



Cisco Catalyst 9500 Series Switches Hardware Installation Guide

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



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- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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CHAPTER 1

Preface

- [Document Conventions](#) , on page 1
- [Related Documentation](#), on page 3
- [Obtaining Documentation and Submitting a Service Request](#), on page 3

Document Conventions

This document uses the following conventions:

Convention	Description
<code>^</code> or <code>Ctrl</code>	Both the <code>^</code> symbol and <code>Ctrl</code> represent the Control (<code>Ctrl</code>) key on a keyboard. For example, the key combination <code>^D</code> or <code>Ctrl-D</code> means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in bold font .
<i>Italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .
<code>Courier font</code>	Terminal sessions and information the system displays appear in <code>courier font</code> .
Bold Courier font	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x y}	Required alternative keywords are grouped in braces and separated by vertical bars.

Convention	Description
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document may use the following conventions for reader alerts:



Note

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



Tip

Means *the following information will help you solve a problem*.



Caution

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



Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.



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

Related Documentation

**Note**

Before installing or upgrading the switch, refer to the switch Release Notes.

- Cisco Catalyst 9500 Series Switches documentation, located at: <http://www.cisco.com/go/c9500>
- Cisco SFP and QSFP modules documentation, including compatibility matrixes, located at:
http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html
- Cisco Validated Designs documents, located at:
<http://www.cisco.com/go/designzone>

Obtaining Documentation and Submitting a Service Request

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<http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>

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CHAPTER 2

Product Overview

The Cisco Catalyst 9500 Series Switches family consists of fixed core and aggregation layer switches supporting redundant power supplies and modular fans. The Cisco Catalyst 9500 Series offers switch models with downlink ports of the following types:

- 16 and 32 ports of 100G QSFP28
- 12, 24 and 32 ports of 40G QSFP
- 24 and 48 ports of 25G SFP28
- 16, 24, 40 and 48 ports of 10G SFP/SFP28

The Catalyst 9500 Series Switches provide support for the following features:

- Uplink connectivity
 - Network modules with SFP and QSFP uplink ports that provide 10G and 40G connectivity on C9500-16X and C9500-40X switches.
 - Fixed QSFP uplink ports that support 40G/100G connectivity on C9500-24Y4C and C9500-48Y4C switches.
- Advanced security capabilities like MACSec-256 and TrustWorthy systems.
- IoT integration and policy-based automation from the edge to the cloud with SD-Access solution.
- RJ-45 and USB Mini-Type B console ports.
- Supports SATA SSD storage for container-based application hosting on select switch models.
- [Switch Models, on page 6](#)
- [Front Panel, on page 7](#)
- [Rear Panel, on page 29](#)

Switch Models

Table 1: Switch Models — Base PIDs

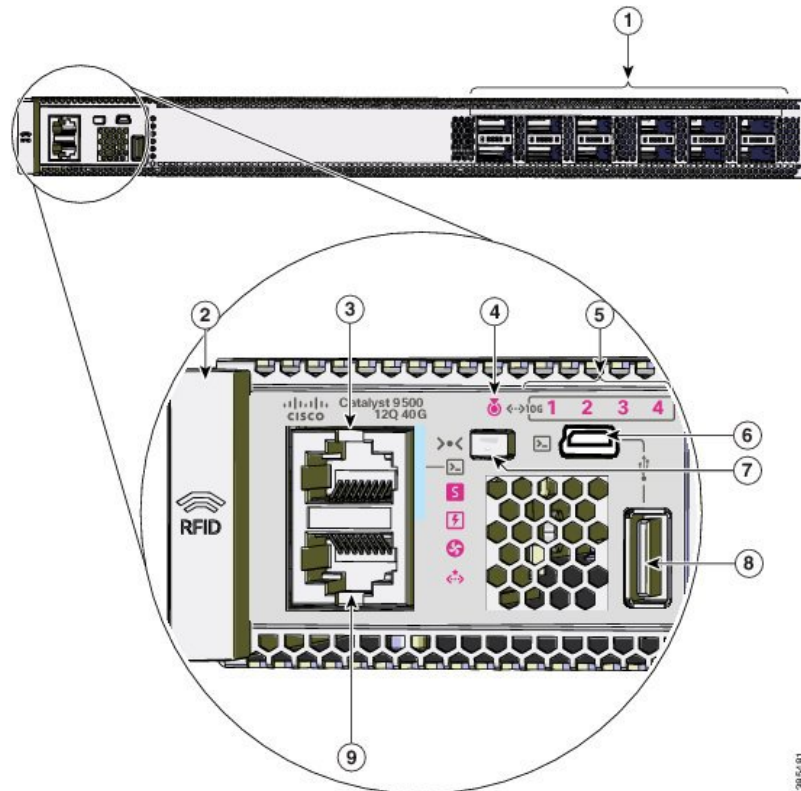
Switch Model	Description
Cisco Catalyst 9500 Series Switches	
C9500-12Q	12x40 Gigabit Ethernet QSFP+ ports and 2 power supply slots
C9500-24Q	24x40 Gigabit Ethernet QSFP+ ports and 2 power supply slots
C9500-16X	16x10 Gigabit Ethernet SFP/SFP+ ports and 2 power supply slots; supports optional network modules on uplinks ports — 8x10 Gigabit Ethernet(SFP/SFP+) and 2x40 Gigabit Ethernet(QSFP+)
C9500-40X	40x10 Gigabit Ethernet SFP/SFP+ ports and 2 power supply slots; supports optional network modules on uplink ports — 8x10 Gigabit Ethernet(SFP/SFP+) and 2x40 Gigabit Ethernet(QSFP+)
Cisco Catalyst 9500 Series High Performance Switches	
C9500-32C	32x40G/100G QSFP28 ports and 2 power supply slots
C9500-32QC	32x40G or 16x100G QSFP28 ports and 2 power supply slots
C9500-24Y4C	24x1G/10G/25G SFP28 ports and 2 power supply slots; 4x40G/100G QSFP28 fixed uplink ports
C9500-48Y4C	48x1G/10G/25G SFP28 ports and 2 power supply slots; 4x40G/100G QSFP28 fixed uplink ports

Table 2: Switch Models — Bundle PIDs

Switch Model	Description
C9500-16X-2Q	16x10 Gigabit Ethernet SFP/SFP+ ports and 2x40 Gigabit Ethernet (QSFP+) network module on uplink ports; and two power supply slots
C9500-40X-2Q	40 10-Gigabit Ethernet SFP/SFP+ ports and 2x40 Gigabit Ethernet (QSFP+) network module on uplink ports; and two power supply slots
C9500-24X	16x10 Gigabit Ethernet SFP/SFP+ ports and 8x10 Gigabit Ethernet (SFP/SFP+) network module on uplink ports; and two power supply slots
C9500-48X	40x10 Gigabit Ethernet SFP/SFP+ ports and 8x10 Gigabit Ethernet (SFP/SFP+) network module on uplink ports; and two power supply slots

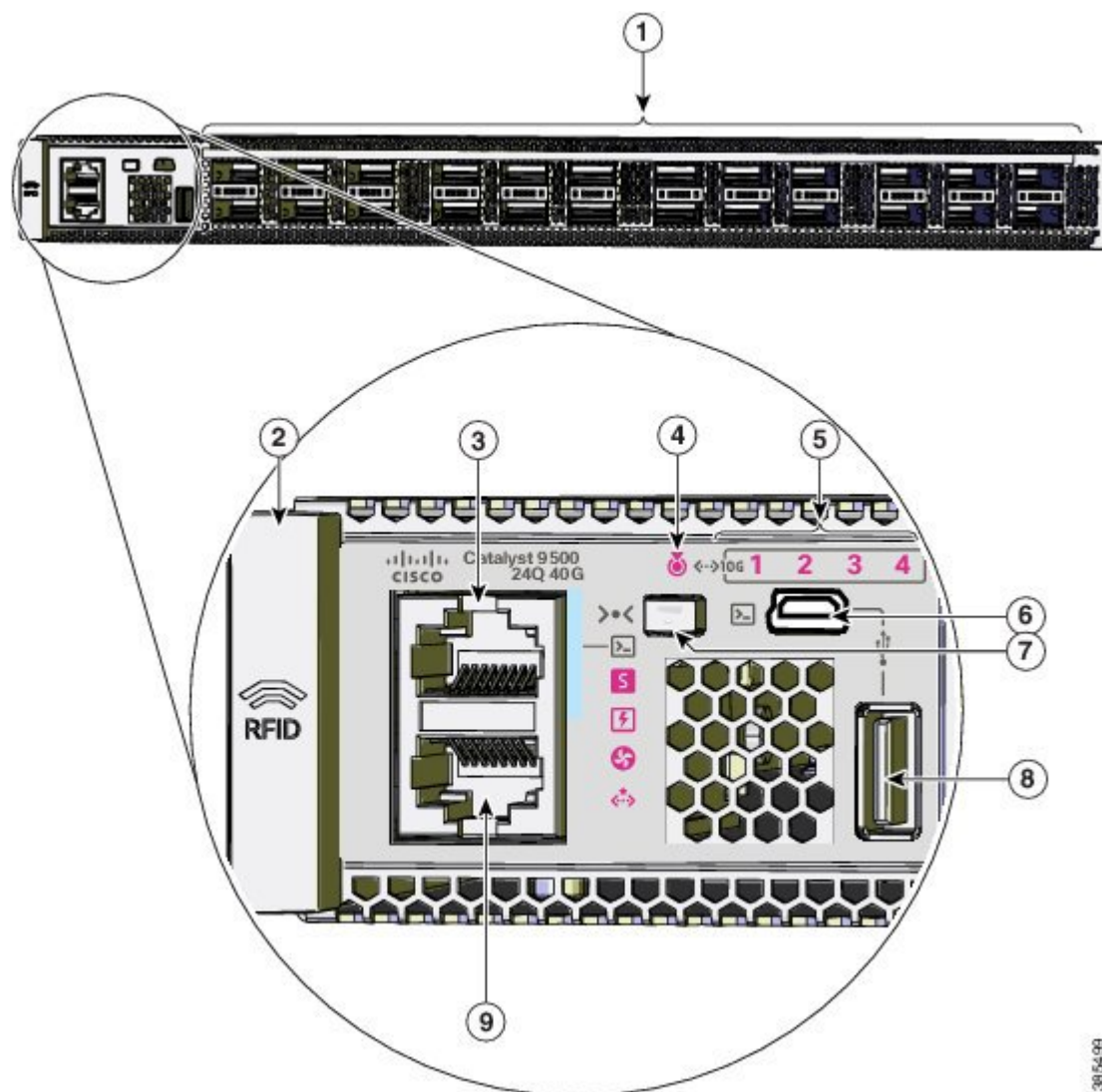
Front Panel

Figure 1: Front Panel of a 12-Port Cisco Catalyst 9500 Switch



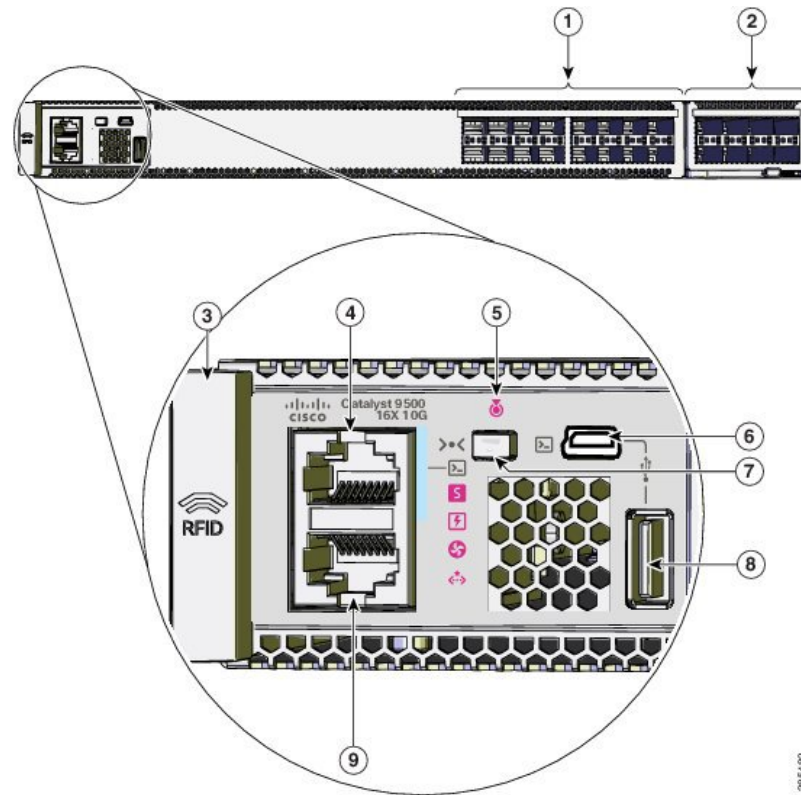
1	12 40G QSFP ports	6	USB mini Type B console port
2	RFID	7	Mode button
3	Console port (RJ-45 Serial)	8	USB 2.0 host port
4	Blue beacon LED	9	Ethernet management RJ-45 port
5	10G Status LEDs		

Figure 2: Front Panel of a 24-Port Cisco Catalyst 9500 Switch



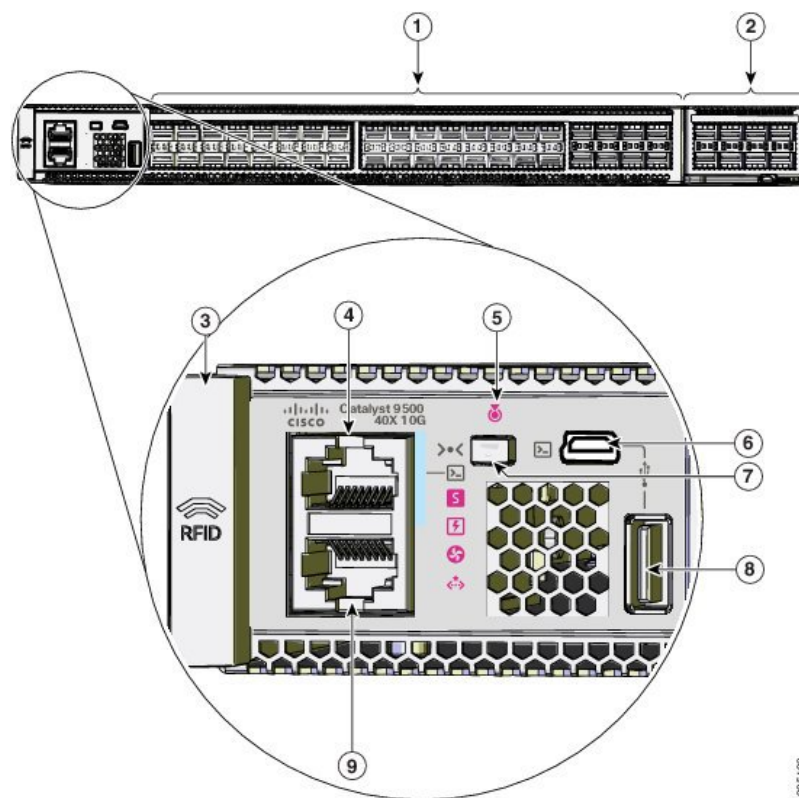
1	24 40G QSFP ports	6	USB mini Type B console port
2	RFID	7	Mode button
3	Console port (RJ-45 Serial)	8	USB 2.0 host port
4	Blue beacon LED	9	Ethernet management RJ-45 port
5	10G Status LEDs		

Figure 3: Front Panel of a 16-Port Cisco Catalyst 9500 Switch



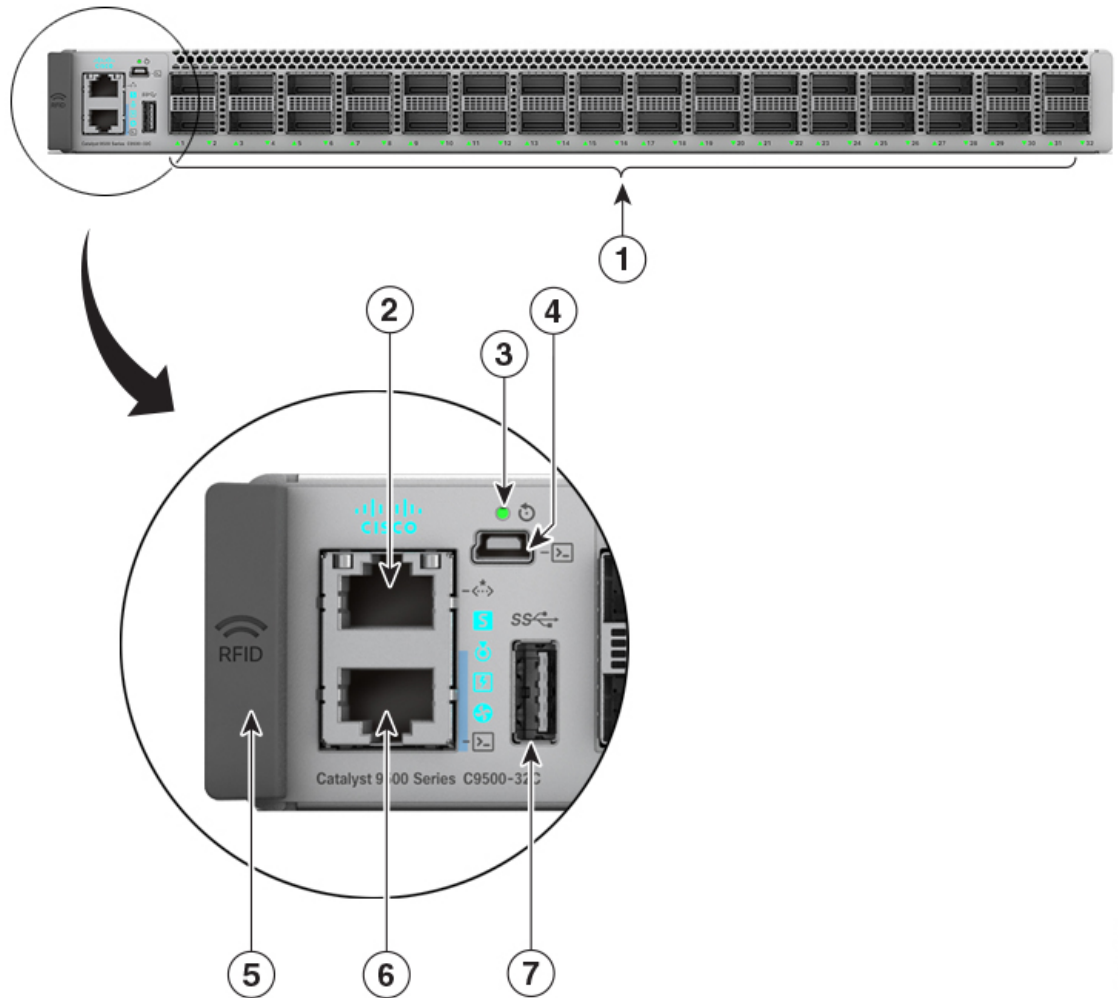
1	16 10G SFP ports	6	USB mini Type B console port
2	Network modules	7	Mode button
3	RFID	8	USB 2.0 host port
4	Console port (RJ-45 Serial)	9	Ethernet management RJ-45 port
5	Blue beacon LED		

Figure 4: Front Panel of a 40-Port Cisco Catalyst 9500 Switch



1	40 10G SFP ports	6	USB mini Type B console port
2	Network modules	7	Mode button
3	RFID	8	USB 2.0 host port
4	Console port (RJ-45 Serial)	9	Ethernet management RJ-45 port
5	Blue beacon LED		

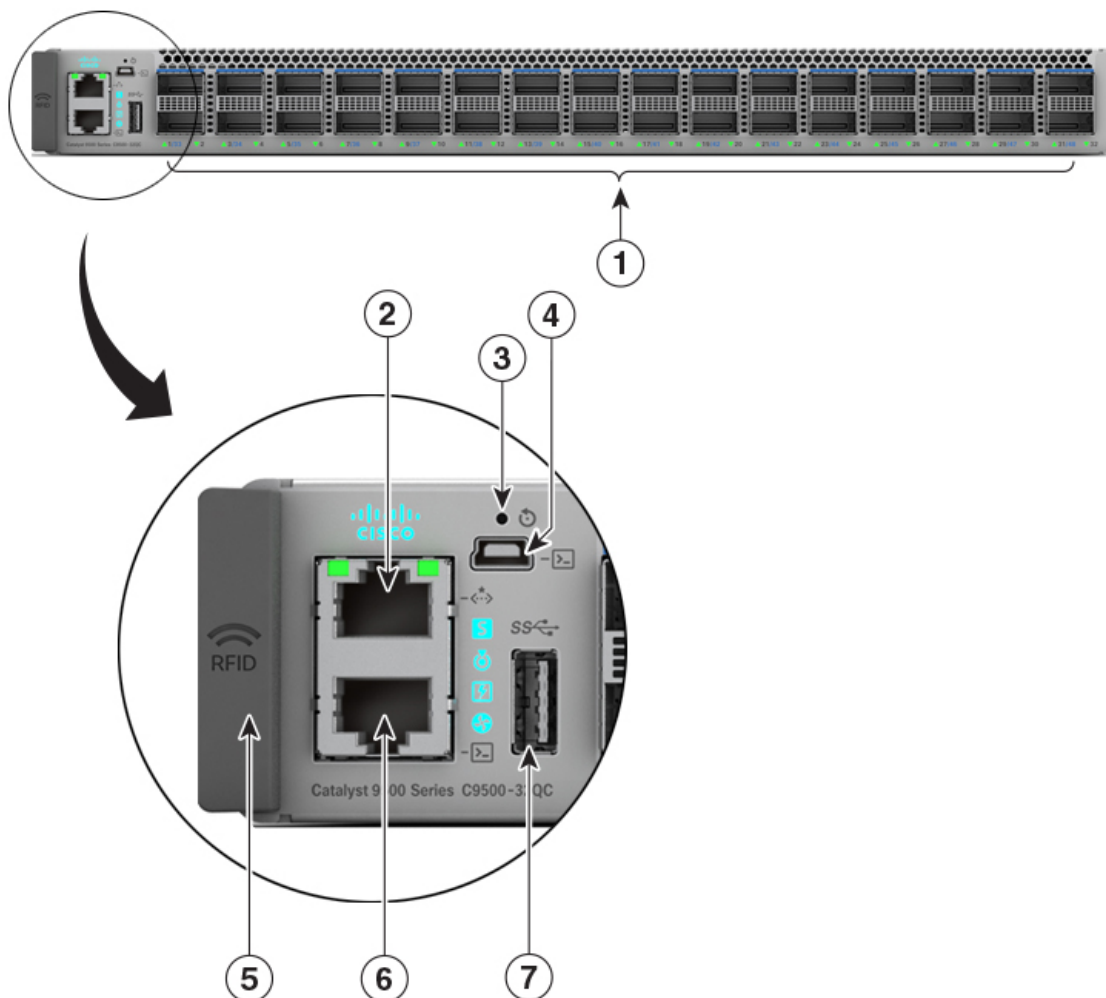
Figure 5: Front Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32C)



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1	32 40G/100G QSFP28 ports	5	RFID
2	Ethernet management port	6	Console port (RJ-45 Serial)
3	Reset button	7	USB 3.0 host port
4	USB mini Type B console port		

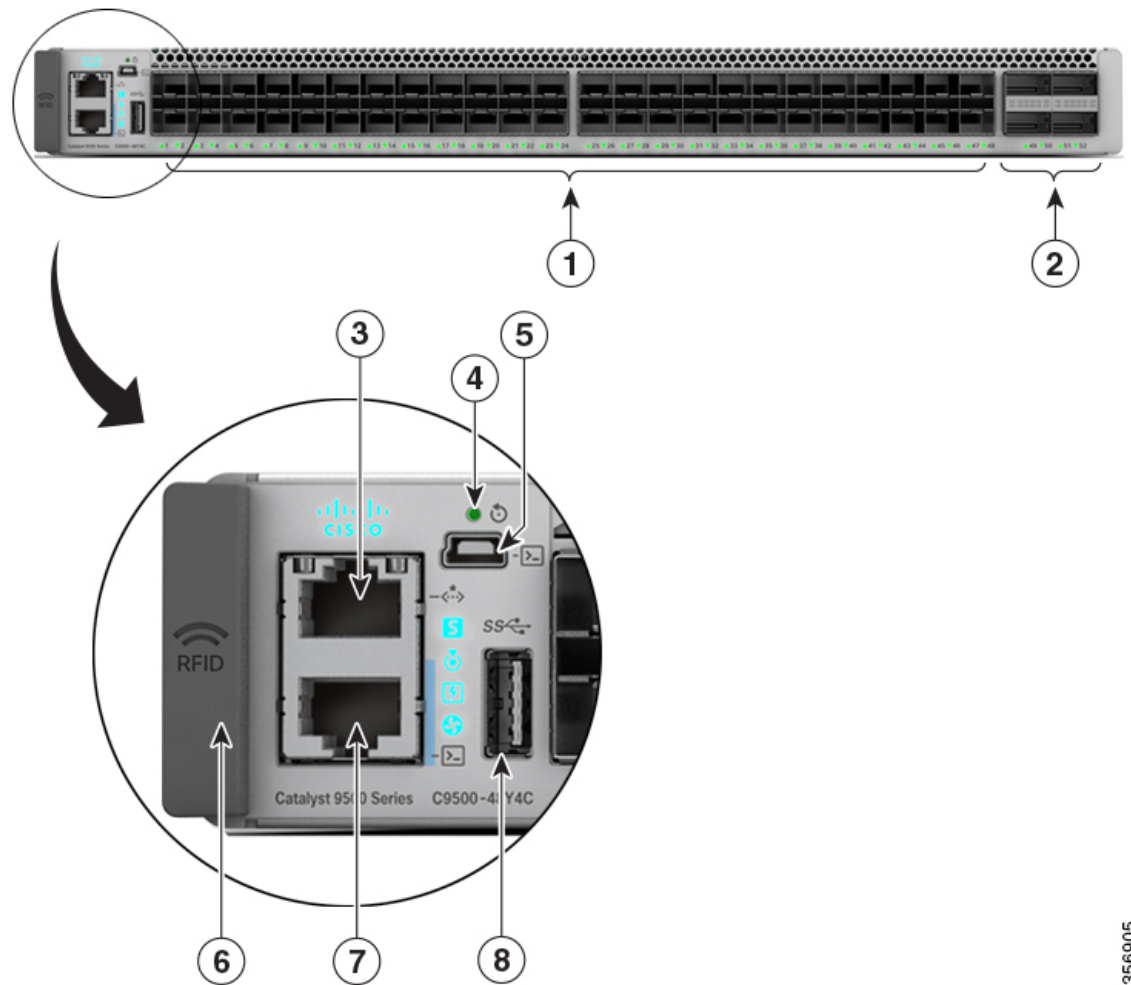
Figure 6: Front Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32QC)



