 Reconfigure and reboot the connected device if necessary.

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

Figure 2-23 Connecting to an Ethernet Port



Connecting to SFP Modules

This section describes how to connect to SFP modules. For instructions on how to connect to fiber-optic SFP modules, see the "Connecting to Fiber-Optic SFP Modules" section. For instructions on how to connect to copper 1000BASE-T SFP modules, see the "Connecting to 1000BASE-T SFP Modules" section.

For instructions about how to install or remove an SFP module, see the "Installing and Removing SFP Modules" section on page 2-23.

Connecting to Fiber-Optic SFP Modules

Follow these steps to connect a fiber-optic cable to an SFP module:

Warning **Class 1 laser product.** Statement 1008

Caution Do not remove the rubber plugs from the 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 2-5 and in the "SFP Module Slots" section on page 1-5. 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 module port (see Figure 2-24).

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

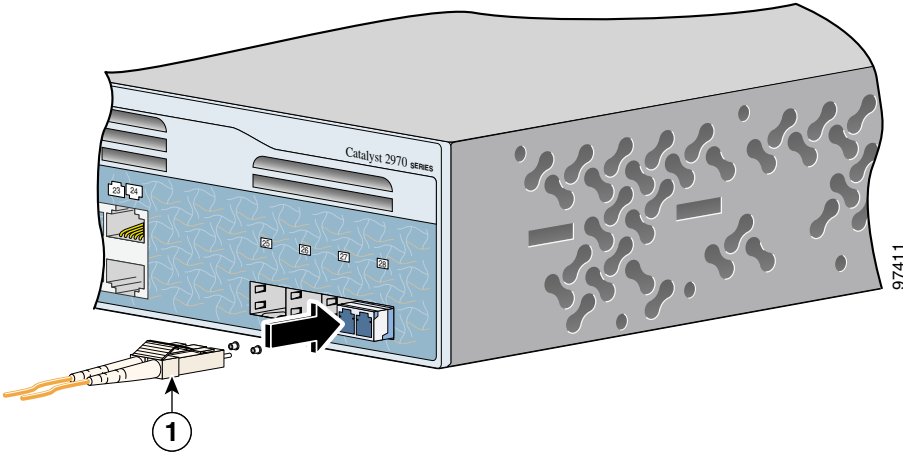
Step 4 Observe the port status LED.

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.

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

Figure 2-24 Connecting to a Fiber-Optic SFP Module Port



1	LC connector

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

Connecting to 1000BASE-T SFP Modules

Follow these steps to connect a Category 5 cable to a 1000BASE-T SFP module:

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

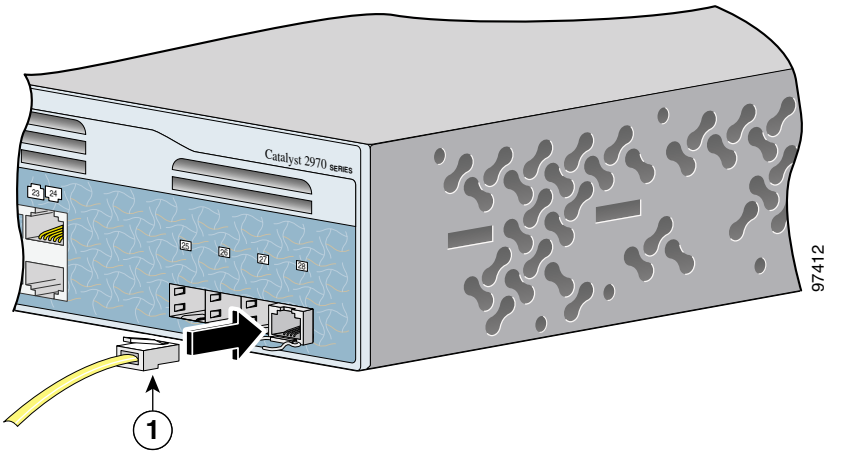
Step 1 When connecting to servers, workstations, and routers, insert a four twisted-pair, straight-through cable in the RJ-45 connector. When connecting to switches or repeaters, insert a four twisted-pair, crossover cable.

