Cisco ME 3400 Ethernet Access Switch Hardware Installation Guide

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Preface

Audience

This guide is for the networking or computer technician responsible for installing the Cisco Metro Ethernet (ME) 3400 Series Ethernet Access switch, also known as *the switch.* We assume that you are familiar with the concepts and terminology of Ethernet and local area networking. If you are interested in more training and education in these areas, learning opportunities including training courses, self-study options, seminars, and career certifications programs are available on the Cisco Training & Events web page:

http://www.cisco.com/web/learning/index.html

Purpose

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

This guide does not describe system messages that you might receive or how to configure your switch. For more information, see the switch software configuration guide, the switch command reference, and the switch system message guide on the Cisco.com Product Documentation home page at:

http://www.cisco.com/en/US/products/ps6580/tsd_products_support_series_home.html

Organization

This guide is organized into these chapters:

Chapter 1, “Product Overview,” is a physical and functional overview of the Cisco ME switch. It describes the switch ports, the standards that they support, and the switch LEDs.

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

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

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

Appendix B, "Technical Specifications," lists the physical and environmental specifications for the switches and the regulatory agency approvals.

Appendix C, "Connecting to DC Power"describes how to connect the Cisco ME switch to a direct current (DC)-input power source.

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

Conventions

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

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

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

Warning

IMPORTANT SAFETY INSTRUCTIONS

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

SAVE THESE INSTRUCTIONS

The safety warnings for this product are translated into several languages in the *Regulatory Compliance and Safety Information for the Cisco ME 3400 and ME 2400 Ethernet Access Switches* that ships with the product. The EMC regulatory statements are also included in that guide.

Related Publications

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

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

http://www.cisco.com/en/US/products/ps6580/tsd_products_support_series_home.html

- *Release Notes for the Cisco ME 3400 Ethernet Access Switch* (not orderable but available on Cisco.com)

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

- *Cisco ME 3400 Ethernet Access Switch Software Configuration Guide* (not orderable but available on Cisco.com)
- *Cisco ME 3400 Ethernet Access Switch Command Reference* (not orderable but available on Cisco.com)
- *Cisco ME 3400 and ME 2400 Ethernet Access Switches System Message Guide* (not orderable but available on Cisco.com)
- *Cisco ME 3400 Ethernet Access Switch Hardware Installation Guide* (not orderable but available on Cisco.com)
- *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide (*order number DOC-7817050=)
- *Regulatory Compliance and Safety Information for the Cisco ME 3400 and ME 2400 Ethernet Access Switches* (order number DOC-7817051)
- *Cisco Small Form-Factor Pluggable Modules Installation Notes* (order number DOC-7815160=)
- *Cisco CWDM GBIC and CWDM SFP Installation Notes* (not orderable but available on Cisco.com)

These compatibility matrix documents are available from this Cisco.com site:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

- *Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco CWDM SFP Transceiver Compatibility Matrix* (not orderable but available on Cisco.com)
- *Cisco Small Form-Factor Pluggable Modules Compatibility Matrix* (not orderable but available on Cisco.com)
- *Compatibility Matrix for 1000BASE-T Small Form-Factor Pluggable Modules* (not orderable but available on Cisco.com)

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New* in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at this URL:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

CHAPTER 1

Product Overview

The Cisco Metro Ethernet (ME) 3400 Ethernet Access switch—referred to as *the switch*—is an Ethernet access switch to which you can connect other network devices, such as routers, other switches, a home access gateway (HAG), or a computer. This chapter provides a functional overview of the Cisco ME switch. These topics are included:

- Setting up the Switch, page 1-1
- Switch Models, page 1-1
- Front Panel Description, page 1-2
- Rear Panel Description, page 1-12
- Power Supply Features, page 1-13
- Management Options, page 1-14

Setting up the Switch

See the *Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches Getting Started Guide* that shipped with the switch for instructions on how to initially configure your switch. The getting started guide also covers switch management options, basic rack-mounting procedures, port and module connections, power connection procedures, and troubleshooting help.

For instructions on setting up your switch using the command-line interface (CLI), see Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Switch Models

The Cisco ME switch can be deployed as a backbone switch, aggregating 10BASE-T, 100BASE-TX, 1000-BASE-T, and fiber-optic Ethernet traffic from other network devices.

Depending on your model, the switches support either AC or DC power. See the switch software configuration guide for examples that show how you might deploy the switch in your network.

Table 1-1 describes the switch models.

Table 1-1 Cisco ME 3400 Switch Models

Switch Model	Part Number	Description
Cisco ME 3400-24TS-AC	ME-3400-24TS-A	24 10/100 FastEthernet ports and 2 small form-factor pluggable (SFP) module ports, AC power
Cisco ME 3400-24TS-DC	ME-3400-24TS-D	24 10/100 FastEthernet ports and 2 SFP module ports, DC power
Cisco ME-3400-24FS-A	ME-3400-24FS-A	24 100BASE-FX SFP module ports and 2 Gigabit Ethernet SFP module ports, AC power
Cisco ME 3400G-12CS-AC	ME-3400G-12CS-A	12 dual-purpose ports and 4 SFP module ports, AC power
Cisco ME 3400G-12CS-DC	ME-3400G-12CS-D	12 dual-purpose ports and 4 SFP module ports, DC power
Cisco ME 3400G-2CS	ME 3400G-2CS	2 dual-purpose ports and 2 SFP module ports, AC power

Front Panel Description

The switch front panel includes the 10/100 ports or dual-purpose ports (that you can configure as either 10/100/1000 Ethernet ports that use RJ-45 connectors or for SFP modules), dedicated SFP module ports, switch LEDs, power connectors, and the console port.

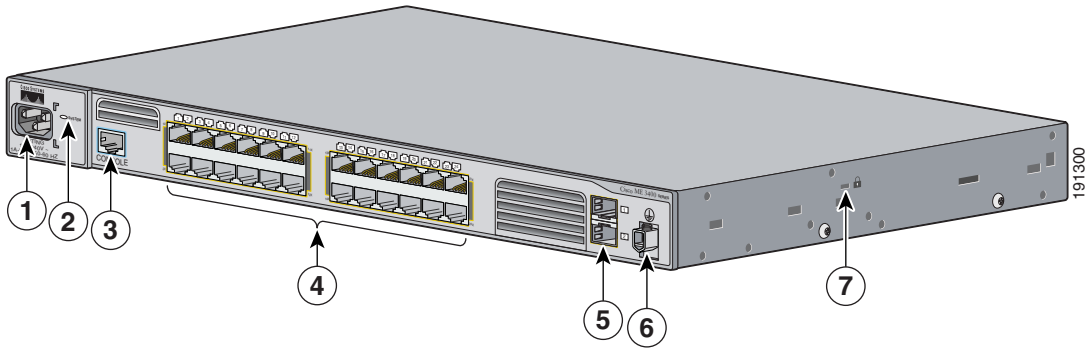
The front panels are described in these sections:

- Cisco ME 3400-24TS AC and DC Switches Front Panel, page 1-3
- Cisco ME 3400-24FS Switch AC Switch Front Panel, page 1-4
- Cisco ME 3400G-12CS AC and DC Switches Front Panel, page 1-4
- Cisco ME 3400G-2CS Switch Front Panel, page 1-5
- 10/100 Ports (Only the Cisco ME-3400-24TS Switches), page 1-6
- Dual-Purpose Ports (Only the Cisco ME 3400G-12CS and Cisco ME 3400G-2CS Switches), page 1-6
- SFP Module Ports, page 1-7
- LEDs, page 1-8
- Console Port, page 1-11

Cisco ME 3400-24TS AC and DC Switches Front Panel

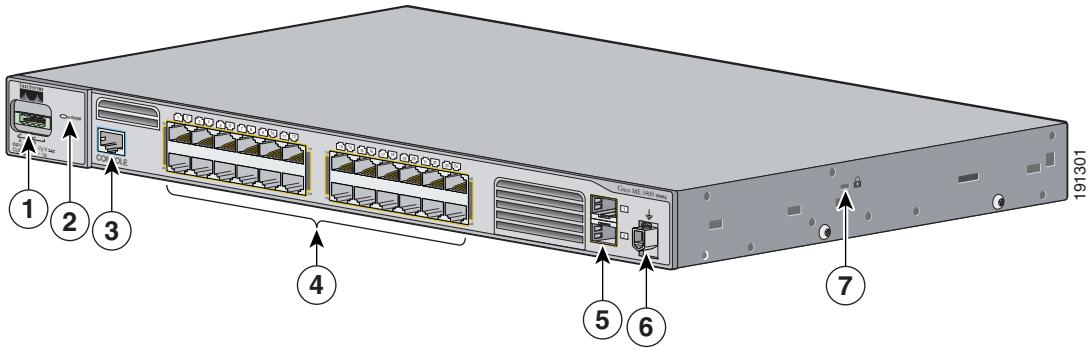
Figure 1-1 shows the Cisco ME 3400G-24TS AC switch front panel. Figure 1-2 shows the Cisco ME 3400G-24TS DC switch front panel. The 10/100 Fast Ethernet ports are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left. Port 3 is above port 4, and so on. The Gigabit Ethernet uplink SFP module ports are numbered 1 and 2.

Figure 1-1 Cisco ME 3400-24TS AC Ethernet Access Switch Front Panel



1	AC power connector	**4**	10/100 Fast Ethernet ports	**7**	Cable lock
2	System LED	**5**	Gigabit Ethernet SFP module ports		
3	Console port	**6**	Ground connector		

Figure 1-2 Cisco ME 3400-24TS DC Ethernet Access Switch Front Panel

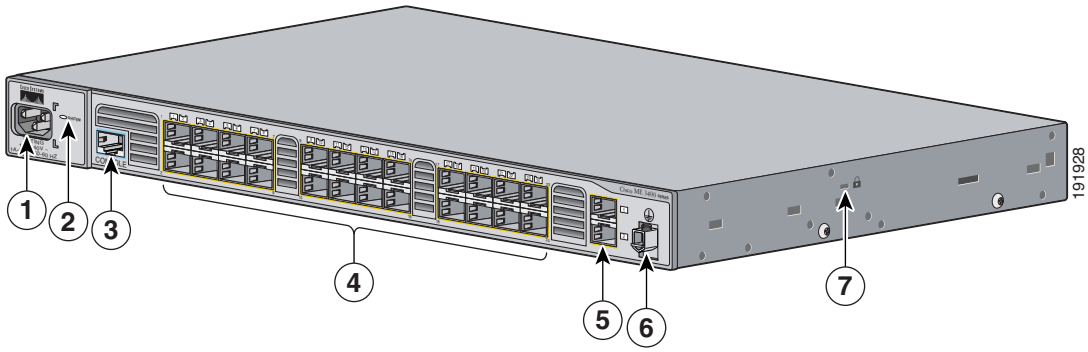


1	DC power connector	**4**	10/100 Fast Ethernet ports	**7**	Cable lock
2	System LED	**5**	Gigabit Ethernet SFP module ports		
3	Console port	**6**	Ground connector		

Cisco ME 3400-24FS Switch AC Switch Front Panel

The Cisco ME 3400-24FS AC switch has 24 100BASE-FX SFP module ports and 2 Gigabit Ethernet SFP module ports, as shown in Figure 1-3. The first member of the pair (port 1) is above the second member (port 2) on the left. Port 3 is above port 4, and so on. The Gigabit Ethernet uplink SFP module ports are numbered 1 above and 2 below.

Figure 1-3 Cisco ME 3400-24FS AC Ethernet Access Switch Front Panel

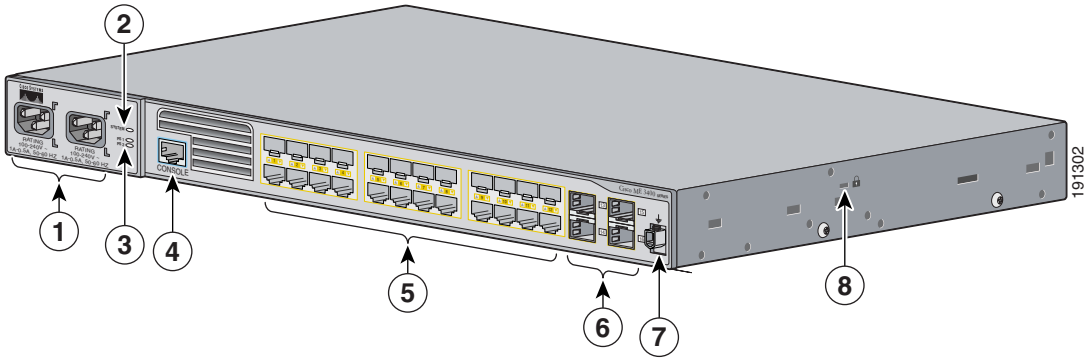


1	AC power connector	**4**	100BASE-FX SFP module ports	**7**	Cable lock
2	System LED	**5**	Gigabit Ethernet SFP module ports		
3	Console port	**6**	Ground connector		

Cisco ME 3400G-12CS AC and DC Switches Front Panel

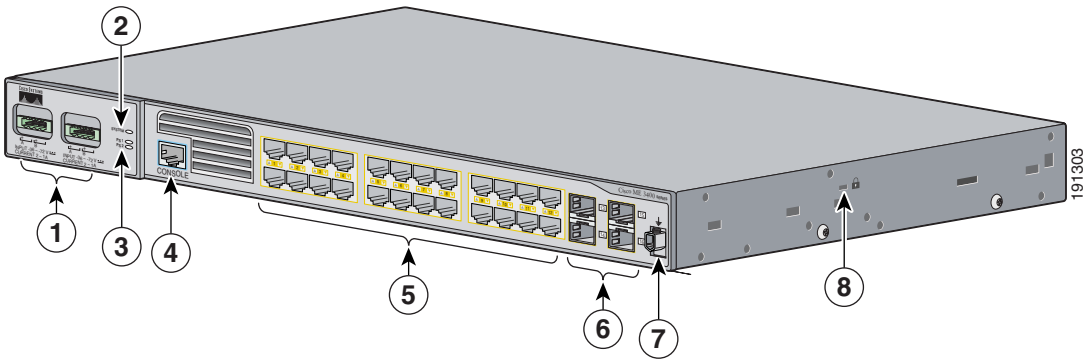
The Cisco ME 3400G-12CS AC and DC switches have dual-purpose ports, numbered 1 through 12, as shown in Figure 1-4 (Cisco ME 3400G-12CS-AC switch) and Figure 1-5 (Cisco ME 3400G-12CS-DC switch). You can configure the dual-purpose ports as either 10/100/1000 ports that use RJ-45 connectors or configure them for SFP modules. The Gigabit Ethernet uplink SFP module ports are numbered 13 through 16.

Figure 1-4 Cisco ME 3400G-12CS-AC Ethernet Access Switch Front Panel



1	AC power connectors	**4**	Console port	**7**	Ground connectors
2	System LED	**5**	Dual-purpose ports	**8**	Cable lock
3	Power supply 1 and 2 LEDs	**6**	SFP module ports		

Figure 1-5 Cisco ME 3400G-12CS-DC Ethernet Access Switch Front Panel

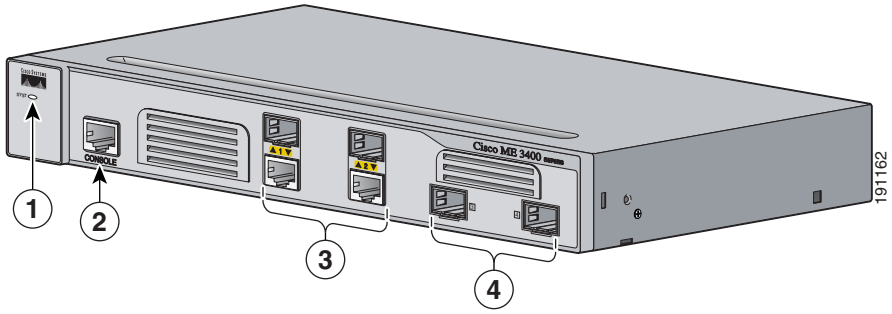


1	DC power connectors	**4**	Console port	**7**	Ground connectors
2	System LED	**5**	Dual-purpose ports	**8**	Cable lock
3	Power supply 1 and 2 LEDs	**6**	SFP module ports		

Cisco ME 3400G-2CS Switch Front Panel

The Cisco ME 3400G-2CS switch has two dual-purpose ports, numbered 1 and 2, as shown in Figure 1-6. You can configure the dual-purpose ports as either 10/100/1000 ports that use RJ-45 connectors or configure them for SFP modules. The Gigabit Ethernet uplink SFP module ports are numbered 3 and 4.

Figure 1-6 Cisco ME 3400G-2CS Ethernet Access Switch



1	System LED	**3**	Dual-purpose ports
2	Console port	**4**	SFP module ports

10/100 Ports (Only the Cisco ME-3400-24TS Switches)

You can set the 10/100 ports on the Cisco ME 3400-24TS switches to operate in any combination of half duplex, full duplex, or 10 or 100 Mb/s. You can set the ports for speed and duplex autonegotiation, in compliance with IEEE 802.3ab. The default setting is autonegotiate.

When set for autonegotiation, the port senses the speed and duplex settings of the attached device and advertises its own capabilities. If the connected device also supports autonegotiation, the switch port negotiates the best connection (the fastest line speed that both devices support and full-duplex transmission if the attached device supports it) and configures itself accordingly. In all cases, the attached device must be within 328 feet (100 meters).

