



Catalyst 2984G, 2948G-GE-TX, and 2980G Switch Hardware Installation Guide

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- Move the equipment farther away from the television or radio.
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Cisco Limited Lifetime Hardware Warranty Terms xi

Preface xv

Audience xv

Organization xv

Related Documentation xvi

Conventions xvii

Obtaining Documentation xxiii

 Cisco.com xxiii

 Documentation CD-ROM xxiii

 Ordering Documentation xxiv

 Documentation Feedback xxiv

Obtaining Technical Assistance xxiv

 Cisco TAC Website xxv

 Opening a TAC Case xxv

 TAC Case Priority Definitions xxv

Obtaining Additional Publications and Information xxvi

CHAPTER 1

Product Overview 1-1

Switch Description 1-1

 GBIC Module Support 1-3

 SFP Module Support 1-3

 Switch Features 1-4

- Port Locations 1-6
 - 10/100 and 10/100/1000 Ports 1-6
 - Catalyst 2948G and 2980G Switch Ports 1-7
 - Catalyst 2948G-GE-TX Switch Ports 1-7
- Switch Components 1-7
 - Management Ports 1-8
 - Console Serial Port 1-8
 - 10BASE-T and 10/100BASE-T Ports 1-8
 - Front Panel LEDs 1-8
 - Airflow 1-9
 - Power Supplies 1-11

CHAPTER 2

Site Planning 2-1

- Site Power Requirements and Heat Dissipation 2-2
- System Ground Connection Guidelines (Catalyst 2948G and 2980G Switches Only) 2-3
 - Connecting the Switch to Earth Ground 2-5
- Site-Planning Checklist 2-7

CHAPTER 3

Installing the Switch 3-1

- Preparing for Installation 3-2
 - EMC Regulatory Statements 3-2
 - U.S.A. 3-2
 - Taiwan 3-2
 - VCCI Class A Notice for Japan 3-3
 - Korea 3-3
 - Class A Notice for Hungary 3-4
- Checking the Shipping Container 3-4
 - Catalyst 2948G and 2980G Switches 3-4
 - Catalyst 2948G-GE-TX Switches 3-5

Installing the Catalyst 2948G and 2980G Switches	3-6
Required Installation Tools	3-6
Rack-Mounting the Catalyst 2948G and 2980G Switches	3-7
Installing the Catalyst 2948G-GE-TX Switch	3-9
Rack-Mounting the Catalyst 2948G-GE-TX Switch	3-10
Removing Screws from the Switch	3-10
Attaching Brackets to the Switch	3-11
Mounting the Switch in a Rack	3-14
Attaching the Cable Guide	3-15
Wall-Mounting the Catalyst 2948G-GE-TX Switch	3-16
Attaching the Brackets to the Switch for Wall-Mounting	3-16
Attaching the RPS Connector Cover	3-17
Mounting the Switch on a Wall	3-17
Mounting the Catalyst 2948G-GE-TX Switch on a Table or Shelf	3-19
Connecting Power to the Switches	3-19
Connecting to 10/100 and 10/100/1000 Ports	3-20
Connecting a Terminal to the Console Serial and Ethernet Management Ports	3-22
Verifying Switch Operation	3-23

CHAPTER 4

Configuring the Gigabit Ethernet Ports	4-1
Installing, Removing, and Maintaining GBICs	4-2
GBIC Features	4-2
Port Cabling Specifications	4-4
GBIC Optical Power Characteristics	4-5
GBIC Cabling Restrictions	4-5
Installing GBICs	4-6
Removing GBICs	4-9
GBIC Maintenance Guidelines	4-10

Patch Cord 4-10

Patch Cord Configuration Example 4-11

Patch Cord Installation 4-11

Connecting To an SFP Module 4-12

CHAPTER 5

Troubleshooting the Installation 5-1

Getting Started 5-2

Problem Solving to the System Component Level 5-2

Identifying Startup Problems 5-3

Troubleshooting the Power Supply 5-4

Contacting Customer Service 5-5

APPENDIX A

Specifications A-1

Console Serial Port A-1

10BASE-T and 10/100BASE-T Ethernet Management Ports A-2

Catalyst 2948G Switch Specifications A-2

Catalyst 2948G-GE-TX Switch Specifications A-5

Catalyst 2980G Switch Specifications A-6

APPENDIX B

Repacking a Switch B-1

APPENDIX C

Differential Mode Delay C-1

APPENDIX D

Translated Safety Warnings D-1

Warning Definition D-2

Safety Information Referral Warning D-7

Qualified Personnel Warning D-9

Invisible Laser Radiation Warning D-10

Laser Radiation	D-11
Attaching the Cisco RPS (model PWR300-AC-RPS-N1)	D-13
Attaching the Cisco RPS (model PWR600-AC-RPS)	D-14
Attaching the Cisco RPS (model PWR675-AC-RPS-N1)	D-15
Redundant Power Supply Connection Warning	D-17
Switch Installation Warning	D-18
Chassis Warning for Rack-Mounting and Servicing	D-20



Cisco Limited Lifetime Hardware Warranty Terms

There are special terms applicable to your hardware warranty and various services that you can use during the warranty period. Your formal Warranty Statement, including the warranty applicable to Cisco software, is included on the Cisco Documentation CD and on Cisco.com. Follow these steps to access and download the *Cisco Information Packet* and your warranty document from the CD or Cisco.com.

1. Launch your browser, and go to this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/cetrans.htm

The Warranties and License Agreements page appears.

2. To read the *Cisco Information Packet*, follow these steps:
 - a. Click the **Information Packet Number** field, and make sure that the part number 78-5235-02F0 is highlighted.
 - b. Select the language in which you would like to read the document.
 - c. Click **Go**.

The Cisco Limited Warranty and Software License page from the Information Packet appears.

- d. Read the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).

**Note**

You must have Adobe Acrobat Reader to view and print PDF files. You can download the reader from Adobe's website: <http://www.adobe.com>

3. To read translated and localized warranty information about your product, follow these steps:
 - a. Enter this part number in the Warranty Document Number field:
78-6310-02C0
 - b. Select the language in which you would like to view the document.
 - c. Click **Go**.
The Cisco warranty page appears.
 - d. Read the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).

You can also contact the Cisco service and support website for assistance:

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

Duration of Hardware Warranty

A Cisco product hardware warranty is supported for as long as the original end user continues to own or use the product, provided that the fan and power supply warranty is limited to five (5) years. In the event of a discontinuance of product manufacture, the Cisco warranty support is limited to five (5) years from the announcement of the discontinuance.

Replacement, Repair, or Refund Policy for Hardware

Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of the Return Materials Authorization (RMA) request. Actual delivery times can vary, depending on the customer location.

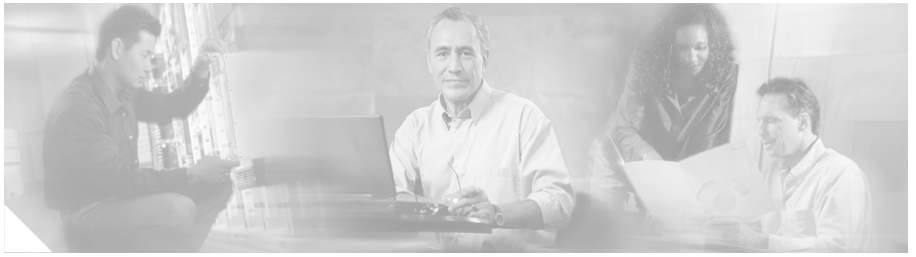
Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

To Receive a Return Materials Authorization (RMA) Number

Contact the company from whom you purchased the product. If you purchased the product directly from Cisco, contact your Cisco Sales and Service Representative.

Complete the information below, and keep it for reference.

Company product purchased from	
Company telephone number	
Product model number	
Product serial number	
Maintenance contract number	



Preface

This preface describes the audience, organization, and conventions of the *Catalyst 2984G, 2948G-GE-TX, and 2980G Switch Hardware Installation Guide* and provides information on how to obtain related documentation.

Audience

To use this hardware guide, you should be familiar with electronic circuitry and wiring practices and preferably be an electronic or electromechanical technician.

Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	Product Overview	Lists and describes the hardware features and functionality of the Catalyst 2948G, 2948G-GE-TX, and 2980G switches.
Chapter 2	Site Planning	Describes how to prepare your site for the installation of the switch.
Chapter 3	Installing the Switch	Describes how to install the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. Provides procedures for removing and installing chassis components.

Chapter	Title	Description
Chapter 4	Gigabit Ethernet Port Configuration	Describes the features and configuration of the Gigabit Ethernet ports.
Chapter 5	Troubleshooting the Installation	Provides troubleshooting guidelines for the initial hardware installation and suggests steps to help isolate and resolve problems.
Appendix A	Specifications	Lists Catalyst 2948G and 2980G switch specifications.
Appendix B	Repacking a Switch	Provides procedures to repack your Catalyst 2948G or 2980G switch in the event that you have to return it to the factory.
Appendix C	Differential Mode Delay	Describes the nature and causes of differential mode delay (DMD) and ways to prevent it.
Appendix D	Translated Safety Warnings	Repeats in multiple languages the warnings in this guide.

Related Documentation

Refer to the following documents for additional Catalyst 4500 series information:

- *Software Configuration Guide—Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches*
- *Command Reference—Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches*
- *System Message Guide—Catalyst 4500 Series, Catalyst 2948G, and Catalyst 2980G Switches*

Conventions

This document uses the following conventions:

Convention	Description
boldface font	Commands and keywords are in boldface .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[]	Elements in square brackets are optional.
{ x y z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
screen font	Terminal sessions and information the system displays are in <i>screen font</i> .
boldface screen font	Information you must enter is in boldface screen font .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords are in angle brackets.

Notes use the following conventions:



Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Cautions use the following conventions:



Caution

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

Warnings use the following conventions:



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

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 figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető 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。

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.

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

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<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_inpk/pdi.htm

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

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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

This chapter provides an overview of the features and components of the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. It contains these sections:

- [Switch Description, page 1](#)
- [Switch Components, page 7](#)



Note

Throughout this guide, *Catalyst 2980G switch* refers to both the Catalyst 2980G switch and the Catalyst 2980G-A switch, unless otherwise noted.

Switch Description

The Catalyst 2948G, 2948G-GE-TX, and 2980G switches are designed for high-performance, high-density wiring-closet applications. [Figure 1-1](#) through [Figure 1-3](#) show the switches.

Figure 1-1 Catalyst 2948G Switch

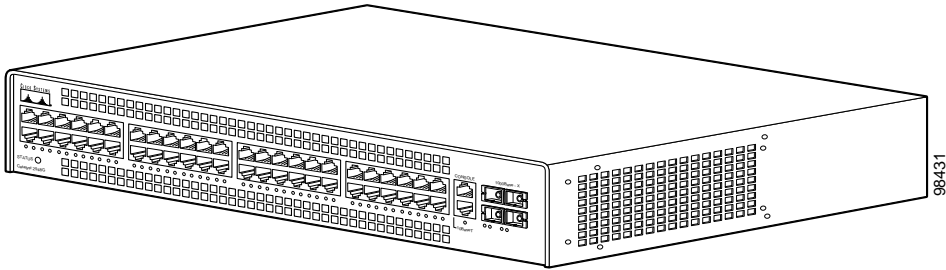


Figure 1-2 Catalyst 2948G-GE-TX Switch

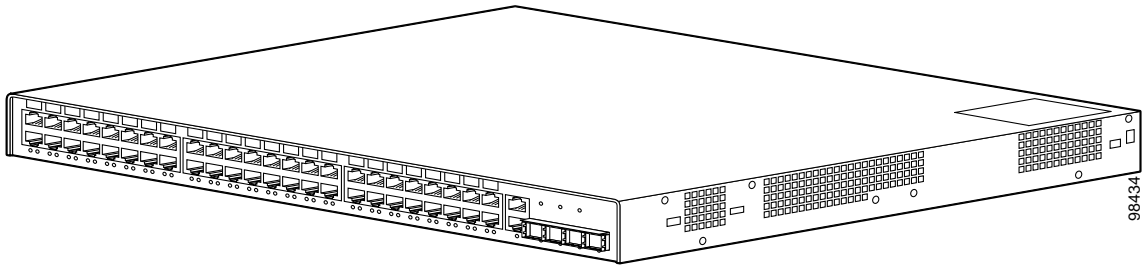
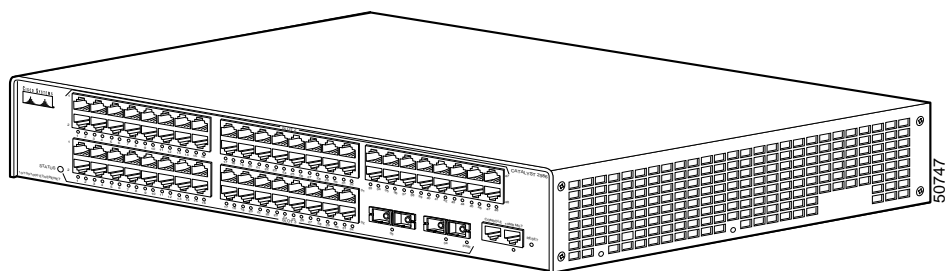


Figure 1-3 Catalyst 2980G Switch



The Catalyst 2948G, 2948G-GE-TX, and 2980G switches interface with networking equipment using Ethernet (10BASE-T), Fast Ethernet (100BASE-T), and Gigabit Ethernet (1000BASE-T) interfaces. Depending on the model, the switches also support Gigabit Interface Converters (GBICs) or small form-factor pluggable (SFP) modules.

The Catalyst 2948G switch has 48 autosensing and autoconfiguring 10/100BASE-T Fast Ethernet fixed ports. The Catalyst 2948G-GE-TX switch has 48 autosensing and autoconfiguring 10/100/1000BASE-T ports. The Catalyst 2980G switch has 80 autosensing and autoconfiguring 10/100BASE-T Fast Ethernet fixed ports.

GBIC Module Support

The Catalyst 2948G and 2980G switches each have two Gigabit Ethernet uplink ports with modular Gigabit Interface Converters (GBICs).

A GBIC is a hot-swappable input/output device that plugs into a Gigabit Ethernet port module and links the port module with a fiber-optic network. For a detailed description of Gigabit Ethernet ports, see the “[GBIC Features](#)” section on [page 4-2](#).

For a complete list of supported GBIC modules, see [Table 4-1 on page 4-3](#).



Note

The Catalyst 2948G-GE-TX switch does not support GBIC modules.

The Gigabit Ethernet ports can be configured with any combination of GBIC types.

The Gigabit Ethernet ports on these modules are used primarily for backbone interconnection of other high-performance switches and routers.

SFP Module Support

The Catalyst 2948G-GE-TX switch has four small form-factor pluggable (SFP) module slots. The switch uses SFP modules to establish Gigabit connections. The SFP module slots are located on the front of the switch.

An SFP module is a hot-swappable input/output device that plugs into an SFP module slot, linking the port module with a fiber-optic network.

For a list of SFP modules supported by the Catalyst 2948G-GE-TX switch, see [Table 4-4 on page 4-12](#).

**Note**

Catalyst 2948G-GE-TX switch only supports 1000 Mbps and full-duplex modes on SFP modules.

Except for the 1000BASE-T SFP module, all of the SFP modules are used to establish fiber-optic connections. You use fiber-optic cables with Lucent (LC) connectors to connect to an SFP module. The SFP modules support 850 to 1550 nanometer nominal wave lengths. These field-replaceable modules provide the uplink optical interfaces, laser send (TX) and laser receive (RX). For a detailed description of Gigabit Ethernet ports see the [“Connecting To an SFP Module” section on page 4-12](#).

Switch Features

[Table 1-1](#) describes the Catalyst 2948G, 2948G-GE-TX, and 2980G switch features.

Table 1-1 Catalyst 2948G, 2948G-GE-TX, and 2980G Switch Features

Feature	Description
Ethernet speeds	<ul style="list-style-type: none"> Ethernet (10BASE-T) interface to workstations and repeaters Fast Ethernet (100BASE-T) interface to workstations, servers, switches, and routers <p>Note Autonegotiation of link speed on each 10/100 and 10/100/1000 port allows migration to 100BASE-T or 1000BASE-T from a 10BASE-T or 100BASE-T installed base.</p> <ul style="list-style-type: none"> Gigabit Ethernet (1000BASE-T) copper and Gigabit Ethernet (1000BASE-X) fiber-optic interface for backbone interconnection of high-performance switches and routers
Standard management and support	<ul style="list-style-type: none"> Layer 2 forwarding with an aggregate forwarding rate of greater than 17.8 million packets per second 16,000 MAC addresses per system

Table 1-1 Catalyst 2948G, 2948G-GE-TX, and 2980G Switch Features (continued)

Feature	Description
Standard management and support (continued)	<ul style="list-style-type: none"> • Up to 1,024 VLANs with IEEE 802.1Q VLAN tagging on all ports and support for VTP¹ • Port aggregation using PAgP² for 100-Mbps and 1-Gbps EtherChannel
Software management	<ul style="list-style-type: none"> • CLI³ and SNMP interfaces consistent with the Catalyst 4500 series and 6500 family switches • Development of new features compatible with the Catalyst 6500 family switches • Out-of-band management through the RJ-45 10BASE-T console serial port • 10BASE-T out-of-band management and in-band management through any switch port with SNMP, Telnet client, and TFTP <p>Note The Catalyst 2948G-GE-TX and 2980G-A switches have a 10/100BASE-T management port.</p> <ul style="list-style-type: none"> • RMON⁴ with RMON 1 • Standard Layer 2 elements: <ul style="list-style-type: none"> – 802.1D Spanning Tree – CDP⁵ – VTP⁶ version 2 with pruning extensions – CGMP⁷ client

Table 1-1 Catalyst 2948G, 2948G-GE-TX, and 2980G Switch Features (continued)

Feature	Description
Embedded management	<ul style="list-style-type: none"> • Full SNMP implementation, including entity-MIB, all relevant standard MIBs, and all relevant Cisco MIBs • The first four RMON groups (Ethernet statistics, Alarms, Events, and History) supported on a per port basis without an optional RMON processing module • Redirection of traffic from any port to a “sniff” port. (Any switching port can be designated as a “sniff” port.) • Performance management information
Power supplies	<ul style="list-style-type: none"> • 120 W AC internal power supply on the Catalyst 2948G switch • 156 W AC internal power supply on the Catalyst 2948G-GE-TX switch • 175 W AC internal power supply on the Catalyst 2980G switch

1. VTP = VLAN Trunking Protocol
2. PAgP = Port Aggregation Protocol
3. CLI = command-line interface
4. RMON = Remote Monitoring
5. CDP = Cisco Discovery Protocol
6. VTP = Virtual Terminal Protocol
7. CGMP = Cisco Group Management Protocol

Port Locations

This section describes the port locations and numbering on the switches.