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

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (Auto-MDIX) feature. When the Auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100/1000 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

The Auto-MDIX feature is enabled by default on switches running Cisco IOS Release 12.2(18)SE or later. For releases between Cisco IOS Release 12.1(14)EA1 and 12.2(18)SE, the Auto-MDIX feature is disabled by default. For configuration information for this feature, see the switch software configuration guide or the switch command reference.

Figure 2-25 Connecting to a 1000BASE-T SFP Module



1	RJ-45 connector

Step 2 Insert the other cable end in an RJ-45 connector on a target device.

Step 3 Observe the port status LED.

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

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

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

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

Where to Go Next

If the default configuration is satisfactory, the switch does not need further configuration. You can use any of these management options to change the default configuration:

- Start the device manager, which is in the switch memory, to manage individual and standalone switches. The device manager is an easy-to-use web interface that offers quick configuration and monitoring. You can access the device manager from anywhere in your network through a web browser. For more information, see the device manager online help.
- Start the Network Assistant application, which is described in the *Getting Started with Cisco Network Assistant* guide. Through this GUI, you can configure and monitor a switch cluster or an individual switch.
- Use the CLI from the console to configure the switch as a member of a cluster or as an individual switch. See the *Catalyst 2970 Switch Software Configuration Guide* and the *Catalyst 2970 Switch Command Reference* on Cisco.com for information on using the CLI with a Catalyst 2970 switch.
- Start an SNMP application such as the CiscoView application.

Troubleshooting

The LEDs on the front panel provide troubleshooting information about the switch. They show failures in the power-on self-test (POST), port-connectivity problems, and overall switch performance. For a full description of the switch LEDs, see the "LEDs" section on page 1-6.

You can also get statistics from the browser interface, from the command-line interface (CLI), or from a Simple Network Management Protocol (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.

This chapter describes these topics for troubleshooting problems:

Understanding POST Results

As the switch powers on, it begins POST, a series of tests that runs automatically to ensure that the switch functions properly. When the switch begins POST, the System, RPS, Status, Duplex, and Speed LEDs turn green. The System LED blinks green, and the other LEDs are solid green.

When the POST completes successfully, the System LED remains green. The RPS LED remains green for some time and then reflects the RPS operating status. The other LEDs turn off and then reflect the switch operating status.

If a switch fails POST, the System LED turns solid amber. The RPS LED is either solid or blinking amber. The other LEDs are off.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

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. For a full description of the switch LEDs, see the "LEDs" section on page 1-6.

You can also get statistics from the browser interface, 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.

You can access the Technical Support Website (http://www.cisco.com/tac) for a list of known hardware problems and extensive troubleshooting documentation including:

- Field notices
- Security advisories
- Troubleshooting resources
- Factory defaults
- Password recovery

- Recovery from corrupted or missing software
- Switch port problems
- Network interface cards
- Troubleshooting tools

Common switch problems fall into these categories:

- Poor performance
- No connectivity
- Corrupted software

Table 3-1 describes how to detect and resolve these problems.

Table 3-1 Common Problems and Their Solutions

Symptom	Possible Cause	Resolution
Poor performance or excessive errors	Duplex autonegotiation mismatch.	See the switch software configuration guide for information on identifying autonegotiation mismatches.
	Cabling distance exceeded • Port statistics show excessive frame check sequence (FCS), late-collision, or alignment errors. • For 10/100/1000BASE-T connections: – The distance between the port and the attached device exceeds 328 feet (100 meters). – If the switch is attached to a repeater, the total distance between the two end stations exceeds the cabling guidelines. • For SFP module port connections: – The distance between the SFP module port and the attached device exceeds the SFP module cabling guidelines.	• See the switch software configuration guide for information on displaying port statistics. • Reduce the cable length to within the recommended distances. • See your repeater documentation for cabling guidelines. • See your SFP module documentation for cabling guidelines.
	Bad adapter in attached device • Excessive errors found in port statistics. • STP checking for possible loops.	• Run adapter card diagnostic utility. • Wait 30 seconds for the port LED to turn green.

