

Hardware Installation Guide for Cisco NCS 5700 Series Fixed-Port Routers

First Published: 2021-06-23

Last Modified: 2026-05-15

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

© 2021–2026 Cisco Systems, Inc. All rights reserved.



CONTENTS

CHAPTER 1 **NCS 5700 Router Overview** 1

- Cisco NCS 5700 Router Overview 1
- Field Replaceable Units 4
- Route Processor Card 11
- Modular Port Adapters 11
- Network Interfaces 21
- Specification 32
- Network Timing Interfaces 32
- GNSS 33
  - GNSS Module RF Input Requirements 33
- Console 34
- Online Insertion and Removal 34
- Transceiver and Cable Specifications 34

CHAPTER 2 **Prepare for Installation** 35

- Review Installation Roadmap 35
- Review Safety Guidelines 36
- Cautions and Regulatory Compliance Statements for NEBS 36
- Review Installation Guidelines 37
- Review Site Selection Guidelines 38
  - Review Outside Plant (OSP) Guidelines 39
- Clearance Requirements 40
  - Airflow Directions 42
- Procure Tools and Equipment 43
- Accessory Kits for Fixed Port Routers 44
- Prepare Your Location 45

Airflow for Site Planning 47
Prepare Yourself 47
Prepare Rack for Chassis Installation 49

CHAPTER 3 **Install the Chassis 51**
Rack Types 51
Install the Extension Plate on 23-inch Rack Post 52
Rack Mount the Chassis 54
Rack Mount the NCS-57B1 Chassis in a 2-Post Rack 54
Rack Mount the NCS-57C1 Chassis in a 2-Post Rack with Sliders 56
Rack Mount the NCS-57C3-MOD Chassis in a 2-Post Rack 62
Rack Mount the NCS-57D2 Chassis in a 2-Post Rack with Sliders 64
Rack-Mount the NCS-57B1 Chassis in a 4-Post Rack 68
Rack Mount the NCS-57C1 Chassis in a 4-Post Rack with Sliders 71
Rack Mount the NCS-57C3-MOD Chassis in a 4-Post Rack using Sliders 77
Rack Mount the NCS-57D2 Chassis in a 4-Post Rack with Sliders 89
(Optional) Install the Air Filter on the NCS-57D2 Router 92
(Optional) Install the Air Filter on the NCS-57C3 Router 98
(Optional) Install the Cable Management Bracket on NCS-57C1 Chassis 101
Ground the Chassis 102
Connect AC Power to the Chassis 106
Connect DC Power to the Chassis 108
Power Supply Unit Input and Output Ranges 113

CHAPTER 4 **Connect Router to the Network 115**
Port Connection Guidelines 115
Interfaces and Port Description 116
Connect to the Console Port 116
Create the Initial Router Configuration 117
Connect to the Management Ethernet Port 119
Accessing RJ-45 Cable 120
Install and Remove Transceiver Modules 121
Install and Remove SFP28 and SFP+ Modules 121
Bale Clasp SFP+ Module 123

Install a Bale Clasp SFP+ Module 124
Remove a Bale Clasp SFP+ Module 124
Install and Remove QSFP-DD Transceiver Modules 126
Install and Remove QSFP+/QSFP28 Transceiver Modules 128
Overview 129
Required Tools and Equipment 129
Installing the 40-Gigabit QSFP+ or 100-Gigabit Transceiver Module 130
Attach the Optical Network Cable 132
Removing the 40-Gigabit QSFP+ or 100-Gigabit QSFP28 Transceiver Module 133
Connect Interface Ports 134
Connect a Fiber-Optic Port to the Network 134
Disconnect Optical Ports from the Network 135
Connecting a Cable to the GNSS Antenna Interface 135
Maintain Transceivers and Optical Cables 136

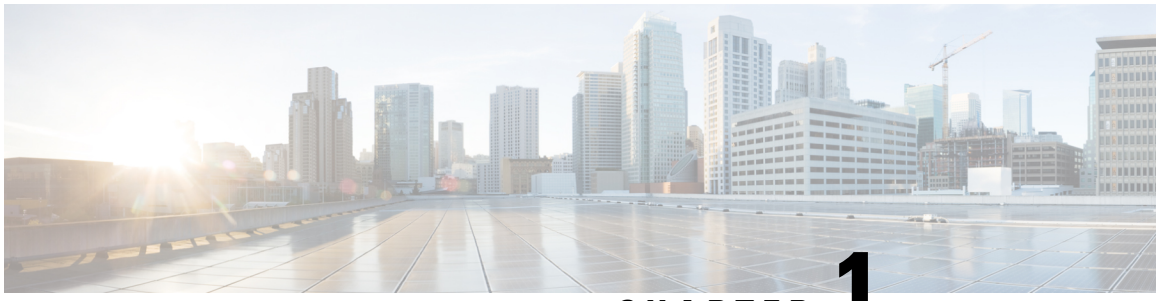
CHAPTER 5 **Replace Chassis Components** 137
Replace Fan Modules and Fan Trays 137
Replace Power Supply 141
Remove the DC Power Supply Module 142
Install the DC Power Supply Module 142
Remove the AC Power Supply Module 144
Install the AC Power Supply Module 145
Replace a Route Processor Card 147
Installing and Removing Modular Port Adapters 149
Handling Modular Port Adapters 149
Online Insertion and Removal 149
Modular Port Adapter Installation and Removal 150

CHAPTER 6 **Verify Chassis Installation** 153
Verify Device Installation 153

CHAPTER 7 **LEDs** 157
Chassis LEDs 157
Route Processor Card LEDs 161

Port Status LEDs 163
Port Status LED Display 163
MPA LEDs 164
Management Port LEDs 165
Fan Module and Fan Tray LED 168
Power Supply LED 169

APPENDIX A **System Specification** 175
Weight and Power Consumption 175
Environmental Specifications 175
Thermal Limitations 176
RJ-45 Connectors 176
Management Pinouts 177
Time-of-Day Port Pinouts 177
USB Flash or MEM Port Pinouts 178
Console Port Pinouts 178
Power Supply Power Cord Specifications 179



CHAPTER 1

NCS 5700 Router Overview

- Cisco NCS 5700 Router Overview, on page 1
- Field Replaceable Units, on page 4
- Route Processor Card, on page 11
- Modular Port Adapters, on page 11
- Network Interfaces, on page 21
- Specification, on page 32
- Network Timing Interfaces, on page 32
- GNSS, on page 33
- Console, on page 34
- Online Insertion and Removal, on page 34
- Transceiver and Cable Specifications, on page 34

Cisco NCS 5700 Router Overview

The Cisco NCS 5700 series fixed-port routers provide aggregation, distributed core, and peering fabric.

The Cisco NCS 5700 series offers two types of systems. Those without external-TCAM (non-SE) rely only on the on-chip resources available for feature scale. The second type of system is equipped with external-TCAM (-SE) which provides an extended scale in addition to the on-chip scale. These systems provide functionality vital to both Top of Rack (ToR) and modern spine-and-leaf architectures.

NCS-57B1

The NCS-57B1 routers provide a power-efficient package with 4.8 Terabits of 400GE/100GE optimized forwarding capacity.

Table 1: Cisco NCS-57B1 Chassis Variants

Variant	Port Configuration
NCS-57B1-5D24H-SE (Perpetual Licensing) NCS-57B1-5DSE-SYS (Flexible Consumption Model) Also known as SE variant	A total of 29 ports: • 24x100G QSFP-DD • 5x400G QSFP-DD

Variant	Port Configuration
NCS-57B1-6D24H-S (Perpetual Licensing) NCS-57B1-6D24-SYS (Flexible Consumption Model) Also known as non-SE variant	A total of 30 ports: • 24x100G QSFP-DD • 6x400G QSFP-DD

For more information on its features and benefits, see the Cisco NCS-57B1 Fixed Chassis Data Sheet.

NCS-57C3-MOD

The NCS-57C3-MOD routers provide a power-efficient package with up to 2.4 Terabits of optimized forwarding capacity.

Table 2: Cisco NCS-57C3-MOD Chassis Variants

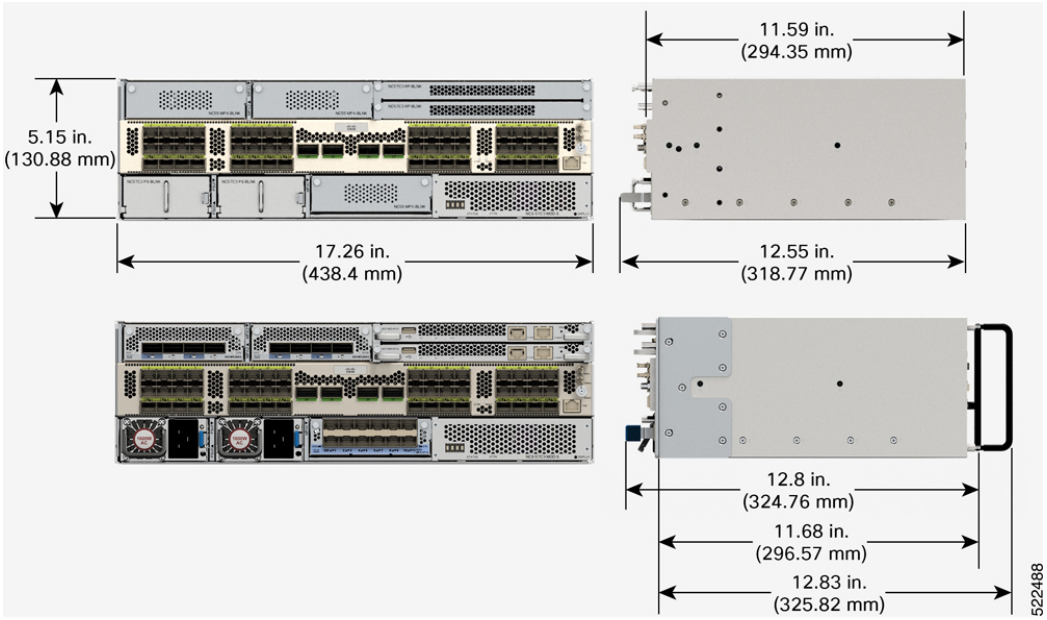
Variant	Port Configuration
NCS-57C3-MOD-SE-S (Perpetual Licensing) NCS-57C3-MODS-SYS (Flexible Consumption Model) Also known as SE variant	A total of 52 ports: • 48 ports of 25G SFP28 • 4 ports of 100G QSFP28 In addition, the chassis has 3 Modular Port Adapter (MPA) slots. See Modular Port Adapters, on page 11 for information on MPAs.
NCS-57C3-MOD-S (Perpetual Licensing) NCS-57C3-MOD-SYS (Flexible Consumption Model) Also known as non-SE variant	A total of 56 ports: • 48 ports of 25G SFP28 • 8 ports of 100G QSFP28 In addition, the chassis has 3 Modular Port Adapter (MPA) slots. See Modular Port Adapters, on page 11 for information on MPAs.
NCS-57C3-MOD-HX (Flexible Consumption Model). Also known as non-SE variant . The NCS-57C3-MOD-HX router is an environmental-hardened variant of the NCS-57C3-MOD-S router, specifically designed for deployment in outside plant environments within cabinet enclosures. It operates with the NC57-MOD-RP2-E-HX route processor, and can be paired with either the NC57-C3-FAN1-HX or NC57-C3-FAN2-HX fan tray, along with the NC57-MPA-2D4H-H-S MPA.	A total of 56 ports: • 48 ports of 25G SFP28 • 8 ports of 100G QSFP28 In addition, the chassis has 3 Modular Port Adapter (MPA) slots. See Modular Port Adapters, on page 11 for information on MPAs.

Note

- The NCS-57C3 router does not support auto negotiation when the ports are configured in the 1Gbps mode. As a result, 1G copper transceiver modules operating on the NCS-57C3 router cannot detect link failures.
- From Cisco IOS-XR software release 24.2.1, NCS-57C3-MOD router supports 2x100GbE autobreakout on MPA slot 2 and slot 3.
- To avoid system alarms, ensure that only environmental-hardened variants of the route processor, fan tray, and MPA are installed in the NCS-57C3-MOD-HX router.

The dimensions of the NCS-57C3-MOD router, with and without fans and power supplies, are shown below.

Figure 1: NCS-57C3-MOD Dimensions



For more information on its features and benefits, see the Cisco NCS-57C3 Fixed Chassis Data Sheet.

NCS-57C1 Chassis Variants

The NCS-57C1 routers provide a power-efficient package with 4 Terabits total port bandwidth and 2.4 Terabits forwarding capacity.

Table 3: Cisco NCS-57C1 Chassis Variants

Variant	Port Configuration
NCS-57C1-48Q6D-S (Perpetual Licensing) NCS-57C1-48Q6-SYS (Flexible Consumption Model)	A total of 54 ports: • 4 ports of 400G QSFP-DD • 2 ports of 4x100G QSFP-DD • 16 ports of 50G SFP+ (also supports traffic speed of 10G/25G/1G) • 32 ports of 25G SFP+ (also supports traffic speed of 10G/1G) **Note** For 1G interface speed, autonegotiation is not supported.

For more information on its features and benefits, see the Cisco NCS-57C1 Fixed Chassis Data Sheet.

NCS-57D2 Chassis Variants

The NCS-57D2 routers provide a power-efficient package with 7.2 Terabits (Tbps) total port bandwidth and 7.2 Terabits (Tbps) forwarding capacity.

Table 4: Cisco NCS-57D2 Chassis Variants

Variant	Port Configuration
NCS-57D2-18DD-SYS (Flexible Consumption Model)	2-RU router with a total of 66 QSFP-DD ports: • 18 ports of 400G (or) • 34 ports of 200G (or) • 66 ports of 100G

For more information on its features and benefits, see the NCS-57D2-18DD Fixed Chassis Data Sheet.

Field Replaceable Units

The NCS 5700 series fixed-port routers support the following FRUs:

- Fan modules (NCS-57B1/NCS-57C1/NCS-57D2) and fan trays (NCS-57C3-MOD)
- Power Supply Units
- Modular Port Adapters (MPAs)—supported on the NCS-57C3-MOD routers
- Route Processors—supported on the NCS-57C3-MOD routers

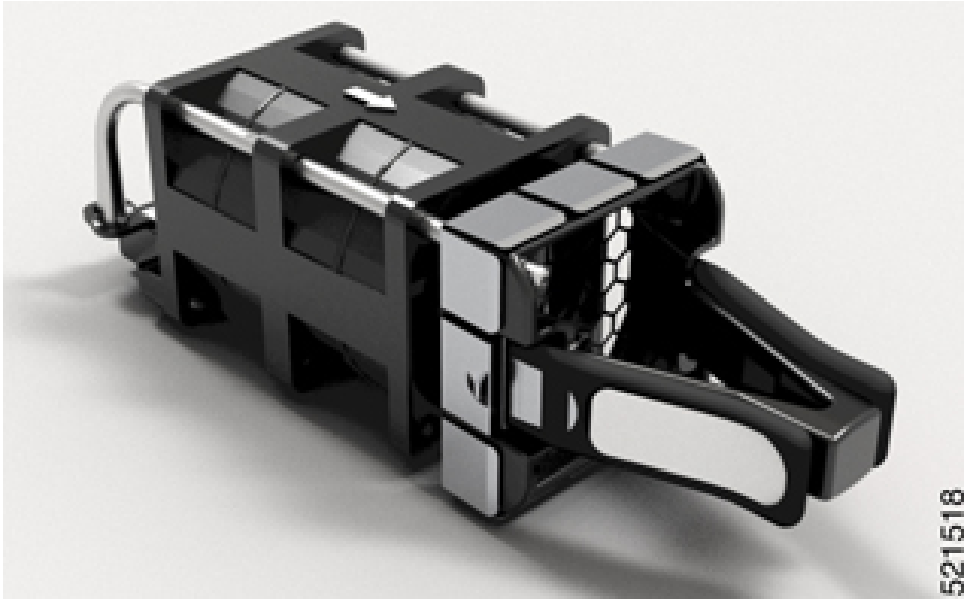
All FRUs support OIR (Online Insertion and Removal).

Fan Modules and Fan Trays

Fans are responsible for cooling the system and to maintain proper airflow through the system. The fan modules work with N+1 redundancy.

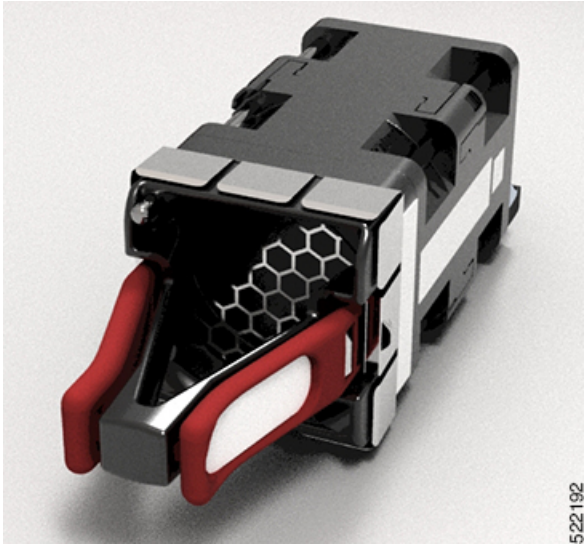
The NCS-57B1 router has 6 latched fan modules that install into the chassis from the rear. The NCS-57B1 router supports the NC57-B1-FAN1-FW fan module.

Figure 2: NCS-57B1 Fan Module



The NCS-57C1 router has 5 latched fan modules that install into the chassis from the rear. The NCS-57C1 router supports the FAN-1RU-PI-V2 fan module for port side intake configuration.

Figure 3: NCS-57C1 Fan Module



The NCS-57C3-MOD router has 6 latched fan trays that install into the chassis from the rear:

- Fan tray slots 0 and 1 support fan tray assembly with 2x60mm fans (NC57-C3-FAN2-FW/NC57-C3-FAN2-HX)
- Fan tray slots 2 through 5 support fan tray assembly with 2x40mm fans (NC57-C3-FAN1-FW/NC57-C3-FAN1-HX)

Figure 4: NC57-C3-FAN2-FW/NC57-C3-FAN2-HX Fan Tray - 2x60mm

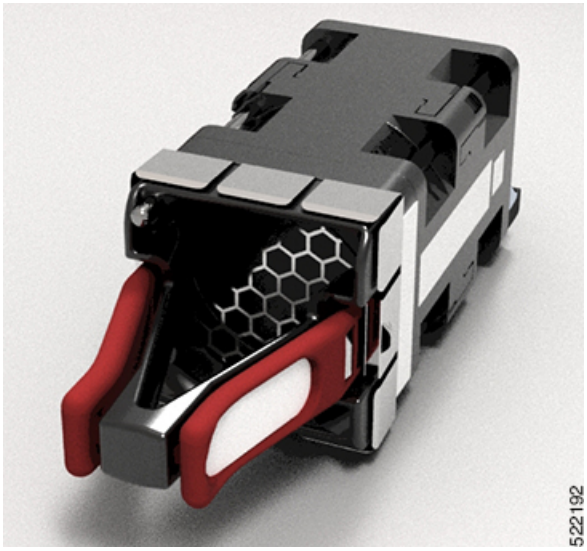


Figure 5: NC57-C3-FAN1-FW/NC57-C3-FAN1-HX Fan Tray - 2x40mm



The NCS-57D2 router has 4 latched fan modules that install into the chassis from the rear. The NCS-57D2 router supports the NC57-D2-FAN-FW fan module for port side intake configuration and NC57-D2-FAN-RV for port side exhaust configuration.