10/100 and 10/100/1000 Ports

The 10/100 and 10/100/1000 ports are configured in vertical pairs. Each vertical pair has two Link Status LEDs below it. The LED on the left is for the top port; the LED on the right is for the bottom port. For example, LED 1 is for the upper port (port 1) and LED 2 is for the bottom port (port 2).

Catalyst 2948G and 2980G Switch Ports

The Catalyst 2948G switch 10/100BASE-T ports are configured in two rows. The top row contains odd-numbered ports (1 through 47), and the bottom row contains even-numbered ports (2 through 48).

The Catalyst 2980G switch 10/100BASE-T ports are configured in four rows. The top two rows are numbered 1 through 48, with the first row odd-numbered (1 through 47) and the second row even-numbered (2 through 48). The bottom two rows are numbered 1 through 32, with the first row odd-numbered (1 through 31) and the second row even-numbered (2 through 32).

Two GBIC ports are at the right of the front panel on the Catalyst 2948G and Catalyst 2980G switches:

- On the Catalyst 2948G switches, these ports are located at the far right of the front panel. The upper Gigabit Ethernet port is port 49; the lower is port 50. The Link Status LEDs for these ports are below port 50.
- On the Catalyst 2980G switches, the GBIC Ethernet ports are located immediately to the right of ports 31 and 32. The port on the left is port 33; the port on the right is port 34. The Link Status LEDs for the Gigabit Ethernet ports are located below each port.

Catalyst 2948G-GE-TX Switch Ports

The Catalyst 2948G-GE-TX 10/100/1000BASE-T Gigabit Ethernet ports are configured in two rows. The top row contains odd-numbered ports (1 through 47), and the bottom row contains even-numbered ports (2 through 48).

The SFP module slots are numbered left to right 49 through 52.

Switch Components

This section describes the following Catalyst 2948G and 2980G switch components:

- [Management Ports, page 8](#)
- [Front Panel LEDs, page 8](#)

- [Airflow](#), page 9
- [Power Supplies](#), page 11

Management Ports

The Catalyst 2948G, 2948G-GE-TX, and 2980G switches have two kinds of management ports: console serial and Ethernet. The Catalyst 2948G switches have a 10BASE-T management port. The Catalyst 2948G-GE-TX and 2980G-A switches have a 10/100BASE-T management port.

[Table 1-2 on page 1-9](#) lists the management options for the switches.

Console Serial Port

An RJ-45 console serial port allows you to perform switch-management functions using a terminal. See [Table A-1 on page A-1](#) for the console connector pinouts.

10BASE-T and 10/100BASE-T Ports

An RJ-45 10BASE-T port allows you to perform TCP/IP switch-management functions (Telnet, SNMP, FTP), configure IP addresses with BOOTP, and download software images.



Note

The Catalyst 2948G-GE-TX and 2980G-A switches have a 10/100BASE-T management port.

This port is for network management only; it is not for switching. Connectivity is not available between this port and the 10/100BASE-T switching ports.

Front Panel LEDs

The LEDs on the front panels of the Catalyst 2948G, 2948G-GE-TX, and 2980G switches perform the following functions:

- STATUS LEDs indicate the operating state of the switches.
- Link Status LEDs provide management and indicate switching port status.

- PSI LED indicates the internal power supply status on the Catalyst 2948G switch.
- PWR LED indicates the internal power supply status on the Catalyst 2980G switch.
- RPS LED provides the external redundant power supply status.

Table 1-2 describes the LEDs.

Table 1-2 Front Panel LEDs

LED	Color/Statue	Description
STATUS	Green	Indicates the results of a series of self-test diagnostics. All tests pass.
	Red	A test other than an individual port test fails.
	Amber	System boot or diagnostic tests in progress.
	Off	Switch is disabled.
Link Status	Green	Indicates the link status of a port. Port is operational.
	Amber	Port is disabled by user.
	Flashing	Power-on self-test indicates faulty port.
	Off	No signal detected, or link configuration failure.
PSI, PWR, and RPS	Green	Indicates power supply operation or failure. Power supply is operational.
	Amber	Power supply has failed or is in Standby mode.

Airflow



Note

For environmental specifications, see [Chapter 2, “Site Planning.”](#)

On the Catalyst 2948G and 2980G switches, the system fan assembly provides cooling air for the internal chassis components. The fans exhaust warm air from one end and draw in cool air at the other end.

If an individual fan fails, the other fans continue to run. Sensors monitor the internal air temperatures. If the air temperature exceeds a tolerable threshold, the environmental monitor displays warning messages.

On the Catalyst 2948G-GE-TX, a blower system draws cool air in from the front and sides of the switch and exhausts air out the back.

Figure 1-4 shows the direction of airflow through the Catalyst 2948G switch.

Figure 1-5 shows the direction of airflow through the Catalyst 2948G-GE-TX switch.

Figure 1-6 shows the direction of airflow through the Catalyst 2980G switch.

Figure 1-4 Catalyst 2948G Airflow

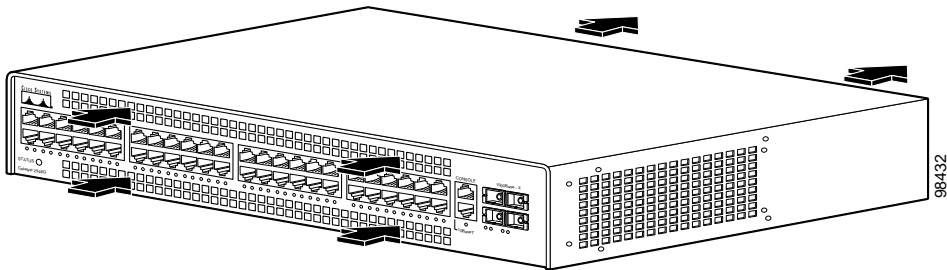


Figure 1-5 Catalyst 2948G-GE-TX Airflow

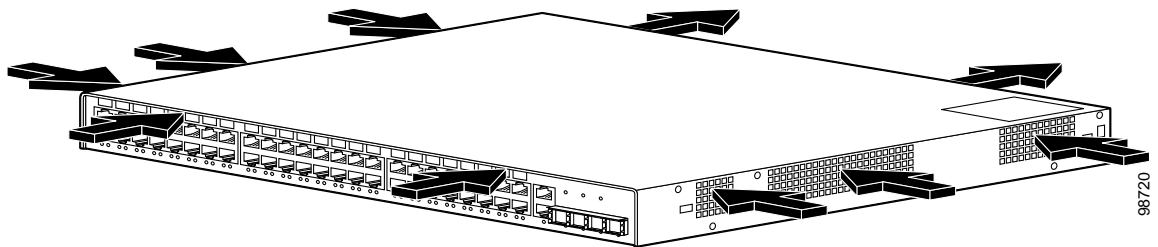
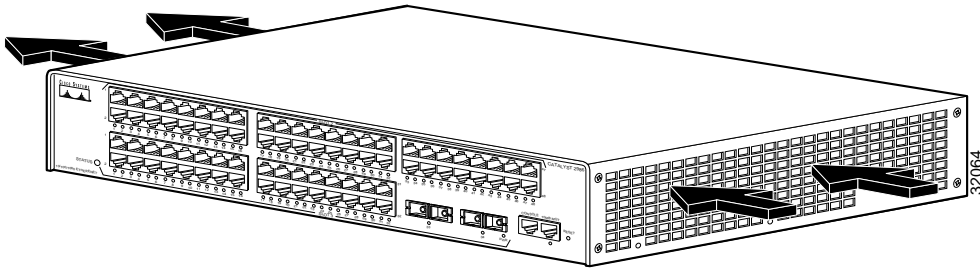


Figure 1-6 Catalyst 2980G Airflow



Power Supplies

There is no power switch on the switches. AC power is present in the power supply when the power cord is plugged in.

The environmental monitoring and reporting functions allow you to maintain normal system operation by correcting adverse environmental conditions before loss of operation.

Each power supply monitors its own temperature and output voltages. If the power supply becomes excessively hot, it shuts down to prevent damage. The switches monitor the operating condition of the power supply and report the status using switch software.

The switches have the following power supplies:

- 120 W AC internal power supply—Catalyst 2948G switch
- 156 W AC internal power supply—Catalyst 2948G-GE-TX switch
- 175 W AC internal power supply—Catalyst 2980G switch
- 156 W AC internal power supply—Catalyst 2980G-A switch



Note

For complete power specifications for the Catalyst 2948G, 2948G-GE-TX, and 2980G switches, see [Appendix A, “Specifications.”](#)

These switches also be used with an optional Cisco Redundant Power System (RPS).

- The Catalyst 2948G switch uses the Cisco RPS 600 AC power supply (PWR600-AC-RPS-CAB).

The Cisco RPS 600 supports four external devices that use up to 150 W DC each. Use a one-to-one cable (one connector at each cable end) to connect four external devices to the four DC output power modules.

The power source is partially redundant. There are two AC input power modules for the Cisco RPS and one DC output power module for each external device. The AC input to the Cisco RPS is fully redundant, but the DC output to the external devices is not.



Warning

Attach only the Cisco RPS (model PWR600-AC-RPS) to the RPS receptacle.
Statement 112

- The Catalyst 2948G-GE-TX switch uses the Cisco RPS 675 (model PWR675-AC-RPS-N1).

The RPS 675 supports six external network devices and provides DC 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 that device, which prevents loss of network traffic.



Warning

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

- The Catalyst 2980G-A switch uses the Cisco RPS 300 (PWR300-AC-RPS-N1).

The RPS 300 supports six external network devices and provides power to one failed device at a time. It automatically senses when the power supply of a connected device fails and provides the necessary power to the failed device to prevent loss of network traffic. When the internal power supply of the device has been brought up or replaced, the RPS automatically stops powering the device.



Warning

Attach only the Cisco RPS (model PWR300-AC-RPS-N1) to the RPS receptacle.
Statement 100B

A Cisco RPS can only power one switch at a time. If more than one switch fails at the same time, any subsequent switch is not supported by the RPS until the first switch failure is resolved. For more information, refer to the documentation that was included with your RPS.

On the Catalyst 2948G switch, you must use a Y cable to connect the switch to two RPS 600 power supplies. Each RPS 600 has status LEDs (PSI and RPS).

On the Catalyst 2980G-A switch, each RPS 300 power supply has an individual power cord and has status LEDs (PSI, PWR, and RPS).

The RPS uses redundant power supplies. If one of the power supplies in the RPS fails, the RPS will automatically switch over to the other power supply without forcing the switch to reboot.

**Note**

On the Catalyst 2948G-GE-TX and 2948G switches, only one power source can supply power to the switch at any one time. When you are using an RPS, unplug the local power cord for the switch. If you are using the local power supply, the RPS can be connected but must not be powered on. The switches can be powered by both the internal power supply and the RPS at the same time.



Site Planning



Warning

Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system. Statement 200



Warning

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

This chapter describes how to prepare your site for the installation of your switch and contains these sections:

- [Site Power Requirements and Heat Dissipation, page 2](#)
- [System Ground Connection Guidelines \(Catalyst 2948G and 2980G Switches Only\), page 3](#)
- [Site-Planning Checklist, page 7](#)



Note

See the “[Site-Planning Checklist](#)” section on [page 7](#) to help ensure that you complete all site-planning activities before you install the switch.

Site Power Requirements and Heat Dissipation



Note

Catalyst 2948G, 2948G-GE-TX, and 2980G switches have internal power supplies. All of the switches support Cisco Redundant Power System (RPS) for redundant operation.

This section provides site power requirements and heat dissipation specifications for the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. You should verify site power before you install a switch.

Power requirements can vary for each Catalyst switch. Knowing the power requirements can be useful for planning the power distribution system needed to support the switches. Heat specifications are used for determining the air-conditioning requirements for an installation.



Note

Refer to the *Site Preparation and Safety Guide* for site power requirements, preinstallation requirements, and EMI recommendations.

[Table 2-1](#) describes the power requirements and heat dissipation specifications for the Catalyst 2948G, 2948G-GE-TX, and 2980G switches.

Table 2-1 Power Requirements and Heat Dissipation Specifications

Model Number/ Module Type	Power Supply Output (Watts)	AC Input Power (Watts)	Heat Diss (BTU/Hr)	AC Input Current (Amps)
Catalyst 2948G switch	120	200	645	90 VAC: 2.0 120 VAC: 1.6 180 VAC: 1.0 240 VAC: 0.9
Catalyst 2948G-GE-TX switch	156	130	445	100 VAC: 1.5 240 VAC: 0.8

Table 2-1 Power Requirements and Heat Dissipation Specifications (continued)

Model Number/ Module Type	Power Supply Output (Watts)	AC Input Power (Watts)	Heat Diss (BTU/Hr)	AC Input Current (Amps)
Catalyst 2980G switch	175	300	950	90 VAC: 3.0 120 VAC: 2.4 180 VAC: 1.6 240 VAC: 1.0
Catalyst 2980G-A switch	156	208	670	90 VAC: 2.3 120 VAC: 1.7 180 VAC: 1.1 240 VAC: 0.9

System Ground Connection Guidelines (Catalyst 2948G and 2980G Switches Only)

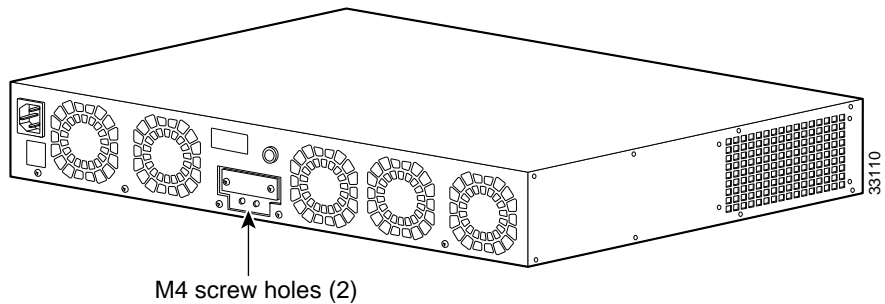
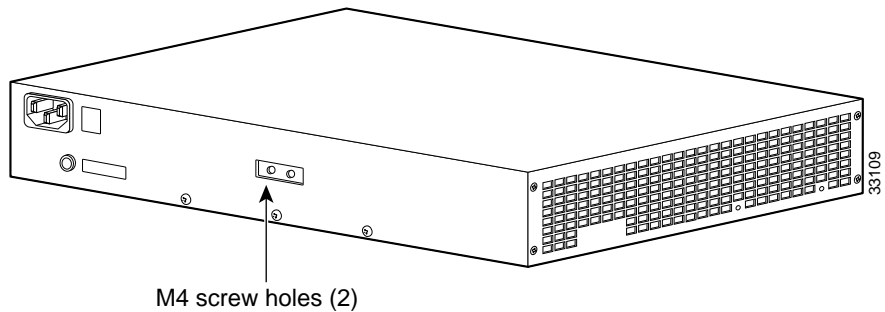
Two system (earth) grounding holes are provided in an enclosure near the power supplies.



Note

These guidelines do not apply to the Catalyst 2948G-GE-TX switches.

See [Figure 2-1](#) for the location of the grounding holes on the Catalyst 2948G switches and [Figure 2-2](#) for the location on the Catalyst 2980G switches.

Figure 2-1 Grounding Holes on the Catalyst 2948G Switch**Figure 2-2** Grounding Holes on the Catalyst 2980G Switch

To make an adequate grounding connection, you need these components and tools:

- Grounding lug—The grounding lug must have two M4 screw holes. See [Figure 2-1](#) for the location of the M4 screw holes on the Catalyst 2948G switch and [Figure 2-2](#) for the Catalyst 2980G switch.
The grounding lugs are not available from Cisco Systems; any electrical-connector vendor can provide this lug.
- Two M4 (metric) hex-head screws with locking washers—These screws are not available from Cisco Systems; they are available from any commercial hardware vendor.
- One grounding wire (6 AWG recommended)—The length of the grounding wires depends on the location of your switch within the site and its proximity to proper grounding facilities. The grounding wire is not available from Cisco Systems; it is available from any commercial cable vendor.

- Number 2 Phillips head screwdriver.
- Crimping tool—This must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug.
- Wire-stripping tool.

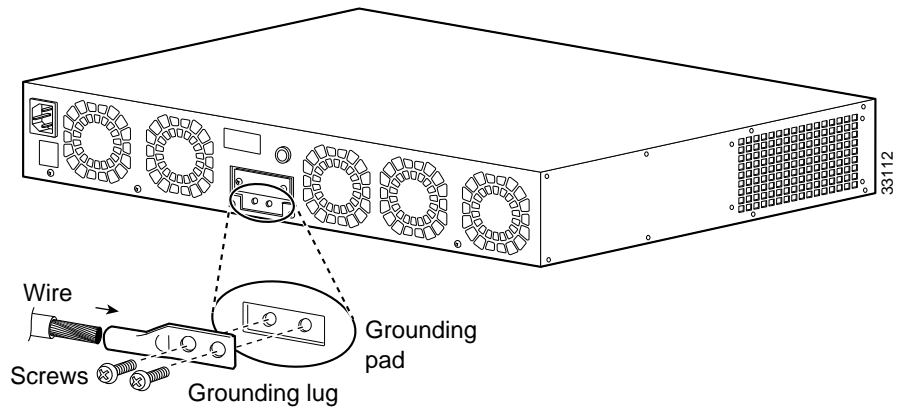
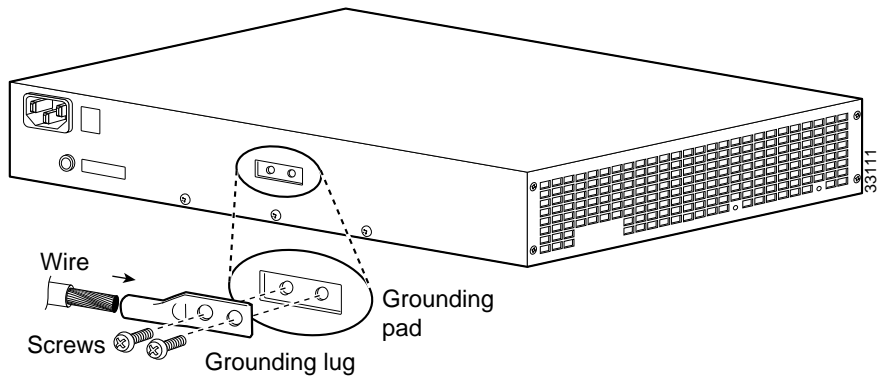
Connecting the Switch to Earth Ground

This procedure describes how to connect the Catalyst 2948G, 2948G-GE-TX, and 2980G switches to earth ground. We strongly recommend that you complete this procedure before connecting system power or turning on your switch.