Table 3-1 Common Problems and Their Solutions (continued)

Symptom	Possible Cause	Resolution
No connectivity	**Incorrect or bad cable** These are results of no link at both ends: • A crossover cable was used when a straight-through was required, or vice-versa.	• For the correct pinouts and the proper application of crossover vs. straight-through cables, see the "Two Twisted-Pair Cable Pinouts" section on page B-5.
	• The cable is wired incorrectly.	• Replace with a tested good cable.
	• A crossover or straight-through cable is wired incorrectly.	• For 1000BASE-T connections, be sure to use a twisted four-pair, Category 5 cable.
	• STP checking for possible loops.	• Wait 30 seconds for the port LED to turn green.
Unreadable characters on the management console	Incorrect baud rate.	Reset the emulation software to 9600 baud.
Amber system LED	Fatal POST error detected.	Contact Cisco Systems.

Table 3-1 Common Problems and Their Solutions (continued)

Symptom	Possible Cause	Resolution
The switch port is placed in error-disabled state after SFP module is inserted	Bad or non-Cisco-approved SFP module.	Remove the SFP module from the switch, and replace it with a Cisco-approved module. Use the **errdisable recovery cause gbic-invalid** global configuration command to verify the port status, and enter a time interval to recover from the error-disable state. See the switch command reference guide for information on the **errdisable recovery** command.
Switch does not recognize the SFP module	The SFP module might be installed upside down. The SFP module does not snap into the slot.	Verify that the SFP module is not installed upside down. Remove the SFP module. Inspect for physical damage to the connector, the module, and the module slot. Replace the SFP module with a known good SFP module.

Technical Specifications

This appendix lists the switch technical specifications in Table A-1 and Table A-2.

Table A-1 Technical Specifications for the Catalyst 2970G-24T Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 45°C)
Storage temperature	–13 to 158°F (–25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
Power Requirements	
AC input voltage	100 to 240 VAC (autoranging) 1.6 A/0.9 A, 50 to 60 Hz
DC input voltage for RPS 675	+12 V ⎓ @13 A
Power consumption	160 W, 545 BTUs per hour
Physical Dimensions	
Weight	10 lb (4.55 kg)
Dimensions (H x D x W)	1.73 x 12.83 x 17.5 in. (4.39 x 32.59 x 44.45 cm)

Table A-2 Specifications for the Catalyst 2970G-24TS Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 45°C)
Storage temperature	–13 to 158°F (–25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
Power Requirements	
AC input voltage	100 to 240 VAC (autoranging) 2.3 A/1.5 A, 50 to 60 Hz
DC input voltages for RPS 675	+12 V ⎓ @17 A
Power consumption	190 W, 650 BTUs per hour
Power rating	0.190 kVA
Physical Dimensions	
Weight	12.5 lb (5.68 kg)
Dimensions (H x D x W)	2.59 x 11.60 x 17.5 in. (6.59 x 29.46 x 44.45 cm)

Connector and Cable Specifications

This appendix describes the Catalyst 2970 switch ports and the cables and adapters that you use to connect the switch to other devices.

Connector Specifications

These sections describe the connectors used with the Catalyst 2970 switch.

10/100/1000 Ports

The 10/100/1000 Ethernet ports on the Catalyst 2970 switch use standard RJ-45 connectors. Figure B-1 shows the pinout.

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (Auto-MDIX) feature. When the Auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100/1000 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

The Auto-MDIX feature is enabled by default on switches running Cisco IOS Release 12.2(18)SE or later. For releases between Cisco IOS Release 12.1(14)EA1 and 12.2(18)SE, the Auto-MDIX feature is disabled by default. For configuration information for this feature, refer to the switch software configuration guide or the switch command reference.

Connecting to 10BASE-T- and 100BASE-TX-Compatible Devices

When connecting the ports to 10BASE-T- and 100BASE-TX-compatible devices, such as servers, workstations, and routers, you can use a two or four twisted-pair, straight-through cable wired for 10BASE-T and 100BASE-TX. Figure B-4 shows the two twisted-pair, straight-through cable schematics. Figure B-6 shows the four twisted-pair, straight-through cable schematics.