Figure 6: NCS-57D2 Fan Module for Port Side Intake Configuration



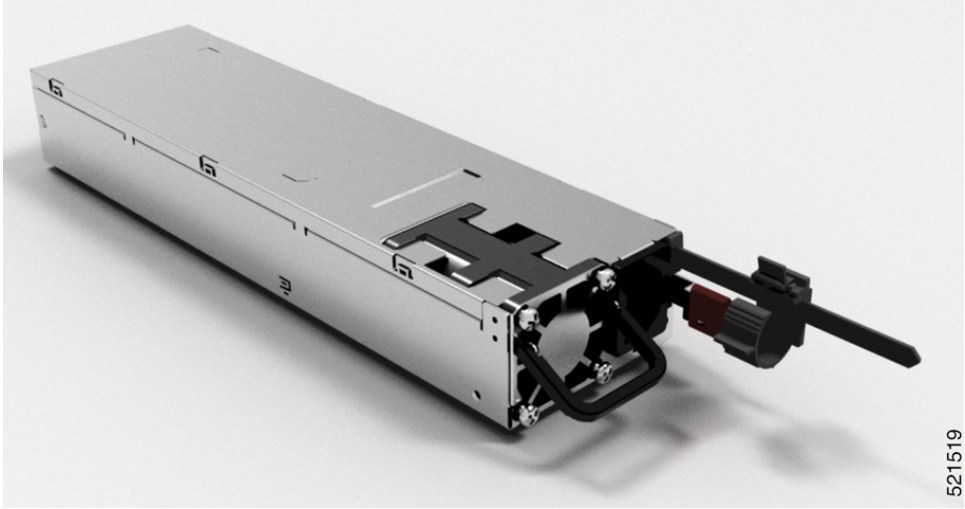
Power Supply Unit

The NCS-57B1 router has 2 PSUs that install into the chassis from the rear. The PSUs have a capacity of 2000W and works with 1+1 redundancy. The PSU can be AC to DC or DC to DC type. The PSUs provide 12V primary power to the entire system.

The NCS-57B1 router supports these PSUs:

- PSU2KW-ACPI—2000W AC power supply module with port-side air intake
- PSU2KW-DCPI—2000W 48V DC power supply module with port-side air intake

Figure 7: NCS-57B1 Power Supply Unit

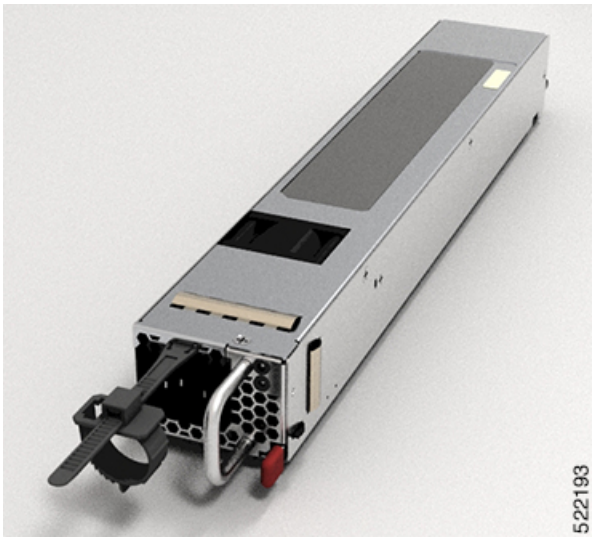


The NCS-57C1 router has 2 PSUs that install into the chassis from the rear. The PSUs work with 1+1 redundancy. The PSU can be AC to DC or DC to DC type. The PSUs provide 12V primary power to the entire system.

The NCS-57C1 router supports these PSUs:

- NCS-1100W-ACFW—1100W AC power supply module with port-side air intake
- NCS-950W-DCFW—950W 48V DC power supply module with port-side air intake

Figure 8: NCS-57C1 Power Supply Unit



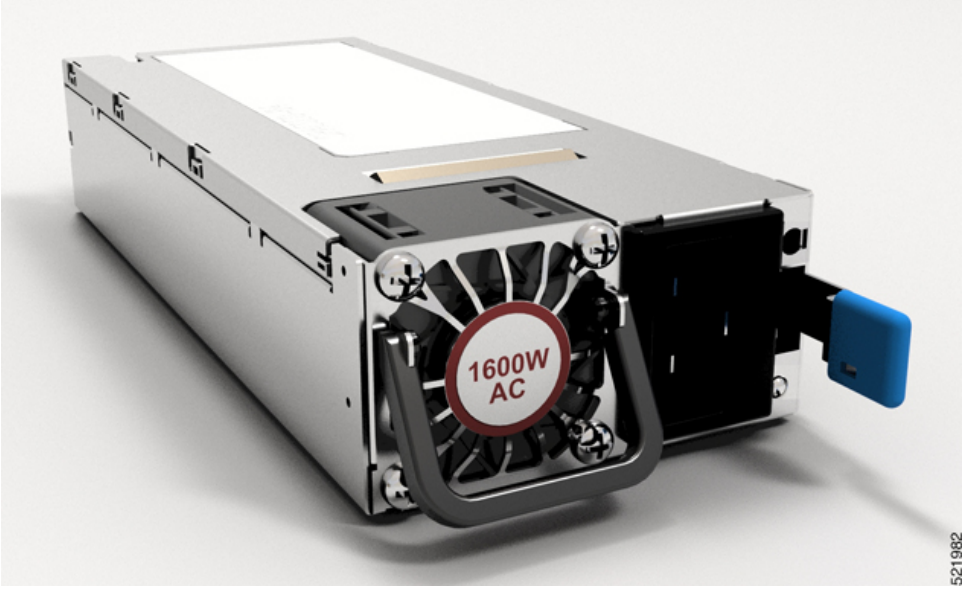
The router doesn't support a mix of AC and DC PSU for normal operation. However, router supports mix of AC and DC PSU only during migration from AC to DC, or vice versa. In case of the NCS-57C1 router, the PEM (power entry module) mismatch alarm is raised when there is a mix of AC and DC power supplies in the router during migration from AC to DC, or vice versa.

The NCS-57C3-MOD router has 2 PSUs that install into the chassis from the front. The PSUs have a capacity of 1600W and works with 1+1 redundancy. The PSU can be AC to DC or DC to DC type. The PSUs provide 12V primary power to the entire system.

The router supports these PSUs:

- NC57-1600W-ACFW — 1600W AC power supply module with port-side air intake
- NC57-1600W-DCFW — 1600W 48VDC power supply module with port-side air intake

Figure 9: NCS-57C3-MOD AC Power Supply Unit



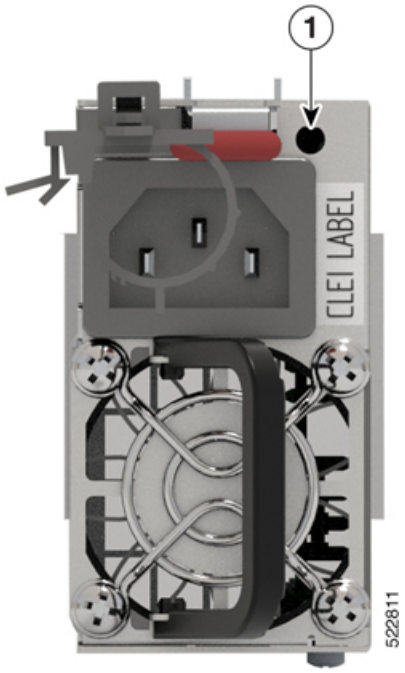
The NCS-57D2-18DD-SYS router has 2 PSUs that install into the chassis from the front. The PSUs have a capacity of 2000W and works with 1+1 redundancy. The PSU can be AC to DC or DC to DC type. The PSUs provide 12V primary power to the entire system.

The router supports the PSUs that are listed in the following table:

Table 5: Supported PSUs

PSU PID	Airflow Direction
PSU2KW-ACPI	Front to Rear
PSU2KW-DCPI	Front to Rear
PSU2KW-ACPE	Rear to Front
PSU2KW-DCPE	Rear to Front

Figure 10: NCS-57D2-18DD-SYS AC Power Supply Unit



Route Processor Card

Route processor cards manage all routing operations on the Cisco NCS-57C3-MOD router.

NC57-MOD-RP2-E/NC57-MOD-RP2-E-HX



1	USB port	3	Management Ethernet port
2	Console port	4	Recessed reset (ORS) button

Modular Port Adapters

The modular port adapters (MPAs) are supported in the NCS-57C3-MOD and NCS-57C3-MODS-SYS fixed-port routers. Each MPA has a STATUS and ATTN (attention) LED, and each port on the MPA has an adjacent A/L (Active/Link) LED.

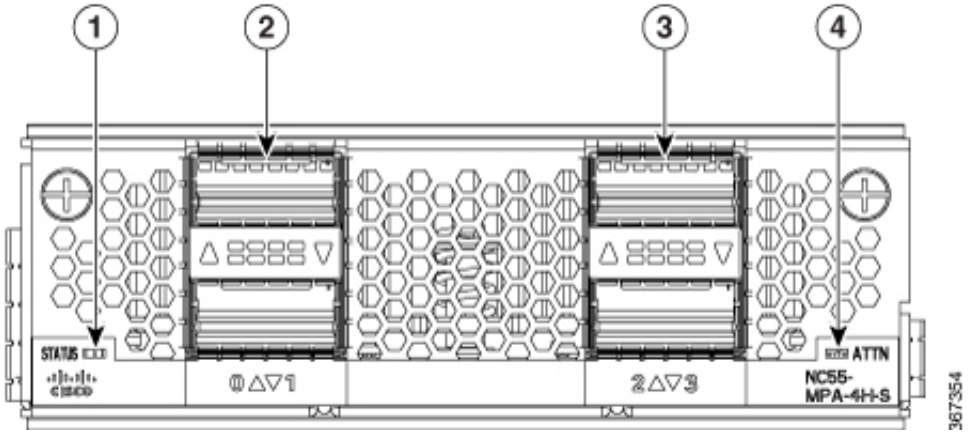
To determine which transceivers and cables are supported by these MPAs, see Cisco Transceiver Modules Compatibility Information.

Note Before replacing an MPA card remove the port-range configurations that are applied on that MPA. If these configurations are not removed, interfaces in the new MPA card are not available.

Note In Cisco NCS-57C3 routers, if the MPA ejectors are exposed to contaminants from the environment or other sources, the system will issue an ejector open alarm and shut down the MPA, even if the ejector is closed. From Release 25.3.1 onwards, in order to prevent the MPA from shutting down unexpectedly, execute the "**hw-module subslot {all|*location-id*} ejector-disable**" command. If you disable the MPA ejector function using this command, make sure to use the Managed OIR procedure when removing the MPA.

4-Port 40GE/100GE MPA with QSFP+/QSFP28

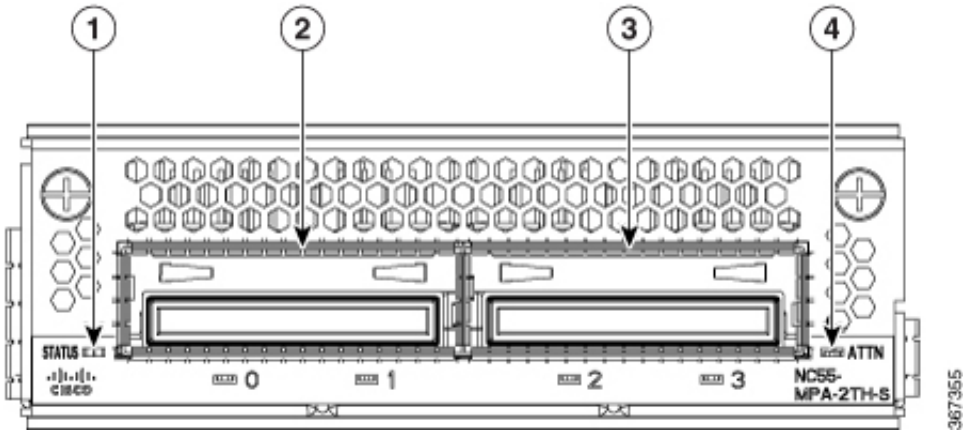
The 4-port 40GE/100GE MPA (NC55-MPA-4H-S) provides 4 ports for 4x25GE (via cable breakout), QSFP+ (40Gbps) or QSFP28 (100Gbps) transceivers.



1	STATUS LED	3	QSFP port and Active/Link LED
2	QSFP port and Active/Link LED	4	ATTN LED

2-Port 100GE/200GE with CFP2-DCO

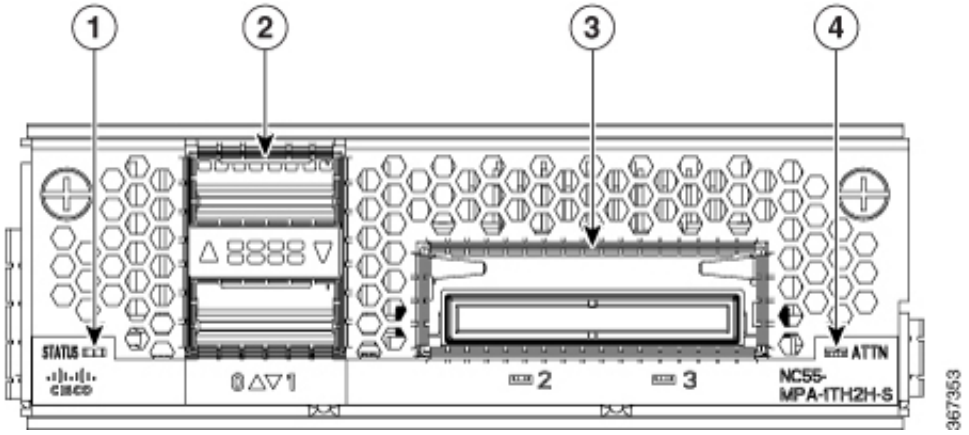
The 2-port 100GE/200GE MPA (NC55-MPA-2TH-S) provides 2 ports for CFP2-DCO transceivers.



1	STATUS LED	3	CFP2-DCO port and Active/Link LED
2	CFP2-DCO port and Active/Link LED	4	ATTN LED

1-port 100GE/200GE with CFP2-DCO + 2-Port 40GE or 100GE with QSFP+/QSFP28

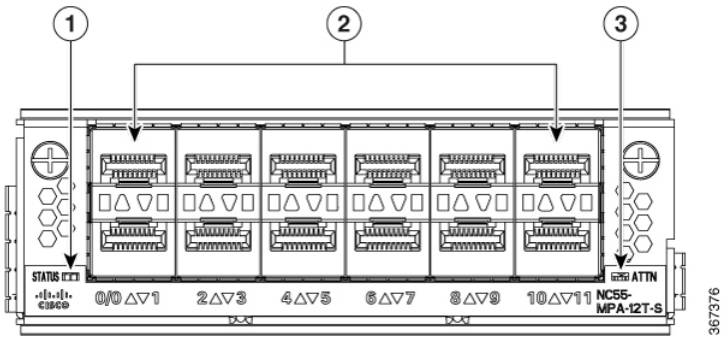
The 1-port 100GE/200GE + 2-Port 40GE/100GE combination MPA (NC55-MPA-1TH2H-S) provides 1 port for CFP2-DCO transceivers and 2 ports for 4x25GE (via cable breakout), QSFP+ (40Gbps) or QSFP28 (100Gbps) transceivers.



1	STATUS LED	3	CFP2-DCO port and Active/Link LED
2	QSFP port and Active/Link LED	4	ATTN LED

12-Port 10GE with SFP+

The 12-port 10GE MPA (NC55-MPA-12T-S) provides 12 ports for SFP+ transceivers.



1	STATUS LED	3	ATTN LED
2	SFP+ ports and LEDs		

Note The NCS-57C3 routers support 12-port 10GE MPA (NC55-MPA-12T-S); however, MPA slots 2 and 3 do not support 1G interfaces. On slot 1, ports 0-3 and 8-11 only support 1G. MACSec is not supported on these 1G interfaces.

4-Port 800GE MPA with QSFP28/QSFP-DD

Table 6: Feature History Table

Hardware	Release Information	Description
NC57-MPA-2D4H-H-S modular port adapter	Release 25.4.1	This release introduces a 4-port 800GE modular port adapter (NC57-MPA-2D4H-H-S) that supports QSFP28 and QSFP-DD optical transceivers. NC57-MPA-2D4H-H-S is an environmental-hardened variant of the NC57-MPA-2D4H-S MPA, specifically designed for deployment in outside plant environments within cabinet enclosures.This MPA is supported in the NCS-55A2-MOD, NCS-57C3-MOD, and NCS-57C3-MOD-HX routers.

Hardware	Release Information	Description
NC57-MPA-2D4H-S modular port adapter	Release 7.4.1	This release introduces a 4-port 800GE modular port adapter (NC57-MPA-2D4H-S) that supports QSFP28 and QSFP-DD optical transceivers. This MPA is supported in the NCS-55A2-MOD and NCS-57C3-MOD routers. This is the first modular port adapter to support the QSFP-DD optical transceiver.

The NC57-MPA-2D4H-S modular port adapter supports QSFP28 and QSFP-DD optical transceivers in the following configurations:

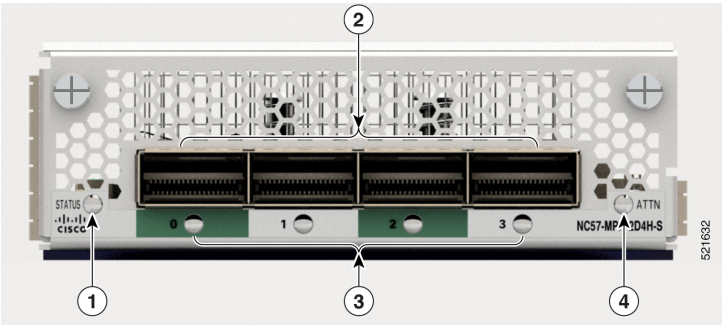
The NC57-MPA-2D4H-S modular port adapter supports the following configurations of optical transceivers while operating on NC55-MOD-A-SE-S and NC57-MOD-S line cards.

