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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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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:

- Preface, on page 1
- Audience, on page 1
- Document Conventions, on page 1
- Related Documentation, on page 2
- Obtaining Documentation and Submitting a Service Request, on page 2

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 *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.
Related Documentation

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

**Release Notes**

**Regulatory Compliance and Safety Information**

**Compatibility Information**

**Installation and Upgrade**

**Configuration**

**CLI**

**Troubleshooting and Reference**

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

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What's New in Cisco Product Documentation.
To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the What's New in Cisco Product Documentation RSS feed. RSS feeds are a free service.
Overview of Cisco MDS 9148T Fibre Channel Switch

The Cisco MDS 9148T switch has 48 x 4/8/16/32-Gbps multispeed ports and is a powerful and compact 1-rack unit (1RU) SAN fabric switch. This switch has the following major features:

• Provides consistent 32-Gbps quality performance for every Fibre Channel port on the switch.

• Provides availability and reliability similar to the previous generations of the Cisco MDS9000 Series switches. Additionally, port-channel link members can be used across the three 16-port port groups providing additional high availability.

• Provides minimum configuration option of twenty four 32-Gbps Fibre Channel ports in the base variant, which can be enabled in increments of 8 ports to up to 48 ports. This allows four possible configurations of 24, 32, 40, and 48 ports.

• Supports enterprise-class features, such as Auto Zone, Smart Zoning, Slow Drain Detection and Isolation, Virtual SAN (VSAN) and Inter-VSAN routing (IVR), and migration from fabricwide Quality of Service (QoS) from SAN islands to enterprise-wide storage networks.

• Provides intelligent diagnostics tools such as Inter-Switch Link (ISL) diagnostics, HBA diagnostics with leading HBA vendors, read diagnostic parameters, protocol decoding, network analysis tools, and integrated Cisco Call Home.

• Supports the Virtual Machine Identifier (VMID) feature that provides visibility into virtual machines that are accessing the storage devices in the fabric.

• Supports Representational State Transfer (REST) and Cisco NX-API capabilities.

• Supports onboard hardware that protects the switch from malicious attacks by securing access to critical components such as the bootloader, system image loader, and Joint Test Action Group (JTAG) interface.

This chapter contains the following topics:

• Chassis Components, on page 6
• Fan Modules, on page 11
• Power Supplies, on page 11
Chassis Components

This section describes the different views of the chassis.

Front View

The following figure shows the front view of a Cisco MDS 9148T Switch:

*Figure 1: Front View of the Cisco MDS 9148T Switch*

| 1 | Serial console port | 7 | Activity status LED |
The following figure shows the rear view of a Cisco MDS 9148T Switch:

**Figure 2: Rear View of the Cisco MDS 9148T Switch**

<table>
<thead>
<tr>
<th></th>
<th>Rear View</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply failure status LED</td>
</tr>
<tr>
<td>2</td>
<td>Power supply unit fan</td>
</tr>
<tr>
<td>3</td>
<td>Power supply unit handle</td>
</tr>
<tr>
<td>4</td>
<td>Unswitched power receptacle</td>
</tr>
<tr>
<td>5</td>
<td>Power supply unit latch release</td>
</tr>
<tr>
<td>6</td>
<td>Power supply status LED</td>
</tr>
<tr>
<td>7</td>
<td>Power supply units (2 units)</td>
</tr>
<tr>
<td>8</td>
<td>Chassis fan modules (4 units)</td>
</tr>
<tr>
<td>9</td>
<td>Chassis fan module release latches (8)</td>
</tr>
</tbody>
</table>

**Figure 3: Rear Panel Slot Numbering of Cisco MDS 9148T**

<table>
<thead>
<tr>
<th></th>
<th>Rear View</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply unit slot 1</td>
</tr>
<tr>
<td>2</td>
<td>Chassis fan module slot 1</td>
</tr>
<tr>
<td>3</td>
<td>Chassis fan module slot 2</td>
</tr>
<tr>
<td>4</td>
<td>Chassis fan module slot 3</td>
</tr>
<tr>
<td>5</td>
<td>Chassis fan module slot 4</td>
</tr>
<tr>
<td>6</td>
<td>Chassis fan module slot 5</td>
</tr>
</tbody>
</table>
The Cisco MDS 9148T switch has LEDs on both the front and back of the switch to indicate the status of different system components during bootup tests and online operation. The following tables describe the location of each LED and the meaning of its color:

**Table 1: Chassis Activity LEDs for a Cisco MDS 9148T Switch**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Location</th>
<th>Function</th>
<th>Color</th>
<th>Status</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power LED</td>
<td>Front panel of the chassis</td>
<td>Chassis Power/Health</td>
<td>Off</td>
<td>Off</td>
<td>Either of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• The system is not receiving sufficient power from the PSUs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• The operating system is not running.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Green</td>
<td>Solid On</td>
<td>Both PSUs are installed and operational.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Red</td>
<td>Solid On</td>
<td>Either of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• A PSU has failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• A PSU has been removed.</td>
</tr>
<tr>
<td>Indicator</td>
<td>Location</td>
<td>Function</td>
<td>Color</td>
<td>Status</td>
<td>State</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>------------</td>
<td>-------</td>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Status LED</td>
<td>Front panel of the chassis</td>
<td>System Status</td>
<td>Green</td>
<td>Solid On</td>
<td>All diagnostics have passed, Cisco NX-OS is running and the system is operational.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Any of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• The system is running bootup diagnostics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• The system is booting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• A minor temperature threshold is exceeded.</td>
</tr>
<tr>
<td>Orange</td>
<td>Solid On</td>
<td></td>
<td></td>
<td></td>
<td>Mismatched airflow direction observed in one of the following modules:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Fan modules—The switch will go down in 10-15 seconds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• PSUs—The switch will go down after 10 minutes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Fan modules and PSUs—The switch will go down after 10 minutes.</td>
</tr>
<tr>
<td>Red</td>
<td>Blinking</td>
<td></td>
<td></td>
<td></td>
<td>One of the following conditions exists:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• A diagnostic test failed or another fault occurred during bootup.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• A major temperature threshold is exceeded.</td>
</tr>
<tr>
<td>Fan status</td>
<td>Front panel of the chassis</td>
<td>Fan health</td>
<td>Green</td>
<td>Solid on</td>
<td>All fan modules are operational.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fan failure.</td>
</tr>
</tbody>
</table>
### LED Status Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Location</th>
<th>Function</th>
<th>Color</th>
<th>Status</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU Status</td>
<td>Faceplate of each PSU</td>
<td>PSU input/output</td>
<td>Green</td>
<td>Off</td>
<td>No input to the PSU.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Solid on</td>
<td>PSU output is OK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blinking</td>
<td>PSU output is not OK, but input is OK.</td>
</tr>
<tr>
<td>PSU operation</td>
<td></td>
<td></td>
<td>Amber</td>
<td>Off</td>
<td>PSU is operating normally.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Solid on</td>
<td>One of the following conditions exists in the PSU:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Over voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Over current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Over temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fan failure.</td>
</tr>
<tr>
<td>Fan Status</td>
<td>Faceplate of each fan module</td>
<td>Fan module</td>
<td>Green</td>
<td>Solid on</td>
<td>Fan module is operating normally.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Amber</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Solid on</td>
<td>The fan in the fan module has failed.</td>
</tr>
</tbody>
</table>

The following table describes the Ethernet port LEDs for a Cisco MDS 9148T switch.