1	32 40G or 16 100G QSFP28 ports	5	RFID
2	Ethernet management port	6	Console port (RJ-45 Serial)
3	Reset button	7	USB 3.0 host port
4	USB mini Type B console port		

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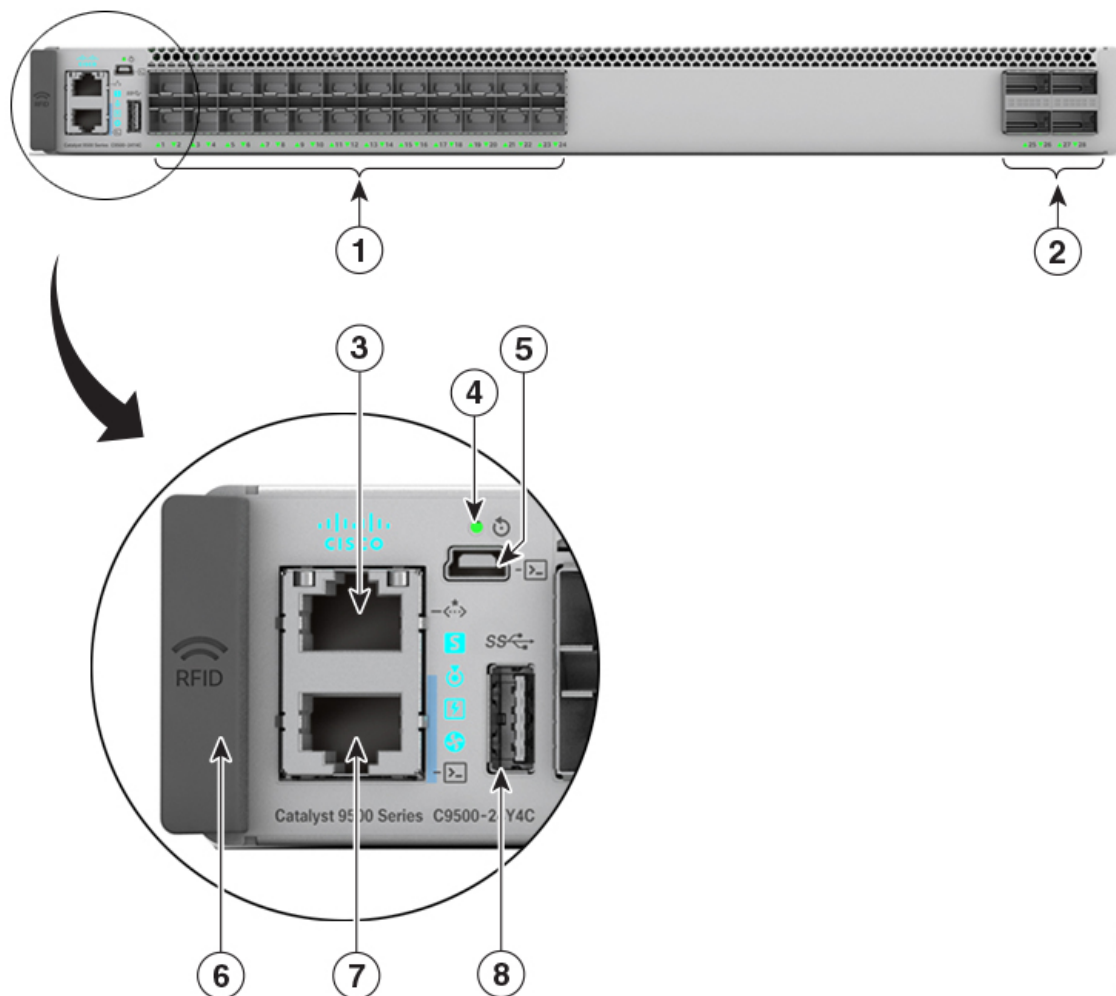
Figure 7: Front Panel of a 48-Port Cisco Catalyst 9500 High Performance Switch (C9500-48Y4C)



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1	48 1G/10G/25G SFP28 ports	5	USB mini Type B console port
2	Uplink ports	6	RFID
3	Ethernet management port	7	Console port (RJ-45 Serial)
4	Reset button	8	USB 3.0 host port

Figure 8: Front Panel of a 24-Port Cisco Catalyst 9500 High Performance Switch (C9500-24Y4C)



1	24 1G/10G/25G SFP28 ports	5	USB mini Type B console port
2	Uplink ports	6	RFID
3	Ethernet management port	7	Console port (RJ-45 Serial)
4	Reset button	8	USB 3.0 host port

SFP and QSFP Module Ports

The SFP and QSFP modules provide copper or fiber-optic connections to other devices. The SFP and QSFP module ports for Cisco Catalyst 9500 Series Switches are as follows :

Table 3: Cisco Catalyst 9500 Series Switch Models

Switch model	Supported ports
Cisco Catalyst 9500 Series Switches	
C9500-12Q	Supports standard 12x40G QSFP+ modules.
C9500-24Q	Supports standard 24x40G QSFP+ modules.
C9500-16X	Supports standard 16x10G SFP modules. The uplink ports support 8x10G SFP/SFP+ modules and 2x40G QSFP+ modules.
C9500-40X	Supports standard 40x10G SFP modules. The uplink ports support 8x10G SFP/SFP+ modules and 2x40G QSFP+ modules.
Cisco Catalyst 9500 Series High Performance Switches	
C9500-32C	Supports standard 32x100G or 32x40G QSFP28 modules; all ports are 100G/40G capable.
C9500-32QC	Supports standard 16x100G or 32x40G QSFP28 modules; only the ports in the top row are 100G capable.
C9500-24Y4C	Supports standard 24x25G or 24x10G SFP28 modules; all ports are 25G/10G/1G capable. The uplink ports support 4x100G or 4x40G QSFP+ modules.
C9500-48Y4C	Supports standard 48x25G or 48x10G SFP28 modules; all ports are 25G/10G/1G capable. The uplink ports support 4x100G or 4x40G QSFP+ modules.



Note For information about SFP and QSFP network modules, see [Network Modules](#), on page 22.

Support for Breakout Cables

On Cisco Catalyst 9500 Series High Performance Switches ,breakout cables are supported only on the C9500-32C model. Breakout cables enable a single 40G QSFP+ interface to be split into four 10G SFP+ interfaces and a single 100G QSFP28 interface into four 25G SFP28 interfaces.

For supported SFP and QSFP modules, refer to the Cisco Transceiver Modules Compatibility Information at <http://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html> .

Port Mapping for Cisco Catalyst 9500 Series Switches

The odd-numbered ports are on the upper row and the even-numbered ports on the lower row. The following figures show how the ports and the LEDs are numbered on different switch models. This section also explains

the port mapping between 40G and 10G ports for the switches when configuring 40G ports to operate as four 10G ports using breakout cables.

C9500-12Q

Figure 9: 40G native port numbering

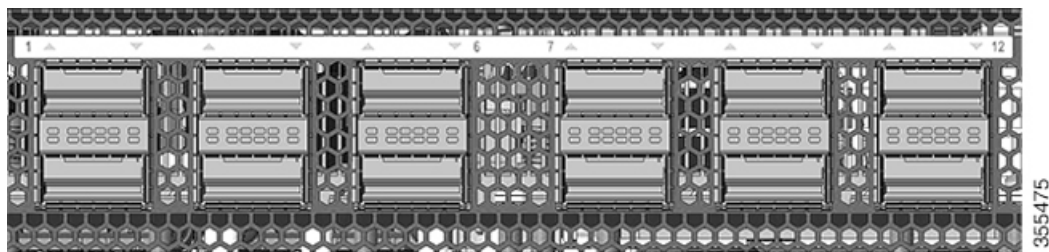


Table 4: Port mapping for C9500-12Q

40-Gigabit native ports	Configurable 10-Gigabit ports with Breakout Cable
1	1, 2, 3, and 4
2	5, 6, 7, and 8
3	9, 10, 11, and 12
4	13, 14, 15, and 16
5	17, 18, 19, and 20
6	21, 22, 23, and 24
7	25, 26, 27, and 28
8	29, 30, 31, and 32
9	33, 34, 35, and 36
10	37, 38, 39, and 40
11	41, 42, 43, and 44
12	45, 46, 47, and 48

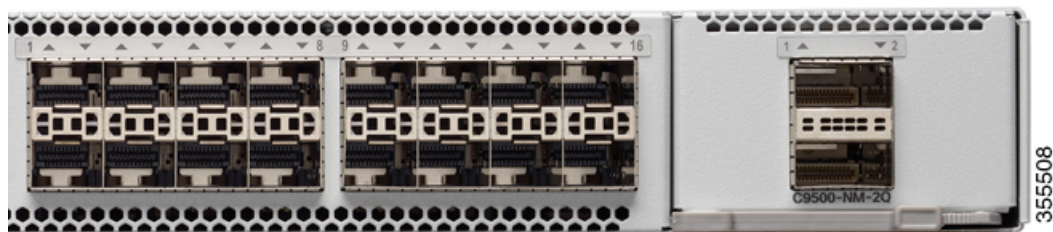
C9500-24Q

Figure 10: 40G native port numbering



Table 5: Port mapping for C9500-24Q

40-Gigabit native ports	Configurable 10-Gigabit ports with Breakout Cable
1	1, 2, 3, and 4
2	5, 6, 7, and 8
3	9, 10, 11, and 12
4	13, 14, 15, and 16
5	17, 18, 19, and 20
6	21, 22, 23, and 24
7	25, 26, 27, and 28
8	29, 30, 31, and 32
9	33, 34, 35, and 36
10	37, 38, 39, and 40
11	41, 42, 43, and 44
12	45, 46, 47, and 48
13	49, 50, 51, and 52
14	53, 54, 55, and 56
15	57, 58, 59 and 60
16	61, 62, 63, and 64
17	65, 66, 67 and 68
18	69, 70, 71, and 72
19	73, 74, 75, and 76
20	77, 78, 79, and 80
21	81, 82, 83, and 84
22	85, 86, 87, and 88
23	89, 90, 91, and 92
24	93, 94, 95, and 96

C9500-16X*Figure 11: 10G native port numbering**Table 6: Port mapping for C9500-16X*

40-Gigabit Uplink ports	Configurable 10-Gigabit ports with Breakout Cable
17	1, 2, 3, and 4
18	5, 6, 7, and 8

C9500-40X*Figure 12: 10G native port numbering**Table 7: Port mapping for C9500-40X*

40-Gigabit Uplink ports	Configurable 10-Gigabit ports with Breakout Cable
41	1, 2, 3, and 4
42	5, 6, 7, and 8

Port Mapping for Cisco Catalyst 9500 Series High Performance Switches

The following figures show how the ports are numbered on different Cisco Catalyst 9500 Series High Performance Switches.

C9500-32C*Figure 13: Native Port Numbering for C9500-32C*

All the 32 ports can be configured as 100G or 40G.

Port Type	Port Number on the Switch
100G native ports	1—32
40G native ports	1—32

Breakout is supported only on 24 ports of the C9500-32C switch model. Every 4th port of C9500-32C does not support breakout due to ASIC limitation. Port numbers 4, 8, 12, 16, 20, 24, 28 and 32 do not support breakout. When you enable breakout on a native port, the port numbering convention changes from 3-tuple to 4-tuple. For example, if you enable breakout on port number 2 which is represented as Hu1/0/2, four logical ports are created which are represented as Hu1/0/2/1, Hu1/0/2/2, Hu1/0/2/3 and Hu1/0/2/4.

Table 8: Port mapping for C9500-32C

40G/100G native ports	Configurable 10G/25G ports with Breakout Cable	40G/100G native ports	Configurable 10G/25G ports with Breakout Cable
1	1/0/1/1, 1/0/1/2, 1/0/1/3, 1/0/1/4	17	1/0/17/1, 1/0/17/2, 1/0/17/3, 1/0/17/4
2	1/0/2/1, 1/0/2/2, 1/0/2/3, 1/0/2/4	18	1/0/18/1, 1/0/18/2, 1/0/18/3, 1/0/18/4
3	1/0/3/1, 1/0/3/2, 1/0/3/3, 1/0/3/4	19	1/0/19/1, 1/0/19/2, 1/0/19/3, 1/0/19/4
4	Not applicable	20	Not applicable
5	1/0/5/1, 1/0/5/2, 1/0/5/3, 1/0/5/4	21	1/0/21/1, 1/0/21/2, 1/0/21/3, 1/0/21/4
6	1/0/6/1, 1/0/6/2, 1/0/6/3, 1/0/6/4	22	1/0/22/1, 1/0/22/2, 1/0/22/3, 1/0/22/4
7	1/0/7/1, 1/0/7/2, 1/0/7/3, 1/0/7/4	23	1/0/23/1, 1/0/23/2, 1/0/23/3, 1/0/23/4
8	Not applicable	24	Not applicable
9	1/0/9/1, 1/0/9/2, 1/0/9/3, 1/0/9/4	25	1/0/25/1, 1/0/25/2, 1/0/25/3, 1/0/25/4
10	1/0/10/1, 1/0/10/2, 1/0/10/3, 1/0/10/4	26	1/0/26/1, 1/0/26/2, 1/0/26/3, 1/0/26/4
11	1/0/11/1, 1/0/11/2, 1/0/11/3, 1/0/11/4	27	1/0/27/1, 1/0/27/2, 1/0/27/3, 1/0/27/4
12	Not applicable	28	Not applicable
13	1/0/13/1, 1/0/13/2, 1/0/13/3, 1/0/13/4	29	1/0/29/1, 1/0/29/2, 1/0/29/3, 1/0/29/4
14	1/0/14/1, 1/0/14/2, 1/0/14/3, 1/0/14/4	30	1/0/30/1, 1/0/30/2, 1/0/30/3, 1/0/30/4
15	1/0/15/1, 1/0/15/2, 1/0/15/3, 1/0/15/4	31	1/0/31/1, 1/0/31/2, 1/0/31/3, 1/0/31/4
16	Not applicable	32	Not applicable

For more information about how to configure a breakout interface, see "Configuring Breakout Interfaces" section in the *Interface and Hardware Components Configuration Guide*.

C9500-32QC**Figure 14: Native Port Numbering for C9500-32QC**

Port Type	Port Number on the Switch
40G native ports	1—32
100G native ports	33—48

The 40G ports on this switch can be configured to function as 100G ports using the Command Line Interface (CLI). For more information about mode conversion, see "Configuring Interface Characteristics" in *Interface and Hardware Components Configuration Guide*.

C9500-24Y4C**Figure 15: Native Port Numbering for C9500-24Y4C**

Port Type	Port Number on the Switch
25G native ports	1—24
40G or 100G native ports	25—28

C9500-48Y4C**Figure 16: Native Port Numbering for C9500-48Y4C**

Port Type	Port Number on the Switch
25G native ports	1—48
40G or 100G native ports	49—52

RFID Tag

The chassis has a built-in, front-facing, passive RFID tag that uses UHF RFID technology and requires an RFID reader with compatible software. It provides auto-identification capabilities for asset management and tracking. The RFID tags are compatible with the Generation 2 GS1 EPC Global Standard and are ISO 18000-6C compliant. They operate in the 860- to 960-MHz UHF band. For more information, see [Radio Frequency Identification \(RFID\) on Cisco Catalyst 9000 Family Switches White Paper](#).

Console Ports

The console ports connect the switch to a PC running Microsoft Windows or to a terminal server.

- RJ-45 console port (EIA/TIA-232). The RJ-45 console port connection uses an RJ-45-to-DB-9 female cable.
- USB mini-Type B console port (5-pin connector).

If you use the USB mini-Type B console port, the Cisco Windows USB device driver must be installed on any PC connected to the console port (for operation with Microsoft Windows). Mac OS X or Linux do not require special drivers.

The 4-pin mini-Type B connector resembles the 5-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B.

This illustration shows a 5-pin mini-Type B USB port.

Figure 17: USB Mini-Type B Port



With the Cisco Windows USB device driver, you can connect and disconnect the USB cable from the console port without affecting Windows HyperTerminal operations.

The console output always goes to both the RJ-45 and the USB console connectors, but the console input is active on only one of the console connectors at any one time. The USB console takes precedence over the RJ-45 console. When a cable is connected into the USB console port, the RJ-45 console port becomes inactive. Conversely, when the USB cable is disconnected from the USB console port, the RJ-45 port becomes active.

You can use the command-line interface (CLI) to configure an inactivity timeout which reactivates the RJ-45 console if the USB console has been activated and no input activity has occurred on the USB console for a specified time.

After the USB console deactivates due to inactivity, you cannot use the CLI to reactivate it. Disconnect and reconnect the USB cable to reactivate the USB console. For information on using the CLI to configure the USB console interface, see the Software Configuration Guide, Cisco IOS XE Everest 16.5.1 (Catalyst 9500 Switches).

Management Port

The Ethernet management port, also referred to as the Gi0/0 or GigabitEthernet0/0 port, is a VRF (VPN routing/forwarding) interface to which you can connect a PC. It supports TFTP image downloading, network management, SNMP, Telnet, and SSH connections. The switches support out-of-band management through

the Mgmt-vrf. Mgmt-vrf is used to segment management traffic from the global routing table of the switch. The Ethernet management port supports speeds upto 10/100/1000 Mbps and is set to auto-negotiate.

USB Host Ports

The Cisco Catalyst 9500 Series Switches support two USB host ports — USB 2.0 on the front panel and USB 3.0 on the back panel. USB 2.0 port supports Cisco USB flash drives with capacities from 128 MB to 8 GB (USB devices with port densities of 128 MB, 256 MB, 1 GB, 4 GB, and 8 GB are supported). Cisco IOS software provides standard file system access to the flash device: read, write, erase, and copy, as well as the ability to format the flash device with a FAT file system. USB 3.0 SSD port provides an optional 120 GB USB 3.0 SSD storage device for application hosting and saving packet captures and trace logs.

In Cisco Catalyst 9500 Series High Performance Switches, the USB 3.0 port is available on the front panel and support Cisco USB flash drives with capacities from 64 MB to 16 GB.

Mode Button

The mode button has the following function:

- 10G Status LED Mode — works with 10G Status LEDs to indicate status of 10G ports

10G Status LED Mode



Note

This functionality is available only on Cisco Catalyst 9500 Series Switches.

Each 40G port can be configured to function as a 10G port using a Cisco QSFP to four SFP Active Optical Breakout Cables that connect a 40G QSFP port of the switch on one end to four 10G SFP ports of the switch on the other end. After system bootup, the four 10G Status LEDs indicate the status of 10G ports 1-4 by default which maps to 40G port number 1. A short press on the mode button moves the pointer to the next 10G group (5-8) which maps to 40G port number 2. You can check the status of all the 96 10G ports by pressing the mode button 24 times, after which it rolls back to 10G port 1-4.

Network Modules

The C9500-16X and C9500-40X switch models support two network modules that provide uplink ports to connect to other devices. The switch should only be operated with either a network module or a blank module installed.

Table 9: Network Modules

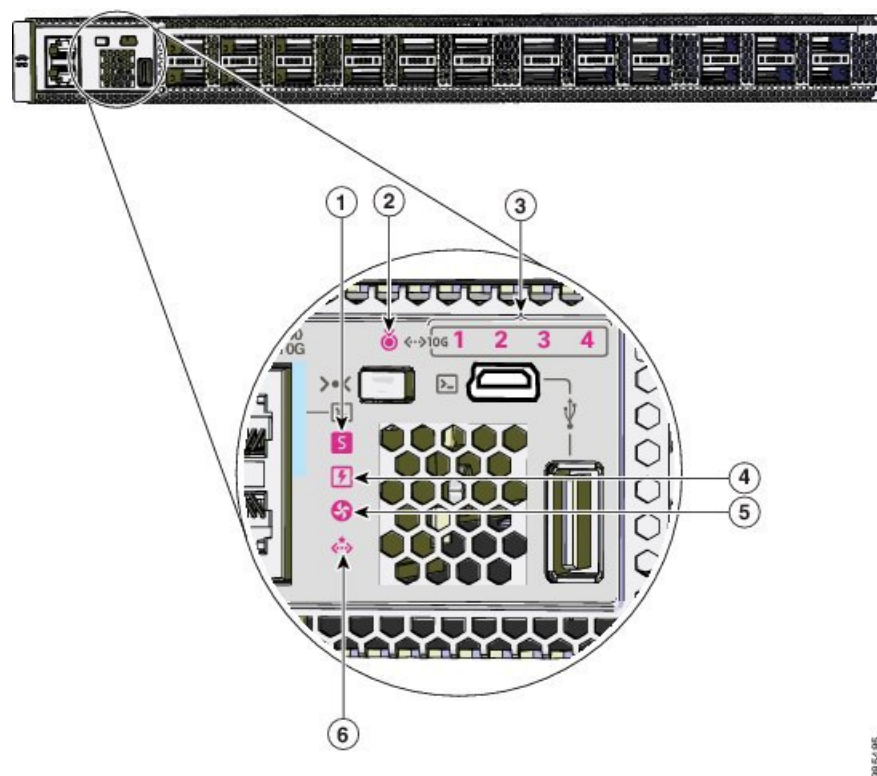
Network Module	Description
C9500-NM-8X	This module has eight 10G SFP ports. Any combination of standard SFP modules are supported.
C9500-NM-2Q	This module has two 40G QSFP ports. Any combination of standard QSFP modules are supported.

For information about the network modules, see Installing the Network Modules section. For cable specifications, see Cables and Adapters section.

LED Indicators

You can use the switch LEDs to monitor switch activity and performance. You can also monitor the status of the fan tray assembly and the power supplies.

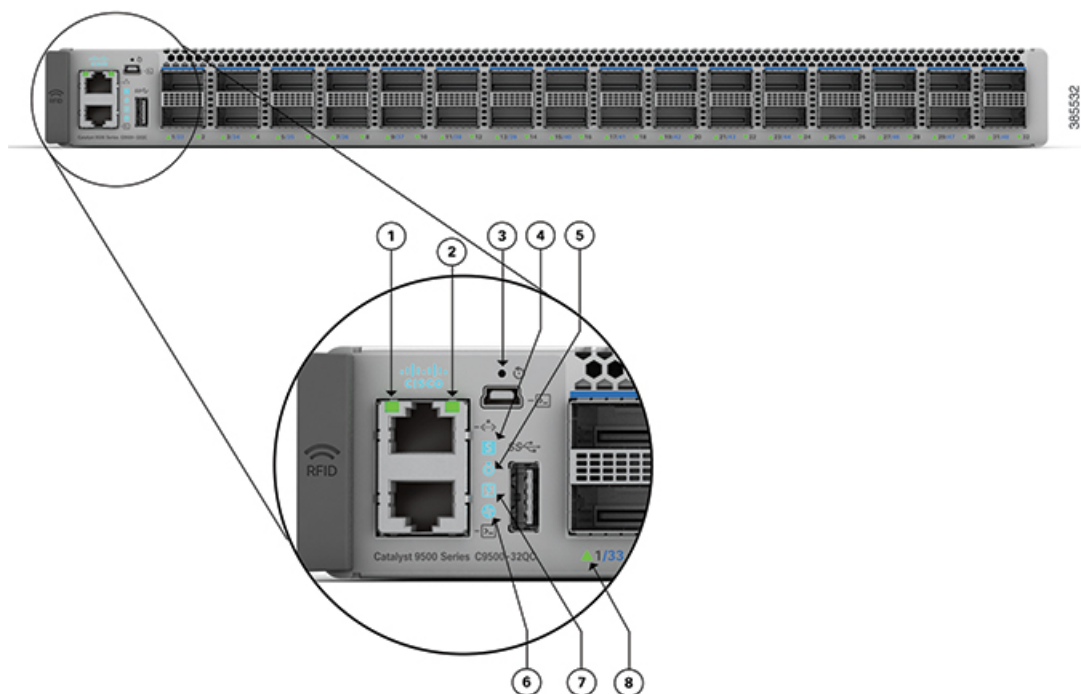
Figure 18: LEDs on Cisco Catalyst 9500 Series Switches



1	System LED	4	Power Supply Unit(PSU) LED
2	Blue beacon LED	5	Fan LED
3	10G Status LEDs ¹	6	Ethernet Management port LED

¹ Available only on switches with 10G ports.

Figure 19: LEDs on Cisco Catalyst 9500 Series High Performance Switches



1	Ethernet Management port link activity LED	5	Blue beacon LED
2	Ethernet Management port link status LED	6	Fan LED
3	Reset switch	7	Power Supply Unit (PSU) LED
4	System LED	8	Port LEDs

System LED

The system LED indicates the status of the system.

Table 10: System LED Indicator

Color/State	Description
Off	System is not operational.
Green	System is operating normally without alarms.
Amber	System has triggered a minor environmental alarm.
Red	System has triggered a major environmental alarm.

Power Supply LEDs

Power supply modules LED

The following description applies only when two power supplies modules are installed in the switch.

Table 11: Power Supply LED Indicators

Color/State	Description
Green	Power supply is operating normally.
Amber	One of the PSU has input loss.
Red	One of the PSU has output failure.

Port LEDs and Modes

Cisco Catalyst 9500 Series Switches

Each Ethernet port, 1-Gigabit Ethernet module slot, and 10-Gigabit Ethernet module slot has a port LED. These port LEDs, as a group or individually, display information about the switch and about the individual ports. The port mode determines the type of information shown by the port LEDs.

