



Cisco SN 5428 Storage Router Hardware Installation Guide

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Preface

This preface describes the audience, organization, and conventions of the *Cisco SN 5428 Storage Router Hardware Installation Guide*. It also provides information on how to obtain related documentation.

Audience

To use this installation guide, you need to 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	Provides an overview of the SN 5428 Storage Router and its components.
Chapter 2	Installing the SN 5428 Storage Router	Describes how to prepare your site for installation, how to install the SN 5428 Storage Router chassis, how to connect to ports, and how to connect power to the chassis.

Chapter	Title	Description
Chapter 3	Troubleshooting	Provides troubleshooting procedures for problems encountered with installation.
Appendix A	Technical Specifications	Lists the storage router chassis specifications.
Appendix B	Cable and Port Pinouts	Lists cable and port specifications for the storage router.

Conventions

This document uses the following conventions:



Note

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



Caution

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



Warning

Means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

Related Documentation

Refer to the following documents for additional information:

- *Cisco SN 5428 Storage Router Software Configuration Guide*
- *Cisco SN 5400 Series Storage Router Command Reference*
- *Regulatory Compliance and Safety Information for Cisco SN 5428 Storage Router*
- *Read Me First: Accessing SN 5428 Software, Documentation and Release Notes, Product Bulletins, and Security Advisories*
- *Site Preparation and Safety*
- Release notes for the SN 5428 Storage Router

Obtaining Documentation

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

Cisco.com

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

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

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco websites can be accessed from this URL:

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

Documentation CD-ROM

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

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

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

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

Ordering Documentation

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

You can order Cisco documentation in these ways:

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

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

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

We appreciate your comments.

Obtaining Technical Assistance

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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

Installing and configuring a Cisco SN 5428 Storage Router consists of the following tasks:

- Install the SN 5428 Storage Router according to the *Cisco SN 5428 Storage Router Hardware Installation Guide* (this manual).
- Configure the SN 5428 Storage Router software according to the *SN 5428 Storage Router Software Configuration Guide*.
- Install and configure the Cisco iSCSI drivers according to the readme and example configuration files downloaded from Cisco.com.

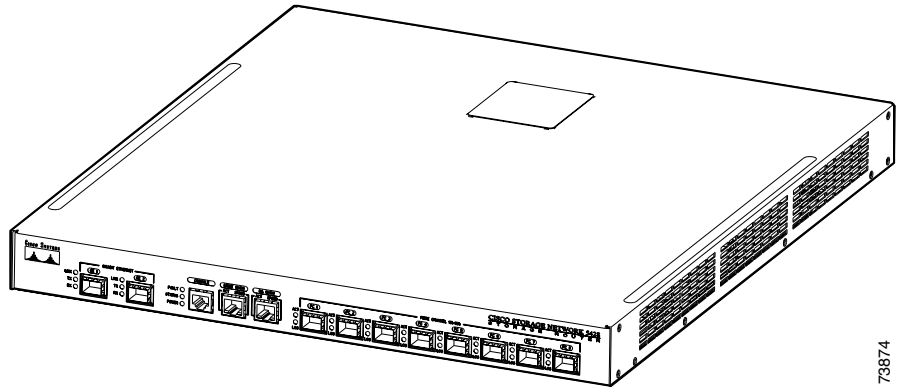
This chapter is the starting point for installing the SN 5428 Storage Router hardware. The chapter provides some very basic information you should know before proceeding to other chapters in this manual and contains the following topics:

- [SN 5428 Basic Description, page 1-2](#)
- [Port Descriptions, page 1-3](#)
- [Front-Panel LEDs, page 1-5](#)
- [Fan Assembly, page 1-8](#)
- [Power Supply, page 1-9](#)

SN 5428 Basic Description

The SN 5428 Storage Router is a 1U rack-mountable chassis (see [Figure 1-1](#)) that provides IP hosts with access to Fibre Channel storage through an IP network.

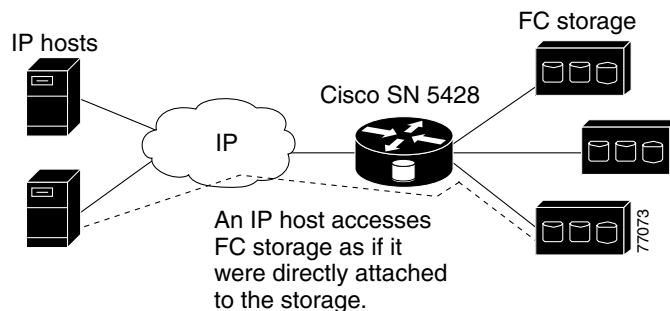
Figure 1-1 SN 5428 Storage Router Chassis



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The storage router provides IP hosts with access to Fibre Channel storage as if the IP hosts were directly attached to the storage. (See [Figure 1-2](#).) For more information about the types of storage access available with the SN 5428 Storage Router, see the *SN 5428 Storage Router Software Configuration Guide* and other related documentation.

Figure 1-2 IP Hosts Accessing Storage Through the SN 5428 Storage Router

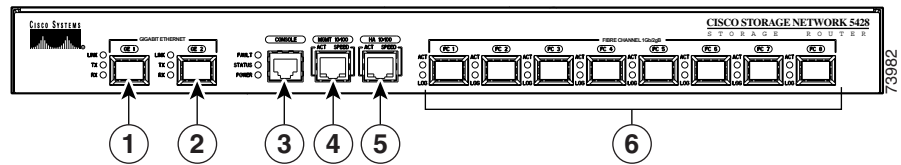


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Port Descriptions

The SN 5428 Storage Router provides two 1-Gigabit Ethernet ports, a console port, a 10/100 Ethernet management port, a 10/100 Ethernet high availability (HA) port, and eight 1-Gigabit/2-Gigabit Fibre Channel ports. (See [Figure 1-3](#).)

Figure 1-3 SN 5428 Storage Router Ports



1	Gigabit Ethernet port, GE 1	4	10/100 Ethernet management port, MGMT 10/100
2	Gigabit Ethernet port, GE 2	5	10/100 Ethernet high availability (HA) port, HA 10/100
3	Console port, CONSOLE	6	Fibre Channel ports, FC 1 through FC 8 (from left to right)

The following sections described the ports:

- [Gigabit Ethernet Ports, page 1-4](#)
- [Console Port, page 1-4](#)
- [10/100 Ethernet Management Port, page 1-4](#)
- [10/100 Ethernet HA Port, page 1-4](#)
- [Fibre Channel Ports, page 1-5](#)

Gigabit Ethernet Ports

The Gigabit Ethernet ports are labeled GE 1 and GE 2. (See [Figure 1-3](#).) Each port provides a 1-Gigabit Ethernet interface for connecting to IP hosts that require IP access to storage. Each port uses a small form-factor pluggable (SFP) module for connection to the port's physical medium. See [Appendix B, "Cable and Port Pinouts"](#) for SFP module specifications. Each Gigabit Ethernet port has LEDs indicating its status, as described in the ["Front-Panel LEDs" section on page 1-5](#).

Console Port

The console port is labeled CONSOLE. (See [Figure 1-3](#).) It is an EIA/TIA-232 interface for connecting to the serial port of a PC running terminal emulation software. Using the console port you can manage the storage router with the SN 5428 Storage Router command-line interface (CLI). The console port uses an 8-pin RJ-45 receptacle. It has no LEDs.

10/100 Ethernet Management Port

The 10/100 Ethernet management port is labeled MGMT 10/100. (See [Figure 1-3](#).) It is a 10BaseT/100BaseT Ethernet interface for connecting to a management network. Through a management network you can manage the storage router using the CLI, the web-based GUI, or SNMP. The 10/100 Ethernet management port uses an 8-pin RJ-45 receptacle and has LEDs indicating its status, as described in the ["Front-Panel LEDs" section on page 1-5](#).

10/100 Ethernet HA Port

The 10/100 Ethernet high availability (HA) port is labeled HA 10/100. (See [Figure 1-3](#).) It is a 10BaseT/100BaseT Ethernet interface for connecting to an HA network. The port allows the SN 5428 to function in a multiple-node cluster with other SN 5428 Storage Routers to provide fault-tolerant operation. The 10/100 Ethernet HA port uses an 8-pin RJ-45 receptacle and has LEDs indicating its status, as described in the ["Front-Panel LEDs" section on page 1-5](#).

Fibre Channel Ports

The Fibre Channel ports are labeled FC 1 through FC 8. (See [Figure 1-3](#).) Each port provides a 1-Gigabit/2-Gigabit autosensing Fibre Channel interface for connecting to storage systems, Fibre Channel switches, Fibre Channel hosts, or other Cisco storage networking products. Each Fibre Channel port can be configured as one of the following port types: G_Port, GL_Port, F_Port, FL_Port, or TL_Port. Each port uses a small form-factor pluggable (SFP) module for connection to the port's physical medium. See [Appendix B, "Cable and Port Pinouts"](#) for SFP module specifications. Each Fibre Channel port has LEDs indicating its status, as described in the ["Front-Panel LEDs"](#) section.

