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Cisco MDS 9396S Multilayer Fabric Switch Hardware Installation Guide

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Americas Headquarters

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Preface

This preface describes the audience, and conventions of the Cisco MDS 9396S Multilayer Fabric Switch Hardware Installation Guide. It also provides information on how to obtain related documentation.

- Preface, on page 1
- Audience, on page 1
- Document Conventions, on page 1
- Related Documentation, on page 2
- Communications, Services, and Additional Information, on page 2

Preface

This preface describes the audience, organization of, and conventions used in the Cisco MDS 9000 Series Configuration Guides. It also provides information on how to obtain related documentation, and contains the following chapters:

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.

Document Conventions

This document uses the following conventions:

Note	Means <i>reader take note</i> . Notes contain helpful suggestions or references to material not covered in the manual.
<u>^</u> Caution	Means <i>reader be careful</i> . In this situation, you might do something that could result in equipment damage or loss of data.

Warnings use the following conventions:



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

Related Documentation

The documentation set for the Cisco MDS 9000 Series Switches includes the following documents.

Release Notes

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-release-notes-list.html

Regulatory Compliance and Safety Information

http://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/hw/regulatory/compliance/RCSI.html

Compatibility Information

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-device-support-tables-list.html

Installation and Upgrade

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-guides-list.html

Configuration

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-and-configuration-guides-list.html

CLI

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-command-reference-list.html

Troubleshooting and Reference

http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/tsd-products-support-troubleshoot-and-alerts.html

To find a document online, use the Cisco MDS NX-OS Documentation Locator at:

http://www.cisco.com/c/en/us/td/docs/storage/san_switches/mds9000/roadmaps/doclocater.html

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.
- To get the business impact you're looking for with the technologies that matter, visit Cisco Services.

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- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco Marketplace.
- To obtain general networking, training, and certification titles, visit Cisco Press.
- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



Product Overview

The Cisco MDS 9396S Multilayer Fabric Switch (DS-C9396S-K9) is a next generation multilayer Intelligent Services-oriented fabric switch. With powerful, compact, two rack unit (2 RU) form factors, it has an integrated 96-port Fibre Channel functionality. The Cisco MDS 9396S switch meets the requirements for a:

- Standalone storage area network (SAN) in small departmental storage environments.
- · Middle-of-row switch in medium-sized redundant fabrics.
- Edge switch in enterprise data center core-edge topologies.

The Cisco MDS 9396S switch has the following major features:

- 96 licensed ports, or 48 licensed ports expandable up to 96 ports in 12 port increments with On-Demand licenses.
- All Fibre Channel ports capable of line rate at 2, 4, 8, 10, 16 Gbps.
- Port interfaces that support field-replaceable, hot-swappable small form-factor pluggable (SFP) transceivers.
- Redundant hot-swappable power supplies and fan trays.
- Port Channels for Inter-Switch Link (ISL) resiliency, and F-port channeling for resiliency on uplinks from a Cisco MDS 9396S operating in NPV mode.
- Enterprise class features such as In-Service Software Upgrades (ISSU), Virtual SANs (VSANs), security features, and Quality of Service (QoS).
- Power On Auto Provisioning (POAP) to automate software image upgrades and configuration file installation on newly deployed switches.
- Generic OnLine Diagnostics (GOLD), a built in diagnostic system with intelligent boot up and periodic runtime tests.
- Full compatibility with the Cisco MDS 9000 Family.

This chapter contains the following topics:

- Chassis Components, on page 6
- Fan Modules, on page 12
- Power Supplies, on page 13
- Switch Ports, on page 14

• Supported SFP+ Transceivers, on page 14

Chassis Components

This section describes the different components of the chassis.

Front View

The front of the Cisco MDS 9396S switch contains LEDs, console and management ports, and 96 2/4/8/10/16 Gbps line rate Fibre Channel ports.

Figure 1: Front View of the Cisco MDS 9396S Switch



1	Serial console port	6	USB port
2	System status LED	7	10/100/1000 Mbps Ethernet management port
3	Power supply LED	8	Fibre Channel ports
4	Fan LED	9	Exhaust grill
5	Exhaust grill		

Rear View

The rear of the Cisco MDS 9396S switch has two PSU bays for the redundant AC PSUs, two fan bays for the redundant fan modules and the chassis ground pad. Each side panel has attachments points for rack mount rails.

Figure 2: Side and Rear view of the Cisco MDS 9396S Switch



1	Power receptable	5	Fan module 2
2	Power supply 1	6	Power supply 2
3	Power module handle	7	Fan securing screws
4	Fan module 1		

Figure 3: Rear Panel Slot Numbering of Cisco MDS 9396S Switch



Grounding Point

The rear of the Cisco MDS 9396S switch also contains the grounding point which is present under a label (Figure 2).

Figure 4: Grounding Point and fan Securing Screws



Switch LEDs

The Cisco MDS 9396S Multilayer Fabric Switch includes the LEDs shown in the following figure. You can use the LEDs to quickly identify the system status.



Figure 5: LEDs : Front view of the Cisco MDS 9396S Switch

1	System status LED	4	Management port link LED
2	Power subsystem status LED	5	Management port activity LED
3	Fan subsystem status LED	6	FC port link status LED

Figure 6: LEDs: Rear view of the Cisco MDS 9396S Switch



1	PSU status LED	2	Fan module status LED
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The	e following ta	ble desc	ribes the	chassis	activity	LEDs	for the	Cisco	MDS	9396S	switch.

Indicator	Location	Color	Status	State
Power subsystem status LED	Front panel of chassis	Off	Off	Either of the following conditions exists:
				 The system is not receiving sufficient power from the PSUs. NXOS is not running.
		Green	Solid On	Both PSUs are installed and operating
		Red	Solid On	A PSU has failed.

Indicator	Location	Color	Status	State
Status LED	Front panel of chassis	Green	Solid On	All diagnostics have passed, NX-OS is running and the system is operational.
		Orange	Solid On	 Any of the following conditions exists: The system is running bootup diagnostics. The system is booting. A minor temperature threshold is currently exceeded.
		Red	Blinking	Unmatched airflow direction for PSU/Fan tray.
			Solid On	 Any of the following conditions exists: A diagnostic test failed or another fault occurred during bootup. A major temperature threshold is currently exceeded.
Fan status	Front panel of	Green	Solid on	Both fan modules are operational.
	Chassis	Red	Solid on	Fan failure.

Indicator	Location	Color	Status	State
PSU Status	Faceplate of each	Green	Off	No input to the PSU.
Indicators	PSU		Solid on	PSU output is OK.
			Blinking	PSU output is not OK, but input is OK.
		Amber	Solid on	Any of the following conditions exists in the PSU:
				Over voltage
				Over current
				Over temperature
				Fan failure.
			Blinking	PSU has a fault, but is still operating.
			Off	PSU is operating normally.
Fan Status	Faceplate of each Fan Module	Green Solid on Fan module is opera		Fan module is operating normally.
		Amber	Solid on	One fan in the fan module has failed.
		Red	Solid on	Both fans in the fan module have failed.

Fan Modules

The Cisco MDS 9396S Multilayer Fabric switch supports two hot-swappable fan modules that allow the switches to continue to run if a fan module is removed, provided that the preset temperature thresholds have not been exceeded. You can swap out a fan module without having to bring the system down. Each fan module on the Cisco MDS 9396S switch has two fans.

New fan modules which support reverse airflow (port-side intake) have been introduced in Cisco MDS NX-OS Releases 6.2(x) starting from Cisco MDS NX-OS Release 6.2(15) and Cisco MDS NX-OS Releases 7.3(x) starting from Cisco MDS NX-OS Release 7.3(1)D1(1).



Note In Cisco MDS NX-OS Release 7.3(0)DY(1) and 7.3(1)DY(1), DS-CAC-1200W power supply unit and DS-C96S-FAN-I as port side intake fan tray are not supported on Cisco MDS 9396S Switch.

To verify the direction of airflow in fan modules, the following colors are denoted on the fan modules:

- Red—Port-side intake airflow (DS-C96S-FAN-I)
- Blue—Port-side exhaust airflow (DS-C96S-FAN-E)

Fan modules which support port-side intake airflow can be used with a new Power Supply Unit, DS-CAC-1200W, only. If an older PSU (DS-CAC-1200W-E) is used with the fan modules which support port-side intake airflow, a warning is issued on the software after which the switch shuts down in 10 minutes.

If a chassis has two different fan modules, one supporting port-side exhaust airflow and the other supporting port-side intake airflow, the switch is immediately powered down.



Note To verify the current fan module on the switch, use the **show inventory fan** command.

<image>





Caution The Cisco MDS 9396S switch has internal temperature sensors that can shut down the system if the temperature at different points within the chassis exceeds certain safety thresholds. To be effective, the temperature sensors require the presence of airflow; therefore, in the event a fan module is removed from the chassis, the Cisco MDS 9396S switch will shut down after five minutes to prevent potentially undetectable overheating. However, the switches will shut down sooner if the higher-level temperature threshold is exceeded. For normal operation, the Cisco MDS 9396S switch requires four fans. Fan module status is also indicated on a front panel LED. To check temperature threshold values, use the **show environment temperature** command.

Procedures for replacing and installing the fan modules are available in the Removing and Installing Components, on page 27 section.

Power Supplies

The Cisco MDS 9396S Multilayer Fabric switch supports two hot swappable AC power supply units (PSUs). Each unit has a power receptacle and a status LED on the faceplate, and a handle for inserting and removing

the unit from the chassis. In the event of a PSU or AC supply (in grid redundant mode) failure, the system will continue to run. PSUs are hot swappable and can be individually replaced without shutting down the system. Procedures for installing and removing PSUs are detailed in the Removing and Installing AC Power Supplies, on page 28 section.

A new high voltage AC and DC PSU (DS-CAC-1200W) which supports bidirectional airflow, port-side exhaust airflow and port-side intake airflow, of fan modules has been introduced in Cisco MDS NX-OS Releases 6.2(x) starting from Cisco MDS NX-OS Release 6.2(17) and Cisco MDS NX-OS Releases 7.3(x) starting from Cisco MDS NX-OS Release 7.3(1)D1(1).