To attach the grounding lug and cable to the grounding pad on the Catalyst 2948G, 2948G-GE-TX, and 2980G switches, follow these steps:

-
- Step 1** Use a wire-stripping tool to remove approximately 0.75 inches (19 mm) of the covering from the end of the grounding wire.
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug.
- Step 3** Use the crimping tool to secure the grounding wire in place in the grounding lug.
- Step 4** Locate the grounding pad on the switch.

See [Figure 2-3](#) for the location of the grounding pad on the Catalyst 2948G switch and [Figure 2-4](#) for the Catalyst 2980G switch.

Figure 2-3 Connecting System Ground on the Catalyst 2948G Switch**Figure 2-4 Connecting System Ground on the Catalyst 2980G Switch**

- Step 5** Remove the label that covers the grounding pad.
- Step 6** Place the grounding lug against the grounding pad on the rear panel of the switch.
- Step 7** Install locking washers; tighten them to secure the grounding lug to the grounding pad.
- Step 8** Insert two screws through the holes in the grounding lug and the grounding pad. Ensure that the grounding lug and the attached wire will not interfere with other switch hardware or rack equipment.

- Step 9** Prepare the other end of the grounding wire and connect it to an appropriate grounding point at your site to ensure adequate earth ground for the switch.
-

Site-Planning Checklist

Table 2-2 lists the site-planning activities that you should complete before you install the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. Completing each activity helps ensure a successful switch installation.

Table 2-2 Site-Planning Checklist

Task No.	Planning Activity	Verified By	Time	Date
1	Space evaluation: Space and layout Floor covering Impact and vibration Lighting Maintenance access			
2	Environmental evaluation: Ambient temperature Humidity Altitude Atmospheric contamination Airflow			
3	Power evaluation: Input power type Proximity of receptacle to the equipment Dedicated (separate) circuits for redundant power supplies UPS for power failures			
4	Grounding evaluation: Circuit breaker size			

Table 2-2 Site-Planning Checklist (continued)

Task No.	Planning Activity	Verified By	Time	Date
5	Cable and interface equipment evaluation: Cable type Connector type Cable distance limitations Interface equipment (transceivers)			
6	EMI evaluation: Distance limitations for signaling Site wiring RFI levels			



Installing the Switch



Warning

Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system. Statement 200



Warning

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

This chapter describes how to install the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. For first-time installations, perform the procedures in these sections in the order listed:

- [Preparing for Installation, page 2](#)
- [Installing the Catalyst 2948G and 2980G Switches, page 6](#)
- [Installing the Catalyst 2948G-GE-TX Switch, page 9](#)
- [Connecting Power to the Switches, page 19](#)
- [Connecting a Terminal to the Console Serial and Ethernet Management Ports, page 22](#)



Note

Before starting the installation procedures in this chapter, complete the site-planning checklist in [Chapter 2, “Site Planning.”](#)

Preparing for Installation

This section provides information about these topics:

- [EMC Regulatory Statements, page 2](#)
- [Checking the Shipping Container, page 4](#)

EMC Regulatory Statements

This section includes specific regulatory statements about the switches.

U.S.A.

U.S. regulatory information for this product is in the front matter of this manual.

Taiwan



Warning

This is a Class A Information Product, when used in residential environment, it may cause radio frequency interference, under such circumstances, the user may be requested to take appropriate countermeasures.

警告

這是甲類資訊產品，在居住環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

VCCI Class A Notice for Japan

**Warning**

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

警告

これは、情報処理装置等電波障害自主規制協議会（VCCI）の規定に基づくクラスA装置です。この装置を家庭環境で使用すると、電波妨害を引き起こすことがあります。この場合には、使用者が適切な対策を取るようにより要求されることがあります。

Korea

**Warning**

This is a Class A Device and is registered for EMC requirements for industrial use. The seller or buyer should be aware of this. If this type was sold or purchased by mistake, it should be replaced with a residential-use type.

주의

A급 기기 이 기기는 업무용으로 전자파 적합 등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Class A Notice for Hungary



Warning

This equipment is a class A product and should be used and installed properly according to the Hungarian EMC Class A requirements (MSZEN55022). Class A equipment is designed for typical commercial establishments for which special conditions of installation and protection distance are used.

Figyelem

Figyelmeztetés a felhasználói kézikönyv számára: Ez a berendezés "A" osztályú termék, felhasználására és üzembe helyezésére a magyar EMC "A" osztályú követelményeknek (MSZ EN 55022) megfelelően kerülhet sor, illetve ezen "A" osztályú berendezések csak megfelelő kereskedelmi forrásból származhatnak, amelyek biztosítják a megfelelő speciális üzembe helyezési körülményeket és biztonságos üzemelési távolságok alkalmazását.

Checking the Shipping Container

Do not discard the packing carton and other packing materials after you unpack the switch. Flatten the packing carton and store it. You will need the packing materials if you need to move or ship the switch in the future. Repacking instructions are provided in [Appendix B, "Repacking a Switch."](#)

Check the contents of the accessory kit against the accessories checklist and the packing slip. Verify that you received all listed equipment.

Catalyst 2948G and 2980G Switches

The Catalyst 2948G and 2980G switches are shipped with these items:

- This hardware guide
- AC power cord
- RJ-45 to DB-9 cable
- DB-9 to RJ-45 cable

- ESD wrist strap
- Mounting kit

Catalyst 2948G-GE-TX Switches

The Catalyst 2948G-GE-TX switch is shipped with these items:

- This hardware guide
- *About the Catalyst 2948G Documentation* flyer
- AC power cord
- One RJ-45-to-DB-9 adapter cable (78-3383-XX)
- Mounting kit containing:
 - Four rubber feet for mounting the switch on a table (51-0089)
 - Two 19-inch rack-mounting brackets (700-08209-XX)
 - Four Phillips machine screws for attaching the brackets to a rack (48-0655-XX)
 - One cable guide (700-05613-XX)
 - One black Phillips machine screw for attaching the cable guide to one of the mounting brackets (48-0654-XX)
 - One Redundant Power System (RPS) connector cover for wall mounting (700-16465-XX)
 - Two Phillips pan-head screws for attaching the RPS cover (48-0482-XX)
 - Four Phillips truss-head screws for attaching wall-mounting brackets (48-0656-XX)
 - Four Phillips pan-head screws for attaching the switch to a rack (48-0523-XX)

Installing the Catalyst 2948G and 2980G Switches



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
-

A standard rack-mount kit is included for mounting the switch in a standard 19-inch (48.3 cm) equipment rack with two unobstructed outer posts. This kit is not suitable for racks with obstructions (such as a power strip) that could impair access to the switch.

Required Installation Tools

You will need the following tools and equipment to install the switch chassis in a rack:

- Rack-mount kit
- Tape measure and level
- Number 1 Phillips, number 2 Phillips, or a 3/16-inch flat-blade screwdriver
- Antistatic mat or antistatic foam
- Your own electrostatic discharge (ESD) grounding strap or the disposable ESD strap included with the switch



Note

For more information about ESD, refer to the *Site Preparation and Safety Guide*.

Rack-Mounting the Catalyst 2948G and 2980G Switches

To install Catalyst 2940G and 2980G switches in a 19-inch rack, follow these steps:

- Step 1** Prepare for installation as follows:
- a. Place the chassis on the floor or on a sturdy table, as close as possible to the rack. Leave enough clearance to allow yourself to move around the chassis.
 - b. Use the tape measure to measure the depth of the rack. Measure from the outside of the front-mounting posts to the outside of the rear-mounting strip. The depth must be at least 19.25 inches (48.9 cm) and not greater than 32 inches (81.3 cm).
 - c. Measure the space between the inner edges of the left front- and right front-mounting posts to ensure that it is 17.75 inches (45.09 cm) wide. (The chassis is 17.5 inches [44 cm] wide and must fit between the mounting posts. See [Figure 3-2](#).)
 - d. Open the rack-mount kit and refer to the component checklist in [Table 3-1](#) to verify that all parts are included.

Table 3-1 Rack-Mount Kit Checklist

Part Description	Quantity
L brackets	2
M4 Phillips pan-head screws	4
12-24 x 3/4-inch Phillips binder-head screws	6



Note

Some equipment racks have a power strip along the length of one of the rear posts. If the rack has this feature, consider the position of the strip when planning fastener points. Before installing the L brackets on the chassis, determine whether to install the chassis from the front or the rear of the rack.

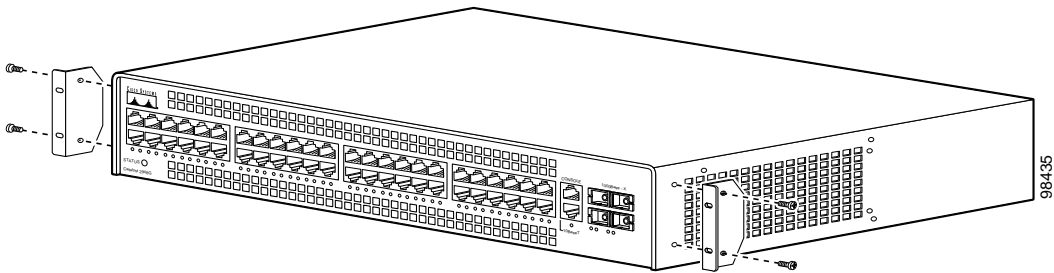
- Step 2** Attach the left and right L brackets using the four M4 Phillips pan-head screws provided in the rack-mount kit (see [Figure 3-1](#)).

The L brackets connect the switch chassis to the rack. You can mount the L brackets to the front- or rear-mounting holes of the chassis, depending on which end is in the front of the rack.



Note The Catalyst 2948G switch is shown in the rack-mounting illustrations. The rack-mounting procedure for the Catalyst 2980G switch is the same.

Figure 3-1 Attaching the L Brackets

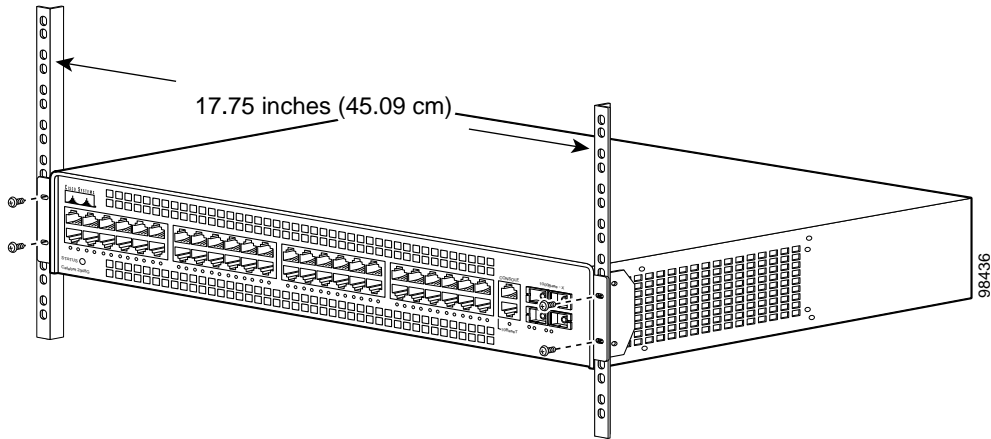


Step 3 [Figure 3-2](#) shows how to attach the front of the switch to the rack. You can also attach the rear of the switch to the rack, depending on the configuration of your rack.

Install the chassis in the rack as follows:

- a. Position the switch chassis in the rack (see [Figure 3-2](#)):
 - If the chassis front panel is to be in the front of the rack, insert the rear of the chassis between the mounting posts.
 - If the rear of the chassis is to be in the front of the rack, insert the front of the chassis between the mounting posts.
- b. Align the mounting holes in the L bracket with the mounting holes in the equipment rack.
- c. Secure the chassis using six 12-24 x 3/4-inch screws (three per side) through the elongated holes in the L bracket and into the threaded holes in the mounting post.
- d. Use the tape measure and level to ensure that the chassis is installed straight and level.

Figure 3-2 Installing the Switch in the Rack



Installing the Catalyst 2948G-GE-TX Switch



Warning

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

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

To install a Catalyst 2948G-GE-TX switch, follow the steps described in these procedures:

- [Rack-Mounting the Catalyst 2948G-GE-TX Switch, page 10](#)
- [Wall-Mounting the Catalyst 2948G-GE-TX Switch, page 16](#)
- [Mounting the Catalyst 2948G-GE-TX Switch on a Table or Shelf, page 19](#)

Rack-Mounting the Catalyst 2948G-GE-TX Switch

To install a Catalyst 2948G-GE-TX switch in a 19-inch rack (24-inch racks require optional mounting hardware), follow the instructions described in these procedures:

- [Removing Screws from the Switch, page 10](#)
- [Attaching Brackets to the Switch, page 11](#)
- [Mounting the Switch in a Rack, page 14](#)
- [Attaching the Cable Guide, page 15](#)
- [Attaching the Brackets to the Switch for Wall-Mounting, page 16](#)
- [Attaching the RPS Connector Cover, page 17](#)
- [Mounting the Switch on a Wall, page 17](#)
- [Mounting the Catalyst 2948G-GE-TX Switch on a Table or Shelf, page 19](#)



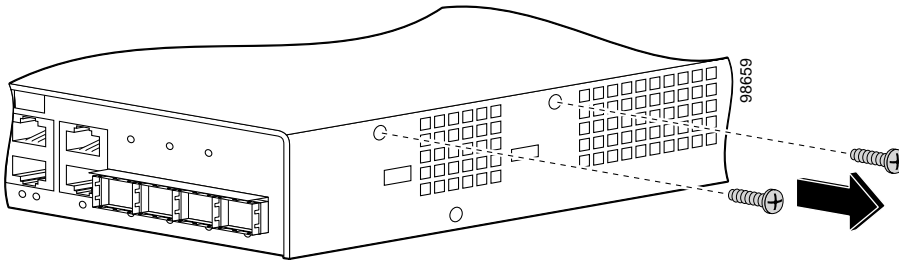
Note

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 (order part number RCKMNT-1RU=) from Cisco.

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 3-3](#) shows how to remove the chassis screws from the switch.

Figure 3-3 Removing Screws from the Catalyst 2948G-GE-TX Switch



Attaching Brackets to the Switch

The bracket orientation and the brackets you use depend on whether you are attaching the brackets for a 19-inch or a 24-inch rack. For 19-inch racks, use the brackets that are included in the mounting kit.

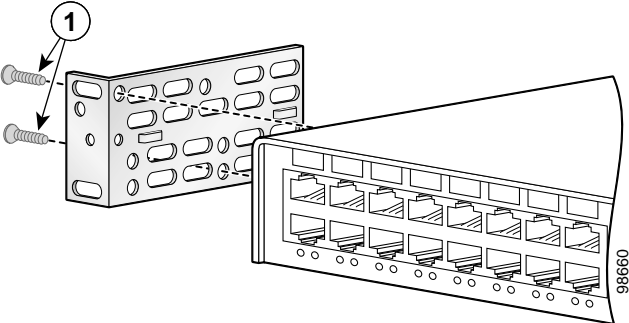


Note

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 (order part number RCKMNT-1RU=) from Cisco.

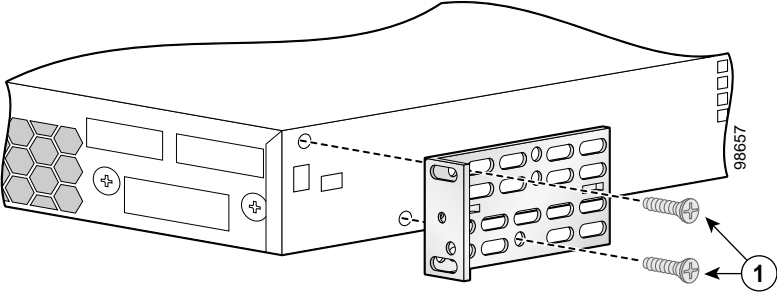
Figure 3-4 through Figure 3-9 show how to attach each type of bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side of the switch.

Figure 3-4 Attaching Brackets for 19-Inch Racks, Front Panel Forward

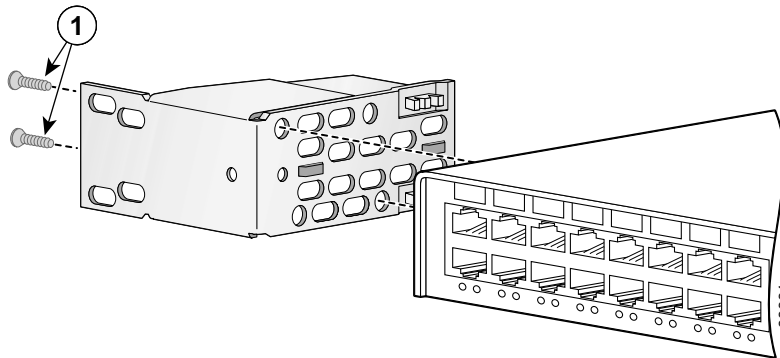


- 1 Phillips flat-head screws

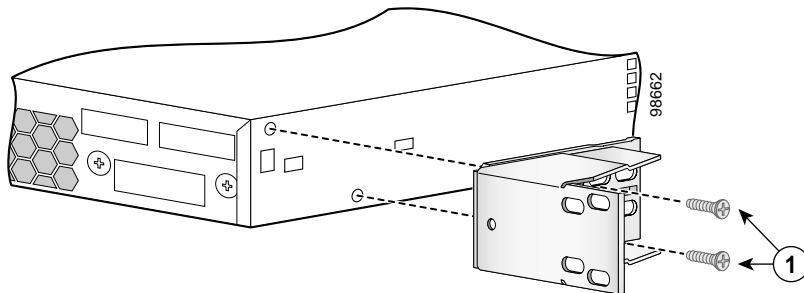
Figure 3-5 Attaching Brackets for 19-Inch Racks, Rear Panel Forward



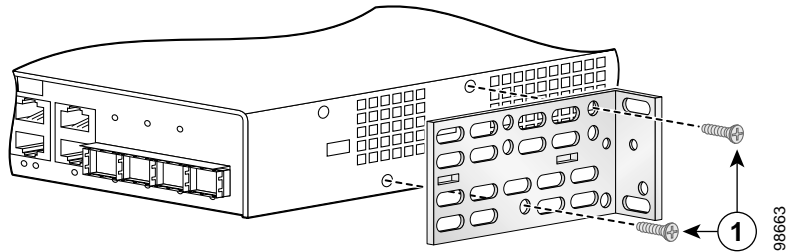
- 1 Phillips flat-head screws

Figure 3-6 Attaching Brackets for 24-Inch Racks, Front Panel Forward

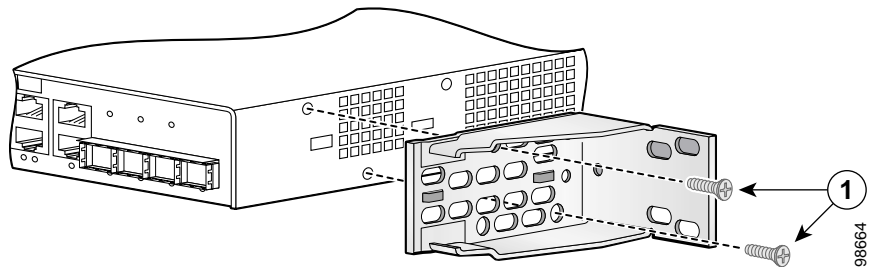
1	Phillips flat-head screws
---	---------------------------

Figure 3-7 Attaching Brackets for 24-Inch Racks, Rear Panel Forward

1	Phillips flat-head screws
---	---------------------------

Figure 3-8 Attaching Brackets for 19-Inch Telco Racks

1	Phillips flat-head screws
---	---------------------------

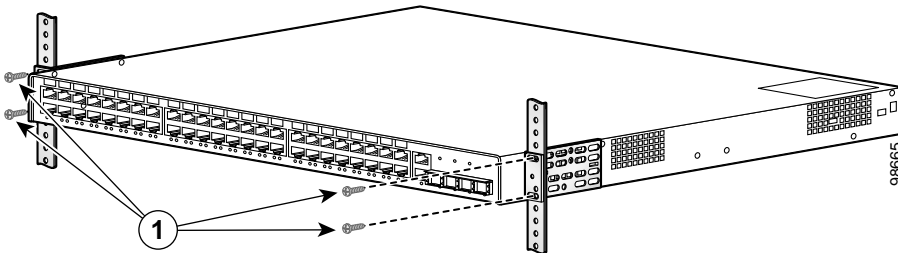
Figure 3-9 Attaching Brackets for 24-Inch Telco Racks

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 3-10](#).