<table>
<thead>
<tr>
<th>LED Position</th>
<th>Status</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>Off</td>
<td>There is no link.</td>
</tr>
<tr>
<td></td>
<td>Solid Green</td>
<td>Indicates a physical link.</td>
</tr>
<tr>
<td>Right</td>
<td>Off</td>
<td>There is no link traffic.</td>
</tr>
<tr>
<td></td>
<td>Blinking Yellow</td>
<td>Indicates link traffic.</td>
</tr>
</tbody>
</table>

The following table describes the Fibre Channel port LEDs for a Cisco MDS 9148T switch.

<table>
<thead>
<tr>
<th>Status</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Green</td>
<td>The link is up.</td>
</tr>
<tr>
<td>Regular Blinking Green</td>
<td>The link is up and the port beacon is active.</td>
</tr>
<tr>
<td>Intermittent Blinking Green</td>
<td>The link is up (and traffic is flowing through the port).</td>
</tr>
</tbody>
</table>
Fan Modules

The Cisco MDS 9148T Switch fan modules have a fixed handle for insertion and removal from the chassis. The Cisco MDS 9148T Switch requires a minimum of two operating fan modules to prevent automatic shutdown. It supports up to four fan modules. This provides redundancy for uninterrupted operation in the event of fan module failure. The Cisco MDS 9148T Switch fan modules are hot-swappable to also allow swapping out of a fan module during operation for uninterrupted operation. During a fan module replacement, the internal airflow through the chassis is changed. If the internal airflow is disrupted for too long, the preset temperature thresholds will be exceeded and the system will automatically shut down to prevent permanent damage.

Figure 4: Cisco MDS 9148T Fan Module

To facilitate different data center cooling configurations of hot or cold aisles and racks, there are two models of fan modules. The first type has airflow with port-side intake and exhaust at the rear of the chassis. The second type has airflow in the opposite direction, that is, rear-chassis intake and port-side exhaust. The airflow direction is denoted on each fan module as follows:

- Red—Port-side intake airflow
- Blue—Port-side exhaust airflow

For more information on installing and removing fan modules, see Installing and Removing Fan Modules.

Power Supplies

The Cisco MDS 9148T Switch PSUs have an unswitched power receptacle, a PSU status LED and a handle for insertion and removal of the PSU from the chassis. The Cisco MDS 9148T Switch requires a minimum of one operating PSU. It supports up to two PSUs. This provides redundancy for uninterrupted operation in
the event of PSU or grid failure. The PSUs are hot-swappable to allow swapping out of a PSU during operation for uninterrupted operation. During a PSU replacement, the internal airflow through the chassis is changed. If the internal airflow is disrupted for too long, the preset temperature thresholds will be exceeded and the system will automatically shut down to prevent permanent damage.

Figure 5: Cisco MDS 9148T PSU

To facilitate different data center cooling configurations of hot or cold aisles and racks, there are two models of PSUs. The first type has airflow with port-side intake and exhaust at the rear of the chassis. The second type has airflow in the opposite direction, that is, rear-chassis intake and port-side exhaust. The airflow direction is denoted on each PSU as follows:

- Red—Port-side intake airflow
- Blue—Port-side exhaust airflow

The switch supports PSUs of only one airflow type at a time. Both PSUs have to be either port-side exhaust, or port-side intake PSUs.

Note

The direction of PSU airflow must match the direction of the fan module airflow.

For more information on installing and removing PSUs, see Installing and Removing Power Supply Units.
Cabinet and Rack Installation

- Cabinet and Rack Requirements, on page 13

Cabinet and Rack Requirements

This section provides the Cisco MDS 9000 Series switches requirements for the following types of cabinets and racks in an external ambient air temperature range of 0 to 40°C. If you are selecting an enclosed cabinet, we recommend that you choose one of these thermally validated types:

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

General Requirements for Cabinets and Racks

A cabinet or rack must belong to one of the following types:

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

The cabinet or rack must also meet the following requirements:

- The minimum vertical rack space per chassis should be 1 RU, equal to 1.75 in. (4.4 cm).
- The width between the inside edges of the mounting posts must be at least 17.75 in. (45.1 cm). This is the distance between the two front posts of the four-post EIA racks.
- The minimum rack-load ratings per RU are listed in the following table:

<table>
<thead>
<tr>
<th>Rack Type</th>
<th>MDS 9148T</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA (4 post)</td>
<td>7.5 lb (3.4 kg)</td>
</tr>
<tr>
<td>Telco (2 post)</td>
<td>15 lb (6.8 kg)</td>
</tr>
</tbody>
</table>
For four-post EIA cabinets (perforated or solid-walled):

- The distance between the front door and front mounting posts should be a minimum of 3 in. (7.6 cm) to allow for the bend radius of FC port fibre-optic patch cables.

- The distance between the outside face of the front mounting post and the outside face of the back mounting post should be 26 to 32 in. (66 to 81 cm) to allow for installation with the Cisco rack mounting kit.

- The distance between the rear of the chassis and the perforated rear door of the cabinet (required for airflow in the cabinet, if used) should be a minimum of 3.0 in. (7.6 cm).

- No clearance is required between the chassis and the sides of the rack or cabinet (no side airflow).

- The amount of clearance required for interface cables is 3 in. [7.6 cm] minimum and module handles is 1 in. [25 mm] minimum.

Note

- Optional jumper power cords are available for use in a cabinet.

- Cisco MDS 9148T switches are compatible with Cisco racks (such as Cisco R42612) and PDUs.

Requirements Specific to Perforated Cabinets

In addition to the requirements listed in the General Requirements for Cabinets and Racks, on page 13 section, perforated cabinets with front-to-back airflow 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. (96.7 sq cm) 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 9148T 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:

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, on page 13 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 sends it out from the top, with a minimum airflow of 849.5 m³/h exiting the cabinet roof through the fan tray, to be available.

• Nonperforated (solid and sealed) front and back doors and side panels to be present so that air travels predictably from bottom to top.

• The overall cabinet depth to be 36 to 42 in. (91.4 to 106.7 cm) to allow the doors to close and to facilitate adequate airflow.

• A minimum of 150 sq. in. (968 sq. cm) of open area to be available at the floor air intake of the cabinet.