To verify the direction of airflow in PSUs, the following colors are denoted on the PSUs:

- White (DS-CAC-1200W)—Represents bidirectional airflow. Port-side intake airflow or port-side exhaust airflow depending on the type of airflow of the system fan modules. This PSU automatically configures itself to work in port-side exhaust airflow mode if the switch has Blue system fan modules installed. Similarly, the PSU automatically configures itself to work in port-side intake airflow mode if the switch has Red fan modules installed. For more information on the direction of airflow in fan modules, see the Fan Modules, on page 12 section.
- Blue (DS-CAC-1200W-E)—Represents port-side exhaust airflow. This power supply can only be used with the port-side exhaust airflow fan (DS-C96S-FAN-E).

Switch Ports

The Cisco MDS 9396S Multilayer Fabric Switch provides host, target and Inter Switch Link (ISL) connectivity. Each port has an LED which indicates the link status. The ports support SFP+ type Fibre Channel transceivers. For more information on transceivers, see the Supported SFP+ Transceivers section.

Up to 96 auto speed detecting Fibre Channel ports capable of 2, 4, 8, 10, and 16 Gbps speeds are available. By default, the first 48 ports are licenced and activated. The remaining ports can be activated by purchasing On Demand Port Activation Licences, which are available in 12 port increments.

The Cisco 9396S switch has an out of band Ethernet management port. This port has link and link activity LEDs. There is also an out of band RS-232 console port for access and monitoring the system in the boot mode. This port provides software flow control only.

The Cisco 9396S switch has a USB port. This can be used for increasing the flash storage of the system or moving files between the system and outside world through a USB stick.

Supported SFP+ Transceivers

SFP+ transceivers are field-replaceable. You can use any combination of SFP+ transceivers that are supported by the switch. The only restrictions are that Shortwave (SW) transceivers must be paired with SW transceivers, and Longwave (LW) transceivers with LW transceivers, and the cable must not exceed the stipulated cable length for reliable communications.

For the list of SFP+ transceivers supported on the Cisco MDS 9396S Switch, see the Cisco MDS 9000 Family Release Notes for Cisco MDS NX-OS Release 6.2(13). For more information about a specific Cisco SFP+ transceiver, see the SFP Transceiver Specifications section. SFP+ transceivers can be ordered separately or with the Cisco MDS 9396S Switch.



Note

Use only Cisco SFP+ transceivers on the Cisco MDS 9396S switches. Each Cisco SFP+ transceiver is encoded with model information that enables the switch to verify that the SFP+ transceiver meets the requirements for the switch.

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Installing the Cisco MDS 9396S Switch

This chapter describes how to install the Cisco MDS 9396S switch and its components.



Note

Before you install, operate, or service the system, see the Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family for important safety information.

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

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Warning

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

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

Note

Each new switch requires a license; see the Cisco MDS 9000 Family NX-OS Licensing Guide for instructions on installing a license.

- Preinstallation, on page 18
- Installing the Switch, on page 21
- Grounding the Switch, on page 25
- Powering Up the Switch, on page 26

• Removing and Installing Components, on page 27

Preinstallation

This section includes the following information:

Installation Options

The Cisco MDS 9396S Switch can be installed using the following methods:

- In an open EIA rack, using:
 - The rack-mount kit shipped with the switch
 - The Telco and EIA Shelf Bracket Kit (an optional kit, purchased separately) in addition to the rack-mount kit shipped with the switch
- In a perforated or solid-walled EIA cabinet, using:
 - The rack-mount kit shipped with the switch
 - The Telco and EIA Shelf Bracket Kit (an optional kit, purchased separately) in addition to the rack-mount kit shipped with the switch

For instructions on installing the switch using the optional, separately purchased Telco and EIA Shelf Bracket Kit, see the Cisco MDS 9000 Family Telco and EIA Shelf Bracket section.

Note

P The Telco and EIA Shelf Bracket Kit is optional and is not provided with the switch. To order the kit, contact your switch provider.

Installation Guidelines

Follow these guidelines when installing the Cisco MDS 9396S Switch:

- Plan your site configuration and prepare the site before installing the switch. The recommended site planning tasks are listed in the Site Planning and Maintenance Records section.
- Ensure there is adequate space around the switch to allow for servicing the switch and for adequate airflow (airflow requirements are listed the Technical Specifications section).
- Ensure the air-conditioning meets the heat dissipation requirements listed the Technical Specifications section.
- Ensure the cabinet or rack meets the requirements listed in the Cabinet and Rack Installation section.

Note If the front cabinet mounting rails are not offset from the front door or bezel panel by a minimum of 3 inch (7.6 cm), and a minimum of 5 inch. (12.7 cm), respectively, and cable management brackets are installed on the front of the chassis, the chassis should be mounted rear-facing to ensure the minimum bend radius for fiber-optic cables. Note Jumper power cords are available for use in a cabinet. For more information, see the Jumper Power Cord section. • Ensure the chassis is adequately grounded. If the switch is not mounted in a grounded rack, we recommend connecting both the system ground on the chassis and the power supply ground to an earth ground. • Ensure the site power meets the power requirements listed in the Technical Specifications section. If available, you can use an uninterrupted power supply (UPS) to protect against power failures. ∕!∖ Caution Avoid UPS types that use ferro-resonant technology. These UPS types can become unstable with systems such as the Cisco MDS 9000 Family, which can have substantial current draw fluctuations because of fluctuating data traffic patterns. Ensure that circuits are sized according to local and national codes. For North America, the 300 W power supplies require a 20 A circuit. If you are using a 200 or 240 VAC power source in North America, the circuit must be protected by a two-pole circuit breaker. ∕!∖ Caution To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the switch are within current ratings for wiring and breakers. As you install and configure the switch, record the information listed in the Site Planning and Maintenance **Records** section • Use the following screw torques when installing the switch: • Captive screws: 4 in-lb (0.45 N·m) M3 screws: 4 in-lb (0.45 N·m) • M4 screws: 12 in-lb (1.36 N·m) M6 screws: 40 in-lb (4.5 N·m) • 10-32 screws: 20 in-lb (2.26 N·m) • 12-24 screws: 30 in-lb (3.39 N·m)

Required Equipment

Before beginning the installation, ensure that you have the following items available in addition to the switch and its accessory kit:

- Eight customer-supplied 12-24 or 10-32 screws (required for attaching slider rails and mounting bracket to the mounting rails)
- Number 1 and number 2 Phillips screwdrivers with torque capability
- 3/16-inch flat-blade screwdriver
- Tape measure and level
- ESD wrist strap or other grounding device
- · Anti static surface

The following additional items (not found in the accessory kit) are required to ground the chassis:

• Grounding cable (6 AWG recommended), sized according to local and national installation requirements; the required length depends on the proximity of the switch to proper grounding facilities

Crimping tool large enough to accommodate girth of lug

• Wire stripping tool

Unpacking and Inspecting the Switch

When handling switch components, wear an ESD strap and handle modules by the carrier edges only. An ESD socket is provided on the chassis. For the ESD socket to be effective, the chassis must be grounded through the power cable, the chassis ground, or the metal-to-metal contact with a grounded rack.				
Keep the shipping container in case the chassis requires shipping in the future.				
If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at this URL:				
http://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html				
The switch is thoroughly inspected before shipment. If any damage occurred during transportation or any				

To inspect the shipment, follow these steps:

- 1. Compare the shipment to the equipment list provided by your customer service representative and verify that you have received all items, including the following:
 - Grounding lug kit
 - Rack-mount kit
 - ESD wrist strap
 - Cables and connectors
 - Any optional items ordered
- 2. Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:
 - Invoice number of shipper (see packing slip)
 - Model and serial number of the damaged unit
 - Description of damage
 - · Effect of damage on the installation
- **3.** Check to be sure that all of the power supplies and the fan trays have the expected direction of airflow. Port-side-intake airflow modules have a burgundy coloring, and port-side exhaust airflow modules have blue coloring. The airflow direction must be the same for all modules.

Installing the Switch

This section describes how to use the rack-mount kit to install the Cisco MDS 9396S switch into a cabinet or rack that meets the requirements described in the Cabinet and Rack Requirements section.

Attaching the Bottom-Support Rails on the Rack

The switch chassis that you are installing ships with two adjustable bottom-support rails that you can attach to a four-post rack to hold the chassis. Each of these bottom-support rails has two pieces—one that slides into the other so that you can adjust them to fit racks with front and rear mounting posts that are spaced less than 36 inches (91 cm). On each bottom-support rail, the rail half that slides into the other rail includes a chassis stop that fits into the module end of the chassis. With the air intake on the port side of the chassis, you must position the bottom-support rail piece with the chassis stop on the hot aisle side of the rack.

Before you begin

- Verify that a four-post rack or cabinet is installed.
- If any other devices are stored in the rack or cabinet, verify that the heavier devices are installed below lighter devices and that there is at least 2 RU open to install the switch.
- Verify that the bottom-support rails kit is included in the switch accessory kit.
- Verify that you have 8 screws for attaching the bottom-support rails to the racks (typicallyM6 x 10 mm screws or the screws appropriate for the vertical mounting rails on the rack.

Step 1 Look at the fan trays and power supplies installed in the chassis to determine how you must position the bottom-support rails on the rack.