User-network interfaces (UNIs) and network node interfaces (NNIs) are supported on the Cisco ME switches. UNIs are typically connected to a host, such as a PC or a Cisco IP phone. NNIs are typically connected to a router or to another switch. By default, the 10/100 ports on the Cisco ME switch are configured as UNIs.

A port can be reconfigured from UNI to NNI and the reverse. When a port is reconfigured as another interface type, it inherits all the characteristics of that interface type. All ports on the Cisco ME switch are either UNI or NNI at any time.

For information on configuring interfaces, see the software configuration guide.

Dual-Purpose Ports (Only the Cisco ME 3400G-12CS and Cisco ME 3400G-2CS Switches)

You can configure the dual-purpose ports on the Cisco ME 3400G-12CS switches and the Cisco ME 3400G-2CS switches as either 10/100/1000 ports or as SFP module ports.

You can set the 10/100/1000 ports to autonegotiate. You can also configure them as fixed 10, 100, or 1000 Mb/s (Gigabit) Ethernet ports.

The switch dynamically selects the media type for each dual port (10/100/1000BASE-T or SFP). When a link is achieved on one media type, the switch disables the other media type until the active link goes down. If links are active on both media, the SFP module port has priority. You cannot configure this priority.

UNIs and NNIs are supported on the dual-purpose ports. UNIs are typically connected to a host, such as a PC or a Cisco IP phone. NNIs are typically connected to a router or to another switch. By default, the dual-purpose ports are UNIs. A port can be reconfigured from UNI to NNI and the reverse. When a port is reconfigured as another interface type, it inherits all the characteristics of that interface type. All ports on the Cisco ME switch are either UNI or NNI at any time.

You can configure the speed and duplex settings consistent with the selected media type.

For information on configuring interfaces, see the software configuration guide.

SFP Module Ports

The Cisco ME switch supports Gigabit Ethernet and 100 megabit Ethernet, field-replaceable SFP transceiver modules to establish fiber-optic and copper connections to other network devices. The SFP modules that use fiber-optic connections need fiber-optic cables with LC connectors. The SFP modules that use copper connections need Category 5 or higher cables with RJ-45 connectors.

The Cisco ME switch uses Gigabit Ethernet SFP modules to establish fiber-optic and 1000BASE-T connections. These transceiver modules are field-replaceable, providing the interfaces when inserted in an SFP module slot. You can use the SFP modules for Gigabit connections to other switches.

The 10/100 Fast Ethernet ports and the dual-purpose ports on Cisco ME 3400-12CS and Cisco ME 3400-2CS switches are configured as UNIs. The SFP module uplink ports are configured as NNIs. If the switch is running the metro base or metro access image, you can configure only four ports on the switch as NNIs at one time, but you can configure all ports on the switch as UNIs. Starting with Cisco IOS Release 12.2(25)SEG, if the switch is running the metro IP access image, you can configure an unlimited number of NNIs.

Note The Cisco ME-3400-24FS switch downlink ports support only the 100BASE-BX, 100BASE-FX, and 100BASE-LX SFP modules.

For more information on configuring interfaces, see the software configuration guide. For more information about cabling specifications for SFP modules, see the "SFP Module Cable Specifications" section on page A-4.

SFP Modules

The Cisco ME switch supports these Cisco SFP modules:

- 100BASE-BX
- 100BASE-FX
- 100BASE-LX
- 1000BASE-BX
- 1000BASE-LX/LH
- 1000BASE-SX
- 1000BASE-T
- 1000BASE-ZX
- CWDM
- DWDM

When installed in Cisco ME switches, 1000BASE-T SFP modules can operate at 10, 100, or 1000 Mb/s in full-duplex mode or at 10 or 100 Mb/s in half-duplex mode. For more information about these SFP modules, see your SFP module documentation.

You can use any combination of SFP modules that your switch supports. The only restrictions are that each port must match the wavelength specifications on the other end of the cable and that the cable must not exceed the stipulated cable length for reliable communications listed in the "SFP Module Cable Specifications" section on page A-4.

Use only Cisco SFP modules on your switch. Each SFP module has an internal serial electrically erasable programmable read-only memory (EEPROM) that is encoded with security information. This encoding provides a way for Cisco to identify the module and to ensure that it meets the performance, quality, and interoperability requirements for the device.

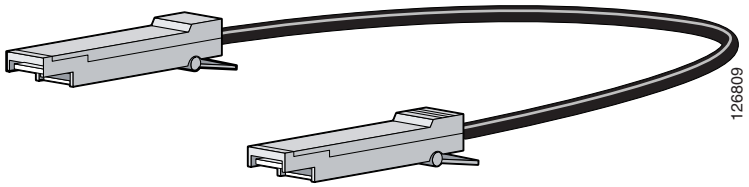
For information about Cisco SFP modules, see the documentation at this URL:

http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html

SFP Module Patch Cable

The Cisco ME switch supports the SFP module patch cable, a 0.5-meter, copper, passive cable with SFP module connectors at each end (see Figure 1-7). The patch cable connects two Cisco ME switches in a cascaded configuration.

Figure 1-7 SFP Module Patch Cable



See the "Inserting and Removing the SFP Module Patch Cable" section on page 2-19 for more information about using the SFP module patch cable.

On the Cisco ME-3400-24FS-A switch, only the Gigabit Ethernet uplink ports support the SFP module patch cable.

You can order the SFP module patch cable (part number CAB-SFP-50CM=).

LEDs

You can use the switch System and port LEDs to monitor switch activity and performance. The LEDs are described in these sections:

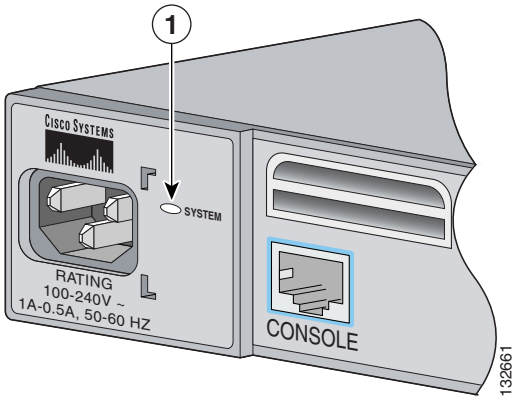
- System LED, page 1-8
- Power Supply LEDs (Only Cisco ME 3400G-12CS Switches), page 1-10
- Port LEDs, page 1-10
- Dual-Purpose Port LEDs, page 1-11

System LED

These illustrations show the location of the System LED:

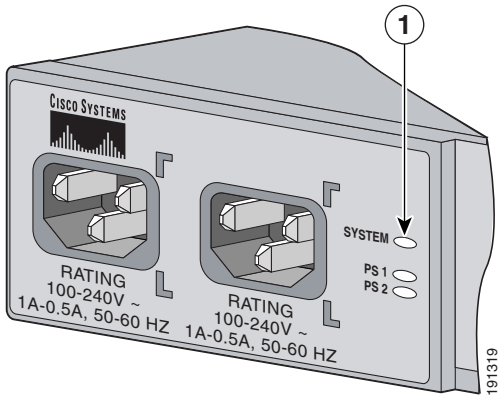
- Figure 1-8 on page 1-9, Cisco ME 3400-24TS and Cisco ME 3400-24FS Switches
- Figure 1-9 on page 1-9, Cisco ME 3400-12CS Switch
- Figure 1-10 on page 1-9, Cisco ME 3400G-2CS Switch

Figure 1-8 Cisco ME 3400-24TS and Cisco ME 3400-24FS Switches System LED



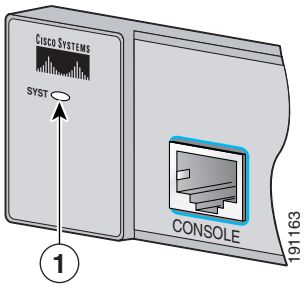
1	System LED

Figure 1-9 Cisco ME 3400G-12CS Switch System LED



1	System LED

Figure 1-10 Cisco ME 3400G-2CS Switch System LED



1	System LED

The System LED shows whether the system is receiving power and is functioning properly. Table 1-2 lists the LED colors and their meanings.

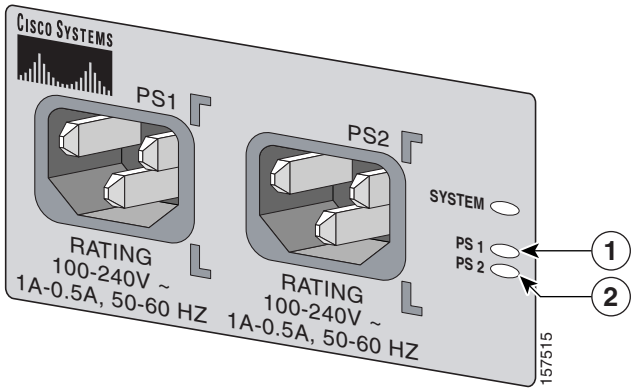
Table 1-2 System LED

Color	System Status
Off	System is not powered on.
Blinking green	POST is in progress.
Green	System is operating normally.
Amber	System is receiving power but is not functioning properly.

Power Supply LEDs (Only Cisco ME 3400G-12CS Switches)

The Cisco ME 3400G-12CS switches have power supply LEDs labeled PS1 and PS2, as shown in Figure 1-11. The lit LED shows which power supply is on. Figure 1-11 shows the PS LEDs for an AC switch. The PS LEDs for a DC switch are in the same position on the front panel.

Figure 1-11 Cisco ME 3400G-12CS Switch PS LEDs



1	PS1 LED	**2**	PS2 LED

Port LEDs

Each RJ-45 port and SFP module slot has a port LED. These port LEDs, as a group or individually, display information about the switch and about the individual ports. Table 1-3 explains how to interpret the port LED colors.

Table 1-3 Meaning of Port LED Colors

LED Color	Meaning
Off	No link, or port was administratively shut down.
Green	Link present but not sending or receiving data.
Blinking green	Activity. Port is sending or receiving data.

Table 1-3 Meaning of Port LED Colors (continued)

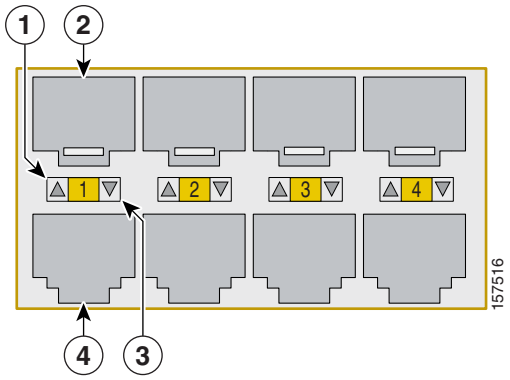
LED Color	Meaning
Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
Amber	Port is disabled.

Dual-Purpose Port LEDs

The LEDs on the Cisco ME 3400G-12CS switch dual-purpose ports, as shown in Figure 1-12, show which is connected: either an RJ-45 connector or an SFP module. The Cisco ME3400G-2CS switch dual-purpose ports are similar to those shown in this section.

You can configure each dual-purpose port as either 10/100/1000 ports that use RJ-45 connectors or as SFP module ports, but not both types at the same time. The LEDs show how the port is being used—either as an RJ-45 Ethernet port or as an SFP module.

Figure 1-12 Cisco ME 3400G-12CS Switch Dual-Purpose Port LEDs



1	SFP module port in-use LED	**3**	RJ-45 port in-use LED
2	SFP module slot	**4**	RJ-45 connector

The LED colors have the same meanings as described in Table 1-3 on page 1-10.

Console Port

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

Rear Panel Description

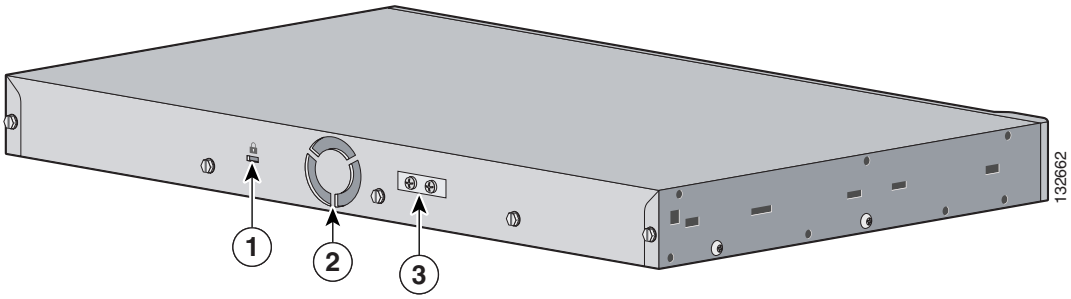
The Cisco ME switches rear panels are described in these sections:

- Cisco ME 3400-24TS Switch Rear Panel, page 1-12
- Cisco ME 3400-24FS Switch Rear Panel, page 1-12
- Cisco ME 3400G-12S Switch Rear Panel, page 1-13
- Cisco ME 3400-2CS Switch Rear Panel, page 1-13

Cisco ME 3400-24TS Switch Rear Panel

The rear panel on the Cisco ME 3400-24TS switch has a cable lock, an exhaust fan, and a ground connector. (See Figure 1-13.)

Figure 1-13 Cisco ME 3400-24TS Switch Rear Panel

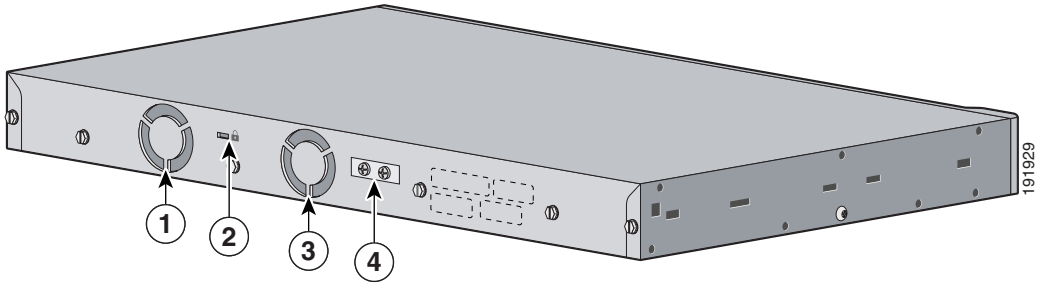


1	Cable lock	**3**	Ground connector
2	Fan exhaust		

Cisco ME 3400-24FS Switch Rear Panel

The rear panel on the Cisco ME 3400-24FS switch has a cable lock, two exhaust fans, and a ground connector. (See Figure 1-14.)

Figure 1-14 Cisco ME 3400-24FS Switch Rear Panel

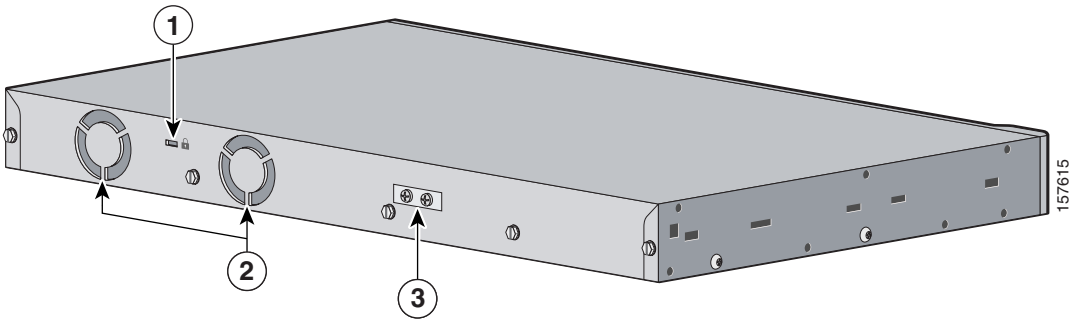


1	Exhaust fan 1	**3**	Exhaust fan 2
2	Cable lock	**4**	Ground connector

Cisco ME 3400G-12S Switch Rear Panel

The rear panel on the Cisco ME 3400G-12CS switch has a cable lock, two exhaust fans, and a ground connector. (See Figure 1-15.) The switch can operate with only one fan. You should replace a switch that has a failed fan as soon as possible.

Figure 1-15 Cisco ME 3400G-12CS Switch Rear Panel

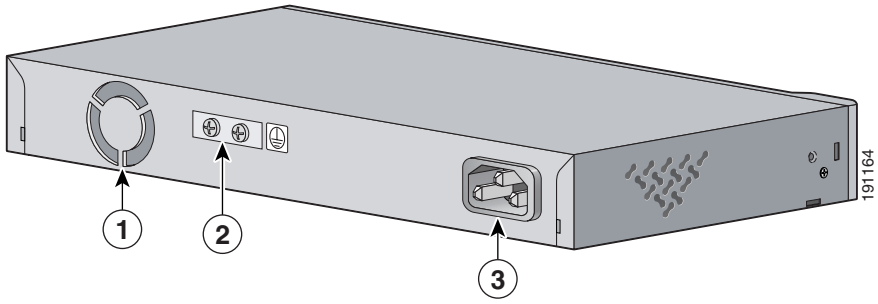


1	Cable lock	**3**	Ground connector
2	Fan exhaust		

Cisco ME 3400-2CS Switch Rear Panel

The rear panel on the Cisco ME 3400G-2CS switch has a fan exhaust, a ground connector, and an AC power connector. Figure 1-16 shows the Cisco ME 3400G-2CS switch rear panel.