To select or change a mode, press the Mode button until the desired mode is highlighted. When you change port modes, the meanings of the port LED colors also change.

When you press the Mode button on any switch in the switch stack, all the stack switches change to show the same selected mode. For example, if you press the Mode button on the active switch to show the SPEED LED, all the other switches in the stack also show the SPEED LED.

Table 12: Port Mode LEDs

Mode LED	Port Mode	Description
STAT	Port status	The port status. This is the default mode.
SPEED	Port speed	The port operating speed: 10, 100, or 1000 Mb/s.
DUPLX	Port duplex mode	The port duplex mode: full duplex or half duplex.
ACTV	Active	The active switch status.
STACK	Stack member status StackWise port status	Stack member status. The StackWise port status.
PoE ²	The PoE+ port status.	The PoE+ port status.

² Only switches with PoE+ ports.

Table 13: Meaning of Switch LED Colors in Different Modes

Port Mode	Port LED Color	Meaning
STAT (port status)	Off	No link, or port was administratively shut down.
	Green	Link present, no activity.
	Blinking green	Activity. Port is sending or receiving data.
	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 blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED can be amber for up to 30 seconds as STP checks the switch for possible loops.
SPEED	10/100/1000/SFP ports	
	Off	Port is operating at 10 Mb/s.
	Green	Port is operating at 100 Mb/s.
	Single green flash (on for 100 ms, off for 1900 ms)	Port is operating at 1000 Mb/s.
	Blinking twice	Port is operating at 2500, 5000 or 10000 Mb/s
	Network module slots	
	Off	Port is not operating.
	Blinking green	Port is operating at up to 10 Gb/s.
DUPLX (duplex)	Off	Port is operating in half duplex.
	Green	Port is operating in full duplex.
ACTV (data active switch)	Off	The switch is not the active switch. Note For a standalone switch, this LED is off.
	Green	The switch is the active switch.
	Amber	Error during active switch election.
	Blinking green	Switch is a standby member of a data stack and assumes active responsibilities if the current active switch fails.

Port Mode	Port LED Color	Meaning
STACK (stack member)	Off	No stack member corresponding to that member number.
	Blinking green	Stack member number.
	Green	Member numbers of other stack member switches.
PoE+ ³	Off	PoE+ is off. If the powered device is receiving power from an AC power source, the port LED is off even if the device is connected to the switch port.
	Green	PoE+ is on. The port LED is green when the switch port is providing power.
	Alternating green-amber	PoE+ is denied because providing power to the powered device will exceed the switch power capacity.
	Blinking amber	PoE+ is off due to a fault or because it has exceeded a limit set in the switch software. Caution PoE+ faults occur when noncompliant cabling or powered devices are connected to a PoE+ port. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points or IEEE 802.3af-compliant devices to PoE+ ports. You must remove from the network any cable or device that causes a PoE+ fault.
	Amber	PoE+ for the port has been disabled. Note PoE+ is enabled by default.

³ Only switches with PoE or PoE+ ports.

Cisco Catalyst 9500 Series High Performance Switches

The port LEDs on the Cisco Catalyst 9500 Series High Performance Switches display only the port status.

Table 14: Meaning of Switch LED Colors for Port Status LED

Port LED Color	Meaning
Off	Link is not up.
Green	Link present.
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.

Port LED Color	Meaning
Amber	<ul style="list-style-type: none"> Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED can be amber for up to 30 seconds as STP checks the switch for possible loops. Port link is disabled, that is, administratively down.

Beacon LED

The UID and the Beacon LED can be turned on by the administrator to indicate that the switch needs attention. It helps the administrator identify the switch. The beacon can be turned on by either pressing the UID button on the switch front panel, or by using the CLI. There is a blue beacon on the front and rear panel of the switch. The blue beacon on the front panel is a button labeled UID, and on the back panel it is a LED labeled BEACON.

Color/State	Description
Solid blue	The operator has indicated that the system needs attention.

Fan LED

Table 15: Fan LED Indicator

Color/State	Description
Off	The fan is not receiving power; the fans have stopped.
Green	All fans are operating normally.
Amber	One or more fans have encountered tachometer faults.
Red	One or more fans' tachometer faults have exceeded the maximum limit.

Ethernet Management Port LED

The following table describes the colors and the descriptions of the LEDs for link activity and link status of the Ethernet management port.

Table 16: Ethernet Management Port Link Activity LED

Color	Description
Blinking green	Link is up.
Off	Link is down.

Table 17: Ethernet Management Port Link Status LED

Color	Description
Solid green	Link is up.
Off	Link is down.

Rear Panel

Figure 20: Rear Panel of a Cisco Catalyst 9500 Switch (C9500-12Q, C9500-24Q, C9500-40X and C9500-16X)

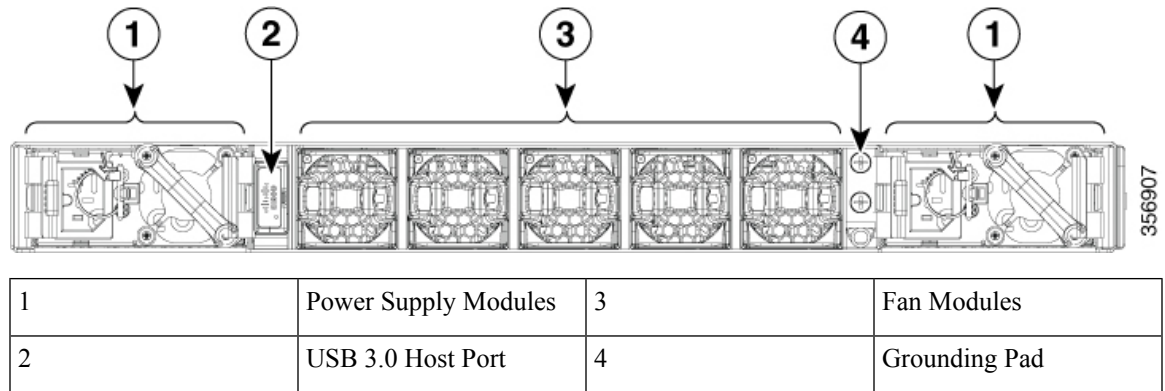


Figure 21: Rear Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32C)

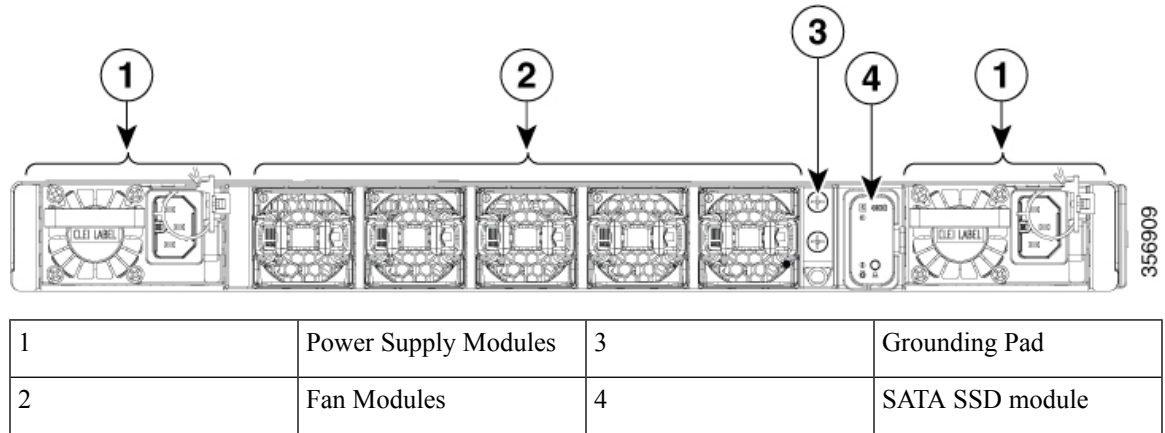
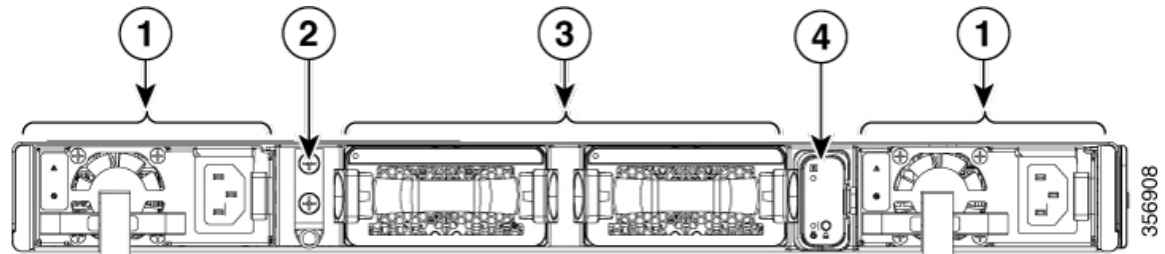


Figure 22: Rear Panel of a Cisco Catalyst 9500 High Performance Switch (C9500-32QC, C9500-48Y4C, and C9500-24Y4C)



1	Power Supply Modules	3	Fan Modules
2	Grounding Pad	4	SATA SSD module

SATA SSD Module

To support the storage needs on the switch, the Cisco Catalyst 9500 Series High Performance Switches provide support for pluggable Serial Advanced Technology Attachment (SATA) Solid State Drive (SSD) module. The SATA SSD module slot is located at the rear panel of the switch. The SSD module storage capacity ranges are 240GB, 480GB and 960GB. SATA SSD works as a general-purpose storage device. The storage drive can also be used to save packet captures and trace logs generated by the operating system.

Power Supply Slots

The switch has two power supply slots that accept AC and DC input power supplies. The power supply modules are field replaceable units (FRUs) and are hot-swappable. The chassis is delivered with one power supply pre-installed in the power supply slot. If only one power supply is ordered, then a blank cover is installed in the empty power supply slot, which must remain installed if a power supply is not installed.

The following table describes the internal power supply modules supported on different switch models:

Part Number	PSU Modules	Switches Supported
PWR-C4-950WDC-R=	950-W DC power supply module	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X
PWR-C4-950WAC-R=	950-W AC power supply module	
C9K-PWR-650WAC-R=	650-W AC power supply module	Cisco Catalyst 9500 Series High Performance switches: C9500-32QC C9500-48Y4C C9500-24Y4C
C9K-PWR-930WDC-R=	930-W DC power supply module	
C9K-PWR-1600WAC-R=	1600-W AC power supply module	Cisco Catalyst 9500 Series High Performance switch: C9500-32C
C9K-PWR-1600WDC-R=	1600-W DC power supply module	

Fan Modules

The switch supports field-replaceable, variable-speed modular fans with front-to-back airflow. These fan units support Online Insertion and Removal (OIR) for up to 120 seconds. The fan unit is responsible for cooling the entire chassis and interfacing with environmental monitors to trigger alarms when conditions exceed thresholds.

The following table describes the fan modules supported on different switch models.

Part Number	Fan Modules	Switches Supportes
FAN-T4-R=	Type 4 front to back cooling Fan	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X
C9K-T1-FANTRAY=	Hot-swappable fan tray unit with dual stacked fans.	Cisco Catalyst 9500 Series High Performance switches: C9500-32QC C9500-48Y4C C9500-24Y4C
C9K-T2-FANTRAY=	Type 4 front to back cooling Fan	Cisco Catalyst 9500 Series High Performance switch: C9500-32C

For more information, see [Fan Module Overview](#) , on page 74.



CHAPTER 3

Installing a Switch

For initial switch setup, assigning the switch IP address, and powering on information, see the switch getting started guide on Cisco.com.

This chapter contains these topics:

- [Installation Tasks, on page 33](#)
- [Safety Warnings, on page 34](#)
- [Contents of the Shipping Box, on page 35](#)
- [Spare Accessory Kits, on page 38](#)
- [Unpacking the Switch, on page 38](#)
- [Establishing the System Ground, on page 39](#)
- [Installing the Switch, on page 41](#)

Installation Tasks

The process of installing the switch can be broken down into a series of tasks, which are described in the following table.

Task	Description
Unpacking the switch	Remove the switch from the packaging material. Note Save the packaging material for later use if you need to move the chassis.
Installing the switch	Install the switch.
Connecting the chassis to system ground	Construct and attach a system ground wire from the building (earth) ground to the system ground point on the chassis.
Installing the power supply module	Power supplies that are ordered with the switch are preinstalled in the switch. If ordered separately, install the power supplies.
Installing a network module	Install the network modules on the network module slots.

Task	Description
Installing the fan	Install the fan modules in the fan module slots.
Cabling the chassis and modules to the network	The various ports on the chassis must be connected to the network. This process can involve only attaching a network interface cable to the port or it can include the installation of a transceiver of some type in port and then attaching the network interface cable to the transceiver.
Powering up the chassis	After completing the network cabling and making sure that system ground is connected, the power supplies can be turned on. The system powers up and runs through a set of built-in diagnostics.

Safety Warnings



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



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



Warning To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Statement 1032



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

**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**

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

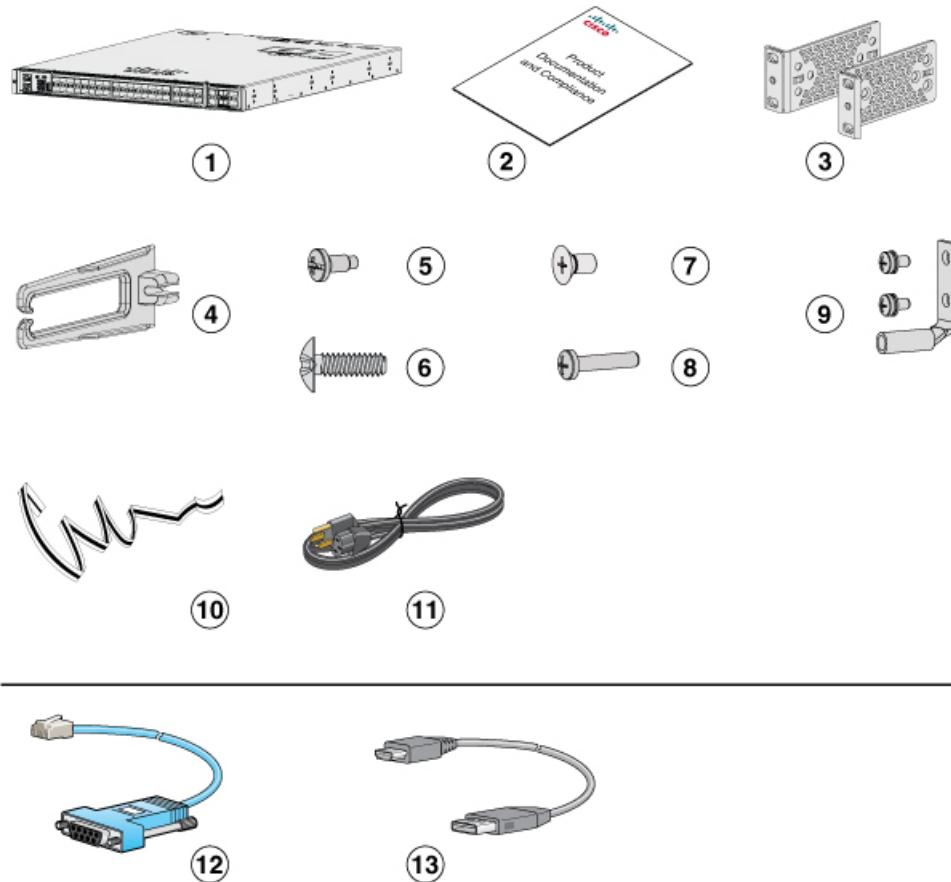
**Warning**

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

Contents of the Shipping Box

The shipping box contains the model of the switch you ordered and other components needed for installation. Some components are optional, depending on your order.

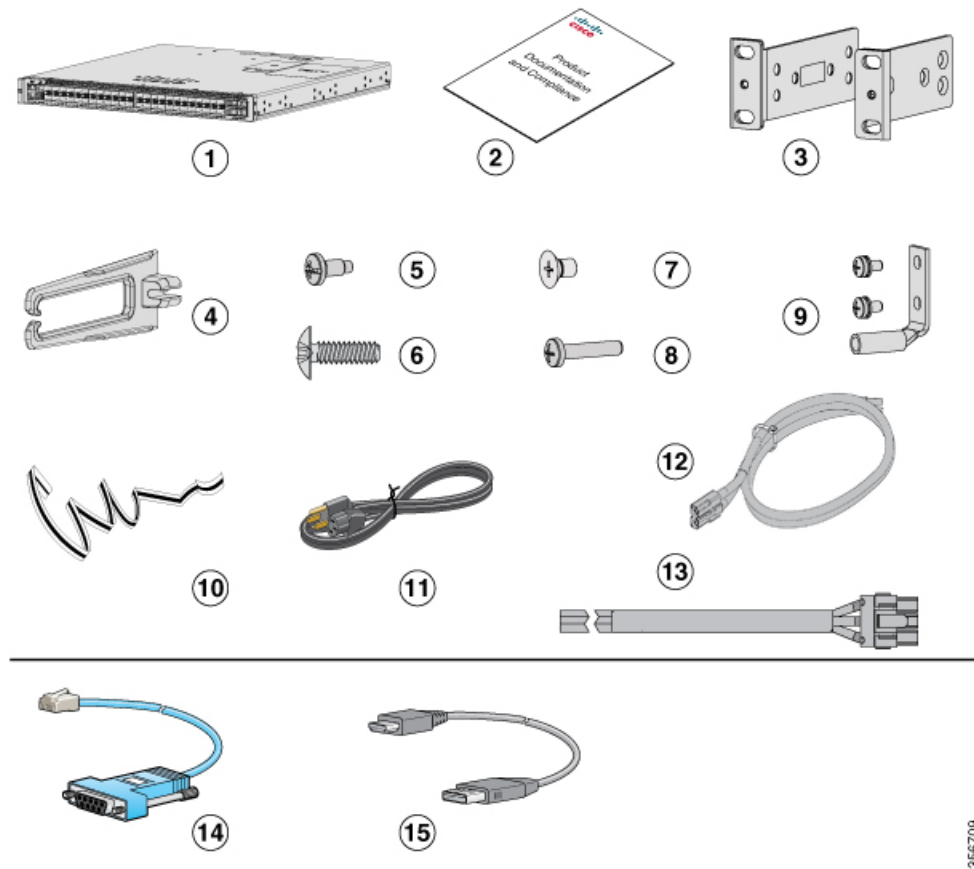
Figure 23: Components Delivered in the Shipping Box of Cisco Catalyst 9500 Series Switches



356731

1	Cisco Catalyst 9500 Series switch with optional network module ¹ (power supply and fan modules not shown)	8	Two M4.0 x 20mm Phillips pan-head screws (Black color)
2	Product documentation and compliance document	9	Ground lug and two M4.0 x 8mm Phillips pan-head screws
3	Two 19-inch mounting brackets	10	Disposable ESD strap
4	Two Cable guides	11	(Optional) AC power cord ²
5	Four number-12 pan-head 0.50" long screws	12	(Optional) RJ-45 console cable ¹
6	Four number-10 pan-head 0.625" long screws	13	(Optional) USB console cable ¹
7	Eight number-8 Phillips flat-head 0.312" long screws		

Figure 24: Components Delivered in the Shipping Box of Cisco Catalyst 9500 Series High Performance Switches



356709

1	Cisco Catalyst 9500 Series High Performance switch with optional network module ¹ (power supply and fan modules not shown)	9	Ground lug and two M4.0 x 8mm Phillips pan-head screws
2	Product documentation and compliance document	10	Disposable ESD strap
3	Two 19-inch mounting brackets	11	(Optional) AC power cord ²
4	Cable guide	12	(Optional) DC power cord for Cisco Catalyst 9500 High Performance C9500-32C switch model. ¹
5	Four number-12 pan-head 0.50" long screws	13	(Optional) DC power cord for Cisco Catalyst 9500 High Performance C9500-32QC, C9500-48Y4C, and C9500-24Y4C switch models. ¹
6	Four number-10 pan-head 0.625" long screws	14	(Optional) RJ-45 console cable ¹

7	12 M4.0 x 6mm Phillips flat-head screws	15	(Optional) USB console cable ¹
8	Two M4.0 x 20mm Phillips pan-head screws (Black color)		



- Note**
1. The item is orderable.
 2. The item is orderable. You can choose the type of AC cord as per your requirement.

Spare Accessory Kits

The following table describes the spare accessory kits supported on different switch models:

Part Number	Accessory Kits	Switches Supportes
C9500-ACCKITH-19I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 19" rack mount	Cisco Catalyst 9500 Series High Performance switches: C9500-32C C9500-32QC C9500-48Y4C C9500-24Y4C
C9500-ACCKITH-23I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 23" rack mount	
C9500-4PTH-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series – High-End	
C9500-ACC-KIT-19I=	Accessory Kit for Cisco Catalyst 9500 Series - 19" rack mount	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X
C9500-ACC-KIT-23I=	Accessory Kit for Cisco Catalyst 9500 Series - 23" rack mount	
C9500-4PT-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series	

Unpacking the Switch



- Note**
- Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them with the pallet. You will need these containers if you need to move or ship the switch in the future.

Check the contents of the accessory kit. Verify that you received all listed equipment, which should include the following:

- Grounding lug and disposable ESD strap.
- Optional equipment that you ordered, such as console cables, transceivers, or special connectors.
- Blank covers are installed for the power supply slots on the chassis.

Establishing the System Ground

This section describes how to connect a system ground to the switch.

**Caution**

Installations that rely solely on system grounding using only an AC third-prong ground run a substantially greater risk of equipment problems and data corruption than those installations that use both the AC third-prong ground and a properly installed system ground.

The system ground provides additional grounding for EMI shielding requirements and grounding for the low voltage supplies (DC-DC converters) on the modules. You must observe the following system grounding guidelines for your chassis:

- You must install the system ground connection with any other rack or system power ground connections that you make. The system ground connection is required if FXS modules are installed or if this equipment is installed in a U.S. or European Central Office.
- You must connect both the system ground connection and the power supply ground connection to an earth ground. The system ground connection is required if FXS modules are installed or if this equipment is installed in a U.S. or European Central Office.
- When using DC-input power supplies, you must install the system ground before you attach the source DC power cables to the DC PEM. Power down the chassis before attaching the system ground.

**Note**

In all situations, grounding practices must comply with Section 250 of the National Electric Code (NEC) requirements or local laws and regulations. A 6 AWG grounding wire is recommended from the chassis to the rack ground or directly to the common bonding network (CBN). The equipment rack should also be connected to the CBN with 6 AWG grounding wire.

**Note**

The system ground serves as the primary safety ground for chassis that are equipped with DC-input power supplies. The DC-input power supplies for these chassis do not have a separate ground.

Required Tools and Equipment

To connect the system ground, you need the following tools and materials:

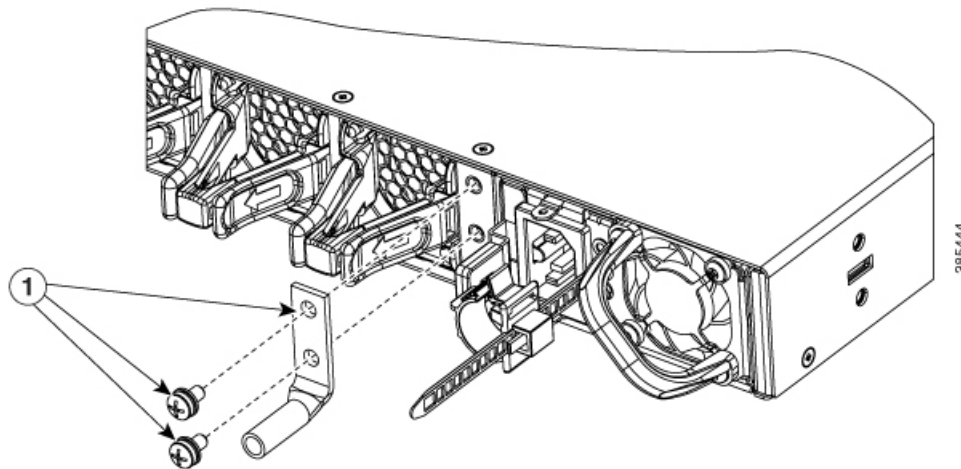
- Grounding lug — When using the double-hole lug connector provided with the system, the ground wire must be 6 AWG only. Otherwise, a supported closed-loop ring connector must be used for 8-14 AWG wire.

- Grounding screws — Two M4.0 x 8mm Phillips pan-head screws. Supplied as part of the accessory kit.
- Grounding wire — Not supplied as part of accessory kit. The grounding wire should be sized according to local and national installation requirements. For U.S. installations, AC power supply systems require a 14 AWG copper conductor. Commercially available 8-14 AWG wire is recommended. DC power supply systems with 930W power supply module require a 12 AWG wire and 1600W power supply module require an 8 AWG wire. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- No. 1 Phillips screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

Connecting the System Ground

To establish an earth ground for the chassis, you must attach a grounding cable from the chassis' grounding lug to the rack.

Figure 25: Connecting the System Ground



1	Ground lug and two M4.0x8mm Phillips pan-head screws	
---	--	--

Procedure

-
- Step 1** Use a wire-stripping tool to remove approximately 0.75 inch (19 mm) of the covering from the end of the grounding wire.
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug.
- Step 3** Crimp the grounding wire in the barrel of the grounding lug. Verify that the ground wire is securely attached to the ground lug.

- Step 4** Place the grounding wire lug against the grounding pad, making sure that there is solid metal-to-metal contact.
- Step 5** Secure the grounding lug to the chassis with two M4.0 x 8mm Phillips pan-head screws. Ensure that the grounding lug and the grounding wire will not interfere with other switch hardware or rack equipment.
- Step 6** Prepare the other end of the grounding wire with a ring lug, and secure it to the rack with a screw.
-

Installing the Switch

Rack-Mounting

- For Network Equipment Building Systems (NEBS) installation, use the four post rack mount kit. The depth of the rack, measured between the front-mounting and the rear-mounting strips must be:
 - between 25.14 inches and 35.84 inches for C9500-24Q, C9500-12Q, C9500-40X and C9500-16X.
 - between 26.68 inches and 42.63 inches for C9500-32C.
 - between 23.48 inches and 39.43 inches for C9500-32QC, C9500-48Y4C AND C9500-24Y4C.
- Ensure you read the Regulatory Compliance and Safety Information (RCSI) before installing the switch.
- Installation in racks other than 19-inch racks requires a bracket kit not included with the switch.