• The lowest piece of equipment to be installed at a minimum of 1 RU (1.75 in. or 4.4 cm) above the floor openings to prevent blockage of the floor intake.
CHAPTER 4

Installing the Cisco MDS 9148T Switch

This chapter describes how to install a Cisco MDS 9148T switch and its components.

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

⚠️ Warning

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

⚠️ Warning

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

- Preinstallation, on page 17
- Installing the Switch, on page 24
- Grounding the Switch, on page 31
- Installing and Removing Components, on page 32

Preinstallation

Cisco MDS 9000 Series 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 9148T switch during installation. After the front rack-mount brackets are securely attached to the rack-mounting rails, the shelf bracket can be removed.

The Telco and EIA Shelf Bracket kit supports the following configurations:

- A Cisco MDS 9148T Switch in a two-post Telco rack
- A Cisco MDS 9148T Switch in a four-post EIA rack
Note
Telco and EIA Shelf Bracket 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 9148T switch in a rack or cabinet using the optional Telco and EIA Shelf Bracket Kit.

Shelf-Installation Guidelines

Caution
• If the rack is on wheels, ensure that the brakes are engaged or the rack is otherwise stabilized.
• If you are installing this kit in an EIA rack, attach the shelf to all four rack-mounting posts; the EIA posts may not be thick enough to prevent flexing of shelf brackets if only two posts are used.

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:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Part Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Slider brackets</td>
</tr>
<tr>
<td>2</td>
<td>Shelf brackets</td>
</tr>
<tr>
<td>1</td>
<td>Crossbar</td>
</tr>
<tr>
<td>2</td>
<td>10-32 x 3/8-in. Phillips pan-head screws</td>
</tr>
<tr>
<td>16</td>
<td>12-24 x 3/4-in. Phillips screws</td>
</tr>
<tr>
<td>16</td>
<td>10-24 x 3/4-in. Phillips screws</td>
</tr>
</tbody>
</table>

Required Equipment

You need the following equipment for this installation:
• Number 2 Phillips screwdriver
• Tape measure and level (to ensure that shelf brackets are at level with each other)

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

**Step 1**  Position a shelf bracket inside a rack-mounting post as shown in Figure 6: Installing the Shelf Bracket Kit into a Telco Rack, on page 19 and align the screw holes at the front of the shelf bracket with the holes in the rack-mounting post. Then, attach the shelf bracket to the rack-mounting post 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 (the hole immediately above the 1/2 in. spacing) of a rack unit on the rack-mounting post.

**Step 2**  Repeat Step 1 with the other shelf brackets.

**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 Figure 6: Installing the Shelf Bracket Kit into a Telco Rack, on page 19, 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:
To install the shelf brackets in an EIA rack, follow these steps:

**Step 1**  Position a shelf bracket inside the rack-mounting posts, as shown in Figure 7: Installing the Shelf Bracket Kit into an EIA Rack, on page 20. Align the screw holes at the front of the shelf bracket with the holes in the front rack-mounting post. Then, attach the shelf bracket to the front rack-mounting post 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 (the hole immediately above the 1/2 in. spacing) of a rack unit on the rack-mounting post.

**Step 2**  Repeat Step 1 with the other shelf brackets.

**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 Figure 7: Installing the Shelf Bracket Kit into an EIA Rack, on page 20, using the 10-32 screws.

**Step 5**  Insert the slider posts into the shelf brackets, as shown in Figure 7: Installing the Shelf Bracket Kit into an EIA Rack, on page 20. Attach them to the rear rack-mounting posts, using a minimum of four 12-24 or 10-24 screws.
Preinstallation Guidelines

Airflow Considerations

The switch comes with fan modules and power supply units that have either port-side intake or port-side exhaust airflow for cooling the switch. If you are orienting the switch with the FC ports facing a cold aisle, make sure that the switch has a port-side intake fan and power supply modules with red colorings. If you are orienting the switch with the fan and power supply modules facing a cold aisle, make sure that the switch has port-side exhaust fan and power supply units with blue colorings. All fan modules and power-supply modules must have the same direction of airflow.

Connection Guidelines for AC-Powered Systems

To connect to the Cisco MDS 9396T switch AC power supply units to the site power source, follow these guidelines:

- For power redundancy, each power supply should be connected to a separate power feed (at a minimum, separate branch circuits).
- Circuits should be sized according to local and national codes.
- The AC power receptacles that are used to power the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground in the service equipment.

Installation Guidelines

Follow these guidelines when installing the Cisco MDS 9148T switch:

- Each new switch requires a license. See the Cisco MDS 9000 Family NX-OS Licensing Guide for instructions on installing a license.
- Plan your site configuration and prepare the site before installing the switch.
- Ensure that there is adequate space around the switch to allow for servicing the switch and for adequate airflow. The airflow requirements are listed in the Technical Specifications section.
- Ensure that you are positioning the switch in a rack so that it takes in cold air from the cold aisle and exhausts air to the hot aisle. For more information, see the Airflow Considerations section.
- Ensure that the air-conditioning meets the heat dissipation requirements listed in the Technical Specifications section.
- Ensure that the cabinet or rack meets the requirements listed in the Cabinet and Rack Installation section.
- Ensure that the chassis is adequately grounded. If the switch is not mounted in a grounded rack, we recommend that you connect both the system ground on the chassis and the site power ground to an earth ground.
- Ensure that the site power meets the power requirements listed in the Technical Specifications section. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.
Avoid UPS types that use ferro-resonant technology. These UPS types can become unstable with systems such as the Cisco MDS 9000 Series, triggered by substantial current draw fluctuations due to fluctuating data traffic patterns.

- Ensure that electrical circuits are sized according to local and national codes.

For North America, the 650 W power supplies require a 15 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.

To prevent loss of input power, ensure that the total maximum loads on the circuits supplying power to the switch are within the electrical current ratings for circuit for wiring and breakers.

Unpacking and Inspecting the Switch

Caution
When handling switch components, wear an ESD strap and handle modules using only the carrier edges.

Tip
Retain the shipping container in case the chassis has to be shipped in the future.

Note
The switch is thoroughly inspected before shipment. If any damage occurs during transportation, or if any item is missing, contact your customer representative immediately. If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support.

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
   - Optional items, if any, 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)
NEBS Compliance

In case of port-side intake airflow, the chassis is not Network Equipment-Building System (NEBS) compliant by default. To be NEBS compliant, install the NEBS kit by performing these steps:

1. Install the NEBS rack-mount brackets onto the switch.
2. Install the NEBS air baffle by aligning the notches on the baffle with the slots on the brackets and sliding the ends of the baffle so that the baffle locks into place.

Figure 8: NEBS Kit for 2-Post Installation
For more information on how to install the switch, see the Installing the Switch in a 4-Post Rack and Installing the Switch into a 2-Post Rack.

Installing the Switch

This section describes how to use the rack mount kit to install the Cisco MDS 9148T switch into a cabinet or rack that meets the requirements described in the Cabinet and Rack Requirements section.