Figure 3-10 Mounting the Catalyst 2948G-GE-TX Switch In a Rack

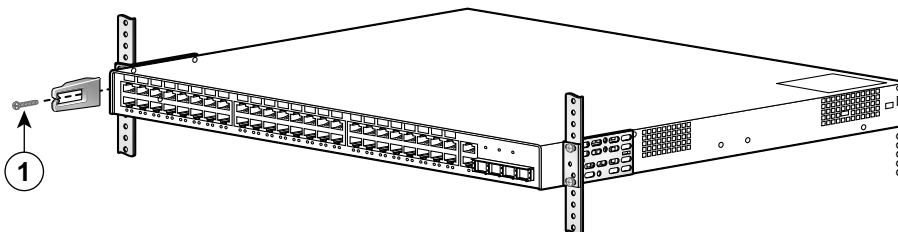


1	Phillips machine screws
---	-------------------------

Attaching the Cable Guide

We recommend attaching the cable guide to the left or right bracket 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, as shown in [Figure 3-11](#), to attach the cable guide to the left or right bracket.

Figure 3-11 Attaching the Cable Guide on the Catalyst 2948G-GE-TX Switch



1	Cable guide screw
---	-------------------



Note

The Catalyst 2948G-GE-TX switch ships with a special cable guide, as shown in [Figure 3-11](#). This cable guide secures up to 48 cables. Use the supplied black screw to mount it on the left or right bracket.

Wall-Mounting the Catalyst 2948G-GE-TX Switch

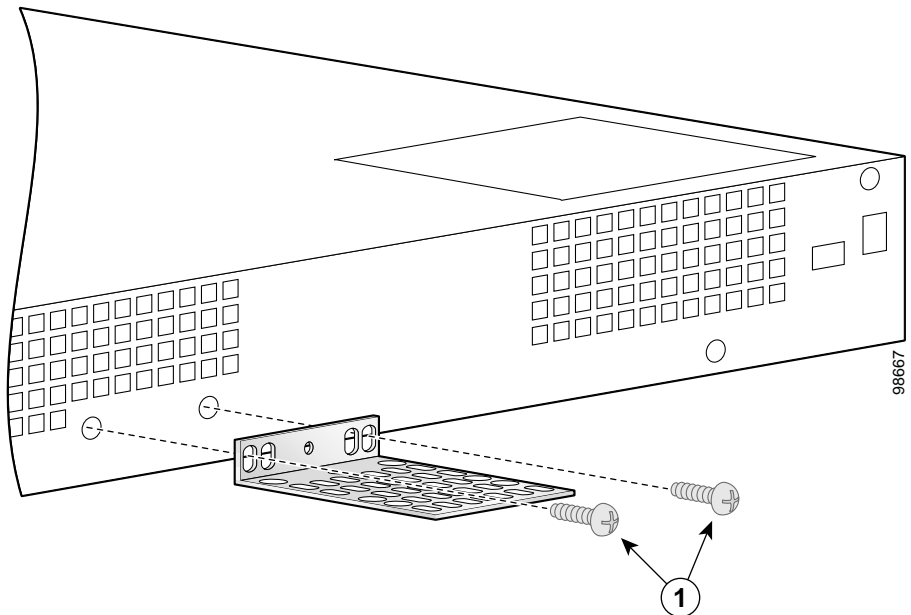
To install the Catalyst 2948G-GE-TX switch on a wall, follow the instructions in these procedures:

- [Attaching the Brackets to the Switch for Wall-Mounting, page 16](#)
- [Attaching the RPS Connector Cover, page 17](#)
- [Mounting the Switch on a Wall, page 17](#)

Attaching the Brackets to the Switch for Wall-Mounting

Figure 3-12 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 of the switch.

Figure 3-12 Attaching the 19-Inch Brackets for Wall-Mounting



- | | |
|---|----------------------------|
| 1 | Phillips truss-head screws |
|---|----------------------------|

Attaching the RPS Connector Cover

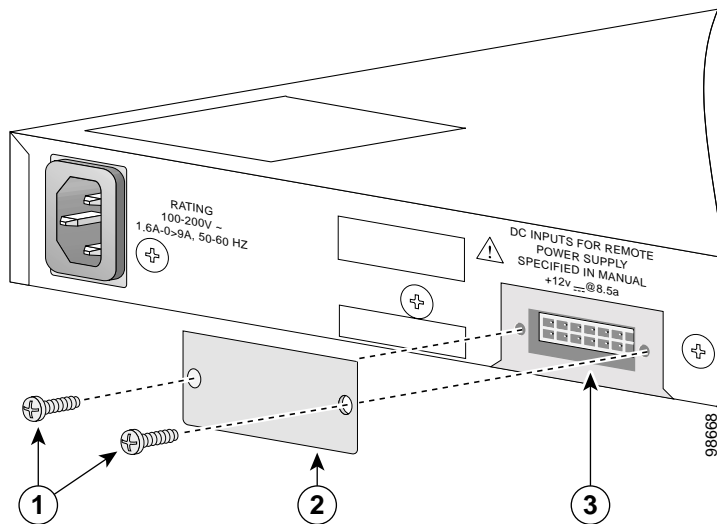
If you are not using a Cisco RPS with your switch, use the two Phillips pan-head screws to attach the RPS connector cover to the back of the switch before you mount it, as shown in [Figure 3-13](#).



Warning

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

Figure 3-13 Attaching the RPS Connector Cover on the Catalyst 2948G-GE-TX Switch



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

Mounting the Switch on a Wall

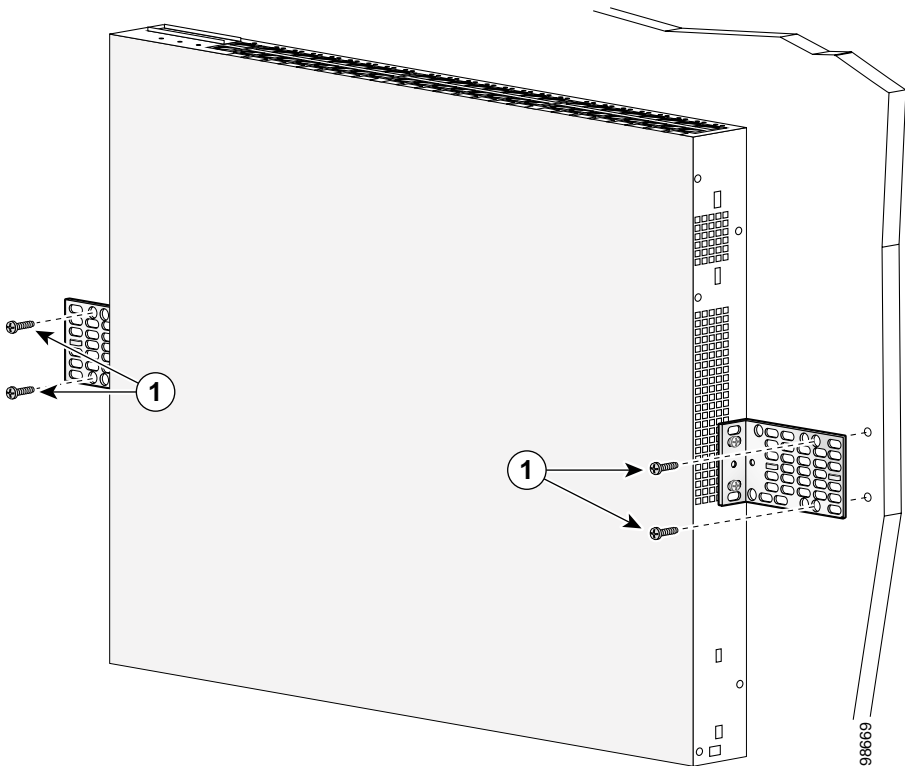
For the best support of the switch and cables, make sure the switch is attached securely to wall studs or to a firmly attached plywood mounting backboard. Mount the switch with the front panel facing up, as shown in [Figure 3-14](#).



Warning

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

Figure 3-14 Mounting the Switch on a Wall



1	User-supplied screws
---	----------------------

Mounting the Catalyst 2948G-GE-TX Switch on a Table or Shelf

To install the switch on a table or shelf, follow these steps:

-
- Step 1** Locate the adhesive strip with the rubber feet in the mounting-kit envelope.
 - Step 2** Attach the four rubber feet to the recessed areas on the bottom of the unit.
 - Step 3** Place the switch on the table or shelf near an AC power source.
-

Connecting Power to the Switches

To connect power to Catalyst 2948G, 2948G-GE-TX, and 2980G switches, follow these steps:

-
- Step 1** Before you connect the power supply to a power source, ensure that all site power and grounding requirements described in [“Site Planning” section on page 2-1](#) have been met.
 - Step 2** Plug the power cord into the chassis.
 - Step 3** Connect the other end of the power cord to an AC-power input source.
 - Step 4** Verify power supply operation by checking the front panel power supply LEDs:
 - When the power supply is operational, the LED is green.
 - When the power supply has failed, the LED is amber.
-

From the system console, enter the **show system** command to display the power supply and system status. For more information on commands, refer to the command reference for your switch.

If the LEDs or the **show system** command indicate a power problem or other system problem, see [Appendix D, “Translated Safety Warnings”](#) for more information.

Connecting to 10/100 and 10/100/1000 Ports

The 10/100 ports on the Catalyst 2948G and 2980G switches configure themselves to operate at the speed and duplex settings of attached devices. They operate at 10 or 100 Mbps in half- or full-duplex mode. If the attached devices do not support autonegotiation, the speed should resolve correctly. You can also explicitly set the speed and duplex parameters.

The 10/100/1000 ports on the Catalyst 2948G-GE-TX switches configure themselves to operate at the speed setting of attached devices. These ports operate at 10, 100, or 1000 Mbps in full-duplex mode. If the attached devices do not support autonegotiation, you can set the speed.

Connecting devices that do not autonegotiate or devices with manually set speed and duplex parameters can reduce performance or result in link failures between the devices. To maximize performance, choose one of these methods for configuring the ports:

- Allow the ports to autonegotiate both speed and duplex for 10/100 ports and only speed for 10/100/1000 ports.
- Set the speed and duplex parameters on both ends of the connection.



Caution

To comply with the intrabuilding lightning surge requirements, intrabuilding wiring must be shielded, and the shield for the wiring must be grounded at both ends.



Caution

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

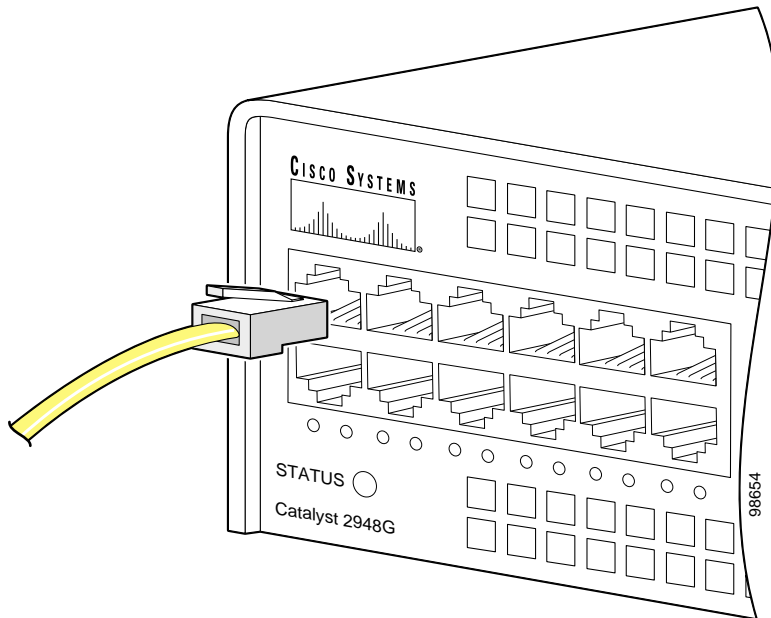
To connect the switch to 10BASE-T, 100BASE-TX, or 1000BASE-T devices, follow these steps:

- Step 1** When connecting to servers, workstations, and routers, insert a twisted-pair straight-through cable in a front-panel RJ-45 connector, as shown in [Figure 3-15](#). When connecting to switches or repeaters, insert a twisted-pair crossover cable. (See the [Appendix A, “Specifications,”](#) for cable-pinout descriptions.)

**Note**

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

Figure 3-15 Connecting to a 10/100 or 10/100/1000 Port



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

Step 3 Observe the port STATUS LED:

- The LED turns amber while Spanning Tree Protocol (STP) discovers the network topology and searches for loops. This process takes about 30 seconds.
- The LED turns green when the switch and the target device have an established link.

The LED does not light when the target device is not turned on, a cable problem exists, or a problem exists with the adapter installed in the target device.

If the STATUS LED does not turn green or does not light at all, see [“Troubleshooting the Installation” section on page 5-1](#) for solutions to cabling problems.

Step 4 Reconfigure and restart the target device if necessary.**Step 5** Repeat Steps 1 through 4 to connect each port.

Connecting a Terminal to the Console Serial and Ethernet Management Ports

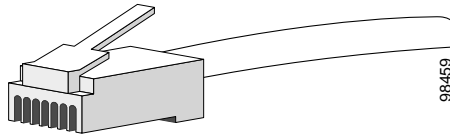
The console serial and Ethernet management ports are located on the front panel of the Catalyst 2948G, 2948G-GE-TX, and 2980G switches. These ports use an RJ-45 media-dependent interface crossed-over (MDIX) connector, as shown in [Figure 3-16](#). For information about port pinouts, see [Appendix A, “Specifications.”](#)

The Catalyst 2948G switches have a 10BASE-T management port. The Catalyst 2948G-GE-TX and 2980G-A switches have a 10/100BASE-T management port.

**Note**

The MDIX Ethernet ports are crossed over internally. For an MDI-to-MDI or MDIX-to-MDIX connection, use a crossover cable. For an MDI-to-MDIX connection, use a straight-through cable, which allows the Tx pins to connect with the Rx pins.

Figure 3-16 Ethernet Cable with RJ-45 Connector



Verifying Switch Operation

After you have connected all the interfaces, check all connections, and then perform the following steps to power on the system to verify that it is operational:

-
- Step 1** Before powering on the system, make sure the connector is installed securely in a grounded outlet at the power-source end of the power cord and that the source power is within the range labeled on the back of the switch. When two power supplies are present, make sure that the second cord is connected to a separate line from the first, if possible.
 - Step 2** Check the console terminal and make sure it is powered on.
 - Step 3** Connect the power cords to the switch.
 - Step 4** Verify that the PSI or PWR LEDs on the power supply front panel is green.
 - Step 5** Listen for the system fans to ensure that they are operational.
 - Step 6** While the system initializes, check that the STATUS LED on the supervisor engine is amber until the boot is complete.



Note Many of the interface LEDs do not illuminate until you configure the interfaces.

When the system boot is complete (it takes a few seconds), the supervisor engine begins to initialize the interfaces. During this initialization, the interface LEDs flash on and off. When initialization is complete, the console screen displays a script and system banner.



Note

When interface LEDs are on, the interface ports may not be functional or enabled. Although the LEDs for many interface types might turn on at system startup, they do not indicate an accurate status until the interface is configured.



Note

If the system does not complete this verification process, see [Chapter 5, “Troubleshooting the Installation.”](#)



Configuring the Gigabit Ethernet Ports



Warning

Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system. Statement 200



Warning

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

This chapter describes how to configure the Gigabit Ethernet ports on the Catalyst 2948G and 2980G switches and how to configure the small form-factor-pluggable (SFP) module slot on the Catalyst 2948G-GE-TX switches. The chapter contains these sections:

- [Installing, Removing, and Maintaining GBICs, page 4-2](#)
- [Connecting To an SFP Module, page 4-12](#)

The Gigabit Ethernet ports can be configured with any combination of GBICs. The Gigabit Ethernet ports on these modules are used primarily for backbone interconnection of other high-performance switches and routers.

Installing, Removing, and Maintaining GBICs

The following sections describe Gigabit Interface Converters (GBICs) and how to install, remove, and maintain them:

- [GBIC Features, page 4-2](#)
- [Port Cabling Specifications, page 4-4](#)
- [GBIC Optical Power Characteristics, page 4-5](#)
- [GBIC Cabling Restrictions, page 4-5](#)
- [Installing GBICs, page 4-6](#)
- [Removing GBICs, page 4-9](#)
- [GBIC Maintenance Guidelines, page 4-10](#)
- [Patch Cord, page 4-10](#)

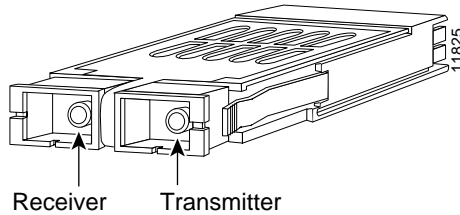
GBIC Features



Warning

Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures. Statement 70

GBICs (see [Figure 4-1](#)) are hot-swappable input/output devices that plug into a Gigabit Ethernet switching module, linking the module with a fiber-optic network. The GBICs use SC-type connectors and plug into connectors on the module. You can install any combination of GBICs in the Gigabit Ethernet switching module.