The storage router contains two internal Fibre Channel interfaces to allow access between the GE ports and the Fibre Channel ports, FC 1 through FC 8. These two internal Fibre Channel interfaces are named fci1 and fci2. As Fibre Channel initiators, these interfaces are assigned World Wide Port Numbers (WWPN); therefore, fci1 is also referred to as initiator WWPN1 and fci2 is also referred to as initiator WWPN2. There are no hardware installation tasks for these interfaces; however, it is important to be aware of this internal architecture and the WWPNs for some software configuration tasks that required these port WWPNs (i.e. zoning).

Front-Panel LEDs

The front-panel LEDs provide status indications about the SN 5428 chassis and its ports. (See [Figure 1-4](#).)

Each Gigabit Ethernet port, GE 1 and GE 2, has three LEDs, labeled LINK, TX, and RX. The LEDs are located to the left of each Gigabit Ethernet port.

The FAULT, STATUS, and POWER LEDs indicate the overall status of the SN 5428 Storage Router. The LEDs are located to the left of the CONSOLE port.

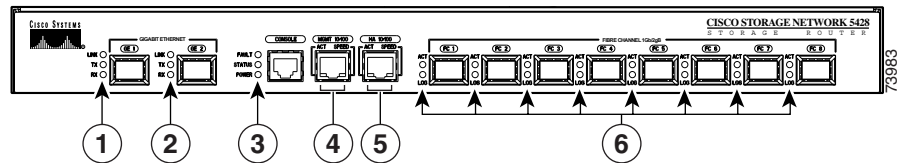
The 10/100 Ethernet management port, MGMT 10/100, has two LEDs, labeled ACT and SPEED. The ACT LED is located at the left-bottom corner of the port; the SPEED LED is located at the right-bottom corner of the port.

The 10/100 Ethernet HA port, HA 10/100, has two LEDs, labeled ACT and SPEED. The ACT LED is located at the left-bottom corner of the port; the SPEED LED is located at the right-bottom corner of the port.

Each Fibre Channel port, FC 1 through FC 8, has two LEDs, labeled ACT and LOG. The LEDs are located to the left of each Fibre Channel port.

Table 1-1 describes the LED indications.

Figure 1-4 SN 5428 Front-Panel LEDs



1	Gigabit Ethernet port, GE 1	4	10/100 Ethernet management port, MGMT 10/100
2	Gigabit Ethernet port, GE 2	5	10/100 Ethernet HA port, HA 10/100
3	FAULT, STATUS, and POWER	6	Fibre Channel ports, FC 1 through FC 8

Table 1-1 LED Indication Descriptions

LED		Color	Description (when LED is on)
GE 1 and GE 2 LEDs	LINK	Green	Port is operational.
	TX	Green	Packets are being transmitted.
	RX	Green	Packets are being received.
FAULT		Red	On if error condition in entire storage router.
			Flashing if error condition in a storage router component.
STATUS		Green	On after successful boot up.
			Flashing during boot up.
POWER		Green	Power is on.

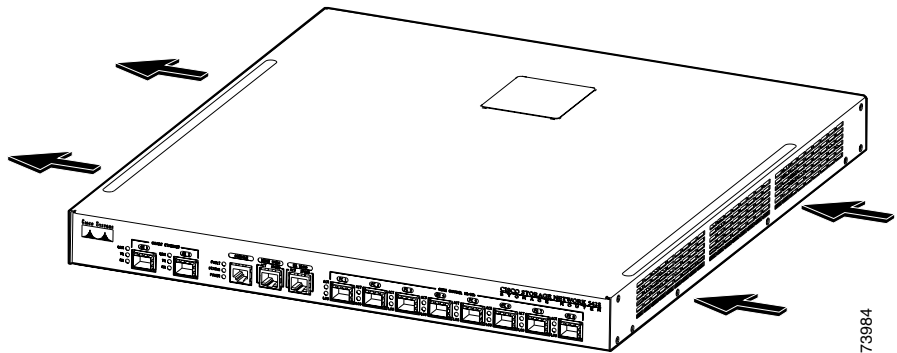
Table 1-1 LED Indication Descriptions (continued)

LED		Color	Description (when LED is on)
MGMT 10/100 LEDs	ACT	Green	(Left) Link is active.
	SPEED	Yellow	(Right) Port speed is 100 Mbps.
HA 10/100 LEDs	ACT	Green	(Left) Link is active.
	SPEED	Yellow	(Right) Port speed is 100 Mbps.
FC 1 through FC 8 LEDs	ACT (Activity LED)	Yellow	Frames are being transmitted or received.
	LOG (Logged- In LED)	Green	<p>On (continuously) indicates that the port is properly connected and able to communicate with its attached devices.</p> <p>Flashing once per second indicates that the port connection is in the process of logging in.</p> <p>Flashing twice per second indicates that the port connection is broken or an error condition exists with the port. For troubleshooting information refer to “Troubleshooting a Connection to a Fibre Channel Port” section on page 3-6.</p>

Fan Assembly

The fan assembly provides cooling for the internal chassis components. The SN 5428 chassis contains four exhaust fans that are located on the left side of the chassis. The fans draw in air from the right side and exhaust air from the left side. (See [Figure 1-5](#).)

Figure 1-5 Chassis Airflow

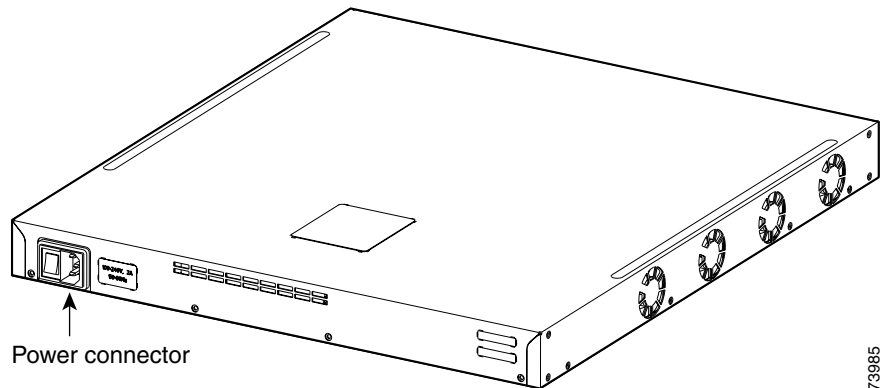


Power Supply

The SN 5428 Storage Router has an internal power supply that monitors its temperature and output voltages. The power supply automatically senses and adjusts to either of these input voltages: 115 VAC/60 Hz or 230 VAC/50 Hz.

If conditions reach critical thresholds, the power supply will shut down to avoid damage from excessive heat or electrical current. The power supply connects to site power through a power cord and the power connector on the rear panel. (See [Figure 1-6](#).) The power supply is powered on with a rocker switch that is next to the power connector. The switch is labeled **I** and **O**. Pressing **I** switches power on. Pressing **O** switches power off.

Figure 1-6 Rear Panel, Power Connector



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Installing the SN 5428 Storage Router

This chapter describes how to prepare your site for installation, how to prepare and install the SN 5428 Storage Router chassis, how to connect network and Fibre Channel cables, how to connect power, and how to verify correct installation. For first-time installations, perform the procedures in the following sections in the order listed here:

- [Read Safety Notices, page 2-2](#)
- [Site Planning, page 2-5](#)
- [Installing the SN 5428 Chassis, page 2-6](#)
- [Installing SFP Modules, page 2-11](#)
- [Connecting to Gigabit Ethernet and Fibre Channel Ports, page 2-20](#)
- [Connecting to the 10/100 Ethernet Management and HA Ports, page 2-23](#)
- [Connecting to the Console Port, page 2-24](#)
- [Connecting Power, page 2-25](#)
- [Verifying Installation, page 2-27](#)
- [Where to Go Next, page 2-29](#)



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. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

Read Safety Notices

Read the following safety notices before installing the SN 5428 Storage Router.



Warning

Ultimate disposal of this product should be handled according to all national laws and regulations. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.



Warning

The device is designed to work with TN power systems. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.



Warning

Only trained and qualified personnel should be allowed to install or replace this equipment. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.



Warning

Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.



Warning

Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

The plug-socket combination must be accessible at all times because it serves as the main disconnecting device. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

When installing the unit, the ground connection must always be made first and disconnected last. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

The safety cover is an integral part of the product. Do not operate the unit without the safety cover installed. Operating the unit without the cover in place will invalidate the safety approvals and pose a risk of fire and electrical hazards. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from the power outlet voltage, do not connect the chassis to that receptacle. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**Warning**

Class 1 laser product. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

**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. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

Site Planning

Planning the proper location and layout of your SN 5428 Storage Router, your equipment rack, or wiring closet is essential for successful storage router operation. Equipment placed too close together or in an inadequately ventilated area can cause system overtemperature conditions. In addition, poor equipment placement can make system panels inaccessible and difficult to maintain.