Installing the Switch in a 4-Post Rack

To install the switch, you must attach the front and rear mounting guides to the switch, install the slider rails on the rear of the rack, slide the switch into the slider rails, and secure the switch to the front of the rack. Typically, the front of the rack is the side that is easiest to access for maintenance.

Before you begin

- Inspect the switch shipment to ensure that you have everything you ordered.
- Make sure that the switch rack-mount kit includes the following parts:
• Rack-mount brackets (2)
• Rack-mount guides (2)
• Slider rails (2)
• M4 x 0.7 x 8-mm Phillips countersink screws (12)

• The rack is installed and secured to its location.
• If your switch must meet NEBS standards, ensure that it is configured to be compliant. For more information, see the NEBS Compliance.
• Determine how you want to set up your switch:
  1. Determine which end of the chassis is to be located in the cold aisle as follows:
     a. If the switch has port-side intake modules (fan modules and power supply units with red coloring), position the switch so that its ports are in the cold aisle.
     b. If the switch has port-side exhaust modules (fan modules and power supply units with blue coloring), position the switch so that its fan modules and power supply units are in the cold aisle.

  2. Determine which way the chassis should slide in and out of the rack—port-side entry first or rear-side entry first. You might consider whether the front or back of the rack provides better clearance for maneuvering the chassis in and out during installation and servicing. The end that needs to enter the rack first requires the guides and the other end the brackets.

---

**Step 1** Install two rack-mount brackets to the switch as follows:

a. Position a rack-mount bracket so that four of its screw holes are aligned to the screw holes on the side of the chassis. You can align any four of the holes in the rack-mount bracket to four of the six screw holes on the side of the chassis. The holes that you use depend on the requirements of your rack and the amount of clearance. For more information on clearance, see the General Requirements for Cabinets and Racks, on page 13.

b. You can install the rack-mount bracket either at the front or rear of the chassis. The choice is determined by which end of the chassis will be inserted into the rack first. If the rear end of the chassis is to be inserted first, then mount the brackets on the front of the chassis, and vice versa.
Figure 10: Installing Rack-Mount Brackets on the Front Side of the Chassis

1. Four M4 screws
2. Rack-mount bracket
3. Rack-mount guide
4. Two M4 screws

c. Secure the rack-mount bracket to the chassis using the four M4 screws and tighten each screw to 12 in-lb (1.36 N·m) of torque.
d. Repeat Step 1 for the other rack-mount bracket on the other side of the switch, and be sure to position it in the same distance from the front of the switch.

Step 2
Install the two rack-mount guides on the chassis, as follows:
a. Align the two screw holes on a rack-mount guide to the middle two screw holes in the remaining six screw holes on a side of the chassis.
b. Attach the guide to the chassis using two M4 screws. Tighten the screws to 12 in-lb (1.36 N·m) of torque.
c. Repeat Step 2 for the other rack-mount guide on the other side of the switch.

Step 3
If you are installing the chassis into an ungrounded rack, you must attach a customer-supplied grounding wire to the chassis, as explained in Grounding the Switch. However, if you are installing the chassis into a grounded rack, you can skip this step.

Step 4
Install the slider rails into the rack or cabinet, as follows:
a. Determine which two posts of the rack or cabinet you should use for the slider rails. Of the four vertical posts in the rack or cabinet, two will be used for the rack-mount brackets, and the other two posts will have the slider rails.

b. Position a slider rail at the desired level side of the rack and use two 12-24 screws or two 10-32 screws, depending on the rack thread type, to attach the slider rail to the rack. Tighten the 12-24 screws to 30 in-lb (3.39 N·m) of torque, or tighten the 10-32 screws to 20 in-lb (2.26 N·m) of torque.

c. Repeat Step 3 to attach the other slider rail to the other side of the rack.

To make sure that the slider rails are at the same level, you should use a level tool or tape measure, or carefully count the screw holes in the vertical mounting posts.

Step 5 Insert the switch into the rack and attach it as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fan-tray end of the chassis</td>
</tr>
<tr>
<td>2.</td>
<td>rack-mount screws</td>
</tr>
<tr>
<td>3.</td>
<td>Direction of insertion</td>
</tr>
<tr>
<td>4.</td>
<td>Slider rails</td>
</tr>
</tbody>
</table>

a. Holding the switch with both hands, position the two rack-mount guides on the switch between the rack or cabinet posts that do not have slider rails attached to them.

b. Align the two rack-mount guides on either side of the switch with the slider rails installed in the rack. Slide the guides onto the slider rails, and then gently slide the switch all the way into the rack until the brackets come in contact with two rack or cabinet posts.

Note If you attached a grounding cable to the chassis, you will need to flex one of the rack-mount posts slightly to allow the grounding lug to go behind the post.
Installing the Switch into a 2-Post Rack

Before you begin

- If your switch must meet NEBS standards, ensure that it is configured to be compliant. For more information, see the NEBS Compliance.
- Determine how you want to set up your switch:
  - Determine which end of the chassis is to be located in the cold aisle as follows:
    1. If the switch has port-side intake modules (fan modules and power supply units with red coloring), position the switch so that its ports are in the cold aisle.
    2. If the switch has port-side exhaust modules (fan modules and power supply units with blue coloring), position the switch so that its fan modules and power supply units are in the cold aisle.
  - Determine which way the chassis should slide in and out of the rack—port side entry first or rear-side entry first. You might consider whether the front or back of the rack provides better clearance for maneuvering the chassis in and out during installation and servicing. The end that needs to enter the rack first requires the guides and the other end the brackets.

Step 1
Install two rack-mount brackets onto the switch as follows:

a. Position a rack-mount bracket so that four of its screw holes are aligned to the screw holes on the side of the chassis. You can align any four of the holes in the rack-mount bracket to four of the six screw holes on the side of the chassis. The holes that you use depend on the requirements of your rack and the amount of clearance. For more information on clearance, see the General Requirements for Cabinets and Racks, on page 13.

b. You can install the rack-mount bracket either at the front or rear of the chassis. The choice is determined by which end of the chassis will be inserted into the rack first. If the rear end of the chassis is to be inserted first, then mount the brackets on the front of the chassis, and vice versa.

c. Holding the chassis level, insert two screws (12-24 or 10-32, depending on the rack type) into each of the two brackets (using a total of four screws), and into the cage nuts or threaded holes in the rack or cabinet posts.

d. Tighten the 10-32 screws to 20 in-lb (2.26 N·m), or tighten the 12-24 screws to 30 in-lb (3.39 N·m).

Step 6
If you have attached a grounding wire to the chassis grounding pad, connect the other end of the wire to the facility ground.
Step 2 If you are installing the chassis into an ungrounded rack, you must attach a customer-supplied grounding wire to the chassis, as explained in Grounding the Switch. However, if you are installing the chassis into a grounded rack, you can skip this step.