- If the modules have burgundy coloring (port-side-intake airflow), you must position the bottom-support rails so that their chassis stops are positioned in the hot aisle.
- If the modules have blue coloring (port-side-exhaust airflow), you must position the bottom-support rails so that their chassis stops are positioned in the cold aisle.
- **Step 2** Separate the two sliders that make up one bottom-support rail, and position the half with the chassis stop in the hot aisle of the rack. Make sure there is at least 2 RU open above the bottom-support rails so that you can easily install the chassis.
- **Step 3** Use two customer-supplied screws (typically M6 x 10 mm screws) to attach the bottom-support rail half to the vertical mounting rails on the rack post. Tighten each screw to the appropriate torque setting for the screws (for M6 screws, use 40 in-lb [4.5 N·m] of torque).
- **Step 4** Slide the other half of the bottom-support rail onto the attached half of the rail set and use two customer supplied screws (typically M6 x 10 mm screws) to secure that portion to the vertical mounting rails on the rack. Tighten each screw to the appropriate torque setting for the screws (for M6 x 10 mm screws, use 40 in-lb [$4.5 \text{ N} \cdot \text{m}$] of torque).
- **Step 5** Repeat Steps 2 and 3 to attach the other expanding bottom-support rails to the other side of the rack.
- **Step 6** Check the two installed bottom support rails to be sure that both rails are level and level with each other. If they are not level, adjust the higher rail down to the level of the lower rail.

What to do next

You are ready to install two front-mount brackets on the chassis.

Attaching the Front-Mount Brackets to the Chassis

Before you begin

- You need to attach a right-angled bracket to each side of the chassis. This bracket holds the chassis in place on a four post rack.
- · You must have a Phillips-head torque screwdriver.
- **Step 1** Align the two holes in one side of one of two front-mount brackets to two holes on the left or right side of the chassis (see the following figure). Be sure that the other side of the bracket is facing towards the front (port end) of the chassis.

Figure 8: Aligning and Attaching Front-Mount Brackets to the Sides of the Chassis



1	Front-mount bracket with two screw holes aligned to two screw	2	Two M4 x 6 mm screws used to fasten the
	holes in the chassis and one screw hole facing the port side of		bracket to the chassis.
	the chassis.		

Step 2Use two M4 x 6 mm screws to attach the bracket to the chassis. Tighten each screw to 11 to 15 in-lb ($1.2 ext{ to}1.7 ext{ N} \cdot ext{m}$).Step 3Repeat Steps 1 and 2 to attach the second front-mount bracket to the other side of the chassis.

What to do next

You are ready to mount the chassis to the four-post rack.

Installing the Switch

Before you begin

- You need to slide the chassis onto the bottom-support rails so that the end with the fan trays and power supplies locks onto the chassis stops at the end of the rails and so that the front-mount brackets on the chassis come into contact with the front-mount rails on the rack.
- Make sure that the four-post rack is properly installed and secured to the concrete floor.
- Make sure that the bottom-support rails are installed so that the power supplies and fan trays will be in the appropriate aisle.
- The color of the stripe on fan trays and the color of the latch on power supplies determines which end of the switch must be positioned in the cold aisle as follows:
 - If the modules have burgundy coloring, position the port end of the chassis in the cold aisle.
 - If the modules have blue coloring, position the fan trays and power supply end of the chassis in the cold aisle.
- Make sure that two front-mount brackets are securely fastened to the sides of the chassis at the port end.

• Make sure that you have two customer-supplied rack-mount screws (M6 x 10 mm or appropriate screw for the vertical mounting rails on the rack).

Step 1 Slide the power supply and fan tray end of the chassis onto the bottom support rails that are installed on the rack. Be sure that the sides of the chassis by the fan trays and power supplies clips onto the chassis stops on the bottom support rails and the front mounting brackets come in contact with the rack (see the following figure).

If the bottom support rails are extended a long distance, they can bend outwards slightly when you install the chassis and the chassis stops at the far end of the rails might not fit into the end of the chassis. If this happens, press the side rails toward the sides of the chassis so that the chassis stops can go inside the chassis and hold it in place on the rack.

Figure 9: Sliding the Chassis onto the Bottom-Support Rails



1	Slide the fan-tray end of the chassis onto the bottom-support rails so that the chassis locks onto the chassis stops at the end of the rails.	3	Customer-supplied rack-mount screw (M6 x 10 mm screw or other appropriate screw) used to secure each side of the chassis to the rack.
2	Chassis stops for holding the chassis (installed by the hot aisle)		

Step 2 Use a customer-supplied rack-mount screw (an M6 x 10 mm screw or other appropriate screw for the rack) to attach each of the two mounting brackets on the chassis to the rack and tighten each screw to the appropriate torque setting for the screw (for M6 x 10 mm screws, use 40 in-lb [4.5 N·m] of torque).

Grounding the Switch

The switch is grounded when you connect the chassis and the power supplies to the earth ground in the following ways:

• You connect the chassis (at its grounding pad) to either the data center ground or to a fully bonded and grounded rack.



Note

e The chassis ground connection is active even when the AC power cables are not connected to the system.

• You connect an AC power supply to the earth ground automatically when you connect the power supply to an AC power source.

Before you begin

- Before you can ground the chassis, you must have a connection to the earth ground for the data center building. If you installed the switch chassis into a bonded rack (see the rack manufacturer's instructions for more information) that now has a connection to the data center earth ground, you can ground the chassis by connecting its grounding pad to the rack. Otherwise, you must connect the chassis grounding pad directly to the data center ground.
- To connect the switch chassis to the data center ground, you need the following tools and equipment:
 - Grounding lug—A two-holed standard barrel lug that supports up to 6 AWG wire. This lug is supplied with the accessory kit.
 - Grounding screws—Two M4 x 8 mm pan-head screws. These screws are shipped with the accessory kit.
 - Grounding wire—Not supplied with the accessory kit. This wire should be sized to meet local and
 national installation requirements. Depending on the power supply and system, a 12 AWG to 6
 AWG copper conductor is required for U.S. installations. We recommend that you use commercially
 available 6 AWG wire. The length of the grounding wire depends on the proximity of the switch
 to proper grounding facilities.
 - Number 1 Phillips head torque screwdriver.
 - Crimping tool to crimp the grounding wire to the grounding lug.
 - Wire stripping tool to remove the insulation from the grounding wire.

Step 1 Use a wire stripping tool to remove approximately 0.75 inch (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, and use a crimping tool to crimp the lug to the wire. Verify that the ground wire is securely attached to the grounding lug by attempting to pull the wire out of the crimped lug.

Figure 10: Grounding a Cisco MDS 9396S Switch



- **Step 3** Secure the grounding lug to the chassis grounding pad with two M4 screws, and tighten each screw to 11.5 to 15 in-lb (1.3 to 1.7 N·m) of torque.
- **Step 4** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure an adequate earth ground for the switch. If the rack is fully bonded and grounded, connect the grounding wire as explained in the documentation provided by the vendor for the rack.

Powering Up the Switch

To power up the switch, you must connect one or two power supplies to AC power sources. The number of power supplies and power sources used depends on the following conditions:

- If you are using combined power (not using power redundancy), you must connect one power supply to one AC power source.
- If you are using power supply (n+1) redundancy, you must connect two power supplies to one AC power source.
- If you are using grid (n+n) redundancy, you must use two power supplies and two AC power sources—you must connect each power supply to a different power source.

Before you begin

You must have the following before powering up the switch:

· Switch installed in a rack and connected to an earth ground

- · Recommended power cable for your nation or region
- AC power source with the required amperage located within reach of the power cable being used
- **Step 1** Connect a power supply to an AC power source as follows:
 - **a.** Using the recommended power cable for your country or region (see the Supported Power Cords and Plugs section), connect the C19 plug on the power cable to the power receptacle on the power supply.
 - **b.** Connect the other end of the power cable to the AC power source.
 - c. Verify that the LED is on and green. If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.
- **Step 2** If you are using the power supply (n+1) redundancy, you must connect the second power supply as follows:
 - **a.** Using the recommended power cable for your country or region (see the Supported Power Cords and Plugs section), connect the C19 plug on the power cable to the power receptacle on the second power supply.
 - **b.** Connect the other end of the power cable to the AC power source used by the other power supply.
 - c. Verify that the LED is on and green. If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.
- **Step 3** If you are using the grid (n+n) redundancy, you must connect the second power supply as follows:
 - **a.** Using the recommended power cable for your country or region (see the Supported Power Cords and Plugs section), connect the C19 plug on the power cable to the power receptacle on the second power supply.
 - **b.** Connect the other end of the power cable to a second AC power source (this is a different power source than the one used by the first power supply).
 - c. Verify that the LED is on and green. If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.

Removing and Installing Components

The Cisco MDS 9396S switch is shipped with two field replaceable power supplies. Each power supply includes a fixed fan. The Cisco MDS 9396S switch has two field-replaceable fan modules.



Warning Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Statement 1034

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Caution

During this procedure, wear grounding wrist straps to avoid ESD damage to the switch.

Note

The Cisco MDS 9396S Switch is only supported for continuous operation with both power supplies and both fan modules installed, and with all fans working.

With two power supplies installed, if one power supply fails, the system can continue to function normally on a single healthy power supply. However, the failed power supply should be replaced as soon as possible to provide redundancy. The fan modules are required to ensure proper cooling of the switches.

Figure 11: Rear View of the Cisco MDS 9396S Switch



Removing and Installing AC Power Supplies

This section provides instructions for removing and installing the AC power supplies for the Cisco MDS 9396S switch.

Removing Power Supplies

To remove an AC power supply, follow these steps:

- **Step 1** Turn the power switch to the off (0) position on the power supply that you are removing.
- **Step 2** Disconnect the power cord from the power source.
- **Step 3** Loosen the captive screw.
- **Step 4** Grasp the power supply handle and slide the power supply out of the switch.

Installing Power Supplies

To install an AC power supply, follow these steps:

- **Step 1** Ensure that the system (earth) ground connection has been made.
- **Step 2** Make sure the power cord is disconnected before installing the power supply.
- **Step 3** Verify that the power switch is in the off (0) position on the power supply that you are installing.
- **Step 4** Slide the power supply into the power supply bay. Make sure that the power supply is fully seated in the bay.
- **Step 5** Tighten the power supply captive screw.
- **Step 6** Plug the power cord into the power supply.
- **Step 7** Connect the other end of the power cord to an AC input power source.
 - **Note** Depending on the outlet receptacle on your power distribution unit, you may need the optional jumper power cord to connect the Cisco MDS 9396S switch to your outlet receptacle. See the Jumper Power Cord section.
- **Step 8** Turn the power switch to the on (|) position on the power supply.
- **Step 9** Verify power supply operation by checking that the power supply (P/S) LED in the front panel is green. If the LED is not green, see the Cisco MDS 9000 Family Troubleshooting Guide.