To ensure normal operation and to avoid unnecessary maintenance, plan your site configuration and prepare your site *before* installation.

[Table A-1 on page A-1](#) lists the operating and nonoperating environmental site requirements for the SN 5428 Storage Router. Within specified environmental ranges the system can continue to operate; however, a measurement that approaches the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental conditions before they exceed the maximum operating range.

Verify the site power for the type of device you are installing. Power requirements are useful for planning the power distribution system needed to support the storage router. Heat dissipation is an important consideration for sizing the air-conditioning requirements for an installation. See [Table A-1 on page A-1](#) for power and heat ratings for the storage router.

**Caution**

To prevent a loss of input power, verify that the total maximum load on the circuit supplying power to the power supply is within the current ratings of the wiring and breakers.

Installing the SN 5428 Chassis

You can install the SN 5428 chassis on a table or a shelf, or in an equipment rack. The following sections describe the steps required to install the SN 5428 chassis:

- [Installing on a Table or a Shelf, page 2-6](#)
- [Rack-Mounting the SN 5428 Storage Router, page 2-7](#)
- [Attaching the Optional Cable Guide, page 2-10](#)

Before installing the storage router, read the *Site Preparation and Safety Guide* to familiarize yourself with proper site and environmental conditions.

Installing on a Table or a Shelf

You can install the SN 5428 Storage Router chassis on a table or a shelf (or another flat, secure surface).

If you are going to install the SN 5428 Storage Router in an equipment rack, skip this section and proceed to the [“Rack-Mounting the SN 5428 Storage Router” section on page 2-7](#). To install the chassis on a table or a shelf, follow these steps:

-
- Step 1** Locate the four adhesive-backed rubber feet. They are in the accessory kit that is shipped with the storage router.
 - Step 2** Peel the rubber feet from their backing and place the feet, adhesive-side down, onto the four round recessed areas on the bottom of the chassis.
 - Step 3** Place the storage router on a table or a shelf near an AC power source.
-

Rack-Mounting the SN 5428 Storage Router

You can rack-mount the SN 5428 Storage Router chassis in a 19-inch equipment rack with the front panel forward.

The accessory kit that is shipped with your storage router contains two L-brackets, six L-bracket screws, a cable guide (with mounting screw), and two sets of rack-post screws. One set of rack-post screws consists of four 10-32 3/4" screws; the other set consists of four 12-24 3/4" screws.

**Note**

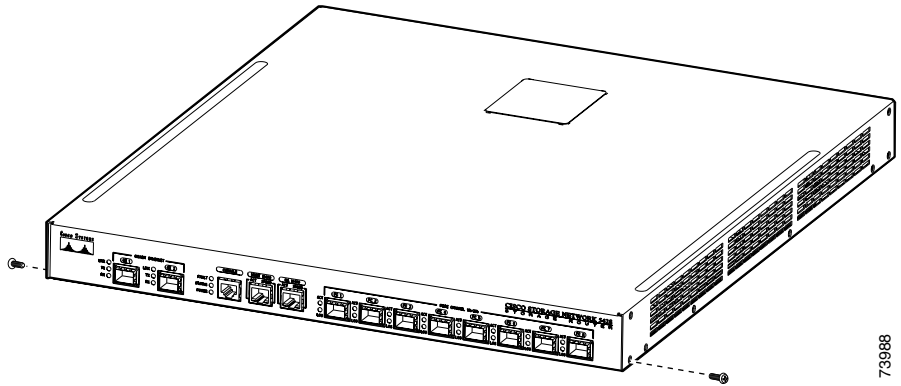
If your mounting-post holes cannot accommodate the rack-post screws shipped with your storage router, you will need to supply other screws (and clips if necessary) suitable for your equipment rack.

You need the following tools to install the storage router in a rack:

- Phillips screwdriver suitable for L-bracket screws and cable-guide screw
- Phillips screwdriver suitable for the rack-post screws
- Tape measure

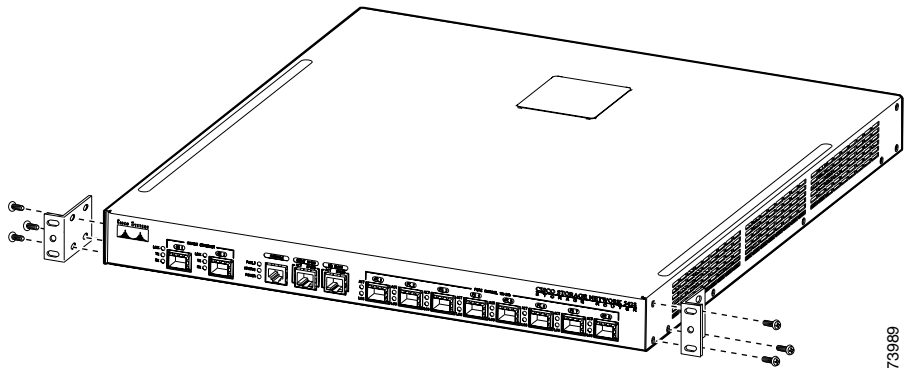
To install the storage router in a rack, follow these steps:

-
- Step 1** Prepare for installation as follows:
- a. Place the storage router on the floor or on a sturdy table as close as possible to the rack. Leave enough clearance so that you can move around the storage router.
 - b. Use a 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 inches (48.26 cm) but not more 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 the space is 17.75 inches (45.72 cm) wide.
- Step 2** Remove the front screw from each side of the chassis. (See [Figure 2-1](#).) You may discard the screws.

Figure 2-1 Removing the Front Screws from the Sides

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- Step 3** Attach the left and right L-brackets using the screws supplied with the brackets in the accessory kit. (See [Figure 2-2](#).)

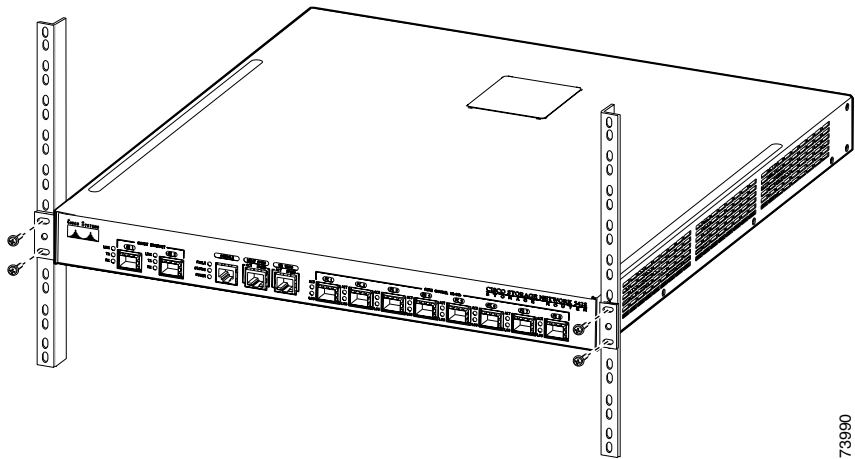
Figure 2-2 Attaching the L-Brackets

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- Step 4** Install the storage router in the rack as follows:
- a. Insert the rear of the storage router between the mounting posts.
 - b. Align the mounting holes in the L-brackets with the mounting holes in the equipment rack.

- c. Secure the storage router by screwing four (two on each side) screws through the elongated holes in the L-brackets and into the threaded holes in the mounting posts. (See [Figure 2-3](#).)

Figure 2-3 *Installing the Chassis in the Rack*

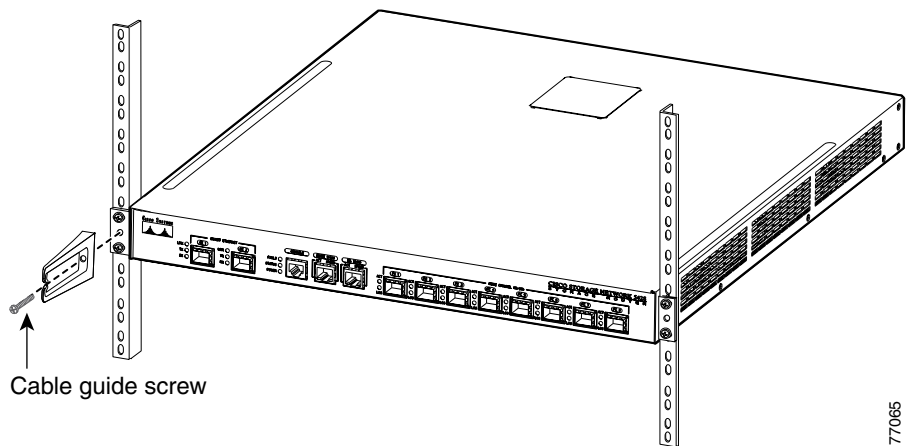


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Attaching the Optional Cable Guide

A cable guide is included in the accessory kit that is shipped with the SN 5428 Storage Router. If the storage router is installed in a rack, you can attach the cable guide to either the left or right L-bracket, using the supplied black screw. (See [Figure 2-4](#).) Attaching the cable guide will prevent the cables from obscuring the front panel of the storage router and the other devices in the rack.