Figure 4-1 GBIC Module

[Table 4-1](#) lists the GBIC modules that are supported by the Catalyst 2948G and 2980G switches.

Table 4-1 Supported GBIC modules

GBIC Type	Model Number
Fiber-optic 1000BASE-SX	WS-G5484=
Fiber-optic 1000BASE-LX/LH	WS-G5486=
Fiber-optic 1000BASE-ZX	WS-G5487=
Copper 1000BASE-TX GBIC	WS-G5483=
Coarse Wave Division Multiplexing (CWDM) fiber-optic 1000BASE-X GBIC	CWDM-GBIC-1470= CWDM-GBIC-1490= CWDM-GBIC-1510= CWDM-GBIC-1530= CWDM-GBIC-1550= CWDM-GBIC-1570= CWDM-GBIC-1590= CWDM-GBIC-1610=

**Note**

Cisco 1000BASE-LX/LH interfaces fully comply with the IEEE 802.3z 1000BASE-LX standard. However, their higher optical quality allows them to reach 10 kilometers over single-mode fiber (SMF) versus the 5 kilometers specified in the standard.

Other GBIC media types may be supported as additional technology becomes available.

**Note**

Because of interoperability issues, Cisco does not support GBICs purchased from third-party vendors.

Port Cabling Specifications

[Table 4-2](#) provides cabling specifications for the GBICs. The minimum cable distance for all GBICs listed (MMF [multimode fiber] and SMF) is 6.5 feet (2 meters).

**Note**

For information about the Coarse Wave Division Multiplexing (CWDM), refer to the *Cisco CWDM GBIC and CWDM SFP Installation Note*.

Table 4-2 GBIC Port Cabling Specifications

GBIC	Wavelength ¹ (nm)	Fiber Type	Core Size (microns)	Modal Bandwidth (MHz/km)	Maximum Cable Distance
SX ²	850	MMF	62.5	160	722 ft (220 m)
			62.5	200	902 ft (275 m)
			50.0	400	1640 ft (500 m)
			50.0	500	1804 ft (550 m)
LX/LH	1300	MMF ³	62.5	500	1804 ft (550 m)
			50.0	400	1804 ft (550 m)
			50.0	500	1804 ft (550 m)
		SMF	9/10	–	6.2 mi (10 km)
ZX	1550	SMF	9/10	–	43.5 mi (70 km)
		SMF ⁴	–	–	62.1 mi (100 km)

1. Nominal fiber specification wavelength.
2. MMF only.
3. Patch cord required (refer to the [“Patch Cord” section on page 4-10](#) for details).
4. Dispersion-shifted single-mode fiber-optic.

GBIC Optical Power Characteristics

Table 4-3 provides the GBIC optical power characteristics.



Note

For information about the Coarse Wave Division Multiplexing (CWDM), refer to the *Cisco CWDM GBIC and CWDM SFP Installation Note*.

Table 4-3 GBIC Optical Power Characteristics

Parameter	1000BASE-SX (WS-G5484)	1000BASE-LX/LH (WS-G5486)	1000BASE-ZX (WS-G5487)
Transmitter output power (min/max)	0/−9.5 dBm	−3/−9.5 dBm	0/4.77 dBm
Receiver maximum input power	0 dBm	−3 dBm	−3 dBm
Receiver sensitivity	−17 dBm	−19 dBm	−23 dBm
Channel insertion loss			
50/125 micron ¹ MMF	3.4 dBm	4.4 dBm	—
62.5/125 micron MMF	3.2 dBm	6 dBm	—
9/10 micron SMF	—	6.5 dBm	21.5 dBm

1. 1 micron (μ) equals 1 micrometer or 10^{−6} meters

GBIC Cabling Restrictions

You must observe the following fiber-optic cabling restrictions when using GBICs:

- The minimum cabling distance for 1000BASE-SX and 1000BASE-LX/LH GBICs is 6.5 feet (2 meters).
- The maximum cabling distance for each GBIC type is listed in [Table 4-2](#).

- When using the 1000BASE-LX/LH GBIC with 62.5-micron diameter MMF, you must install a mode-conditioning patch cord between the MMF fiber-optic network and the GBIC. The mode-conditioning patch cord (CAB-GELX-625 or equivalent) is required to comply with IEEE standards. See the “Patch Cord” section on page 4-10 for more information.
- You must insert a 10-dB inline optical attenuator between the single-mode fiber-optic network and the receiving port on the 1000BASE-ZX GBIC at each end of the link if the link length is less than 15.5 miles (25 km).
- You must insert a 5-dB inline optical attenuator between the single-mode fiber-optic network and the receiving port on the 1000BASE-ZX GBIC at each end of the link if the link is greater than 15.5 miles (25 km), but less than 31 miles (50 km).

Installing GBICs

This section describes how to install GBICs.



Caution

Unnecessary removal and insertion of a GBIC could lead to premature failure of the GBIC. A GBIC has a lifetime of 100 to 500 removals and insertions.

A switch can be shipped with or without GBICs installed.



Caution

When removing or inserting a GBIC, always wear an ESD wrist strap connected to the ESD wrist strap connector. For more information about ESD, refer to the *Site Preparation and Safety Guide*.



Note

GBICs are online swappable.

To install a GBIC, perform these steps:

-
- Step 1** Remove the GBIC from its protective packaging.
- Step 2** Verify that the GBIC is the correct type for your network by checking the part number.

The part number indicates whether it is 1000BASE-SX, 1000BASE-LX/LH, or 1000BASE-ZX.

- Step 3** Grip the sides of the GBIC with your thumb and forefinger; insert the GBIC into the slot on the front of the module.

See [Figure 4-2](#) for GBIC installation on a Catalyst 2948G switch. See [Figure 4-3](#) for GBIC installation on a Catalyst 2980G switch.



Note GBICs are keyed to prevent incorrect slot insertion. See [Figure 4-4](#).

Figure 4-2 Installing a GBIC on a Catalyst 2948G Switch

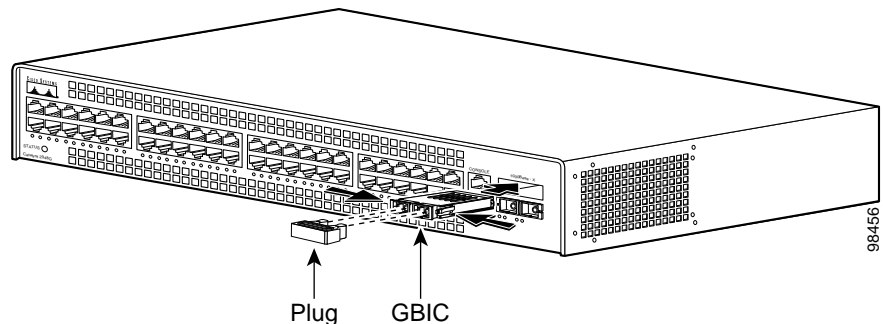
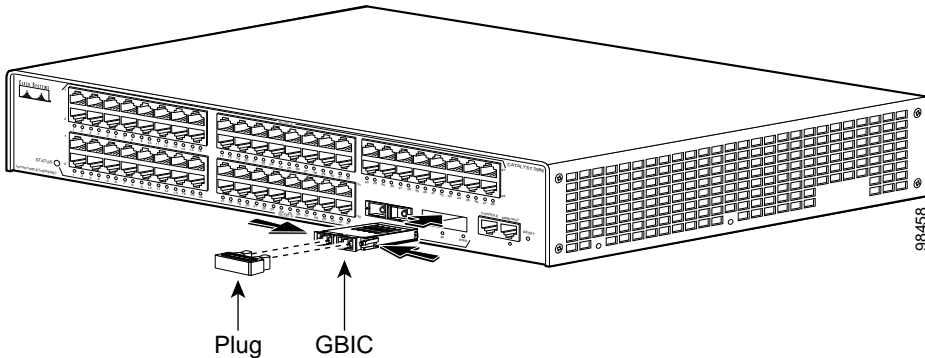


Figure 4-3 Installing a GBIC on a Catalyst 2980G Switch



Step 4 Slide the GBIC into the slot until you hear a click. The click indicates that the GBIC is locked into the slot.

Step 5 When you are ready to attach the fiber-optic cable, remove the plug from the GBIC and save it for future use.



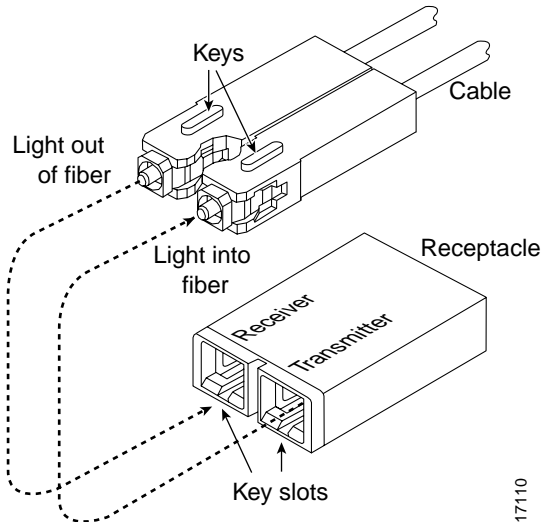
Caution

Do not remove the plug from the GBIC optical bores or the fiber-optic cable until you are ready to connect the cable. The plug protects the GBIC optical bores and cable from contamination.

Step 6 Remove the protective plug from the SC-type connector on the fiber-optic cable if necessary. Insert the connector into the GBIC.

When you plug the SC-type connector into the GBIC, make sure that both the Tx and Rx fiber-optic cables are already fully inserted into the SC-type connector.

Figure 4-4 Connecting the SC-Type Connector



17110

**Note**

If you are using the LX/LH GBIC with MMF, you need to install a patch cord between the GBIC and the MMF cable. See the [“Patch Cord”](#) section on page 4-10 for details.

Removing GBICs

**Note**

If you are removing the GBIC from an online switch, enter the **show port** command to verify the type of GBIC that is installed.

To remove a GBIC, perform these steps:

- Step 1** Disconnect the fiber-optic cable from the GBIC SC-type connector.
- Step 2** Release the GBIC from the slot by simultaneously squeezing the plastic tabs (one on each side of the GBIC).

- Step 3** Slide the GBIC out of the slot.
- Step 4** Install the plug into the GBIC optical bores and place the GBIC in its protective packaging.
-

GBIC Maintenance Guidelines

Follow these GBIC maintenance guidelines:

- GBICs are static sensitive. To prevent ESD damage, follow your normal board and component handling procedures.
- GBICs are dust sensitive. When the GBIC is stored or when a fiber-optic cable is not plugged in, always keep plugs in the GBIC optical bores.
- The most common source of contaminants in the optical bores is debris picked up on the ferrules of the optical connectors. Use an alcohol swab or Kim-Wipe to clean the ferrules of the optical connector.

Patch Cord

When using the LX/LH GBIC with a 62.5-micron diameter core size MMF, you must install a mode-conditioning patch cord (Cisco product number CAB-GELX-625 or equivalent) between the GBIC and the MMF cable on both the transmit and receive ends of the link. The patch cord is required for link distances greater than 984 feet (300 meters).



Note

We do not recommend using the LX/LH GBIC with MMF without a patch cord for very short link distances (tens of meters). The result could be an elevated bit error rate (BER).



Note

The patch cord is required to comply with IEEE standards. The IEEE found that link distances could not be achieved with certain types of fiber-optic cable due to a problem in the center of some fiber-optic cable cores. The solution is to launch light from the laser at a precise offset from the center by using the patch cord. At

the output of the patch cord, the LX/LH GBIC is compliant with the IEEE 802.3z standard for 1000BASE-LX. For a detailed description of this problem, refer to [Appendix C, “Differential Mode Delay.”](#)

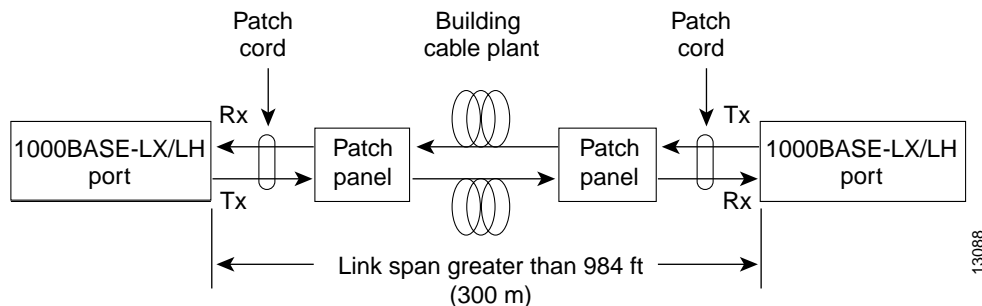
**Note**

Cisco Gigabit Ethernet products have been tested and evaluated to comply with the standards listed in [Appendix A, “Specifications.”](#) Equivalent cables should also meet these standards.

Patch Cord Configuration Example

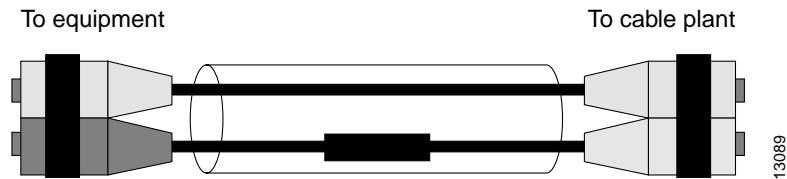
[Figure 4-5](#) shows a typical configuration using patch cords.

Figure 4-5 Patch Cord Configuration



Patch Cord Installation

Plug the end of the patch cord labeled “To equipment” into the GBIC (see [Figure 4-6](#)). Plug the end labeled “To cable plant” into the patch panel. The patch cord is 9.84 feet (3 meters) long and has duplex SC-type male connectors at each end.

Figure 4-6 Patch Cord Installation

Connecting To an SFP Module

This section describes how to connect to an SFP module. For instructions about how to install or remove an SFP module, refer to the *Cisco Small Form-Factor Pluggable Modules Installation Notes* (not orderable but is available on Cisco.com) and to the documentation that came with your SFP module.

[Table 4-4](#) lists the SFP modules supported by the Catalyst 2948G-GE-TX switch.

Table 4-4 Supported SFP Modules

SFP Type	Model Number
Fiber-optic 1000BASE-LX	GLC-LS-SM=
Fiber-optic 1000BASE-SX	GLC-SX-MM=
Fiber-optic 1000BASE-ZX	GLC-ZX-SM=
Copper 1000BASE-T	GLC-T=
Coarse Wave Division Multiplexing (CWDM) fiber-optic SFP modules	CWDM-SFP-1470= CWDM-SFP-1490= CWDM-SFP-1510= CWDM-SFP-1530= CWDM-SFP-1550= CWDM-SFP-1570= CWDM-SFP-1590= CWDM-SFP-1610=

The restrictions are that each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the recommended cable length for reliable communications. [Table 4-5](#) lists these recommendations.

Table 4-5 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	160	722 ft (220 m)
			62.5	200	902 ft (275 m)
			50.0	400	1640 ft (500 m)
			50.0	500	1804 ft (550 m)
1000BASE-LX/LH	1300	MMF ¹	62.5	500	1804 ft (550 m)
			50.0	400	1804 ft (550 m)
		SMF	50.0	500	1804 ft (550 m)
			9/10	—	6.2 mi (10 km)
1000BASE-ZX	1550	SMF	9/10	—	43.4 to 62 mi (70 to 100 km) ²

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 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

For information about the Coarse Wave Division Multiplexing (CWDM), refer to the *Cisco CWDM GBIC and CWDM SFP Installation Note*.

The 1000BASE-T (copper) SFP module is used to establish a Gigabit Ethernet connection through a Category 5 Category 5 cable.

Use only Cisco SFP modules on the Catalyst 2948G-GE-TX 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 more information about these SFP modules, refer to your SFP module documentation and to the *Cisco Small Form-Factor Pluggable Modules Installation Notes* (not orderable but is available on Cisco.com.)

For the latest information about SFP modules supported by the switch, refer to the release notes.

**Caution**

Do not remove the rubber plugs from the ports on fiber-optic SFP modules or the rubber caps from the 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.

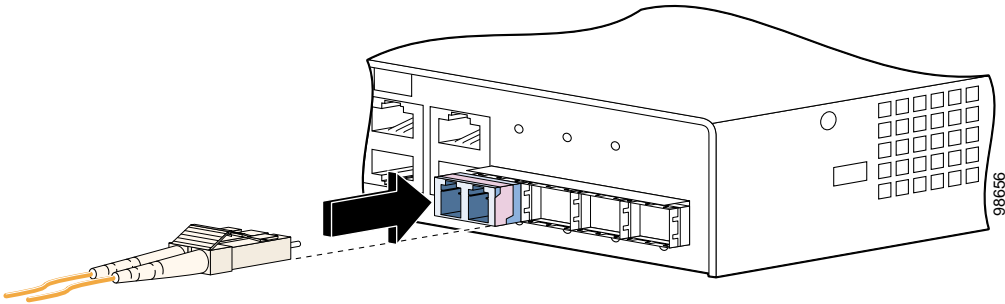
Before connecting to an SFP module, be sure that you understand the port and cabling stipulations in [Table 4-5](#). See [Appendix A, “Specifications,”](#) for information about the LC on the SFP modules for fiber-optic connections.

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

**Warning**

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.
Statement 272

-
- 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, as shown in [Figure 4-7](#).

Figure 4-7 Connecting to an SFP Module Port

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

Step 4 Observe the port 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 5, “Troubleshooting the Installation,”](#) for solutions to cabling problems.

- Step 5** If necessary, reconfigure and restart the switch or target device.
- The Gigabit Ethernet ports on these modules are used primarily for backbone interconnection of other high-performance switches and routers.
-

After you have connected all the interfaces, check all connections, and then perform the steps described in the [“Verifying Switch Operation” section on page 3-23](#) to verify that the switch is operational.



Troubleshooting the Installation

This chapter describes how to troubleshoot the Catalyst 2948G, 2948G-GE-TX, and 2980G switch installations. It contains these sections:

- [Getting Started, page 5-2](#)
- [Problem Solving to the System Component Level, page 5-2](#)
- [Identifying Startup Problems, page 5-3](#)
- [Troubleshooting the Power Supply, page 5-4](#)
- [Contacting Customer Service, page 5-5](#)

If you have problems starting up your system, use the information in this chapter to help isolate the cause. Problems with the initial startup are often caused by poor or improper connections. Temperature conditions above the maximum acceptable level are rarely the source of problems at startup; however, environmental monitoring functions are included in the following sections because they also monitor DC-line voltages.