Step 3 Install the switch onto the 2-post rack:

a. Holding the switch with both hands, position the back of the switch between the two posts of the rack. Then gently move the switch until the rack-mount brackets come in contact with two rack posts.

b. Holding the chassis level, insert three screws (12-24 or 10-32, depending on the rack type) into each of the two rack-mount brackets (using a total of six screws) and into the cage nuts or threaded holes in the rack or cabinet posts.
c. Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).
Step 4 If you have attached a grounding wire to the chassis grounding pad, connect the other end of the wire to the facility ground.

---

**Grounding the Switch**

The switch chassis is automatically grounded when you install the switch properly in a grounded rack with metal-to-metal connections between the switch and rack.

Alternatively, you can ground the chassis (this is required if the rack is not grounded) by attaching a customer-supplied grounding cable to the chassis grounding pad and the facility ground.

⚠️ **Warning** This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. **Statement 1024**

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

---

**Step 1** Use a wire-stripping tool to remove approximately 0.75 in. (1.9 cm) 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.

**Step 3** Remove the label covering the grounding pad on the chassis. 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 from whom you bought the rack.

Installing and Removing Components

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

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

Installing the ESD Grounding Strap

This section illustrates how to prepare yourself before removing the chassis from the sealed antistatic bag. The figures show how to cuff the ESD strap around the wrist and the ground cord that connects the cuff to the ground. ESD wrist straps are the primary means of controlling static charge on personnel.
Note
These images are for only representation purposes. The chassis' actual appearance and size may vary.

*Figure 15: Wearing the ESD Strap*
Installing and Removing Power Supply Units

This section provides instructions for installing and removing the power supply units in the Cisco MDS 9148T switch.

Installing Power Supply Units

You can replace one power supply unit (PSU) while the other one provides power to the switch.

Before you begin

- To implement n+n redundancy, each PSU must be connected to a separate power feed. Otherwise, only one power feed is required.
There must be an earth ground connection to the chassis to which you are installing the replacement module. Typically, the chassis is grounded by its metal-to-metal connection with a grounded rack. If you need to ground the chassis, see Grounding the Switch.

**Step 1**

Holding the PSU with one hand underneath it and the other hand holding the handle, turn the PSU so that its release latch is on the right side, and align the back end (the end with the electrical connections) to the open power supply slot. Carefully slide the PSU all the way into the slot until it clicks into place.

**Note**

If the PSU does not fit into the slot opening, turn the unit over and try again.

**Step 2**

Test the installation by trying to pull the PSU out of the slot without using the release latch.

If the PSU does not move out of place, it is secured in the slot. If the PSU moves, carefully press it all the way into the slot until it clicks in place.

**Step 3**

Attach the power cable to the electrical outlet on the front of the PSU.

**Step 4**

Make sure that the other end of the power cable is attached to the appropriate power feed for the PSU. If the power feed has a switch, slide it to the On position.

**Note**

Depending on the outlet receptacle on your power distribution unit, you might need the optional jumper cable to connect the switch to your outlet receptacle.

**Step 5**

Verify that the PSU is operational by making sure that the PSU LEDs are both green. For information on what the PSU LEDs indicate, see the LEDs section.

---

**Removing Power Supply Units**

You can remove one faulty PSU, while the other one provides enough power to operate the switch.

**Step 1**

Holding the plug for the power cable, pull the plug out from the power receptacle on the PSU, and wait until both the PSU LEDs are off.

**Step 2**

Grasp the PSU handle while pressing the release latch towards the handle.

**Step 3**

Place your other hand under the PSU to support it while you slide it out of the chassis.

**Caution**

Do not touch the electrical connectors on the back side of the unit and prevent anything else from coming into contact with and damaging the connectors.

---

**Installing and Removing Fan Modules**

This section provides instructions for installing and removing the fan modules for the Cisco MDS 9148T switch.

You can replace one of the four fan modules even when the switch is operating so long as you perform the replacement within one minute of removing the old fan module. If you cannot perform the replacement within one minute, leave the original fan module in the chassis to maintain the designed airflow until you have the replacement fan module on hand and can perform the replacement.
If you are replacing a module during operation, be sure that the replacement fan module has the correct direction of airflow, which means that it has the same airflow direction as the other modules in the chassis. Also, be sure that the airflow direction takes in air from a cold aisle and sends it out to a hot aisle. Otherwise, the switch can overheat and shut down.

If you are changing the airflow direction of all the modules in the chassis, you must shut down the switch before replacing all the fan and power supply modules with modules using the other airflow direction. During operation, all the modules must have the same direction of airflow.

Installing a Fan Module

To install a new fan module, follow these steps:

**Before you begin**

- You must have a new fan module on hand and ready to install within one minute of removing the original fan module if the switch is operating.
- The new fan module must have the same airflow direction as the other fan and power supply modules installed in the switch. All of these modules must have either red coloring (port-side intake airflow) or blue coloring (port-side exhaust airflow).
- Remove any blank plate or existing fan module from the fan slot.

---

**Step 1**

Holding the fan module by its handle, align the back of the fan module (the side with the electrical connectors) to the open fan slot in the chassis.

**Step 2**

Slide the fan module into the fan module bay until it clicks into place.

**Step 3**

Verify that the Status LED turns on and becomes green. For more information on what the LEDs indicate, see the LEDs.

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.

---

**Caution**

The Cisco MDS 9000 Series Switches have internal temperature sensors that can shut down the system if the temperature 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.

---

**Warning**

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 an existing fan module, follow these steps:

**Step 1**  
On the fan module that you are removing, press the two sides of the fan module handle next to where it connects to the fan module and pull on the handles enough to unseat it from its connectors.

**Step 2**  
Holding the handle, pull the module out of the chassis.

**Caution**  
Do not touch the electrical connectors on the back side of the module and prevent anything else from coming into contact with and damaging the connectors.
Connecting the Cisco MDS 9148T Switch

The Cisco MDS 9148T switch provides the following types of ports:

- **Console port**—An RS-232 port that you can use for a local management connection.
- **MGMT 10/100/1000 Ethernet port**—Two Ethernet ports that you can use to access and manage the switch by IP address, such as through the CLI or Fabric Manager. One of the Ethernet ports can also be used to export analytic data.
- **Fibre Channel ports**—Fibre Channel ports that you can use to connect to the SAN, or for in-band management.
- **USB port**—USB port for USB disk that you can use for configuration file backups, and capturing logs to file.

This chapter describes how to connect the various components of the Cisco MDS 9148T switch.

- Preparing for Network Connections, on page 39
- Connecting the Console Port, on page 40
- Connecting the Management Ports, on page 42
- Connecting to a Fibre Channel Port, on page 42
- Powering Up the Switch, on page 45

Preparing for Network Connections

When preparing your site for network connections to the Cisco MDS 9148T 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 the 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.
- Perform initial switch configuration
- Perform password recovery

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 9148T switch.