Figure 2-4 Attaching the Cable Guide



Installing SFP Modules

Before you install or remove an SFP (small form-factor pluggable) module, read the installation information in this section. For connecting to SFP modules in the Gigabit Ethernet ports and the Fibre Channel ports, read the instructions in the [“Connecting to Gigabit Ethernet and Fibre Channel Ports”](#) section on page 2-20.

**Note**

Because of interoperability issues, Cisco does not support SFPs purchased from third-party vendors. See [Appendix B, “Cable and Port Pinouts”](#) for SFP port specifications.

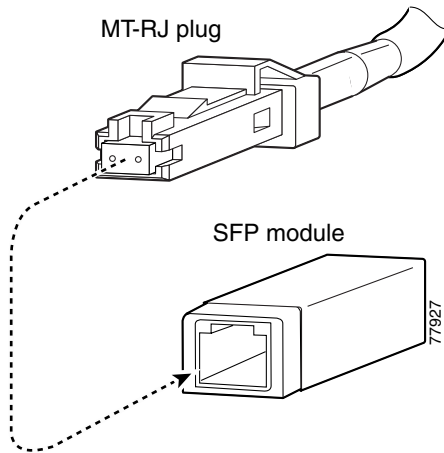
**Note**

When fiber-optic cable plugs and SFP module receptacles are disconnected from each other, place dust covers on them.

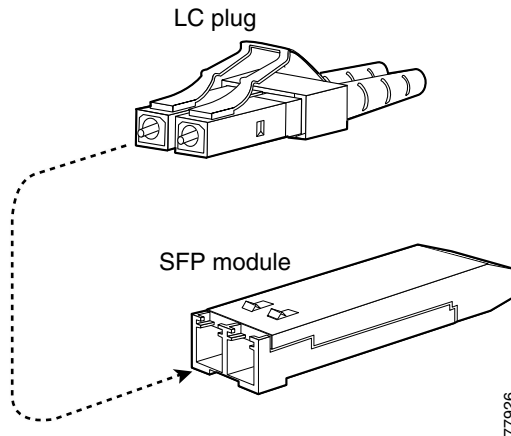
**Warning**

Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

The Gigabit Ethernet ports use fiber-optic SFP modules with either MT-RJ connectors (see [Figure 2-5](#)) or LC connectors (see [Figure 2-6](#)). The Fibre Channel ports use fiber-optic SFP modules with LC connectors (see [Figure 2-6](#)). See [Table 2-1 on page 2-13](#) to determine what types of SFP modules you can install in the Gigabit Ethernet and Fibre Channel ports. See [Appendix B, “Cable and Port Pinouts”](#) for SFP module specifications.

Figure 2-5 MT-RJ Fiber-Optic Connector and SFP Module**Caution**

Protect your fiber-optic SFP modules by inserting clean dust covers into the SFPs after the cables are extracted from them. Be sure to clean the optic surfaces of the fiber cables before you plug them back into the optical bores of another SFP module. Avoid getting dust and other contaminants into the optical bores of your SFP modules: The optics will not work correctly when obstructed with dust.

Figure 2-6 LC Connector and Fiber-Optic SFP Module**Table 2-1 Types of SFP Modules for Gigabit Ethernet and Fibre Channel Ports**

SFP Product Number	Connector Type	Port	Usage
SN-SFP-GEMM-MTRJ	MT-RJ	Gigabit Ethernet only	This module can be used in any combination with the SN-SFP-FCGEMM-LC module.
SN-SFP-FCMM-LC	LC	Fibre Channel only	This module can be used in any combination with the SN-SFP-FCGEMM-LC module.
SN-SFP-FCGEMM-LC	LC	Gigabit Ethernet or Fibre Channel	For Gigabit Ethernet ports, this module can be used in any combination with the SN-SFP-GEMM-MTRJ module. For Fibre Channel ports, this module can be used in any combination with the SN-SFP-FCMM-LC module.

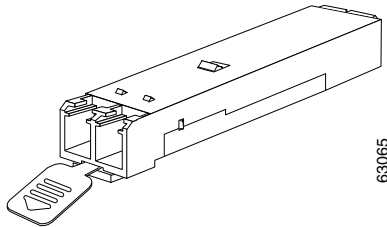
The SFP modules have three different types of latching devices used to secure and detach the SFP module from a port. The three types of SFP modules are described in the following sections:

- [Mylar Tab SFP Modules, page 2-14](#)
- [Actuator/Button SFP Modules, page 2-16](#)
- [Bale Clasp SFP Modules, page 2-18](#)

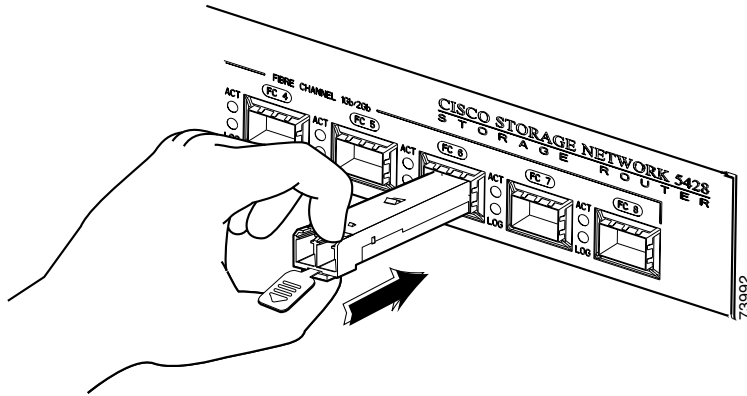
Mylar Tab SFP Modules

The Mylar tab SFP module (see [Figure 2-7](#)) has a tab that you must pull in order to remove the module from a port.

Figure 2-7 Mylar Tab SFP Module

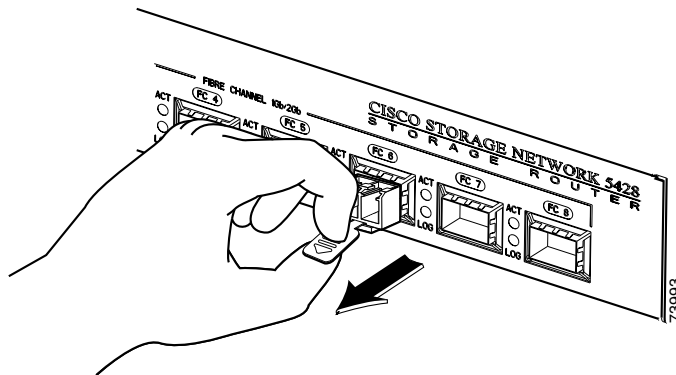


To insert the Mylar tab SFP module into a port, line up the SFP module with the port, and slide it into place (see [Figure 2-8](#)).

Figure 2-8 Inserting a Mylar Tab SFP Module**Caution**

When pulling the tab to remove the SFP module, be sure to pull in a straight outward motion so you remove the SFP module from the port in a parallel direction. Do not twist or pull the tab because you may disconnect it from the SFP module.

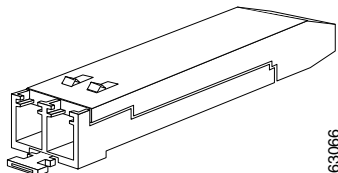
To remove the SFP module from the port, pull the tab gently in a slightly downward direction until it disengages from the port, and then pull the SFP module out (see [Figure 2-9](#)).

Figure 2-9 Removing a Mylar Tab SFP Module

Actuator/Button SFP Modules

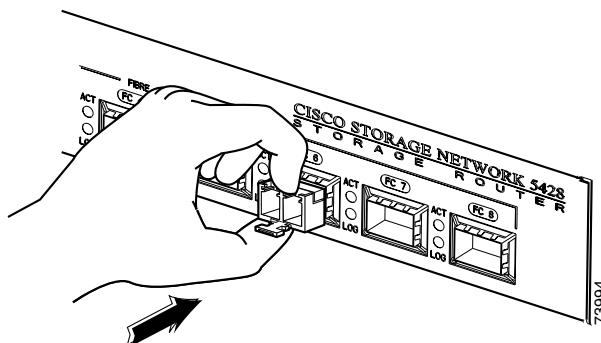
The actuator/button SFP module (see [Figure 2-10](#)) has a button that you must push in order to remove the SFP module from a port.

Figure 2-10 Actuator/Button SFP Module



To insert the actuator/button SFP module into a port, line up the SFP module with the port and slide it in until the actuator/button clicks into place (see [Figure 2-11](#)). Be sure not to press the actuator/button as you insert the SFP module because you might inadvertently disengage the SFP module from the port.