For configuration questions or problems, refer to the software configuration guide or the command reference for your switch.

Getting Started

When the initial system boot is complete, verify the following:

- Power supplies are supplying power to the system.
- On Catalyst 2948G and 2980G switches, the system fan assembly is operating.
- On Catalyst 2948G-GE-TX switches, the blower is operating.

If all of these conditions are met and the hardware installation is complete, refer to the software configuration guide and the command reference for your switch to troubleshoot the software. However, if any of these conditions is not met, use the procedures in this chapter to isolate and, if possible, resolve the problem.

Problem Solving to the System Component Level

The key to success when troubleshooting the system is to isolate the problem to a specific system component. The first step is to compare what the system *is* doing to what it *should be* doing. Because a startup problem can usually be attributed to a single component, it is more efficient to isolate the problem to a subsystem rather than troubleshoot each component in the system separately.

The switch consists of the following subsystems:

- Power supply—Includes the power supplies and power supply fans (see [“Troubleshooting the Power Supply” section on page 5-4](#))
- Fans—The fan assembly should operate whenever system power is on. The fan assembly continues to operate even when the environmental monitor shuts the system down because of an overtemperature or overvoltage condition (although it will shut down in the event of a power supply shutdown).

The following are simple checks you can make to determine if there is a fan problem:

- Determine if the software is reporting a temperature problem.
- Listen to the fan assembly to determine if it is operating.
- Check for any obstructions that might be restricting the airflow through the switch.

If you encounter a problem in performing any of the above checks, you should contact a customer service representative.

Identifying Startup Problems

LEDs indicate all system states in the startup sequence. By checking the LEDs, you can determine when and where the system failed in the startup sequence. If you have problems after the switch is powered on and the startup sequence is complete, refer to the software configuration guide for your switch.

After you connect the power cord to the Catalyst 2948G, 2948G-GE-TX, or 2980G switches, follow these steps:

Step 1 You should immediately hear the system fans begin to operate. If you do not, see the [“Troubleshooting the Power Supply” section on page 5-4](#). If you determine that the power supplies are functioning normally and that the fans are faulty, contact a customer service representative.

Step 2 Check the power supply LEDs as follows:

- The power supply LED should turn green immediately when power is applied to the switch. The LED should remain on during normal system operation.
- If the LED turns amber, see the section, [“Troubleshooting the Power Supply” section on page 5-4](#).

Step 3 Check that the LEDs on the front panel light as follows:

- The STATUS LED flashes amber once and stays amber during diagnostic boot tests. It turns green when the switch is operational (on line). If the system software is unable to start up, this LED stays amber.
- The Link LED flashes amber once after diagnostic boot tests, and turns green when the module is operational (on line). If no signal is detected, the Link LED turns off. The Link LED blinks amber continuously if the port is bad.



Note After the diagnostic boot tests, the single flash of amber on the Link LED may occur too quickly to be detected visually.

- If a STATUS LED is red or amber, contact a customer service representative for instructions.

- Step 4** If the boot information and system banner are not displayed, verify that the terminal is set correctly and that it is connected properly to the console port.
-

Troubleshooting the Power Supply

To help isolate a power subsystem problem, follow these steps:

- Step 1** Check the power supply LED:



Note Power supply LEDs are labeled PSI, PWR, and RPS.

- If the LED is either off or amber, unplug the power cord, and then plug the power cord in again.
- If the LED remains off, there might be a problem with the AC source, or the power cable. Connect the power cord to another power source (if one is available).

If the LED then lights, the problem is the first power source.

- If the LED fails to light after you connect the power supply to a new power source, replace the power cord.

If the LED still fails to light, the power supply is probably faulty.

- Step 2** If a Redundant Power System (RPS) is installed, check the RPS LED:

If the LED is amber or off, repeat the previous procedure to troubleshoot the second power supply.



Note If the power supply is a Cisco RPS 675 and the LED is amber, the RPS may be in standby mode. Press the Standby/Active button on the RPS to put it in active mode and the LED should then turn to green.

**Note**

If you are using an RPS, do not apply power to the RPS *and* the switch simultaneously. Disconnect power from the internal power supply before turning the power on for the RPS. The RPS contains multiple power supplies for redundant power protection. Refer to the RPS documentation for installation and configuration details.

Step 3 If you are unable to resolve the problem, contact a customer service representative for instructions.

Contacting Customer Service

If you are unable to solve a startup problem after using the troubleshooting suggestions in this chapter, contact a customer service representative for assistance and further instructions. Before you call, have the following information ready to help your customer service representative assist you as quickly as possible:

- Date you received the switch
- Chassis serial number (located on a label on the right of the rear panel of the chassis)
- Type of software and release number
- Maintenance agreement or warranty information
- Brief description of the problem
- Brief explanation of the steps you have already taken to isolate and resolve the problem



Specifications

This appendix provides management port and technical specifications for the Catalyst 2948G, 2948G-GE-TX, and 2980G switches.

Console Serial Port

The console serial port is an RJ-45 receptacle. Data terminal ready (DTR) and data set ready (DSR) handshake signals are supported on this port. The Request To Send (RTS) signal tracks the state of the Clear To Send (CTS) input. [Table A-1](#) lists the console port pinouts.

Table A-1 Console Port Pinouts

Pin	Signal	Direction	Description
1	RTS	output	request to send
2	DTR	output	data terminal ready
3	TXD	output	transmit data
4	GND		
5	GND		
6	RXD	input	receive data
7	DSR	input	data set ready
8	CTS	input	clear to send

10BASE-T and 10/100BASE-T Ethernet Management Ports

The Ethernet management port on each switch is an RJ-45 receptacle with a Link Status LED. [Table A-2](#) lists the port pinouts.

Table A-2 10BASE-T Port Pinouts

Pin	Signal	Direction	Description
1	RXD+	input	receive data
2	RXD-	input	receive data
3	TXD+	output	transmit data
4	unused		
5	unused		
6	TXD-	output	transmit data
7	unused		
8	unused		

Catalyst 2948G Switch Specifications

[Table A-3](#) lists the Catalyst 2948G specifications.

Table A-3 Catalyst 2948G Switch Specifications

Item	Specification
Environmental	
Temperature, ambient operating	32°F (0°C) to 104°F (40°C)
Temperature, ambient nonoperating and storage	-40°F (-40°C) to 167°F (75°C)
Humidity (RH), ambient (noncondensing) operating	10% to 90%

Table A-3 Catalyst 2948G Switch Specifications (continued)

Item	Specification
Environmental (continued)	
Humidity (RH), ambient (noncondensing) nonoperating and storage	5% to 95%
Altitude, operating and nonoperating	0 to 65621.7 ft (0 to 2,000 m)
Switching Components	
Backplane	12 Gbps full duplex
Microprocessor	150-MHz R5000 RISC-Y2K compliant
Memory	64 MB SDRAM, 12 MB Flash (onboard), 512 KB NVRAM, 8 MB synchronous SRAM, 256 bytes serial EEPROM
Physical Characteristics	
Dimensions (H x W x D)	2.625 x 17.5 x 15 in. (6.6 x 44 x 38 cm)
Weight	13 lb. (5.9 kg)
AC Power	
Power supply output	120 W
System power dissipation	189 W
System heat dissipation	645 BTU/hr.
AC input current	2.5 A maximum at 100 VAC 1.3 A maximum at @ 240 VAC
AC frequency	50 to 60 Hz
KVA rating	0.20
Airflow	Front side in, back side out

Table A-3 Catalyst 2948G Switch Specifications (continued)

Item	Specification
Standards Compliance	
Compliance	CE Marking
Safety	UL ¹ 1950, CSA ² -C22.2 No. 950, EN ³ 60950, IEC ⁴ 60950
EMI ⁵	CFR ⁶ 47, part 15 Class A (FCC), ICES ⁷ 003 Class A with UTP cables, EN55022 Class A with UTP cables, CISPR22 ⁸ Class A with UTP cables, AS/NZS 3548 Class A with UTP cables, and VCCI ⁹ Class A with UTP cables EN55024, ETS 300 386 EN55022 Class B with FTP cables, CISPR22 Class B with FTP cables, AS/NZS 3548 Class B with FTP cables, and VCCI Class B with FTP cables

1. UL = Underwriters Laboratory
2. CSA = Canadian Standards Association
3. EN = European Norm
4. IEC = International Electrotechnical Commission
5. EMI = electromagnetic interference
6. CFR = Code of Federal Regulations
7. ICES = International Commerce Exchange Systems
8. CISPR = Comite International Special des Perturbation Radioelectriques
9. VCCI = Voluntary Control Council for Information Technology Equipment

Catalyst 2948G-GE-TX Switch Specifications

Table A-4 lists the Catalyst 2948G-GE-TX specifications.

Table A-4 Catalyst 2948G-GE-TX Switch Specifications

Item	Specification
Environmental	
Temperature, ambient operating	32°F (0°C) to 104°F (45°C)
Temperature, ambient nonoperating and storage	−40°F (−40°C) to 167°F (75°C)
Humidity (RH), ambient (noncondensing) operating	10% to 90%
Humidity (RH), ambient (noncondensing) nonoperating and storage	5% to 95%
Altitude, operating and nonoperating	0 to 65621.7 ft (0 to 2,000 m)
Physical Characteristics	
Dimensions (H x W x D)	1.75 x 17.5 x 17 in. (4.45 x 44.5 x 43.1 cm)
Weight	13 lb. (5.9 kg)
AC Power	
Power supply output	110 W
System power dissipation	130 W
System heat dissipation	445 BTU/hr.
AC input current	1.5 A maximum at 100 VAC 0.8 A maximum at 240 VAC
AC frequency	50 to 60 Hz
KVA rating	0.13
Airflow	Front side in, back side out

Table A-4 Catalyst 2948G-GE-TX Switch Specifications (continued)

Item	Specification
Standards Compliance	
Compliance	CE Marking
Safety	UL ¹ 1950, CSA ² -C22.2 No. 950, EN ³ 60950, IEC ⁴ 60950
EMI ⁵	CFR ⁶ 47, part 15 Class A (FCC), ICES ⁷ 003 Class A with UTP cables, EN55022 Class A with UTP cables, CISPR22 ⁸ Class A with UTP cables, AS/NZS 3548 Class A with UTP cables, and VCCI ⁹ Class A with UTP cables EN55024, ETS 300 386

1. UL = Underwriters Laboratory
2. CSA = Canadian Standards Association
3. EN = European Norm
4. IEC = International Electrotechnical Commission
5. EMI = electromagnetic interference
6. CFR = Code of Federal Regulations
7. ICES = International Commerce Exchange Systems
8. CISPR = Comite International Special des Perturbation Radioelectriques
9. VCCI = Voluntary Control Council for Information Technology Equipment

Catalyst 2980G Switch Specifications

Table A-5 lists the Catalyst 2980G switch specifications.

Table A-5 Catalyst 2980G Switch Specifications

Item	Specification
Environmental	
Temperature, ambient operating	32°F (0°C) to 104°F (40°C)
Temperature, ambient nonoperating and storage	-4°F (-20°C) to 149°F (65°C)

Table A-5 Catalyst 2980G Switch Specifications (continued)

Item	Specification
Humidity (RH), ambient (noncondensing) operating	10% to 90%
Humidity (RH), ambient (noncondensing) nonoperating and storage	5% to 95%
Altitude, operating and nonoperating	6561.7 ft. (0 to 2,000 m)
Switching Components	
Backplane	12 Gbps full duplex
Microprocessor	150-MHz R5000 RISC-Y2K compliant
Memory	64 MB SDRAM, 16 MB Flash (onboard), 512 KB NVRAM, 8 MB synchronous SRAM, 256 bytes serial EEPROM
Physical Characteristics	
Dimensions (H x W x D)	3.38 x 17.17 x 14.3 in. (8.6 x 43.6 x 36.3 cm)
Weight	13 lb. (5.9 kg)
AC Power	
Power supply output	175 W (156 W on the Catalyst 2980G-A)
System power dissipation	270 W
System heat dissipation	950 BTU/hr. (670 BTU/hr. on the Catalyst 2980G-A)
AC input current	3 A maximum at 100 VAC 1 A maximum at 240 VAC
AC frequency	50 to 60 Hz
KVA rating	0.30
Airflow	Right side in, left side out
Standards Compliance	
Compliance	CE Marking

Table A-5 Catalyst 2980G Switch Specifications (continued)

Item	Specification
Safety	UL ¹ 1950, CSA ² -C22.2 No. 950, EN ³ 60950, IEC ⁴ 60950
EMI ⁵	FCC ⁶ Class A (CFR ⁷ 47, part 15), ICES ⁸ -003 Class A, EN55022 Class A, CISPR22 ⁹ Class A, AS/NZS 3548 Class A, and VCCI ¹⁰ Class A with FTP ¹¹ cables EN55022 Class B, CISPR22 Class B, AS/NZS 3548 Class B, and VCCI Class B with FTP cables

1. UL = Underwriters Laboratories
2. CSA = Canadian Standards Association
3. EN = European Norm
4. IEC = International Electrotechnical Commission
5. EMI = electromagnetic interference
6. FCC = Federal Communications Commission
7. CFR = Code of Federal Regulations
8. ICES = International Commerce Exchange Systems
9. CISPR = Comite International Special des Perturbation Radioelectriques
10. VCCI = Voluntary Control Council for Information Technology Equipment
11. FTP = foil-twisted pair



Repacking a Switch

This appendix provides repacking and shipping instructions for the Catalyst 2948G, 2948G-GE-TX, and 2980G switches if you need to return your switch to the factory.

To repack the switch using the original packaging material, follow these steps:

Step 1 Slide the pieces of the packing foam over the switch. (See [Figure B-1](#).)



Note The Catalyst 2948G switch is shown in [Figure B-1](#). The repackaging procedure for the other switches is identical.

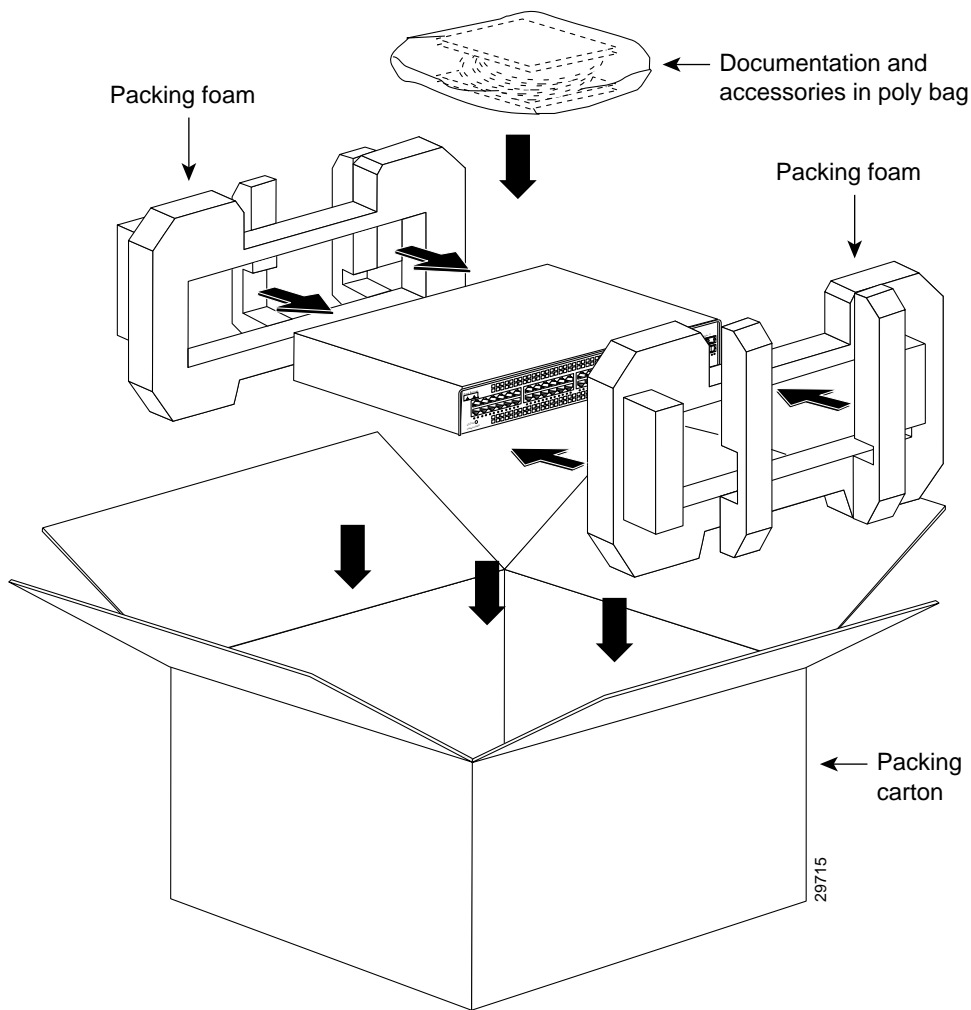
Step 2 Place the documentation and accessory kit in the box or poly bag provided.

Step 3 Place the box or poly bag containing the documentation and accessory kit on top of the packing material.

Step 4 Place the switch (with packing foam pieces) into the packing carton.

Step 5 Fold in the top flaps of the packing carton and seal with packing tape.

Figure B-1 Switch Packing Material





Differential Mode Delay

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

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

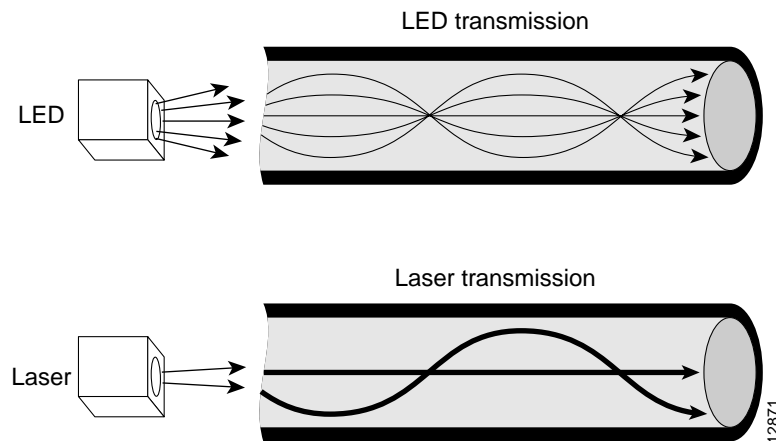
Lasers function at the baud rates and longer distances required for Gigabit Ethernet. The IEEE 802.3z Gigabit Ethernet Task Force has identified the DMD condition that occurs in certain circumstances with particular combinations of lasers and MMF cable. The resulting characteristics create an additional element of jitter, which limits the reach of Gigabit Ethernet over MMF cable.