Removing and Installing Fan Modules

This section provides instructions for removing and installing the fan modules for the Cisco MDS 9396S switch.

Removing a Fan Module

The fan module is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damaging the system.



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Caution
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n The Cisco MDS 9000 Family has internal temperature sensors that can shut down the system if the temperature at different points within the chassis exceed certain safety thresholds. To accurately monitor the system temperature, the temperature sensors require sufficient airflow through the chassis. In the event that a fan module is removed from the chassis and the airflow is reduced, the system will bypass the temperature sensor information and shut down after five minutes to prevent undetected overheating. However, the switches will shut down sooner if the major temperature threshold is exceeded.

Note While removing the fan module, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan module. Statement 258

To remove the existing fan module, follow these steps:

- **Step 1** Locate the fan module in the back of the switch.
- **Step 2** Loosen the fan module captive screw.
- **Step 3** Slide the seating tabs toward the center of the fan module.
- **Step 4** Grasp the fan module handle and pull it outward.

Step 5 Once the fan blades have stopped spinning, remove the fan module completely from the fan bay.

Installing a Fan Module

To install a new fan module, follow these steps:

Step 2 Tighten the fan module captive screw.

Verifying the Fan Module

To verify that the new fan module is installed correctly, follow these steps:

- **Step 1** Listen for the fans; you should immediately hear them operating. If you do not hear them, ensure that the fan module is inserted completely in the switch and the faceplate is flush with the switch back panel.
- **Step 2** Verify that the fan module LED is green. If the LED is orange, then one fan has failed in this fan module; if the LED is red, then both fans have failed in this fan module.
- **Step 3** Contact your customer service representative for assistance if, after several attempts, the fans do not operate or you experience trouble with the installation.
 - **Note** If you purchased this product through a Cisco reseller, contact the reseller directly for technical support. If you purchased this product directly from Cisco, contact Cisco Technical Support at this URL: http://www.cisco.com/c/en/us/support/web/tsd-cisco-worldwide-contacts.html


Connecting the Cisco MDS 9396S Switch

The Cisco MDS 9396S switch provides the following types of ports:

- Console port—An RS-232 port that you can use to create a local management connection.
- Management port—A 10/100/1000 Mbps Ethernet port to access and manage the switch by IP address, such as through the CLI or Fabric Manager.
- Fibre Channel ports—Fibre Channel ports that you can use to connect to the SAN, or for in-band management.
- USB port—USB port that you can use for configuration file backups, log dumps, report captures, etc.

This chapter describes how to connect the various components of the Cisco MDS 9396S switch.

- Preparing for Network Connections, on page 31
- Connecting the Console Port, on page 31
- Connecting the Management Port, on page 34
- Connecting to a Fibre Channel Port, on page 34

Preparing for Network Connections

When preparing your site for network connections to the Cisco MDS 9396S switch, consider the following for each type of interface:

- · Cabling required for each interface type
- · Distance limitations for each signal type
- · Additional interface equipment needed

Before installing the component, have all additional external equipment and cables available.

Connecting the Console Port

This section describes how to connect the RS-232 console port to a PC. The console port allows you to perform the following functions:

• Configure the switch from the CLI.

- Monitor network statistics and errors.
- Configure SNMP agent parameters.
- Download software updates to the switch or distribute software images residing in flash memory to attached devices.

The console port is located on the front panel.

Figure 12: Connecting the Console Cable



1 Serial console port

Connecting the Console Port to a PC

You can connect the console port to a PC serial port for local administrative access to the Cisco MDS 9396S switch.

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Note The PC must support VT100 terminal emulation. The terminal emulation software—frequently a PC application such as HyperTerminal Plus—makes communication between the Cisco MDS 9396S switch and your PC possible during setup and configuration.

To connect the console port to a PC, follow these steps:

- **Step 1** Configure the baud rate and character format of the PC terminal emulation program to match the following management port default characteristics:
 - 9600 baud
 - 8 data bits
 - 1 stop bit
 - No parity
- Step 2 Connect the supplied RJ-45 to DB-9 female adapter or RJ-45 to DB-25 female adapter (depending on your PC connection) 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 (or RJ-45 to DB-25) adapter at the PC serial port.

Connecting a Modem to a Console Port

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Caution Do not connect the console port to a modem while the switch is booting. Connect the console port to a modem either before powering the switch on or after the switch has completed the boot process.

To connect the console port to a modem before the switch is powered on, follow these steps:

- **Step 1** Connect the supplied console cable (a rollover RJ-45 to RJ-45 cable) to the console port.
- **Step 2** Connect the other end of the console cable to the supplied RJ-45 to DB-25 adapter.
- **Step 3** Connect the RJ-45-to-DB-25 adapter to the DB-25 port on the modem.
- **Step 4** Power on the switch. The switch boots automatically, and the following default console port characteristics are applied to the modem connection:
 - 9600 baud
 - 8 data bits
 - 1 stop bit

- No parity
- Default initialization string (ATE0Q1&D2&C1S0=1\015) if previously configured
- **Note** For instructions on how to change these settings, see the Cisco Fabric Manager Fundamentals Configuration Guide for instructions on how to change these settings.

To connect the console port to a modem after the switch is powered on, follow these steps:

- **Step 1** Ensure that the system has completed booting and the system image is running.
- **Step 2** Connect the supplied console cable (a rollover RJ-45 to RJ-45 cable) to the console port.
- **Step 3** Connect the other end of the console cable to the supplied RJ-45 to DB-25 adapter.
- **Step 4** Connect the RJ-45-to-DB-25 adapter to the DB-25 port on the modem.
- **Step 5** Initialize and configure the modem as specified in the Cisco Fabric Manager Fundamentals Configuration Guide and the Cisco NX-OS Fundamentals Configuration Guide.

Connecting the Management Port

The autosensing 10/100/1000 Mbps Ethernet management port is located on the left side of the front panel (labeled 10/100/1000 MGMT), to the right of the Console port. This port is used for out-of-band management of the Cisco MDS 9396S switch.

Use a modular, RJ-45, straight-through UTP cable to connect the 10/100/1000 Mbps Ethernet management port to external hubs and switches. To connect to a router, use a crossover cable.

Connecting to a Fibre Channel Port

The Fibre Channel ports are compatible with LC-type fiber-optic SFP transceivers and cables (see the Removing and Installing Cables into SFP Transceivers section). You can use these ports to connect to the SAN or for in-band management. For information about configuring the switch for in-band management, see the Cisco Fabric Manager Fundamentals Configuration Guide and the Cisco NX-OS Fundamentals Configuration Guide.

The Cisco MDS 9396S switch supports both Fibre Channel and Gigabit Ethernet protocols for SFP transceivers. Each transceiver must match the transceiver on the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communications. SFP transceivers can be ordered separately or with the Cisco MDS 9396S switch.



Warning Class 1 laser product. Statement 1008



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



Note Wear an ESD wrist strap connected to the chassis when handling transceivers. Keep optical connectors covered when not in use, and do not touch connector ends. The fiber-optic connectors must be free of dust, oil, and other contaminants.

Removing and Installing SFP Transceivers



Removing and installing an SFP transceiver can shorten its useful life. Do not remove and insert SFP transceivers more often than is absolutely necessary. We recommend disconnecting cables before installing or removing SFP transceivers to prevent damage to the cable or transceiver.



Note Use only Cisco SFP transceivers on the Cisco MDS 9396S switch. Each Cisco SFP transceiver is encoded with model information that enables the switch to verify that the SFP transceiver meets the requirements for the switch.

The Cisco MDS 9396S switch supports SFP transceivers with the following two types of latching devices:

- Mylar tab latch
- Bale-clasp latch

Figure 13: SFP Transceiver with Mylar Tab Latch



Figure 14: SFP Transceiver with Bale-Clasp Latch



Installing an SFP Transceiver

To install an SFP transceiver, follow these steps:

Step 1 Attach an ESD-preventive wrist strap and follow its instructions for use.

- **Caution** If the transceiver does not install easily, ensure it is correctly oriented and the tab or clasp are in the correct position before continuing.
- **Step 2** Remove the dust cover from the port cage.
- **Step 3** Remove the dust cover from the port end of the transceiver.
- **Step 4** Insert the transceiver into the port:
 - If the transceiver has a mylar tab latch, orient the transceiver with the tab on the bottom, and then gently insert the transceiver into the port until it clicks into place.
 - If the transceiver has a bale-clasp latch, orient the transceiver with the bale clasp on the bottom, close the bale clasp by pushing it up and over the transceiver, and then gently insert the transceiver into the port until it clicks into place.
- **Step 5** Insert or leave the dust plug in the cable end of the transceiver if a cable is not being installed in the transceiver.

Removing an SFP Transceiver

To remove an SFP transceiver, follow these steps:

Step 1 Attach an ESD-preventive wrist strap and follow its instructions for use.

- **Step 2** Perform these steps if cable is installed in the transceiver:
 - a. Record the cable and port connections for later reference.
 - **b.** Press the release latch on the cable, grasp the connector near the connection point, and gently pull the connector from the transceiver.
 - c. Insert a dust plug into the connector on the cable.
 - d. Insert a dust plug into the cable end of the transceiver.
 - **Tip** If the transceiver does not remove easily in the next step, push the transceiver all the way back in and then ensure that the latch is in the correct position before continuing.
- **Step 3** Remove the transceiver from the port:
 - If the transceiver has a mylar tab latch, gently pull the tab straight out (do not twist), and then pull the transceiver out of the port.
 - If the transceiver has a bale-clasp latch, open the clasp by pressing it downwards, and then pull the transceiver out of the port.
- **Step 4** Insert a dust cover into the port end of the transceiver and place the transceiver on an antistatic mat or into a static shielding bag if you plan to return it to the factory.
- **Step 5** Protect the optical cage by inserting a clean cover if another transceiver is not being installed.