Figure 2-11 Inserting an Actuator/Button SFP Module

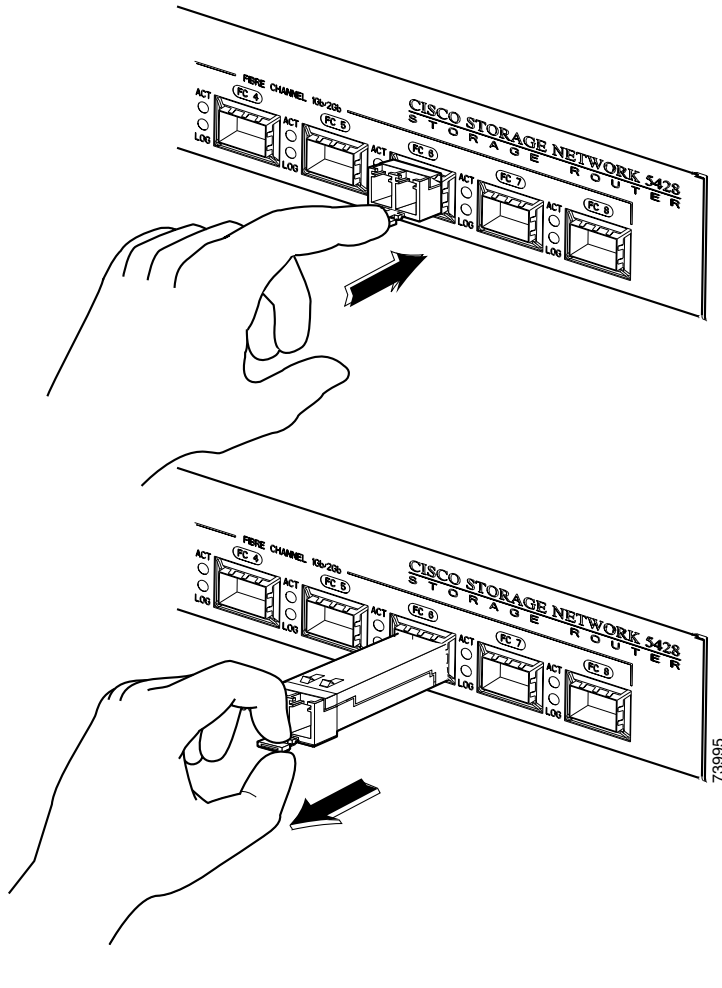


To remove an actuator/button SFP module from a port, perform the following steps:

- Step 1** Gently press the actuator/button on the front of the SFP module until it clicks and the latch mechanism activates, releasing the SFP module from the port (see [Figure 2-12](#)).

- Step 2** Grasp the actuator/button between your thumb and index finger and carefully pull the SFP module from the port.

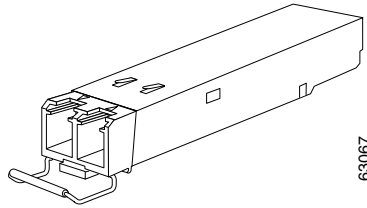
Figure 2-12 Removing an Actuator/Button SFP Module from a Port



Bale Clasp SFP Modules

The bale clasp SFP module (see [Figure 2-13](#)) has a bale clasp that you use to secure the SFP module in a port.

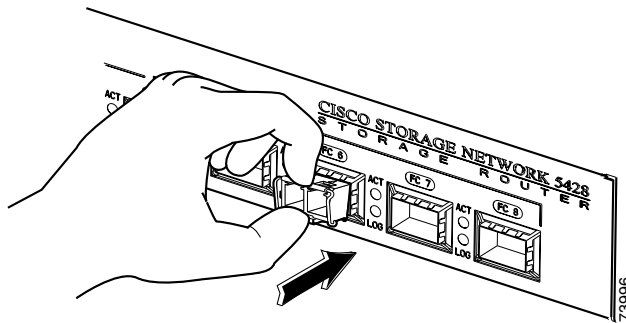
Figure 2-13 Bale Clasp SFP Module



To insert a bale clasp SFP module into a port, perform the following steps:

-
- Step 1** Close the bale clasp before inserting the SFP module.
 - Step 2** Line up the SFP module with the port and slide it into the port (see [Figure 2-14](#)).

Figure 2-14 Inserting a Bale Clasp SFP Module into a Port



To remove a bale clasp SFP module from a port, perform the following steps:

- Step 1** Open the bale clasp on the SFP module with your index finger in a downward direction as shown in [Figure 2-15](#). If the bale clasp is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale clasp as shown in [Figure 2-16](#).
- Step 2** Grasp the SFP module between your thumb and index finger and carefully remove it from the port as shown in [Figure 2-15](#).

Figure 2-15 Removing a Bale Clasp SFP Module with Your Index Finger

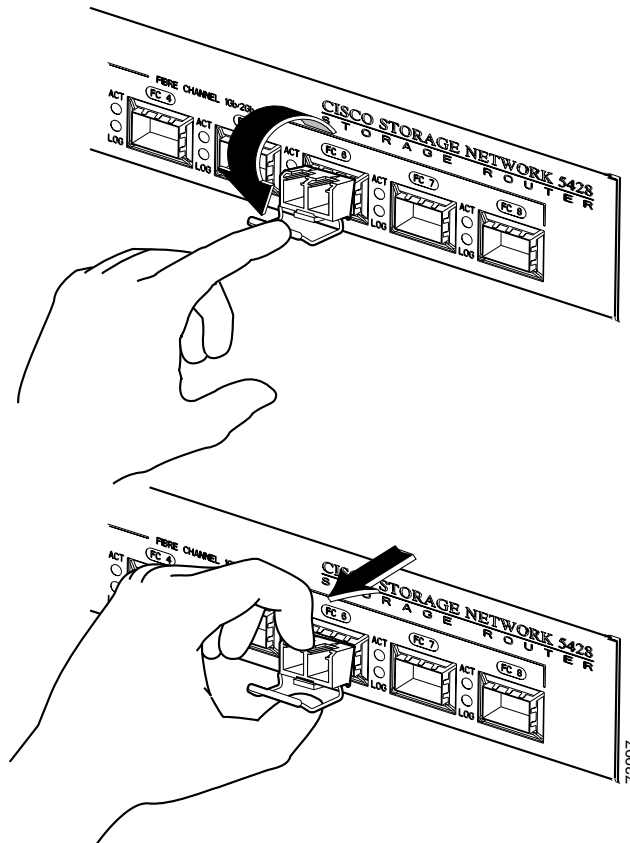
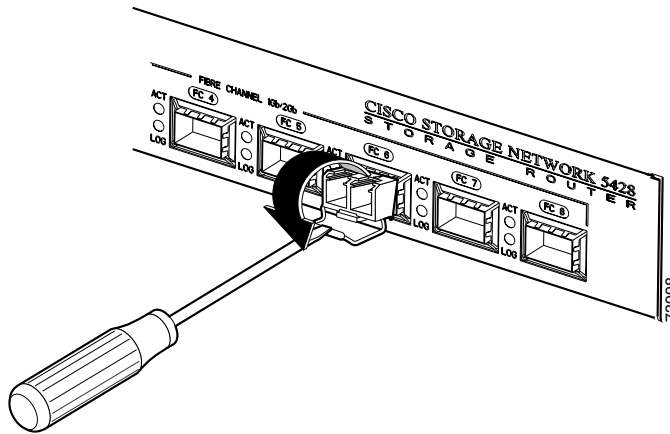


Figure 2-16 Removing a Bale Clasp SFP Module with a Flat-Blade Screwdriver



Connecting to Gigabit Ethernet and Fibre Channel Ports

The Gigabit Ethernet ports, GE 1 and GE 2, use MT-RJ-type or LC-type fiber-optic SFP modules and cables. The Fibre Channel ports, FC 1 through FC 8, use LC-type fiber-optic SFP modules and cables. When you are connecting a cable to a fiber-optic SFP module, make sure that you firmly press the cable plug into the socket. The upper edge of the plug must snap into the upper front edge of the socket. You should hear the plug click when it is locked into the socket. To make sure that the plug is locked into the socket, gently pull on it.

To disconnect a plug from a socket, press the trigger on top of the plug, releasing the latch. You should hear a click, which indicates that the latch has released. Carefully pull the plug out of the socket.

**Note**

When you disconnect the fiber-optic cable from the module, grip the body of the connector. Do not grip the connector jacket-sleeve. Gripping the sleeve can, over time, compromise the integrity of the fiber-optic cable termination in the connector.

Dirt or skin oils may have accumulated on an MT-RJ plug faceplate (around the optical-fiber openings), which can generate significant attenuation and reduce the optical power levels below threshold levels so that a link cannot be made. To clean an MT-RJ plug faceplate, follow this procedure:

-
- Step 1** Using a lint-free tissue soaked in 99 percent pure isopropyl alcohol, gently wipe the faceplate.
- Step 2** Remove any residual dust from the faceplate with compressed air before installing the cable.
-

**Note**

When fiber-optic cable plugs and SFP module receptacles are disconnected from each other, place dust covers on them.