Warning

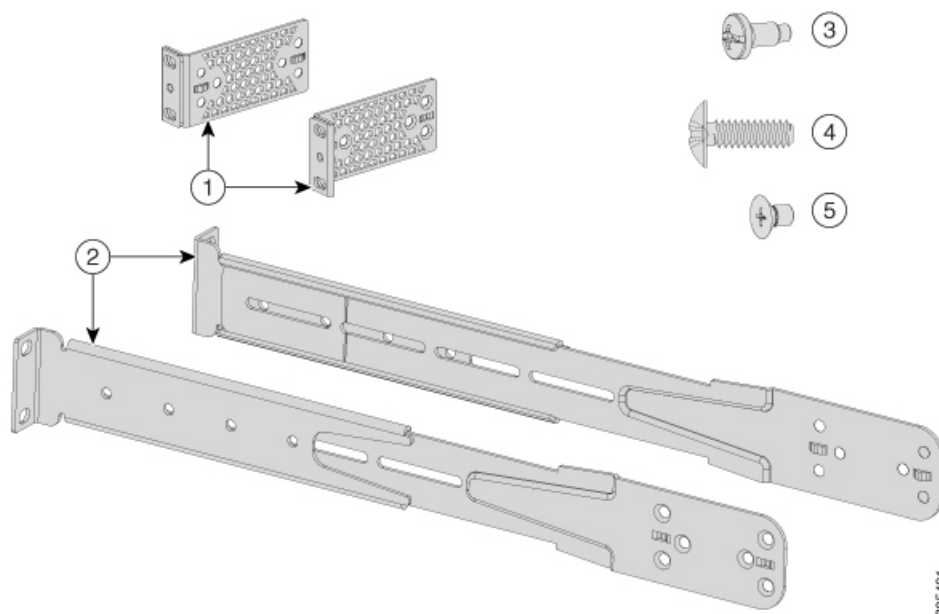
To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

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

Statement 1006

Figure 26: Rack-Mounting Brackets

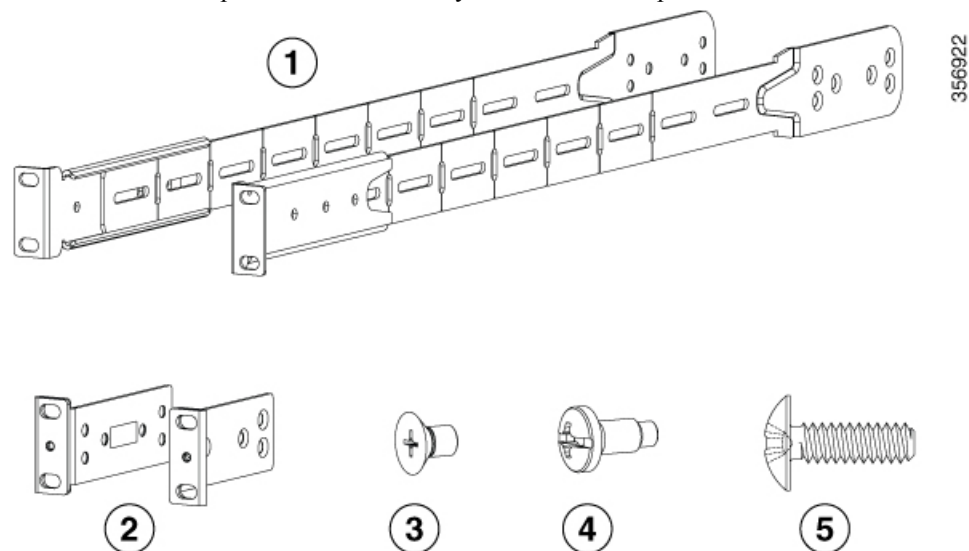
This figure shows the four post rack mount kit for Cisco Catalyst 9500 Series Switches. You can order the optional brackets from your Cisco sales representative.



1	Two 19-inch brackets	4	Eight number-10 Phillips pan-head 0.625" long screws
2	Extension rails and - - brackets for four-point mounting	5	16 number-8 Phillips flat-head 0.312" long screws
3	Eight number-12 Phillips pan-head 0.50" long screws		

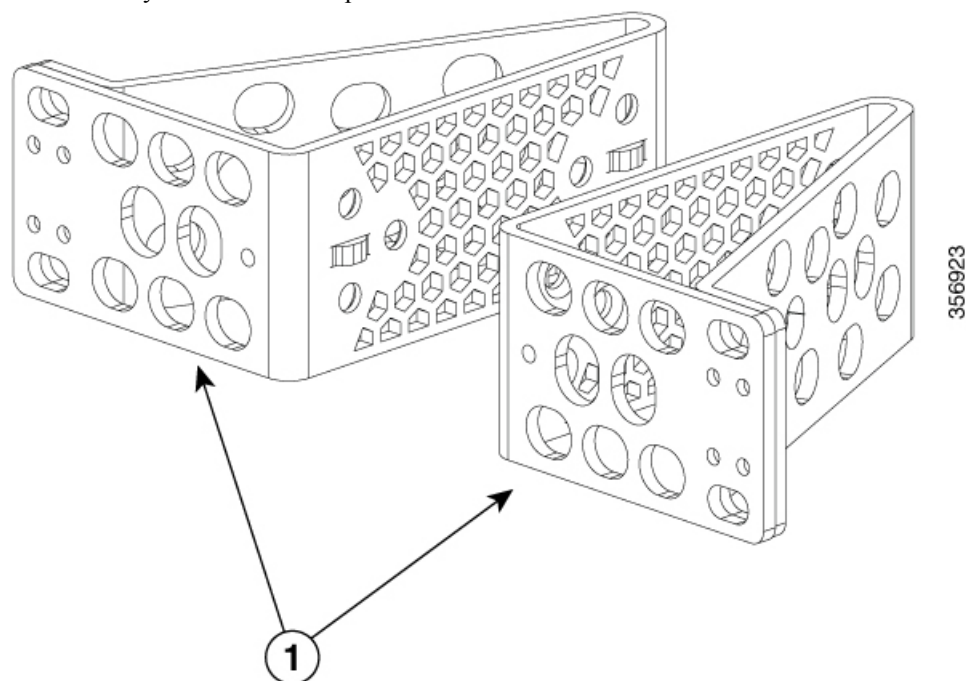
Figure 27: Rack-Mounting Brackets

This figure shows the four post rack mount kit for Cisco Catalyst 9500 High Performance Series Switches. You can order the optional brackets from your Cisco sales representative.



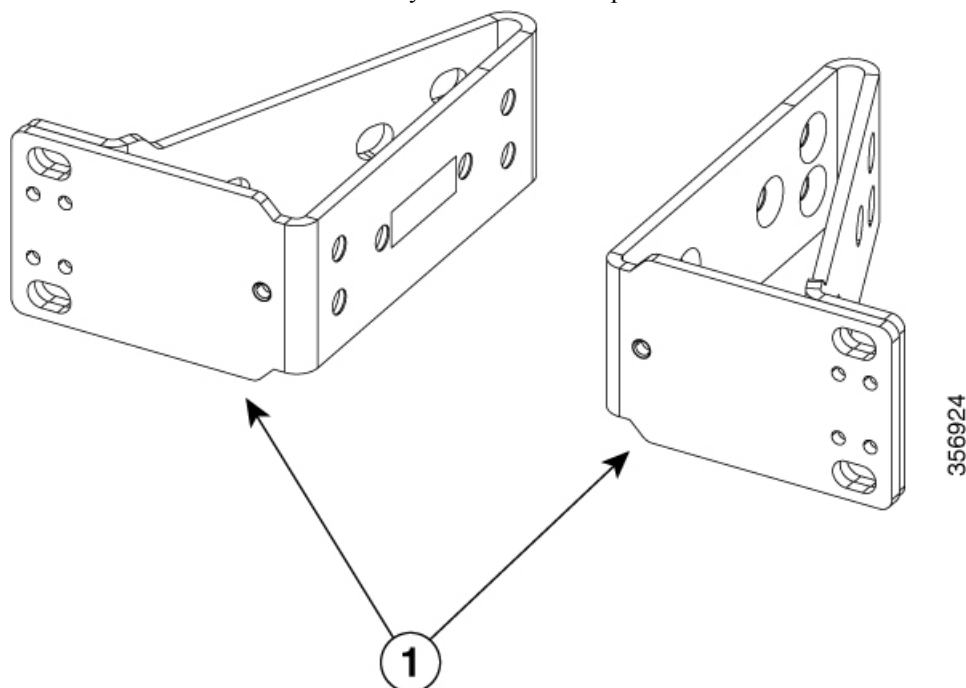
1	Extension rails and - - brackets for four-point mounting	4	Eight number-12 Phillips pan-head 0.50" long screws
2	Two 19-inch brackets	5	Eight number-10 Phillips pan-head 0.625" long screws
3	24 M4.0x6mm Phillips flat-head screws		

This figure shows the optional 23-inch rack mount kit for Cisco Catalyst 9500 Series Switches. You can order the kit from your Cisco sales representative.



1	23-inch rack mount bracket	
---	----------------------------	--

This figure shows the optional 23-inch rack mount kit for Cisco Catalyst 9500 High Performance Series Switches. You can order the kit from your Cisco sales representative.



1	23-inch rack mount bracket	
---	----------------------------	--

Attaching the Rack-Mount Brackets

Procedure

Attach the rack-mount brackets to the switch.

For Cisco Catalyst 9500 Series Switches, use number-8 Phillips flat-head 0.312" long screws to attach the long side of the bracket to each side of the switch for the front- middle- or rear-mounting positions.

Figure 28: Front Mounting position of Rack Mounting Brackets

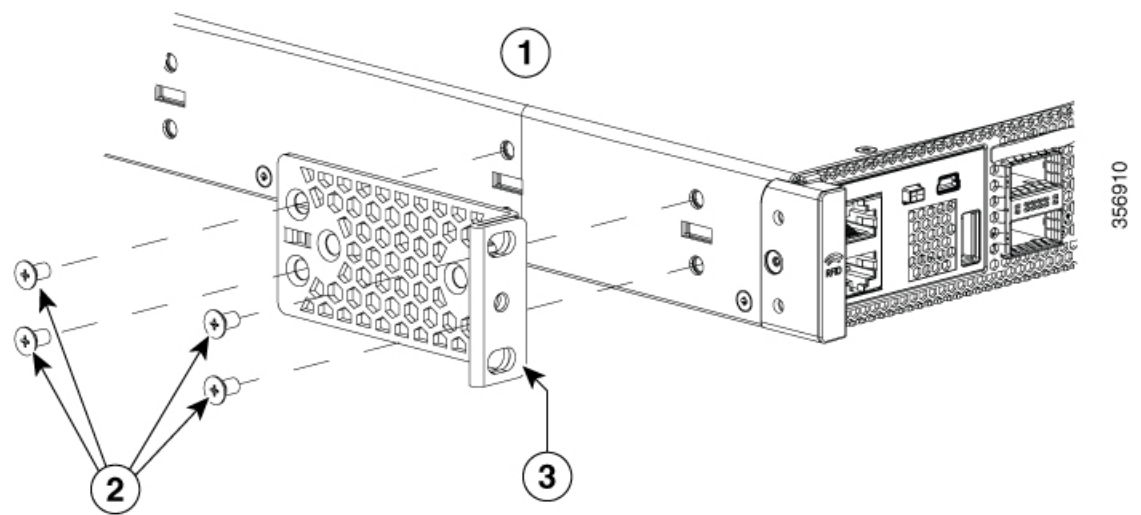


Figure 29: Middle Mounting position of Rack Mounting Brackets

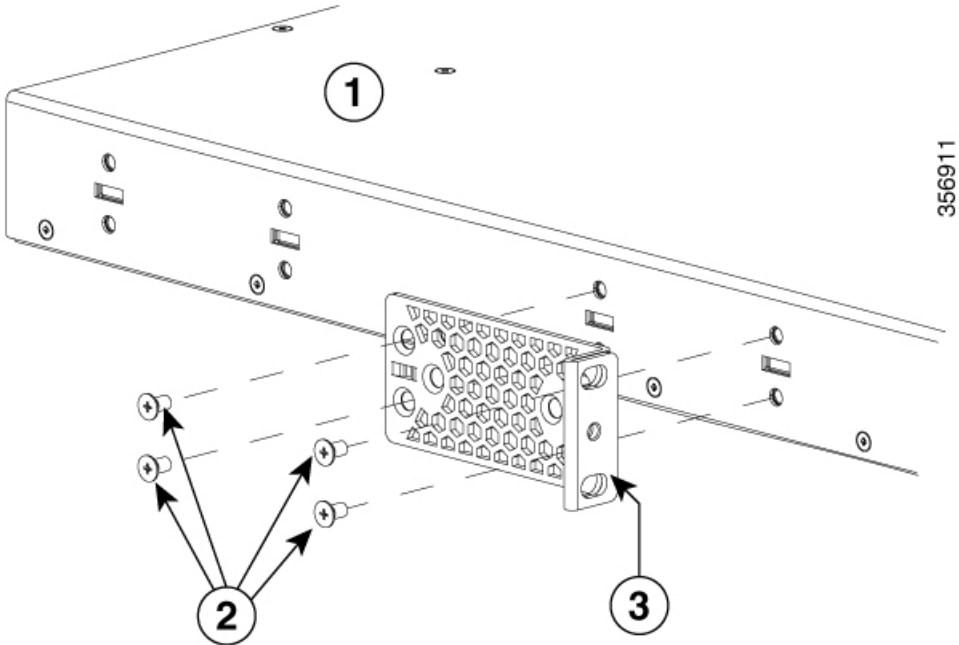
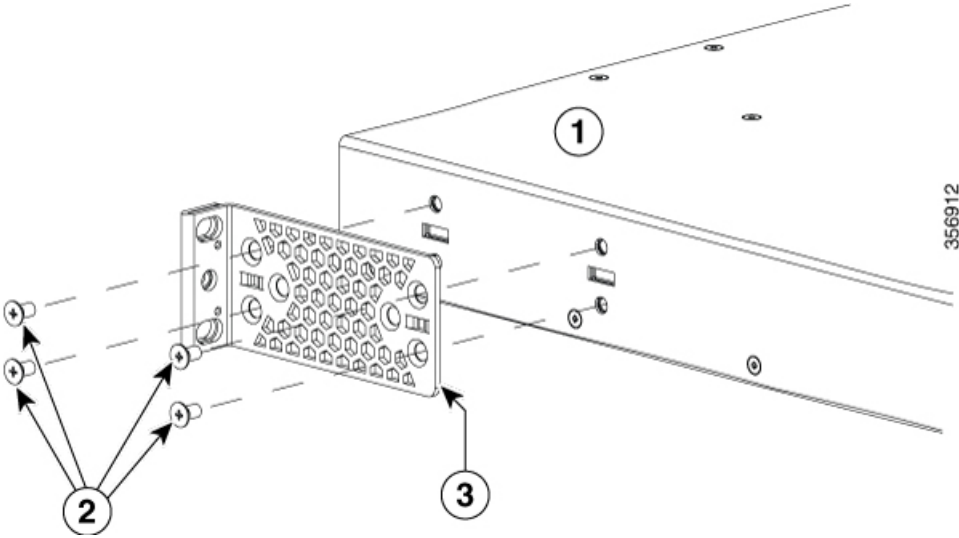


Figure 30: Rear Mounting position of Rack Mounting Brackets



1	Cisco Catalyst 9500 Series switch	3	19-inch mounting brackets
2	Number-8 Phillips flat-head 0.312" long screws		

For Cisco Catalyst 9500 High Performance Series Switches, use M4.0x6mm Phillips flat-head screws to attach the long side of the bracket to each side of the switch for the front- middle- or rear-mounting positions.

Figure 31: Front Mounting position of Rack Mounting Brackets

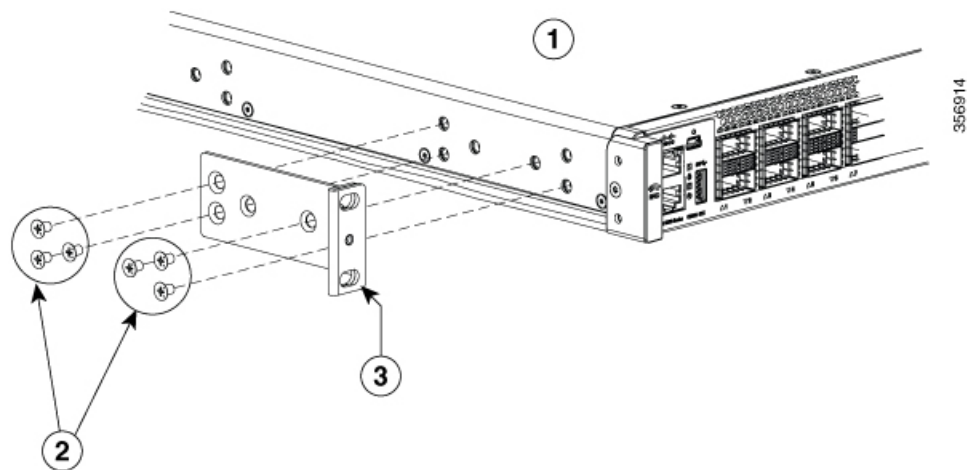


Figure 32: Middle Mounting position of Rack Mounting Brackets

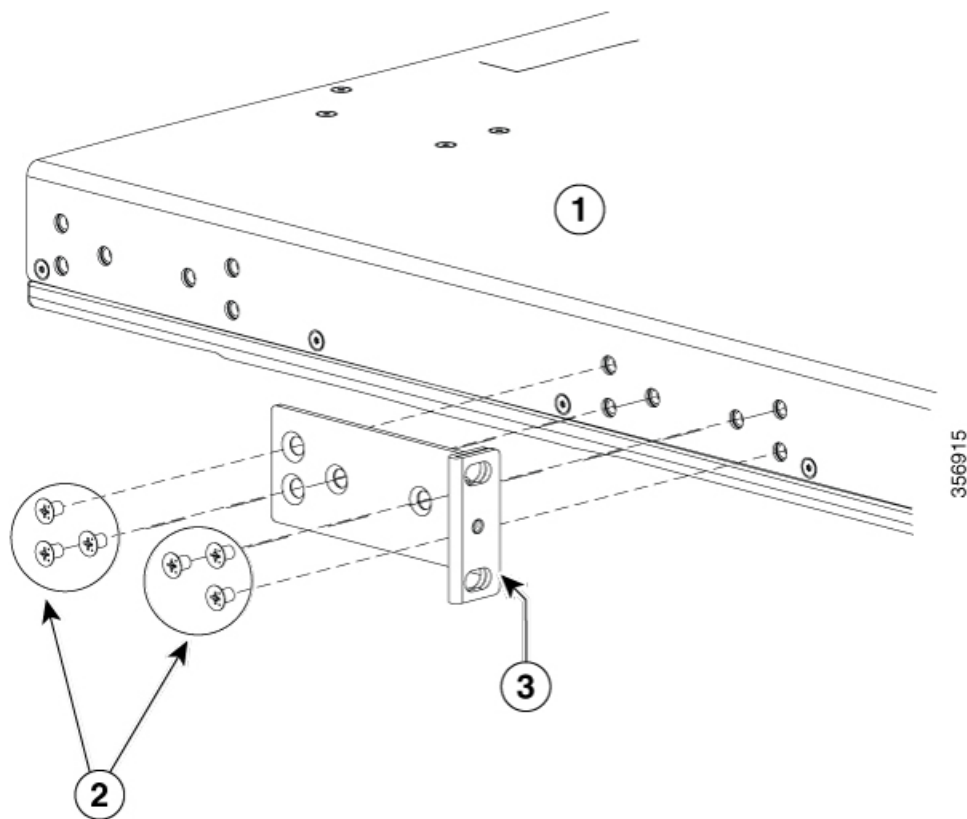
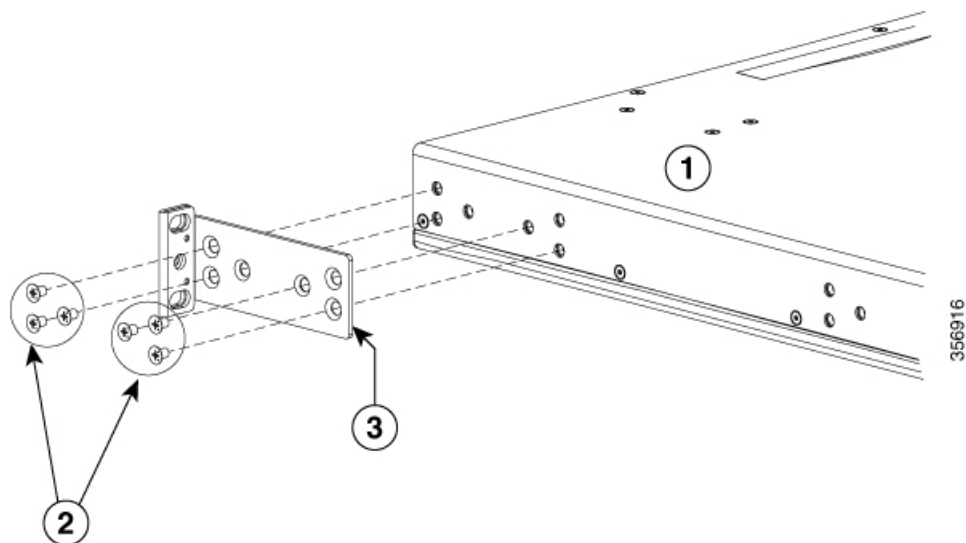


Figure 33: Rear Mounting position of Rack Mounting Brackets



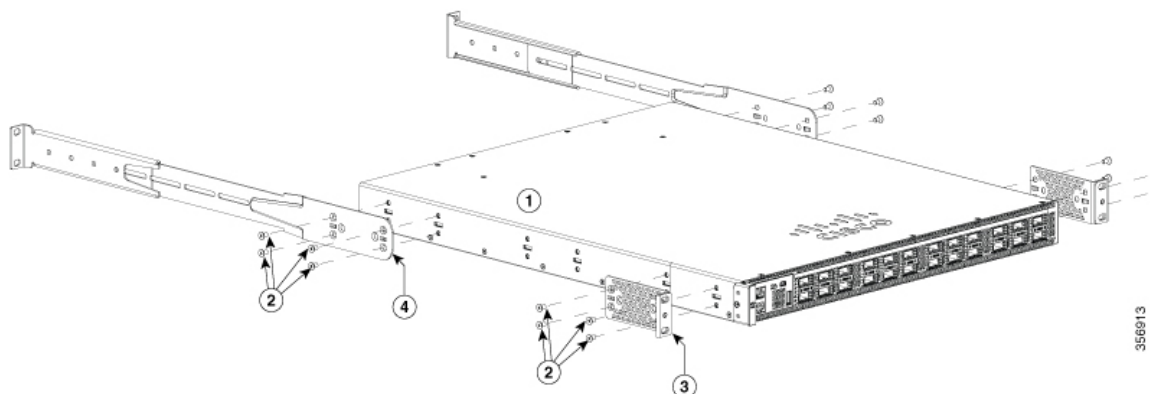
1	Cisco Catalyst 9500 Series High Performance switch	3	19-inch mounting brackets
2	M4.0x6mm Phillips flat-head screws		

Mounting the Switch in a Rack

Procedure

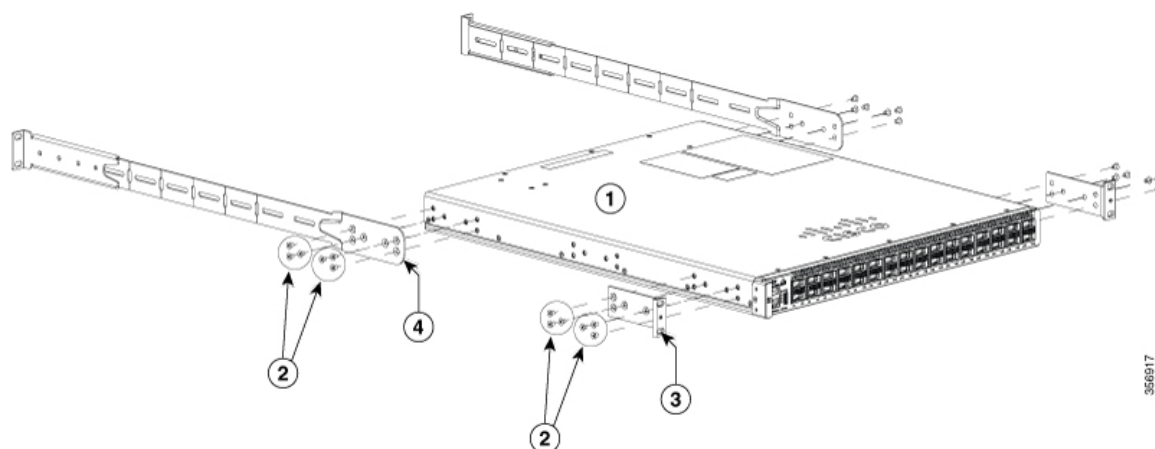
- Step 1** Use the Phillips machine screws to attach the brackets and the extension rail to the switch.