Transceiver	MPA slot 1	MPA slots 2 and 3
	Max bandwidth = 400GE **Note** You can use a combination of QDD-2x100GE (Port 0 *or* Port 2) and QSFP28-100GE (Port 0, 1, 2 or 3) transceivers at the same time, provided the total bandwidth does not exceed 400GE.	Max bandwidth per MPA = 800GE **Note** You can use a combination of QDD-400GE (Port 0 *or* Port 2) and QSFP28-100GE/QDD-2x100GE (Port 0, 1, 2 or 3) transceivers at the same time, provided the total bandwidth does not exceed 800GE.
QSFP28-100GE	All ports	All ports
QDD-2x100GE	Ports 0 and 2 **Note** When QDD-2x100GE transceivers are installed in ports 0 and 2, ports 1 and 3 cannot be used.	All ports
QDD-400GE	Port 0 **Note** When QDD-400GE transceiver is installed in port 0, ports 1, 2, and 3 cannot be used	Ports 0 and 2 **Note** When QDD-400GE transceivers are installed in ports 0 and 2, ports 1 and 3 cannot be used.

The following are the limitations while using NC57-MPA-2D4H-S on NCS-57C3-MOD/ NCS-57C3-MODS-SYS.

- While configuring 400G or 2x100G speeds on even ports (0 and 2), you should not have 40G or 4x10G interfaces on odd ports (1 and 3).
- While configuring 3x100G speeds on even ports (0 and 2), you should not have 40G or 4x10G interfaces on odd ports (1 and 3).
- In MPA slot 0, you can configure only one 4x100G interface, either in port 0 or port 2.

Figure 11: NC57-MPA-2D4H-S Modular Port Adapter (MPA)



1	STATUS LED	3	Active/Link LED
2	QSFP28/QSFP-DD port and LED	4	ATTN LED

12-Port 10GE/25GE/50GE MPA with SFP+/SFP28/SFP56

Table 7: Feature History Table

Hardware	Release Information	Feature Description
NCS57-MPA-12L-S modular port adapter	Release 7.6.1	A 12-port 600GE modular port adapter that supports SFP+, SPF28, and SFP56 optical transceivers, the NCS57-MPA-12L-S operates in 10GE, 25GE, and 50GE modes. The following command is modified to add support for the 50GE mode for even-numbered ports (port 4, port 6, port 8, and port 10): • **hw-module port-range** For more information, see the Cisco Network Convergence System 5700 Series: Modular Port Adapters Data Sheet.

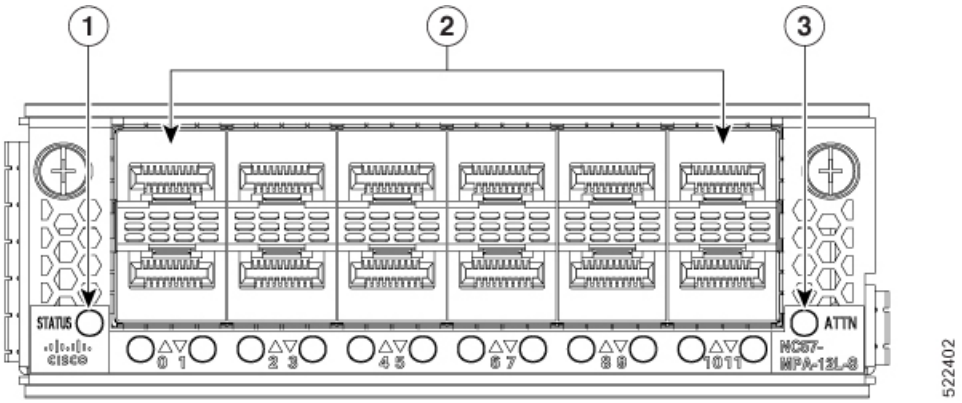
The NCS57-MPA-12L-S modular port adapter supports SFP+, SFP28 and SFP56 optical transceivers in these configurations:

Table 8: Supported SFP optical transceiver configurations

Port	MPA Slot-1	MPA Slot-2 and Slot-3
	Maximum bandwidth per MPA = 400GE	Maximum bandwidth per MPA = 600GE

0 and 1	• 10G • 25G • 50G • Combination of 10G, 25G and 50G	• 10G • 25G • 50G • Combination of 10G and 25G • Combination of 25G and 50G **Note** Combination of 10G and 50G or 10G, 25G and 50G is not supported.
2 and 3		
4, 5, 6 and 7	• 10G • 25G • 50G • Combination of 10G, 25G and 50G **Note** 50G can be enabled on even-numbered ports using **hw-module port-range** and the subsequent odd port will be disabled.	
8, 9, 10 and 11		

Figure 12: NCS57-MPA-12L-S Modular Port Adapter (MPA)



1	STATUS LED	3	ATTN LED
2	SFP56 ports and LEDs		

8-Port MPA with SFP+

Table 9: Feature History Table

Hardware	Release Information	Description
NC55-OIP-02 Modular Port Adapter	Release 7.7.1	An 8-port MPA (NC55-OIP-02) that supports SFP+ optical transceivers, this MPA is available for the NC55A2-MOD-S and NC57C3-MOD-SYS routers. It supports the following port mode options: • Ethernet • FC • OTN • SDH • SONET The **port-mode** command is introduced to configure port mode option. For more information on PLE, see Private Line Emulation over EVPN-VPWS Single Homed section of the *L2VPN and Ethernet Services Configuration Guide for Cisco NCS 5500 Series Routers, IOS XR Release 7.7.x*. For more information on the MPA, see the Cisco Network Convergence System 5700 Series: Modular Port Adapters Data Sheet.

The NC55-OIP-02 modular port adapter supports SFP+ optical transceivers. The MPA supports the following port mode options:

- Ethernet - 1GbE and 10GbE
- Fiber channel (FC) - 1G, 2G, 4G, 8G, 16G, and 32G
- Optical Transport Network (OTN) - OTU2 and OTU2e
- Synchronous Digital Hierarchy (SDH) - STM16 and STM64
- SONET - OC48 and OC192

Note The NC55-OIP-02 supports circuit emulation (CEM) and does not support L3 VPN service termination.

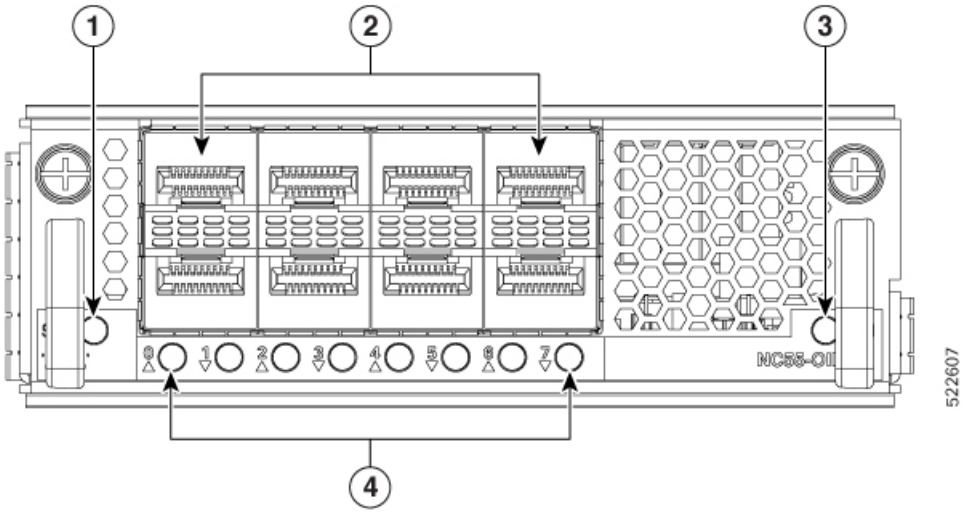
The MPA supports the following data rates:

Table 10: Port mode data rate options

Port mode	Data rate
1GbE	1.25 Gbps
10GbE	10.3125 Gbps
OC48	2.48832 Gbps
OC192	9.95328 Gbps
OTU2	10.709 Gbps
OTU2e	11.0957 Gbps
STM16	2.48 Gbps
STM64	9.95 Gbps
FC1	1.0625 Gbps
FC2	2.125 Gbps
FC4	4.25 Gbps
FC8	8.5 Gbps
FC16	14.025 Gbps
FC32	28.05 Gbps

Note Port mode FC32 is supported only on the even ports (Port 0, 2, 4, and 6) of the MPA.

Figure 13: NC55-OIP-02 Modular Port Adapter (MPA)



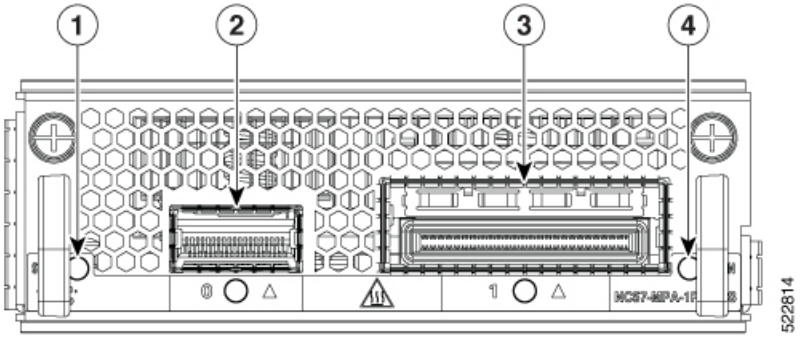
1	STATUS LED	3	ATTN LED
2	SFP+ port	4	Active/Link LED

1-port 400GbE with CFP2-DCO + 1-Port 400GbE with QSFP-DD MPA

Table 11: Feature History Table

Hardware	Release Information	Feature Description
NCS57-MPA-1FH1D-S Modular Port Adapter	Release 7.8.1	This release introduces NCS57-MPA-1FH1D-S, a 2-port 800GbE modular port adapter with one port supporting QSFP-DD and the other supporting CFP2-DCO optical transceivers. This MPA is supported in the NCS-57C3-MODS-SYS router and NC57-MOD-S line card. For more information, see the Cisco Network Convergence System 5700 Series: Modular Port Adapters Data Sheet.

The 2-port 800GbE MPA (NCS57-MPA-1FH1D-S) provides one port for QSFP-DD and one port for CFP2-DCO transceivers. The QSFP-DD port operates in 400GbE mode and supports 4x100G breakout mode, and the CFP2-DCO port operates in 400GbE mode and supports 4x100G, or 3x100G, or 2x100G, or 1x100G breakout modes.



1	STATUS LED	3	CFP2-DCO port and LED
2	QSFP-DD port and LED	4	ATTN LED

Network Interfaces

NCS-57B1

The Cisco NCS-57B1 Router has the following ports:

- 24 ports of 100G QSFP-DD.
- 6 ports of 400G QSFP-DD. Applicable for NCS-57B1-6D24-SYS.
- 5 ports of 400G QSFP-DD. Applicable for NCS-57B1-5DSE-SYS.

In the NCS-57B1-5DSE-SYS and NCS-57B1-6D24-SYS routers, the ports from 0 to 23 are organized into groups of four, known as quad ports: Quad 0 (ports 0-3), Quad 1 (ports 4-7), Quad 2 (ports 8-11), Quad 3 (ports 12-15), Quad 4 (ports 16-19), and Quad 5 (ports 20-23) to support various SFP/QSFP and breakout configurations.

Each quad contains two pairs of ports. For example, ports 0-1 make up pair 1, and ports 2-3 make up pair 2 in Quad 0.

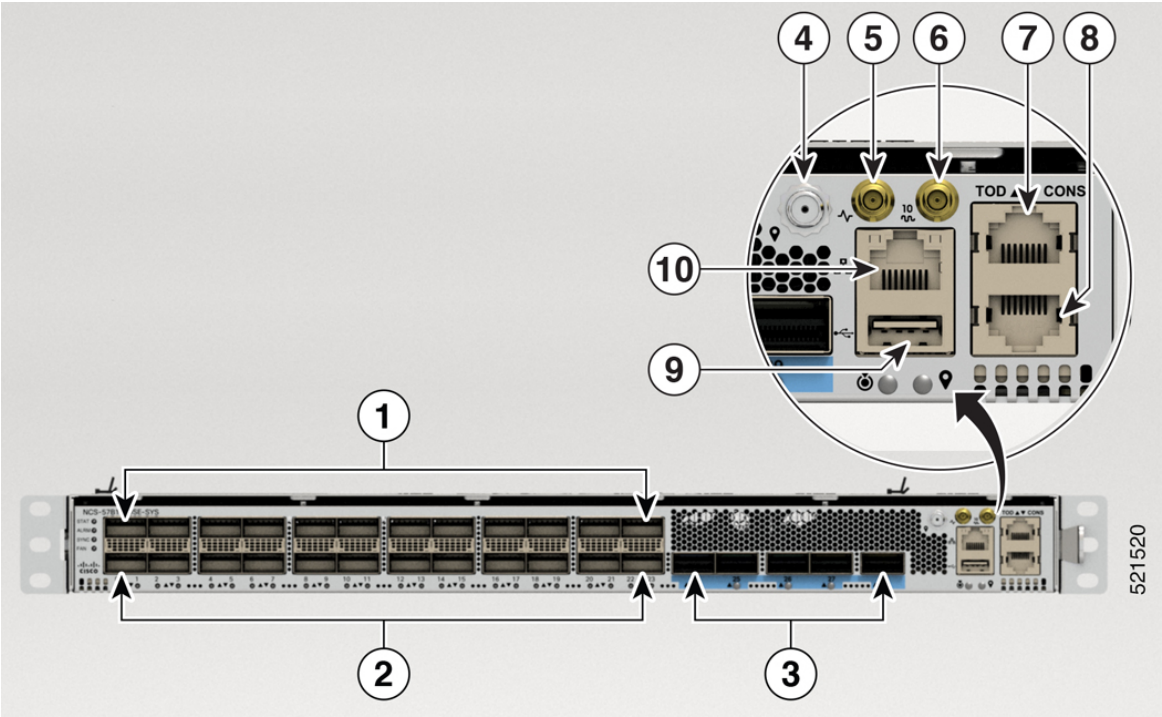
To adjust the speed of a port in a pair, you must first disable the other port in the pair, then change the speed as required, and finally re-enable both ports.

For instance, in Quad 4 (ports 16-19), SFPs need to be inserted in pairs such as 16-17 and 18-19. To change the speed of port 17 while port 16 is active, you must first disable port 16 before inserting the optics into port 17.

Note

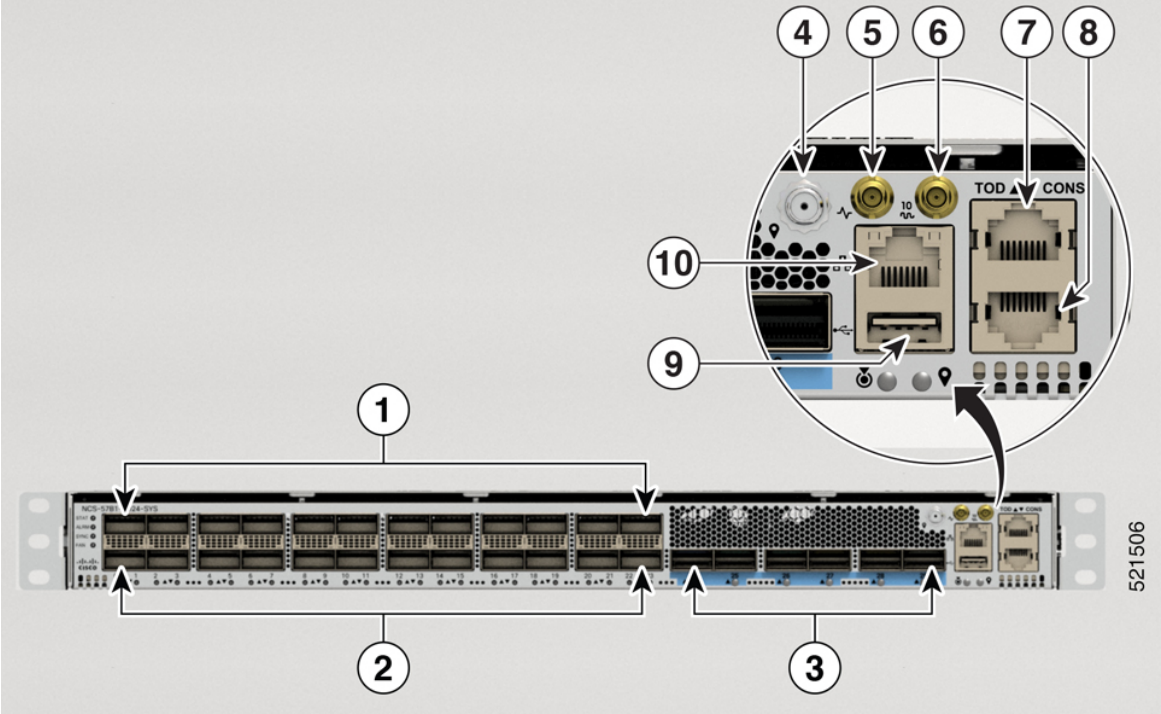
- In all quads (Quad 0: 0-3, Quad 1: 4-7, ..., Quad 5: 20-23), a 4x25 breakout cannot coexist with either 40G native mode or 4x10 breakout mode.
- Additionally, the interface speed on Quad 0 must be consistent across all ports at any given time.

Figure 14: NCS-57B1-5DSE-SYS—Front View



1	12 QSFP-DD ZR ports	6	10MHz port
2	12x100G QSFP-DD ports **Note** Only even ports support QSFP-DD 100G-ZR	7	Time of Day (ToD) port
3	5x400G QSFP-DD ports	8	Console port
4	GNSS	9	USB port
5	1 PPS port	10	Management Ethernet port

Figure 15: NCS-57B1-6D24-SYS—Front View



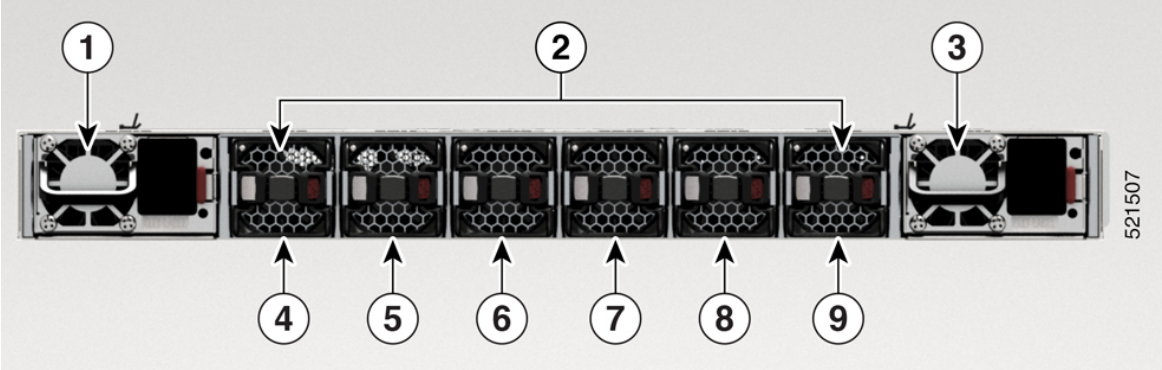
1	12 QSFP-DD ZR ports	6	10MHz port
2	12x100G QSFP-DD ports **Note** Only even ports support QSFP-DD 100G-ZR	7	Time of Day (ToD) port
3	6x400G QSFP-DD ports	8	Console port
4	GNSS	9	USB port
5	1 PPS port	10	Management Ethernet port

Note Some of the ports are color coded in the chassis for ease of access:

- The ports from 0 through 23 have no color.
- The ports from 24 onwards are colored in blue.