The following sections describe how to connect cables to the Gigabit Ethernet and Fibre Channel ports:

- [Connecting to a Gigabit Ethernet Port, page 2-22](#)
- [Connecting to a Fibre Channel Port, page 2-22](#)

Connecting to a Gigabit Ethernet Port

To connect a cable to a Gigabit Ethernet port, follow these steps:

-
- Step 1** Remove the dust cover from the SFP module in the Gigabit Ethernet port; store the dust cover for future use.
 - Step 2** Remove the dust cover (or covers) from the plug on the cable; store the cover (or covers) for future use. Insert the cable plug into the Gigabit Ethernet SFP module.
 - Step 3** Connect the other end of the cable to the external end system, switch, or router.
-

Connecting to a Fibre Channel Port



Caution

If an SN 5428 Fibre Channel port is going to be connected to a zoned fabric, do *not* connect the port until you have completed the SN 5428 hardware installation and have confirmed that the SN 5428 Domain ID has been configured. After the SN 5428 has been installed and after the SN 5428 Domain ID has been configured, you can then connect Fibre Channel ports to zoned fabric according to the procedures in this section. Then, verify the operation of the ports according to the procedures in the [“Verify That Fibre Channel Connections Are Operational” section on page 2-28](#). For information about configuring the Domain ID, see the *Cisco SN 5428 Storage Router Software Configuration Guide*.

To connect a cable to a Fibre Channel port, follow these steps:

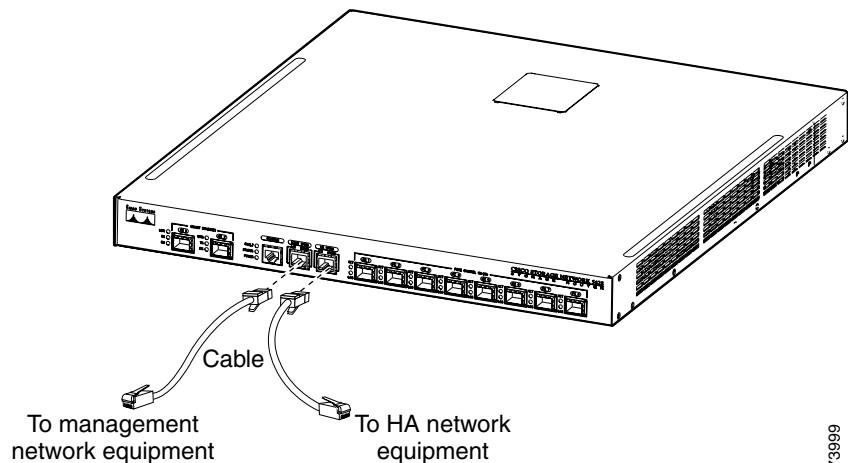
-
- Step 1** Remove the dust cover from the SFP module in the Fibre Channel SFP port; store the dust cover for future use.
 - Step 2** Remove the dust covers from the cable plug on the fiber-optic cable; store the dust covers for future use. Insert the cable plug into the Fibre Channel SFP module.
 - Step 3** Connect the other end of the cable to a Fibre Channel port of another system (for example, a storage system, switch, host, or another SN 5428 Storage Router.)
-

Connecting to the 10/100 Ethernet Management and HA Ports

To connect to the 10/100 management and HA ports, follow these steps:

-
- Step 1** Use modular, RJ-45, straight-through UTP cables to connect the 10/100 management and HA ports to end systems. Use modular, RJ-45 cross-connect cables to connect to external switches and routers.
- Step 2** Connect the appropriate modular cables to the 10/100 management and HA ports. (See [Figure 2-17](#).)

Figure 2-17 Connecting to the 10/100 Management and HA Ports



- Step 3** Connect the other end of the cable to the external end system, switch, or router.
-

Connecting to the Console Port

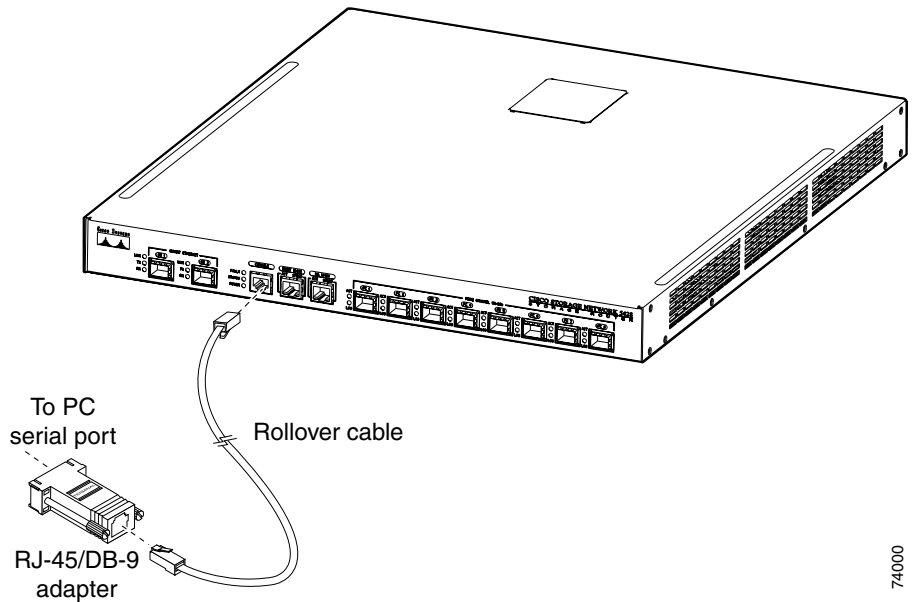
Connect a PC serial port to the console port for local administrative access to the SN 5428 Storage Router. The PC must support VT100 terminal emulation. The terminal-emulation software—frequently a PC application such as HyperTerminal or Procomm Plus—makes communication between the storage router and your PC possible during setup and configuration.

Perform the following steps to connect to the console port:

- Step 1** Configure the PC terminal emulation program to match these console port default characteristics:

Bits Per Second	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

- Step 2** Connect the supplied RJ-45-to-DB-9 female adapter to the PC serial port.
- Step 3** Connect one end of the supplied console cable (a rollover RJ-45-to-RJ-45 cable) to the console port. Connect the other end to the RJ-45-to-DB-9 adapter at the PC serial port. (See [Figure 2-18](#).)

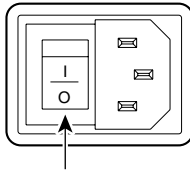
Figure 2-18 Connecting the Console Cable

Connecting Power

The SN 5428 Storage Router can be connected to either of two power sources: 115-120 VAC/60 Hz or 230-240 VAC/50 Hz. The power supply automatically senses the source and adjusts to either source.

To connect power to the storage router, follow these steps:

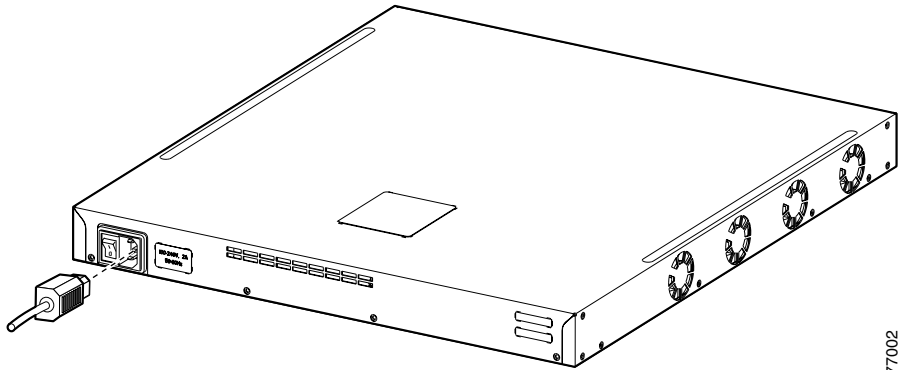
- Step 1** Ensure that all site power and grounding requirements described in the *Site Preparation and Safety Guide* have been met before connecting the chassis to a power source.
- Step 2** Make sure the power switch is set to off. (See [Figure 2-19](#).)

Figure 2-19 Power Set to Off

Power switch
set to off

77001

- Step 3** Plug the power cord into the power receptacle located on the rear panel on the chassis. (See [Figure 2-20](#).)

Figure 2-20 Connecting a Power Cord to the SN 5428 Power Connector

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- Step 4** Connect the other end of the power cord to the power source for the storage router.

Verifying Installation

Verifying installation of the SN 5428 Storage Router consists of making sure that it starts up properly and that the network and Fibre Channel connections are operational.

**Caution**

Fibre Channel ports should not be connected to zoned fabric until the SN 5428 Domain ID has been configured. See the [“Connecting to a Fibre Channel Port” section on page 2-22](#). For information about configuring the Domain ID, see the *Cisco SN 5428 Storage Router Software Configuration Guide*.