Note

The PC must support VT100 terminal emulation. The terminal emulation software—frequently a PC application, such as HyperTerminal Plus—makes the communication between the Cisco MDS 9148T 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 Attach the adapter required for your PC to its communication port. It must present an RJ-45 socket towards the switch.

- For a DB-9 serial port, attach the supplied RJ-45-to-DB-9 female adapter.
- For a DB-25 serial port, attach the supplied RJ-45-to-DB-25 female adapter.
- For a USB port, attach a customer-supplied USB-to-serial dongle.
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 female RJ-45 adapter attached to the PC communication port.

---

**Connecting a Modem to a Console Port**

⚠️ **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.

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 Ports

The autosensing 10/100/1000 Mbps Ethernet management ports are located on the left side of the front panel (labeled MGMT ETH0 and MGMT ETH1), below the console port. MGMT ETH0 is the default Ethernet management port (interface mgmt0). This port is used for out-of-band management and data streaming to remote receivers.

Note

MGMT ETH1 is disabled and reserved for further use.

Use a modular, RJ-45, straight-through UTP cable to connect the management ports to an external hub or switch. To connect to a router, use a crossover cable.

Connecting to a Fibre Channel Port

The Fibre Channel ports in the Cisco MDS 9148T switch are compatible with FC 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 or the Cisco NX-OS Fundamentals Configuration Guide.

Each transceiver must match the transceiver at the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communications. SFP+ transceivers can be ordered either separately or with the Cisco MDS 9148T 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 Cables into SFP Transceivers

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 (2.5 cm) if there is no tension in the cable, or two inches (5 cm) if there is tension in the cable.
Installing a Cable into an SFP Transceiver

**Caution**
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:

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

*Figure 17: Connecting an LC-Type Cable to a Fibre Channel Port*

- **Caution**  The LC connector has keys to allow insertion only one way into the transceiver. If the cable does not install easily, ensure that 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

**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.
- 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:
Removing and Installing SFP Transceivers

Warning
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 that you disconnect the cables before installing or removing SFP transceivers to prevent damage to the cable or transceiver.

Note
Use only Cisco transceivers in the Cisco MDS 9148T switch. Each Cisco transceiver is encoded with model information that enables the switch to verify that the transceiver meets the requirements for the switch.

The Cisco MDS 9148T switch supports transceivers with the following types of latching devices:

- Mylar tab latch
- 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.

Step 2
Remove the dust plug from the FC port.

Step 3
Insert the transceiver into the port.

Caution
The transceiver can only be inserted one way into the FC port. If the transceiver does not install easily, ensure that it is correctly oriented and the tab or clasp are in the correct position before continuing.

Step 4
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 Remove attached fibre-optic cables, if any. For more information, see the Removing a Cable from an SFP Transceiver section.

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 cable-end of the transceiver and place the transceiver on an antistatic mat or into a static shielding bag.

Step 5 Protect the FC port by inserting a clean dust plug if another transceiver is not being installed.

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. Therefore, attenuation 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 while handling transceivers.
- Do not remove and reinsert 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 them before using in order to prevent dust from scratching the fiber-optic cable ends.
- Do not touch the ends of connectors. This prevents fingerprints and other contamination of the connectors.
- Inspect cables before installation for dust and damage. If damage is suspected, clean the ends and check for excessive light loss with a light meter.

Powering Up the Switch

This section provides instructions for powering up the switch and verifying component installation.

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

Note
Do not connect the MGMT ETH0 port to the LAN until the initial switch configuration has been performed through the console connection. For instructions on connecting this port, see the Connecting the Management Ports section.
To power up the switch and verify hardware operation, follow these steps:

**Step 1**  
Verify that sufficient PSUs and fan modules are installed.

**Step 2**  
Plug the power cables into the power supplies and arrange the cables so that they cannot be accidentally pulled out.

*Note* Depending on the outlet receptacle on your power distribution unit, you may need the optional jumper power cord to connect the Cisco MDS 9148T Switch to your outlet receptacle.

**Step 3**  
Connect the other end of the power cables to the site power outlets that have the required power specification.

**Step 4**  
Ensure that the switch is adequately grounded, as described in the *Grounding the Switch* section.

**Step 5**  
Connect a terminal device to the serial console port. For more information, see the *Connecting the Console Port* section.

**Step 6**  
If using Power On Automatic Provisioning (POAP), insert the USB stick with the required files into the USB port.

**Step 7**  
Turn the site power outlet switches to On. The switch boots automatically.

**Step 8**  
Listen for the fans; they should begin operating as soon as the switch is powered on.

*Note* Do not operate the switch without a functioning fan module, except briefly during the fan module replacement procedure. Cisco MDS 9000 Series Switches can operate for only a few minutes without any functioning fan modules before they begin to overheat.

**Step 9**  
Verify that the LED behavior is as follows when the switch has finished booting:

- Fan status LED is green.

- Both LEDs on each PSU are green.

- The switch status LED is green. If this LED is orange or red, it indicates that one or more environmental monitors is reporting a problem.

- The Ethernet port link LEDs should not be On unless the cable is connected.

*Note* The LEDs for the Fibre Channel ports remain orange until the ports are enabled, and the LED for the management port remains Off until the port is connected.

**Step 10**  
If a component is not operating properly, try removing and reinstalling it. If it still does not operate correctly, contact your customer service representative for a replacement.

*Note* If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support.

**Step 11**  
Verify that the system software has booted and the switch has initialized without error messages. If any problems occur, see the *Cisco MDS 9000 Series System Messages Guide*. If you cannot resolve an issue, contact your customer service representative.

**Step 12**  
If not using POAP, manually complete the initial configuration of the switch via the automatically launched setup script through the console connection.

**Step 13**  
Complete the worksheets provided in Site Planning and Maintenance Records for future reference.
A setup utility is automatically launched the first time you boot the switch and guides you through the basic configuration. For instructions about how to configure the switch and check module connectivity, see the Cisco Fabric Manager Fundamentals Configuration Guide.
CHAPTER 6

Technical Specifications

• Switch Specifications, on page 49
• Power Specifications, on page 50

Switch Specifications

The following table lists the environmental specifications for the Cisco MDS 9148T switch:

Table 2: Environmental Specifications for the Cisco MDS 9148T Switch

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, ambient operating</td>
<td>32 to 104°F (0 to 40°C)</td>
</tr>
<tr>
<td>Temperature, ambient nonoperating and storage</td>
<td>-40 to 158°F (-40 to 70°C)</td>
</tr>
<tr>
<td>Humidity (RH), ambient (noncondensing) operating</td>
<td>10 to 90%</td>
</tr>
<tr>
<td>Humidity (RH), ambient (noncondensing) nonoperating and storage</td>
<td>10 to 95%</td>
</tr>
<tr>
<td>Altitude, operating</td>
<td>-197 to 6500 ft (-60 to 2000 m)</td>
</tr>
</tbody>
</table>

The following table lists the physical specifications for the Cisco MDS 9148T switch:

Table 3: Physical Specifications for the Cisco MDS 9148T Switch

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (HxWxD)</td>
<td>1.72 x 17.3 x 22.3 in. (4.37 x 43.94 x 56.64 cm) excluding PSU and fan module handles</td>
</tr>
<tr>
<td>Rack Space</td>
<td>Chassis requires 1 RU (1.75 in. or 4.45 cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>18.73 lb (8.5 kg)</td>
</tr>
<tr>
<td>Fan Dimensions (WxH)</td>
<td>1.575 x 1.575 in. (4.0 x 4.0 cm)</td>
</tr>
<tr>
<td>Fan Slots Opening Dimensions (WxH)</td>
<td>1.614 x 1.602 in. (4.09 x 4.06 cm)</td>
</tr>
</tbody>
</table>
### Power Specifications

#### General Power Supply Specifications

The following table lists the specifications for the Cisco MDS 9148T switch AC power supply:

<table>
<thead>
<tr>
<th>AC Input Power</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC input voltage</td>
<td>100 to 240 V AC</td>
</tr>
<tr>
<td>AC input frequency</td>
<td>Nominal = 50 to 60 Hz</td>
</tr>
<tr>
<td>Power supply output capacity</td>
<td>650 W</td>
</tr>
<tr>
<td>Output holdup time</td>
<td>20 ms</td>
</tr>
</tbody>
</table>

We recommend 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 Supply Requirement Specifications

The following table provides a sample calculation of power for the Cisco MDS 9148T switch AC power supply:

Table 5: Power Dissipation for AC Power Supply

<table>
<thead>
<tr>
<th>Power Mode</th>
<th>PSU</th>
<th>Traffic Rate</th>
<th>Temperature</th>
<th>Voltage</th>
<th>Optics Speed</th>
<th>Optics Number</th>
<th>Fan Trays</th>
<th>Power at 110V/60HZ (Watts)</th>
<th>Power at 220V/50HZ (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical</td>
<td>2</td>
<td>50%</td>
<td>25°C</td>
<td>Nominal</td>
<td>32G-SW</td>
<td>24</td>
<td>4</td>
<td>257</td>
<td>251</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>48</td>
<td></td>
<td></td>
<td>305</td>
<td>297</td>
</tr>
<tr>
<td>Max</td>
<td>2</td>
<td>100%</td>
<td>25°C</td>
<td>Nominal</td>
<td>32G-SW</td>
<td>24</td>
<td>4</td>
<td>267</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32G-LW</td>
<td>48</td>
<td></td>
<td>323</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40°C</td>
<td></td>
<td>32G-SW</td>
<td></td>
<td></td>
<td>322</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>55°C</td>
<td></td>
<td>32G-LW</td>
<td></td>
<td></td>
<td>374</td>
<td>348</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nominal + 5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>403</td>
<td>385</td>
</tr>
</tbody>
</table>

Component Power Requirements and Heat Dissipation

Consider heat dissipation when sizing the air-conditioning requirements for an installation. The power and heat associated with a Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch varies based on the following considerations:

- The environment (temperature) outside the chassis
- Internal chassis temperature
- Any hardware component failure in the chassis
- Average switching traffic levels

The following table lists the power requirements and heat dissipation for the components of the Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch.

Table 6: Power Requirements and Heat Dissipation for the Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch

<table>
<thead>
<tr>
<th>Module Type/Product Number</th>
<th>Power Required (watts)</th>
<th>Heat Dissipation (BTU/hr)</th>
<th>Input Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>85VAC(amps)</td>
</tr>
<tr>
<td>Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch</td>
<td>290 maximum</td>
<td>989</td>
<td>3.41</td>
</tr>
</tbody>
</table>
Cable and Port Specifications

This appendix includes information about the cables and connectors used with the Cisco MDS 9148T 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 at 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 53
- Console Port, on page 54
- Out of Band Ethernet Management Port, on page 55
- Supported Power Cords and Plugs, on page 57

Cables and Adapters

The Cisco MDS 9148T 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**
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 9148T switch:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(^1)</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>DTR</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>RxD</td>
</tr>
<tr>
<td>7</td>
<td>DSR</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
</tbody>
</table>

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 the 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:

<table>
<thead>
<tr>
<th>Console Port</th>
<th>RJ-45-to-RJ-45 Rollover Cable</th>
<th>RJ-45-to-DB-25 Terminal Adapter</th>
<th>Console Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>RJ-45 Pin</td>
<td>RJ-45 Pin</td>
<td>DB-25 Pin</td>
</tr>
<tr>
<td>RTS</td>
<td>1</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>DTR</td>
<td>2</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>TxD</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Console Port</th>
<th>RJ-45-to-RJ-45 Rollover Cable</th>
<th>RJ-45-to-DB-25 Terminal Adapter</th>
<th>Console Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>4</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>RxD</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>DSR</td>
<td>7</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

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

Out of Band Ethernet Management Port

Use a modular, RJ-45, straight-through UTP cable to connect the 10/100/1000 management Ethernet port to external hubs and switches.
The following table lists the connector pinouts and signal names for a 10/100/1000BASE-T management port (MDI) cable:

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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BI DA+</td>
</tr>
<tr>
<td>2</td>
<td>BI DA-</td>
</tr>
<tr>
<td>3</td>
<td>BI DB+</td>
</tr>
<tr>
<td>4</td>
<td>BI DC+</td>
</tr>
<tr>
<td>5</td>
<td>BI DC-</td>
</tr>
<tr>
<td>6</td>
<td>BI DB-</td>
</tr>
<tr>
<td>7</td>
<td>BI DD+</td>
</tr>
<tr>
<td>8</td>
<td>BI DD-</td>
</tr>
</tbody>
</table>

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

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

The following table lists the connector pinouts and signal names for a 10/100 BASE-T management port (MDI) cable:
### Table 11: 10/100 BASE-T Management Port Cable Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TD+</td>
</tr>
<tr>
<td>2</td>
<td>TD-</td>
</tr>
<tr>
<td>3</td>
<td>RD+</td>
</tr>
<tr>
<td>4</td>
<td>RD-</td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
</tr>
</tbody>
</table>

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

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

```
Switch  Switch
1 RD+  1 RD+
2 RD-  2 RD-
3 TD+  3 TD+
6 TD-  6 TD-
4 NC   4 NC
5 NC   5 NC
7 NC   7 NC
8 NC   8 NC
```

## Supported Power Cords and Plugs

Each switch power supply unit requires one power cord. Cisco approved cords may be ordered with the product. Standard power cords with a country specific plug can be used with wall outlets. Jumper power cords can be used with cabinet outlets. The user may also source their own power cords for the product, as long as they meet the power cord specifications for this product.

---

**Note**

Only the standard power cords or jumper power cords ordered from Cisco are supported.
If you do not order a power cord with the system, you are responsible for selecting the appropriate power cord for the product. Using a noncompatible 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.