Removing and Installing Cables into SFP Transceivers

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Caution To prevent damage to the fiber-optic cables, do not place more tension on them than the rated limit and do not bend to a radius of less than one inch if there is no tension in the cable, or two inches if there is tension in the cable.

Installing a Cable into an SFP Transceiver

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Caution

on To prevent possible damage to the cable or transceiver, install the transceiver in the port before installing the cable in the transceiver.

To install a cable into a transceiver, follow these steps:

- **Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- **Step 2** Remove the dust cover from the connector on the cable.
- **Step 3** Remove the dust cover from the cable end of the transceiver.
- **Step 4** Align the cable connector with the transceiver and insert the connector into the transceiver until it clicks into place.

Figure 15: Connecting the LC-Type Cable to a Fibre Channel Port



Caution If the cable does not install easily, ensure it is correctly oriented before continuing.

For instructions on verifying connectivity, see the Cisco Fabric Manager Fundamentals Configuration Guide and the Cisco NX-OS Fundamentals Configuration Guide.

Removing a Cable from an SFP Transceiver

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Caution When pulling a cable from a transceiver, grip the body of the connector. Do not pull on the jacket sleeve, because this can compromise the fiber-optic termination in the connector.

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Caution If the cable does not remove easily, ensure that any latch present on the cable has been released before continuing.

To remove the cable, follow these steps:

- **Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- **Step 2** Press the release latch on the cable, grasp the connector near the connection point, and gently pull the connector from the transceiver.
- **Step 3** Insert a dust plug into the cable end of the transceiver.
- **Step 4** Insert a dust plug onto the end of the cable.

Maintaining SFP Transceivers and Fiber-Optic Cables

SFP transceivers and fiber-optic cables must be kept clean and dust-free to maintain high signal accuracy and prevent damage to the connectors. Attenuation (loss of light) is increased by contamination, and it should be kept below 0.35 dB.

Follow these maintenance guidelines:

- SFP transceivers are static sensitive. To prevent ESD damage, wear an ESD-preventive wrist strap that is connected to the chassis.
- Do not remove and insert a transceiver more often than necessary. Repeated removals and insertions can shorten its useful life.
- Keep all optical connections covered when not in use. If they become dusty, clean before using to prevent dust from scratching the fiber-optic cable ends.
- Do not touch ends of connectors. This prevents fingerprints and other contamination of the connectors.
- Clean regularly; the required frequency of cleaning depends upon the environment. In addition, clean
 connectors if they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can
 be effective; refer to your site's fibre-optic connection cleaning procedures.
- Inspect routinely for dust and damage. If damage is suspected, clean and then inspect fiber ends under a microscope to determine if damage has occurred.



Cabinet and Rack Installation

- Cabinet and Rack Requirements, on page 39
- Cisco MDS 9000 Family Telco and EIA Shelf Bracket, on page 41

Cabinet and Rack Requirements

This section provides the Cisco MDS 9000 Family requirements for the following types of cabinets and racks, assuming an external ambient air temperature range of 0 to 40°C:

- · Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom to top cooling)
- · Standard open racks
- · Telco racks



- Note If you are selecting an enclosed cabinet, we recommend one of the thermally validated types listed above: standard perforated or solid-walled with a fan tray.

General Requirements for Cabinets and Racks

The cabinet or rack must be one of the following rack types:

- Standard 19 in. four-post EIA cabinet or rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992. See the Requirements Specific to Perforated Cabinets and Requirements Specific to Solid-Walled Cabinets sections.
- Standard two-post telco rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992. See the Requirements Specific to Telco Racks section.

The cabinet or rack must also meet the following requirements:

- The minimum vertical rack space per chassis should be 1 RU (rack unit), equal to 1.75 in. (4.4 cm).
- The width between the rack-mounting rails must be at least 17.75 in. (45.1 cm). For four-post EIA racks, this is the distance between the two front rails.

- For four-post EIA cabinets (perforated or solid-walled):
 - The minimum spacing for bend radius for fiber-optic cables should have the front mounting rails of the cabinet offset from the front door by a minimum of 3 in. (7.6 cm), and a minimum of 5 in. (12.7 cm) if cable management brackets are installed on the front of the chassis.
 - The distance between the outside face of the front mounting rail and the outside face of the back mounting rail should be 23.5 to 34.0 in. (59.7 to 86.4 cm) to allow for rear bracket installation.
 - There should be a minimum of 2.5 in. (6.4 cm) of clear space between the side edge of the chassis and the side wall of the cabinet. No sizeable flow obstructions should be immediately in the way of the chassis air intake or exhaust vents.



Note

Optional jumper power cords are available for use in a cabinet. See the Jumper Power Cord section.

Requirements Specific to Perforated Cabinets

In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, perforated cabinets must meet the following requirements:

- The front and rear doors must have at least a 60 percent open area perforation pattern, with at least 15 sq. in. of open area per rack unit of door height.
- We recommend that the roof be perforated with at least 20 percent open area, unless the cabinet only contains Cisco MDS 9396S switch, in which case the roof does not have to be perforated.
- We recommend an open or perforated cabinet floor to enhance cooling but it is not required.

Reference Perforated Cabinet

A perforated cabinet that conforms to the above requirements is available from Rittal Corporation:

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Rittal Corporation
One Rittal Place
Springfield, OH 45504
Phone: (800) 477-4000
Cabinet P/N: Rittal 9969427
Cabinet description: PS-DK/OEM Cabinet Assembly, 1998 x 600 x 1000 (H x W x D)
(42U)
```

Requirements Specific to Solid-Walled Cabinets

In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, solid-walled cabinets must meet the following requirements:

• A roof-mounted fan tray and an air cooling scheme in which the fan tray pulls air in at the bottom of the cabinet and exhausts it out the top, with a minimum of 500 cfm of airflow exiting the cabinet roof through the fan tray.

- Nonperforated (solid and sealed) front and back doors and side panels so that air travels predictably from bottom to top.
- The overall cabinet depth should be 36 to 42 in. (91.4 to 106.7 cm) to allow the doors to close and adequate airflow.
- A minimum of 150 sq. in. (968 sq. cm) of open area at the floor air intake of the cabinet.
- The lowest piece of equipment should be installed a minimum of 1.75 in. (4.4 cm) above the floor openings to prevent blocking the floor intake.

Requirements Specific to Standard Open Racks

In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, if mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets the following requirements:

- Width between two front mounting rails: minimum of 17.75 in. (45.1 cm)
- Minimum vertical rack space per chassis: 1 rack unit (RU), equal to 1.75 in. (4.4 cm)
- The distance between the outside face of the front mounting rail and the outside face of the back mounting rail should be 23.5 to 34.0 in. (59.7 to 86.4 cm) to allow for rear bracket installation.
- The distance between the chassis air vents and any walls should be 2.5 in. (6.4 cm).

Requirements Specific to Telco Racks

In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, telco racks should meet the following requirements:

- The width of the rack between the two rack-mounting rails should be at least 17.75 in. (45.1 cm).
- The distance between the chassis air vents and any walls should be 2.5 in. (6.4 cm).

Cisco MDS 9000 Family Telco and EIA Shelf Bracket

The optional Telco and EIA Shelf Bracket Kit (part number DS-SHELF=) can temporarily or permanently support the Cisco MDS 9396S switch during installation. Once the front rack-mount brackets are securely attached to the rack-mounting rails, the shelf bracket can be removed.

This kit supports the following configurations:

- A Cisco MDS 9396S Switch in a two-post Telco rack
- A Cisco MDS 9396S Switch in a four-post EIA rack



Note

This optional kit is not provided with the switch; to order the kit, contact your switch supplier.

This section describes the procedure for installing a Cisco MDS 9396S switch in a rack or cabinet using the optional Telco and EIA Shelf Bracket Kit.

Rack-Mounting Guidelines

<u>/</u>

Caution

n If the rack is on wheels, ensure that the brakes are engaged or the rack is otherwise stabilized.

Â

Caution If installing this kit in an EIA rack, attach the switch to all four rack-mounting rails; the EIA rails may not be thick enough to prevent flexing of the shelf brackets if only two rails are used.

Before rack-mounting the chassis, ensure that the cabinet or rack meets the following requirements:

- The specifications listed in the "Cabinet and Rack Requirements" section.
- The depth of the rack between the front and rear mounting rails is at least 18 in. (45.7 cm) but less than or equal to 30 in. (76.2 cm). This is specific to four-post EIA cabinets or racks.
- The airflow and cooling are adequate and there is sufficient clearance around the air vents on the switch, as described in "Technical Specifications." This is particularly important to verify if you are installing the switch in an enclosed cabinet.
- The rack has sufficient vertical clearance for the chassis plus two rack units for the shelf brackets, and any desired clearance for the installation process.
- The rack meets the minimum rack load ratings per rack unit (RU) listed in the following table.

Rack Type	MDS 9396S
EIA (4-post)	7.5 lb
Telco (2 post)	15 lb

Before Installing the Shelf Brackets

Before installing the shelf brackets, inspect the contents of your kit. The following table lists the contents of the shelf bracket kit.

Quantity	Part Description		
2	Slider brackets		
2	Slider brackets		
1	Crossbar		
2	10-32 x 3/8-in. Phillips pan-head screws		
16	12-24 x 3/4-in. Phillips screws		

Quantity	Part Description	
16	10-24 x 3/4-in. Phillips screws	

Required Equipment

You need the following equipment for this installation:

- Number 2 Phillips screwdriver
- Tape measure and level (to ensure shelf brackets are level)

Installing the Shelf Bracket Kit into a Two-Post Telco Rack

The following figure shows the installation of the shelf bracket kit into a two-post Telco rack.

Figure 16: Installing the Shelf Bracket Kit into a Telco Rack



To install the shelf brackets in a Telco rack, follow these steps:

- **Step 1** Position a shelf bracket inside a rack-mounting rail as shown in the above figure and align the screw holes at the front of the shelf bracket with the holes in the rack-mounting rail. Then attach the shelf bracket to the rack-mounting rail using a minimum of four 12-24 or 10-24 screws.
 - **Note** The bottom hole of the shelf bracket should align with the bottom hole of a rack unit on the rack-mounting rail (the hole immediately above the 1/2 in. spacing).
- **Step 2** Repeat with the other shelf bracket.

- **Step 3** Verify that the shelf brackets are at the same height (using the level or tape measure as desired).
- **Step 4** Attach the crossbar to the rear of the shelf brackets as shown in the above figure, using the 10-32 screws.

Installing the Shelf Bracket Kit into a Four-Post EIA Rack

The following figure shows the installation of the shelf bracket kit into a four-post EIA rack.

Figure 17: Installing the Shelf Bracket Kit into an EIA Rack



To install the shelf brackets in an EIA rack, follow these steps:

- **Step 1** Position a shelf bracket inside the rack-mounting rails as shown in the above figure. Align the screw holes at the front of the shelf bracket with the holes in the front rack-mounting rail. Then attach the shelf bracket to the front rack-mounting rail using a minimum of four 12-24 or 10-24 screws.
 - **Note** The bottom hole of the shelf bracket should align with the bottom hole of a rack unit on the rack-mounting rail (the hole immediately above the 1/2 in. spacing).
- **Step 2** Repeat with the other shelf bracket.
- **Step 3** Verify that the shelf brackets are at the same height (using the level or tape measure as desired).
- **Step 4** Attach the crossbar to the shelf brackets as shown in the above figure, using the 10-32 screws.
- **Step 5** Insert the slider rails into the shelf brackets as shown in the above figure. Attach them to the rear rack-mounting rails using a minimum of four 12-24 or 10-24 screws.

Installing the Switch on the Shelf Brackets

This section provides general instructions for installing the switch on top of the shelf brackets.



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



To install the switch on top of the shelf brackets, follow these steps:

- **Step 1** Verify that the shelf brackets are level and securely attached to the rack-mounting rails, the crossbar is securely attached to the shelf brackets, and the rack is stabilized.
- **Step 2** Slide the switch onto the shelf brackets, ensuring that it is squarely positioned.
- **Step 3** Attach the switch to the rack-mounting rails.
 - **Caution** We recommend grounding the chassis, even if the rack is already grounded. A grounding pad with two threaded M4 holes is provided on the chassis for attaching a grounding lug.
 - **Note** The grounding lug must be NRTL listed and compatible with copper conductors. Only copper conductors (wires) must be used and the copper conductor must comply with National Electrical Code (NEC) for ampacity.

Removing the Shelf Bracket Kit (Optional)

The shelf bracket kit can be removed after the Cisco MDS 9396S switch has been installed in a four-post EIA rack, and both front rack-mount brackets and both C brackets are securely attached to the rack-mounting rails.

To remove the shelf bracket kit, follow these steps:

- **Step 1** Remove the screws fastening the slider brackets to the rear rack-mounting rails, and then slide the slider brackets out of the shelf brackets.
- **Step 2** Remove the screws fastening the crossbar to the shelf brackets, and then remove the crossbar.
- **Step 3** Remove the screws fastening the shelf brackets to the front rack-mounting rails and remove the shelf brackets from the rack.



Technical Specifications

- Switch Specifications, on page 47
- Power Specifications, on page 48
- SFP Transceiver Specifications, on page 50

Switch Specifications

The following table lists the environmental specifications for the Cisco MDS 9396S switch.

Table 1: Environmental Specifications for the Cisco MDS 9396S switch

Description	Specification
Temperature, ambient operating	32 to 104°F (0 to 40°C)
Temperature, ambient nonoperating and storage	-40 to 158°F (-40 to 70°C)
Humidity (RH), ambient (noncondensing) operating	10 to 90%
Humidity (RH), ambient (noncondensing) nonoperating and storage	5 to 95%
Altitude, operating	-197 to 6500 ft (-60 to 2000 m)
Noise levels	60 dB

The following table lists the physical specifications for the Cisco MDS 9396S switch.

Table 2: Cisco MDS 9396S Switch Specifications

Description	Specification
Cisco MDS 9396S Switch Dimensions	Width = 17.16 inch (43.59 cm)
	Height = 1.72 inch (4.37 cm)
	Depth = 16.34 inch (41.50 cm)
Rack Unit (RU)	Chassis requires 2 RU (1.75 in. or 4.45 cm)

Description	Specification	
Weight	19.84 lb (9 kg) (with two fan modules and two power supplies installed)	
Power Supply	1200 W with 180-264 VAC input; 800 W with 90-180 VAC input	
	Part Number: DS-CAC-1200W-E	
	Power cord: Notched C13 socket connector connecting to C14 plug on power supply	
	100 to 240V AC (10% range)	
	50 to 60 Hz (nominal)	
Airflow	Port side exhausted.	
	110 linear feet per minute (LFM) through the system and a maximum of 255 LMDM.	
	Cisco recommends that you maintain a minimum air space of 2.5 in. (6.4 cm) between walls and chassis air vents and a minimum horizontal separation of 6 in. (15.2 cm) between two chassis to prevent overheating.	