Verifying Start-up Operations

To verify that the storage router starts up properly, perform the following steps:

- Step 1** At the rear of the storage router, press the power switch to the on position.
- Step 2** At the front of the storage router, observe the POWER LED to make sure power is on. Make sure that the FAULT LED is off.
- Step 3** Listen and check for air flow to make sure the fan assembly is operating.
- Step 4** Observe console output to make sure that the storage router software is booting properly. The boot process may last for three to five minutes and will display boot information and a banner. A successful boot-up is indicated by a CLI prompt for user input.
- Step 5** If any of these conditions are not met, reference [Chapter 3, “Troubleshooting,”](#) to isolate and, if possible, resolve the problem.

Verify That Network Connections Are Operational

Verifying the network connections consists of making sure that the following ports are operational: Gigabit Ethernet, 10/100 Ethernet management, and 10/100 HA.

To verify that the network connections are operational, perform the following steps:

-
- Step 1** Verify the Gigabit Ethernet port connections by checking the port link status LED. See [Table 1-1 on page 1-6](#) for LED indication descriptions.
 - Step 2** Verify the 10/100 Ethernet management port connection by checking the port link status LED. See [Table 1-1 on page 1-6](#) for LED indication descriptions.
 - Step 3** Verify the 10/100 HA port connection by checking the port link status LED. See [Table 1-1 on page 1-6](#) for LED indication descriptions.
 - Step 4** If any of these conditions are not met, reference [Chapter 3, “Troubleshooting,”](#) to isolate and, if possible, resolve the problem.
-

Verify That Fibre Channel Connections Are Operational

To verify that the connections are operational, perform the following steps:

-
- Step 1** Verify Fibre Channel port connections by checking Fibre Channel LOG LEDs. See [Table 1-1 on page 1-6](#) for LED indication descriptions.
 - Step 2** If the LOG LEDs for connected ports are flashing, reference [Chapter 3, “Troubleshooting,”](#) to isolate and, if possible, resolve the problem.
-

Where to Go Next

Once you have verified that the SN 5428 Storage Router hardware is properly installed, it is ready for software configuration. To configure the software, refer to the *SN 5428 Storage Router Software Configuration Guide*.

■ Where to Go Next



Troubleshooting

This chapter provides troubleshooting procedures for problems encountered during installation and consists of the following sections:

- [Solving Problems at the Component Level, page 3-1](#)
- [Identifying Startup Problems, page 3-2](#)
- [Troubleshooting the Power Supply, page 3-3](#)
- [Troubleshooting a Network or Fibre Channel Port Connection, page 3-4](#)
- [Contacting Customer Service, page 3-7](#)

Solving Problems at the Component Level

The key to success when troubleshooting the SN 5428 Storage Router is to isolate the problem to a specific storage router component. The first step is to compare what the SN 5428 Storage Router *is doing* to what it *should be doing*. Because a startup problem is usually attributed to a single component, it is more efficient to isolate the problem to a subsystem rather than troubleshoot each separate component in the storage router.

The SN 5428 Storage Router chassis consists of the following subsystems:

- The power supply operates whenever system power is on (see the [“Troubleshooting the Power Supply” section on page 3-3](#)).

- The chassis fan assembly operates when the system power is on. The fan may continue to operate even when the power supply shuts down the SN 5428 Storage Router because of an overtemperature or overvoltage condition (although it does shut down for a power supply shutdown).

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

- Listen to the fan assembly to determine if it is operating.
- Check for any obstructions restricting airflow through the storage router.

If you determine that the fan assembly is not operating properly, contact a customer service representative.

Identifying Startup Problems

Observe the operation of the SN 5428 Storage Router and its front-panel LEDs to determine startup problems. LEDs indicate storage router states in the startup sequence. By checking the LEDs, you can determine when and where the storage router failed in the startup sequence.

Perform the following steps when you power up the SN 5428 Storage Router:

-
- Step 1** Listen for the chassis fan assembly operation. If it does not operate, see the [“Troubleshooting the Power Supply” section on page 3-3](#). If you determine that the power supply is functioning normally and that the fan assembly is faulty, contact a customer service representative. If the fan assembly does not function properly at initial startup (there are no installation adjustments that you can make), contact a customer service representative.
- Step 2** Check the POWER LED on the front panel. The POWER LED turns on immediately when power is on. The LED remains on during normal SN 5428 Storage Router operation. If the LED is not on, see the [“Troubleshooting the Power Supply” section on page 3-3](#).
- Step 3** Check the STATUS and FAULT LEDs on the front panel. See the [“Front-Panel LEDs” section on page 1-5](#) for LED descriptions.

- Step 4** Check the network and Fibre Channel port LEDs on the front panel. See the “[Front-Panel LEDs](#)” section on page 1-5 for LED descriptions. If a network or Fibre Channel port LED indicates a problem with the port connection, see the “[Troubleshooting a Network or Fibre Channel Port Connection](#)” section on page 3-4.
- Step 5** Verify that the PC terminal emulation program is set correctly and that the PC is connected properly to the console port. Also, verify at the PC terminal emulation program display that the SN 5428 has started up properly (for example, a prompt for starting a configuration wizard or a CLI prompt).
- Step 6** Contact a customer service representative for instructions if a status LED indicates a failure or if the PC connected to the console port indicates an incomplete boot-up process.
-

Troubleshooting the Power Supply

To help isolate a power problem, follow these steps:

-
- Step 1** Check the POWER LED.
- If the POWER LED is off, unplug the power cord, and then plug the power cord back in.
 - If the POWER LED remains off, check the AC source or the power cable for problems.
- Step 2** Connect the power cord to another power source if one is available.
- If the POWER LED comes on, the problem is the first power source.
 - If the POWER LED is off after you connect the power supply to a new power source, replace the power cord.
 - If the POWER LED still fails to light when the storage router is connected to a different power source with a new power cord, the power supply is probably faulty.
- Step 3** If you are unable to resolve the problem, contact a customer service representative for instructions.
-

Troubleshooting a Network or Fibre Channel Port Connection

If an LED on a network or Fibre Channel port indicates a problem, follow the steps in the following sections to help isolate the problem:

- [Troubleshooting a Connection to a Gigabit Ethernet Port, page 3-4](#)
- [Troubleshooting a Connection to a 10/100 Ethernet Management or 10/100 Ethernet HA Port, page 3-5](#)
- [Troubleshooting a Connection to a Fibre Channel Port, page 3-6](#)

Troubleshooting a Connection to a Gigabit Ethernet Port

A bad connection to a Gigabit Ethernet (GE 1 or GE 2) port is indicated by the LINK LED not being on. If the LINK LED is not on, follow these steps to help isolate the problem:

-
- Step 1** Check to make sure that the cable is connected properly and in good operating condition.
- Disconnect and connect both ends of the cable. If the LINK LED turns on, then the cable was not connected properly.
 - If the LINK LED remains off, replace the cable. If the LINK LED turns on, then the cable was defective.
 - If the LINK LED remains off, the cable is most likely not the problem. Continue to the next step.
- Step 2** Check the external end system, switch, or router to which the port is connected.
- If the external end system, switch, or router is operating properly, continue to the next step.
 - If the external end system, switch, or router is not operating properly, then correct the problem. If the LINK LED turns on, then the problem was with the external end system, switch, or router.
 - If the LINK LED remains off, continue to the next step.

Step 3 Replace the SFP module.

- If the LINK LED turns on, the problem was the SFP module.
 - If the LINK LED remains off, contact a customer service representative for instructions.
-

Troubleshooting a Connection to a 10/100 Ethernet Management or 10/100 Ethernet HA Port

A bad connection to the 10/100 Ethernet Management or the 10/100 Ethernet HA port (MGMT 10/100 or HA 10/100) is indicated by the ACT LED not being on. If the ACT LED is not on, follow these steps to help isolate the problem:

Step 1 Check to make sure that the cable is connected properly and in good operating condition.

- Verify that the cable is the correct type of cable. (See [Appendix B, “Cable and Port Pinouts”](#).)
- Disconnect and connect both ends of the cable. If the ACT LED turns on, then the cable was not connected properly.
- If the ACT LED remains off, replace the cable. If the ACT LED turns on, then the cable was defective.
- If the ACT LED remains off, the cable is most likely not the problem. Continue to the next step.

Step 2 Check the external end system, switch, or router to which the port is connected.

- If the external end system, switch, or router is operating properly, continue to the next step.
 - If the external end system, switch, or router is not operating properly, then correct the problem. If the ACT LED turns on, then the problem was with the external end system, switch, or router.
 - If the ACT LED remains off, contact a customer service representative for instructions.
-

Troubleshooting a Connection to a Fibre Channel Port

A bad connection to a Fibre Channel port (FC 1 through FC 8) is indicated by the LOG LED flashing twice per second. If the LOG LED is flashing twice per second, follow these steps to help isolate the problem:

-
- Step 1** Make sure that the Domain ID of the SN 5428 is configured properly. For information about configuring the Domain ID, see the *Cisco SN 5428 Storage Router Software Configuration Guide*. If the Domain ID is configured properly, continue to the next step.



Note When a connection problem is resolved, the LOG LED will turn on after a brief logging-in period that is indicated by the LOG LED flashing once per second.