The rear view of both the routers is same.

Figure 16: NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS—Rear View



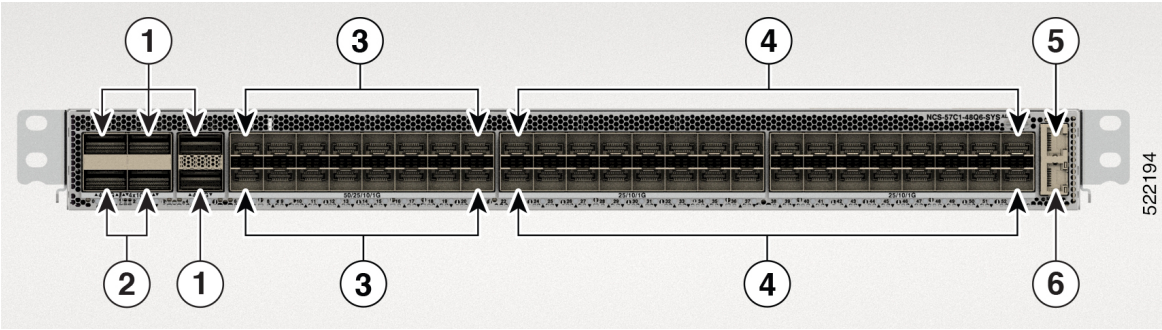
1 and 3	PSU-0 and PSU-1
2	Fan Trays
4,5,6,7,8, and 9	Six Fan Trays: FT0, FT1, FT2, FT3, FT4, and FT5

NCS-57C1

The Cisco NCS-57C1 router has the following ports on the front panel:

- 4 ports of 400G QSFP-DD
- 2 ports of 4x100G QSFP-DD
- 16 ports of 50G SFP+ (also supports traffic speed of 10G/25G/1G)
- 32 ports of 25G SFP+ (also supports traffic speed of 10G/1G)
- Console port
- Management port

Figure 17: NCS-57C1—Front View



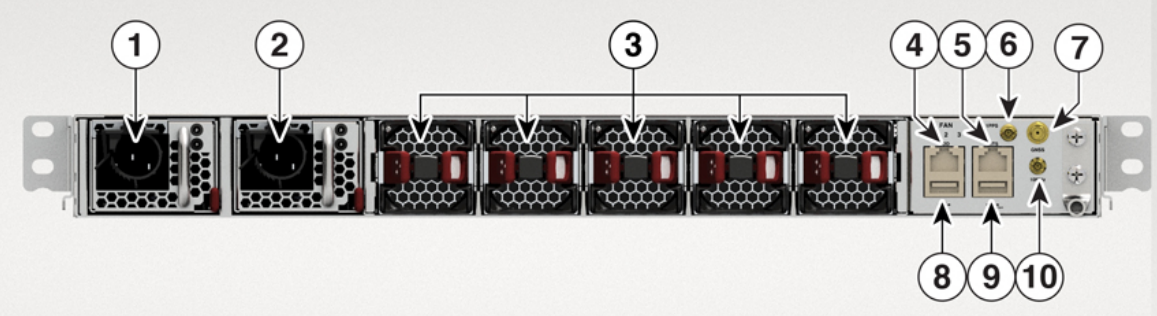
1	Port 0, 2, 4, and 5. 400G QSFP-DD ports.
2	Port 1 and 3. 4x100G QSFP-DD ports.
3	Ports 6 through port 21. Supports 50/25/10/1G traffic speed.

4	Ports 22 through port 53. Supports 25/10/1G traffic speed.
5	Console port.
6	Management port.

Note In the NCS-57C1 routers, there are additional thermal vent perforations next to the port status LEDs. These perforations are meant to provide additional air flow for cooling the chassis. The LED status of a port can be viewed from these perforations as well.

The Cisco NCS-57C1 router has PSUs, fan modules, and network timing interfaces on the rear side:

Figure 18: NCS-57C1—Rear View



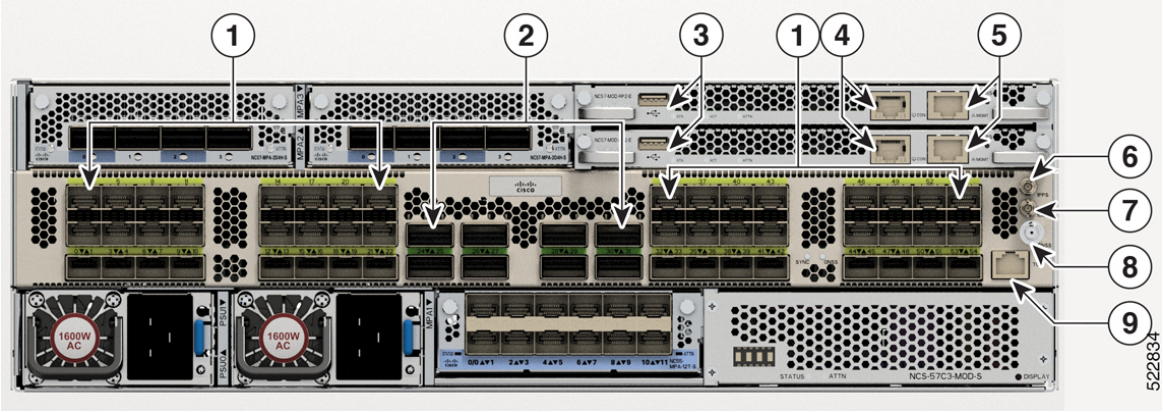
1 and 2	PSU-0 and PSU-1
3	Fan Trays
4	Time Of Day (TOD) port. RS422 format as input.
5	Building Integrated Timing Supply (BITS) port. **Note** The BITS port is not enabled in Cisco IOS XR Release 7.5.2.
6	1 PPS port
7	GNSS port
8	USB port
9	USB console. This port is used as an alternative for the front panel console port.
10	10 MHz port

NCS-57C3-MOD

The Cisco NCS-57C3-MOD router has the following ports:

- 48 ports of 25G SFP28
- 4 ports (NCS-57C3-MOD-SE-S) or 8 ports (NCS 57C3-MOD-S/NCS-57C3-MOD-HX) of 100G QSFP28
- MACsec supported on the following SFP28 ports:
  - NCS 57C3-MOD-S/NCS-57C3-MOD-HX: ports 0-7, 40-55
  - NCS-57C3-MOD-SE-S: ports 0-7, 36-51

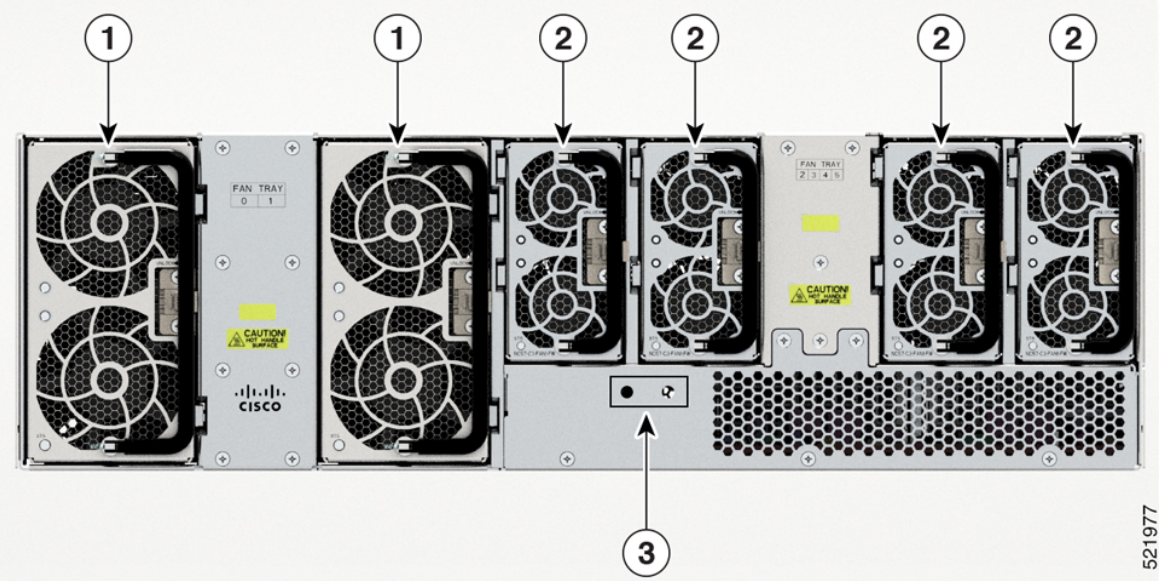
Figure 19: NCS-57C3-MOD-SE-S—Front View



1	48 ports of 25G SFP28	6	PPS port
2	4 ports (NCS-57C3-MOD-SE-S) or 8 ports (NCS 57C3-MOD-S/NCS-57C3-MOD-HX) of 100G QSFP28	7	10 MHz port
3	USB ports	8	GNSS port
4	Console ports	9	Time of Day (ToD) port
5	Management Ethernet ports		

The rear view of both the chassis is same.

Figure 20: NCS 57C3-MOD—Rear View



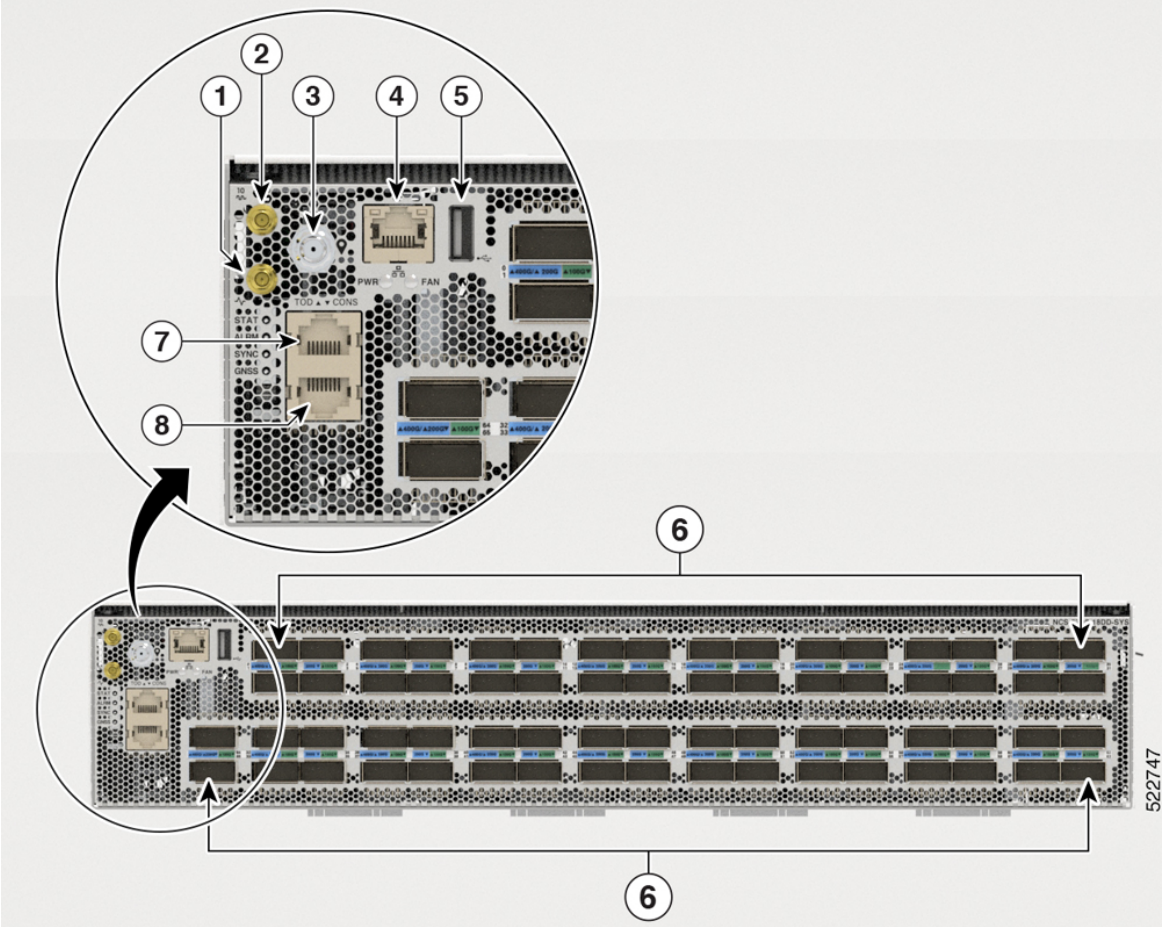
1	Fan tray assembly with 2x60mm fans (NC57-C3-FAN2-FW/NC57-C3-FAN2-HX)
2	Fan tray assembly with 2x40mm fans (NC57-C3-FAN1-FW/NC57-C3-FAN1-HX)
3	Grounding pad

NCS-57D2-18DD-SYS

The Cisco NCS-57D2-18DD-SYS router has the following ports on the front panel:

- 66 QSFP-DD ports
- Management port
- Cosole port
- Network timing interfaces
- GNSS port
- USB port

Figure 21: NCS-57D2-18DD-SYS Front View



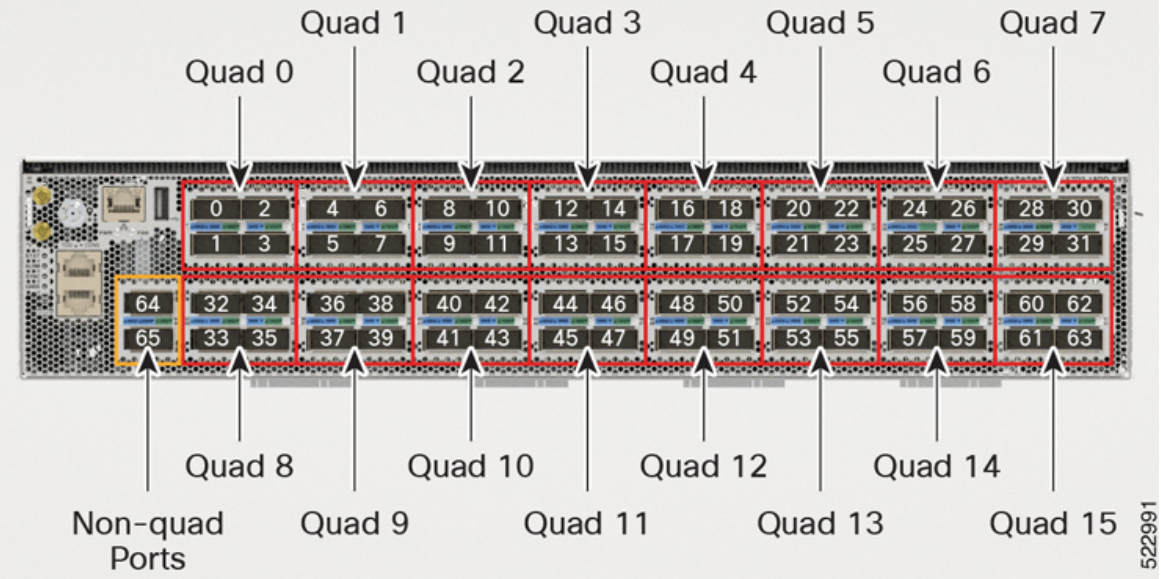
1	Mini coax connector for 1 PPS, input, and output.	5	USB port
2	Mini coax connector for 10MHz, input, and output.	6	66 QSFP-DD ports
3	GNSS port	7	Time of Day (ToD) port
4	Management Ethernet port	8	Console port

The NCS-57D2-18DD-SYS router ports are divided as below:

- 16 quads (group of 4 ports)
- 2 non-quad ports

These 16 quads and 2 non-quad ports (a total of 66 ports) provide 18x400GbE or 66x100GbE configuration options.

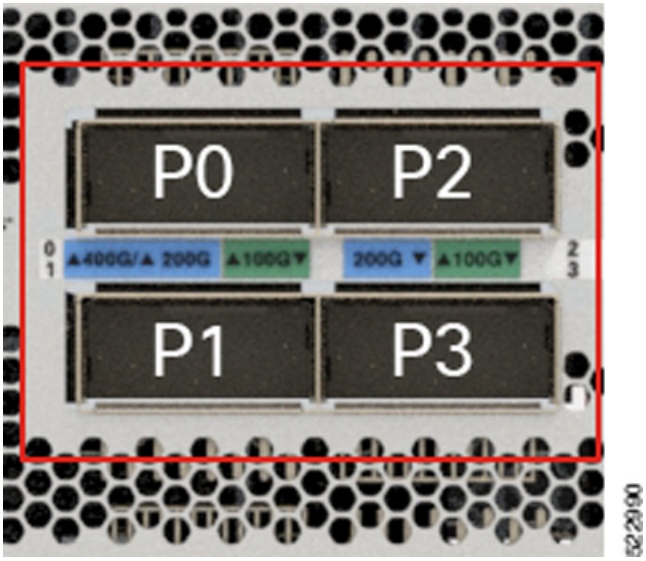
Figure 22: Quad and Non-quad Ports



All 16 quads are identical and provide flexible port configuration.

Consider one quad group with ports labelled as P0, P1, P2, and P3. This sequence of port numbering (P0, P1, P2, and P3) and the behavior of ports is the same for each quad group:

Figure 23: Single Quad Group - P0, P1, P2, and P3



A quad group can support up to 400GbE total traffic.

The following table outlines the supported port configuration for various optics on a quad group in the NCS-57D2-18DD-SYS router:

Table 12: Supported Port Configuration

Front Panel Configuration	Supported Front Panel Ports per Quad	
Number of ports x Port Configuration	**Active Port**	**Disabled Port**
1x400GbE	P0 – 400GbE	P1, P2, and P3
4x100GbE	P0 – 100GbE P1– 100GbE P2 – 100GbE P3 – 100GbE	NA
4x40GbE	P0 – 40GbE P1 – 40GbE P2 – 40GbE P3 – 40GbE	NA
4x25GbE (breakout)	P0 – 25GbE P3 – 25GbE	P1 and P2
4x10GbE (breakout)	P0 – 10GbE P3 – 10GbE	P1 and P2

Note QDD-400G-ZRP optical modules are supported on P0 and P3 of the quad group and both non-quad ports (port 64 and 65). Refer to the tables below for different operating mode combinations.