Figure 34: Attaching the Extension Rail on a Cisco Catalyst 9500 Series Switch



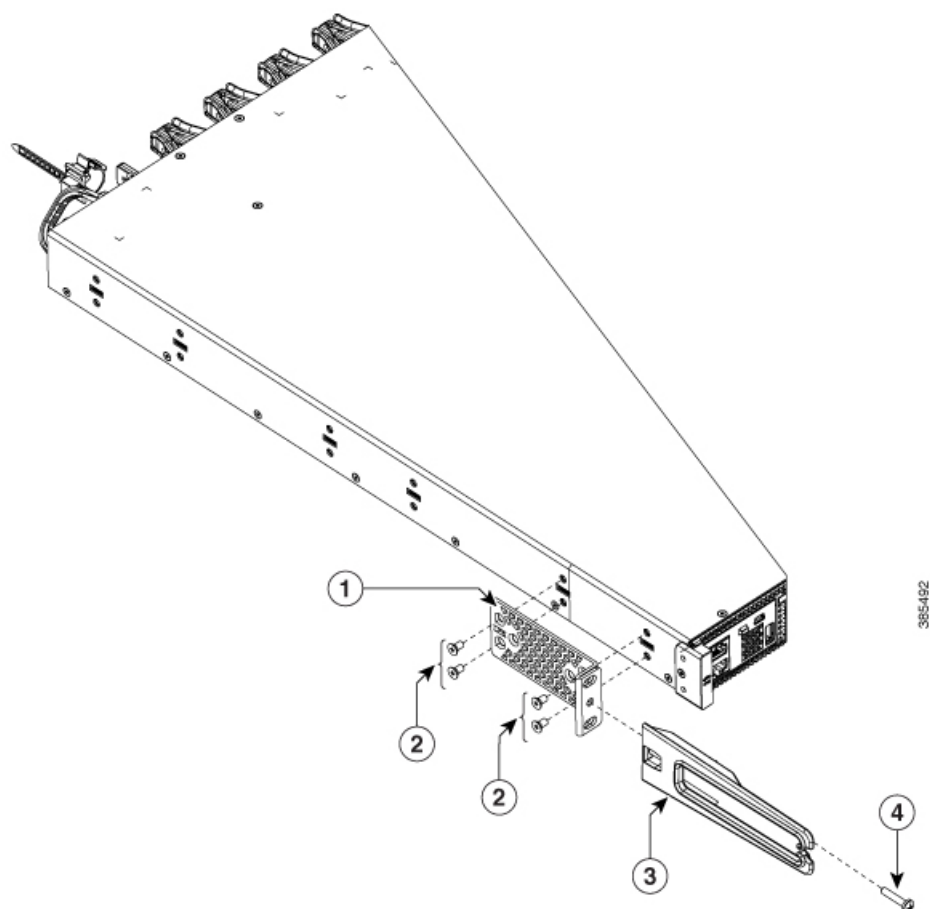
1	Cisco Catalyst 9500 Series switch	3	19-inch mounting brackets
2	Number-8 Phillips flat-head 0.312" long screws	4	Extension rails and - - brackets

Figure 35: Attaching the Extension Rail on a Cisco Catalyst 9500 High Performance Series Switch

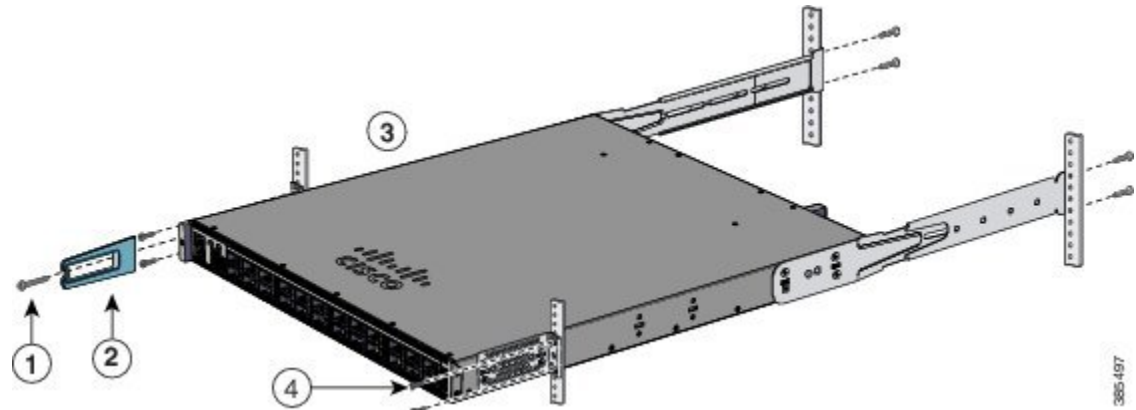


1	Cisco Catalyst 9500 Series High Performance switch	3	19-inch mounting brackets
2	M4.0x6mm Phillips flat-head screws	4	Extension rails and - - brackets

Step 2 Use the black Phillips machine screw to attach the cable guide to the left or right bracket.

Figure 36: Attaching the Cable Guide

1	19-inch bracket	3	Cable guide
2	Phillips machine screws	4	M4.0x20mm Phillips pan-head screws (Black color)

Step 3 *Figure 37: Mounting the switch in a rack*

1	M4.0x20mm Phillips pan-head screws (Black color)	3	Front-mounting position
2	Cable guide	4	Number-12 or number-10 Phillips machine screws

After Switch Installation

- Configure the switch using the Web User Interface. For more information, see "Configuring the Switch Using the Web User Interface" topic in the *Software Configuration Guide*.
- Connect the required devices to the switch ports.
- Turn on the power supply switches to power up the system. While powering up, the switch performs a series of bootup diagnostic tests.



Note The switch is designed to boot up in less than 30 minutes, provided that the neighboring devices are in fully operational state.

- Verify port connectivity after connecting devices to the switch ports. The LED turns green when the switch and the attached device have a link.



CHAPTER 4

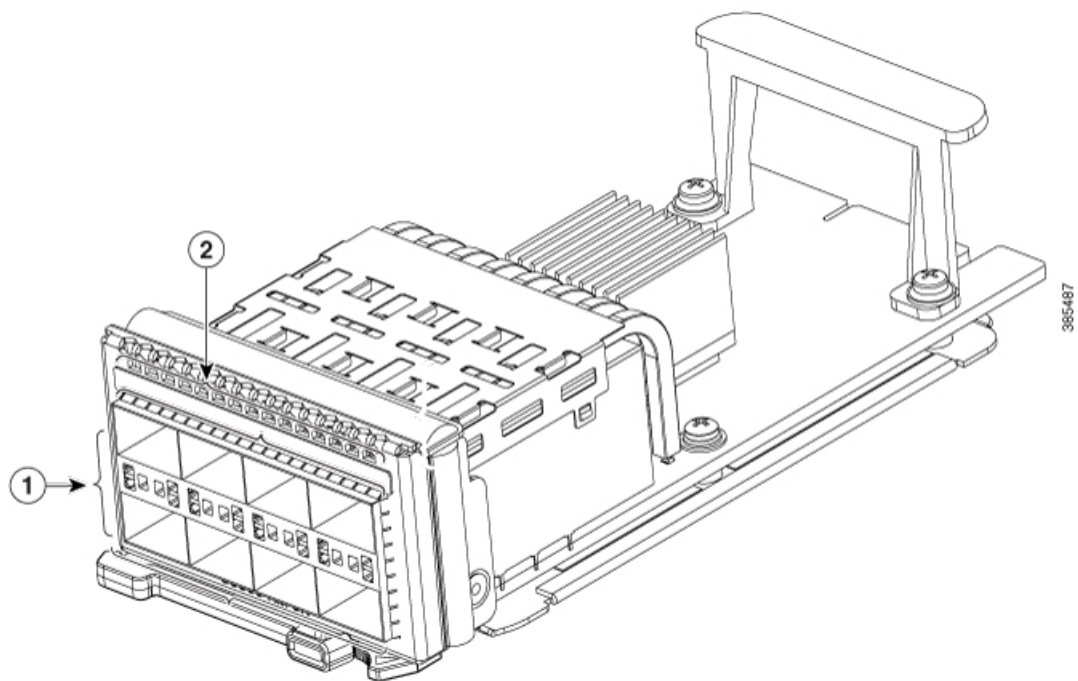
Installing a Network Module

- [Network Module Overview, on page 53](#)
- [Installing a Network Module in the Switch, on page 55](#)
- [Removing a Network Module, on page 57](#)
- [Finding the Network Module Serial Number, on page 58](#)

Network Module Overview

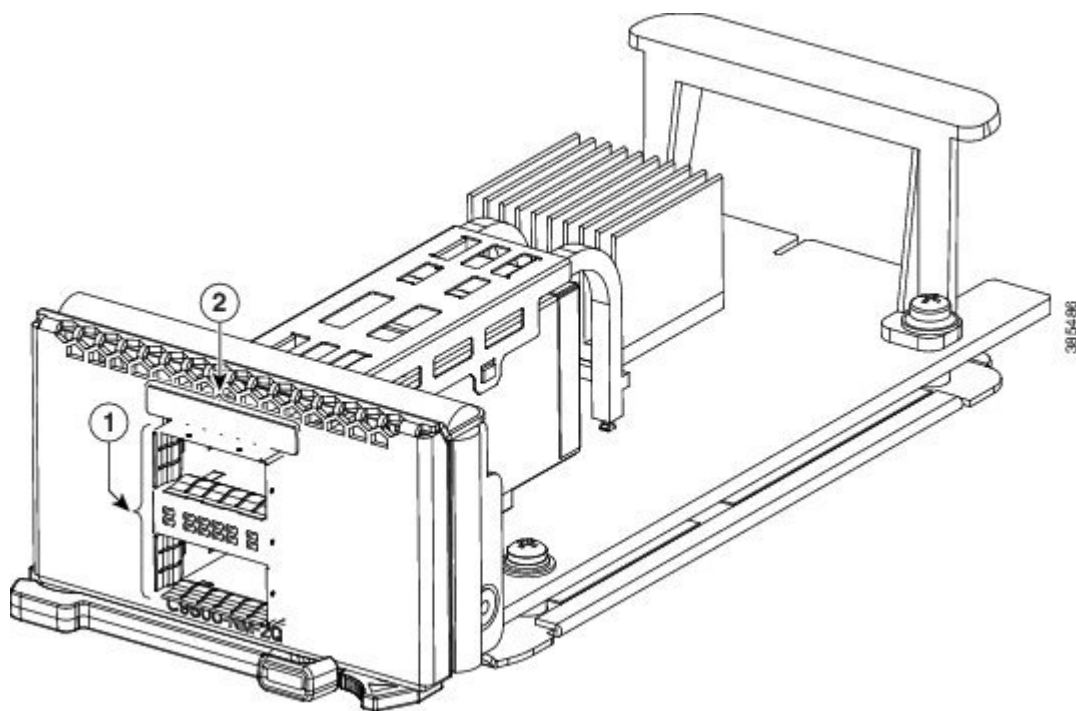
Network Module	Description
C9500-NM-8X	<p>This module has eight 10G SFP module ports. Any combination of standard SFP modules are supported.</p> <p>Note This is supported on the following switch models:</p> <ul style="list-style-type: none">• C9500-16X• C9500-40X
C9500-NM-2Q	<p>This module has two 40G QSFP module ports. Any combination of standard QSFP modules are supported.</p> <p>Note This is supported on the following switch models:</p> <ul style="list-style-type: none">• C9500-16X• C9500-40X
Blank Network Module (NM-C4-10G-BLANK)	<p>Insert this blank module when the switch has no uplink ports (this is required for sufficient air flow).</p>

Figure 38: C9500-NM-8X Network Module



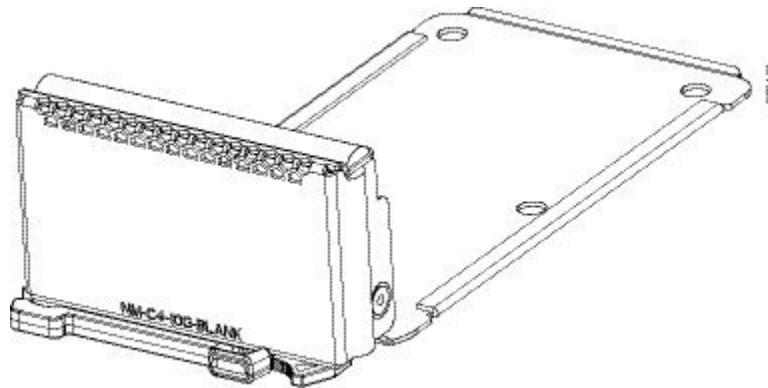
1	SFP module ports	2	LEDs
---	------------------	---	------

Figure 39: C9500-NM-2Q Network Module



1	QSFP module ports	2	LEDs
---	-------------------	---	------

Figure 40: Blank Network Module



Installing a Network Module in the Switch

Installing a Network Module



Note The switch can operate without a network module, but a blank module (with no ports or SFP slots) is available and should be installed when uplink ports are not required.



Note The switch generates logs when you insert or remove a network module with SFP/SFP+/SFP28 slots.

Use only supported network modules and SFP/SFP+/SFP28/QSFP modules. Each module has an internal serial EEPROM that is encoded with security information.

The network module is hot-swappable. If you remove a module, replace it with another network module or a blank module.



Note The switch complies with EMC, safety, and thermal specifications when a network module is present. If no uplink ports are required, install a blank network module.

Before you begin

When installing network modules, observe these precautions:

- Do not remove the blank module from the slot unless you are installing an SFP/SFP+/SFP28/QSFP module. Either a module or a dust plug must be in the slot at all times.

- Do not remove the dust plugs from the fiber-optic SFP/SFP+/SFP28/QSFP modules or the rubber caps from the fiber-optic cable until you connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing a network module can shorten its useful life. Do not remove and insert a network module more often than is necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.

Step 2 Remove the module from the protective packaging.

Step 3 Remove the blank module from the switch and save it.

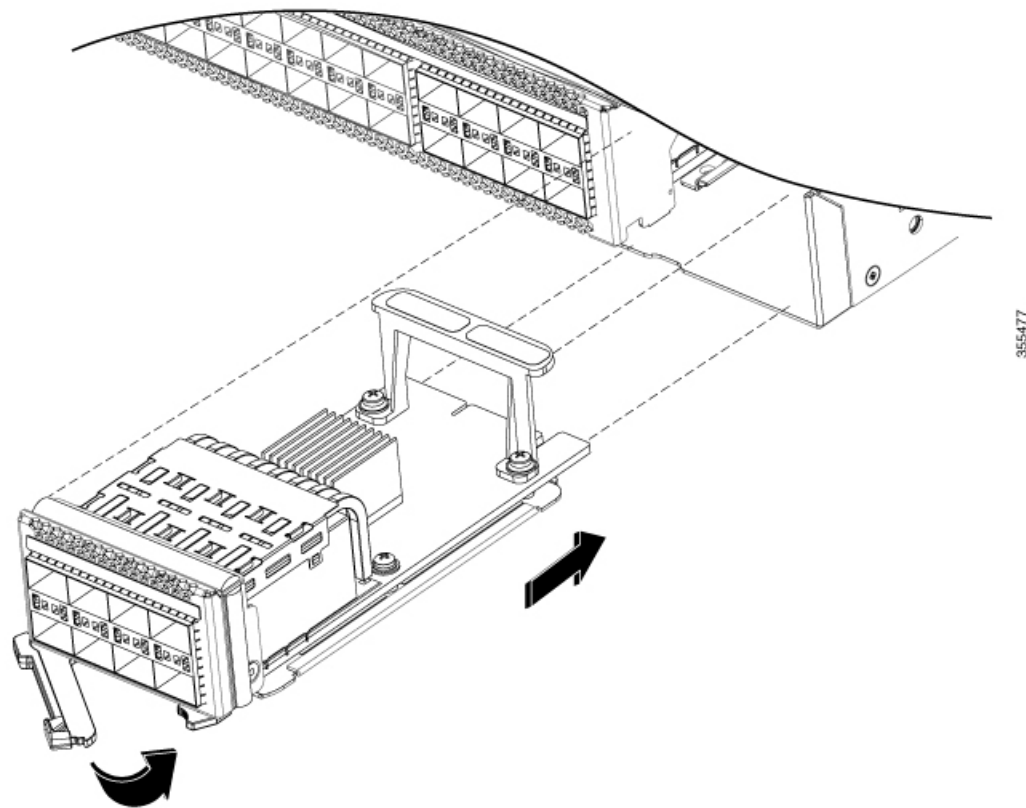
Caution Verify the correct orientation of your module before installing it. Incorrect installation can damage the module.

Caution Do not install the network module with connected cables or installed SFP/SFP+/SFP28 modules. Always remove any cables and modules before you install the network module.

Caution A module interface might become error-disabled when a network module with connected fiber-optic cables is installed or removed. If an interface is error-disabled, you can reenable the interface by using the **shutdown** and **no shutdown** interface configuration commands.

Step 4 Position the module face up to install it in the module slot. Slide the module into the slot until the back of the module faceplate is flush with the switch faceplate. Secure the network module in place by latch.

Figure 41: Installing the Network Module in the Switch



Removing a Network Module



Note The switch complies with EMC, safety, and thermal specifications when a network module is present. If no uplink ports are required, install a blank network module.



Note To avoid authentication failure and non-detection of modules, wait for a minimum of 6-8 seconds between the online insertion and removal (OIR) of network modules.

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface

Caution Do not remove the network module with connected cables or installed pluggable transceiver modules. Always remove any cables and modules before you remove the network module.

Caution A module interface might become error-disabled when a network module with connected fiber-optic cables is installed or removed. If an interface is error-disabled, you can reenableView the interface by using the **shutdown** and **no shutdown** interface configuration commands.

Step 2 Disconnect the cables from the pluggable transceiver module.

Step 3

Step 4 Release latch and carefully slide the network module out of the slot.

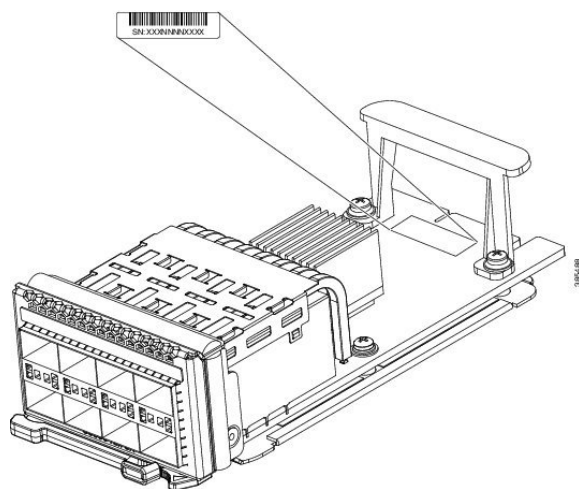
Step 5 Install a replacement network module or a blank module in the slot.

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

Finding the Network Module Serial Number

If you contact Cisco Technical Assistance regarding a network module, you need to know its serial number.

Figure 42: Network Module Serial Number Location





CHAPTER 5

Installing Field Replaceable Units

- [Installing a Power Supply](#) , on page 59
- [Installing a Fan Module](#), on page 74
- [Installing an SSD Module](#), on page 80

Installing a Power Supply

Power Supply Overview

The switch chassis has two slots in which you can install power supplies using any of the following combinations:

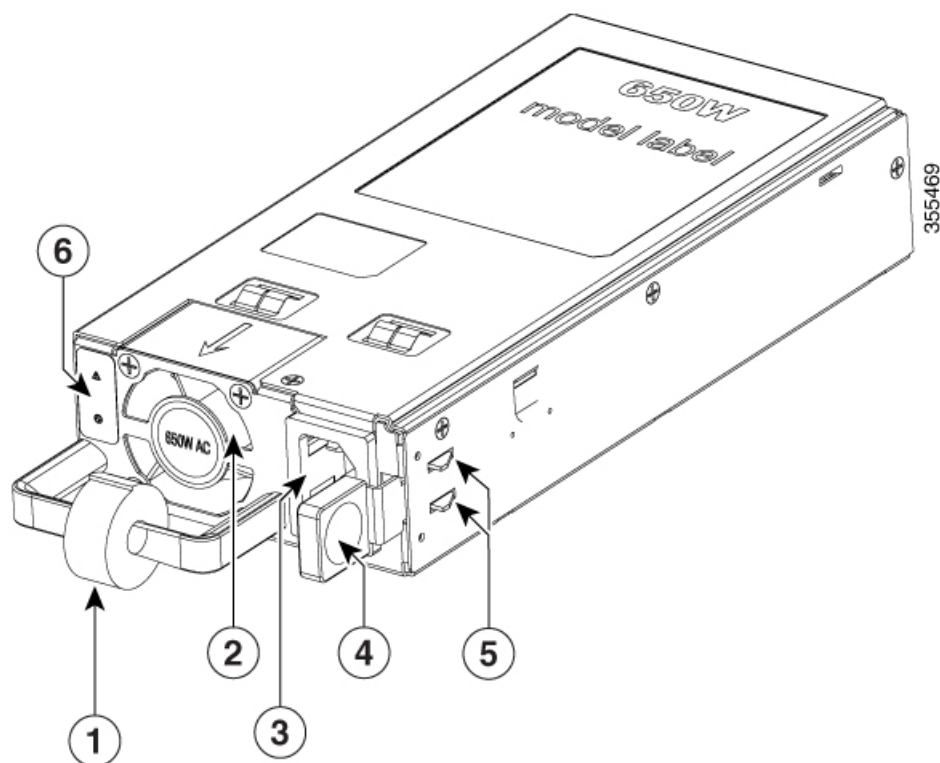
- Two AC, two DC or AC-DC power supplies
- One AC-input power supply or one DC-input power supply (leaving the blank cover on the other slot)



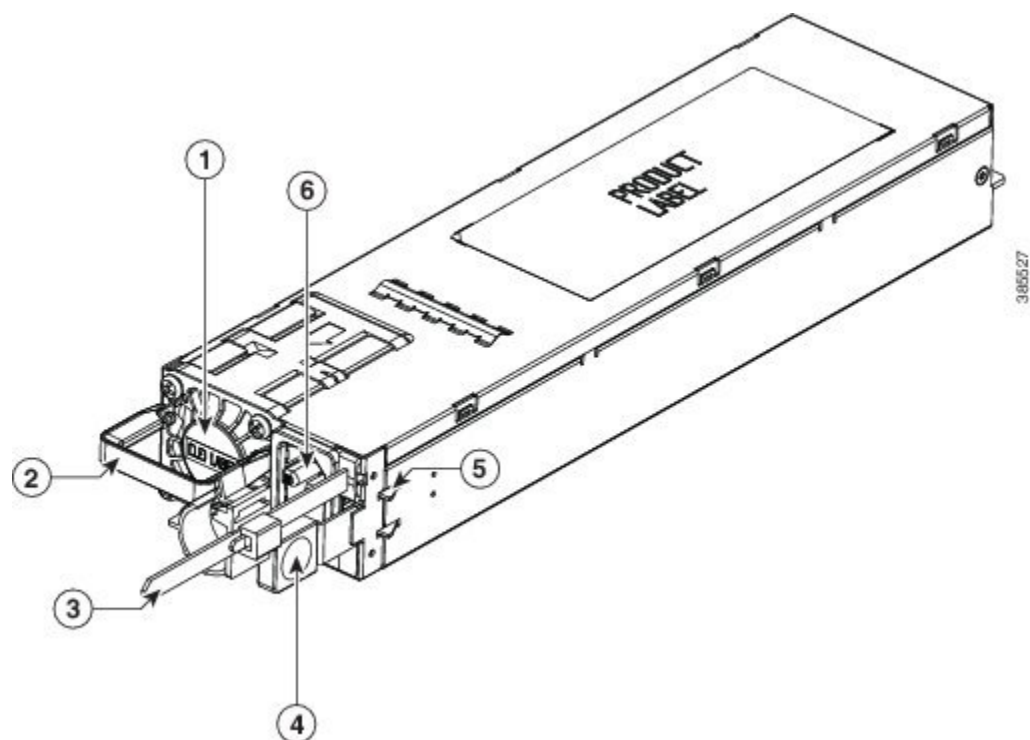
Note If you leave any power supply slots empty, you must ensure that the blank cover (Part Numbers PWR-C4-BLANK, C9K-PWR-C4-BLANK, and C9K-PWR-C5-BLANK) is installed in that slot to maintain the designed airflow.

This table lists the power supply models.