- Step 2** Check to make sure that the cable is connected properly and in good operating condition.
- Disconnect and connect both ends of the cable. If the LOG LED turns on, then the cable was not connected properly.
 - If the LOG LED remains off, replace the cable. If the LOG LED turns on, then the cable was defective.
 - If the LOG LED remains off, the cable is most likely not the problem. Continue to the next step.
- Step 3** Check the device or switch to which the port is connected.
- If the device or switch is operating properly, continue to the next step.
 - If the device or switch is not operating properly, then correct the problem. If the LOG LED turns on, then the problem was with the device or switch.
 - If the LOG LED remains off, continue to the next step.
- Step 4** Replace the SFP module.
- If the LOG LED turns on, the problem was the SFP module.
 - If the LOG LED remains off, 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 service representative assist you as quickly as possible:

- Date you received the SN 5428 Storage Router
- Chassis serial number (located on the upper-right label on 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 taken to isolate and resolve the problem



Technical Specifications

This appendix lists the technical specifications in [Table A-1](#).

Table A-1 SN 5428 Storage Router Chassis Specifications

Environmental	
Temperature, ambient operating	32 to 104°F (0 to 40°C)
Temperature, ambient nonoperating and storage	−40 to 185°F (−40 to 85°C)
Humidity (RH), ambient (non-condensing) operating	10 to 95 percent non-condensing
Humidity (RH), ambient (noncondensing) nonoperating and storage	10 to 95 percent non-condensing
Altitude, operating and nonoperating	−500 to 10,000 ft (−152.4 to 3,048 m)
Physical Characteristics	
Dimensions (H x W x D)	1.75 x 17.44 x 19.17 in. (4.45 x 44.3 x 48.69 cm) 1 RU ¹ in height
Weight	9.5 lb (4.3 kg)
AC Power	
Power supply output	150W
System power dissipation	80 to 90W
AC current	2.0A maximum @ 100 to 240 VAC
AC frequency	50 to 60 Hz
Airflow	Right side in, left side out

Table A-1 SN 5428 Storage Router Chassis Specifications (continued)

Power Supply	
Fuse (F1) rating	5A, 250 VAC, time delay, not field-servicable

1. RU = rack unit



Cable and Port Pinouts

This appendix provides cabling and port pinout information for the SN 5428 Storage Router and includes the following sections:

- [Gigabit and Fibre Channel Ports, page B-1](#)
- [10/100 Ethernet Management and HA Ports, page B-3](#)
- [Console Port, page B-4](#)

Gigabit and Fibre Channel Ports

[Table B-1](#) lists the types of SFP modules and connectors used with the Gigabit Ethernet and Fibre Channel ports in the SN 5428 Storage Router. For more information about the SFP modules and connectors, see the standards for the SFP modules and connectors.

Table B-1 SFP Modules and Connectors

Port	Compliance	Connector	Fiber Type	Cisco Product Number
Gigabit Ethernet, GE 1 and GE 2	1000Base-SX	SW	MMF	DS-SFP-FCGE-SW
	1000Base-LX	LW	SMF	DS-SFP-FCGE-LW
Fibre Channel, FC 1 through FC 8	FC-PI 100/200-M5-SN-I and FC-PI 100/200-M6-SN-I	SW	MMF	DS-SFP-FCGE-SW
		LW	SMF	DS-SFP-FCGE-LW

The DS-SFP-FCGE-SW is a short wave SFP that operates on ordinary multimode fiber optic link spans of up to 500 meters in length for 1 Gbps Fibre Channel and up to 300 meters in length for 2 Gbps Fibre Channel. This SFP is ideal for Fibre Channel connectivity within an individual data center or department.

The DS-SFP-FCGE-LW operates on ordinary single-mode fiber optic link spans of up to 10,000 meters in length. This SFP is ideal for Fibre Channel Connectivity within a campus network or between data centers in close proximity.

[Table B-2](#) lists the SFP port cabling specifications for the SFP modules and connectors used in the SN 5428 Storage Router.

Table B-2 SFP Port Cabling Specifications

Cisco Product Number	Wavelength (nanometer)	Core Size (micron)	Baud Rate	Cable Distance
DS-SFP-FCGE-SW	850	62.5	1.0625	300 m
		62.5	2.125	150 m
		50.0	1.0625	500 m
		50.0	2.125	300 m
DS-SFP-FCGE-LW	1300	9.0	1.0625	10 km
		9.0	2.125	10 km

10/100 Ethernet Management and HA Ports

Use modular, RJ-45, straight-through UTP cables to connect the 10/100 Ethernet ports to end systems. Use modular, RJ-45 cross-connect cables to connect to external switches and routers. [Figure B-1](#) shows straight-through cables and [Figure B-2](#) shows cross-connect cables.

Figure B-1 *Straight-Through Cables*

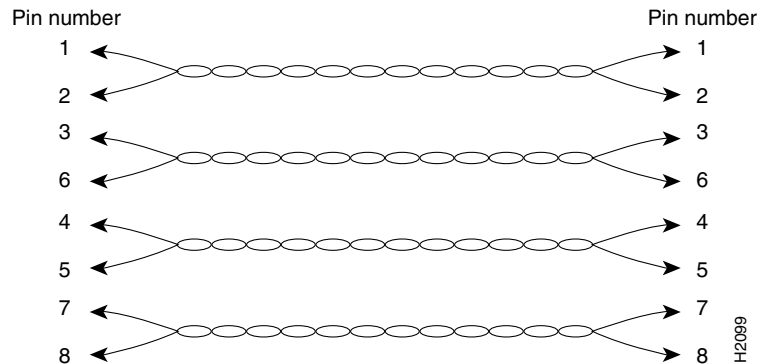
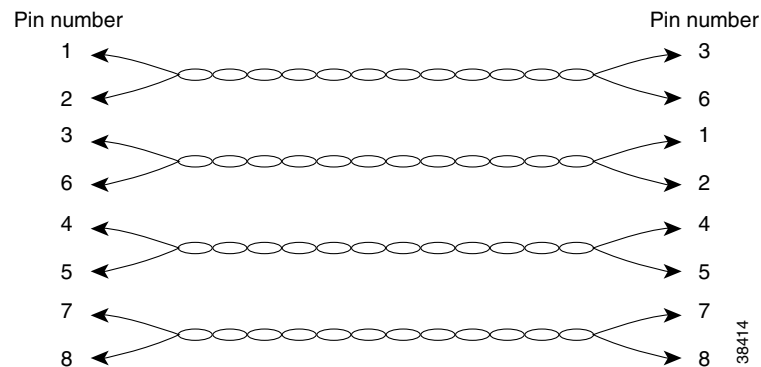


Figure B-2 *Cross-Connect Cables*



The 10/100 Ethernet ports support RJ-45 connectors. [Table B-3](#) lists the signals for RJ-45 connector pinouts.

Table B-3 10/100 Ethernet Management and HA Port Pinouts

Pin	Signal	Direction	Description
1	TD_P	Output	Transmit Data +
2	TD_N	Output	Transmit Data –
3	RD_P	Input	Receive Data +
4	—	—	Terminated
5	—	—	Terminated
6	RD_N	Input	Receive Data –
7	—	—	Terminated
8	—	—	Terminated

Console Port

The console port is an EIA/TIA-232 port with a female 8-pin RJ-45 receptacle. Use the rollover cable supplied with the SN 5428 Storage Router to connect to the console port. (See [Figure B-3](#).) [Table B-4](#) lists the console port pinouts.

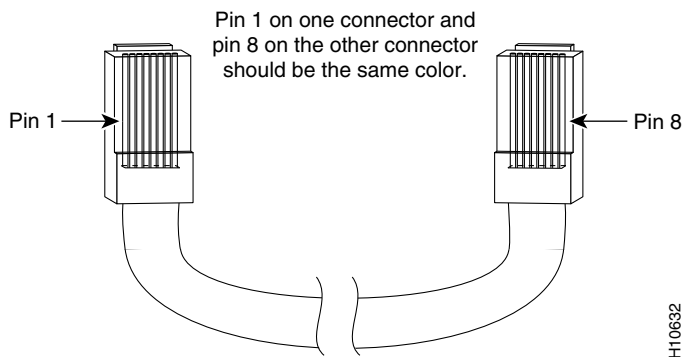
Figure B-3 Rollover Cable for Connection to Console Port

Table B-4 Console Port Pinouts

Pin	Signal	Direction	Description
1	RTS	Output	Request To Send
2	—	—	Not Connected
3	TxD_N	Output	Transmitted Data
4	GND	—	Signal Ground
5	GND	—	Signal Ground
6	RxD_N	Input	Received Data
7	—	—	Not Connected
8	CTS	Input	Clear To Send

The console port uses a subset of the EIA/TIA-232 signals. Only the signals TxD_N, RxD_N, CTS and RTS are connected.

**Note**

The modem control signals are not connected; to access the SN 5428 Storage Router remotely through the console port, you should do so through a terminal server.



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