When connecting the ports to 10BASE-T- and 100BASE-TX-compatible devices, such as switches or repeaters, you can use a two or four twisted-pair, crossover cable. Figure B-5 shows the two twisted-pair, crossover cable schematics. Figure B-7 shows the four twisted-pair, crossover cable schematics.

You can use Category 3, 4, or 5 cabling when connecting to 10BASE-T-compatible devices. You must use Category 5 cabling when connecting to 100BASE-TX-compatible devices.

Connecting to 1000BASE-T Devices

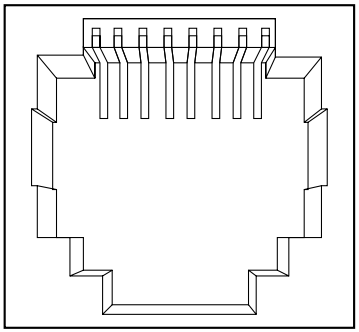
When connecting the ports to 1000BASE-T devices, such as servers, workstations, and routers, you must use a four twisted-pair, Category 5, straight-through cable wired for 10BASE-T, 100BASE-TX, and 1000BASE-T. Figure B-6 shows the straight-through cable schematics.

When connecting the ports to other devices, such as switches or repeaters, you must use a four twisted-pair, Category 5, crossover cable. Figure B-7 shows the crossover cable schematics.

Note Be sure to use a four twisted-pair, Category 5 cable when connecting to a 1000BASE-T-compatible device.

Note Use a straight-through cable to connect two ports only when one port is designated with an X. Use a crossover cable to connect two ports when both ports are designated with an X or when both ports do not have an **X**.

Figure B-1 10/100/1000 Port Pinouts

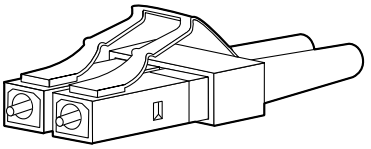
Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

60915

SFP Module Ports

The Catalyst 2970 switch uses SFP modules for fiber-optic and copper uplink ports. Refer to the Catalyst 2970 release notes for a list of supported SFP modules.

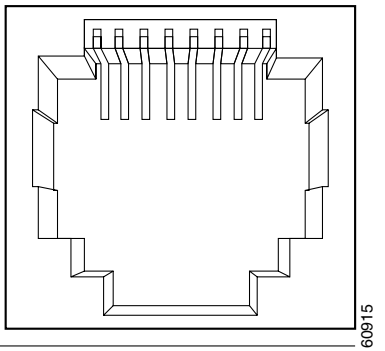
Figure B-2 Fiber-Optic SFP Module LC Connector



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

Figure B-3 Copper SFP Module RJ-45 Connector

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



Console Port

The console port uses an 8-pin RJ-45 connector, which is described in Table B-1 and Table B-2. The supplied RJ-45-to-DB-9 adapter cable is used to connect the console port of the switch to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see Table B-1 and Table B-2.

Cable and Adapter Specifications

These sections describe the cables and adapters used with Catalyst 2970 switches.

Two Twisted-Pair Cable Pinouts

Figure B-4 and Figure B-5 show the schematics of two twisted-pair cables for connecting to 10BASE-T- and 100BASE-TX-compatible devices.

Figure B-4 Two Twisted-Pair Straight-Through Cable Schematic

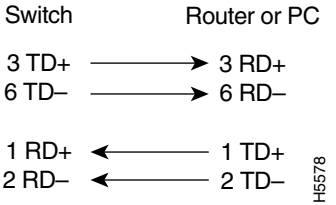
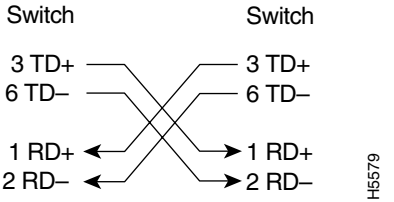


Figure B-5 Two Twisted-Pair Crossover Cable Schematic



Four Twisted-Pair Cable Pinouts for 1000BASE-T Ports

Figure B-6 and Figure B-7 show the schematics of four twisted-pair cables for 10/100/1000 ports on Catalyst 2970 switches.