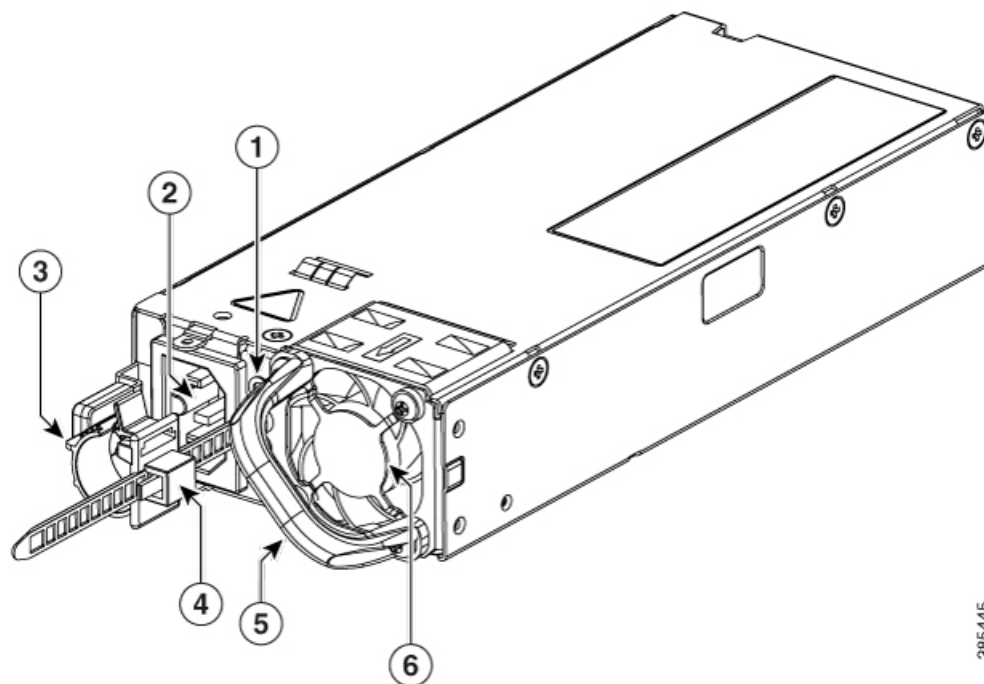
Part Number	Description
PWR-C4-950WAC-R	950W AC Power Supply
C9K-PWR-650WAC-R	650W AC Power Supply
C9K-PWR-1600WAC-R	1600W AC Power Supply
C9K-PWR-930WDC-R	930W DC Power Supply
C9-PWR-950WDC-R	950W DC Power Supply
C9K-PWR-1600WDC-R	1600W DC Power Supply

Figure 43: Cisco Catalyst 650W AC Input Power Supply

1	Power cord retainer	4	Release latch
2	PSU fan	5	Retainer clips
3	AC power cord connector	6	Power status and power supply failure LEDs

Figure 44: Cisco Catalyst 1600W AC Input Power Supply

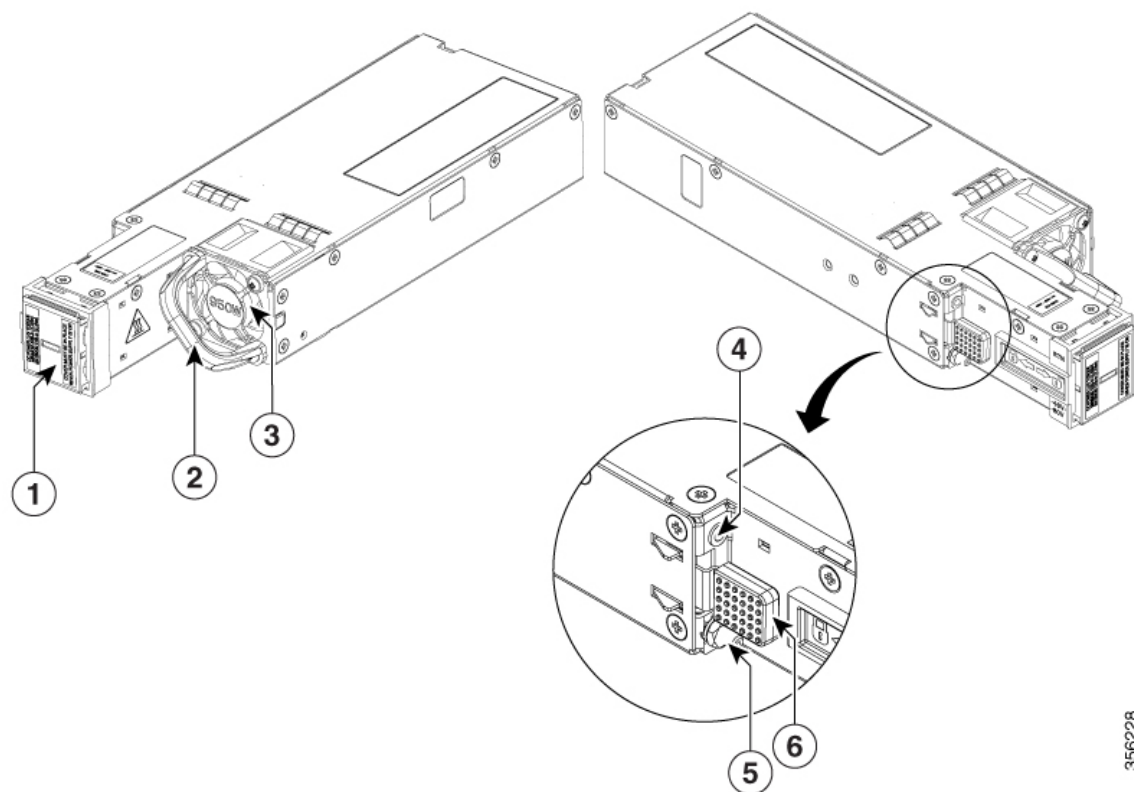
1	PSU fan	4	Release latch
2	Release handle	5	Retainer clips
3	Cable tie	6	AC input connector

Figure 45: Cisco Catalyst 950W AC Input Power Supply

385445

1	PSU LED	4	Power cord retainer
2	AC input connector	5	Release handle
3	Release latch	6	PSU fan

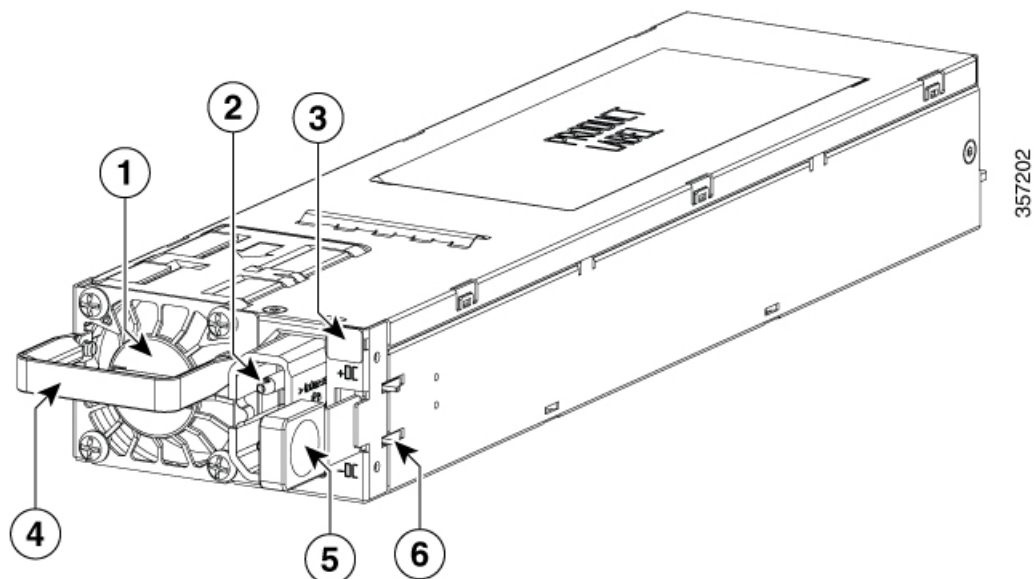
Figure 46: Cisco Catalyst 950W DC Input Power Supply



356228

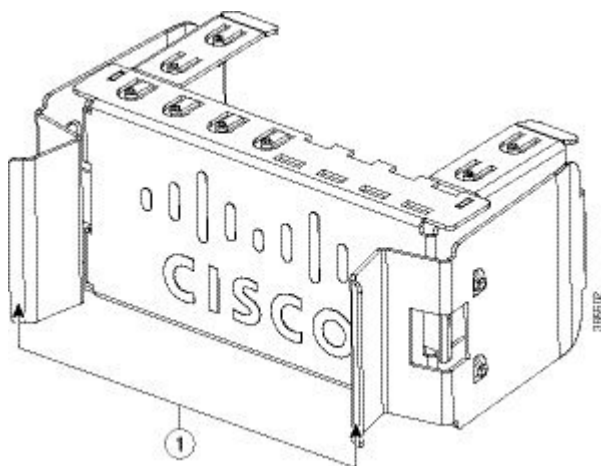
1	DC input connector	4	PSU LED
2	Release handle	5	Grounding terminal
3	PSU fan	6	Release latch

Figure 47: Cisco Catalyst 1600W DC Input Power Supply



1	PSU fan	4	Release handle
2	DC input connector	5	Release latch
3	PSU LED	6	Retainer clips

Figure 48: Power Supply Slot Cover for Cisco Catalyst 9500 Series Switches



1	Release handles
---	-----------------

Figure 49: Power Supply Slot Cover for Cisco Catalyst 9500 High Performance C9500-32C Switch Model

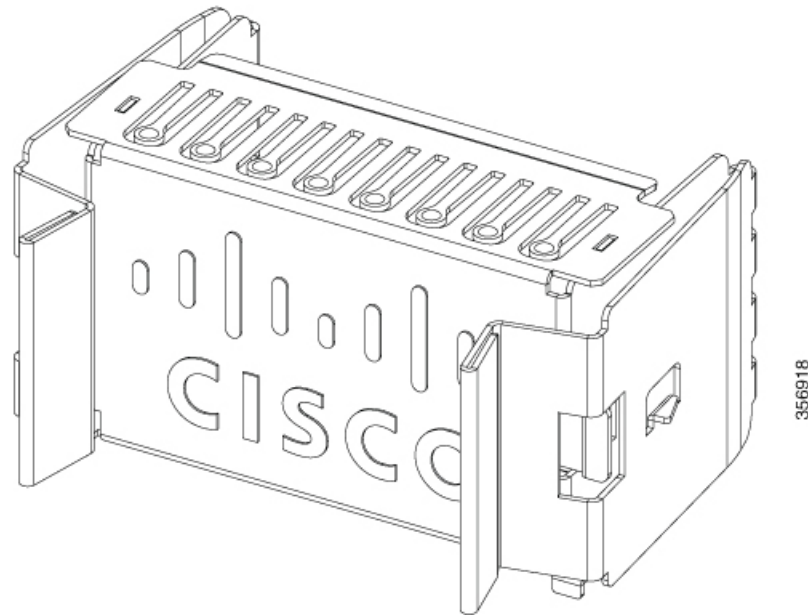
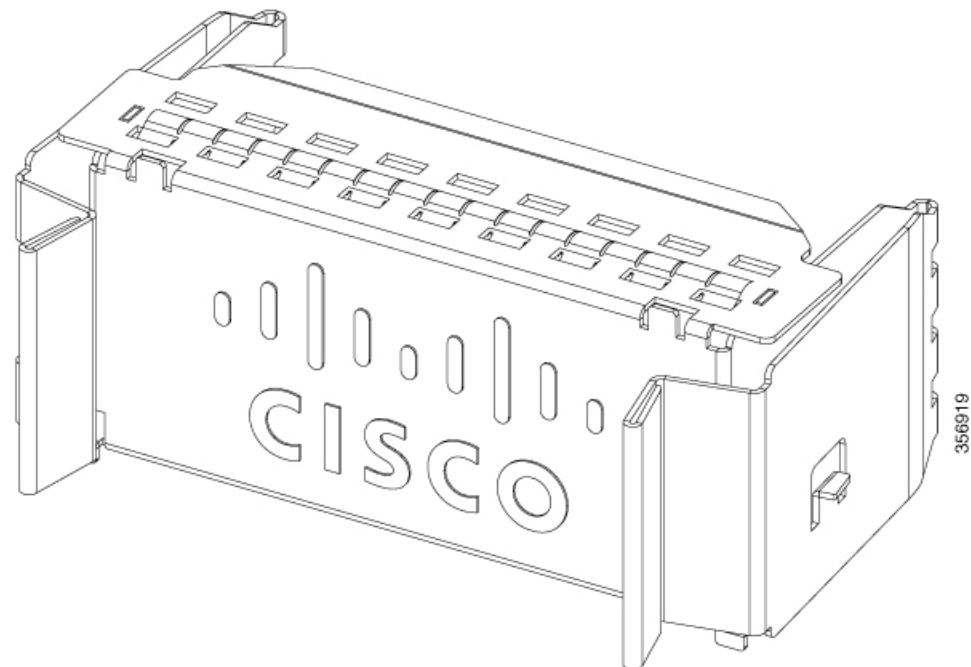


Figure 50: Power Supply Slot Cover for Cisco Catalyst 9500 High Performance C9500-32QC, C9500-48Y4C and C9500-24Y4C Switch Models



The power supplies can work together in Redundant Mode, in which each power supply operates at approximately 50 percent of its capacity, no greater than 60 percent and no less than 40 percent. If one power supply fails, the other power supply can provide power for the entire system on its own. This is the default and recommended mode.

Power supply modules LED

The AC and DC power supply modules except the 1600W AC and DC power supply modules, have the following LEDs:

- Green indicating the power status
- Amber indicating the power supply failure

Table 18: LEDs on the AC/DC power supply modules

LED	Status	Description
Unlit	Off	No input power.
Green	Blinking	12V aux output is on; 12V main output is off.
	Solid	Both 12V aux output and 12V main output are on; Power supply is functioning normally.
Amber	Blinking	Warning detected. OR AC power cord is not inserted properly.
	Solid	Critical error detected.

The 1600W AC and DC power supply modules have a bi-color (green/amber) LED to indicate the status of the power supplies.

Table 19: LEDs on the 1600W AC/DC power supply modules

LED Status	Description
Off	No input power.
Solid amber	Critical error detected; PSU 12V main output is off.
Solid green	Both 12V aux output and 12V main output are on; Power supply is functioning normally.
1Hz blinking amber	Warning detected; PSU 12V main output is on.
2Hz blinking green	PSU 12V main output is off and 12V aux output is on.

Installation Guidelines

- The switch chassis must be installed in a cabinet or rack that is secured to the data center.
- Remove the power supply from its shipping container and remove any packaging.
- You need the following additional tools and equipment:
 - Nut driver attachment for number 1 Phillips-head screwdriver or ratchet wrench with torque capability (used only for DC-input power supplies).

- Grounding wire — Size this wire to meet local and national installation requirements. For U.S. installations, you must use an 8-14 AWG copper conductor for AC power supply systems. For installations outside the U.S., consult your local and national electrical codes. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- The chassis is connected to an earth ground.
- You have receptacles for the power sources within reach of the power supply cables.
- If you are connecting to a DC power, check that you are using power cables to connect to the power supply. The wire size applies to the negative [-], and positive [+] cables that connect to negative and positive apertures on the connector. You have to procure the power cable.
- If you are installing more than one DC-input power supply, each must be protected by a dedicated circuit breaker or a fuse that is sized according to the power supply input rating and the local or national electrical code requirements.
- The power sources are rated as follows:
 - For North American AC-input installations—16A with 110V circuits.
 - For North American DC-input installations—(-48 VDC nominal at 37 A in North America (operating range: -40.5 to -56 VDC).
 - For international installations—Size the circuits by local and national standards.
- The power supply is already inserted into the chassis.

**Caution**

Ensure that the power source is OFF. As an added precaution, place the appropriate safety flag and lockout devices at the source power circuit breaker, or place a piece of adhesive tape over the circuit breaker handle to prevent accidental power restoration while you are working on the circuit.

**Warning**

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

Installing Power Supply

Inserting the Power Supply

To insert the power supply into the chassis, follow these steps:

Procedure

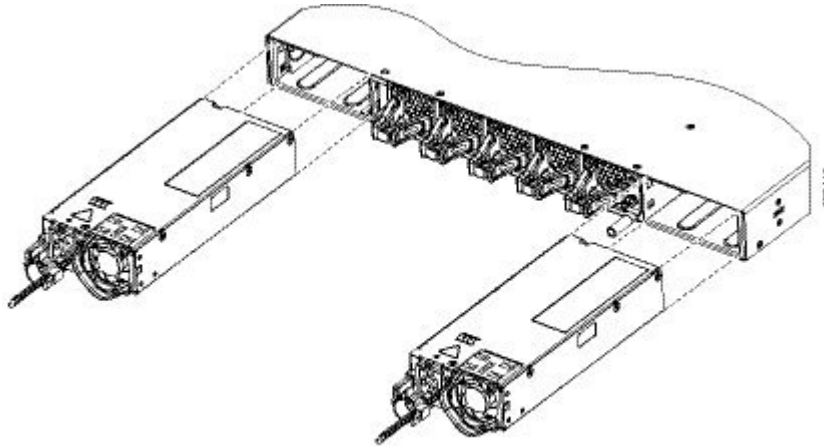
- Step 1** Remove the blank cover and store it for future use.
- Step 2** Verify that the power supply is not connected to any power sources.

Step 3 Hold the handle on the power supply with one hand and position the power supply with its back end at the open power supply bay. See the figure for an example (AC power supply is shown as an example, DC power supply can be installed in the same way).

Step 4 Slide the unit all the way into the power supply bay until the release latch on the front of the power supply clicks and prevents you from moving the power supply in or out of the chassis.

Note Ensure that the power supply is inserted into the slot in the right direction. If you have inserted the power supply in the reverse direction, the amber LED on the power supply blinks continuously.

Figure 51: Installing the Power Supply



Connecting to the Power Source

Each power cable is shipped with mating connectors with one of the connectors on the power socket and the other connector on the front panel of the power supply. You follow the same steps to install the AC-input and DC-input power supplies, but you must ground them differently.

- AC-input power supply—It is automatically grounded when you connect its power cable to the power supply and the power source.
- DC-input power supply—You do not connect the power supply directly to the earth ground.

You use one power cord for each power supply to connect the power supply to its power source.

Connecting to an AC Power Source

To connect to a power source, follow these steps:



Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

Procedure

-
- Step 1** Prior to connecting the power supply to a power source, ensure that the chassis is properly grounded.
- Step 2** Plug the power cable into the power supply.
- Step 3** Plug the other end of the power cable into a power source supplied by the data center.
- Note** When using redundant mode, connect each power supply to a separate power source.
- Step 4** Verify that the power supply is receiving power by checking that the LED is on and is amber or red. For more information about the power supply LEDs and the conditions that they indicate, see [Power Supply LEDs](#).
- When you first activate the power supply, you can verify the functionality of the LED by checking that LED turns on for a couple of seconds. If the LED is flashing amber or red, check the power connections on the power supply and the power source.
-

Connecting to a DC Power Source

To connect the DC power supply directly to one or two DC power sources, follow these steps:



Warning

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

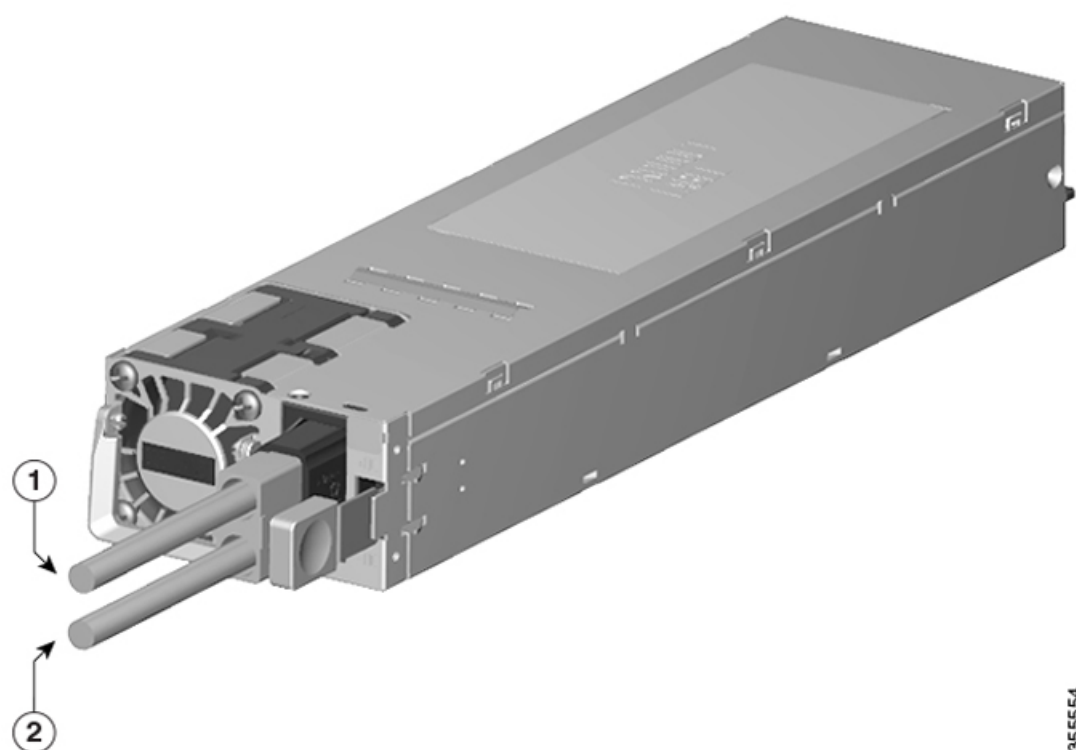


Warning

Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. **Statement 1075.**

Procedure

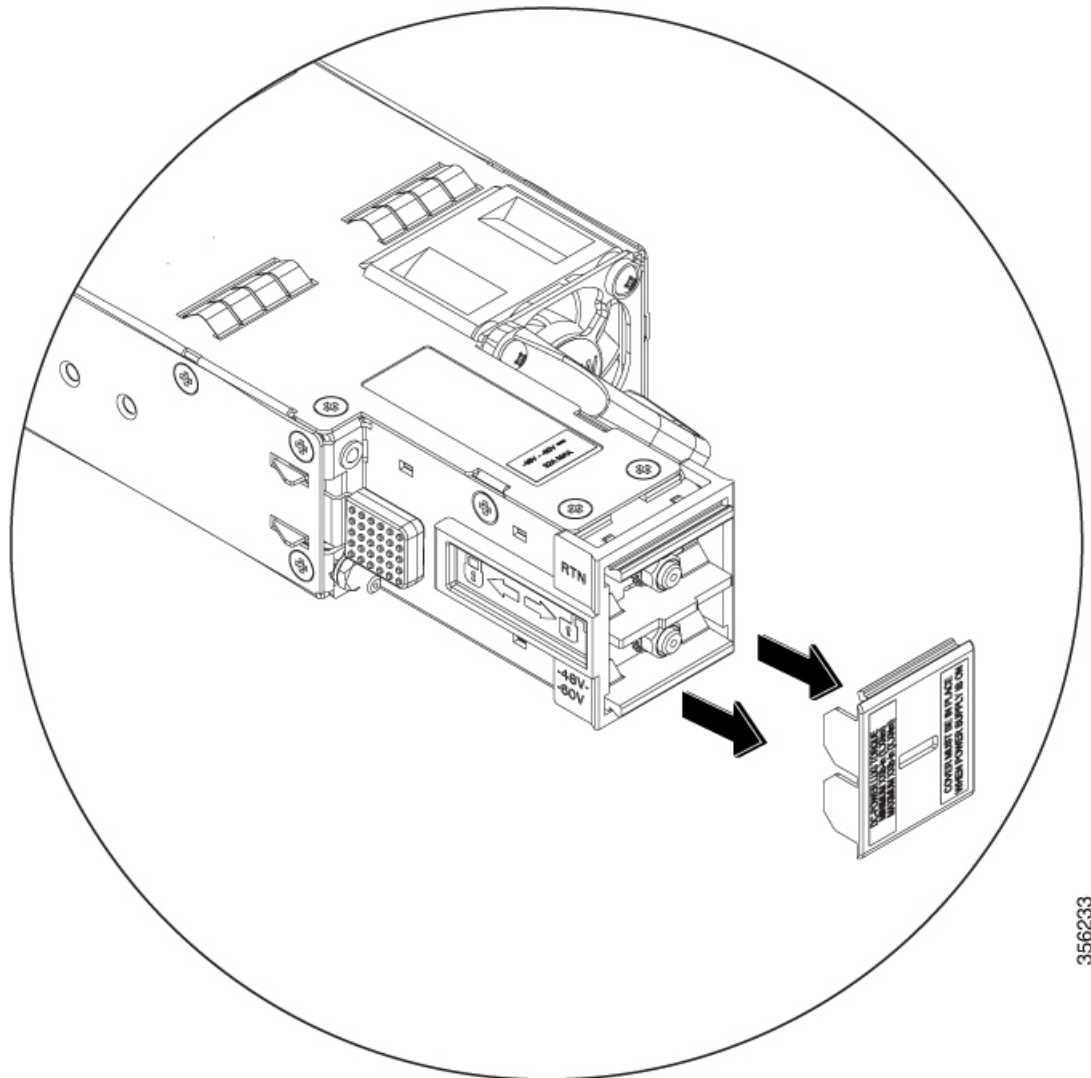
-
- Step 1** Prior to connecting the power supply to a power source, ensure that the chassis is properly grounded.
- Step 2** Plug the DC power cable into the DC power supply.
- Step 3** Turn off the power at the circuit breakers for the portions of the DC grid power that you are connecting to and verify that all of the LEDs on the DC grid power supplies are off.
- Step 4** Depending on the power supply installed, install the two cables from the DC power supply to the DC power source as follows:
- If you are using C9K-PWR-1600WDC-R or C9K-PWR-930WDC-R, do the following:
 - a. If the unconnected end of each power cable is not stripped off of its insulation for the last 0.75 inches (19 mm), use wire strippers to remove that amount of insulation.
 - b. Attach the negative cables to the negative terminals of a DC power source, and attach the positive cables to the positive terminals of the same power source.



1	Positive terminal	2	Negative terminal
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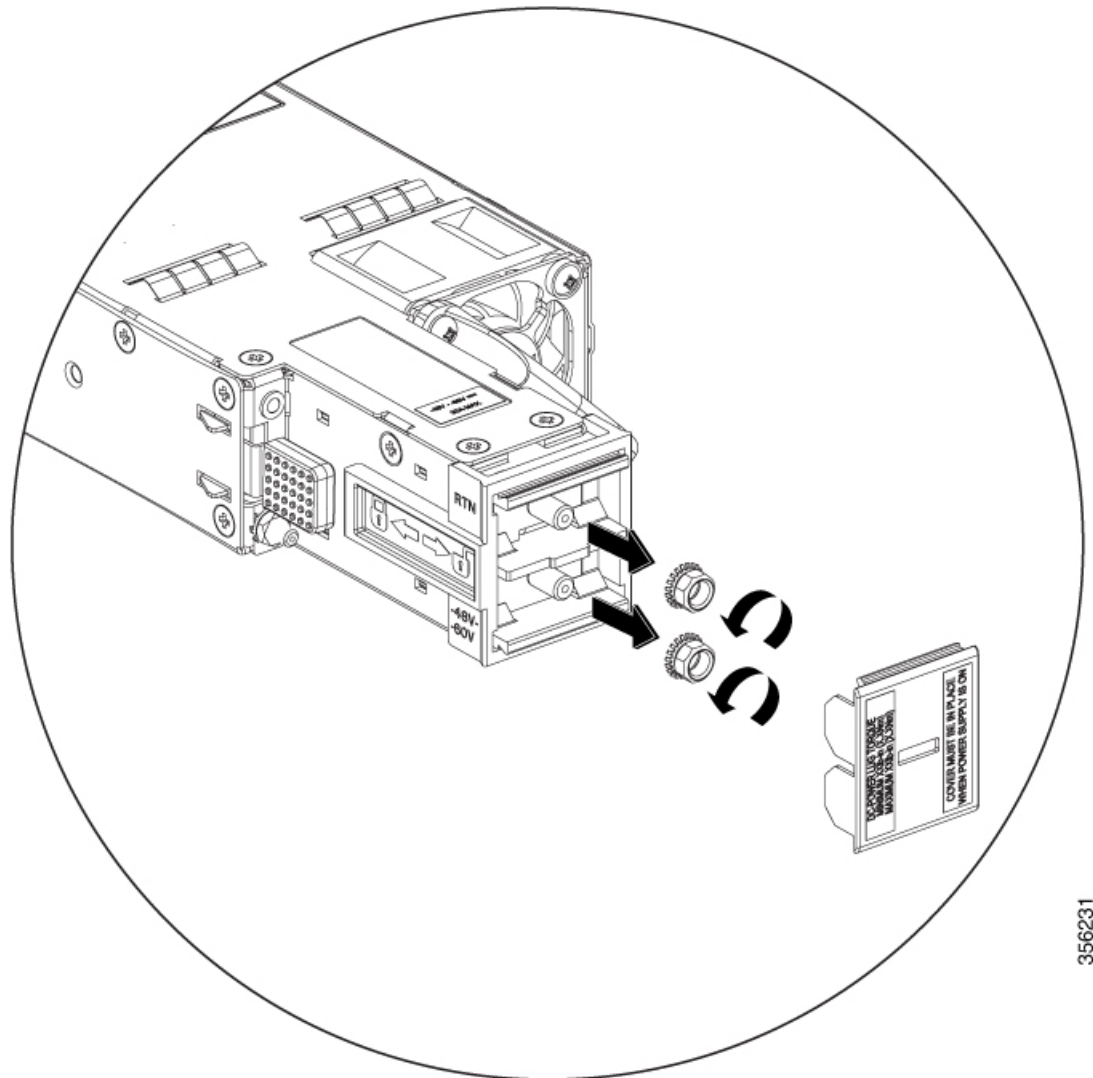
- If you are using PWR-C4-950WDC-R, do the following:
 - a. Remove the safety cover on the terminal box on the front of the DC power supply.