QDD-400G-ZR-S optical modules are supported only on P0 quad group and both non-quad ports (port 64 and 65).

The following tables provide the supported combinations of QDD-400G-ZRP and other optical modules. These tables contain information of optical modules supported in the remaining ports of the quad group, while the QDD-400G-ZRP module is used in P0 and configured in the muxponder mode. Also, when QDD-400G-ZRP is configured in 1x100GbE or 2x100GbE muxponder modes, they can be used on both P0 and P3 quad ports; however the remaining P1 and P2 quad ports are disabled.

Table 13: Supported Combinations of QDD-400G-ZR-S/QDD-400G-ZRP Optical Modules

Quad Port[1]	QDD-400G-ZR-S/QDD-400G-ZRP	QDD-400G-ZRP	QDD-400G-ZRP (P0 and P3)
N+0	400GbE/4x100GbE	3x100GbE	2x100GbE/1x100GbE
N+1	Disabled	Disabled	Disabled
N+2	Disabled	Disabled	Disabled
N+3	Disabled	Disabled	2x100GbE/1x100GbE

[1] N = Quad Number x 4. The Quad Number can range from 0 to 15.

Table 14: Supported Combinations of QDD-400G-ZRP (2x100GbE Muxponder Mode) on N+0 and other Optical Modules

Quad Port[2]	QDD-400G-ZRP	QDD-400G-ZRP
N+0	2x100GbE	2x100GbE
N+1	40GbE/100GbE	Disabled
N+2	Disabled	Disabled
N+3	40GbE/100GbE	4x10GbE/4x25GbE

[2] N = Quad Number x 4. The Quad Number can range from 0 to 15.

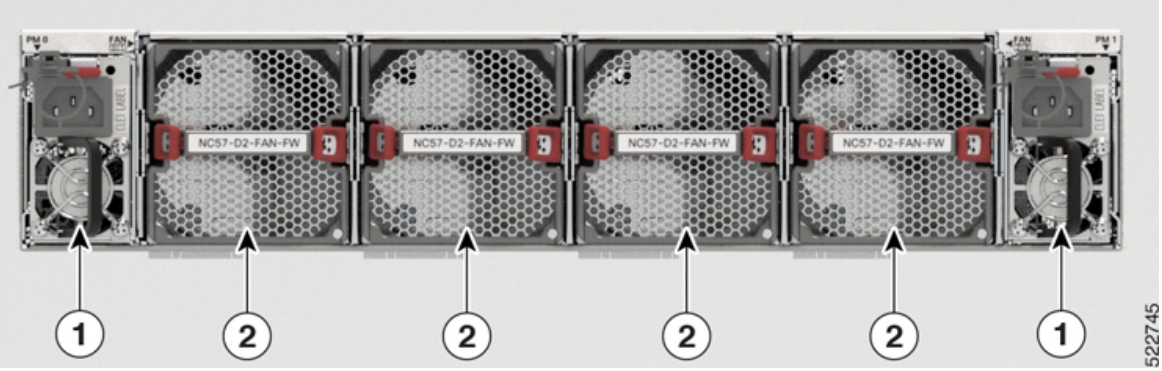
Table 15: Supported Combinations of QDD-400G-ZRP (1x100GbE Muxponder Mode) on N+0 and other Optical Modules

Quad Port[3]	QDD-400G-ZRP	QDD-400G-ZRP	QDD-400G-ZRP
N+0	1x100GbE	1x100GbE	1x100GbE
N+1	40GbE/100GbE	Disabled	Disabled
N+2	40GbE/100GbE	100GbE	40GbE/100GGbE
N+3	40GbE/100GbE	4x25GbE	4x10GbE

[3] N = Quad Number x 4. The Quad Number can range from 0 to 15.

The Cisco NCS-57D2-18DD-SYS router has PSUs and fan modules on the rear side:

Figure 24: NCS-57D2-18DD-SYS—Rear View



1	PSUs
2	Fan modules (4)

Specification

For information on physical specification, temperature, Route Processor, and other details for all variants, see *Cisco NCS 5700 chassis specification* of the Cisco Network Convergence System 5700 Router Data Sheet.

Network Timing Interfaces

For location of network timing interfaces on the routers, see Network Interfaces, on page 21.

Clock interfaces are external connectors for connecting timing signals, such as, GPS and Building Integrated Timing Supply (BITS).

GPS

The router can receive 1PPS, 10 MHz, and ToD signals from an external clocking and timing source. The three inputs are combined as a Sync-2 interface to form the external timing source or the GPS input.

The GPS connector details present on router are:

- ToD—RS422 format as input. ToD format includes both NTP and IEEE 1588-2008 time formats.
- 1PPS—1.0/2.3 DIN connector as input
- 10MHz—1.0/2.3 DIN connector as input

1PPS input or output and ToD input or output—This shielded RJ-45 interface is used for input or output of time-of-day (ToD) and 1PPS pulses. ToD format includes both NTP and IEEE 1588-2008 time formats.

The same RS422 pins for 1PPS and TOD are shared between input and output directions. The direction for each can be independently configurable through software.

Use an SMB connector of type DIN 1.0/2.3 for the following:

- GPS 10Mhz input and output—10MHz input for GPS Synchronization.
- GPS 1 PPS input and output—1 PPS input for GPS Synchronization.

BITS

The router supports receiving (Rx) and transmitting (Tx) of frequency via BITS interface. To receive and transmit BITS signals, configuration is done under the clock-interface sync 0 on the route processor (RP). BITS port is present on the rear side of NCS-57C1 router.

Note On a 1GE interface for NCS-57C1 router, the jitter experienced with SyncE can be beyond the G.8262 tolerance specification.

GNSS

GNSS module has an in-built ESD protection on all pins, including the RF-input pin. However, additional surge protection is required if an outdoor antenna is being connected. The Lightning Protector must support a low clamping voltage (less than 600V).

GNSS Module RF Input Requirements

- The GNSS module requires an active GPS/GNSS antenna with built-in Low-Noise Amplifier (LNA) for optimal performance. The antenna LNA amplifies the received satellite signals for two purposes:
  - Compensation of losses on the cable
  - Lifting the signal amplitude in the suitable range for the receiver frontend

  The Amplification required is 22dB gain + cable/connector loss + Splitter signal loss.

  The recommended range of LNA gain (LNA gain minus all cable and connector or splitter losses) at the connector of the receiver module is 22dB to 30dB with a minimum of 20dB and a maximum of 35dB.
- GNSS module provides 5V to the active antenna through the same RF input.
- Actual supply voltage at the antenna LNA input depends on the current drawn by the antenna . Antennas with high current consumption, leads to more drop, hence supply voltage at the RF-connector may drop too low to provide sufficient power to the antenna LNA. In that case, we recommend to use either antennas with lower operating current or with wider supply voltage range (3V to 5.5V)
- Recommended maximum current drawn from GNSS module is 55mA. The system triggers short alarm when antenna LNA consumes more than100mA. Open alarm triggered if antenna consume very less current (less than 4 - 8mA) or the cable is open.
- Surge requirement:
  - GNSS modules have built-in ESD protections on all pins, including the RF-input pin. However, additional surge protection may be required if rooftop antennas are being connected, to meet the regulations and standards for lightning protection in the countries where the end-product is installed.
  - A lightning protection must be mounted at the place where the antenna cable enters the building. The primary lightning protection must be capable of conducting all potentially dangerous electrical energy to PE (Protective Earth).
  - Surge arrestors should support DC-pass and suitable for the GPS frequency range (1.575GHz) with low attenuation.
- Antenna Sky visibility:
  - GNSS signals can only be received on a direct line of sight between antenna and satellite. There should not be any obstacle between the antenna and the open sky. For proper timing, minimum of four satellites should be locked with C/No value greater than 35.

Note The antenna terminal should be earthed at the building entrance in accordance with the ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.

- Use a passive splitter if more than one GNSS modules are fed from a single antenna.

Note The splitter should have all the RF ports capable of DC-pass, if the antenna needs to feed power from GNSS module.

Console

The RS232 console port provides transmission (Tx), reception (Rx), and ground (Gnd).

Online Insertion and Removal

The router supports OIR for optical modules, power supplies, and fan modules and trays.

The router supports the following OIR operations:

- When an optical module is removed, there is no effect on traffic flowing on other ports.
- When an optical module is installed, the system initializes that port for operation that is based on the current configuration. If the inserted optical module is incompatible with the current configuration for that port, the port does not become operational until the configuration is updated.
- With both power supplies installed and active, the load is shared between them.

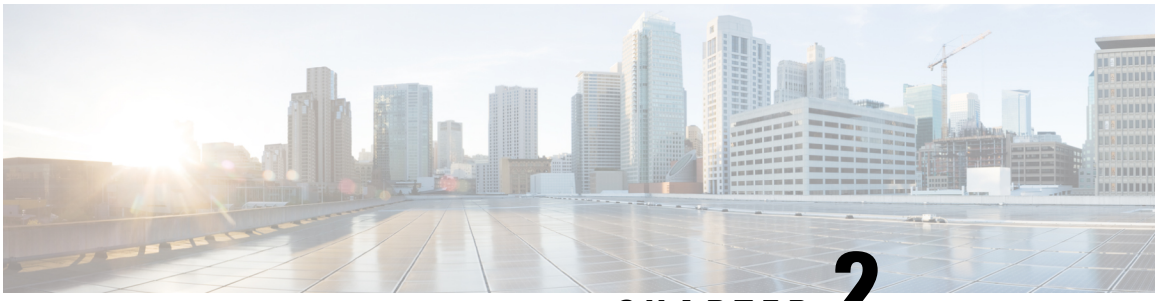
  When a power supply is removed, not working (failure), or the input cable is removed, the remaining power supply takes the entire load without disruption.
- There are six fan modules for the NCS 57B1 chassis, five fan modules for the NCS 57C1 chassis, and six fan trays for the NCS 57C3-MOD chassis. Each module or fan tray has two fan units.

Transceiver and Cable Specifications

To determine which transceivers and cables are supported by this router, refer to the Transceiver Module Group (TMG) Compatibility Matrix Tool:

https://tmgmatrix.cisco.com

To see the transceiver specifications and installation information, see Cisco Transceiver Modules Install and Upgrade Guides.



CHAPTER 2

Prepare for Installation

Before you install the Cisco NCS 5700 chassis, you must prepare your site for the installation.

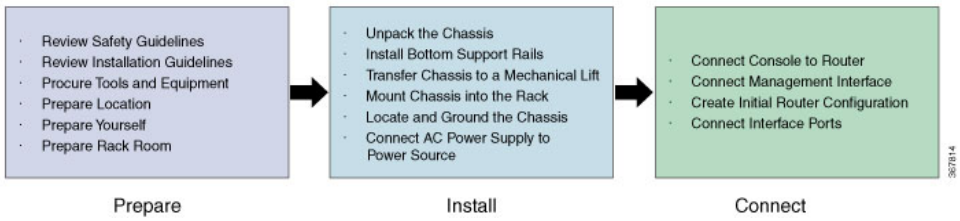
Preparing your site involves these tasks:

- Review Installation Roadmap, on page 35
- Review Safety Guidelines, on page 36
- Cautions and Regulatory Compliance Statements for NEBS, on page 36
- Review Installation Guidelines, on page 37
- Review Site Selection Guidelines, on page 38
- Clearance Requirements, on page 40
- Procure Tools and Equipment, on page 43
- Accessory Kits for Fixed Port Routers, on page 44
- Prepare Your Location , on page 45
- Prepare Yourself , on page 47
- Prepare Rack for Chassis Installation, on page 49

Review Installation Roadmap

This figure lists the steps to install Cisco NCS 5700 series fixed-port chassis and its components and prepare the system for operation. Use this workflow as a reference to ensure that all components are properly installed in the correct order. For information about a step, see the respective section of this installation guide.

Figure 25: Installation Workflow



Review Safety Guidelines

Before you perform any procedure in this document, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment. The following guidelines are for your safety and to protect equipment. Because the guidelines do not include all hazards, be constantly alert.

- Keep the work area clear, smoke and dust-free during and after installation. Do not allow dirt or debris to enter into any laser-based components.
- Do not wear loose clothing, jewelry, or other items that could get caught in the router or other associated components.
- Cisco equipment operates safely when used in accordance with its specifications and product-usage instructions.
- Be sure to power down a fixed configuration PDU or modular configuration power shelf before removing it from the chassis.
- If potentially hazardous conditions exist, do not work alone.
- Take care when connecting multiple units to the supply circuit so that wiring is not overloaded.
- This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain about whether suitable grounding is available.
- 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.
- Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.
- When installing or replacing the unit, the ground connection must always be made first and disconnected last.
- The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack may cause the rack to tip over.



Warning **Statement 1051—**Laser Radiation

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

Cautions and Regulatory Compliance Statements for NEBS

The following are NEBS GR-1089-CORE cautions, regulatory compliance statements, and requirements:

- The intra-building port(s) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.

Caution The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces which connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

- Products that have AC power ports that are intended for deployments where an external Surge Protective Device (SPD) is utilized at the AC power service equipment (see definition in National Electric Code).
- This product is designed for a Common Bonding Network (CBN) installation.
- This product can be installed in network telecommunication facilities or locations where the National Electric Code applies.
- An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or nonconductive coatings and establish a metal-to-metal contact. Any paint or other nonconductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.
- The DC return connection to this system should remain isolated from the system frame and chassis (DC-I).
- The nominal DC operating voltage -48 VDC.

Review Installation Guidelines

Before installing the chassis, verify that these guidelines are met:

- Site is properly prepared so that there is sufficient room for installation and maintenance. For specifications on the clearances required for chassis installation, see Clearance Requirements, on page 40.
- Operating environment is within the ranges listed in table *Environmental properties* on the Cisco Network Convergence System 5700 Series: NCS-57B1 Fixed Chassis Data Sheet

  If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the chassis in the rack.
- Chassis is mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the chassis in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- Airflow around the chassis and through the vents is unrestricted.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.

- For cable requirements for optical module connections, see the Transceiver and Cable Specifications, on page 34 section. Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the maximum cable length.

Review Site Selection Guidelines

This equipment requires specific environmental operating conditions such as temperature, humidity, altitude, and vibration for better performance and reliability. The following sections provide guidelines for installation of the equipment to ensure operating conditions are within specified limits mentioned in the Datasheet . There are two categories of installation sites: Central Office and Outside Plant.

Central Offices (COs) and Similar Facilities

- Equipment qualified for GR-63-CORE is intended for installation in Central Offices (COs) and similar facilities.
- Temperature and humidity levels of central offices shall be as per GR-63-CORE - Issue 5, Table 4-4 and Figure 4-1. Maximum allowable temperature and humidity levels must be within the values mentioned in the data sheets. Always maintain absolute humidity levels less than 0.024 Kg of water vapor/Kg of dry air. We do not recommend installations where condensation may occur or where equipment is exposed to high humidity for long duration.
- Environmental pollutant limits of central offices shall be as per GR-63-CORE Table 2-4.

Outside Plant Installation (OSP)

- Equipment qualified for GR-3108-CORE is intended for installation in outside plant applications (OSP).
- Temperature and humidity levels of OSP installation sites shall be as per GR-3108-CORE Table 1-1. Maximum allowable inlet air temperature and humidity levels must be within the values mentioned in the data sheets. Environments with relative humidity above 85% or where condensation may occur is not acceptable for equipment qualified for GR-3108-CORE Class 1.
- Environmental pollutant limits of OSP sites shall be as per GR-63-CORE Table 2-3.

Note We recommended that you check the concentration of pollutants periodically at CO and OSP sites. Equipment should be provided with necessary protection to ensure it is not exposed to high concentration level of pollutants.

Caution Installation in highly corrosive areas is not recommended. Examples of highly corrosive areas include: near the sea, rivers, and large bodies of water where high humidity persist for long peroids of time; highly polluted areas such as sites less than 10 meters from high traffic roadways; areas with high industrial pollutants.

Caution Equipment should be provided with necessary protection against insects, pests, etc.

Review Outside Plant (OSP) Guidelines

The following sections provide guidelines for the temperature-hardened, conformal coated chassis for outside plant installation (OSP).

Cabinet Selection Guidelines

For an outside plant installation, it is required that the equipment be protected against airborne contaminants, dust, moisture, insects, pests, corrosive gases, polluted air, or other reactive elements present in the outside air. The table below provides guidelines for cabinet selection.

	Central Office (CO)	Outside Plant (OSP)
Open rack with no front and rear doors	Yes	No
Ventilated cabinets with normal air filter at intake and fans	Yes	No
Sealed cabinets with heat exchanger, meeting NEMA-4/IP66 or IP65 protection	Yes	Yes
Sealed cabinets with air-conditioners, meeting NEMA-4/IP66 or IP65 protection	Yes	Yes

Equipment (PID) Selection Guidelines

Data sheet provides details of PID, respective maximum operating conditions and standards that equipment comply with. This section provides guidelines of selection of PID based on environmental conditions. Below table shows PIDs and environmental conditions in which it can be installed.

PID	Central Office (CO)	Outside Plant (OSP)
NCS-57B1-5D24H-SE	Yes	No
NCS-57B1-5DSE-SYS	Yes	No
NCS-57B1-6D24H-S	Yes	No
NCS-57C1-48Q6D-S	Yes	No
NCS-57C1-48Q6-SYS	Yes	No
NCS-57C3-MOD-SE-S	Yes	No
NCS-57C3-MODS-SYS	Yes	No
NCS-57C3-MOD-S	Yes	No
NCS-57C3-MOD-SYS	Yes	No
NCS-57D2-18DD-SYS	Yes	No

PID	Central Office (CO)	Outside Plant (OSP)
NCS-57C3-MOD-HX	Yes	Yes

Selection of Air Filter Box

Some sites may have high suspended dust concentration. Suspended dust flows into the air breathing equipment along with cooling and caus earlier failures. Air filters can be considered to minimize the course particles intrusion into the equipment and mitigate early failures. Table below show guidelines for selection of air filters.