Figure B-6 Four Twisted-Pair Straight-Through Cable Schematic for 10/100/1000 Ports

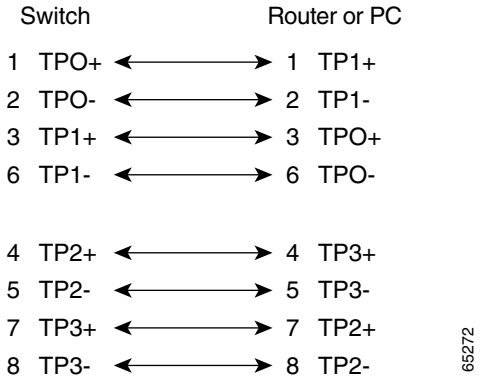
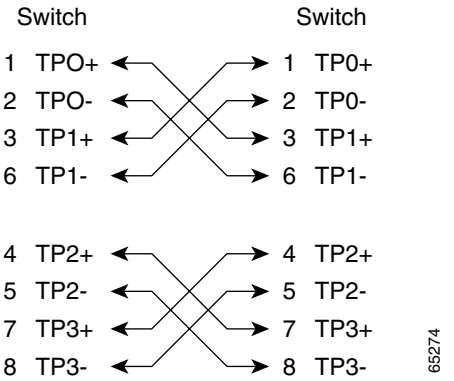


Figure B-7 Four Twisted-Pair Crossover Cable Schematics for 10/100/1000 Ports



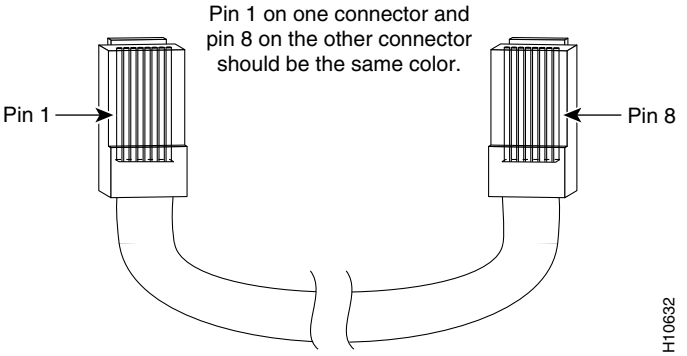
Crossover Cable and Adapter Pinouts

This section describes how to identify a crossover cable and also describes the adapter pinouts.

Identifying a Crossover Cable

To identify a crossover cable, compare the two modular ends of the cable. Hold the cable ends side-by-side, with the tab at the back. The wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (See Figure B-8.)

Figure B-8 Identifying a Crossover Cable



Adapter Pinouts

Table B-1 lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

Table B-1 Console Port Signaling Using 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-2 lists the pinouts for the console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

Note The RJ-45-to-DB-25 female DTE adapter is not supplied with the switch. You can order a kit (part number ACS-DSBUASYN=) containing this adapter from Cisco.

Table B-2 Console Port Signaling Using 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

Table B-2 Console Port Signaling Using a DB-25 Adapter (continued)

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

Configuring the Switch with the CLI-Based Setup Program

This appendix provides a command-line interface (CLI)-based setup procedure for a standalone switch. For product overview information, see Chapter 1, "Product Overview." Before connecting the switch to a power source, review the safety warnings in Chapter 2, "Switch Installation." For installation procedures on rack-mounting your switch, connecting to the switch ports, or connecting to the small form-factor pluggable (SFP) modules, see Chapter 2, "Switch Installation."

These steps describe how to do a simple installation:

1. Accessing the CLI, page C-2
2. Taking Out What You Need, page C-4
3. Connecting to the Console Port, page C-5
4. Starting the Terminal Emulation Software, page C-6
5. Connecting to a Power Source, page C-7
6. Entering the Initial Configuration Information, page C-8

Accessing the CLI

For an unconfigured switch, you can access the CLI through Express Setup or through the console port.

Accessing the CLI Through Express Setup

Note Express Setup is supported on switches running Cisco IOS Release 12.1(14)EA1 or later. If you are installing a new switch, refer to the Cisco IOS release label on the rear panel of the switch to determine the release.