Figure 52: Remove the Safety Cover



356233

- b.** Loosen and unscrew the two nuts on the terminal box. The terminal box has two slots for power terminals. Each terminal has a nut that you use to fasten the power cable to the terminal.

Figure 53: Removing the Nuts on the Terminal Box

356231

- c. Secure the positive (+) DC power cable lug to the RTN terminal and the negative (–) DC power cable lug to the –48V terminal with the nuts.

To tighten the nuts, apply torque between 7 lbf.in (0.8Nm) and 10lbf.in (1.1 Nm) to each nut.

- d. Replace the safety cover over the terminal box on the DC power supply.

Step 5

Verify that the power supply is receiving power by checking that the LED is on and is amber or red. For more information about the power supply LEDs and the conditions that they indicate, see [Power Supply LEDs](#).

When you first activate the power supply, you can verify the functionality of the LED by checking that LED turns on for a couple of seconds. If the LED is flashing amber or red, check the power connections on the power supply and the power source.

Removing Power Supplies

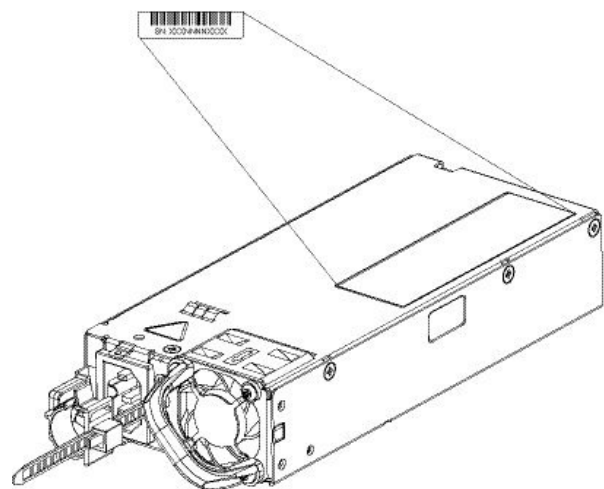
Procedure

-
- Step 1** Turn off the power to the power supply that you are removing, as follows:
- If you are removing a DC-input power supply, ensure that the power is turned off at the power source by turning off the power for that circuit.
- Step 2** Detach the power and ground cables, as follows:
- For the AC-input power supply, unplug the power cables that are attached to the power supply and the power source.
 - For the DC-input power supply, remove the power cables from the power supply and the power source.
- Step 3** Remove the power supply from the chassis, as follows:
- a) Press the ejector latch on the right of the power supply.
 - b) Pull the power supply partially out of the slot by its handle.
 - c) Pull the power supply fully from the slot.
- Caution** If you intend to operate the switch without installing another power supply in the empty slot, then you must reinstall the blank cover over the empty power supply slot to ensure proper air flow in the system and for safety reasons.
-

Finding the Serial Number

If you contact Cisco Technical Assistance, you need to know the serial number. These figures show where the serial number is located. You can also use the **show inventory EXEC** command to see the serial number.

Figure 54: Serial Number on the Power Supply



Installing a Fan Module

Fan Module Overview

Depending on the switch model, 5 individual fan modules or 2 fan trays with dual-stacked fan modules are available. In models using 5 fan modules, the switch can operate with 4 operational fans and 1 nonfunctional fan, but the failed fan should be replaced as soon as possible to avoid a service interruption due to a second fan fault.

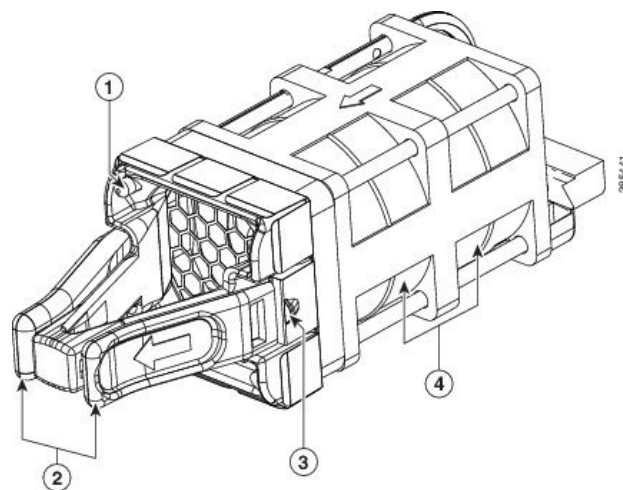
For the switch to boot-up, ensure the following conditions are met.

- the switches using FAN-T4-R and C9K-T2-FANTRAY= modules must have at the minimum 4 fans operating normally
- the switches using C9K-T1-FANTRAY modules must have 2 fan tray modules with all the fans operating normally

If the switch fails to meet the minimum number of required fans, the switch shuts down automatically to prevent the system from overheating.

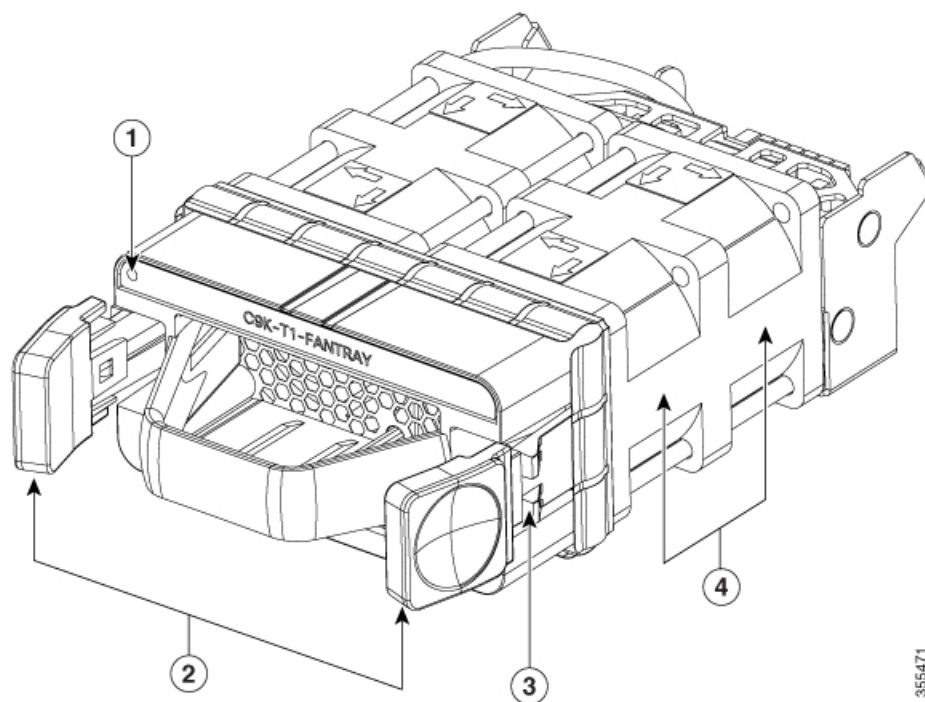
Part Number	Supported Switches	Description
FAN-T4-R=	Cisco Catalyst 9500 Series switches: C9500-12Q C9500-24Q C9500-40X C9500-16X	<ul style="list-style-type: none"> • Each switch contains five individual fan modules operating in N+1 redundancy mode. • Type 4 hot-swappable fan module.
C9K-T2-FANTRAY=	Cisco Catalyst 9500 Series High Performance switch: C9500-32C	
C9K-T1-FANTRAY=	Cisco Catalyst 9500 Series High Performance switches: C9500-32QC C9500-48Y4C C9500-24Y4C	<ul style="list-style-type: none"> • Each switch contains two fan tray units with dual-stacked fans. • Functions in the event of the failure of one of the fans in the fan tray unit. The individual fans are not replaceable; you must replace the fan unit.

Figure 55: FAN-T4-R Fan Module and C9K-T2-FANTRAY=



1	Fan assembly levers	3	Fan LED
2	Fan	4	Fan assembly retention latch

Figure 56: Fan Tray Unit with Dual-Stacked Fans



1	Fan LED	3	Fan assembly retention latch
2	Fan assembly levers	4	Fans

Installation Guidelines

Observe these guidelines when removing or installing a fan module:

- Do not force the fan module into the slot. This can damage the pins on the switch if they are not aligned with the module.
- A fan module that is only partially connected to the switch can disrupt the system operation.
- The switch supports hot swapping of the fan module. You can remove and replace the module without interrupting normal switch operation.

**Warning**

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

Installing a Fan Module

Procedure**Step 1**

Pinch the fan module release handle and slide the module out.

Caution You should replace the fan module within 5 minutes to avoid overheating the switch.

Step 2

Install the fan module in the fan slot, and firmly push it into the slot, applying pressure to the end of the module, not the extraction handles. When correctly inserted, the fan module is flush with the switch rear panel. When the fan is operating, a green LED is on in the top left corner of the fan.

Warning Do not reach into a vacant slot when installing or removing a module. Exposed circuitry is an energy hazard. Statement 206

Figure 57: Installing the Fan Module on a Cisco Catalyst 9500 Series Switch

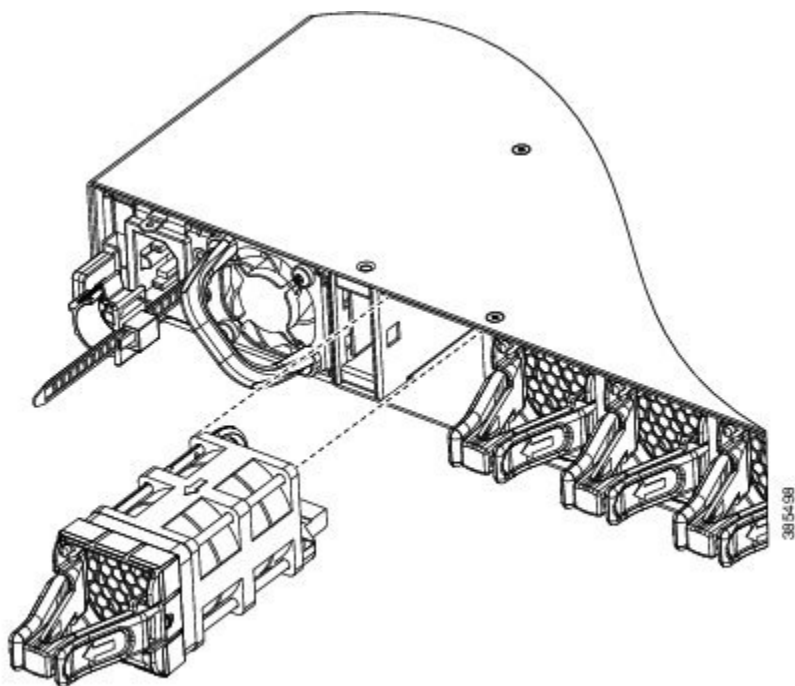


Figure 58: Installing the Fan Module on Cisco Catalyst 9500 High Performance C9500-32C Switch Model

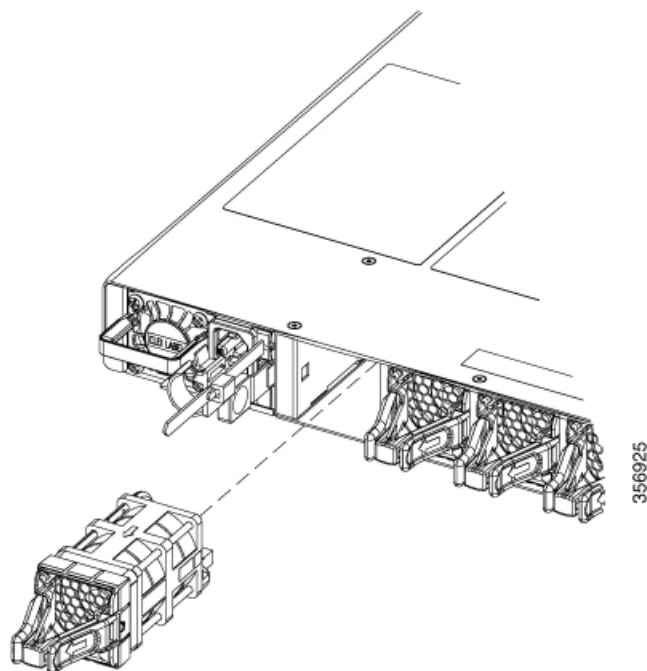
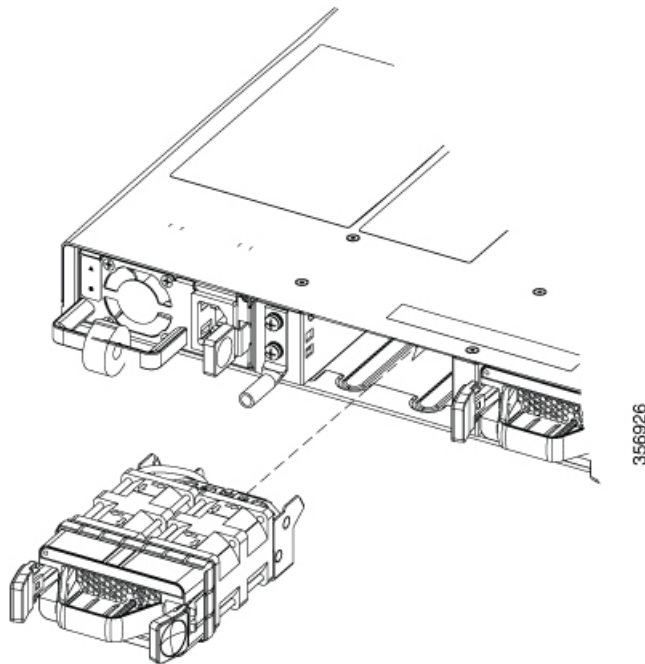


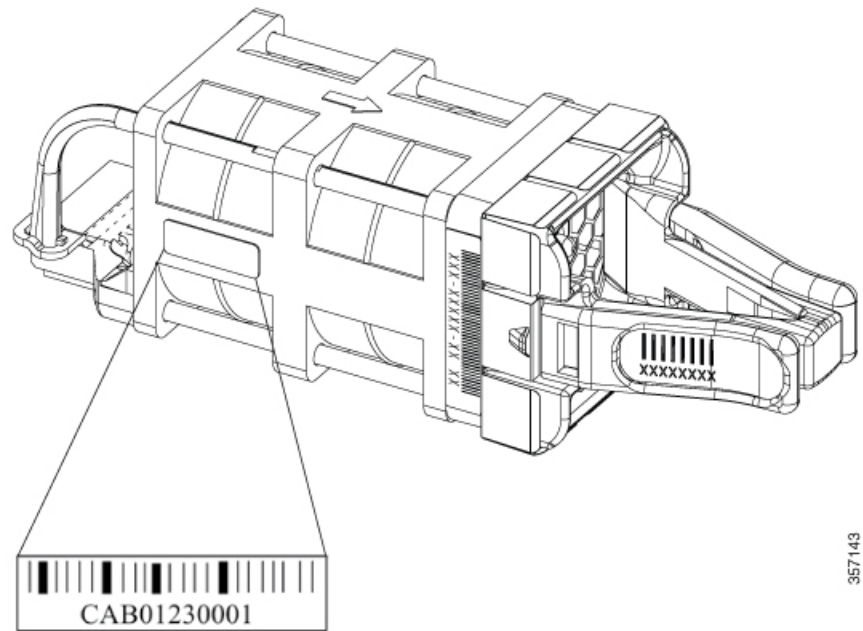
Figure 59: Installing the Fan Module on Cisco Catalyst 9500 High Performance C9500-32QC, C9500-48Y4C and C9500-24Y4C Switch Models



Finding the Fan Module Serial Number

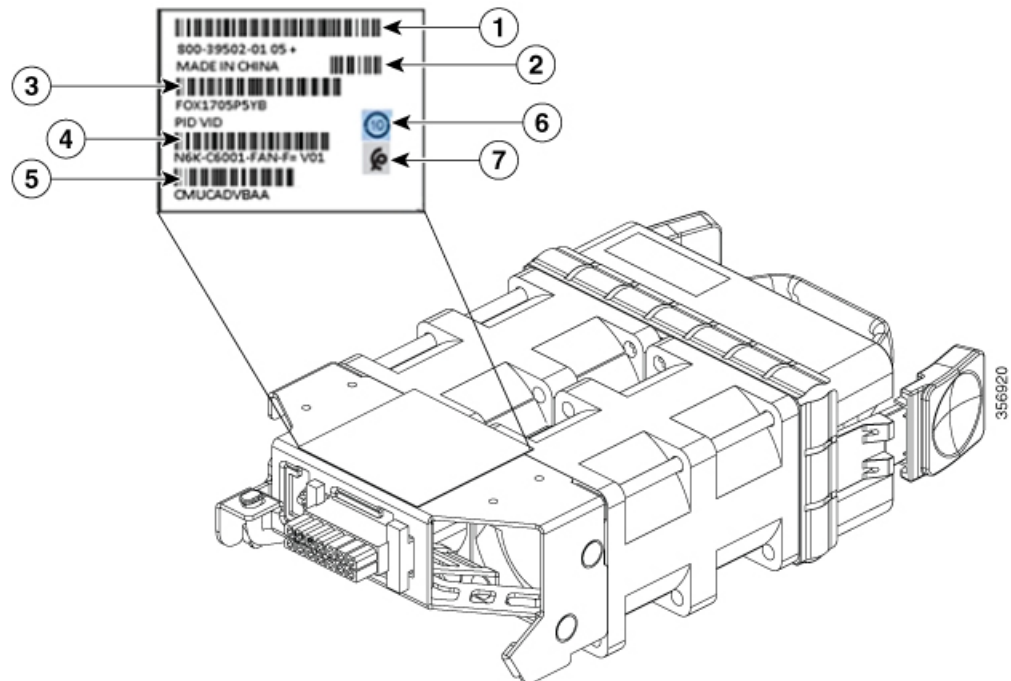
If you contact Cisco Technical Assistance regarding a fan module, you need to know the fan module serial number. See the following illustration to find the serial number.

Figure 60: Fan Module Serial Number on Cisco Catalyst 9500 Series and High Performance Switch C9500-32C Switch Models



357143

Figure 61: Fan Module Serial Number on Cisco Catalyst 9500 High Performance C9500-32QC, C9500-48Y4C and C9500-24Y4C Switch Models



1	Product Number	5	CLEI
2	Country of Origin	6	China RoHS

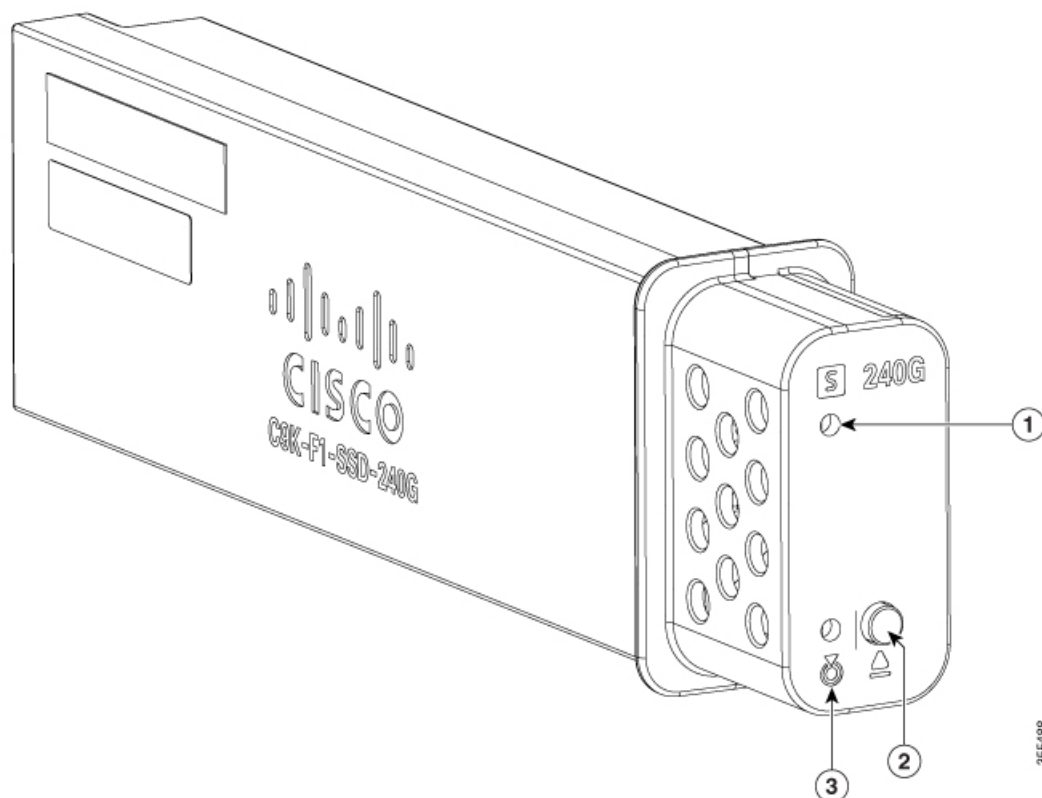
3	Serial Number	7	Morocco Logo
4	PID/VID		

Installing an SSD Module

SATA SSD Module Overview

SATA SSD module is available as a field-replaceable unit (FRU). The SSD module has a button which facilitates hot-swapping of the module. To prevent data loss, press the hot-swap button to request removal and wait for the system to confirm safe-removal by turning off the status LED.

Figure 62: SATA SSD



1	Status LED	3	Blue beacon LED
2	Hot-swap button		

The following table lists the SATA SSD modules supported on Cisco Catalyst 9500 Series High Performance Switches.

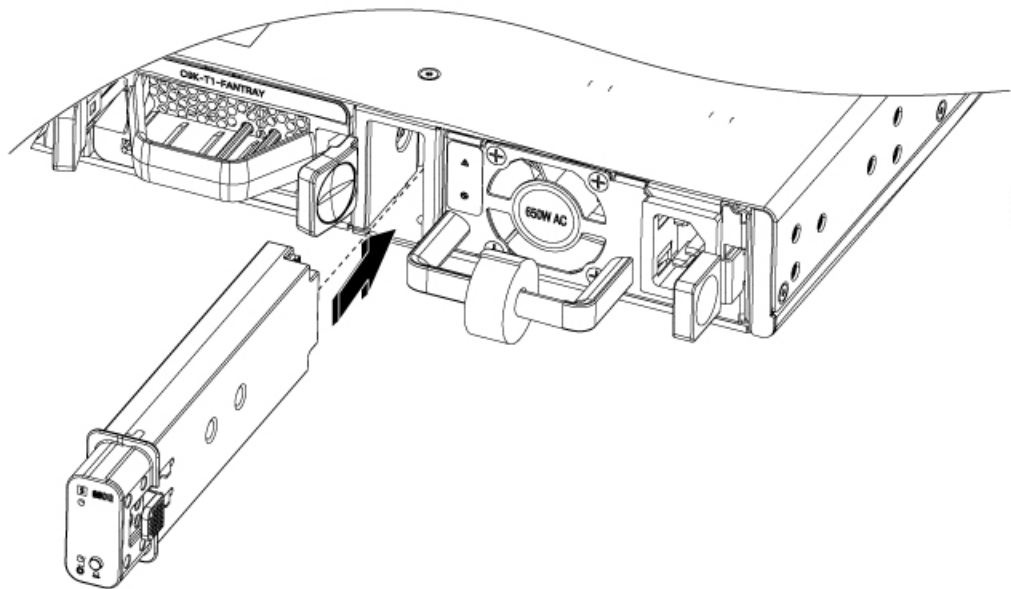
Table 20: SATA SSD modules

SATA SSD	Description
C9K-F1-SSD-240G	Cisco Catalyst 9500 Series 240GB SATA memory
C9K-F1-SSD-480G	Cisco Catalyst 9500 Series 480GB SATA memory
C9K-F1-SSD-960G	Cisco Catalyst 9500 Series 960GB SATA memory

Installing an SSD Module

Procedure

- Step 1** Remove the blank cover on the SSD module slot on the switch and store it for future use.
- Step 2** Insert the SSD module into the USB 3.0 SSD module slot, and firmly push it into the slot.



- Step 3** Verify that the LED on the SSD module turns solid green.

Removing an SSD Module

Procedure

- Step 1** Press and hold the hot-swap button on the SSD module for at least four seconds.

The system powers down the SSD module and the port and the LED turns off indicating that the module is ready for removal.