	Central Office (CO)		Outside Plant (OSP)
Dust concentration levels	< 20µg/m3	>/= 20µg/m3	< 90µg/m3
NCS-57C3-FR-KIT	Optional	Recommended	Recommended
NC57-2RU-FILTER	Optional	Recommended	Recommended
Note µg/m3: Micrograms per cubic meter			

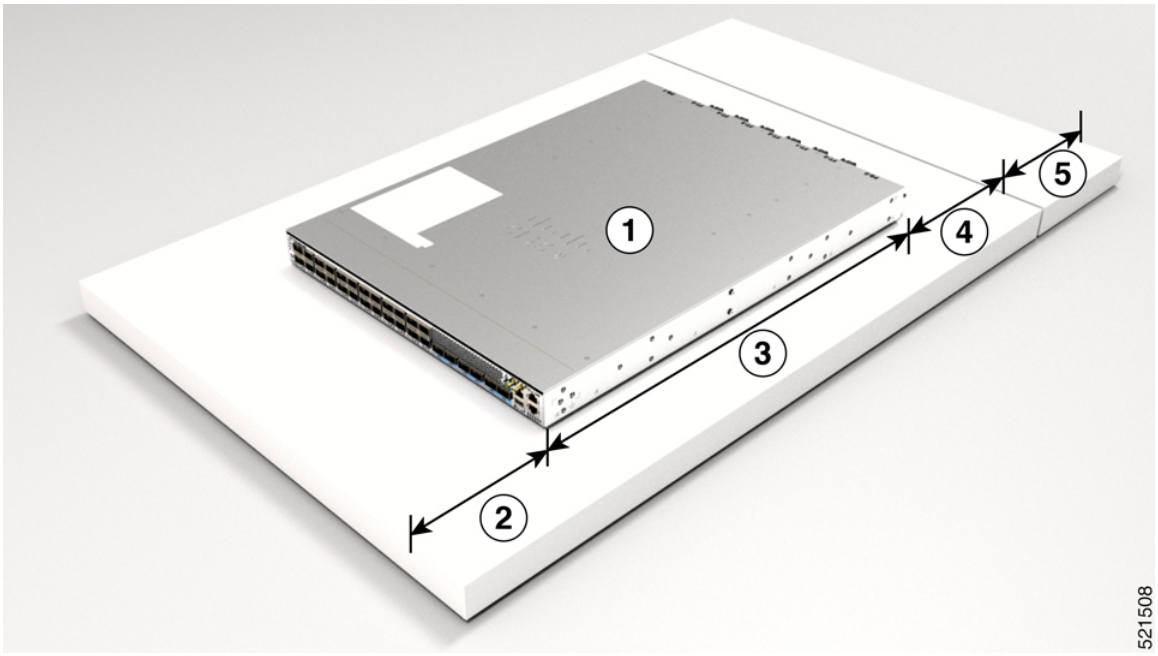
Air Filter Maintenance

A periodic health check of the filter, every three months based on the level of dust in the environment, helps in avoiding over clogging of the filters and provide a better life. This product's filter is used as a single-use component. If the product is installed in a controlled environment, check and replace the filter every three months, otherwise replace the filter every month.

Clearance Requirements

The fixed-port chassis requires front-to-back airflow. Leave at least 6.0 in. (15.24 cm) front and rear clearance for air intake/exhaust. Leave an additional 6.0 inches (15.24 cm) rear clearance for removal and installation of power supplies and fan modules.

Figure 26: Clearance Requirement



1	Chassis	4	6.0 inches (15.24 cm) rear clearance for air intake/exhaust.
2	6.0 inches (15.24 cm) front clearance for air intake/exhaust.	5	Additional 6.0 inches (15.24 cm) rear clearance for removal and installation of power supplies and fan modules. **Note** The NCS-57C3-MOD power supplies are installed from the front of the chassis; therefore, additional rear clearance is not required for NCS-57C3-MOD chassis.
3	Chassis depth: • NCS-57B1: 23.6 in. (59.944 cm) • NCS-57C3-MOD: 12.55 in. (31.88 cm) • NCS-57C1: 19.68 in. (50.00 cm) • NCS-57D2: 23.62 in. (59.99 cm)		

Clearance Requirements for Outside Plant Enclosure (OSP)

NCS-57C3-MOD-HX is temperature-hardened, conformal coated chassis that can be installed in OSP enclosures. Observe the following clearance requirements when installing these chassis in OSP enclosures:

Installation and Options	Front Clearance	Rear Clearance
Chassis with slider and air filter box, with 1RU space between chassis	6 in. (152.4 mm)	5 in. (127 mm)
Chassis with bracket and air filter box, with 1RU space between chassis		
Chassis with bracket, with 1RU space between chassis		
Chassis with slider and air filter box, with no space between chassis	6 in. (152.4 mm)	5 in. (127 mm)
Chassis with bracket and air filter box, with no space between chassis		
Chassis with bracket, with no space between chassis		

Note

- The temperatures are measured at the air inlet to the equipment.
- The temperatures are valid at sea level. The maximum allowable temperatures are reduced at higher altitudes. Altitude derating 1°C for every 300m.
- In case of a single fan failure, the maximum allowable temperature will be less than specified.
- In case the air filter is clogged, the temperature alarm may be raised at temperatures below the listed temperatures.

Airflow Directions

The airflow through the fan trays and power supplies on the Cisco NCS 5700 series router is either from the port side exhaust or the port side intake, depending on how the modules were ordered. To ensure proper airflow, you must make sure that when you install the router its air intake is positioned in a cold aisle and the air exhaust is positioned in a hot aisle.

Figure 27: Port Side Intake Airflow Direction

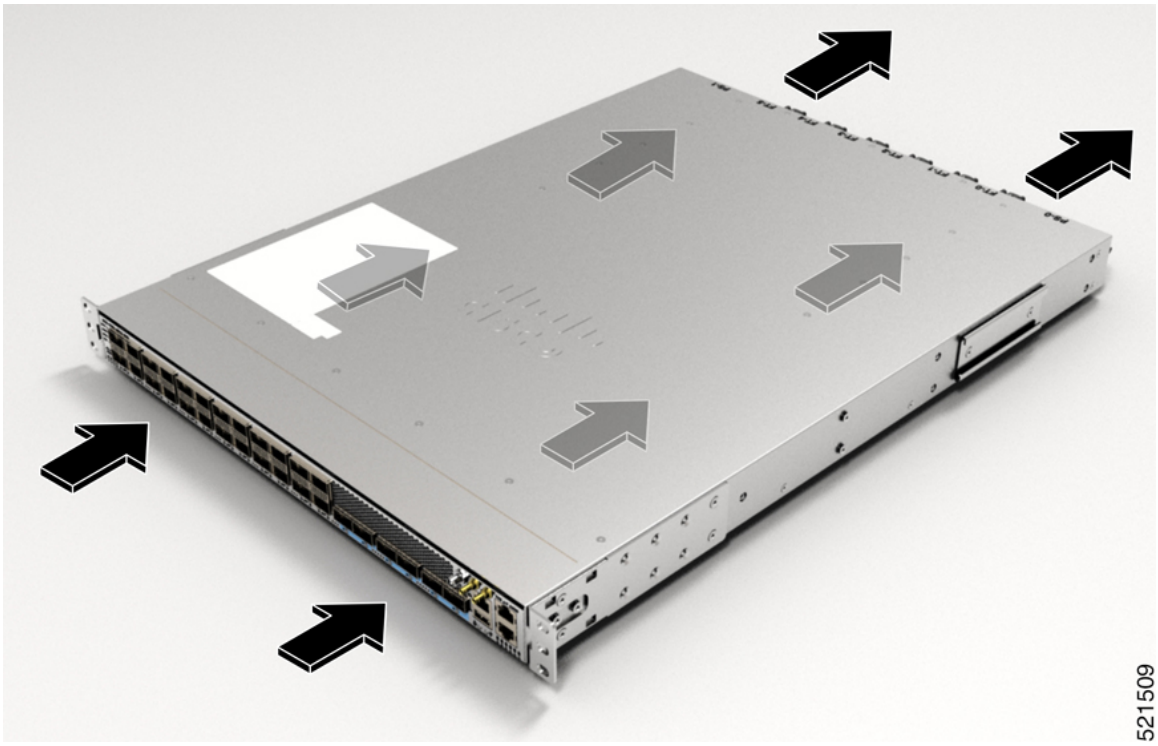
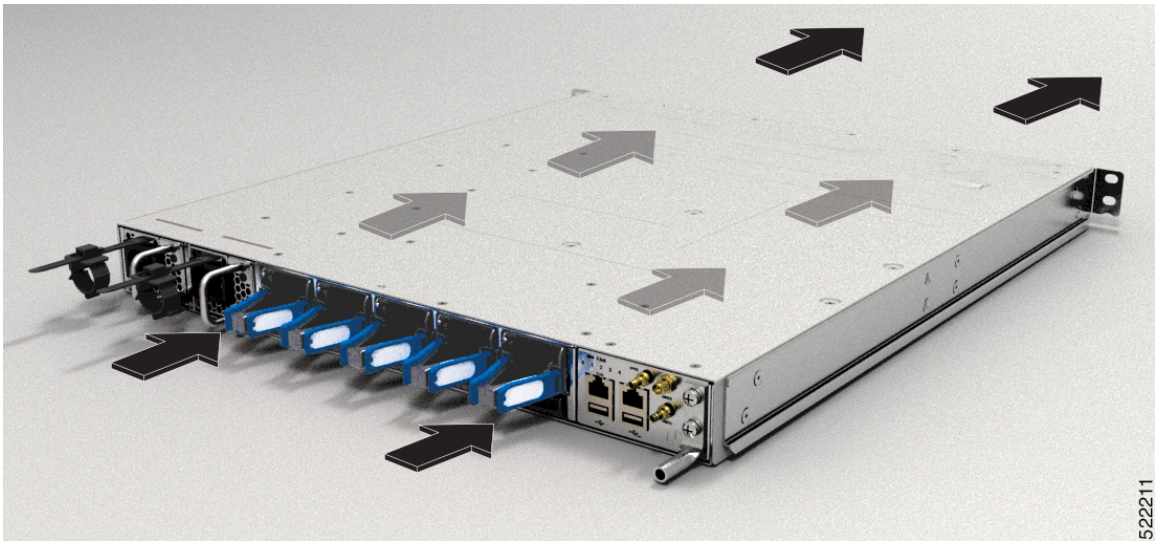


Figure 28: Port Side Exhaust Airflow Direction



Procure Tools and Equipment

Obtain these necessary tools and equipment for installing the chassis:

- Number 1 and number 2 Phillips screwdrivers with torque capability to rack-mount the chassis

- 3/16-inch flat-blade screwdriver
- Tape measure and level
- ESD wrist strap or other grounding device
- Antistatic mat or antistatic foam
- A Torx T15 screwdriver, or the Torx T15 key to install adapters
- Grounding cable (6 AWG recommended), sized according to local and national installation requirements; the required length depends on the proximity of the switch to proper grounding facilities
- Ground lug (1)
- Crimping tool large enough to accommodate the girth of the lug
- Wire-stripping tool
- (ANSI) Pair of 19-inch mounting brackets
- M4 screws to fix brackets (16)
- M4 screws to fix ground lug (2)

Accessory Kits for Fixed Port Routers

The following table contains the accessory kit PIDs and the items present in the accessory kits of the fixed port routers. The rack mount kit present in the accessory kit contains the screws and brackets required for installation.

Table 16: Accessory Kits Information

Router	Accessory Kit-1	Items in Accessory Kit-1
NCS-57C1-48Q6-SYS / NCS-57C1-48Q6D-S	NC57-1RU-ACC-KIT1	19-inches 4-post rack mount kit and ground lug kit
	NC57-1RU-ACC-KIT2	19-inches 2-post rack mount kit and ground lug kit
	NC57-1RU-ACC-KIT3	23-inches 4-post rack mount kit and ground lug kit
	NC57-1RU-ACC-KIT4	23-inches 2-post rack mount kit and ground lug kit
	NCS-57C1-CAB-MGMT	Cable management kit
NCS-57B1-6D24-SYS	8200-1RU-KIT	Rack mount kit and ground lug kit
NCS-57B1-5DSE-SYS		

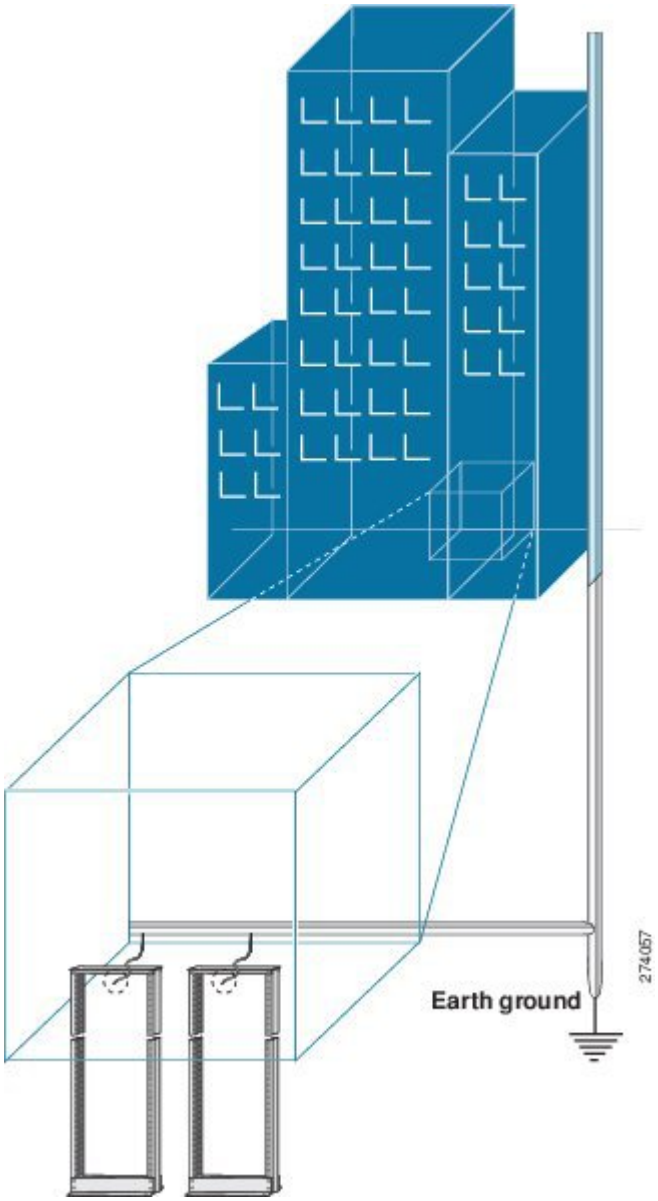
Router	Accessory Kit-1	Items in Accessory Kit-1
NCS-57D2-18DD-SYS	NC57-2RU-ACC-KIT	19-inches 4-post rack mount kit and ground lug kit
	NC57-2RU-ACC-KIT2	19-inches 2-post rack mount kit and ground lug kit
	NC57-2RU-ACC-KIT3	23-inches 4-post rack mount kit and ground lug kit
	NC57-2RU-ACC-KIT4	23-inches 2-post rack mount kit and ground lug kit
	NC57-2RU-FILTER	Air filter
NCS-57C3-MOD-SE-S	NC57-3RU-ACC-KIT	Rack mount kit and ground lug kit
NCS 57C3-MOD-S	NCS-57C3-FR-KIT	Air filter
NCS-57C3-MOD-HX		

Prepare Your Location

This section illustrates how the building that houses the chassis must be properly grounded to the earth ground.

Note This image is only for representational purposes. Your grounding requirement depends on your building.

Figure 29: Building with Rack Room Connected to Earth Ground



Airflow for Site Planning

Table 17: Cisco NCS 5700 Airflow

Device	Maximum System Airflow (CFM) at Maximum System Temperature
NCS-57B1-5DSE-SYS	150
NCS-57B1-6D24-SYS	
NCS-57C1-48Q6-SYS	
NCS-57D2-18DD-SYS	150
NCS-57C3-MOD-S	350
NCS-57C3-MOD-SE-S	
NCS-57C3-MOD-HX	

Prepare Yourself

This section illustrates how to prepare yourself before removing the chassis from the sealed antistatic bag. The figures show how to cuff the ESD strap around the wrist and the ground cord that connects the cuff to the ground. ESD wrist straps are the primary means of controlling static charge on personnel.