Figure 1-16 Cisco ME 3400-2CS Switch Rear Panel



1	Fan exhaust	**3**	AC power connector
2	Ground connector		

Power Supply Features

These sections describe the power supply features for the Cisco ME AC and DC switches.

For redundancy, the Cisco ME 3400G-12CS switch has two power supplies. The switch runs with one power supply, but you should replace a switch that has a failed power supply as soon as possible.

Cisco ME AC Switch Power Supply

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

Cisco ME DC Switch Power Supply

The Cisco ME DC switch internal power supplies support input voltages between –36 to –72 VDC. For more information, see Appendix B, "Technical Specifications."

See Appendix C, "Connecting to DC Power," for instructions on connecting the Cisco ME DC switches.

To order spare or replacement DC connectors, use one of these sources:

- Digi-Key, part number 277-1013-ND, www.digikey.com
- Phoenix Contact, part number 1757035, www.phoenixcontact.com

Management Options

These management options are available for the Cisco ME switch:

- Cisco IOS CLI

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

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

- CiscoView application

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

- SNMP network management

  You can manage switches from a SNMP-compatible management station that is running platforms such as HP OpenView or SunNet Manager. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for more information.

Network Configurations

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

CHAPTER 2

Switch Installation

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

- Preparing for Installation, page 2-1
- Verifying Switch Operation, page 2-5
- Installing the Switch, page 2-5
- Installing and Removing SFP Modules, page 2-16
- Inserting and Removing the SFP Module Patch Cable, page 2-19
- Connecting to the 10/100 and 10/100/1000 Ports, page 2-20
- Connecting to SFP Modules, page 2-21
- Where to Go Next, page 2-24

Preparing for Installation

This section covers these topics:

- Warnings, page 2-1
- Installation Guidelines, page 2-4

Warnings

These warnings are translated into several languages in the *Regulatory Compliance and Safety Information for the Cisco ME 3400 and Cisco ME 2400 Ethernet Access Switches* document that ships with the switch.

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

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

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

Note Warning Statement 345 applies only when you wall-mount the switch:

Warning **Suitable for mounting on and over a concrete or other non-combustible surface only.** Statement 345

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

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

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

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

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

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

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 **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Note Warning statement 1030 applies to all switches except the Cisco ME 3400G-2CS switch:

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

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

Warning **For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection.**
10/100/1000 Ethernet Statement 1044

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

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

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:**
122°F (50°C) Statement 1047

Warning **No user-serviceable parts inside. Do not open.** Statement 1073

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Caution To comply with the Telcordia GR-1089 Network Equipment Building Systems (NEBS) standard for electromagnetic compatibility and safety, connect the Ethernet cables only to intrabuilding or nonexposed wiring or cabling.

Note The grounding architecture of this product is DC-isolated (DC-I).

You can use the grounding lug to attach a wrist strap for ESD protection during servicing.

Cisco ME 3400-24TS Switches

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
5 A Statement 1005

Cisco ME 3400G-12CS Switches

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
6 A Statement 1005

Installation Guidelines

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

- For Ethernet ports, including the 10/100, the 10/100/1000 dual-purpose, and 1000BASE-T small form-factor pluggable (SFP) module ports, cable lengths from the switch to connected devices can be up to 328 feet (100 meters).
- The cables meet the specifications in the "Cable and Adapter Specifications" section on page A-4. Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the required cable length.
- Operating environment is within the ranges listed in Appendix B, "Technical Specifications."
- Clearance to front and rear panels is such that
  - Front-panel indicators can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - Rear-panel power connector is within reach of an AC power receptacle.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.
- Airflow around the switch and through the vents is unrestricted.

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

- Before you connect the switch to a power source, note these power consumption specifications:
  - Cisco ME 3400G-12CS-AC switch:
    65 W (typical), 80 W (maximum), 222 BTUs per hour (typical), 273 BTUs per hour (maximum)
  - Cisco ME 3400G-12CS-DC switch:
    55 W (typical), 70 W (maximum), 188 BTUs per hour (typical), 239 BTUs per hour (maximum)
  - Cisco ME 3400G-2CS switch:
    15 W (typical), 20 W (maximum), 51 BTUs per hour (typical), 68 BTUs per hour (maximum)
  - Cisco ME 3400-24TS-AC and DC switches:
    25 W (typical), 30 W (maximum), 86 BTUs per hour (typical), 102 BTUs per hour (maximum)
  - Cisco ME 3400-24FS-AC switch:
    50 W (typical), 65 W (maximum), 171 BTUs per hour (typical), 222 BTUs per hour (maximum)

Verifying Switch Operation

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

- To power on the AC switch, connect one end of the AC power cord to the AC power connector on the switch, and connect the other end of the power cord to an AC power outlet.
- To power on a DC switch, see Appendix C, “Connecting to DC Power.”

When the switch powers on, it automatically begins the POST, a series of tests that verifies that the switch functions properly. When the switch begins POST, the system LED slowly blinks green. When POST completes, the system LED blinks amber. If POST fails, the system LED remains amber. If POST completes successfully, the system LED rapidly blinks green.

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

Powering Off the Switch

After a successful POST, disconnect the power cord from the switch. Install the switch in a rack, on a wall, on a table, or on a shelf as described in the “Installing the Switch” section on page 2-5.

Installing the Switch

This section describes these installation procedures:

- Rack-Mounting, page 2-6
- Wall-Mounting, page 2-14
- Table- or Shelf-Mounting, page 2-16

Rack-Mounting

To install the switch in a 19-inch, 23-inch, 24-inch rack, or a European Telecommunications Standards Institute (ETSI) rack (24-inch racks and ETSI racks require optional mounting hardware), follow the instructions described in these procedures.

- Removing Screws from the Switch, page 2-6
- Attaching Brackets to the Switch, page 2-7
- Mounting the Switch in a Rack, page 2-13

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

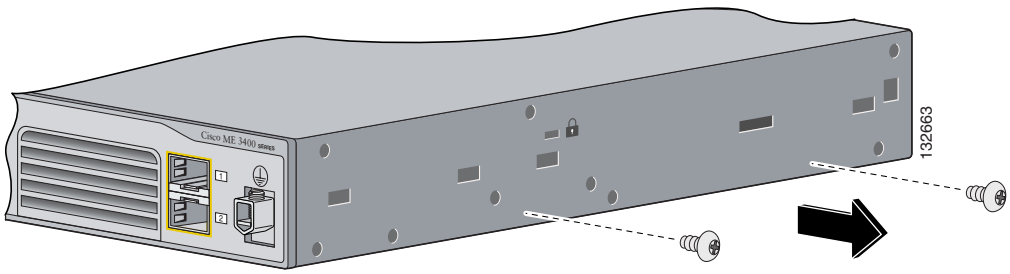
- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices,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

Note Installing the switch in a 24-inch rack requires an optional bracket kit that is not included with the switch. You can order a kit containing the 24-inch rack-mounting brackets and hardware from Cisco. The kit part number is RCKMNT-1RU= (700-12398-XX).

Removing Screws from the Switch

If you plan to install the switch in a rack, you must first remove the screws in the switch chassis so that you can attach the mounting brackets. Figure 2-1 shows how to remove the chassis screws in a Cisco ME switch.

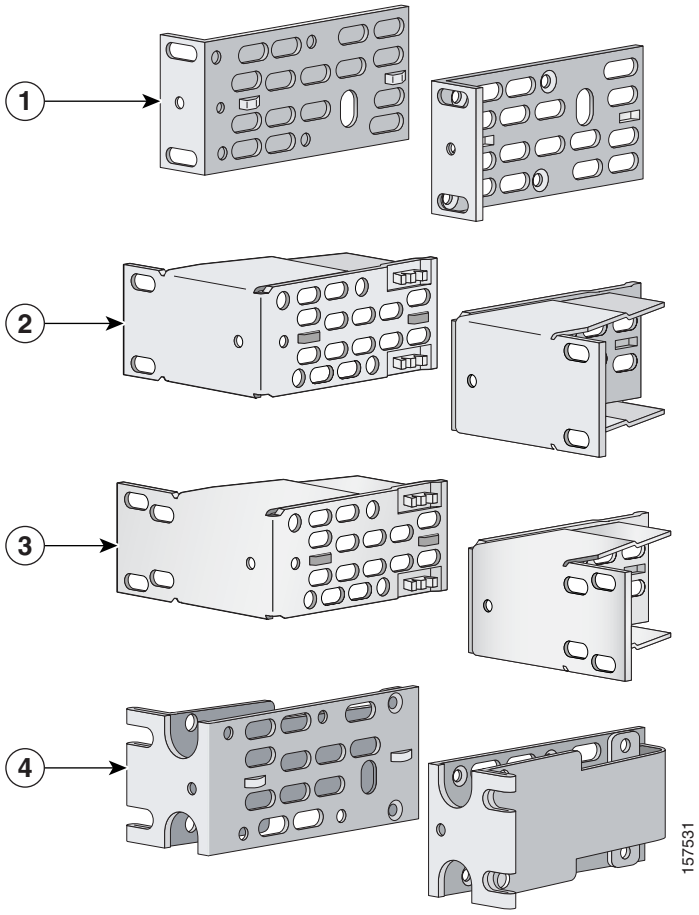
Figure 2-1 Removing Screws from the Cisco ME Switch



Attaching Brackets to the Switch

The bracket orientation and the brackets that you use depend on whether you are attaching the brackets for a 19-inch, 23-inch, 24-inch, or an ETSI rack. Figure 2-2 shows the standard types of mounting brackets.

Figure 2-2 Rack-Mounting Brackets



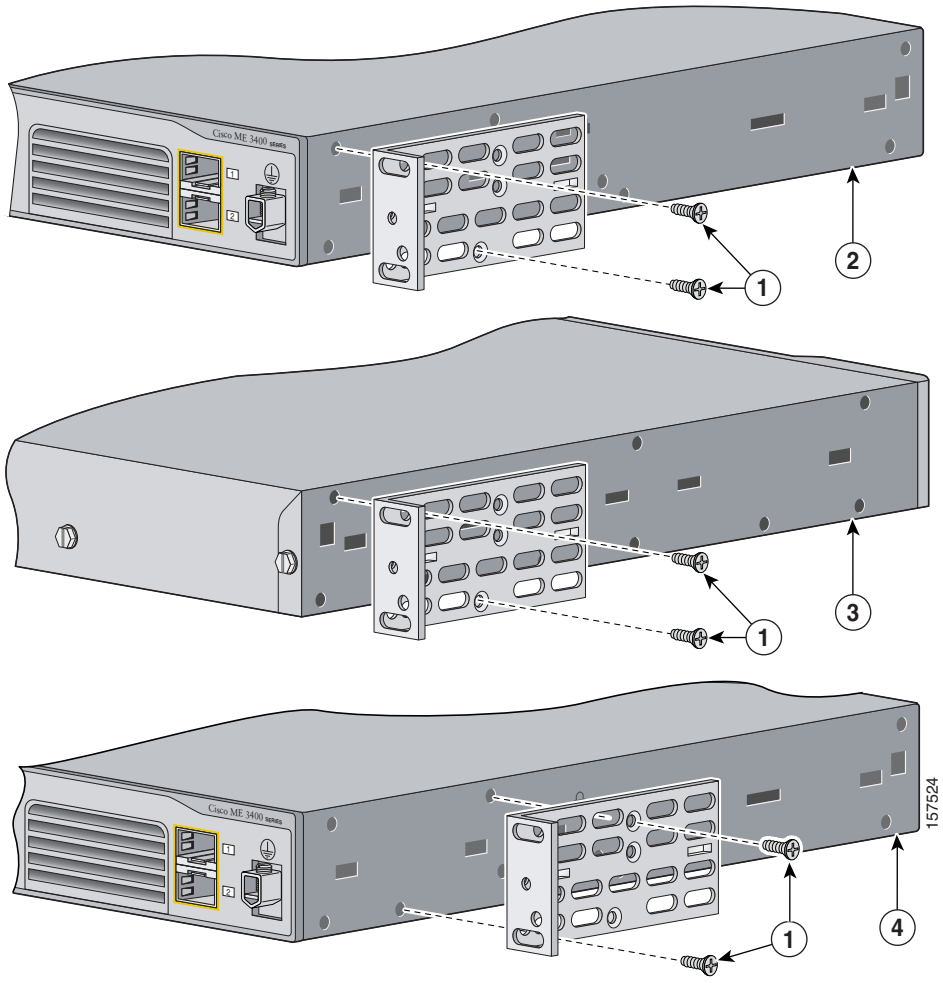
1	19-inch brackets	**3**	24-inch rack-mounting brackets
2	23-inch mounting brackets	**4**	ETSI-rack brackets

- For 19-inch racks, use part number RCKMNT-19IN-1RU (700-08209-XX) on all except the Cisco ME 3400G-2CS switch, and see Figure 2-3 on page 2-8. For the Cisco ME 3400G-2CS switch, use RCKMNT-19-CMPCT= (700-23401-XX), and see Figure 2-4 on page 2-9.
- For 23-inch racks, use part number RCKMNT-23IN-1RU (700-21646-XX) on all except the Cisco ME 3400G-2CS switch, and see Figure 2-5 on page 2-10. For the Cisco ME 3400G-2CS switch, use RCKMNT-23-CMPCT= (700-23402-01).
- For 24-inch racks, use part number RCKMNT-24IN-1RU (700-13248-XX), and see Figure 2-6 on page 2-11.
- For ETSI racks, use part number RCKMNT-ETSI-1RU= (700-19781-XX), and see Figure 2-7 on page 2-12.

Attaching Brackets for 19-Inch Racks (On all Except the Cisco ME 3400G-2CS Switch)

Figure 2-3 shows how to attach brackets for 19-inch racks on all except the Cisco ME 3400G-2CS switch.

Figure 2-3 Attaching Brackets to 19-Inch Racks

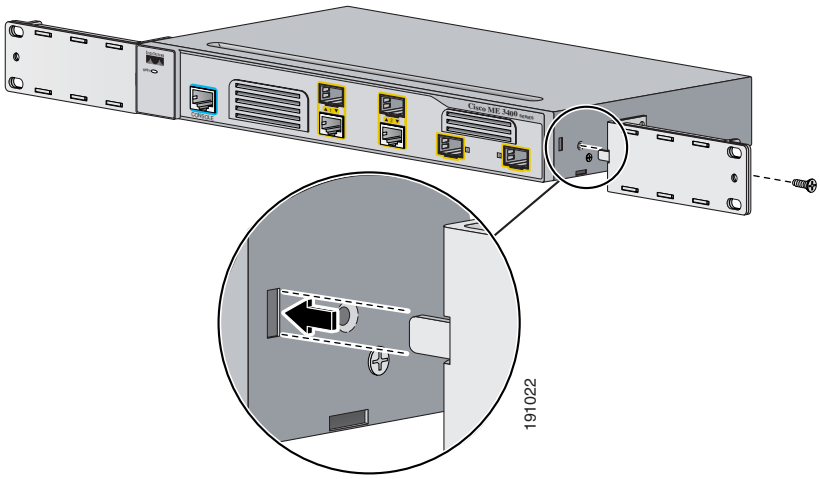


1	Phillips flat-head screws	**3**	Rear-panel facing forward
2	Front-panel facing forward	**4**	Telco-rack mount

Attaching Brackets for 19-Inch Racks on the Cisco ME 3400G-2CS Switch

Figure 2-4 shows how to use the tab on the bracket and the Phillips flat-head screw to attach the short side of each bracket to the Cisco ME 3400G-2CS switch.