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

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

MMF cable has been tested for use only with LED sources. LEDs create a condition within a fiber-optic cable referred to as an *overfilled launch* condition. The overfilled launch condition describes the way LED transmitters couple light into the fiber-optic cable in a broad spread of modes. Similar to a light bulb radiating light in a dark room, the generated light that shines in multiple directions can overfill the existing cable space and excite a large number of modes. (See [Figure C-1](#).)

Figure C-1 LED Transmission Compared to Laser Transmission



Lasers launch light in a more concentrated fashion. A laser transmitter couples light into only a fraction of the existing modes or optical pathways present in the fiber-optic cable. (See [Figure C-1](#).)

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

modes. This is in contrast to an unconditioned launch, which, in the worst case, might concentrate all of its light in the center of the fiber-optic cable, exciting only two or more modes equally.

A significant variation in the amount of DMD is produced from one MMF cable to the next. No reasonable test can be performed to survey an installed cable plant to assess the effect of DMD. Therefore, you must use a mode-conditioning patch cord for all interfaces using MMF when the link span exceeds 984 feet (300 meters). For link spans less than this, you can omit the patch cord (there is no problem using it on short links).





Translated Safety Warnings

This appendix repeats in multiple languages the warnings in this guide. These translated warnings can be used with other documents related to this guide.

Warning Definition



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

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 figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető 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。

Safety Information Referral Warning

**Warning**

Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system. Statement 200

Waarschuwing

Lees de handleiding *Vorbereiding en veiligheid van de locatie Handleiding* voordat u het systeem installeert of gebruikt of voordat u onderhoud aan het systeem uitvoert. Deze handleiding bevat belangrijke beveiligingsvoorschriften waarvan u op de hoogte moet zijn voordat u met het systeem gaat werken.

Varoitus	Ennen kuin asennat järjestelmän tai käytät tai huollat sitä, lue <i>Asennuspaikan valmistelu-jaturvaopas</i> -opasta. Tässä oppaassa on tärkeitä turvallisuustietoja, jotka tulisi tietää ennen järjestelmän käyttämistä.
Attention	Avant d'installer le système, de l'utiliser ou d'assurer son entretien, veuillez lire le <i>Guide de sécurité et de préparation du site</i> . Celui-ci présente des informations importantes relatives à la sécurité, dont vous devriez prendre connaissance.
Warnung	Warnhinweis Bevor Sie das System installieren, in Betrieb setzen oder warten, lesen Sie die <i>Anleitung zur Standortvorbereitung und Sicherheitshinweise</i> . Dieses Handbuch enthält wichtige Informationen zur Sicherheit, mit denen Sie sich vor dem Verwenden des Systems vertraut machen sollten.
Avvertenza	Prima di installare, mettere in funzione o effettuare interventi di manutenzione sul sistema, leggere le informazioni contenute nella documentazione sulla <i>Guida alla sicurezza</i> . Tale guida contiene importanti informazioni che è necessario acquisire prima di iniziare qualsiasi intervento sul sistema.
Advarsel	Før du installerer, tar i bruk eller utfører vedlikehold på systemet, må du lese <i>Veiledning for stedsklargjøring og sikkerhet</i> . Denne håndboken inneholder viktig informasjon om sikkerhet som du bør være kjent med før du begynner å arbeide med systemet.
Aviso	Antes de instalar, funcionar com, ou prestar assistência ao sistema, leia o <i>Guia de Preparação e Segurança do Local</i> . Este guia contém informações de segurança importantes que deve conhecer antes de trabalhar com o sistema.
¡Advertencia!	Antes de instalar, manejar o arreglar el sistema, le aconsejamos que consulte la <i>Guía de prevención y preparación de una instalación</i> . Esta guía contiene importante información para su seguridad que debe saber antes de comenzar a trabajar con el sistema.
Varning!	Innan du installerar, använder eller utför service på systemet ska du läsa <i>Förberedelser och säkerhet Handbok</i> . Denna handbok innehåller viktig säkerhetsinformation som du bör känna till innan du arbetar med systemet.

Qualified Personnel Warning



Warning

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

Waarschuwing

Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.

Varoitus

Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.

Avertissement

Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.

Achtung

Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.

Avvertenza

Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Advarsel

Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.

Aviso

Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.

¡Atención!

Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.

Varning

Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Figyelem

A berendezést csak szakképzett személy helyezheti üzembe és cserélheti ki.

Предупреждение Установку и замену этого оборудования может осуществлять только специально обученный квалифицированный персонал.

警告 只有经过培训且具有资格的人员才能安装或更换此设备。

警告 この装置の設置または交換は、訓練を受けた対応の資格のある人のみが行ってください。

Invisible Laser Radiation Warning



Warning

Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures. Statement 70

Waarschuwing

Omdat er onzichtbare laserstraling uit de opening van de poort geëmitteerd kan worden wanneer er geen kabel aangesloten is, dient men om blootstelling aan laserstraling te vermijden niet in de open openingen te kijken.

Varoitus

Kun porttiin ei ole kytketty kaapelia, portin aukosta voi vuotaa näkymätöntä lasersäteilyä. Älä katso avoimiin aukkoihin, jotta et altistu säteilylle.

Attention

Etant donné qu'un rayonnement laser invisible peut être émis par l'ouverture du port quand aucun câble n'est connecté, ne pas regarder dans les ouvertures béantes afin d'éviter tout risque d'exposition au rayonnement laser.

Warnung

Aus der Öffnung des Ports kann unsichtbare Laserstrahlung austreten, wenn kein Kabel angeschlossen ist. Kontakt mit Laserstrahlung vermeiden und nicht in offene Öffnungen blicken.

Avvertenza	Poiché quando nessun cavo è collegato alla porta, da quest'ultima potrebbe essere emessa radiazione laser invisibile, evitare l'esposizione a tale radiazione e non fissare con gli occhi porte a cui non siano collegati cavi.
Advarsel	Usynlige laserstråler kan sendes ut fra åpningen på utgangen når ingen kabel er tilkoblet. Unngå utsettelse for laserstråling og se ikke inn i åpninger som ikke er tildekket.
Aviso	Evite uma exposição à radiação laser e não olhe através de aberturas expostas, porque poderá ocorrer emissão de radiação laser invisível a partir da abertura da porta, quando não estiver qualquer cabo conectado.
¡Advertencia!	Cuando no esté conectado ningún cable, pueden emitirse radiaciones láser invisibles por el orificio del puerto. Evitar la exposición a radiaciones láser y no mirar fijamente los orificios abiertos.
Varning!	Osynliga laserstrålar kan sändas ut från öppningen i porten när ingen kabel är ansluten. Undvik exponering för laserstrålning och titta inte in i ej täckta öppningar.

Laser Radiation



Warning

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.
Statement 272

Waarschuwing

Losgekoppelde of losgeraakte glasvezels of aansluitingen kunnen onzichtbare laserstraling produceren. Kijk niet rechtstreeks in de straling en gebruik geen optische instrumenten rond deze glasvezels of aansluitingen.

Varoitus

Irrotetuista kuiduista tai liittimistä voi tulla näkymätöntä lasersäteilyä. Älä tuijota säteitä tai katso niitä suoraan optisilla välineillä.

■ Laser Radiation

Attention	Les fibres ou connecteurs débranchés risquent d'émettre des rayonnements laser invisibles à l'œil. Ne regardez jamais directement les faisceaux laser à l'œil nu, ni d'ailleurs avec des instruments optiques.
Warnung	Unterbrochene Fasern oder Steckerverbindungen können unsichtbare Laserstrahlung abgeben. Blicken Sie weder mit bloßem Auge noch mit optischen Instrumenten direkt in Laserstrahlen.
Avvertenza	Le fibre ottiche ed i relativi connettori possono emettere radiazioni laser. I fasci di luce non devono mai essere osservati direttamente o attraverso strumenti ottici.
Advarsel	Det kan forekomme usynlig laserstråling fra fiber eller kontakter som er frakoblet. Stirr ikke direkte inn i strålene eller se på dem direkte gjennom et optisk instrument.
Aviso	Radiação laser invisível pode ser emitida de conectores ou fibras desconectadas. Não olhe diretamente para os feixes ou com instrumentos ópticos.
¡Advertencia!	Es posible que las fibras desconectadas emitan radiación láser invisible. No fije la vista en los rayos ni examine éstos con instrumentos ópticos.
Varning!	Osynlig laserstrålning kan avges från fränkopplade fibrer eller kontaktdon. Rikta inte blicken in i strålar och titta aldrig direkt på dem med hjälp av optiska instrument.
Figyelem	A nem csatlakoztatott üvegszálak és csatlakozók láthatatlan lézersugárzást bocsáthatnak ki. Ne nézzen bele a sugárba, és ne nézze közvetlenül, optikai berendezések segítségével!
Предупреждение	Отключенные световоды и разъемы могут испускать невидимое лазерное излучение. Не допускайте попадания лазерного луча в глаза и не смотрите на него через оптические приборы.

警告 断开的光纤或接头有可能发出不可见的激光辐射。请勿直视光束或直接用光学仪器观看光束。

警告 光ファイバ ケーブルまたはコネクタを取り外した状態では、目に見えないレーザー光が放射されていることがあります。光線をのぞきこんだり、光学機器を使用して光線を直接見たりしないでください。

Attaching the Cisco RPS (model PWR300-AC-RPS-N1)



Warning

Attach only the Cisco RPS (model PWR300-AC-RPS-N1) to the RPS receptacle.
Statement 100B

Waarschuwing

Slechts de Cisco RPS (model PWR300-AC-RPS-N1) aan de RPS contactdoos verbinden.

Varoitus

Kiinnitä RPS-vastakappaleeseen vain Cisco RPS (malli PWR300-AC-RPS-N1).

Avertissement

Raccordez le bloc d'alimentation Cisco RPS (modèle PWR300-AC-RPS-N1) uniquement au connecteur RPS.

Warnung

An die RPS-Steckhülse darf nur das Cisco RPS (Modell PWR300-AC-RPS-N1) angeschlossen werden.

Avvertenza

Collegare soltanto il Cisco RPS (modello PWR300-AC-RPS-N1) alla presa RPS.

Advarsel!

Koble bare Cisco RPS (modell PWR300-AC-RPS-N1) til RPS-stikkontakten.

Aviso

Anexe o RPS Cisco (modelo PWR300-AC-RPS-N1) apenas ao receptáculo RPS.

¡Advertencia!

Sólo conecte el Cisco RPS (modelo PWR300-AC-RPS-N1) al receptáculo RPS.

■ Attaching the Cisco RPS (model PWR600-AC-RPS)

Varning! Koppla endast Cisco RPS (modell PWR300-AC-RPS-N1) till RPS-uttaget.

Figyelem Az RPS csatlakozóhoz csak Cisco RPS (PWR300-AC-RPS-N1 modell) aljzatot csatlakoztasson.

Предупреждение К гнезду RPS можно подключать только системы питания Cisco RPS (модель PWR300-AC-RPS-N1).

警告 只能将 Cisco RPS (型号 PWR300-AC-RPS-N1) 连接到 RPS 插座。

警告 RPS レセプタクルには、Cisco RPS (モデル番号 PWR300-AC-RPS-N1) だけを接続してください。

Attaching the Cisco RPS (model PWR600-AC-RPS)



Warning

Attach only the Cisco RPS (model PWR600-AC-RPS) to the RPS receptacle.
Statement 112

Waarschuwing Slechts de Cisco RPS (model PWR600-AC-RPS) aan de RPS contactdoos verbinden.

Varoitus Kiinnitä RPS-vastakappaleeseen vain Cisco RPS (malli PWR600-AC-RPS).

Avertissement Raccordez le bloc d'alimentation Cisco RPS (modèle PWR600-AC-RPS) uniquement au connecteur RPS.

Warnung An die RPS-Steckhülse darf nur das Cisco RPS (Modell PWR600-AC-RPS) angeschlossen werden.

Avvertenza Collegare soltanto il Cisco RPS (modello PWR600-AC-RPS) alla presa RPS.

Advarsel! Koble bare Cisco RPS (modell PWR600-AC-RPS) til RPS-stikkontakten.

Aviso Anexe o RPS Cisco (modelo PWR600-AC-RPS) apenas ao receptáculo RPS.

¡Advertencia! Sólo conecte el Cisco RPS (modelo PWR600-AC-RPS) al receptáculo RPS.

Varning! Koppla endast Ciscos RPS (modell PWR600-AC-RPS) till RPS-uttaget.

Figyelem Az RPS csatlakozóhoz csak Cisco RPS (PWR600-AC-RPS modell) aljzatot csatlakoztasson.

Предупреждение К гнезду RPS можно подключать только системы питания Cisco RPS (модель PWR600-AC-RPS).

警告 只能将 Cisco RPS (型号 PWR600-AC-RPS) 连接到 RPS 插座。

警告 RPS レセプタクルには、Cisco RPS (モデル番号 PWR600-AC-RPS) だけを接続してください。

Attaching the Cisco RPS (model PWR675-AC-RPS-N1)



Warning

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

Waarschuwing

Slechts de Cisco RPS (model PWR675-AC-RPS-N1) aan de RPS contactdoos verbinden.

Varoitus

Kiinnitä RPS-vastakappaleeseen vain Cisco RPS (malli PWR675-AC-RPS-N1).

■ Attaching the Cisco RPS (model PWR675-AC-RPS-N1)

Avertissement	Raccordez le bloc d'alimentation Cisco RPS (modèle PWR675-AC-RPS-N1) uniquement au connecteur RPS.
Warnung	An die RPS-Steckhülse darf nur das Cisco RPS (Modell PWR675-AC-RPS-N1) angeschlossen werden.
Avvertenza	Collegare soltanto il Cisco RPS (modello PWR675-AC-RPS-N1) alla presa RPS.
Advarsel!	Koble bare Cisco RPS (modell PWR675-AC-RPS-N1) til RPS-stikkontaktene.
Aviso	Anexe o RPS Cisco (modelo PWR675-AC-RPS-N1) apenas ao receptáculo RPS.
¡Advertencia!	Sólo conecte el Cisco RPS (modelo PWR675-AC-RPS-N1) al receptáculo RPS.
Varning!	Koppla endast Ciscos RPS (modell PWR675-AC-RPS-N1) till RPS-uttaget.
Figyelem	Az RPS csatlakozóhoz csak Cisco RPS (PWR675-AC-RPS-N1 modell) aljzatot csatlakoztasson.
Предупреждение	К гнезду RPS можно подключать только системы питания Cisco RPS (модель PWR675-AC-RPS-N1).
警告	只能将 Cisco RPS (型号 PWR675-AC-RPS-N1) 连接到 RPS 插座。
警告	RPS レセプタクルには、Cisco RPS (モデル番号 PWR675-AC-RPS-N1) だけを接続してください。

Redundant Power Supply Connection Warning

**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

Waarschuwing

Als er geen redundant voedingssysteem (RPS) aan de schakelaar is gekoppeld, dient u een RPS-connectorkapje op de achterkant van de schakelaar te installeren.

Varoitus

Jos korvautuvaa tehojärjestelmää (redundant power system, RPS) ei ole liitetty kytkimeen, kiinnitä RPS-liittimen suojus kytkimen takapuolelle.

Attention

Si un système d'alimentation électrique redondant (RPS) n'est pas connecté au commutateur, installez un cache de connecteur RPS à l'arrière du commutateur.

Warnung

Wenn keine redundante Stromversorgung (RSV) an den Schalter angeschlossen ist, eine RSV-Steckerabdeckung an der Rückseite des Schalters anbringen.

Avvertenza

Se un sistema RPS (Redundant Power System) di alimentazione ridondante non è collegato al dispositivo switch, installare un copri-connettore RPS sul retro del switch.

Advarsel

Dersom et redundant strømsystem (Redundant Power System -RPS) ikke er koblet til bryteren, skal det installeres et RPS-koblingsdeksel på baksiden av bryteren.

Aviso

Se um sistema de alimentação redundante (RPS) não estiver conectado a um switch, instale uma capa de conector RPS na parte de trás do switch.

¡Advertencia!

Si no se conecta un sistema de potencia redundante (RPS) al interruptor, instale una cubierta de conector RPS en la parte posterior del interruptor.

Switch Installation Warning

Varning!	Om ett redundant strömförsörjningssystem (redundant power system, RPS) inte finns anslutet till switchen skall ett RPS-kontaktkydd installeras på switchens baksida.
Figyelem	Ha a kapcsolóhoz nem csatlakozik redundáns tápegység (RPS), az RPS csatlakozófedelét a kapcsoló hátuljára szerelje fel.
Предупреждение	Если система питания с избыточными источниками и распределением нагрузки (RPS) не подсоединена к переключателю, установите крышку соединителя RPS на задней стенке переключателя.
警告	如果冗余电源系统 (RPS) 未连接切换开关，请在开关后面安装 RPS 接头盖。
警告	Redundant Power System (RPS) がスイッチに接続されていない場合、スイッチの後ろの部分に RPS コネクタ カバーを設置してください。

Switch Installation Warning



Warning

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

Waarschuwing

Om te voldoen aan de veiligheidsvoorschriften dient u de schakelaars op een muur te monteren met het voorpaneel omhoog.

Varoitus

Turvallisuusmääräykset edellyttävät, että kytkimet kiinnitetään seinään etupaneeli ylöspäin.

Attention

Pour satisfaire aux dispositions de sécurité, installez les commutateurs muraux avec le panneau frontal vers le haut.