Figure 30: Wearing the ESD Strap

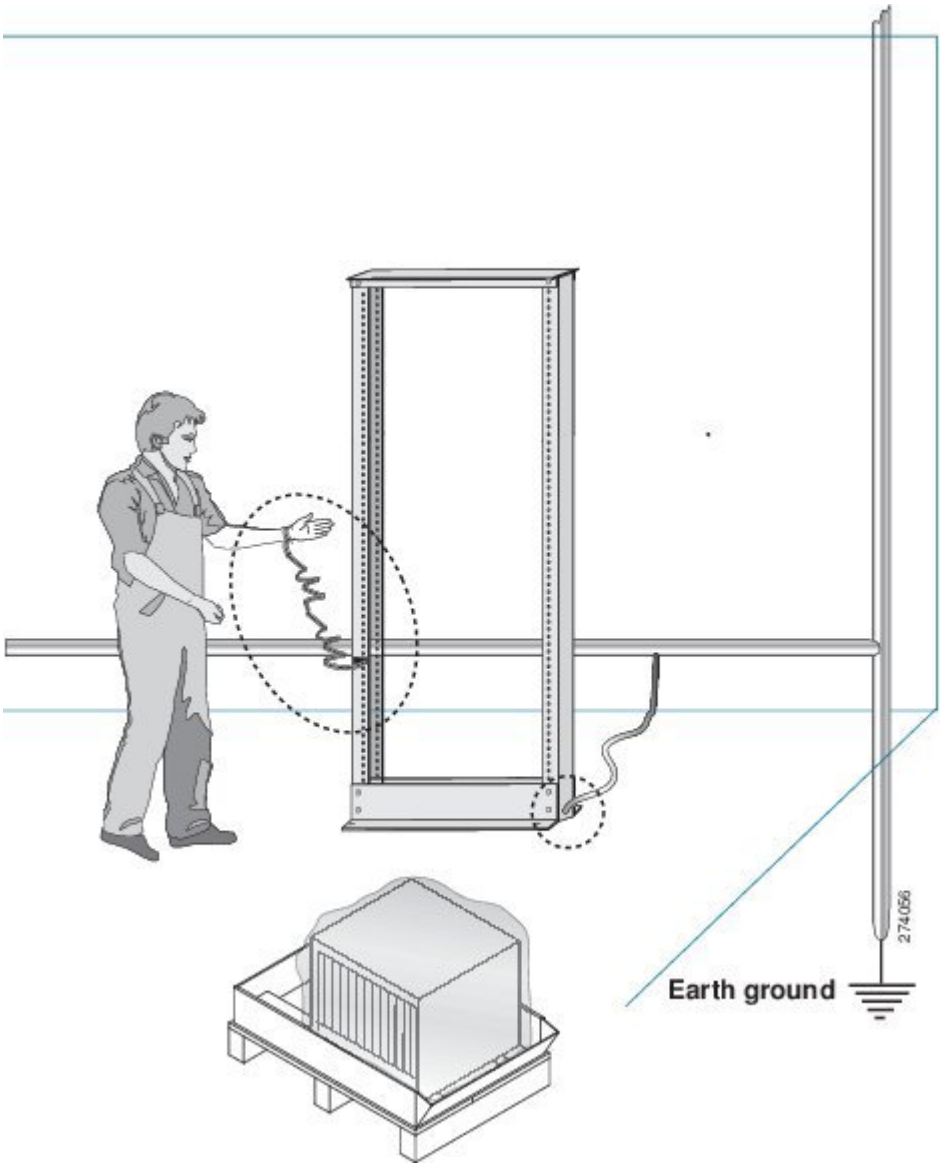
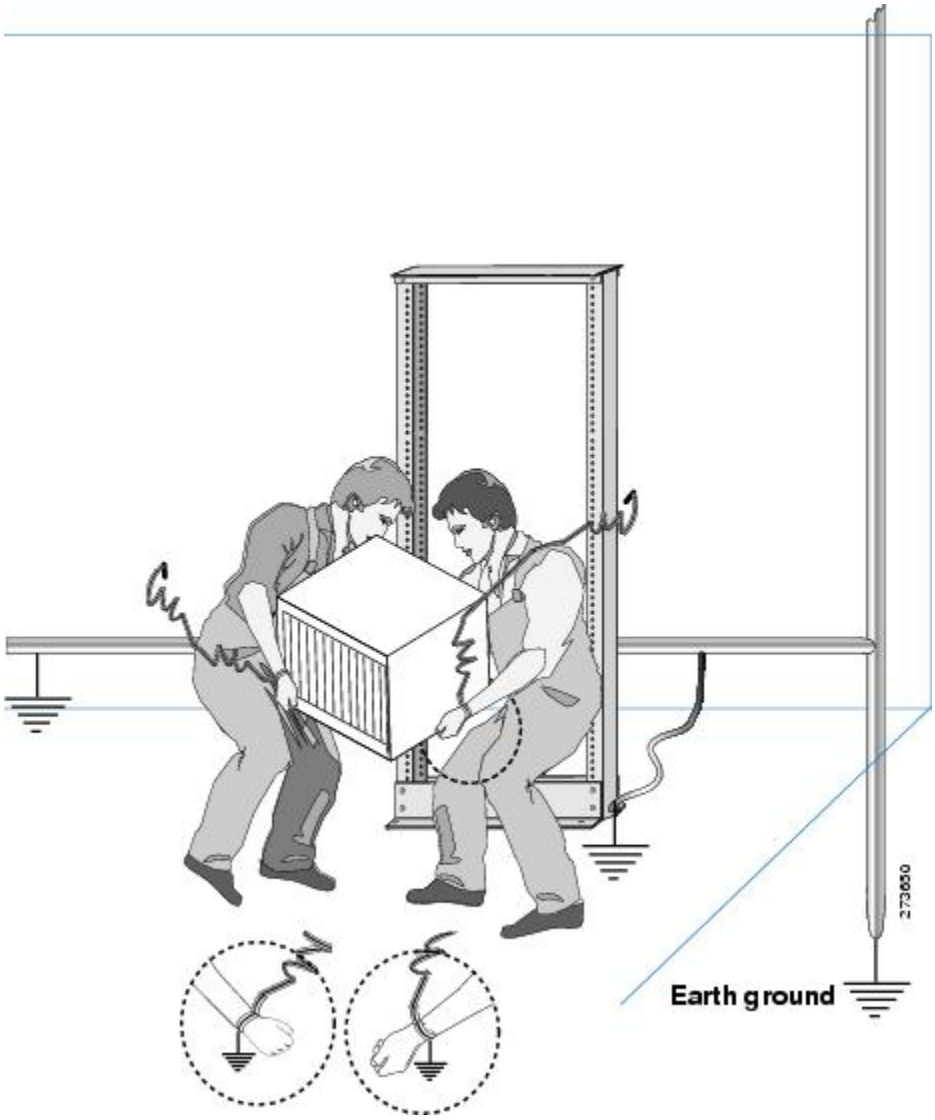


Figure 31: Handling the Chassis



Prepare Rack for Chassis Installation

Install the Cisco NCS 5700 series chassis into a standard 19-inch, four-post Electronic Industries Alliance (EIA) cabinet or rack with mounting rails that conform to English universal hole spacing per section 1 of the ANSI/EIA-310-D-1992 standard.

The spacing between the posts of the rack must be wide enough to accommodate the width of the chassis.

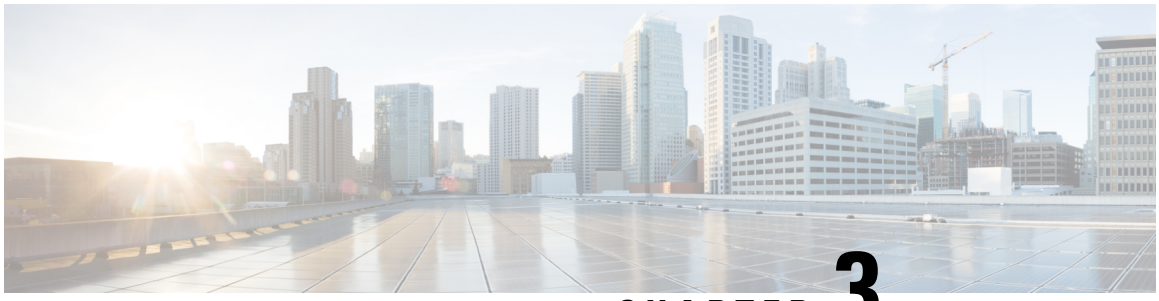
Before you move the chassis or mount the chassis into the rack, we recommend that you do the following:

Procedure

Step 1 Place the rack where you plan to install the chassis. Ensure that the rack that the chassis is being installed is grounded to earth ground as instructed in Prepare Your Location , on page 45.

Step 2 Secure the rack to the floor.

To bolt the rack to the floor, a floor bolt kit (also called an anchor embedment kit) is required. For information on bolting the rack to the floor, consult a company that specializes in floor mounting kits (such as Hilti; see Hilti.com for details). Make sure that floor mounting bolts are accessible, especially if annual retorquing of bolts is required.



CHAPTER 3

Install the Chassis

Before you begin this task, ensure that you have read and understood the safety warnings in the Standard Warning Statements section of the Safety Warnings handout topic.

Installing the Cisco NCS 5700 router involves these tasks:

Note The images in this chapter are only for representation purposes, unless specified otherwise. The chassis' actual appearance and size may vary.

- Rack Types, on page 51
- Install the Extension Plate on 23-inch Rack Post, on page 52
- Rack Mount the Chassis, on page 54
- Ground the Chassis, on page 102
- Connect AC Power to the Chassis, on page 106
- Connect DC Power to the Chassis , on page 108
- Power Supply Unit Input and Output Ranges, on page 113

Rack Types

Figure 32: Rack specification EIA (19 inches and 23 inches)

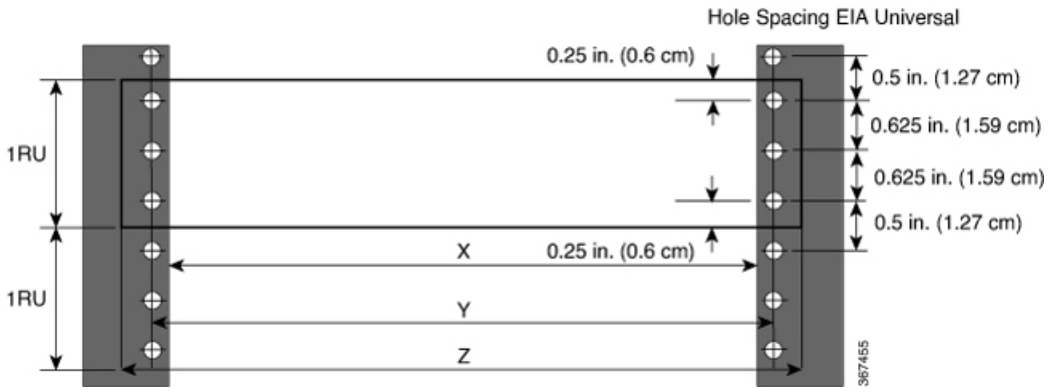


Table 18: Rack specification EIA (19 inches and 23 inches)

Post Type	Rack Type	Rack Front Opening (X)	Rack Mounting Hole Centre-Centre (Y)	Mounting Flange Dimension (Z)
4 Post	19 inches (48.3 centimeters)	450.8mm (17.75”)	465mm (18.312”)	482.6mm (19”)
2 Post				
4 Post	23 inches (58.4 centimeters)	552.45mm (21.75”)	566.7mm (22.312”)	584.2mm (23”)
2 Post				

Note Rack mount kit contains the rack mounting brackets for 19 inch rack. To install the chassis in a 23-inch rack or an ETSI rack, you need adapter plates to accommodate the 19 inch rack mount brackets. The adapter plates for installing in a 23-inch rack or an ETSI rack are included in the accessory kit for the NCS-57C3-MOD chassis.

Note The NCS-57C1 or NCS-57D2 router can be installed either on the 19-inch rack or 23-inch rack. To install this router on the 23-inch rack, you must mount the extension brackets on the 23-inch rack post.

Install the Extension Plate on 23-inch Rack Post

Procedure

Mount the extension plate on the 23-inch rack post. Use three 12-24 Phillips pan-head screws with 30 in-lb (3.39 N.m) to attach each extension plate to the rear and front rack post on either sides.

Figure 33: Mount Extension Plates on a 23-inch 2-Post Rack

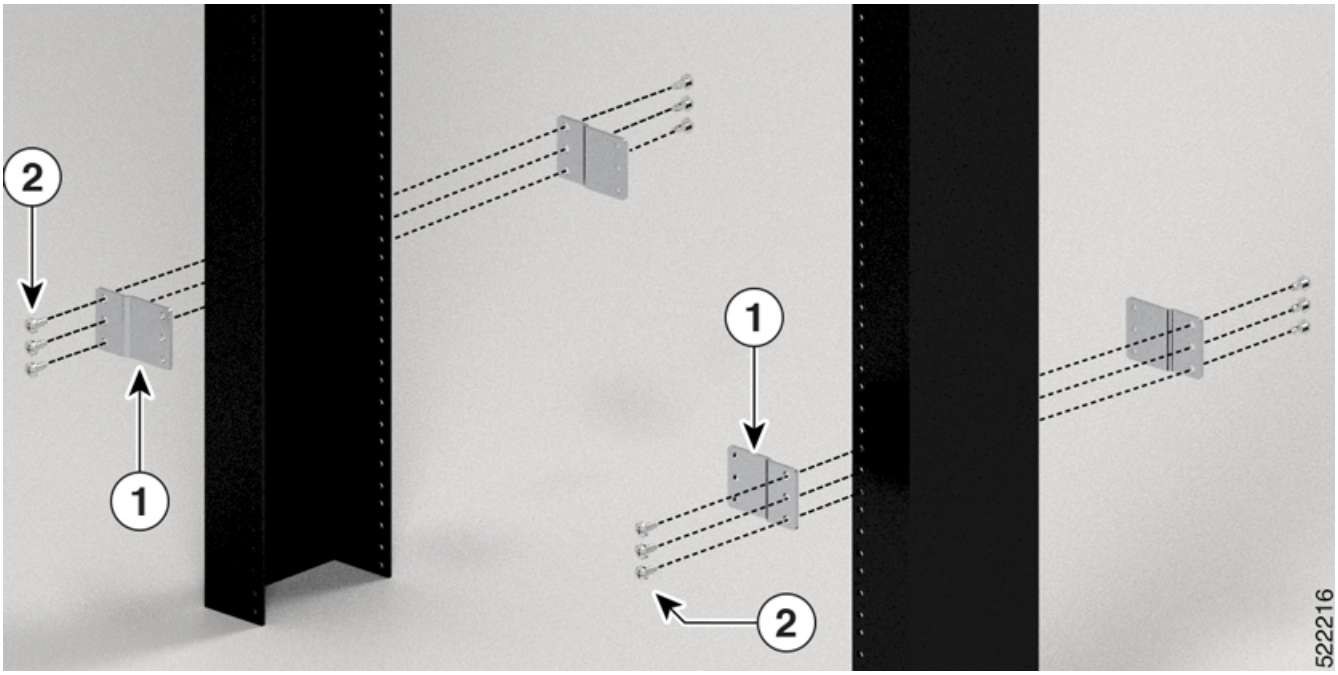
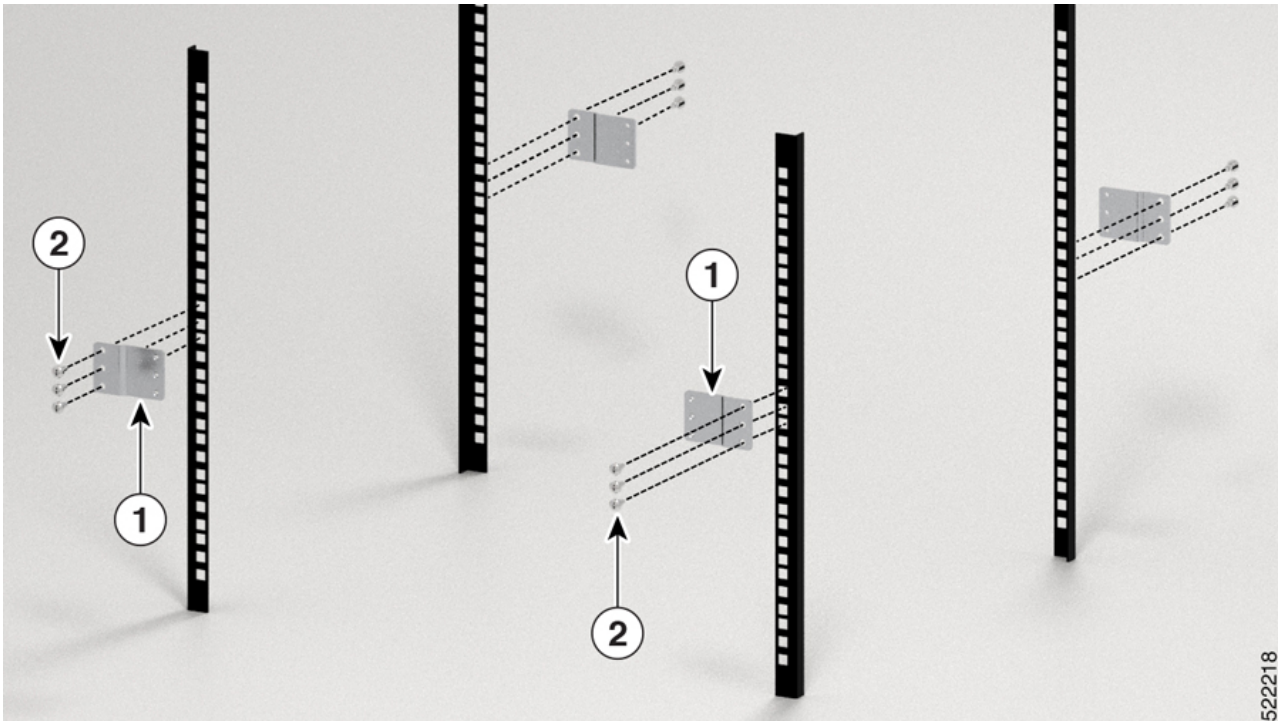


Figure 34: Mount Extension Plates on a 23-inch 4-Post Rack



1	Extension Plates	2	Screws

What to do next

Continue with the installation of the router by referring to the procedures for the 19-inch rack post.

Rack Mount the Chassis

The chassis can be mounted on a 2-post or a 4-post rack.

- Rack Mount the NCS-57B1 Chassis in a 2-Post Rack, on page 54 — Contains the procedure for mounting the NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS chassis in a 2-post rack.
- Rack Mount the NCS-57C1 Chassis in a 2-Post Rack with Sliders, on page 56 — Contains the procedure for mounting the NCS-57C1 chassis in a 2-post rack.
- Rack Mount the NCS-57C3-MOD Chassis in a 2-Post Rack, on page 62 — Contains the procedure for mounting the NCS-57C3-MOD-S/NCS-57C3-MOD-HX and NCS-57C3-MOD-SE-S chassis in a 2-post rack.
- Rack Mount the NCS-57D2 Chassis in a 2-Post Rack with Sliders, on page 64 — Contains the procedure for mounting the NCS-57D2-18DD-SYS chassis in a 2-post rack.
- Rack-Mount the NCS-57B1 Chassis in a 4-Post Rack, on page 68 — Contains the procedure for mounting the NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS chassis in a 4-post rack.
- Rack Mount the NCS-57C1 Chassis in a 4-Post Rack with Sliders, on page 71 — Contains the procedure for mounting the NCS-57C1 chassis in a 4-post rack.
- Rack Mount the NCS-57C3-MOD Chassis in a 4-Post Rack using Sliders, on page 77 — Contains the procedure for mounting the NCS-57C3-MOD-S/NCS-57C3-MOD-HX and NCS-57C3-MOD-SE-S chassis in a 4-post rack using a sliders.
- Rack Mount the NCS-57D2 Chassis in a 4-Post Rack with Sliders — Contains the procedure for mounting the NCS-57D2-18DD-SYS chassis in a 4-post rack using a sliders.

Rack Mount the NCS-57B1 Chassis in a 2-Post Rack

This section describes how to use the rack-mount kit provided with the chassis, to install the following chassis into a cabinet or a 2-post rack:

- NCS-57B1-5DSE-SYS
- NCS-57B1-6D24-SYS

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

The following table lists the items contained in the rack-mount kit provided with the routers.