Also, the switch console displays the following messages indicating safe removal.

```
*Mar 12 11:22:22.285: %IOSXE-3-PLATFORM: R0/0: kernel: ata1: irq_stat
0x00400040, connection status changed
*Mar 12 11:22:28.310: %IOSXE-4-PLATFORM: R0/0: kernel: ata1: limiting
SATA link speed to 1.5 Gbps
*Mar 12 11:22:33.613: %IOSXE-4-PLATFORM: R0/0: kernel: ata1.00: disabled
```

Step 2 Remove the SSD module from the module slot and insert the blank slot cover.

If you are replacing the SSD module, insert the new module into the slot. For more information, see [Installing an SSD Module, on page 81](#).



CHAPTER 6

Troubleshooting

- [Getting Started, on page 83](#)
- [Solving Problems at the System Component Level, on page 83](#)
- [Identifying Startup Problems, on page 84](#)
- [Troubleshooting the Power Supply, on page 84](#)
- [Troubleshooting the Fan Tray , on page 85](#)
- [Status LED Indicators, on page 85](#)
- [Contacting Cisco Customer Service, on page 85](#)
- [Finding the Serial Number, on page 86](#)

Getting Started

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

- Power supplies are supplying power to the system.
- The fan tray assembly is operating.
- System software boots successfully.

If one or more of the above conditions are not met, use the procedures described in this chapter to isolate and, if possible, resolve the problem. If all of the above conditions are met, and the hardware installation is complete, refer to your software release notes for hardware support information and software caveats.

Solving Problems at the System Component Level

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

The switch consists of these subsystems:

- Power supplies
- Fan tray assembly

The chassis fan tray assembly should operate whenever system power is on. You should see the FAN LED turn green and hear the fan tray assembly operating. A red or amber FAN LED indicates that one or more fans in the fan tray assembly is not operating. You should immediately contact a Customer Service representative if the fan tray assembly is not functioning properly. There are no installation adjustments that you can make if the fan tray assembly does not function properly at initial startup.

Identifying Startup Problems

LEDs indicate all system states in the startup sequence. By checking the LEDs, you can determine when and where the system failed in the startup sequence.

Procedure

- Step 1** Turn on the power supplies. You should immediately hear the system fan tray assembly begin to operate.
- Step 2** If the startup information and system banner do not display at startup, verify that the terminal is set correctly and that it is connected properly to the console port.
-

Troubleshooting the Power Supply

If the Power Supply LED does not light after you turn on the power switch, follow these steps to isolate a power subsystem problem:

Procedure

- Step 1** Verify that the Power Supply LED on the power supply is green.
- If the Power Supply LED is green, the AC or DC source is good and the power supply is functional.
 - If the Power Supply LED remains off, there might be a problem with the AC source, the DC source, or the power cable.
 - Turn off the power to the switch, connect the power cord to another power source if one is available, and turn on the power.
 - If the Power Supply LED is green, the problem is the first power source.
 - If the Power Supply LED fails to light after you connect the power supply to a new power source, replace the power cord, and turn on the switch.
 - If the Power Supply LED then goes on, return the first power cord for replacement.

If this unit has more than one power cord, repeat Step 1 for each power supply.

If the Power Supply LED still fails to light when the switch is connected to a different power source with a new power cord, the power supply is probably faulty.

If a second power supply is available, install it in the second power supply bay, and contact a customer service representative for further instructions.

Step 2 If you have a second power supply, repeat Step 1 for this power supply.

What to do next

If you are unable to resolve the problem or if you determine that either a power supply or backplane connector is faulty, see [Contacting Cisco Customer Service, on page 85](#).

Troubleshooting the Fan Tray

To isolate a fan tray problem, follow these steps:

Procedure

- Step 1** Verify that the FAN LED on the fan tray is green.
- If the FAN LED is not green, see [Fan LED, on page 28](#) to determine whether or not the power subsystem is functioning properly.
- Step 2** Check to determine if the FAN LED is red or amber. If the FAN LED is red, one or more fans' tachometer faults have exceeded the maximum limit. If the FAN LED is amber, one or more fans have encountered tachometer faults.
- Do the following:
- To ensure that the fan tray is seated properly, loosen the captive installation screws, remove the fan tray, and reinstall it.
 - Tighten all captive installation screws, and then restart the system.
 - If the FAN LED is still red or amber, the system detects an individual fan failure. Contact a customer service representative for instructions.
-

Status LED Indicators

Refer to "System LED" section in the "Product Overview" chapter. More details will be added here later.

Contacting Cisco Customer Service

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

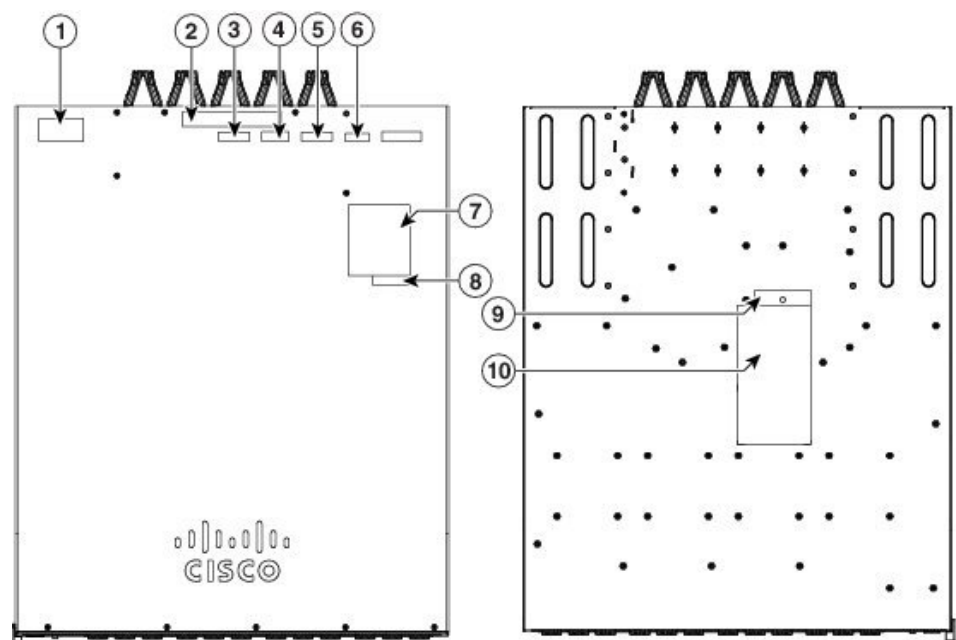
- Date on which you received the switch
- Chassis serial number
- Type of software and release number
- Maintenance agreement or warranty information
- Brief description of the problem
- Brief explanation of the steps you have already taken to isolate and resolve the problem

Finding the Serial Number

If you contact Cisco Technical Assistance, you need to know the switch serial number. The figure shows where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number.

Figure 63: Serial Number Location and Switch Labels on a Cisco Catalyst 9500 Series Switch

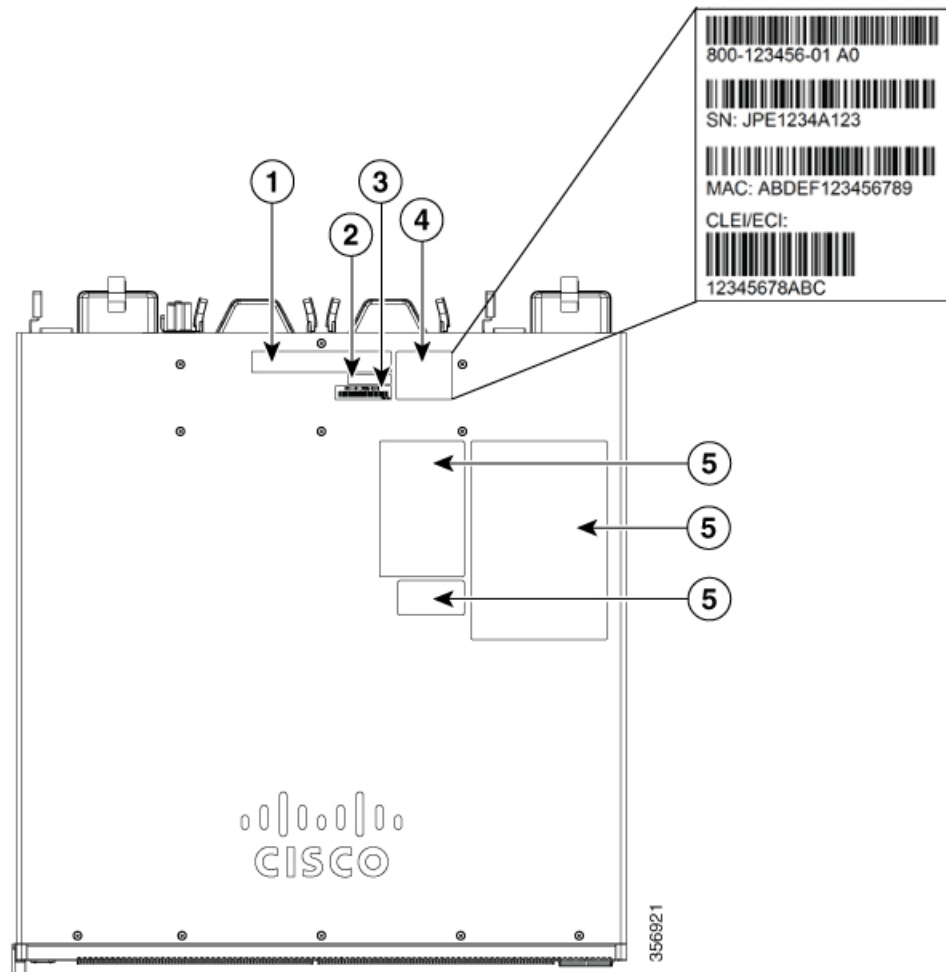
Serial number of the switch is located at the top of the switch. Following illustrations show all the labels at the top and the bottom of the switch.



1	Multi Power Warning	6	Serial Number
2	Fan Tray Warning	7	Laser Warning
3	RFID	8	Caution ESD
4	CLEI	9	Lab Altitude
5	MAC Number	10	Compliance label

Figure 64: Serial Number Location and Switch Labels on a Cisco Catalyst 9500 High Performance Series Switch

Serial number of the switch is located at the top of the switch. Following illustrations show all the labels at the top and the bottom of the switch.



1	Fan Tray Warning	4	Product Number / Serial Number / MAC number / CLEI
2	Country of Origin	5	Agency
3	PID/VID		



APPENDIX A

Technical Specifications

- [Technical Specifications, on page 89](#)

Technical Specifications

This table describes the environmental specifications.

Table 21: Environmental Specifications for the Switch

Environmental Ranges	
Operating temperature	32 to 104°F (0 to 40°C)
Storage temperature	–4 to 149°F (–20 to 65°C)
Relative humidity	Operating : 5 to 90% (noncondensing) Non-Operating : 5% to 95% (noncondensing)
Operating altitude	Up to 6000 ft (1800 m)
Storage altitude	Up to 15,000 ft (4500 m)

Table 22: Acoustic Measurements for the Switches

	Switch Model	Sound Power Level
Cisco Catalyst 9500 Series Switches	C9500-12Q	No greater than 70.4 L _{WAd} dB
	C9500-24Q	No greater than 70.4 L _{WAd} dB
	C9500-16X	No greater than 68.3 L _{WAd} dB
	C9500-40X	No greater than 68.3 L _{WAd} dB

	Switch Model	Sound Power Level
Cisco Catalyst 9500 Series High Performance Switches	C9500-32C	No greater than 76.7 L _{WAd} dB
	C9500-32QC	No greater than 72.1 L _{WAd} dB
	C9500-24Y4C	No greater than 71.5 L _{WAd} dB
	C9500-48Y4C	No greater than 71.5 L _{WAd} dB

This table describes the physical specifications.

Table 23: Physical Specifications for the Switch

Physical Specifications		
Dimensions (H x W x D)	1.73 x 17.5 x 21.5 in. (4.4 x 44.5 x 56.7 cm)	C9500-12Q
		C9500-24Q
		C9500-40X
		C9500-16X
	1.73 x 17.5 x 21.2 in. (4.4 x 44.5 x 56.8 cm)	C9500-32C
	1.73 x 17.5 x 18.0 in. (4.4 x 44.5 x 45.7 cm)	C9500-32QC
		C9500-48Y4C
		C9500-24Y4C
Rack Units (RU)	1 RU	
Chassis with 2 Power Supplies and Built-In Fan	25.75 lbs (11.68 kg)	C9500-12Q
		C9500-24Q
		C9500-40X
	23.6 lbs (10.7 kg)	C9500-16X
	25.64 lbs (11.63 kg)	C9500-32C
	21.85 lbs (9.91 kg)	C9500-32QC
	21.96 lbs (9.96 kg)	C9500-48Y4C
	20.99 lbs (9.52 kg)	C9500-24Y4C

This table describes the power requirements.

Table 24: Power Requirements

Power Requirements		
Input Voltage	115 to 230 VAC	C9500-12Q
		C9500-16X
		C9500-24Q
		C9500-40X
	90 to 264 VAC	C9500-32C
		C9500-32QC
		C9500-48Y4C
		C9500-24Y4C



APPENDIX **B**

Connector and Cable Specifications

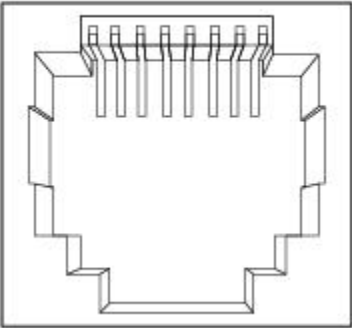
- [Connector Specifications, on page 93](#)
- [Console Port, on page 94](#)
- [Cables and Adapters, on page 95](#)

Connector Specifications

10/100/1000 Ports (Including PoE)

All 10/100/1000 ports use standard RJ-45 connectors and Ethernet pinouts.

Figure 65: 10/100/1000 Port Pinouts

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

SFP Module Connectors

Figure 66: Duplex LC Cable Connector

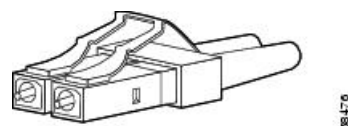
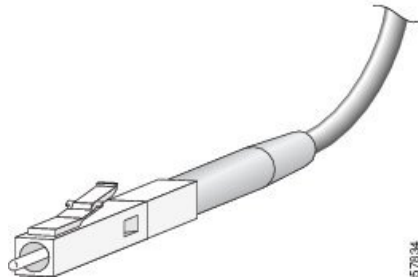
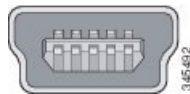


Figure 67: Simplex LC Cable Connector**Figure 68: Copper SFP Module LC Connector**

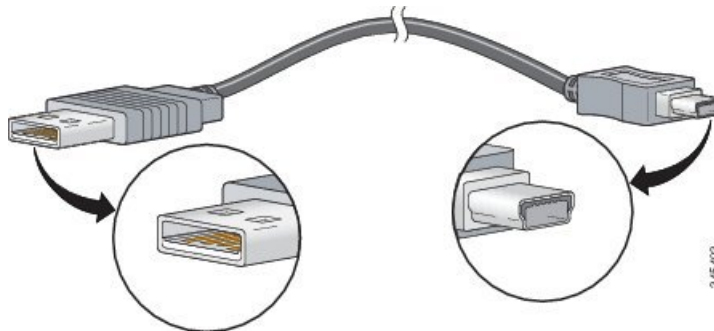
Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

Console Port

The switch has two console ports: a USB 5-pin mini-Type B port on the front panel and an RJ-45 console port on the rear panel.

Figure 69: USB Mini-Type B Port

The USB console port uses a USB Type A to 5-pin mini-Type B cable. The USB Type A-to-USB mini-Type B cable is not supplied. You can order an accessory kit (part number 800-33434) that contains this cable.

Figure 70: USB Type A-to-USB 5-Pin Mini-Type B Cable

The RJ-45 console port uses an 8-pin RJ-45 connection. The supplied RJ-45-to-DB-9 adapter cable is used 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.

Cables and Adapters

Transceiver Module Network Cables

For cabling specifications, refer to the following notes:

- [Cisco SFP and SFP+ Transceiver Module Installation Notes](#)
- [Cisco 40-Gigabit QSFP+ Transceiver Modules Installation Note](#)

Each port must match the wavelength specifications on the other end of the cable, and the cable must not exceed the stipulated cable length. Copper 1000BASE-T SFP module transceivers use standard four twisted-pair, Category 5 cable at lengths up to 328 feet (100 meters).

Cable Pinouts

Figure 71: Four Twisted-Pair Straight-Through Cable Schematic

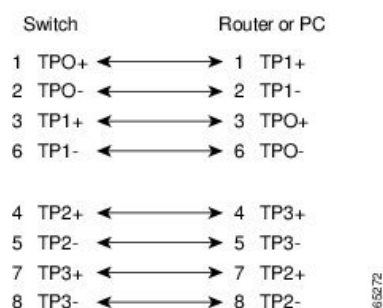


Figure 72: Four Twisted-Pair Semi-Cross Cable Schematic

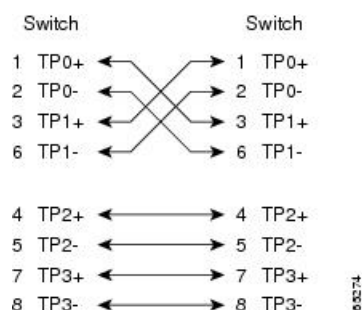
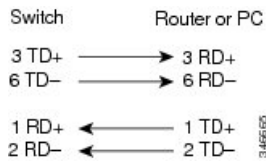
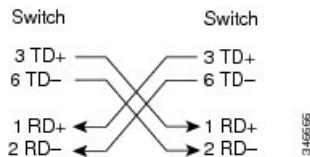
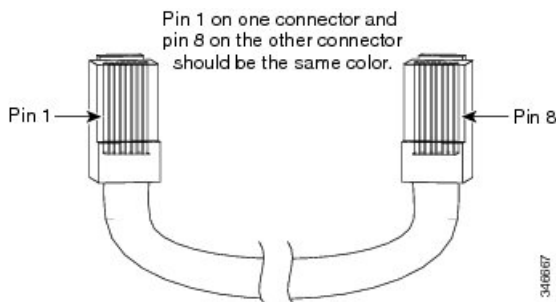


Figure 73: Two Twisted-Pair Straight-Through Cable Schematic**Figure 74: Two Twisted-Pair Crossover Cable Schematic****Identifying a Crossover Cable**

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 a different color from the wire connected to the pin on the inside of the right plug.

Figure 75: Identifying a Crossover Cable

Console Port Adapter Pinouts

The RS-232 console port uses an 8-pin RJ-45 connector. Use an RJ-45-to-DB-9 adapter cable to connect the switch console port to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter to connect the switch console port to a terminal.

Table 25: Console Port Signaling with 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

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

Table 26: Console Port Signaling with 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 C

Configuring the Switch

- [Configuring the Switch Using the Web User Interface, on page 99](#)
- [Configuring the Switch Using the CLI, on page 99](#)

Configuring the Switch Using the Web User Interface

For instructions on setting up the switch using the WebUI, refer to the required version of the [software configuration guide](#). In the guide, go to *Configuring the Switch Using the Web User Interface*.

Configuring the Switch Using the CLI

Accessing the CLI Through the Console Port

You can access the CLI on a configured or unconfigured switch by connecting the RJ-45 console port or USB console port of the switch to your PC or workstation and accessing the switch through a terminal emulation program.



Note If you have stacked your switches, connect to the console port of one of the switches in the stack. You can initially configure the entire stack from any member switch.

Connecting the RJ-45 Console Port

Procedure

- Step 1** Connect the RJ-45-to-DB-9 adapter cable to the 9-pin serial port on the PC. Connect the other end of the cable to the switch console port.
- Step 2** Start the terminal-emulation program on the PC or the terminal. The program, frequently a PC application such as HyperTerminal or ProcommPlus, makes communication between the switch and your PC or terminal possible.

- Step 3** Configure the baud rate and character format of the PC or terminal to match the console port default characteristics:
- 9600 baud
 - 8 data bits
 - 1 stop bit
 - No parity
 - None (flow control)
- Step 4** Power on the switch as described in the switch getting started guide.
- Step 5** The PC or terminal displays the bootloader sequence. Press **Enter** to display the setup prompt.
-

Connecting the USB Console Port

Procedure

- Step 1** If you are connecting the switch USB console port to a Windows-based PC for the first time, install the USB driver. See [Installing the Cisco Microsoft Windows USB Device Driver, on page 101](#).
- Note** USB Type A port on the switch provides file system support and is **NOT** a console port. See USB Type A Port section.
- Step 2** Connect a USB cable to the PC USB port. Connect the other end of the cable to the switch mini-B (5-pin-connector) USB console port.
- Step 3** Start the terminal-emulation program on the PC or the terminal. The program, frequently a PC application such as HyperTerminal or ProcommPlus, makes communication between the switch and your PC or terminal possible.
- Step 4** Configure the baud rate and character format of the PC or terminal to match the console port default characteristics:
- 9600 baud
 - 8 data bits
 - 1 stop bit
 - No parity
 - None (flow control)
- Step 5** Power on the switch as described in the switch getting started guide.
- Step 6** The PC or terminal displays the bootloader sequence. Press **Enter** to display the setup prompt. Follow the steps in the Setup program.
-

Installing the Cisco Microsoft Windows USB Device Driver

A USB device driver must be installed the first time a Microsoft Windows-based PC is connected to the USB console port on the switch.

Installing the Cisco Microsoft Windows 7 USB Driver

Procedure

- Step 1** Obtain the Cisco USB console driver file from the Cisco.com web site and unzip it.
- Note** You can download the driver file from the Cisco.com site for downloading the switch software.
- Step 2** If using 32-bit Windows 7, double-click the setup.exe file in the Windows_32 folder. If using 64-bit Windows 7, double-click the setup(x64).exe file in the Windows_64 folder.
- Step 3** The Cisco Virtual Com InstallShield Wizard begins. Click **Next**.
- Step 4** The Ready to Install the Program window appears. Click **Install**.
- Note** If a User Account Control warning appears, click **Allow - I trust this program** to proceed.
- Step 5** The InstallShield Wizard Completed window appears. Click **Finish**.
- Step 6** Connect the USB cable to the PC and the switch console port. The USB console port LED turns green, and the Found New Hardware Wizard appears. Follow the instructions to complete the driver installation.
-

Uninstalling the Cisco Microsoft Windows USB Driver

Uninstalling the Cisco Microsoft Windows 7 USB Driver

Before you begin

Disconnect the switch console terminal before uninstalling the driver.

Procedure

- Step 1** Run setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click **Next**.
- Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
- Step 3** When the Program Maintenance window appears, select the Remove radio button. Click **Next**.
- Step 4** When the Remove the Program window appears, click **Remove**.
- Note** If a User Account Control warning appears, click **Allow - I trust this program** to proceed.
- Step 5** When the InstallShield Wizard Completed window appears, click **Finish**.
-



APPENDIX **D**

Accessory Kit Contents

- [19-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series](#), on page 103
- [19-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 High Performance Series](#), on page 104
- [23-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series](#), on page 104
- [23-Inch rack mount Accessory Kit for Cisco Catalyst 9500 High Performance Series](#), on page 104
- [Extension Rails and Brackets for Four-Point Mounting for Cisco Catalyst 9500 Series](#), on page 105
- [Extension Rails and Brackets for Four-Point Mounting for Cisco Catalyst 9500 High Performance Series](#), on page 105

19-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series

The 19-inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series contains the following items:

Item	Quantity
19-inch mounting brackets	2
Cable guides	2
Number-12 pan-head 0.50" long screws	4
M4.0 x 20mm Phillips pan-head screws (Black color)	2
Number-8 Phillips flat-head 0.312" long screws	8
Number-10 pan-head 0.625" long screws	4
Ground lug	1
M4.0 x 8mm Phillips pan-head screws	2
Disposable ESD strap	1

19-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 High Performance Series

The 19-inch Rack Mount Accessory Kit for Cisco Catalyst 9500 High Performance Series contains the following items:

Item	Quantity
19-inch mounting brackets	2
Cable guides	2
Number-12 pan-head 0.50" long screws	4
M4.0 x 20mm Phillips pan-head screws (Black color)	2
M4.0 x 6mm Phillips flat-head screws	12
Number-10 pan-head 0.625" long screws	4
Ground lug	1
M4.0 x 8mm Phillips pan-head screws	2
Disposable ESD strap	1

23-Inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series

The 23-inch Rack Mount Accessory Kit for Cisco Catalyst 9500 Series contains the following items:

Item	Quantity
23-inch mounting brackets	2
19-inch mounting brackets	2
Number-12 pan-head 0.50" long screws	8
Number-8 Phillips flat-head 0.312" long screws	16

23-Inch rack mount Accessory Kit for Cisco Catalyst 9500 High Performance Series

The 23-inch Rack Mount Accessory Kit for Cisco Catalyst 9500 High Performance Series contains the following items:

Item	Quantity
23-inch mounting brackets	2
Cable guides	2
Number-12 pan-head 0.50" long screws	4
M4.0 x 20mm Phillips pan-head screws (Black color)	2
M4.0 x 6mm Phillips flat-head screws	12
Number-10 pan-head 0.625" long screws	4

Extension Rails and Brackets for Four-Point Mounting for Cisco Catalyst 9500 Series

The Extension Rails and Brackets for Four-Point Mounting Accessory Kit for Cisco Catalyst 9500 Series contains the following items:

Item	Quantity
Extension rails and brackets for four-point mounting	2 sets
19-inch mounting brackets	2
Number-8 Phillips flat-head 0.312" long screws	16
Number-10 pan-head 0.625" long screws	8
Number-12 pan-head 0.50" long screws	8

Extension Rails and Brackets for Four-Point Mounting for Cisco Catalyst 9500 High Performance Series

The Extension Rails and Brackets for Four-Point Mounting Accessory Kit for Cisco Catalyst 9500 High Performance Series contains the following items:

Item	Quantity
Extension rails and brackets for four-point mounting	2 sets
19-inch mounting brackets	2
M4.0 x 6mm Phillips flat-head screws	24
Number-10 pan-head 0.625" long screws	8
Number-12 pan-head 0.50" long screws	8