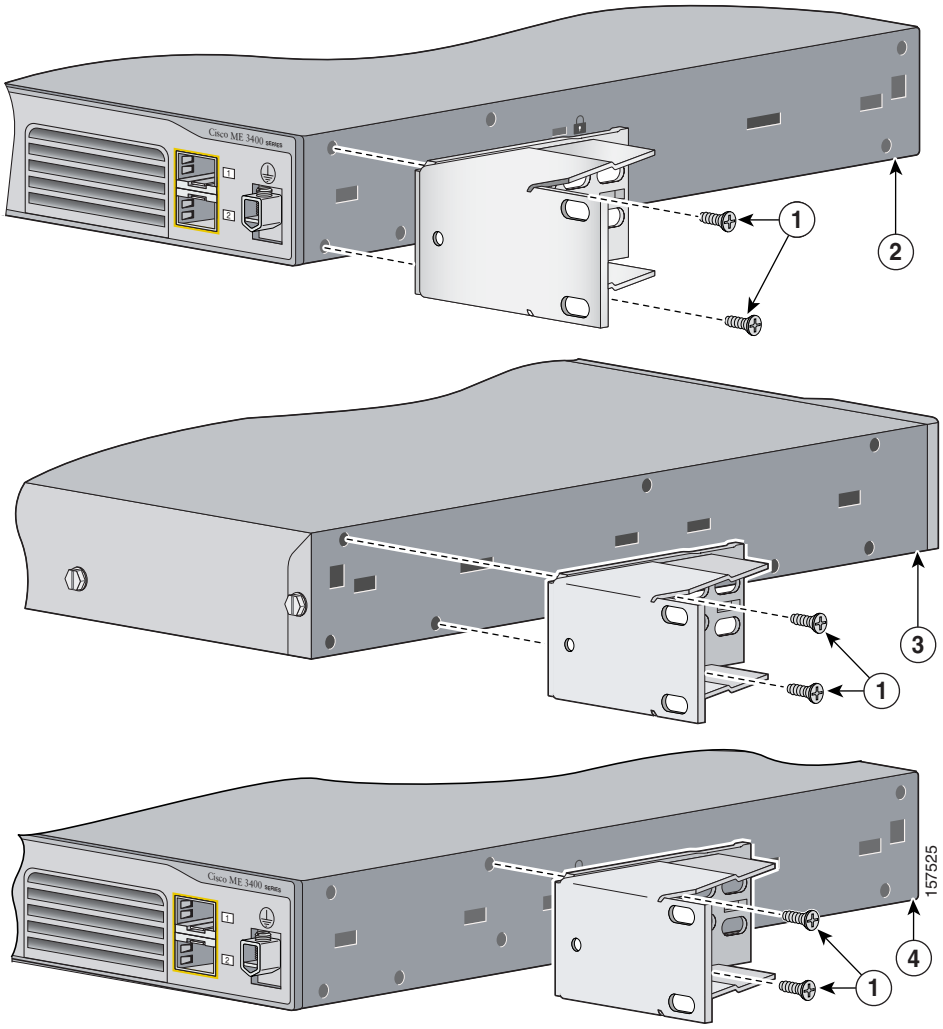
Figure 2-4 Attaching Brackets to 19-Inch Racks on the Cisco ME 3400G-2CS Switch



Attaching Brackets for 23-Inch Racks

Figure 2-5 shows how to attach brackets for 23-inch racks on all except the Cisco ME 3400G-2CS switch:

Figure 2-5 Attaching Brackets for 23- and 24-Inch Racks

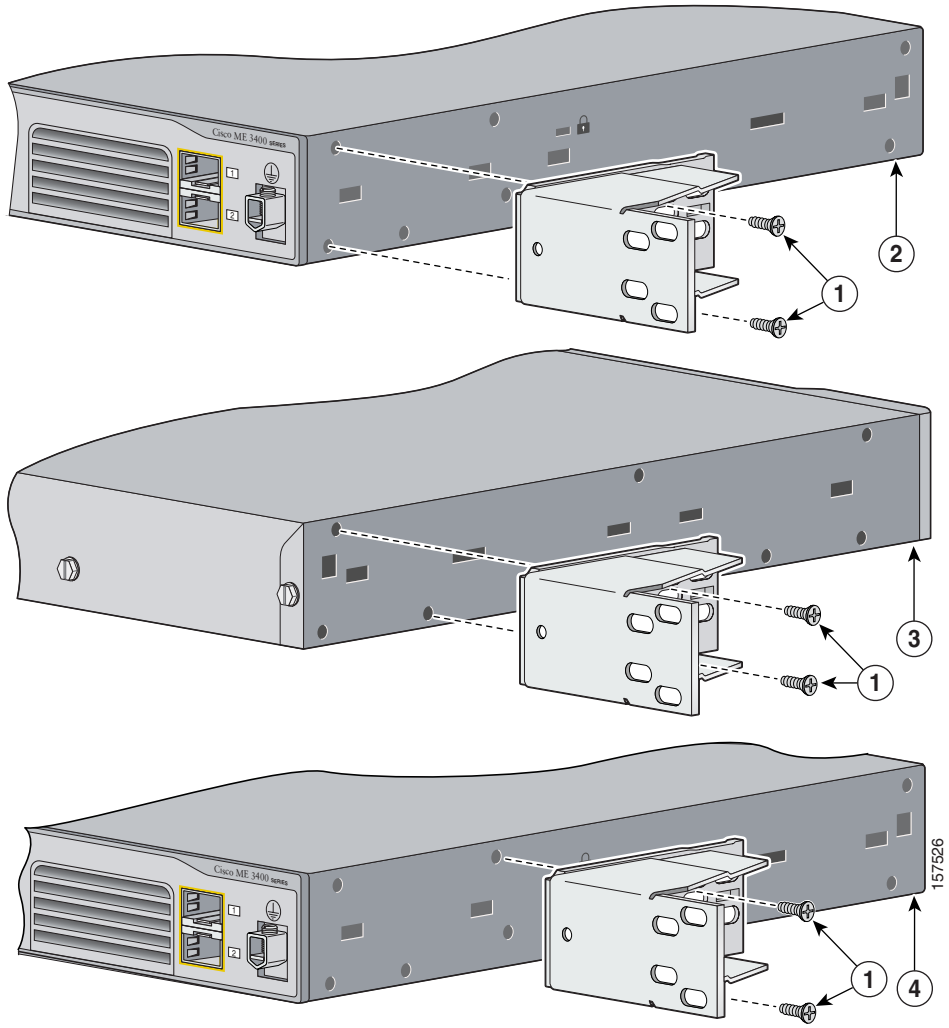


1	Phillips flat-head screws	**3**	Rear-panel facing forward
2	Front-panel facing forward	**4**	Telco-rack mount

Attaching Brackets for 24-Inch Racks

Figure 2-6 shows how to attach brackets for 24-inch racks:

Figure 2-6 Attaching Brackets for 24-Inch Racks

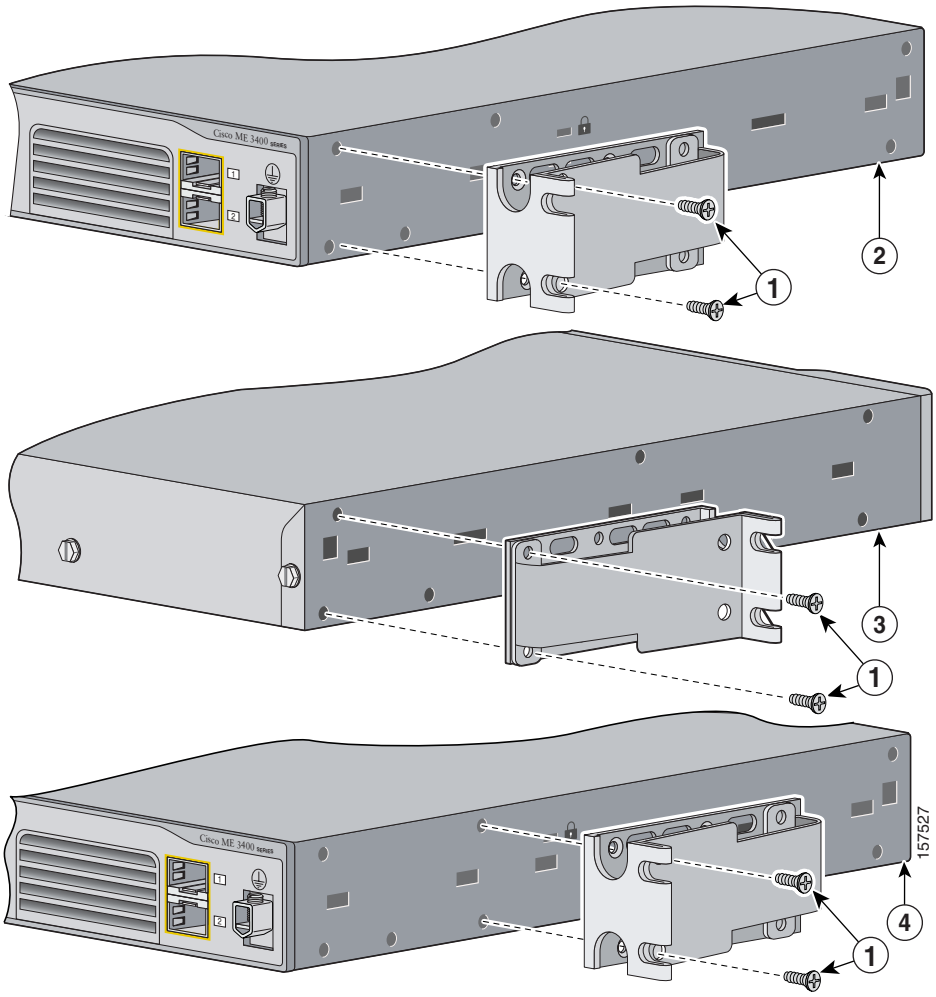


1	Phillips flat-head screws	**3**	Rear-panel facing forward
2	Front-panel facing forward	**4**	Telco-rack mount

Attaching Brackets for ETSI Racks

Figure 2-7 shows how to attach brackets for ETSI racks:

Figure 2-7 Attaching Brackets for ETSI Racks

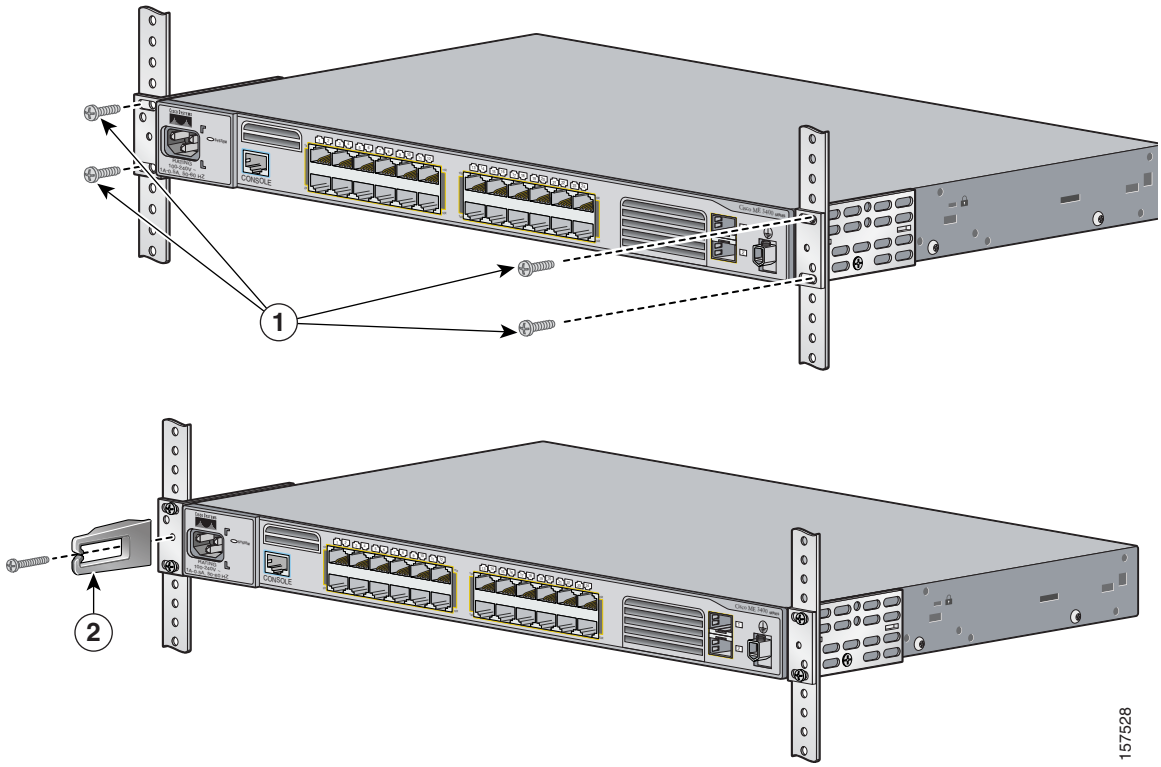


1	Phillips flat-head screws	**3**	Rear-panel facing forward
2	Front-panel facing forward	**4**	Telco-rack mount

Mounting the Switch in a Rack

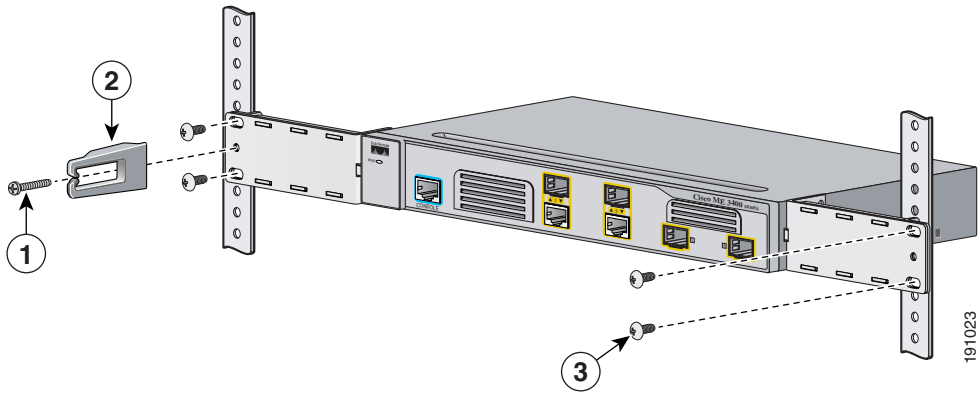
After the brackets are attached to the switch, use the four supplied number-12 Phillips machine screws to securely attach the brackets to the rack, as shown in Figure 2-8. Figure 2-9 shows how to rack-mount the Cisco ME 3400G-2CS switch.

Figure 2-8 Mounting the Cisco ME Switch in a Rack



1	Phillips machine screws	2	Cable guide and screw

Figure 2-9 Mounting the Cisco ME 3400G-CS Switch in a Rack



1	Black Phillips machine screw	3	Number-10 Phillips truss-head screws
2	Cable guide		

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

- Power on the switch. See the "Verifying Switch Operation" section on page 2-5.
- Connect to the RJ-45 connector of a dual-purpose port and run the Initial Configuration Dialog. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 and 10/100/1000 Ports" section on page 2-20 and the "Connecting to SFP Modules" section on page 2-21 to complete the installation.
- We recommend attaching the cable guide to prevent the cables from obscuring the front panel of the switch and the other devices installed in the rack. Use the supplied black screw shown in Figure 2-8 to attach the cable guide to the left or right bracket.

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

Wall-Mounting

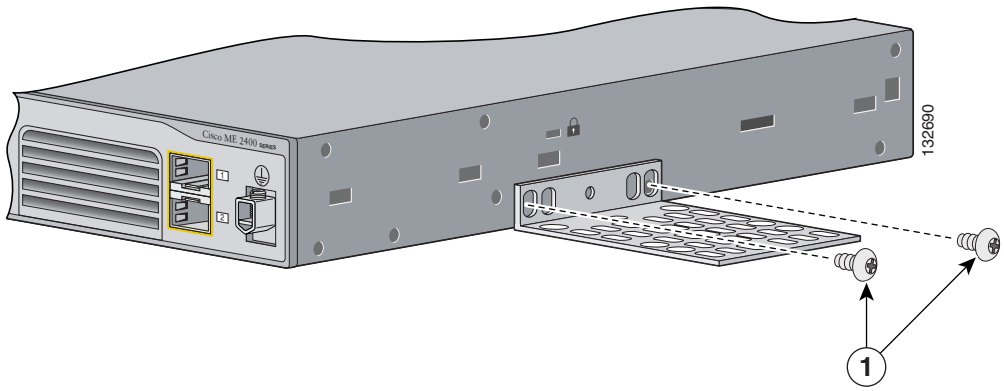
To install the switch on a wall, follow the instructions in these procedures:

- Attaching the Brackets to the Switch for Wall-Mounting, page 2-14
- Mounting the Switch on a Wall, page 2-15

Attaching the Brackets to the Switch for Wall-Mounting

Figure 2-10 shows how to attach a 19-inch bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side.

Figure 2-10 Attaching the 19-inch Brackets for Wall-Mounting



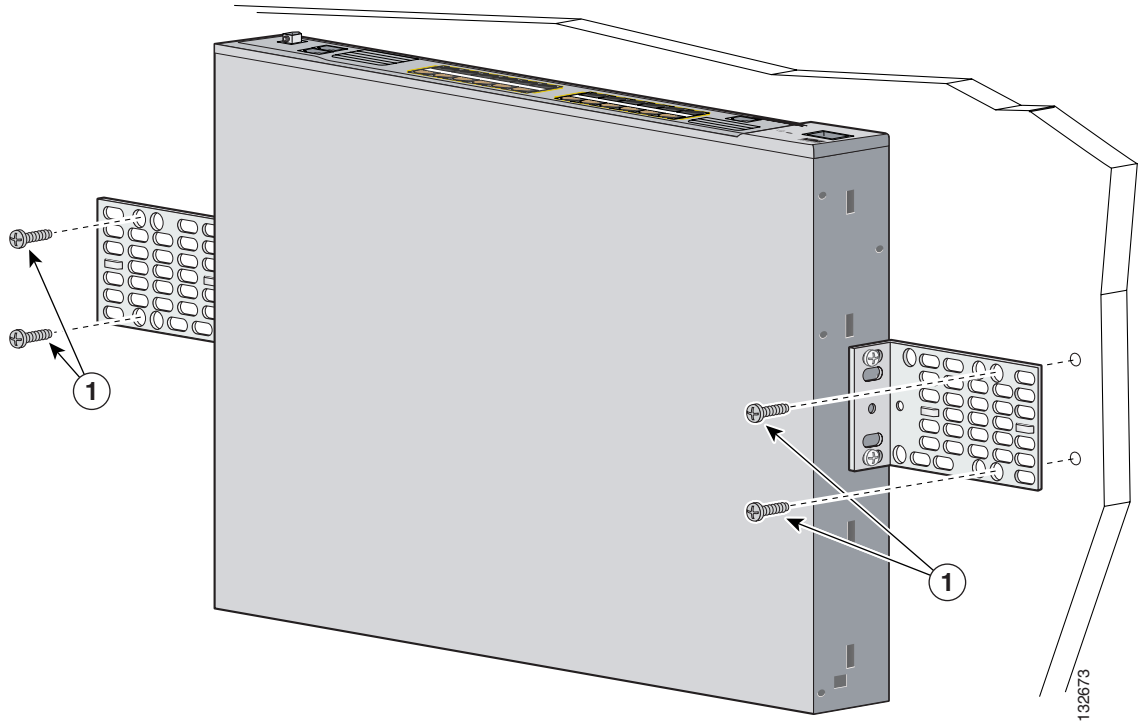
1	Phillips flat-head screws

Mounting the Switch on a Wall

For the best support of the switch and cables, make sure the switch is attached securely to wall studs or to a firmly attached plywood mounting backboard. Mount the switch with the front panel facing up, as shown in Figure 2-11.