Power Specifications

General Power Supply Specifications

The following table lists the specifications for the Cisco MDS 9396S switch AC input power supply.

AC Input Power	Specification		
AC input voltage	Minimum = 90 VAC		
	Nominal = 100 to 240 VAC		
	Maximum = 264 VAC		
Power consumption (maximum)	700 W (on base model configuration running 16 Gbps 100% traffic load at 25° C)		
	800 W (on fully populated configuration running 1 Gbps 100% traffic load at 25° C)		
	Note For plug current rating, see the Jumper Power Cord section.		
AC input frequency	Nominal = 50 to 60 Hz		
Power supply output capacity	1200 W		

AC Input Power	Specification		
Power supply output voltage	12 V +/- 5% up to 66.67 A (90-180 VAC input)		
	12 V +/- 5% up to 66.67 A (180-264 VAC input)		
Output holdup time	20 ms when input > 100 VAC		

Power Supply Requirements Specifications

The following table provides a sample calculation of power for the Cisco MDS 9396S switch AC input power supply.

Table 3: Power Dissipation for AC Input Power Supply

Cisco MDS 9396T Switch	Port Number	AC Power (Volt)	AC Power (Watt)
Typical Case	48 ports	220	675.41
	48ports	110	705.46
	96 ports	220	732.12
	96 ports	110	765.47



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

Table 4: Power Supply Fuse Information

Part Number	PID	Туре	Fuse Rated AMP	I2T	Fuse Melting Time
341-100316-02	DS-CAC-1200W-E	Fast acting	16 A	384	1000 s@28 A, 0.1 s@90 A
341-100315-02	DS-CAC-1200W			260	2.77 hrs@17 A, 0.1 s@55 A

Connection Guidelines for AC-Powered Systems

For connecting the Cisco MDS 9396S switch AC power supplies to the site power source, follow these basic guidelines:

- Each power supply should have its own dedicated branch circuit.
- For international, circuits should be sized according to local and national codes.

• The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

SFP Transceiver Specifications

The Cisco MDS 9396S switch is compatible with SFP transceivers and cables that have LC connectors. Each transceiver must match the transceiver on the other end of the cable in terms of wavelength, and the cable must not exceed the stipulated cable length for reliable communications.

Cisco SFP transceivers provide the uplink interfaces, laser transmit (TX), and laser receive (RX), and they support 850 to 1610 nm nominal wavelengths, depending upon the transceiver.

Use only Cisco SFP transceivers on the Cisco MDS 9396S switch. Each Cisco SFP transceiver is encoded with model information that enables the switch to verify that the SFP transceiver meets the requirements for the switch. For the list of supported SFP transceivers, see the Release Notes.

Use only genuine Cisco SFP+ transceivers in Cisco MDS series switches. Each Cisco SFP+ transceiver is encoded with serial number, vendor name, and other parameters that enable Cisco NX-OS to verify that the transceiver meets the requirements of the switch. If discrepancies are found, the SFP+ will be allowed to function, if possible, but will cause a warning syslog message to be generated. Cisco TAC does not support switch ports populated with non-Cisco SFP+ transceivers.

For details about SFP transceivers see the Cisco MDS 9000 Family Pluggable Transceivers Data Sheet.

For information about safety, regulatory, and standards compliance, see the Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family.

Cisco Fibre Channel SFP+ Transceivers

The following table lists the Fibre Channel SFP+ transceivers available through Cisco Systems for the Cisco MDS 9396S switch.

Part Number	Description	Туре
DS-SFP-FC10G-SW	Cisco MDS 10-Gbps Fibre Channel SW SFP+, LC	Short wavelength
DS-SFP-FC10G-LW	Cisco MDS 10-Gbps Fibre Channel LW SFP+, LC	Long wavelength
DS-SFP-FC16G-SW	Cisco MDS 4/8/16-Gbps Fibre Channel SW SFP+, LC	Short wavelength
DS-SFP-FC16G-LW	Cisco MDS 4/8/16-Gbps Fibre Channel LW SFP+, LC	Long wavelength
DS-SFP-FC8G-SW	Cisco MDS 2/4/8-Gbps Fibre Channel SW SFP+, LC	Short wavelength

Table 5: Cisco Fibre Channel SFP + Transceivers for the Cisco MDS 9396S Switch

Part Number	Description	Туре
DS-SFP-FC8G-LW	Cisco MDS 2/4/8-Gbps Fibre Channel LW SFP+, LC	Long wavelength
DS-SFP-FC8G-ER	Cisco MDS 2/4/8-Gbps Fibre Channel Extended Reach SFP+, LC	Extended Reach
DS-CWDM8Gxxxx	Cisco MDS 2/4/8-Gbps CWDM Long Distance SFP, LC	Long Distance

General Specifications for Cisco Fibre Channel 16 Gbps SFP+ Transceivers

The following table summarizes cabling specifications for 16 Gbps.

SFP+	Wavelength (nm)	Fibre Type	Core Size (microns)	Baud Rate (GBd)	Cable Distance
DS-SFP-FC16G-S	850	MMF	62.5	14.025	15 m (49 ft)
W			50.0	14.025	(OM1)
			50.0	14.025	35 m (115 ft) (OM2)
	50.0 14.025	14.025	100 m (328 ft)		
			62.5	8.5	(OM3)
			50.0	8.5	125 m (410 ft)
			50.0	8.5	(OM4)
			50.0	8.5	21 m (69 ft) (OM1)
			62.5	4.25	50 m (164 ft)
			50.0	4.25	(OM2)
			50.0	4.25	150 m (492 ft)
			50.0	4.25	(OM3)
					190 m (623 ft) (OM4)
					70 m (230 ft) (OM1)
					150 m (492 ft) (OM2)
					380 m (1247 ft) (OM3)
					400 m (1312 ft) (OM4)

SFP+	Wavelength (nm)	Fibre Type	Core Size (microns)	Baud Rate (GBd)	Cable Distance
DS-SFP-FC16G-L	1310	SMF	9.0	14.025	10 km (6.2 mi)
W			9.0	8.5	10 km (6.2 mi)
			9.0	4.25	10 km (6.2 mi)

Environmental Conditions and Power Requirements 16 Gbps

The following table provides the optical parameters for 16 Gbps.

Table 7: Optical Parameters for 16 Gbps

SFP+	Average Transmit Power (dBm)		Average Receive Power n) (dBm)		Fiber Loss Budget (dB)			
	Max	Min	Max	Min	(62.5 microns [OM1])	(50.0 microns [OM2])	(50.0 microns [OM3])	
DS-SFP-FC16G-SW	-1.3	7, 8	0	-10.3	2.08 (4 Gbps) 1.68 (8 Gbps) 1.63 (16 Gbps)	2.08 (4 Gbps) 1.68 (8 Gbps) 1.63 (16 Gbps)	2.88 (4 Gbps) 2.04 (8 Gbps) 1.86 (16 Gbps)	
DS-SFP-FC16G-LW	2.0	-5.0	2.0	10	7.8 (4 Gbps) 6.4 (8 Gbps) 6.4 (16 Gbps)			

The following table provides information on operating and storage temperature ranges.

Table 8: Operating and Storage Temperature Ranges for 16 Gbps

SFP+	Operating		Storage		
	Max	Min	Max	Min	
DS-SFP-FC16G-SW	70°C	0°C	85°C	-40°C	
DS-SFP-FC16G-LW	70°C	0°C	85°C	-40°C	

General Specifications for Cisco Fibre Channel 10 Gbps SFP+ Transceivers

The following table summarizes cabling specifications for 10 Gbps.

SFP+	Wavelength (nm)	Fibre Type	Core Size (microns)	Baud Rate (GBd)	Cable Distance
DS-SFP-FC10G-SW	850	MMF	62.5 (OM1)	10.518	33 m (104 ft)
			50.0 (OM3)	10.518	82 m (269 ft)
			50.0 (OM3)	10.518	300 m (984 ft)
DS-SFP-FC10G-LW	1310	SMF	9.0	10.518	10 km (6.2 mi)

Environmental Conditions and Power Requirements 10 Gbps

The following table provides the optical parameters for 16 Gbps.

Table	10:	Optical	Parameters	for	16	Gbps
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SFP+	Average Transmit Power (dBm)		verage Average ansmit Receive Power ower (dBm) (dBm)		Fiber Loss Budget (dB)
	Max	Min	Max	Min	
DS-SFP-FC10G-SW	-1.3	7.3	-1.0	-9.9	7.3
DS-SFP-FC10-LW	-0.5	-8.2	-1.0	-9.9	7.4

The following table provides information on operating and storage temperature ranges.

Table 11: Operating and Storage Temperature Ranges for 10 Gbps

SFP+	Operating		Storage		
	Max	Min	Max	Min	
DS-SFP-FC10G-SW	70°C	0°C	85°C	-40°C	
DS-SFP-FC10-LW	70°C	0°C	85°C	-40°C	

General Specifications for Cisco Fibre Channel 8-Gbps SFP+ Transceivers

The following table summarizes cabling specifications for 8 Gbps.

SFP+	Wavelength (nm)	Fibre Type	Core Size (microns)	Baud Rate (GBd)	Cable Distance
DS-SFP-FC8G-SW	850	MMF	62.5	2.125	150 m (492 ft)
			62.5	4.250	70 m (230 ft)
			62.5	8.500	21 m (69 ft)
			50.0 (OM2)	2.125	300 m (984 ft)
			50.0 (OM2)	4.250	150 m (492 ft)
			50.0 (OM2)	8.500	50 m (164 ft)
			50.0 (OM3)	2.125	500 m (1640 ft)
			50.0 (OM3)	4.250	380 m (1246 ft)
			50.0 (OM3)	8.500	150 m (492 ft)
			50.0 (OM4)	2.125	520 m (1706 ft)
			50.0 (OM4)	4.250	400 m (1312 ft)
			50.0 (OM4)	8.500	190 m (623 ft)
DS-SFP-FC8G-LW	1310	SMF	9.0	2.125	10 km (6.2 mi)
			9.0	4.250	10 km (6.2 mi)
			9.0	8.500	10 km (6.2 mi)
DS-SFP-FC8G-ER	1550	1310	9.0	2.125	40 km (24.85 mi)
			9.0	4.250	40 km (24.85 mi)
			9.0	8.500	40 km (24.85 mi)

Table 12: General	l Specifications f	or Cisco 8-Gbps Fibre	Channel SFP+ Transceivers
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Environmental Conditions and Power Requirements for 8 Gbps

The following table provides the optical parameters for 8 Gbps.

Table 13: Optical Parameters for 8 Gbps

SFP+	Average Transmit Power (dBm)		Average Receive Power (dBm)		Fiber Loss Budget (dB)		
	Max	Min	Max	Min	(62.5 microns [OM1])	(50.0 microns [OM2])	(50.0 microns [OM3])

SFP+	Average Tr Power (dB	ansmit m)	Average R Power (dE	leceive Bm)	Fiber Loss Budg	et (dB)	
DSSPFC2GSW	-1.3	-10 (2 Gbps) -9 (4 Gbps) -8.2 (8 Gbps)	0		2.10 (2 Gbps) 1.78 (4 Gbps) 1.58 (8 Gbps)	2.08 (4 Gbps) 1.68 (8 Gbps) 1.63 (16 Gbps)	3.31 (2 Gbps) 2.88 (4 Gbps) 2.04 (8 Gbps)
DS-SFP-FC8 G-LW	-3 (2 Gbps) -1 (4 Gbps) 0.5 (8 Gbps)	-11.7 (2 Gbps) -8.4 (4 Gbps) -8.4 (8 Gbps)	-3 (2 Gbps) -1 (4 Gbps) 0.5 (8 Gbps)		-7.8 (2 Gbps) 7.8 (4 Gbps) 6.4 (8 Gbps)		
D&SFP+FC8G+ER	4	-4.7	-1	—	—	10.9	10.9

The following table provides information on operating and storage temperature ranges.

Table 14: Operating and Storage Temperature Ranges for 8 Gbps

SFP+	Operating		Storage	
	Max	Min	Max	Min
DS-SFP-FC8G-SW	70°C	0°C	85°C	-40°C
DS-SFP-FC8G-LW	70°C	0°C	85°C	-40°C

Optical Specifications for Cisco CWDM SFP Transceivers

The following table provides the optical specifications for CWDM SFP transceivers. CWDM SFP transceivers have an optical link budget of 28 decibels (db).



The parameters are specified over temperature and at end of life unless otherwise noted.



Note

When shorter distances of single-mode fiber are used, it might be necessary to insert an inline optical attenuator in the link to avoid overloading the receiver. When shorter distances of single-mode fiber are used, it might be necessary to insert an inline optical attenuator in the link to avoid overloading the receiver.

Parameter	Symbol	Min.	Typical	Max.	Units	Notes
Transmitter central wavelength	λc	(x-4)	(x+1)	(x+7)	nm	Available center wavelengths:
						1470, 1490,
						1510, 1530,
						1550, 1570,
						1590, 1610 nm
Wavelength temperature dependence			0.08	0.1	nm/° C	
Side-mode suppression ratio	SMSR	30			dB	
Transmitter optical output power	P _{out}	0.0		5.0	dBm	Average power coupled into single-mode fiber
Receiver optical input power (BER<10 ⁻¹² with PRBS 2 ⁻⁷ -1)	P _{in}	-28.0		-7.0	dBm	@ 2.12 Gbps, 140°F (60°C) case temp.