Warnung	Zur Einhaltung der Sicherheitsvorschriften die Schalter so an einer Wand montieren, dass die Frontplatte nach oben zeigt.
Figyelem!	A biztonsági előírások betartása érdekében a kapcsolókat úgy szerelje a falra, hogy az előlapjuk felfelé nézzen.
Avvertenza	In conformità ai regolamenti di sicurezza, installare i dispositivi switch a muro con il pannello frontale rivolto in su.
Advarsel	For å etterkomme sikkerhetsreglene skal brytere monteres på en vegg med frontpanelet vendt opp.
Aviso	Para cumprir com os regulamentos de segurança, faça a montagem de switches em uma parede com o painel frontal virado para cima.
¡Advertencia!	Para cumplir con las reglas de seguridad, instale los interruptores en una pared con el panel del frente hacia arriba.
Varning!	För att uppfylla säkerhetsföreskrifter skall omkopplarna monteras på en vägg med frampanelen riktad uppåt.
Figyelem	A biztonsági előírások betartása érdekében a kapcsolókat úgy szerelje a falra, hogy az előlapjuk felfelé nézzen.
Предупреждение	В соответствии с положениями безопасности установите переключатели на стене передней панелью наружу.
警告	为符合安全规章，请将切换开关安装在墙上，前面板朝上。
警告	安全既定に準拠するために、フロントパネルを上向きにしてスイッチを壁にマウントします。

Chassis Warning for Rack-Mounting and Servicing



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

Waarschuwing

Om lichamelijk letsel te voorkomen wanneer u dit toestel in een rek monteert of het daar een servicebeurt geeft, moet u speciale voorzorgsmaatregelen nemen om ervoor te zorgen dat het toestel stabiel blijft. De onderstaande richtlijnen worden verstrekt om uw veiligheid te verzekeren:

- Dit toestel dient onderaan in het rek gemonteerd te worden als het toestel het enige in het rek is.
- Wanneer u dit toestel in een gedeeltelijk gevuld rek monteert, dient u het rek van onderen naar boven te laden met het zwaarste onderdeel onderaan in het rek.
- Als het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.

Varoitus

Kun laite asetetaan telineeseen tai huolletaan sen ollessa telineessä, on noudatettava erityisiä varotoimia järjestelmän vakavuuden säilyttämiseksi, jotta vältetään loukkaantumiselta. Noudata seuraavia turvallisuusohjeita:

- Jos telineessä ei ole muita laitteita, aseta laite telineen alaosaan.
- Jos laite asetetaan osaksi täytettyyn telineeseen, aloita kuormittaminen sen alaosasta kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.
- Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.

- Attention** Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:
- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
 - Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
 - Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.
- Warnung** Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:
- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.
 - Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.
 - Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.
- Avvertenza** Per evitare infortuni fisici durante il montaggio o la manutenzione di questa unità in un supporto, occorre osservare speciali precauzioni per garantire che il sistema rimanga stabile. Le seguenti direttive vengono fornite per garantire la sicurezza personale:
- Questa unità deve venire montata sul fondo del supporto, se si tratta dell'unica unità da montare nel supporto.
 - Quando questa unità viene montata in un supporto parzialmente pieno, caricare il supporto dal basso all'alto, con il componente più pesante sistemato sul fondo del supporto.
 - Se il supporto è dotato di dispositivi stabilizzanti, installare tali dispositivi prima di montare o di procedere alla manutenzione dell'unità nel supporto.

- Advarsel** Unngå fysiske skader under montering eller reparasjonsarbeid på denne enheten når den befinner seg i et kabinett. Vær nøye med at systemet er stabilt. Følgende retningslinjer er gitt for å verne om sikkerheten:
- Denne enheten bør monteres nederst i kabinettet hvis dette er den eneste enheten i kabinettet.
 - Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinettet lastes fra bunnen og opp med den tyngste komponenten nederst i kabinettet.
 - Hvis kabinettet er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinettet.
- Aviso** Para se prevenir contra danos corporais ao montar ou reparar esta unidade numa estante, deverá tomar precauções especiais para se certificar de que o sistema possui um suporte estável. As seguintes directrizes ajudá-lo-ão a efectuar o seu trabalho com segurança:
- Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.
 - Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.
 - Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.
- ¡Advertencia!** Para evitar lesiones durante el montaje de este equipo sobre un bastidor, o posteriormente durante su mantenimiento, se debe poner mucho cuidado en que el sistema quede bien estable. Para garantizar su seguridad, proceda según las siguientes instrucciones:
- Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.
 - Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.
 - Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.

- Varning!** För att undvika kroppsskada när du installerar eller utför underhållsarbete på denna enhet på en ställning måste du vidta särskilda försiktighetsåtgärder för att försäkra dig om att systemet står stadigt. Följande riktlinjer ges för att trygga din säkerhet:
- Om denna enhet är den enda enheten på ställningen skall den installeras längst ned på ställningen.
 - Om denna enhet installeras på en delvis fylld ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.
 - Om ställningen är försedd med stabiliseringsdon skall dessa monteras fast innan enheten installeras eller underhålls på ställningen.

Figyelem A készülék rackbe történő beszerelése és karbantartása során bekövetkező sérülések elkerülése végett speciális óvintézkedésekkel meg kell őrizni a rendszer stabilitását. A személyes biztonsága érdekében tartsa be a következő szabályokat:

- Ha a rackben csak ez az egy készülék található, a rack aljába kell beszerelni.
- Ha nincs teljesen tele az a rack, amelybe beszerelik a készüléket, alulról fölfelé haladva töltsse fel a racket úgy, hogy a legnehezebb készülék kerüljön a rack aljába.
- Ha stabilizáló eszközök is tartoznak a rackhez, szerelje fel a stabilizátorokat, mielőtt beszerelné az egységet a rackbe, vagy karbantartást végezne rajta.

- Предупреждение** Во избежание травм при монтаже и обслуживании устройства в стойке следует принять особые меры предосторожности, чтобы убедиться в устойчивости оборудования. Для обеспечения безопасности работ необходимо соблюдать следующие правила.
- Если в стойке находится одно устройство, оно должно быть установлено в нижней части.
 - При монтаже устройств в частично заполненную стойку устанавливайте оборудование снизу вверх, размещая наиболее тяжелые устройства в нижней части.
 - Если стойка снабжена приспособлениями для стабилизации, их необходимо установить до начала монтажа или обслуживания оборудования.

警告 为避免在机架中安装或维修该部件时使身体受伤，您必须采取特殊的预防措施确保系统固定。以下是确保安全的原则：

- 如果此部件是机架中唯一的部件，应将其安装在机架的底部。
- 如果在部分装满的机架中安装此部件，请按从下往上的顺序安装各个部件，并且最重的组件应安装在机架的底部。
- 如果机架配有固定装置，请先装好固定装置，然后再在机架中安装或维修部件。

警告 この装置をラックに設置したり保守作業を行ったりするときは、人身事故を防ぐため、システムが安定しているかどうかを十分に確認する必要があります。次の注意事項に従ってください。

- ラックにこの装置を単独で設置する場合は、ラックの一番下に設置します。
- ラックに別の装置がすでに設置されている場合は、最も重量のある装置を一番下にして、重い順に下から上へ設置します。
- ラックに安定器具が付属している場合は、その安定器具を取り付けてから、装置をラックに設置するか、またはラック内の装置の保守作業を行ってください。



Numerics

10/100/1000 ports

connecting to [3-20 to 3-22](#)

described [1-3](#)

10/100BASE-T [1-8](#)

10/100 ports

connecting to [3-20 to 3-22](#)

described [1-3](#)

1000BASE-LX/LH GBICs [4-3](#)

1000BASE-LX SFP modules [4-12](#)

1000BASE-SX GBICs [4-3](#)

1000BASE-SX SFP modules [4-12](#)

1000BASE-T [1-4, 1-6, 1-7](#)

1000BASE-T SFP modules [4-12](#)

1000BASE-TX GBICs [4-3](#)

1000BASE-X [1-2](#)

1000BASE-X (CWDM) GBICs [4-3](#)

1000BASE-X (CWDM) SFP modules [4-12](#)

1000BASE-ZX GBICs [4-3](#)

1000BASE-ZX SFP modules [4-12](#)

100BASE-T [1-4](#)

10BASE-T [1-4, 1-8](#)

10BASE-TX RJ-45 connector [3-23](#)

19- and 24-inch racks [3-7](#)

802.1D Spanning Tree [1-5](#)

802.3z, IEEE [C-1](#)

802.3z 1000BASE-LX, IEEE standard [4-3, 4-11](#)

A

airflow [1-9 to 1-11](#)

attaching the cable guide [3-15](#)

autonegotiation [1-4](#)

B

BER [4-10](#)

bit error rate

See BER

blower

see airflow

boot process

observing LEDs [3-23](#)

brackets

See mounting brackets

C

- cable guide
 - attaching [3-15](#)
- cabling
 - GBIC [4-4, 4-5](#)
 - mode-conditioning [4-10](#)
- Catalyst 2948G-GE-TX switch
 - 10/100/1000 ports [1-3](#)
 - heat dissipation [2-2](#)
 - illustration [1-2](#)
 - management ports [1-8, 3-22](#)
- Catalyst 2948G switch
 - 10/100 ports [1-2](#)
 - heat dissipation [2-2](#)
 - illustration [1-2](#)
 - management ports [1-8, 3-22](#)
- Catalyst 2980G-A switch
 - heat dissipation [2-3](#)
 - management ports [1-8, 3-22](#)
 - referred to with Catalyst 2980G switch [1-1](#)
- Catalyst 2980G switch
 - 10/100 ports [1-2](#)
 - heat dissipation [2-3](#)
 - illustration [1-2](#)
- CDP [1-5](#)
- CGMP [1-5](#)
- checking
 - shipping container contents (Catalyst 2948G and 2980G switches) [3-4](#)
 - shipping container contents (Catalyst 2948G-GE-TX) [3-5](#)
- checklist
 - rack-mount [3-7](#)
 - site planning [2-7](#)
- Cisco Discovery Protocol
 - See CDP
- Cisco Group Management Protocol
 - See CGMP
- CLI [1-5](#)
- command-line interface
 - See CLI
- commands
 - show port [4-9](#)
- configuration, patch cord (figure) [4-11](#)
- connecting
 - to 10/100/1000 ports [3-20 to 3-22](#)
 - to 10/100 ports [3-20 to 3-22](#)
 - to console serial port [3-22](#)
 - to Ethernet management port [3-22](#)
 - to SFP modules [4-12 to 4-16](#)
- connections, earth ground [2-3](#)
- connectors
 - 10BASE-TX RJ-45 [3-23](#)
 - SC-type [4-8](#)
- console serial port
 - connecting [3-22](#)
 - description [1-8](#)
- conventions, document [xvii](#)

cooling

See airflow

crossover cable

connecting to

10/100/1000 ports [3-21](#)

10/100 ports [3-21](#)

customer service, contacting [5-5](#)

CWDM GBICs

see [1000BASE-X \(CWDM\) GBICs](#)

CWDM SFP modules

see [1000BASE-X \(CWDM\) SFP modules](#)

D

differential mode delay [C-1](#)

dimensions, chassis

Catalyst 2948G [A-3](#)

Catalyst 2948G-GE-TX [A-7](#)

Catalyst 2980G [A-7](#)

documentation, obtaining [xxiii](#)

document conventions [xvii](#)

E

EMC regulatory statements [3-2 to 3-4](#)

Ethernet interfaces [1-4](#)

Ethernet management port

connecting [3-22](#)

Ethernet speeds

[1000BASE-X 1-2](#)

[100BASE-T 1-4](#)

[10BASE-T 1-4](#)

F

fan assembly [1-9](#)

see airflow

features, switch [1-4 to 1-6](#)

frequency, specifications [A-3, A-5, A-7](#)

G

GBICs

cabling [4-4](#)

cabling restrictions [4-5](#)

care and handling [4-6, 4-8, 4-9, 4-10](#)

description [1-3](#)

Ethernet interfaces [1-2](#)

features [4-2](#)

installing [4-6](#)

maintenance guidelines [4-6, 4-8, 4-9 to 4-10](#)

optical power [4-5](#)

patch cord [4-10](#)

port configuration [4-1](#)

removing [4-9](#)

speeds [1-2](#)

Gigabit Interface Converter

See GBICs

grounding

- holes [2-4](#)
- procedure [2-5 to 2-7](#)
- tools [2-4](#)

H

heat dissipation

- Catalyst 2948G-GE-TX switches [2-2, A-3, A-5](#)
- Catalyst 2948G switches [2-2, A-3, A-5](#)
- Catalyst 2980G switches [2-2, A-7](#)

IIEEE 802.1D Spanning Tree [1-5](#)IEEE 802.3z [C-1](#)IEEE 802.3z 1000BASE-LX standard [4-3](#)

installations

- connecting a terminal to the console serial and Ethernet management ports [3-22](#)

rack-mounting

- Catalyst 2948G and 2980G switches [3-7 to 3-9](#)
- Catalyst 2948G-GE-TX switches [3-10 to 3-15](#)

tools required [3-6](#)

table- or shelf-mounting

- Catalyst 2948G-GE-TX switch [3-19](#)

troubleshooting [5-1](#)wall-mounting [3-16](#)Catalyst 2948G-GE-TX switch [3-16 to 3-18](#)invisible radiation warning [D-10 to D-11](#)

Llaser radiation warning [D-11 to D-13](#)laser transmission [C-1](#)Layer 2 forwarding [1-4](#)

LEDs

- Link Status [1-8, A-2](#)
- power supply [3-19, 5-3](#)
- PSI [1-9](#)
- PWR [1-9](#)
- RPS [1-9](#)
- STATUS [1-9](#)

Link Status LED [1-8, A-2](#)

MMAC addresses [1-4](#)management, software [1-5](#)management ports [1-8](#)10/100BASE-T [1-8](#)10BASE-T [1-8](#)console serial [1-8](#)

MDIX connectors

See media-dependent interface crossed-over connectors

Media Access Control addresses

See MAC addresses

media-dependent interface crossed-over connectors [3-22](#)

memory [A-3, A-7](#)

microprocessor [A-3, A-7](#)

MMF [4-4](#)

mounting, table- or shelf- [3-19](#)

mounting, wall-mounting [3-16](#)

mounting brackets

Catalyst 2948G and 2980A switches [3-7 to 3-8](#)

Catalyst 2948G-GE-TX switch [3-10 to 3-14](#)

multimode fiber-optic

See MMF

O

obtaining technical assistance [xxiv](#)

overfilled launch condition [C-2](#)

P

packaging materials [B-1](#)

packing list [3-5](#)

PAgp

for port aggregation [1-5](#)

patch cord

configuration (figure) [4-11](#)

description [4-10](#)

installing [4-11](#)

mode-conditioning [4-4, 4-6](#)

Port Aggregation Protocol

See PAgP

port cabling specifications [4-4](#)

ports

locations [1-6](#)

management [1-8](#)

power

requirements [2-2](#)

site planning [2-2](#)

specifications

Catalyst 2948G-GE-TX switch [A-3, A-5](#)

Catalyst 2948G switch [A-3, A-5](#)

Catalyst 2980G switch [A-7](#)

troubleshooting [5-2](#)

power supplies

connecting system ground [2-3](#)

description [1-11](#)

internal [1-11](#)

LEDs [5-3](#)

RPS [1-11](#)

RPS 300 [1-12](#)

RPS 600 [1-12](#)

RPS 675 [1-12](#)

supported [1-6](#)

troubleshooting [5-2, 5-3, 5-4](#)

procedures

- connecting system ground [2-3](#)
- connecting to an SFP module [4-12 to 4-16](#)
- connecting to the console serial port [3-22](#)
- connecting to the Ethernet management port [3-22](#)
- installing a GBIC [4-6](#)
- installing a patch cord [4-11](#)
- removing a GBIC [4-9](#)
- repacking a switch [B-1](#)

protocols

- 802.1D Spanning Tree [1-5](#)
 - CDP [1-5](#)
 - CGMP [1-5](#)
 - PAgP [1-5](#)
 - SNMP [1-6](#)
 - TFTP [1-5](#)
 - VTP (Virtual Terminal Protocol) [1-5](#)
- PSI LED [1-9](#)
- PWR LED [1-9](#)

Q

- qualified personnel warning [D-9 to D-10](#)

R

rack-mounting

- Catalyst 2948G and 2980G switches [3-7 to 3-9](#)
- Catalyst 2948G-GE-TX switch [3-10 to 3-15](#)

rack-mounting kit [3-7](#)rack-mounting warning [D-20 to D-24](#)

Redundant Power System

- See RPS

regulatory statements, EMC [3-2 to 3-4](#)

Remote Monitoring

- See RMON

repacking instructions [B-1](#)returns [B-1](#)RMON [1-5, 1-6](#)RPS [1-11, 5-4](#)

- See power supplies

RPS 300 [1-12](#)RPS 300 warning [D-13 to D-14](#)RPS 600 [1-12](#)RPS 600 warning [D-14 to D-15](#)RPS 675 [1-12](#)RPS 675 warning [D-15 to D-16](#)RPS LED [1-9](#)

S

- safety information warning [D-7 to D-8](#)

SFP modules

- connecting to [4-12 to 4-16](#)

- shelf-mounting [3-19](#)

shipping

- container contents (Catalyst 2948G and 2980G switches) [3-4](#)

- container contents (Catalyst 2948G-GE-TX switches) [3-5](#)

- instructions [B-1](#)

- show port command [4-9](#)

Simple Network Management Protocol

- See SNMP

site planning

- checklist [2-7](#)

- heat dissipation [2-2](#)

small form-factor pluggable modules

- see SFP modules [4-12](#)

SNMP [1-5](#)

- software management [1-5](#)

specifications

- Catalyst 2948G switch [A-2, A-5](#)

- Catalyst 2980G switch [A-6](#)

- GBIC optical power [4-5](#)

- startup problems [5-3](#)

STATUS LED [1-9](#)

straight-through cable

- connecting to

- 10/100/1000 ports [3-21](#)

- 10/100 ports [3-21](#)

- switch installation warning [D-18 to D-19](#)

- switch verification [3-23](#)

- system component level problems [5-2](#)

T

- table-mounting [3-19](#)

- technical assistance, obtaining [xxiv](#)

- telco racks [3-7](#)

terminals

- connecting to the console serial port [3-22](#)

- connecting to the Ethernet management port [3-22](#)

- tools, installation [3-6](#)

troubleshooting

- contacting customer service [5-5](#)

- getting started [5-2](#)

- identifying startup problems [5-3](#)

- initial boot [5-2](#)

- methodology [5-2](#)

- power supplies [5-2, 5-3, 5-4](#)

V

- verifying switch operation [3-23](#)

virtual LANs

- See VLANs

Virtual Terminal Protocol

- See VTP (Virtual Terminal Protocol)

- VLANs [1-5](#)

VLAN Trunk Protocol

See VTP (VLAN Trunk Protocol)

VTP (Virtual Terminal Protocol) [1-5](#)

VTP (VLAN Trunk Protocol) [1-5](#)

W

wall-mounting [3-16](#)

warning

definition [D-2 to D-4](#)

invisible radiation [D-10 to D-11](#)

laser radiation [D-11 to D-13](#)

qualified personnel information [D-9 to D-10](#)

rack mounting [D-20 to D-24](#)

RPS 300 [D-13 to D-14](#)

RPS 600 [D-14 to D-15](#)

RPS 675 [D-15 to D-16](#)

safety information [D-7 to D-8](#)

switch installation [D-18 to D-19](#)

weight, chassis

Catalyst 2948G [A-3](#)

Catalyst 2948G-GE-TX [A-5](#)

Catalyst 2980G [A-7](#)

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