Warning **Suitable for mounting on and over a concrete or other non-combustible surface only.** Statement 345

Figure 2-11 Mounting the Switch on a Wall



1	User-supplied screws

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

- Power on the switch. See the "Verifying Switch Operation" section on page 2-5.
- Connect to a 10/100 port or to the RJ-45 connector of a dual-purpose port, and run the Initial Configuration Dialog. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 and 10/100/1000 Ports" section on page 2-20 and the "Connecting to SFP Modules" section on page 2-21 to complete the installation.

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

Table- or Shelf-Mounting

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

Step 1 Place the switch on the table or shelf near an AC power source.

Step 2 After the switch is placed on the table or shelf, you need to do these tasks to complete the installation:

- Power on the switch. See the "Verifying Switch Operation" section on page 2-5.
- Connect to a 10/100 port or to the RJ-45 connector of a dual-purpose port, and run the Initial Configuration Dialog. See the *Cisco ME 3400 and ME 2400 Ethernet Access Switches Getting Started Guide* for instructions.
- Connect to the front-panel ports. See the "Connecting to the 10/100 and 10/100/1000 Ports" section on page 2-20 and the "Connecting to SFP Modules" section on page 2-21 to complete the installation.

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

Note When the connectors are not being used, replace the dust covers on them for protection.

Installing and Removing SFP Modules

These sections describe how to install and remove SFP modules. The modules are inserted into the SFP module slots on the front of the Cisco ME switches. These field-replaceable modules provide interfaces.

See the "SFP Modules" section on page 1-7 for the list of SFP modules that the switch supports. Each port must match the wavelength specifications on the other end of the cable. For reliable communications, the cable must not exceed the stipulated cable length. See the "Installation Guidelines" section on page 2-4 for cable stipulations for SFP module connections.

Use only Cisco SFP modules on the Cisco ME switch. Each SFP module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the SFP module meets the requirements for the switch.

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

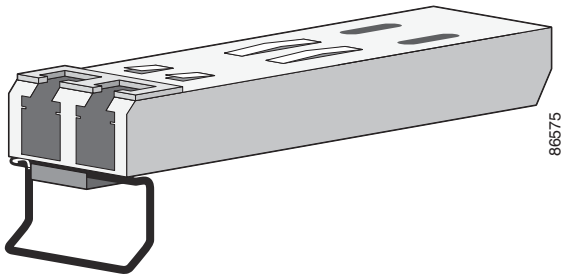
Installing SFP Modules

Figure 2-12 shows an SFP module that has a bale-clasp latch.

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

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

Figure 2-12 SFP Module with a Bale-Clasp Latch



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

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

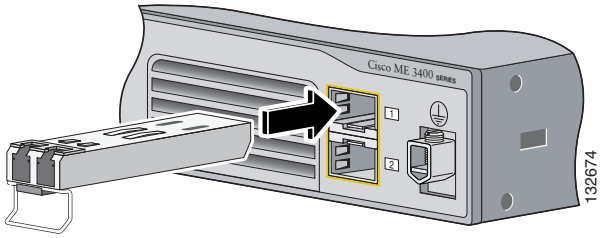
Some SFP modules identify the top side of the module with send (TX) and receive (RX) markings or arrows that show the direction of the connection.

Step 2 If the SFP module that you are using has the markings, use them to identify the top side of the module.

Step 3 Align the SFP module in front of the slot opening.

Step 4 Insert the SFP module into the slot until you feel the connector on the module snap into place in the rear of the slot (see Figure 2-13).

Figure 2-13 Installing an SFP Module into an SFP Module Slot



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

Caution Do not remove the dust plugs from the fiber-optic SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Step 6 Insert the cable connector into the SFP module:

- For fiber-optic SFP modules, insert the LC or MT-RJ cable connector into the SFP module.
- For copper 1000BASE-T SFP modules, insert the RJ-45 cable connector into the SFP module.

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

Removing SFP Modules

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

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

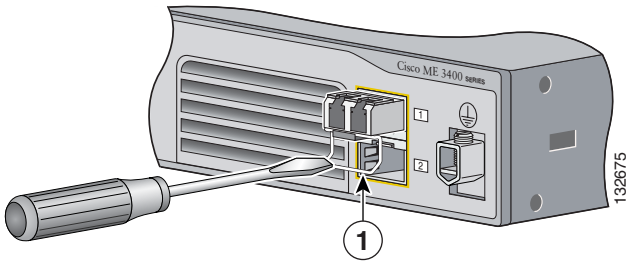
Step 2 Disconnect the cable from the SFP module, and insert a dust plug into the cable end.

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

Step 3 Unlock and remove the SFP module, as shown in Figure 2-14.

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

Figure 2-14 Removing a Bale-Clasp Latch SFP Module by Using a Flat-Blade Screwdriver



1	Bale clasp

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

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

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

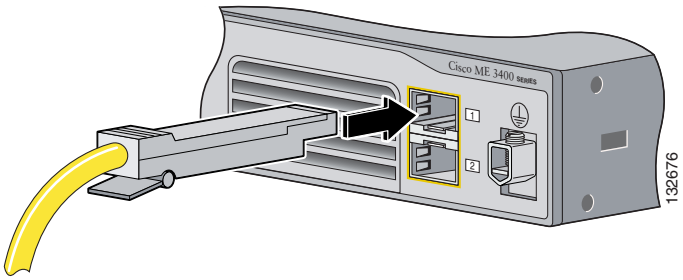
Inserting and Removing the SFP Module Patch Cable

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

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

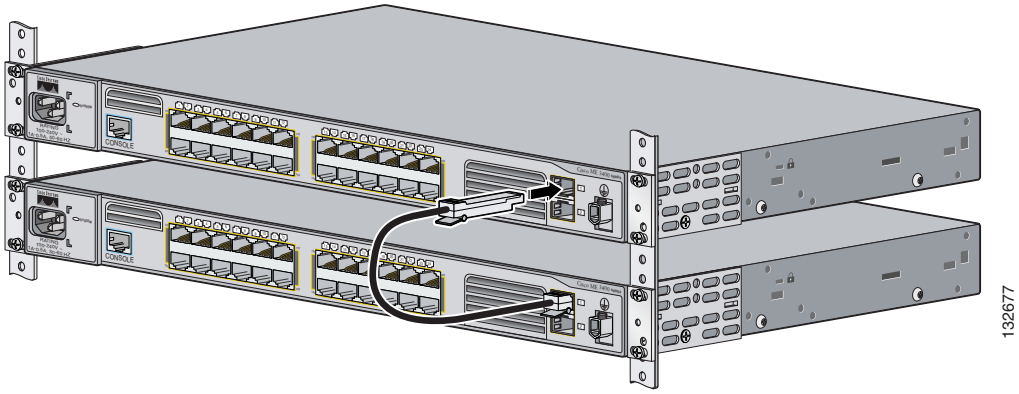
Step 2 Insert the SFP module patch cable into the slot until you feel the connector on the cable snap into place in the rear of the slot (see Figure 2-15).

Figure 2-15 Inserting an SFP Module Patch Cable into an SFP Module Slot



Step 3 Repeat these steps for the second Cisco ME switch to which you want to cascade the first switch. See Figure 2-16.

Figure 2-16 Connecting Two Cisco ME Switches with an SFP Module Patch Cable



To remove an SFP module patch cable from the SFP module slot, release the connector, and pull it from the SFP module slot.

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

The switch 10/100 and 10/100/1000 ports configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the port speed and duplex parameters on both ends of the connection.

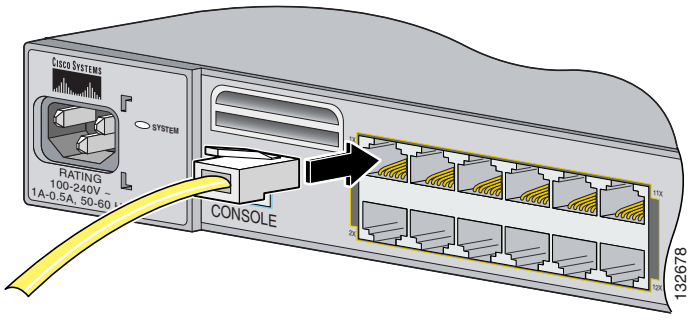
Follow these steps to connect to 10BASE-T, 100BASE-TX, or 1000-BASE-T devices:

Step 1 When connecting to workstations, servers, and routers, connect a straight-through cable to an RJ-45 connector on the front panel. (See Figure 2-17.) When connecting to switches or repeaters, use a crossover cable. (See the "Cable and Adapter Specifications" section on page A-4 for cable-pinout descriptions.)

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

Step 2 Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both the switch and the connected device have established link. (See Figure 2-17.)

Figure 2-17 Connecting to an Ethernet Port



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

Note On user network interface (UNI) ports, the port LED is green after the link is established. It does not turn amber because. STP is not supported.

Step 3 Reconfigure and reboot the connected device, if necessary.

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

Connecting to SFP Modules

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

For instructions about how to install or remove an SFP module, see the "Installing and Removing SFP Modules" section on page 2-16.

Connecting to Fiber-Optic SFP Modules

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

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

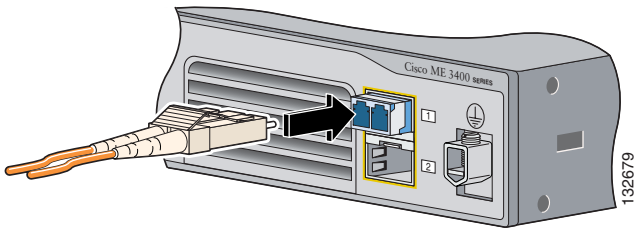
Caution Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, be sure that you understand the port and cabling stipulations in the "Installation Guidelines" section on page 2-4 and in the "SFP Module Ports" section on page 1-7. See Appendix A, "Connector and Cable Specifications," for information about the LC on the SFP module.

Step 1 Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.

Step 2 Insert one end of the fiber-optic cable into the SFP module port (see Figure 2-18).

Figure 2-18 Connecting to a Fiber-Optic SFP Module Port



1	LC connector

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

Step 4 Observe the port status LED.

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

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

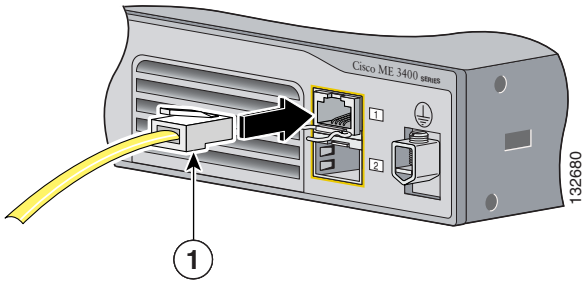
If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be problem with the adapter installed in the target device. See Chapter 3, "Troubleshooting," for solutions to cabling problems.

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

Connecting to 1000BASE-T SFP Modules

Follow these steps to connect a Category 5 (or greater) cable to a 1000BASE-T SFP module (see Figure 2-19):

Figure 2-19 Connecting to a 1000BASE-T SFP Module



1	RJ-45 connector

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

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

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

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

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

Step 3 Observe the port status LED.

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

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

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

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

Connecting to Dual-Purpose Ports

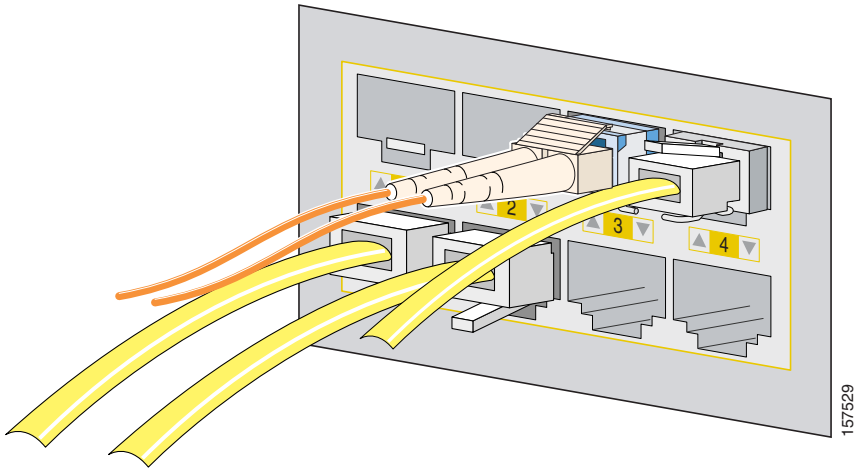
You can configure the dual-purpose ports on the Cisco ME 3400G-12CS and Cisco ME 3400-2CS switches as either 10/100/1000 ports or as SFP module slots. Figure 2-20 shows the Cisco ME 3400G-12CS switch dual-purpose ports. This section also applies to the Cisco ME 3400-2CS switches.

To connect to a dual-purpose port, follow these steps:

Step 1 Connect an RJ-45 connector or an SFP module to the port, as shown in Figure 2-20.

For more information about RJ-45 connectors and SFP modules, see the "Connecting to the 10/100 and 10/100/1000 Ports" section on page 2-20 and the "Connecting to SFP Modules" section on page 2-21.

Figure 2-20 Connecting to a Dual-Purpose Port



Step 2 Connect the other end of the cable to the other device. The switch automatically detects the connection and configures the port.

By default, the switch detects whether an RJ-45 connector or SFP module is connected to a dual-purpose port and configures the port accordingly. You can change this setting and configure the port to recognize only an RJ-45 connector or only an SFP module by using the **media typ**e interface configuration command. For more information, see the command reference.

Where to Go Next

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

- Use the CLI from the console to configure the switch. See the switch software configuration guide or the switch command reference on for information about using the CLI with a Cisco ME switch.

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

- Start an SNMP application such as the CiscoView application.

CHAPTER 3

Troubleshooting

This chapter describes these topics for troubleshooting problems:

- Diagnosing Problems, page 3-1
- How to Clear the Switch IP Address and Configuration, page 3-4
- Locating the Switch Serial Number, page 3-5

Diagnosing Problems

The LEDs on the front panel provide troubleshooting information about the switch. They show power-on self-test (POST) failures, port-connectivity problems, and overall switch performance. You can also get statistics from the CLI or from an SNMP workstation. See the software configuration guide and the switch command reference on Cisco.com or the documentation that came with your SNMP application for more information.

This section includes these troubleshooting topics:

- "Check Switch POST Results" section on page 3-1
- "Check Switch LEDs" section on page 3-2
- "Check Switch Connections" section on page 3-2
- "Check Switch Performance" section on page 3-4

Check Switch POST Results

As the switch powers on, it begins the POST, a series of tests that runs automatically to ensure that the switch functions properly. It might take several minutes for the switch to complete POST.

When the switch begins POST, the system LED slowly blinks green. When POST completes, the system LED blinks amber. If POST fails, the system LED remains amber. If POST completes successfully, the system LED rapidly blinks green.

Note POST failures are usually fatal. Contact your Cisco technical support representative if your switch does not pass POST.

Check Switch LEDs

You must have physical access to the switch to do this. Look at the port LEDs for troubleshooting information about the switch. See the "LEDs" section on page 1-8 for a description of the LED colors and their meanings.

Check Switch Connections

Review this section when troubleshooting switch connectivity problems.

Bad or Damaged Cable

Always check the cable for marginal damage or failure. A cable might be sufficient to connect at the physical layer but then cause packet corruption because of subtle damage to its wiring or connectors. You can identify this situation because the port will have many packet errors, or the port will constantly lose and regain link. In these situations:

- Check or change the copper or fiber-optic cable with a known, good cable.
- Look for broken or missing pins on cable connectors.
- Rule out any insufficient patch panel connections or media convertors between the source and the destination. If possible, bypass the patch panel or eliminate faulty media convertors, such as fiber-optic-to-copper convertors.
- Try using the cable in another port or interface to see if the problem also exists there.

Ethernet and Fiber Cables

Make sure that you have the correct cable type for the connection:

- For Ethernet, use Category 3 copper cable for 10 Mb/s unshielded twisted pair (UTP) connections. Use either Category 5, Category 5e, or Category 6 UTP for 10/100 or 10/100/1000 Mb/s connections.
- For fiber-optic connectors, verify that you have the correct cable for the distance and port type. Make sure that the ports on the connected device match and that they use the same type of encoding, optical frequency, and fiber type. For more information about cabling, see Appendix A, "Connector and Cable Specifications."
- For copper connections, determine if a crossover cable was used when a straight-through cable was required, or the reverse. Enable auto-MDIX on the switch, or replace the cable.

Link Status

Verify that both sides have link. A single broken wire or one shutdown port can cause one side to show link, but the other side does not have link.