Receiver optical input wavelength	λ _{in}	1450		1620	Nm	
Transmitter extinction ratio	OMI	9			dB	
Dispersion penalty at 60 km				2	dB	
Dispersion				2	db	@ 1.25 Gbps
km				3	dB	@ 1.25 Gbps



Cable and Port Specifications

This appendix includes the cables and connectors used with the Cisco MDS 9396S Multilayer Fabric Switch.



Caution

We strongly recommend that power cable runs and other potential noise sources be located as far away as practical from network cabling that terminates on Cisco equipment. In situations where long parallel cable runs exist but cannot be separated by at least 3.3 ft. (1 m), we recommend that you shield these potential noise sources. To avoid interference, the source should be shielded by housing it in a grounded metallic conduit.

- Cables and Adapters, on page 57
- Console Port, on page 58
- MGMT 10/100/1000 Ethernet Port, on page 59
- Supported Power Cords and Plugs, on page 61

Cables and Adapters

The Cisco MDS 9396S Switch accessory kit includes the following:

- RJ-45 to RJ-45 rollover cable
- RJ-45 to DB-9 female DTE adapter (labeled "Terminal")
- RJ-45 to DB-25 female DTE adapter (labeled "Terminal")
- RJ-45 to DB-25 male DCE adapter (labeled "Modem")



Note

Additional cables and adapters can be ordered from your customer service representative.



Note If you purchased this product through a Cisco reseller, contact the reseller directly for technical support. If you purchased this product directly from Cisco, contact Cisco Technical Support at this URL: http://www.cisco.com/c/en/us/support/index.html.

Console Port

The console port is an asynchronous RS-232 serial port with an RJ-45 connector. You can use the RJ-45 to RJ-45 rollover cable and the RJ-45 to DB-9 female adapter or the RJ-45 to DB-25 female DTE adapter (depending on your computer serial port) to connect the console port to a computer running terminal emulation software.

Console Port Pinouts

The following table lists the pinouts for the console port on the Cisco MDS 9396S Switch.

Pin	Signal
1 ¹	RTS
2	DTR
3	TxD
4	GND
5	GND
6	RxD
7	DSR
8	CTS

Table 15: Console Port Pinouts

1. Pin 1 is connected internally to pin 8.

Connecting the Console Port to a Computer Using the DB-25 Adapter

You can use the RJ-45 to RJ-45 rollover cable and RJ-45 to DB-25 female DTE adapter (labeled "Terminal") to connect the console port to a computer running terminal emulation software. The following table lists the pinouts for the console port, the RJ-45 to RJ-45 rollover cable, and the RJ-45 to DB-25 female DTE adapter.

Console Port	e Port RJ-45 to RJ-45 Rollover Cable		RJ-45 to DB-25 Terminal Adapter	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-25 Pin	Signal
RTS	1	8	5	CTS
DTR	2	7	6	DSR
TxD	3	6	3	RxD

Table	16: Port	Mode	Signalin	n and l	Pinouts	with [)B-25	Adanter
Tubic	10.1011	mouo	orgnanni	j unu i	mouto	WITCH P	0 201	auuptor

L

Console Port	RJ-45 to RJ-45 Roll	over Cable	RJ-45 to DB-25 Terminal Adapter	Console Device
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	20	DTR
CTS	8	1	4	RTS

Connecting the Console Port to a Computer Using the DB-9 Adapter

You can use the RJ-45 to RJ-45 rollover cable and RJ-45 to DB-9 female DTE adapter (labeled "Terminal") to connect the console port to a computer running terminal emulation software. The following table lists the pinouts for the console port, the RJ-45 to RJ-45 rollover cable, and the RJ-45 to DB-9 female DTE adapter.

Console Port	RJ-45 to RJ-45 Rollover Cable		RJ-45 to DB-9 Terminal Adapter	Console Device	
Signal	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	Signal	
RTS	1	8	8	CTS	
DTR	2	7	6	DSR	
TxD	3	6	2	RxD	
GND	4	5	5	GND	
GND	5	4	5	GND	
RxD	6	3	3	TxD	
DSR	7	2	4	DTR	
CTS	8	1	7	RTS	

Table 17: Port Mode Signaling and Pinouts with DB-9 Adapter

MGMT 10/100/1000 Ethernet Port

Use a modular, RJ-45, straight-through UTP cable to connect the 10/100/1000 management Ethernet port to external hubs and switches. To connect to a router, use a crossover cable.

Figure 18: RJ-45 Interface Cable Connector



The following table lists the connector pinouts and signal names for a 10/100/1000BASE-T management port (MDI) cable.

Table 18: 10/100/1000BASE-T Management Port Cable Pinout

Pin	Signal
1	BI DA+
2	BI DA-
3	BI DB+
4	BI DC+
5	BI DC-
6	BI DB-
7	BI DD+
8	BI DD-

The following figure shows a schematic of the 10/100/1000BASE-T cable.

Figure 19: Twisted-Pair 10/100/1000BASE-T Cable Schematic



The following table lists the connector pinouts and signal names for a 10/100BASE-T management port (MDI) cable.

Pin	Signal
1	TD+
2	TD-
3	RD+
4	RD-
5	Not used
6	Not used
7	Not used
8	Not used

The following figure shows a schematic of the 10/100BASE-T cable.

Figure 20: Twisted-Pair 10/100BASE-T Cable Schematic



Supported Power Cords and Plugs

A separate power cord is provided for each power supply. Standard power cords or jumper power cords are available for connection to a power distribution unit having IEC 60320 C13 outlet receptacles. The jumper power cords, for use in cabinets, are available as an option instead of the standard power cords.

Power Cords

The standard power cords have an IEC C15 connector on the end that plugs into the switch. The optional jumper power cords have an IEC C15 connector on the end that plugs into the switch, and an IEC C14 connector on the end that plugs into an IEC C13 outlet receptacle.

Note

- Only the standard power cords or jumper power cords provided with the switch are supported.
 - If you do not order the optional power cord with the system, you are responsible for selecting the appropriate power cord for the product. Using a non-compatible power cord with this product may result in electrical safety hazard. Orders delivered to Argentina, Brazil, and Japan must have the appropriate power cord ordered with the system.

The following figure shows the power cord used with the 3.5-kW HVDC/HVAC Power Supply Unit:

Figure 21: CAB-HVAC-C14-2M Power Cord and Plugs for the 3.5-kW HVDC/HVAC Power Supply Unit



The following table lists the supported power cords and power plugs for the Cisco MDS 9396S switch:

Table 20: Supported Power Cords and Power Plugs for the Cisco MDS 9396S Switch

Locale	Power Cord Part Number	Source Plug Type	Cordset Rating	Length		Power Plug
				Feet	Meters	Reference
Argentina	CAB-9K10A-AR	IRAM 2073 plug (10 A)	10 A, 250 V	8.2	2.5	
North America	CAB-9K12A-NA	NEMA 5-15P plug (15 A)	15 A, 125 V	8.2	2.5	
Australia and New Zealand	CAB-9K10A-AU	SAA/3 plug, AS/NZS 3112-1993 (10 A)	10 A, 250 V	8.2	2.5	COLOR BECOG

Locale	Power Cord Part Number	Source Plug Type	Cordset Rating	Length		Power Plug
				Feet	Meters	Reference Illustration
Europe	CAB-9K10A-EU	VIIG Plug, CEE (7) VII (16 A)	10 A, 250 V	8.2	2.5	
Italy	CAB-9K10A-IT	1/3G plug, CEI 23-16 (10 A)	10 A, 250 V	8.2	2.5	
United Kingdom	CAB-9K10A-UK	BS89/13, BS 1363/A (13 A; replaceable fuse)	10 A, 250 V	8.2	2.5	
South Africa	CAB-9K10A-SA	EL 208, SABS 164-1 (10 A)	10 A, 250 V	5.12	1.82	Carbon Provide Andrews
Switzerland	CAB-9K10A-SW	12G SEV 1011 (10 A)	10 A, 250 V	8.2	2.5	
Japan	CAB-C15-CBN-JP	C14-C15	12 A, 250 VAC	10	3.05 m	
Cabinet Jumper Power Cord	CAB-C15-CBN	C14-C15 Connectors	13A, 250 VAC	4	1.22	

Jumper Power Cord

The following figure shows the C14 and C15 connectors on the optional jumper power cord for the Cisco MDS 9396S Switch. The C15 connector connects into the C14 inlet on the Cisco MDS 9396S Switch power supply, while the C14 connector connects into the C13 receptacle of a power distribution unit for a cabinet.

Figure 22: Connectors on Jumper Power Cord for Cisco MDS 9396S Switch







Site Planning and Maintenance Records

This section includes a site planning checklist and maintenance records to use when installing the Cisco MDS 9396S Multilayer Fabric Switch.



- **Note** For information about how to query the switch for configuration information, see the Cisco NX-OS Fundamentals Configuration Guide.
 - Site Preparation Checklist, on page 65
 - Contact and Site Information, on page 67
 - Chassis and Network Information, on page 67

Site Preparation Checklist

Planning the location and layout of your equipment rack or wiring closet is essential for successful switch operation, ventilation, and accessibility. The following table lists the site planning tasks that we recommend completing before installing the Cisco MDS 9396S Switch.

Consider heat dissipation when sizing the air-conditioning requirements for an installation.

Task No.	Planning Activity	Verified By	Time	Date
1	Space evaluation:			
	• Space and layout			
	• Floor covering			
	 Impact and vibration 			
	• Lighting			
	Maintenance access			

Table 21: Site Planning Checklist

Task No.	Planning Activity	Verified By	Time	Date
2	Environmental evaluation:			
	Ambient temperature			
	• Humidity			
	• Altitude			
	Atmospheric contamination			
	• Air flow			
3	Power Evaluation:			
	• Input power type			
	• Power receptacles ¹			
	• Receptacle proximity to the equipment			
	• Dedicated circuit for power supply			
	• Dedicated (separate) circuits for redundant power supplies			
	• UPS ² for power failures			
4	Grounding evaluation:			
	• Circuit breaker size			
	• CO ground (AC-			
	powered systems)			
5	Cable and interface equipment evaluation:			
	• Cable type			
	Connector type			
	Cable distance limitations			
	• Interface equipment (transceivers)			
Task No.	Planning Activity	Verified By	Time	Date
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6	Electromagnetic interference (EMI) evaluation: • Distance limitations for signaling • Site wiring • RFI ³ levels			

1. Verify that the power supply installed in the chassis has a dedicated AC source circuit.

2. UPS = uninterruptible power supply.

3. RFI = radio frequency interference.

Contact and Site Information

Use the following worksheet to record contact and site information.

Table 22: Contact and Site Information

Contact person	
Contact phone	
Contact E-Mail	
Building/site name	
Data center location	
Floor location	
Address (line 1)	
Address (line 2)	
City	
State	
Zip code	
Country	

Chassis and Network Information

Use the following worksheets to record chassis and network information.

Contract Number :

Chassis Serial Number:

Product Number:

Switch IP address	
Switch IP netmask	
Host name	
Domain name	
IP broadcast address	
Gateway/router address	
DNS address	
Modem telephone number	