For switches running releases earlier than Cisco IOS Release 12.1(14)EA1, go to the "Taking Out What You Need" section on page C-4.

You can access the CLI on an unconfigured switch by placing the switch in Express Setup mode and then connecting an Ethernet port of the switch to the Ethernet port of your PC or workstation. To put the switch into Express Setup mode, follow the steps described in the *Catalyst 3750 Switch Getting Started Guide* for powering on the switch and using Express Setup.

After the switch is in Express Setup mode, open a Telnet session to the switch by using the IP address *10.0.0.1*, and enter the **setup** user EXEC command. See these sections in this chapter to then configure the switch by using the CLI:

- Entering the Initial Configuration Information, page C-8
- Completing the Setup Program, page C-9

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

Note While 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 more information about using the CLI, refer to the 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 console port of the switch to the serial port on your PC or workstation and accessing the switch through a Telnet session.

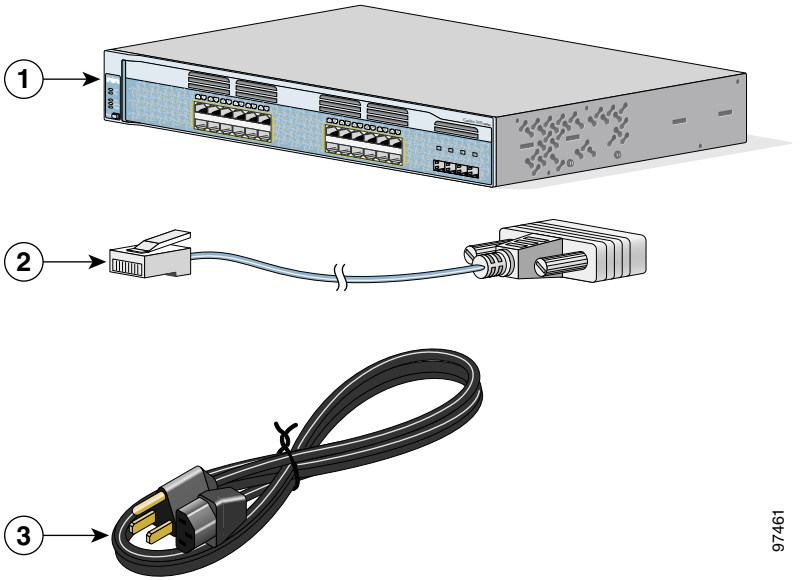
To access the switch through the console port, follow these steps:

- "Taking Out What You Need" section on page C-4.
- "Connecting to the Console Port" section on page C-5
- "Starting the Terminal Emulation Software" section on page C-6
- "Connecting to a Power Source" section on page C-7
- "Entering the Initial Configuration Information" section on page C-8

Taking Out What You Need

Remove the items shown in Figure C-1 from the shipping container:

Figure C-1 The Catalyst 2970 Switch, Adapter Cable, and AC Power Cord



1	Catalyst 2970 switch	**3**	AC power cord
2	RJ-45-to-DB-9 adapter cable		

Note You need to provide the Category 5 straight-through cables to connect the switch ports to other Ethernet devices.

Note You can use the **mdix auto** interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (Auto-MDIX) feature. When the Auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100/1000 or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

The Auto-MDIX feature is enabled by default on switches running Cisco IOS Release 12.2(18)SE or later. For releases between Cisco IOS Release 12.1(14)EA1 and 12.2(18)SE, the Auto-MDIX feature is disabled by default. For configuration information for this feature, refer to the switch software configuration guide or the switch command reference.