A link LED does not guarantee that the cable is fully functional. The cable might have encountered physical stress that causes it to function at a marginal level. If the link light for the port does not come on:

- Connect the cable from the switch to a known, good device.
- Make sure that both ends of the cable are connected to the correct ports.
- Verify that both devices have power.

- Verify that you are using the correct cable type. See Appendix A, "Connector and Cable Specifications," for more information.
- Check for loose connections. Sometimes a cable appears to be seated, but is not. Disconnect and then reconnect the cable.

SFP Module Port Issues

Use only Cisco small form-factor pluggable (SFP) modules on the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch. Check these items:

- Bad or wrong SFP module. Exchange the suspect module with a known, good module. Verify that this module supports this platform. See the "SFP Modules" section on page 1-7 for a list of supported SFP modules.
- Use the **show interfaces** privileged EXEC command to check the port or module error-disabled, disabled, or shutdown status. Re-enable the port if necessary.
- Make sure that all fiber-optic connections are properly cleaned and securely connected.

Port and Interface Settings

An obvious but sometimes overlooked cause of port connectivity failure is a disabled port. Verify that the port or interface is not disabled or for some reason powered down. If a port or interface is manually shut down on one or the other side of the link, the link does not come up until you re-enable the port. Use the **show interfaces** privileged EXEC command to check the port or interface error-disabled, disabled, or shutdown status on both sides of the connection. If necessary, re-enable the port or the interface.

Ping the End Device

Check the end device by pinging it from the directly connected switch first, and then work your way back port by port, interface by interface, trunk by trunk, until you find the source of the connectivity issue. Make sure that each switch can identify the end device MAC address in its Content-Addressable Memory (CAM) table.

Spanning Tree Loops

Spanning Tree Protocol (STP) loops can cause serious performance issues that might appear to be port or interface problems. In this situation, the switch bandwidth is used repeatedly by the same frames, crowding out legitimate traffic.

A unidirectional link can cause loops. This occurs when the traffic that the switch sends is received by its neighbor, but the switch does not receive the traffic that is sent from the neighbor. A broken fiber-optic cable, other cabling, or a port issue could cause this one-way communication.

You can enable the UniDirectional Link Detection (UDLD) protocol on the switch to help identify difficult-to-find unidirectional link problems. UDLD supports a normal mode of operation (the default) and an aggressive mode. In normal mode, UDLD detects unidirectional links because of incorrectly connected interfaces on fiber-optic connections. In aggressive mode, UDLD also detects unidirectional links caused by one-way traffic on fiber-optic and twisted-pair links and by incorrectly connected interfaces on fiber-optic links. For information about enabling UDLD on the switch, see the "Understanding UDLD" section in the software configuration guide.

Check Switch Performance

Review this section when you troubleshoot switch performance problems.

Speed, Duplex, and Autonegotiation

If the port statistics show a large number of alignment errors, frame check sequence (FCS), or late-collisions errors, a speed or duplex mismatch might be the problem.

A common issue with speed and duplex occurs when the duplex settings are mismatched between two switches, between a switch and a router, or between the switch and a workstation or server. This can happen when you manually set the speed and duplex or because of autonegotiation issues between the two devices.

These circumstances can result in a mismatch:

- A manually set speed or duplex parameter is different from the manually set speed or duplex parameter on the connected port.
- A port is set to autonegotiate, and the connected port is set to full duplex with no autonegotiation.

To maximize switch performance and ensure a link, follow one of these guidelines when you set or change the settings for duplex and speed:

- Let both ports autonegotiate both speed and duplex.
- Manually set the speed and duplex parameters for the ports on both ends of the connection.
- If a remote device does not autonegotiate, configure the duplex settings on the two ports to match. The speed parameter can adjust itself even if the connected port does not autonegotiate.

Autonegotiation and NIC Cards

Problems sometimes occur between the switch and third-party network interface cards (NICs). By default, the switch ports and interfaces are set to autonegotiate. It is common for devices such as laptop computers or other devices to also be set to autonegotiate, yet sometimes autonegotation issues occur.

To troubleshoot autonegotiation problems, try manually setting both sides of the connection. If this does not solve the problem, the firmware or software on your NIC card might be causing the problem. Upgrade the NIC card driver to the latest version available from the manufacturer.

Cabling Distance

If the port statistics show excessive FCS, late-collision, or alignment errors, verify that the cable distance from the switch to the connected device meets the recommended guidelines. See the "Cable and Adapter Specifications" section on page A-4 for cabling guidelines.

How to Clear the Switch IP Address and Configuration

This section describes how to reset the switch by rerunning the initial configuration dialog (system configuration dialog). These are reasons why you might want to reset the switch:

- You installed the switch in your network and cannot connect to it because you assigned the wrong IP address.
- You want to clear all the configuration settings from the switch and assign a new IP address.

Caution This procedure clears the IP address and all configuration information stored on the switch. Do not follow this procedure unless you want to completely reconfigure the switch.

To reset the switch:

1. At the switch prompt, enter **enable**, and press **Return** or **Enter**.
2. At the Privileged EXEC prompt, switch#, enter setup and press **Return** or **Enter**.

The switch displays the prompt to run the initial configuration dialog. The switch now behaves like an unconfigured switch. You can configure the switch by using the CLI setup procedure described in Appendix D, "Configuring the Switch with the CLI-Based Setup Program."

Locating the Switch Serial Number

If you contact Cisco Technical Assistance, you need to know the serial number of your switch. Use these figures to locate the serial number on your switch. You can also use the **show version** command to get the serial number.

- Figure 3-1, Serial Number Location on the Cisco ME 3400-24TS-AC and DC Switches
- Figure 3-2, Serial Number Location on the Cisco ME 3400G-12CS-AC and DC Switches
- Figure 3-3, Serial Number Location on the Cisco ME 3400G-2CS Switch
- Figure 3-4, Serial Number Location on the Cisco ME 3400-24FS Switch

Figure 3-1 Serial Number Location on the Cisco ME 3400-24TS-AC and DC Switches

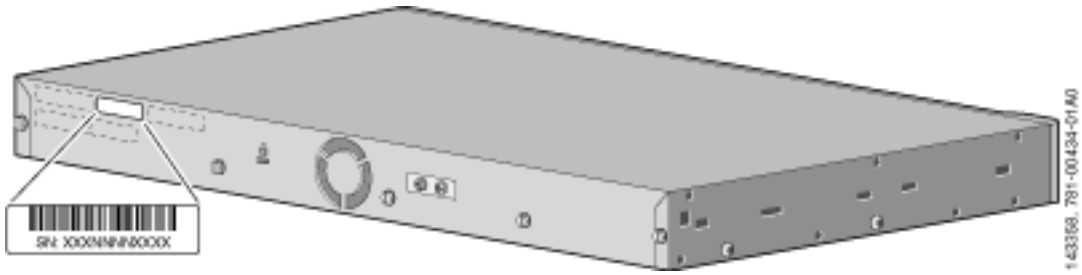


Figure 3-2 Serial Number Location on the Cisco ME 3400G-12CS-AC and DC Switches

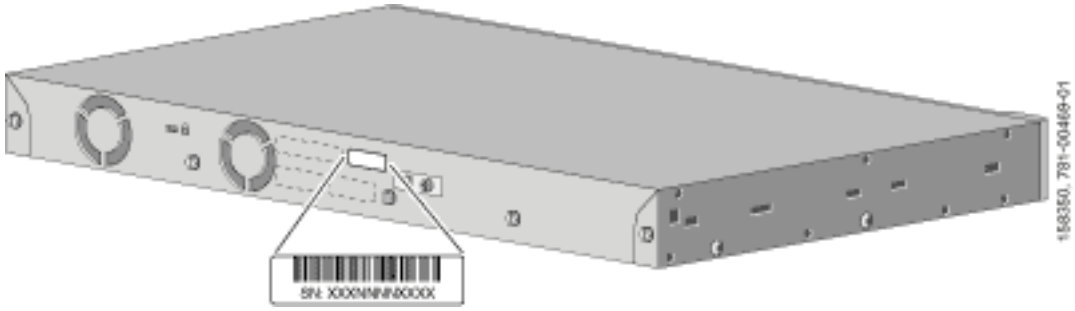


Figure 3-3 Serial Number Location on the Cisco ME 3400G-2CS Switch

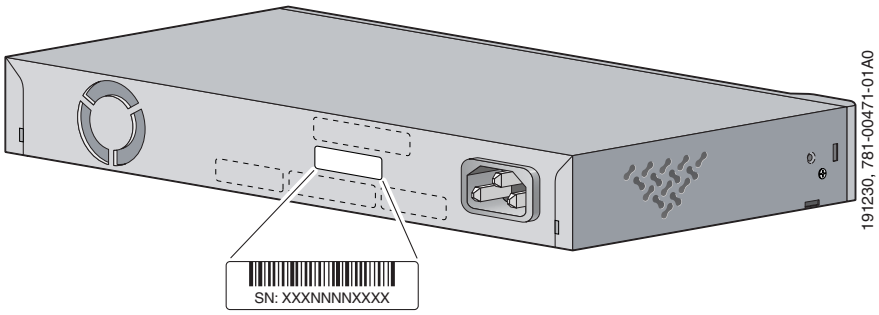
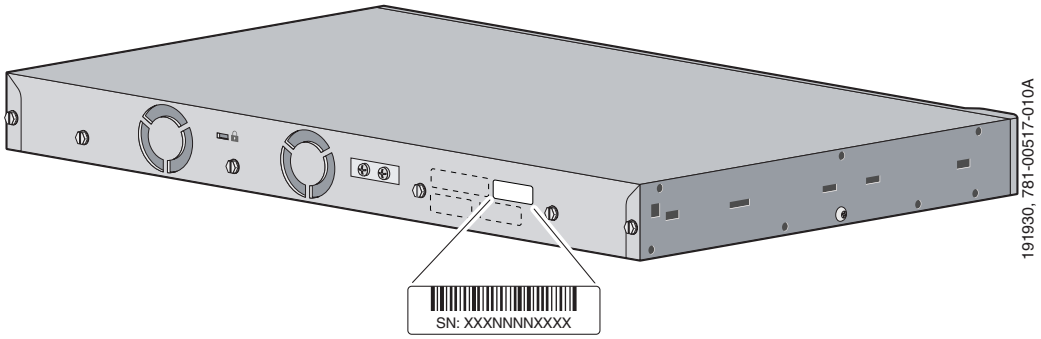


Figure 3-4 Serial Number Location on the Cisco ME 3400-24FS Switch



APPENDIX A

Connector and Cable Specifications

This appendix describes the Cisco ME switch ports and the cables and adapters that you use to connect the switch to other devices and includes these topics:

- Connector Specifications, page A-1
- Cable and Adapter Specifications, page A-4

Connector Specifications

These sections describe the connectors used with the switch:

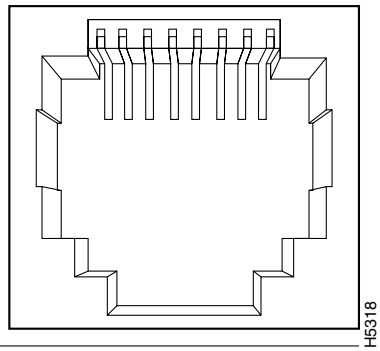
- 10/100 Ports, page A-1
- SFP Module Ports, page A-3
- Dual-Purpose Ports, page A-3
- Console Port, page A-3

10/100 Ports

The Cisco ME 3400-24TS 10/100 Ethernet ports use standard RJ-45 connectors and Ethernet pinouts with internal crossovers. These ports have the send (TD) and receive (RD) signals internally crossed so that a twisted-pair straight-through cable and adapter can be attached to the port. Figure A-1 shows the pinout for a 10/100 port.

Figure A-1 10/100 Port Pinouts

Pin	Label
1	RD+
2	RD-
3	TD+
4	NC
5	NC
6	TD-
7	NC
8	NC



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

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

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

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

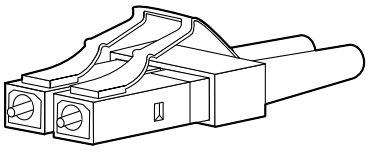
Note Use a straight-through cable to connect two ports only when one port is designated with an X. Use a crossover cable to connect two ports when both ports are designated with an X or when both ports do not have an **X**.

This applies only to switches on which auto-MDIX is disabled.

SFP Module Ports

The Cisco ME switch uses SFP modules for fiber-optic and copper uplinks. See the Cisco ME switch release notes for a list of supported SFP modules.

Figure A-2 Fiber-Optic SFP Module LC Connector



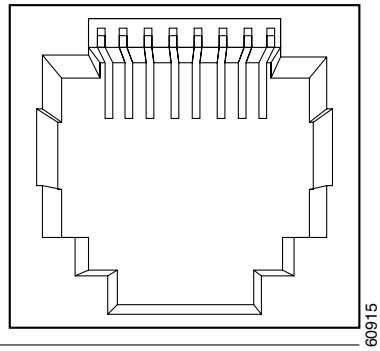
Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Dual-Purpose Ports

The Cisco ME 3400G-12CS 10/100/1000 Ethernet ports on the dual-purpose ports use standard RJ-45 connectors. Figure A-3 shows the pinouts.

Figure A-3 10/100/1000 Port Pinouts

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



Console Port

The console port uses an 8-pin RJ-45 connector, which is described in Table A-2 and Table A-3. If you did not order a console cable with your switch, you need to provide an RJ-45-to-DB-9 adapter cable to connect the console port of the switch to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see Table A-2 and Table A-3.

Cable and Adapter Specifications

These sections describe the cables and adapters used with Cisco ME switches:

- SFP Module Cable Specifications, page A-4
- Two Twisted-Pair Cable Pinouts, page A-5
- Four Twisted-Pair Cable Pinouts for 1000BASE-T Ports, page A-6
- Crossover Cable and Adapter Pinouts, page A-6

SFP Module Cable Specifications

Table A-1 lists the cable specifications for the fiber-optic SFP module connections. Each port must match the wave-length specifications on the other end of the cable, and for reliable communications, the cable must not exceed the required cable length. Copper 1000BASE-T SFP transceivers use standard four twisted-pair, Category 5 (or greater) cable at lengths up to 328 feet (100 meters).

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

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)[1]	Cable Distance
100BASE-BX (GLC-FE-100BX-D GLC-FE-100BX-U)	1310 TX 1550 RX	SMF	G.652[2]	—	32,810 feet (10 km)
100BASE-FX (GLC-GE-100FX)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
100BASE-FX (GLC-FE-100FX)	1310	MMF	50/125 62.5/125	500 500	6,562 feet (2 km) 6,562 feet (2 km)
100BASE-LX (100BASE-LX10)	1310	SMF	G.652[2]	—	32,810 feet (10 km)
1000BASE-BX10-D (GLC-BX-D)	1490 TX 1310 RX	SMF	G.652[2]	—	32,810 feet (10 km)
1000BASE-BX10-U (GLC-BX-U)	1310 TX 1490 RX	SMF	G.652[2]	—	32,810 feet (10 km)
1000BASE-SX (GLC-SX-MM)	850	MMF	62.5/125 62.5/125 50/125 50/125	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-LX/LH (GLC-LH-SM)	1310	MMF[3] SMF	62.5/125 50/125 50/125 G.652[2]	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 32,810 feet (10 km)

Table A-1 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km)[1]	Cable Distance
1000BASE-ZX (GLC-ZX-SM	1550	SMF	G.652[2]	—	43.4 to 62 miles (70 to 100 km)[4]
CWDM	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652[2]	—	62 miles (100 km)

1. Modal bandwidth applies only to multimode fiber.
2. A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers
3. A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance can cause transceiver saturation, resulting in an elevated bit error rate (BER). When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).
4. 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, the number of splices, and the connectors.

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

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

Two Twisted-Pair Cable Pinouts

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

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

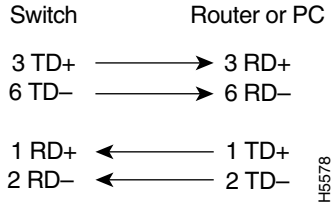
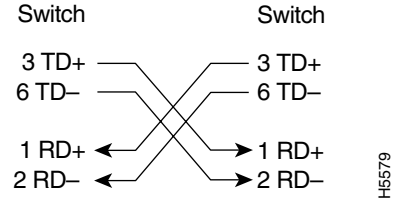


Figure A-5 Two Twisted-Pair Crossover Cable Schematic



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

Figure A-6 and Figure A-7 show the schematics of four twisted-pair cables for 1000BASE-T SFP module ports on Cisco ME switches.