Standard Power Cords

Cisco standard power cords for the Cisco MDS 9148T switch have an IEC C15 connector on the outlet end of the cord and a country specific plug on the inlet end of the cord. To see the list of supported standard power cords, see the Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch Data Sheet.

The following table lists the supported power cords and power plugs for the Cisco MDS 9148T switch.

Table 12: Supported Power Cords and Power Plugs for the Cisco MDS 9148T Switch

<table>
<thead>
<tr>
<th>Locale</th>
<th>Power Cord Part Number</th>
<th>Source Plug Type</th>
<th>Length Feet</th>
<th>Length Meters</th>
<th>Power Plug Reference Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>CAB-9K10A-AR</td>
<td>IRAM 2073 plug (10 A)</td>
<td>8.2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>CAB-9K10A-AU</td>
<td>SAA/3 plug, AS 3112-1993 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>CAB-9K10A-CH</td>
<td>GB1002 (10A)</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>CAB-9K10A-EU</td>
<td>VIIG Plug, CEE (7) VII (16 A)</td>
<td>8.2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Israel</td>
<td>CAB-9K10A-ISR</td>
<td>SI 32 Part 1.01 (16A)</td>
<td>4.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>CAB-9K10A-IT</td>
<td>1/3G plug, CEI 23-16 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>CAB-9K10A-KOR</td>
<td>CEE 7 Standard Sheet VII (16A)</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Jumper Power Cord

Jumper power cords have an IEC C15 connector on the outlet end of the cord and an IEC C14 connector on the inlet end of the cord. This cord is compatible with IEC C13 outlet receptacles. This type of outlet receptacle is commonly used for power distribution inside cabinets.

To see the list of supported jumper power cords, see the Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch Data Sheet.

The following table lists the supported power cords and power plugs for the Cisco MDS 9148T switch.

<table>
<thead>
<tr>
<th>Locale</th>
<th>Power Cord Part Number</th>
<th>Source Plug Type</th>
<th>Length</th>
<th>Power Plug Reference Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Feet</td>
<td>Meters</td>
</tr>
<tr>
<td>South Africa</td>
<td>CAB-9K10A-SA</td>
<td>EL 208, SABS 164-1 (10 A)</td>
<td>5.12</td>
<td>1.82</td>
</tr>
<tr>
<td>Switzerland</td>
<td>CAB-9K10A-SW</td>
<td>12G SEV 1011 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Taiwan</td>
<td>CAB-9K10A-TWN</td>
<td>CNS 10917-2 &amp; CNS 690 (15A)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td>CAB-9K10A-UK</td>
<td>BS89/13, BS 1363/A (13 A; replaceable fuse)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>North America</td>
<td>CAB-9K12A-NA</td>
<td>NEMA 5-15P plug (15 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>CAB-250V-10A-BR</td>
<td>NBR 14136(10A)</td>
<td>7</td>
<td>2.133</td>
</tr>
</tbody>
</table>

---

**Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Switch Hardware Installation Guide**
Table 13: Supported Jumper Power Cords for the Cisco MDS 9148T Switch

<table>
<thead>
<tr>
<th>Locale</th>
<th>Power Cord Part Number</th>
<th>Source Plug Type</th>
<th>Length</th>
<th>Power Plug Reference Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Feet</td>
<td>Meters</td>
</tr>
<tr>
<td>Argentina</td>
<td>CAB-9K10A-AR</td>
<td>IRAM 2073 plug (10 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Australia</td>
<td>CAB-9K10A-AU</td>
<td>SAA/3 plug, AS 3112-1993 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>China</td>
<td>CAB-9K10A-CH</td>
<td>GB1002 (10A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Europe</td>
<td>CAB-9K10A-EU</td>
<td>VIIG Plug, CEE (7) VII (16 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Israel</td>
<td>CAB-9K10A-ISR</td>
<td>SI 32 Part 1.01 (16A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Italy</td>
<td>CAB-9K10A-IT</td>
<td>1/3G plug, CEI 23-16 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Korea</td>
<td>CAB-9K10A-KOR</td>
<td>CEE 7 Standard Sheet VII (16A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>South Africa</td>
<td>CAB-9K10A-SA</td>
<td>EL 208, SABS 164-1 (10 A)</td>
<td>5.12</td>
<td>1.82</td>
</tr>
<tr>
<td>Switzerland</td>
<td>CAB-9K10A-SW</td>
<td>12G SEV 1011 (10 A)</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Taiwan</td>
<td>CAB-9K10A-TWN</td>
<td>CNS 10917-2 &amp; CNS 690 (15A)</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
Fibre Cable Specifications

For information on the fibre cable specifications, see the Cisco MDS 9000 Family Pluggable Transceivers Data Sheet.
Site Planning and Maintenance Records

This section includes a site planning checklist and maintenance records to use when installing the Cisco MDS 9148T Multilayer Fabric Switch.

For information about how to query the switch for configuration information, see the Cisco NX-OS Fundamentals Configuration Guide.

- Site Preparation Checklist, on page 63
- Contact and Site Information, on page 65
- Chassis and Network Information, on page 65

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 we recommend that you complete before installing the Cisco MDS 9148T Switch.

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

Table 14: Site Planning Checklist

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Planning Activity</th>
<th>Verified By</th>
<th>Time</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Space evaluation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Space and layout</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Floor covering</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Impact and vibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Maintenance access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task No.</td>
<td>Planning Activity</td>
<td>Verified By</td>
<td>Time</td>
<td>Date</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
</tr>
</tbody>
</table>
| 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) |             |      |      |
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 15: Contact and Site Information*

<table>
<thead>
<tr>
<th>Contact person</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact phone</td>
<td></td>
</tr>
<tr>
<td>Contact E-Mail</td>
<td></td>
</tr>
<tr>
<td>Building/site name</td>
<td></td>
</tr>
<tr>
<td>Data center location</td>
<td></td>
</tr>
<tr>
<td>Floor location</td>
<td></td>
</tr>
<tr>
<td>Address (line 1)</td>
<td></td>
</tr>
<tr>
<td>Address (line 2)</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Zip code</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
</tbody>
</table>

### Chassis and Network Information

Use the following worksheet to record chassis and network information:
### Site Planning and Maintenance Records

<table>
<thead>
<tr>
<th>Contract Number :</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis Serial Number:</td>
</tr>
<tr>
<td>Product Number:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch IP address</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch IP netmask</td>
<td></td>
</tr>
<tr>
<td>Host name</td>
<td></td>
</tr>
<tr>
<td>Domain name</td>
<td></td>
</tr>
<tr>
<td>IP broadcast address</td>
<td></td>
</tr>
<tr>
<td>Gateway/router address</td>
<td></td>
</tr>
<tr>
<td>DNS address</td>
<td></td>
</tr>
<tr>
<td>Modem telephone number</td>
<td></td>
</tr>
</tbody>
</table>