Connecting to the Console Port

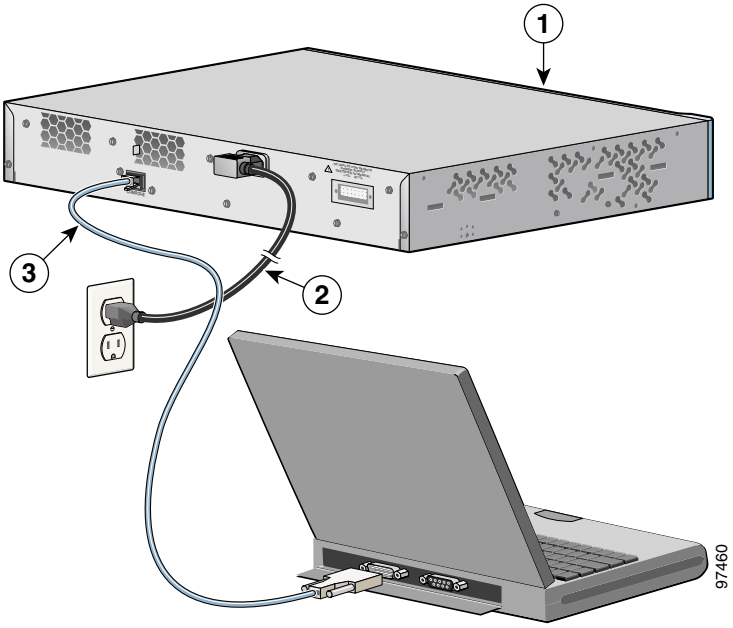
You can use the console port to perform the initial configuration. To connect the switch console port to a PC, use the supplied RJ-45-to-DB-9 adapter cable.

Follow these steps to connect the PC or terminal to the switch:

Step 1 Using the supplied RJ-45-to-DB-9 adapter cable, insert the RJ-45 connector into the console port on the rear of a switch, as shown in Figure C-2.

Step 2 Attach the DB-9 female DTE of the adapter cable to a PC serial port, or attach an appropriate adapter to the terminal.

Figure C-2 Connecting a Switch to a PC



1	Catalyst 2970 switch	**3**	RJ-45-to-DB-9 adapter cable
2	Power cord		

Starting the Terminal Emulation Software

Before you power on the switch, start the terminal emulation session so that you can see the output display from the power-on self-test (POST).

The terminal-emulation software—frequently a PC application such as Hyperterminal or ProcommPlus—makes communication between the switch and your PC or terminal possible.

Step 1 Start the terminal-emulation program if you are using a PC or terminal.

Step 2 Start a terminal-emulation session.

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

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

Connecting to a Power Source

Follow these steps to connect to a power source:

Step 1 Connect one end of the supplied AC power cord to the power connector on a switch rear panel. See Figure C-2.

Step 2 Connect the other end of the power cable to a grounded AC outlet.

Note If you are connecting the switch to a Cisco redundant power system (RPS), refer to the documentation that shipped with your RPS.

As the switch powers on, it begins the power-on self test (POST), a series of tests that runs automatically to ensure that the switch functions properly. 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 POST completes 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.

Note POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

If you started the terminal emulation program before you powered on your switch, the PC or terminal displays the bootloader sequence. You need to press **Enter** to display the setup program prompt.

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 up. 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 required if you plan to use the Network Assistant to configure and manage the switch.

IP Settings

You will need this information from your network administrator before you complete the setup program:

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

Completing the Setup Program

Follow these steps to complete the setup program and to create an initial configuration for the switch:

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 interface that connects 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 below 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 displays its initial configuration. This is an example of output that appears:

```
The following configuration command script was created:
hostname switch1
enable secret 5 $1$Ulq8$DlA/OiaEbl90WcBPd9cOn1
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 FastEthernet1/0/1
!
interface FastEthernet1/0/2

interface FastEthernet1/0/3
!
...<output abbreviated>
!
interface GigabitEthernet2/0/28
!
end
```

Step 10 These choices are displayed:

```
[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.
```

If you want to save the configuration and use it the next time the switch reboots, save it in NVRAM by selecting option 2.

```
Enter your selection [2]:2
```

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

After you complete the setup program, the switch can run the default configuration that you created. If you want to change this configuration or want to perform other management tasks, use one of these tools:

- Command-line interface (CLI)
- Network Assistant (for one or more switches)

To use the CLI, enter commands at the *Switch*> prompt through the console port by using a terminal program or through the network by using Telnet. For configuration information, see the switch software configuration guide or the switch command reference.

To use the Network Assistant, see the *Getting Started with Cisco Network Assistant* guide on Cisco.com.

Numerics

A

B

C

D

E

F

H

I

L

M

N

P

R

S

T

W