Figure A-6 Four Twisted-Pair Straight-Through Cable Schematic for 1000BASE-T Ports

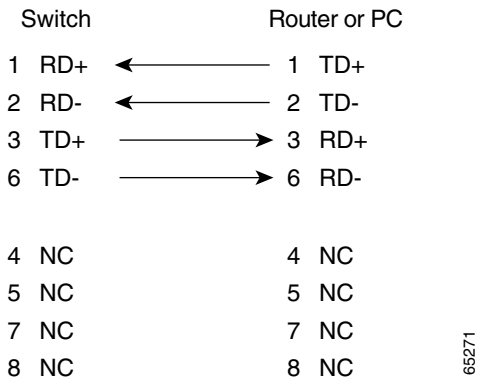
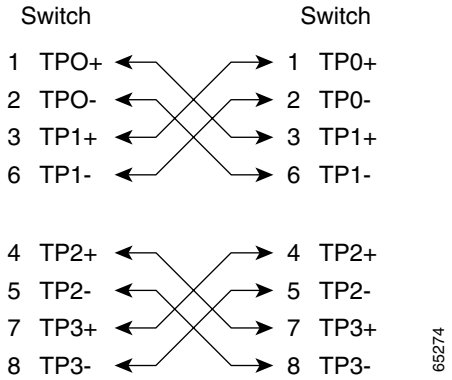


Figure A-7 Four Twisted-Pair Crossover Cable Schematics for 1000BASE-T Ports



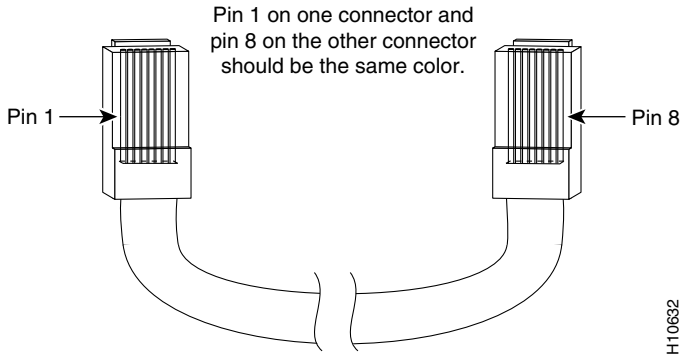
Crossover Cable and Adapter Pinouts

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

Identifying a Crossover Cable

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

Figure A-8 Identifying a Crossover Cable



Adapter Pinouts

Table A-2 lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

Table A-2 Console Port Signaling Using a DB-9 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**DB-9 Pin**	**Signal**
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

Table A-3 lists the pinouts for the console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

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

Table A-3 Console Port Signaling Using a DB-25 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	**DB-25 Pin**	**Signal**
RTS	5	CTS
DTR	6	DSR
TxD	3	RxD
GND	7	GND
GND	7	GND
RxD	2	TxD
DSR	20	DTR
CTS	4	RTS

APPENDIX B

Technical Specifications

This appendix lists the switch technical specifications:

- Table B-1, Technical Specifications for the Cisco ME 3400-24TS AC and DC Ethernet Access Switch
- Table B-2, Technical Specifications for the Cisco ME 3400-24FS AC Ethernet Access Switch
- Table B-3, Technical Specifications for the ME 3400G-12CS-AC and DC Ethernet Access Switch
- Table B-4, Technical Specifications for the ME 3400G-2CS Ethernet Access Switch

Table B-1 Technical Specifications for the Cisco ME 3400-24TS AC and DC Ethernet Access Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 50°C)
Storage temperature	–13 to 158°F (–25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
AC Power Requirements	
AC input voltage	100 to 240 VAC 1 to 0.5 A, 50 to 60 Hz
Power consumption	25 W (typical), 30 W (maximum), 86 BTUs per hour (typical), 102 BTUs per hour (maximum)
Power rating	0.042 KVA
DC Power Requirements	
DC input voltage	–36 to –72 VDC, 2 to 1 A
Power consumption	25 W (typical), 30 W (maximum), 86 BTUs per hour (typical), 102 BTUs per hour (maximum)
Physical Dimensions	
Weight	6.9 lb (3.72 kg)
Dimensions (H x D x W)	1.75 x 9.52 x 17.5 in. (4.45 x 24.18 x 44.5 cm)

Table B-2 Technical Specifications for the Cisco ME 3400-24FS AC Ethernet Access Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 50°C)
Storage temperature	–13 to 158°F (–25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
AC Power Requirements	
AC input voltage	100 to 240 VAC 1.6 to 1 A, 50 to 60 Hz
Power consumption	50 W (typical), 65 W (maximum), 171 BTUs per hour (typical), 222 BTUs per hour (maximum)
Power rating	0.070 KVA
Physical Dimensions	
Weight	7.5 lb (4.05 kg)
Dimensions (H x D x W)	1.75 x 9.52 x 17.5 in. (4.45 x 24.18 x 44.5 cm)

Table B-3 Technical Specifications for the ME 3400G-12CS-AC and DC Ethernet Access Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 50°C)
Storage temperature	–13 to 158°F (– 25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
AC Power Requirements	
AC input voltage	100 to 240 VAC 1.6 to 0.8 A, 50 to 60 Hz
Power consumption	65 W (typical), 80 W (maximum), 222 BTUs per hour (typical), 273 BTUs per hour (maximum)
Power rating	0.087 KVA
DC Power Requirements	
DC input voltage	–36 to –72 VDC, 4.5 to 2.0 A
Power consumption	55 W (typical), 70 W (maximum) 188 BTUs per hour (typical), 239 BTUs per hour (maximum)

Table B-3 Technical Specifications for the ME 3400G-12CS-AC and DC Ethernet Access Switch (continued)

Physical Dimensions	
Weight	Cisco ME 3400G-12CS-AC switches: 9.3 lb (4.2 kg) Cisco ME 3400G-12CS-DC switches: 9 lb (4.1 kg)
Dimensions (H x D x W)	1.75 x 11 x 17.5 in. (4.45 x 27.9 x 44.5 cm)

Table B-4 Technical Specifications for the ME 3400G-2CS Ethernet Access Switch

Environmental Ranges	
Operating temperature	32 to 113°F (0 to 50°C)
Storage temperature	–13 to 158°F (–25 to 70°C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m)
AC Power Requirements	
AC input voltage	100 to 240 VAC, 0.5 to 0.25 A, 50 to 60 Hz
Power consumption	15 W (typical), 20 W (maximum), 51 BTUs per hour (typical), 68 BTUs per hour (maximum)
Power rating	0.04 KVA
Physical Dimensions	
Weight	3.5 lb (1.6 kg)
Dimensions (H x D x W)	1.73 x 7.1 x 10.6 in. (4.4 x18.2 x 26.9 cm)

APPENDIX C

Connecting to DC Power

To connect the Cisco ME switch to a DC-input power source, follow these steps:

1. Preparing for Installation, page C-1
2. Grounding the Switch, page C-2
3. Wiring the DC-Input Power Source, page C-6

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

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

Caution Installation of the equipment must comply with local and national electrical codes.

Note We recommend that you use 18 AWG copper wiring for Network Equipment Building Systems (NEBS) installation. This guideline follows the standard guidelines for DC power wiring in the Central Office.

Note You can use the grounding lug to attach a wrist strap for ESD protection during servicing.

Preparing for Installation

Locate the DC terminal block plug, the ground lug, and the two number-10-32 screws in the DC-switch kit.

Obtain these necessary tools and equipment:

- Ratcheting torque screwdriver with a Phillips head that exerts up to 15 pound-force inches (lbf-in.) of pressure
- Panduit crimping tool with optional controlled cycle mechanism (model CT-700, CT-720, CT-920, CT-920CH, CT-930, or CT-940CH)

- 6-gauge copper ground wire (insulated or noninsulated)
- Four leads of copper wire
- The DC terminal block (Figure C-13)
- 12-28 AWG copper wire
- Wire-stripping tools

To order spare or replacement DC connectors, use one of these sources:

- Digi-Key, part number 277-1013-ND, www.digikey.com
- Phoenix Contact, part number 1757035, www.phoenixcontact.com

Grounding the Switch

Review these safety warnings before you ground the switch.

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

Caution To make sure that the equipment is reliably connected to earth ground, follow the grounding procedure instructions, and use a UL-listed lug suitable for number-6 AWG wire and two number-10-32 ground-lug screws.

Preparing the Ground Wire

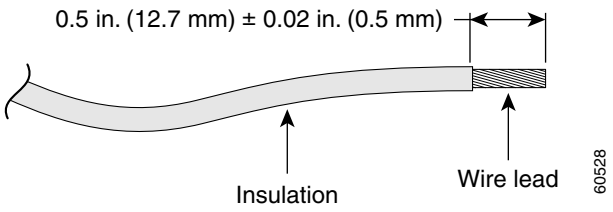
Before you ground the switch to earth ground, you must prepare the ground wire. Follow these steps. Make sure to follow any grounding requirements at your site.

Step 1 Locate the ground lug and the two number-10-32 screws. A ground lug and screws are located both on the front panel and on the rear panel of the switch. Only one ground connection is required.

Use a standard Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head. Set the screws and the ground lug aside.

Step 2 If your ground wire is insulated, use a wire stripping tool to strip the 6-gauge ground wire to 0.5 inch (12.7 millimeter [mm]) ± 0.02 inch (0.5 mm) as shown in Figure C-1.

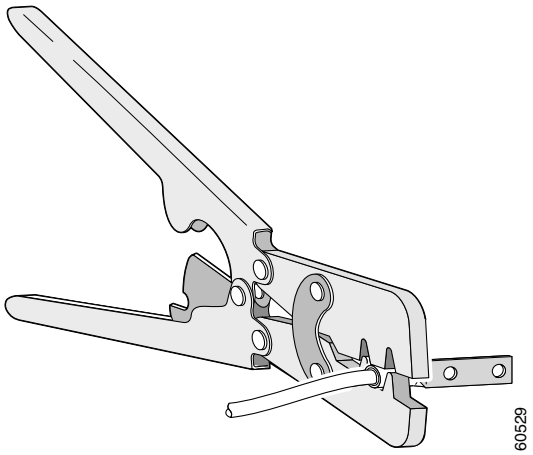
Figure C-1 Stripping the Ground Wire



Step 3 Slide the open end of the ground lug over the exposed area of the 6-gauge wire.

Step 4 Using a Panduit crimping tool, crimp the ground lug to the 6-gauge wire.

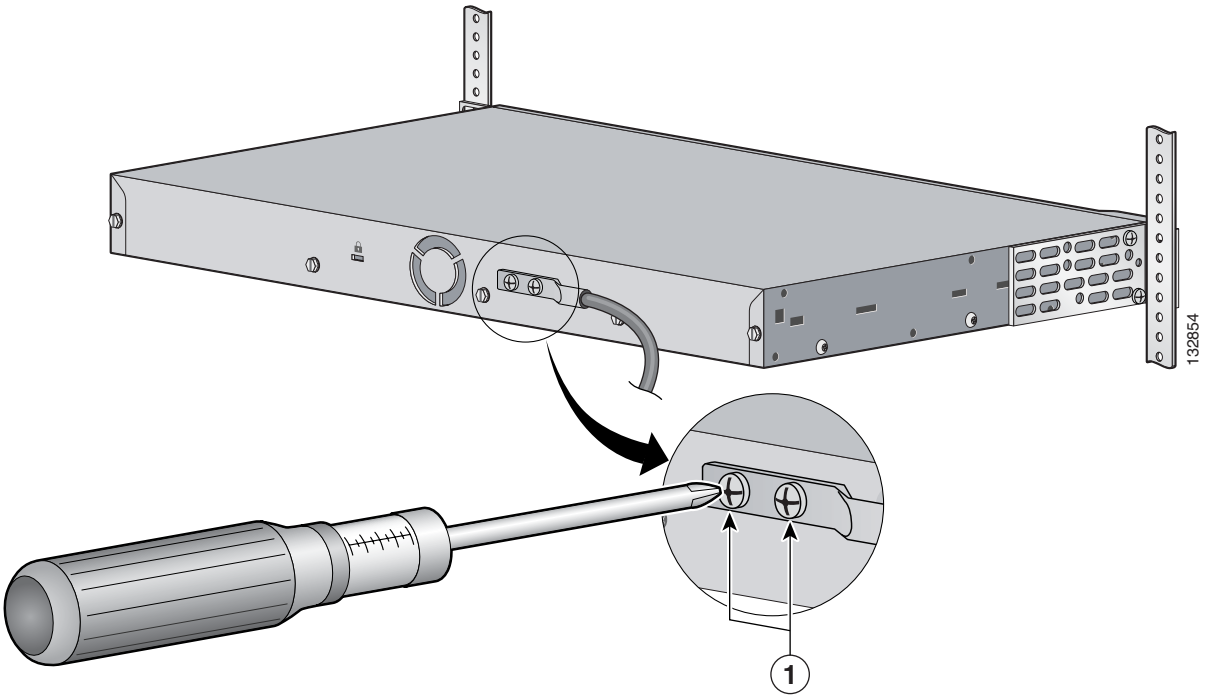
Figure C-2 Crimping the Ground Lug



Step 5 Use the two number-10-32 screws to attach the ground lug and wire assembly to the rear panel of the switch.

Step 6 Using a ratcheting torque screwdriver, torque each ground-lug screw to 15 lbf-in. (240 ounce-force inches [ozf-in.]). Figure C-3 shows how to torque the ground screws on a Cisco ME DC switch.

Figure C-3 Torquing Ground-Lug Screws

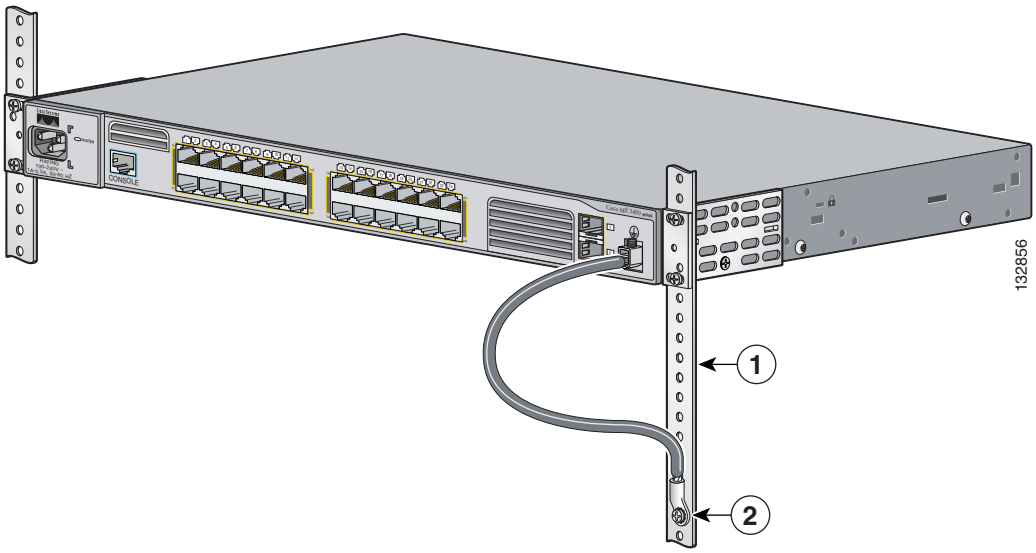


1	Torque to 15 lbf-in.

Connecting the Grounding Wire to Earth Ground

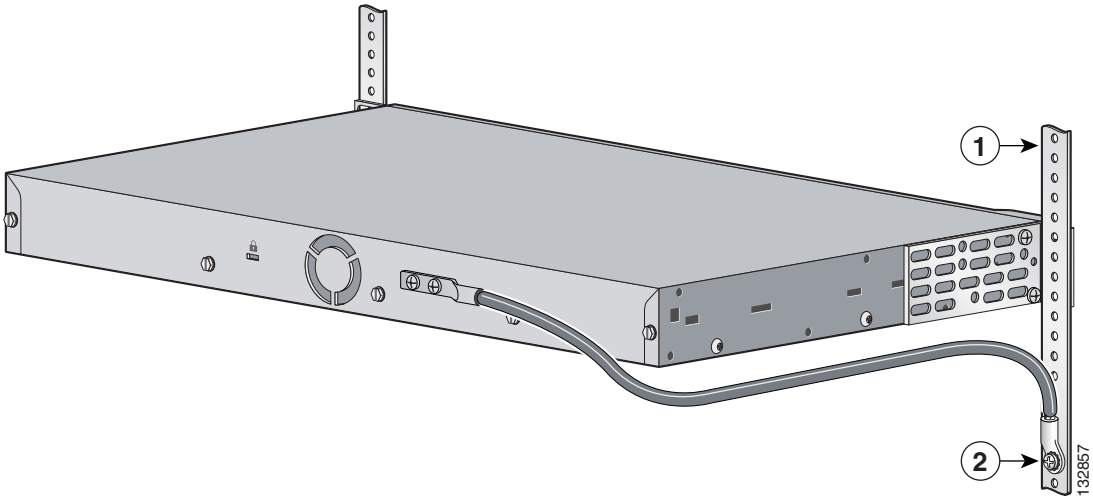
Next you must connect the other end of the grounding wire to an appropriate grounding point at your site or to the telco rack. You can connect the grounding wire to either the front panel ground connector (see Figure C-4) or the rear panel ground connector (see Figure C-5), but not to both.

Figure C-4 Connecting the Grounding Wire to the Rack from the Front-Panel Ground Connector



1	Telco rack	**2**	Grounding wire

Figure C-5 Connecting the Grounding Wire to the Rack from the Rear-Panel Ground Connector



1	Telco rack	**2**	Grounding wire

Complete these steps:

Step 1 Remove all paint or oxidation from the rack at the point of the grounding connection.

Step 2 Use a 3/16-inch flat-head screwdriver to loosen the grounding screw on the rack.

Step 3 Connect the wire to a ring lug (large enough for the rack screw to fit through).

Step 4 Use a 3/16-inch flat-head screwdriver and the screw to attach the ring lug to the rack.

Step 5 Tighten the grounding screw on the rack over the ring lug.

Repeat these steps for each switch being installed.

Wiring the DC-Input Power Source

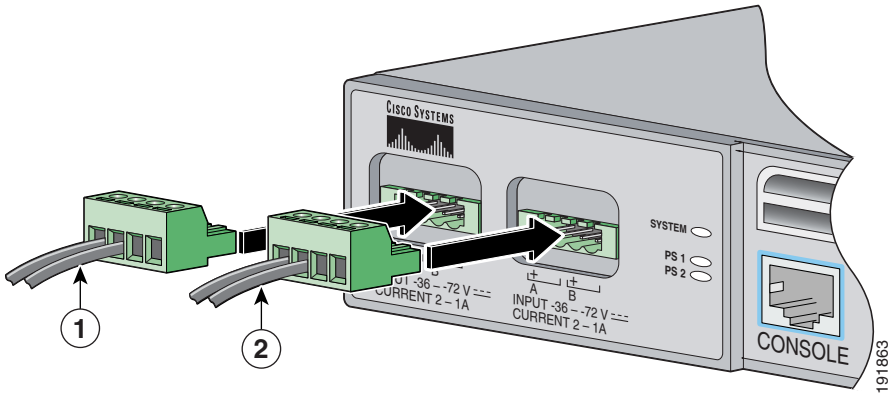
Before you wire the DC-input power source, review the warnings in this section and this information:

If the switch software detects that the circuit boards are not receiving power from an internal power supply, the software sends a message like this to the console:

```
00:06:54: %POWER_SUPPLIES-3-PWR_FAIL: Power supply 2 is not functioning
00:06:54: %PLATFORM_ENV-1-DUAL_PWR: Faulty internal power supply 2 detected
```

This message means that an internal power supply is not providing power. To receive this alert if power fails on the ME 3400G-12CS-DC switch with two power feeds, we recommend that you connect one feed to the left DC power terminal block and the other to the right DC power terminal block. (See the example in Figure C-6.)

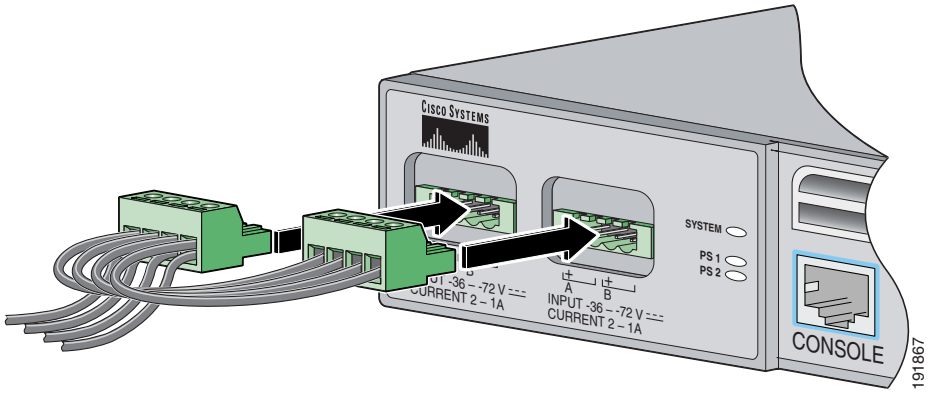
Figure C-6 Connecting Separate Feeds to Each of the DC Power Terminal Blocks



1	Primary power feed	**2**	Secondary (redundant) power feed

If you want to receive an alert if an external power supply fails, do not connect feeds to one terminal block and from there connect feeds to the second terminal block. (See the example in Figure C-7.) This configuration provides redundant power, and the switch continues to operate if one of the external power supplies fails. However, the software does not send a message to you that an internal power supply has failed.

Figure C-7 Connecting Feeds from One Terminal Block to the Second Terminal Block



Cisco ME 3400-24TS Switches

This warning only applies to Cisco ME 3400-24TS switches:

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
5 A Statement 1005

Cisco ME 3400G-12CS Switches

This warning only applies to Cisco ME 3400G-12CS switches:

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:**
6 A Statement 1005

All Cisco ME 3400 Switches

These warnings apply to all Cisco ME switches:

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.**
Statement 1022

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

Caution You must connect the Cisco ME DC switch only to a DC-input power source with –36 to –72 VDC supply voltage. If the supply voltage is not in this range, the switch might not operate properly or might be damaged.

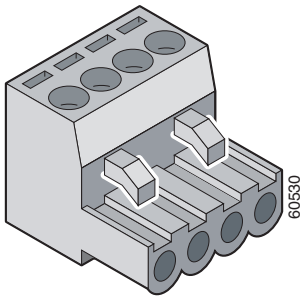
Caution The Cisco ME 3400G-12CS-DC switch has two DC power supplies. They are labelled PS1 and PS2, and each power supply has an A and B input. When you connect power to both PS 1 and PS 2, connect only a single input (A or B) to each power supply.

To wire the switch to a DC-input power source, follow these steps:

Step 1 To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.

Step 2 Locate the terminal block plug (see Figure C-8).

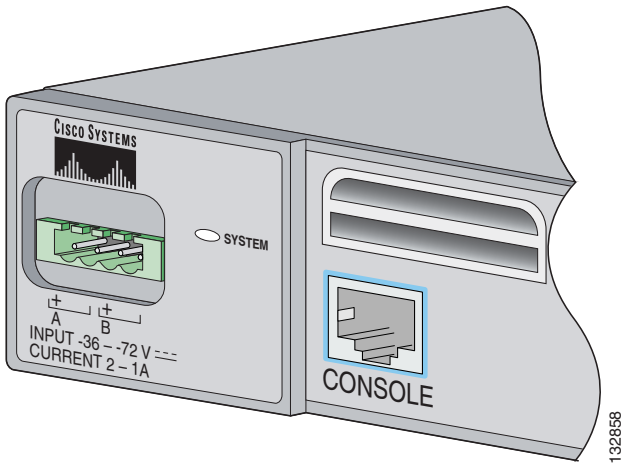
Figure C-8 Terminal Block Plug



Step 3 Identify the positive and negative feed positions for the terminal block connection. The wiring sequence is positive to positive and negative to negative for both the A and the B feed wires.

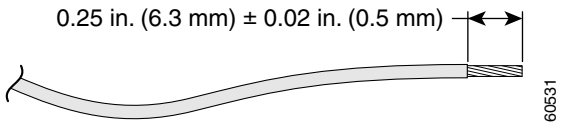
The front panel of the switch shows the positive and negative positions for both the A and B feed wires (See Figure C-9, which shows a Cisco ME 3400-24TS-DC switch.)

Figure C-9 Positive and Negative Positions



Step 4 Using an 18-gauge wire-stripping tool, strip each of the four wires coming from the DC-input power source to 0.27 inch (6.6 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.29 inch (7.4 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the terminal block plug after installation.

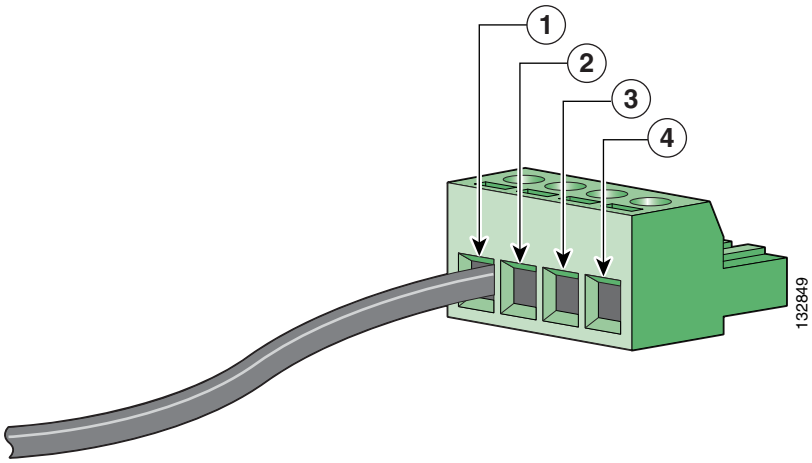
Figure C-10 Stripping the DC-Input Power Source Wire



Step 5 Insert the exposed wire of one of the four DC-input power source wires into the terminal block plug, as shown in Figure C-11. Make sure that you cannot see any wire lead. Only wire *with insulation* should extend from the terminal block.

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022

Figure C-11 Inserting Wires in the Terminal Block Plug

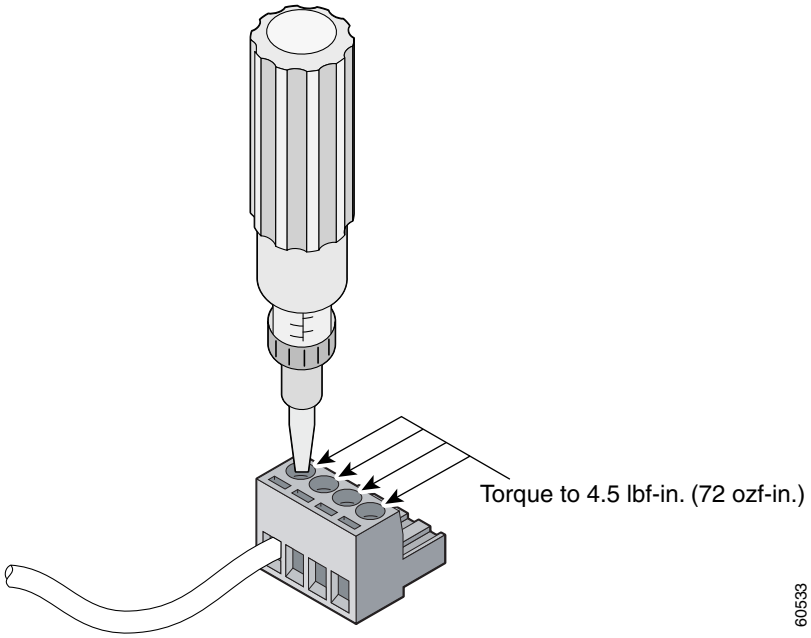


1	Return (positive) Feed A	**3**	Return (positive) Feed B
2	Supply (negative) Feed A	**4**	Supply (negative) Feed B

Step 6 Use a ratcheting torque screwdriver to torque the terminal block captive screw (above the installed wire lead) to 4.5 lbf-in. (72 ozf-in.). (See Figure C-12.)

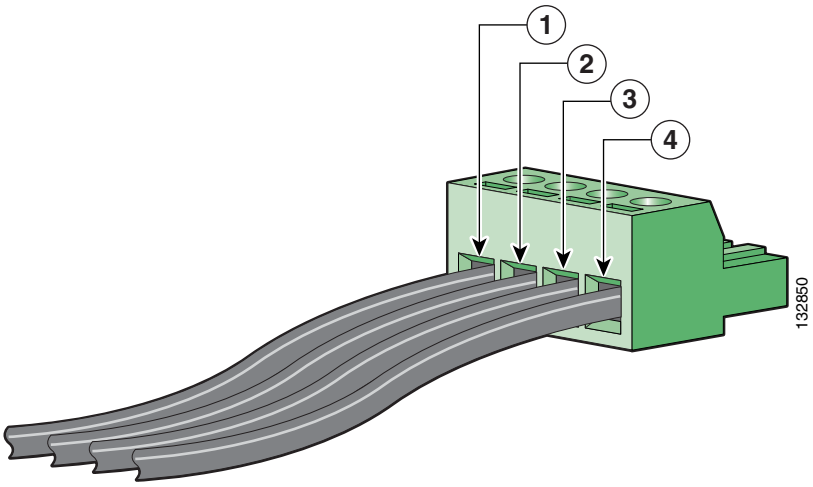
Caution Do not overtorque the terminal-block captive screws. The recommended maximum torque is 4.5 lbf-in.

Figure C-12 Torquing the Terminal-Block Captive Screws



Step 7 Repeat Steps 4 and 5 for the remaining three DC-input power source wires. Figure C-13 shows the completed wiring of a terminal block plug.

Figure C-13 Completed Wiring of Terminal Block Plug

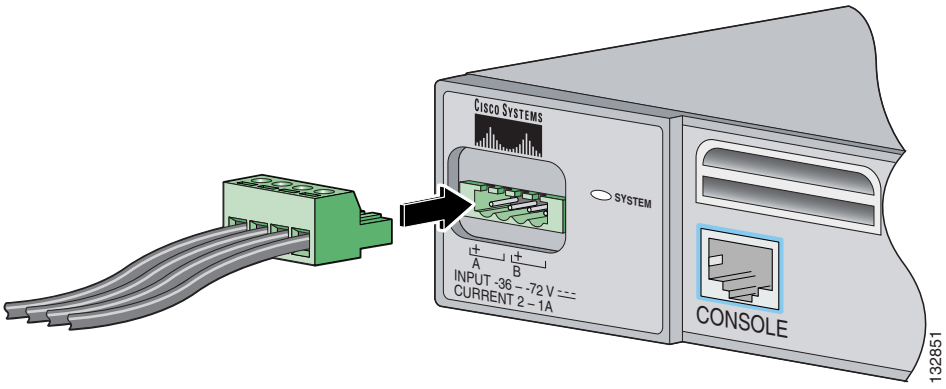


1	Return (positive) Feed A	**3**	Return (positive) Feed B
2	Supply (negative) Feed A	**4**	Supply (negative) Feed B

Step 8 Insert the terminal block plug in the terminal block header on the front panel of the switch. (See Figure C-14).

Caution Secure the wires coming in from the terminal block so that they cannot be disturbed by casual contact. For example, use tie wraps to secure the wires to the rack.

Figure C-14 Inserting the Terminal Block in the Block Header



Step 9 Remove the tape from the circuit-breaker switch handle, and move the circuit-breaker handle to the on position.

APPENDIX D

Configuring the Switch with the CLI-Based Setup Program

This appendix provides a command-line interface (CLI)-based setup procedure for a standalone switch. Before connecting the switch to a power source, review the safety warnings in Chapter 2, "Switch Installation" and Appendix C, "Connecting to DC Power."

Accessing the CLI Through the Console Port

You can access the CLI on a configured or unconfigured switch by connecting the console port of the switch to the serial port on your PC or workstation and accessing the switch through a Telnet session.

Starting the Terminal-Emulation Software

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

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

Follow these steps to start a terminal-emulation session:

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

Step 2 Configure the baud rate and character format of the PC or terminal to match these console port default characteristics:

- 9600 baud or 115200 baud (suggested rate)
- 8 data bits
- 1 stop bit
- No parity
- None (flow control)

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

To power on a DC switch, see Appendix C, "Connecting to DC Power."

Entering the Initial Configuration Information

To set up the switch, you need to complete the setup program, which runs automatically after the switch is powered up. You must assign an IP address and other configuration information necessary for the switch to communicate with the local routers and the Internet.

IP Settings

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

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

Completing the Setup Program

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

Step 1 Enter **Yes** at these two prompts.

```
Would you like to enter the initial configuration dialog? [yes/no]: yes

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system.

Would you like to enter basic management setup? [yes/no]: yes
```

Step 2 Enter a host name for the switch, and press **Return**.

On a command switch, the host name is limited to 28 characters; on a member switch to 31 characters. Do not use *-n*, where n is a number, as the last character in a host name for any switch.

```
Enter host name [Switch]: host_name
```

Step 3 Enter an enable secret password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, can start with a number, is case sensitive, allows spaces, but ignores leading spaces. The secret password is encrypted and the enable password is in plain text.

```
Enter enable secret: secret_password
```

Step 4 Enter an enable password, and press **Return**.

```
Enter enable password: enable_password
```

Step 5 Enter a virtual terminal (Telnet) password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, is case sensitive, allows spaces, but ignores leading spaces.

```
Enter virtual terminal password: terminal-password
```

Step 6 (Optional) Configure Simple Network Management Protocol (SNMP) by responding to the prompts. You can also configure SNMP later through the CLI. To configure SNMP later, enter **no**.

```
Configure SNMP Network Management? [no]: no
```

Step 7 Enter the interface name (physical interface or VLAN name) of the interface that connects to the management network, and press **Return**. For this release, always use vlan1 as that interface.

```
Enter interface name used to connect to the
management network from the above interface summary: vlan1
```

Step 8 Configure the interface by entering the switch IP address and subnet mask and pressing **Return**. The IP address and subnet masks shown below are examples.

```
Configuring interface vlan1:
Configure IP on this interface? [yes]: yes
IP address for this interface: 10.4.120.106
Subnet mask for this interface [255.0.0.0]: 255.0.0.0
```

Step 9 Enter **Y** to configure the switch as the cluster command switch. Enter **N** to configure it as a member switch or as a standalone switch.

If you enter **N**, you can configure the switch as a command switch later through the CLI. To configure it later, enter **no**.

```
Would you like to enable as a cluster command switch? [yes/no]: no
```

You have now completed the initial configuration of the switch, and the switch displays its initial configuration. This is an example of output that appears:

```
The following configuration command script was created:
hostname switch1
enable secret 5 $1$Ulq8$DlA/OiaEbl90WcBPd9cOn1
enable password enable_password
line vty 0 15
password terminal-password
no snmp-server
!
no ip routing

!
interface Vlan1
no shutdown
ip address 10.4.120.106 255.0.0.0
!
interface FastEthernet1/0/1
```

```
!
interface FastEthernet1/0/2

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

Step 10 These choices appear:

```
[0] Go to the IOS command prompt without saving this config.

[1] Return back to the setup without saving this config.

[2] Save this configuration to nvram and exit.
```

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

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

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

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

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

If you are using a Cisco ME 3400-12CS switch with a single power supply, enter the **no power-supply dual** global configuration command so that the switch does not send an alarm that the second power supply is not operating.

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