Table 19: Router Rack-Mount Kit

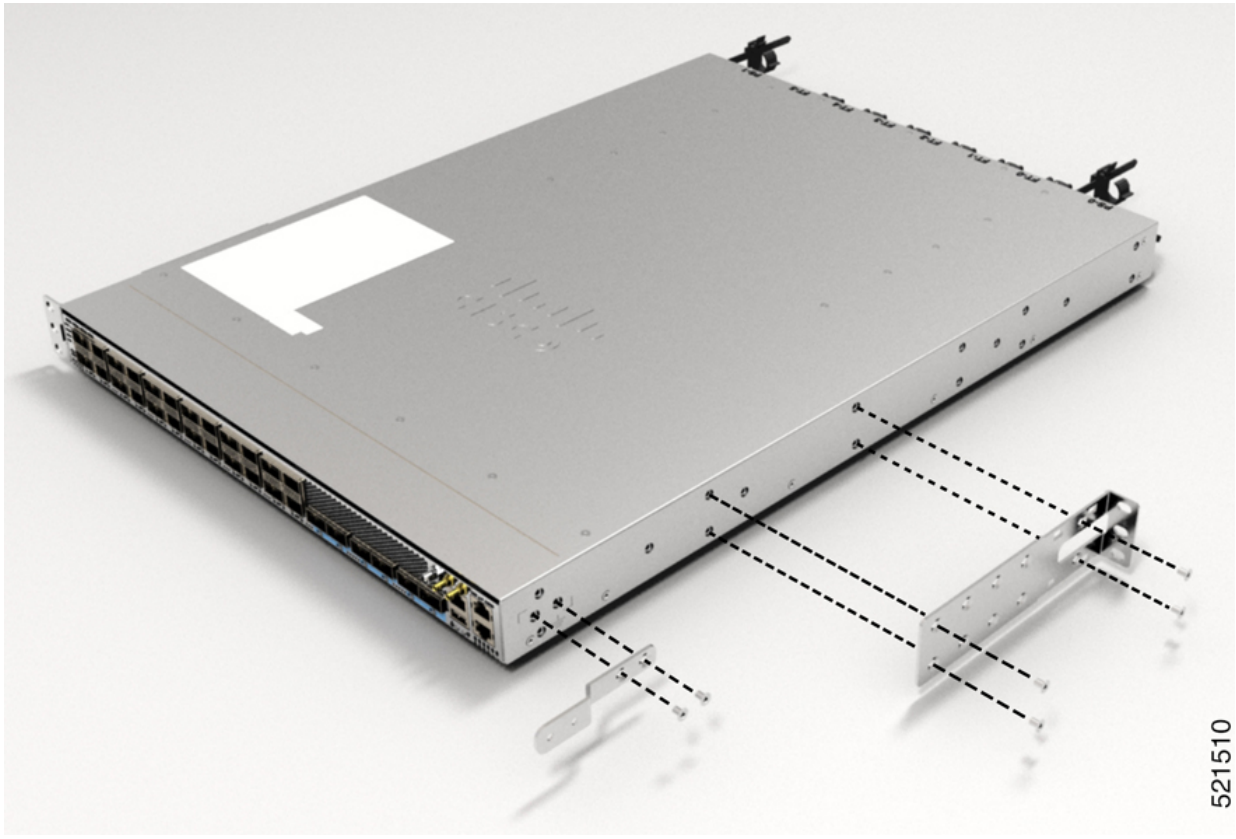
Quantity	Part Description
2	Rack-mount brackets
8	M4 x 6-mm Phillips counter sink screws

Procedure

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

a) Position the router so that its ports will be in the cold aisle.
b) With the bracket ears aligned to the front of the chassis, position a rack-mount bracket on the side of the chassis so that the four holes are aligned to four of the screw holes on the side of the chassis.
c) Use four M4 screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis
d) Repeat Steps 1b and 1c with the other rack-mount bracket on the other side of the router.

Figure 35: Rack-Mount Brackets

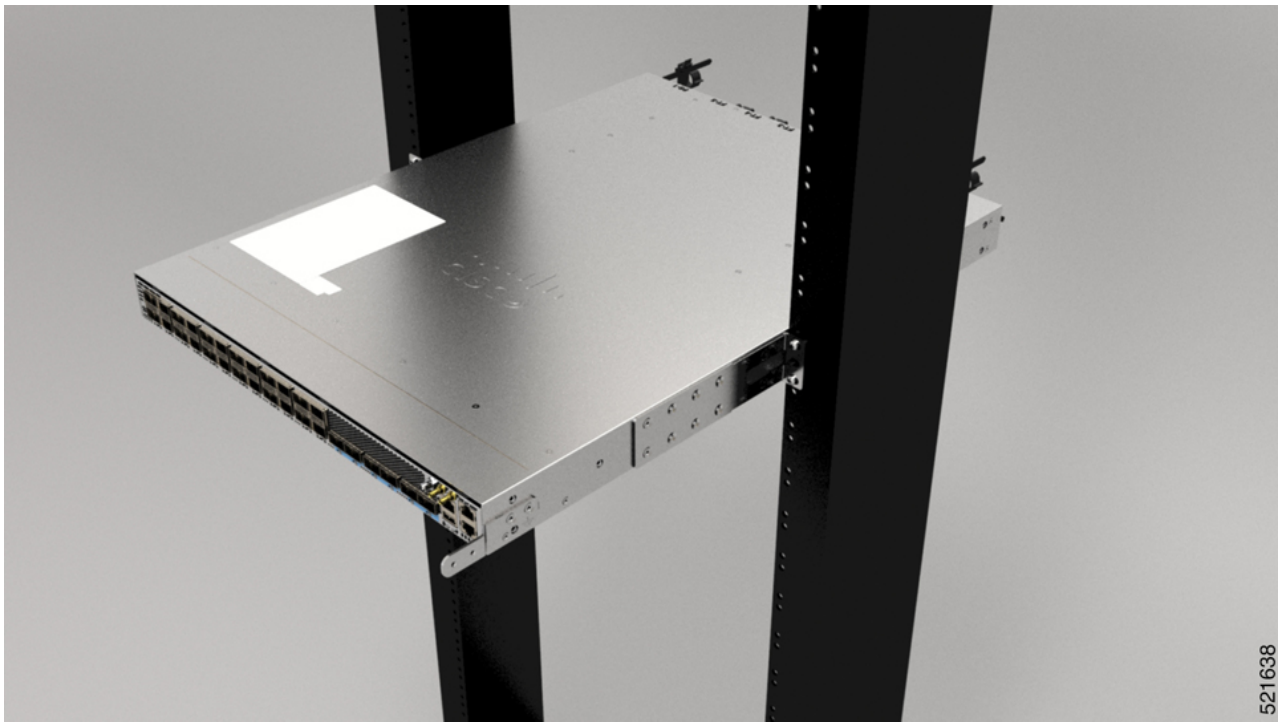


1	Rack-mount brackets	2	Cable guide
3	M4 x 6 Phillips counter sink screws		

Step 2 Install the router onto the 2-post rack as follows:

a) With two people, lift the router into position between the two rack posts.
b) Move the router until the rack-mount brackets come in contact with two rack posts.
c) Hold the chassis level while the second person inserts two screws (12-24 or 10-32, depending on the rack type) in each of the two rack-mount brackets (using a total of four screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Figure 36: 2-Post Rack Mount



Rack Mount the NCS-57C1 Chassis in a 2-Post Rack with Sliders

This section describes how to use the rack-mount kit provided with the NCS-57C1 chassis, to install the chassis into a cabinet or a 2-post rack.

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

The following table lists the items contained in the rack-mount kit provided with the routers.

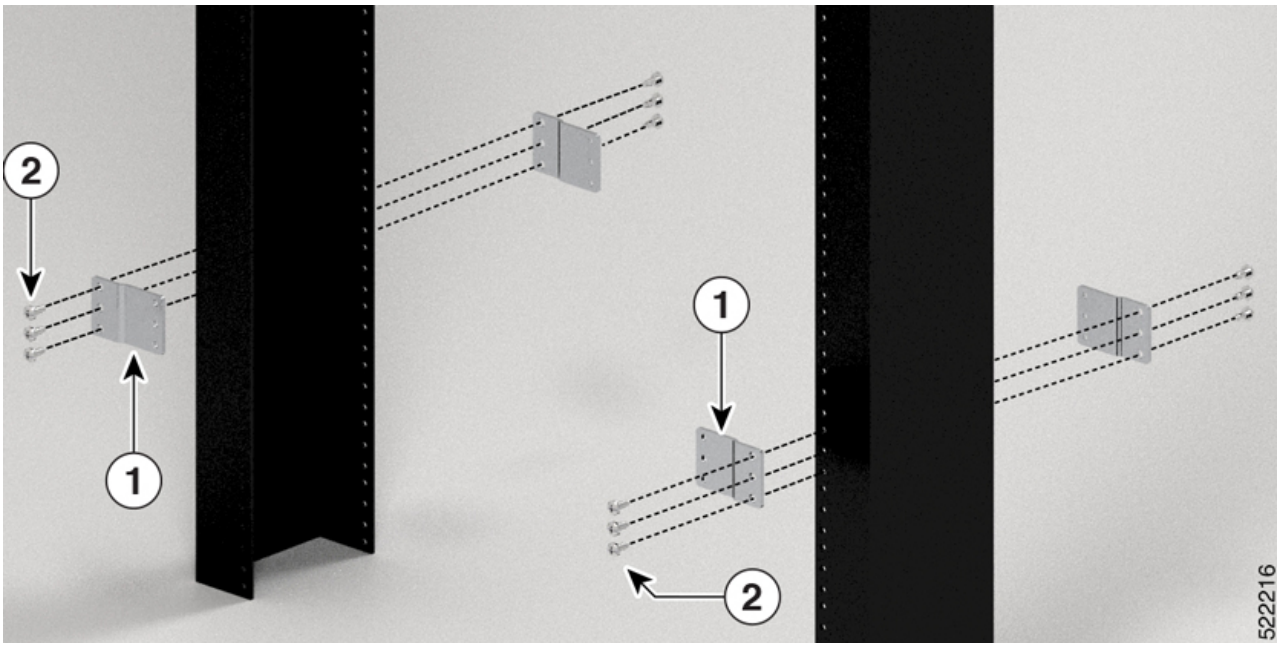
Table 20: 2 Post Rack-Mount Kit

Quantity	Part Description
2	Slider assembly - left and right
2	Slider brackets - left and right
10	12-24 Phillips pan-head screws
12	M4 x 6.5-mm Phillips flat head screws
2	M4 x 8-mm Phillips pan head screws
4	(only 23-inch rack-mount kit) Extension brackets
1	Ground lug

Procedure

Step 1 (Only 23-inch rack post) Mount the extension brackets on the 23-inch rack post. Use three 12-24 Phillips pan-head screws with 30 in-lb (3.39 N.m) to attach each extension bracket to the rear and front rack post on either sides.

Figure 37: Mount Extension Brackets on a 23-inch 2-Post Rack



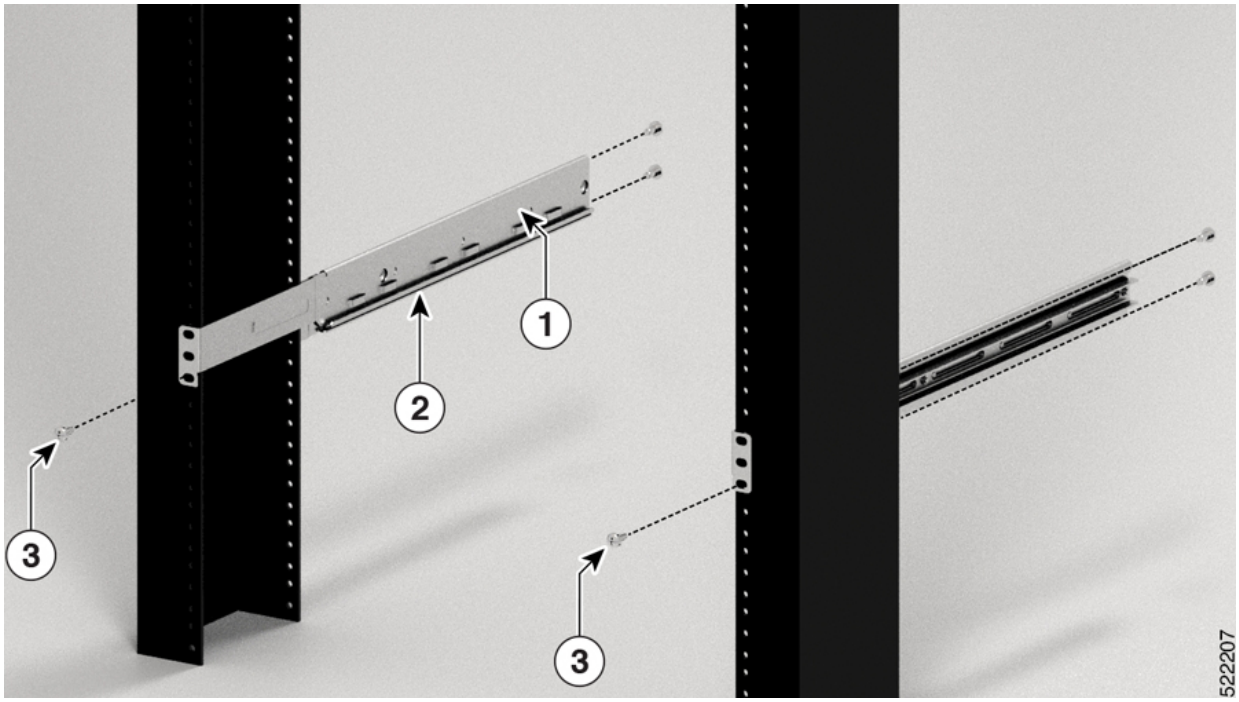
1	Extension brackets	2	Screws

Step 2 Install the slider assembly on the rack as follows:

a) Align the outer slider of the left slider assembly to the rear post rack holes and the inner slider of the left slider assembly to the front post rack holes. The slider rail should be at the bottom.

b) Use three 12-24 Phillips pan-head screws (two on the rear side and one on the front side) with 30 in-lb (3.39 N.m) to attach the slider assembly to the rear and front rack post.
c) Repeat Steps 2a and 2b with the other slider assembly on the other side of the router.

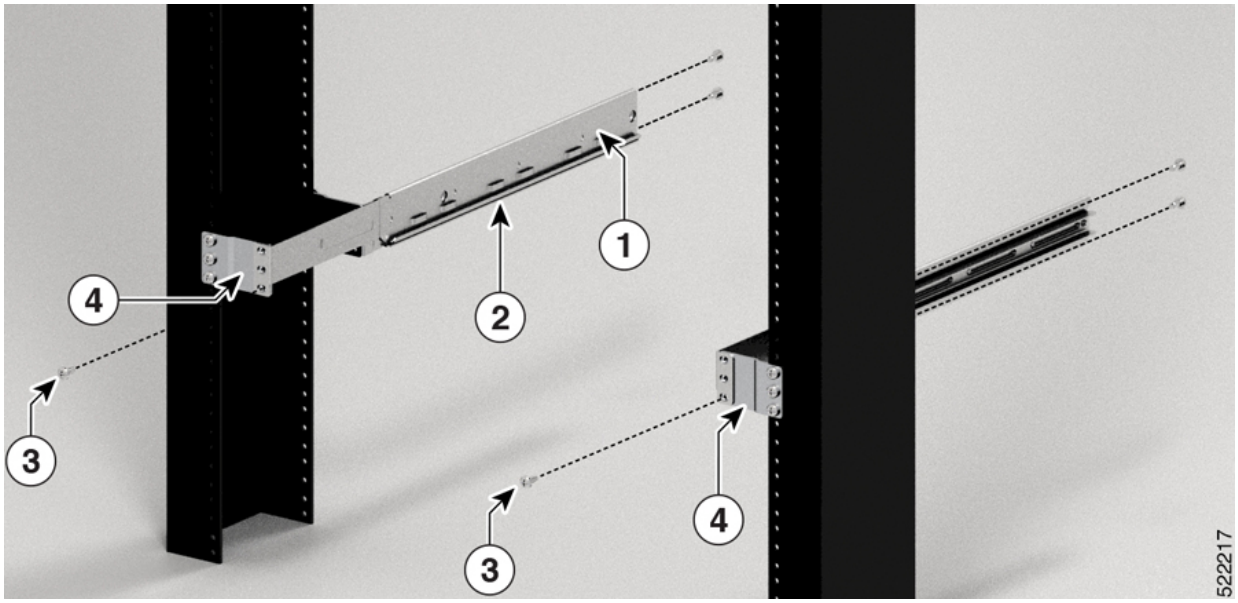
Figure 38: Rack-Mount Slider Assembly on a 19-inch 2-Post Rack



1	Slider assembly	2	Slider rail
3	Screws		

Note
In case of a 23-inch 2-post rack, mount the slider assembly on the extension brackets following the same procedure outlined in Step 2.

Figure 39: Rack-Mount Slider Assembly on a 23-inch 2-Post Rack



1	Slider assembly	2	Slider rail
3	Screws	4	Extension bracket

Step 3 Install slider brackets to the router as follows:

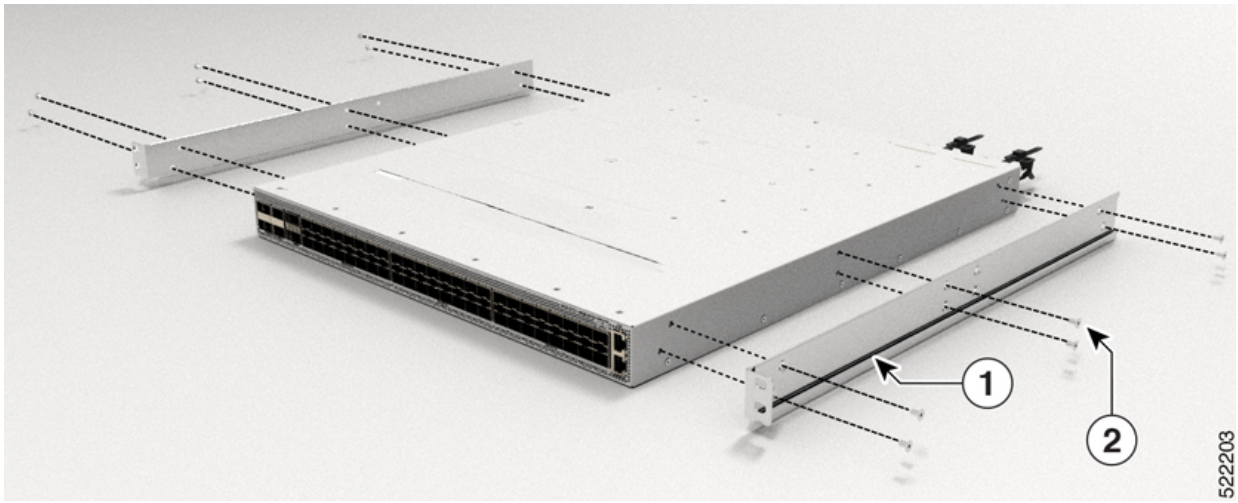
a) Determine which end of the chassis is to be located in the cold aisle as follows:

- If the router has port-side intake modules, position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules, position the router so that the fan and power supply modules are in the cold aisle.

b) With the slider bracket ears aligned to the front of the chassis as shown in the image, use six M4x6.5mm flat head screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis

c) Repeat Steps 3b and 3c with the other slider bracket on the other side of the router.

Figure 40: Mount Slider Brackets



1	Slider brackets	2	Screws

Step 4 Install the router onto the 2-post rack as follows:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.

b) Move the router until the slider brackets come in contact with slider rails installed in the rack. Slide the slider brackets onto the slider rails, and then gently move the router all the way into the rack.

c) Hold the chassis level while the second person inserts two pan-head screws (12-24) in each of the two rack-mount brackets (using a total of four screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.

d) Tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Figure 41: 19-inch 2-Post Rack Mount Chassis

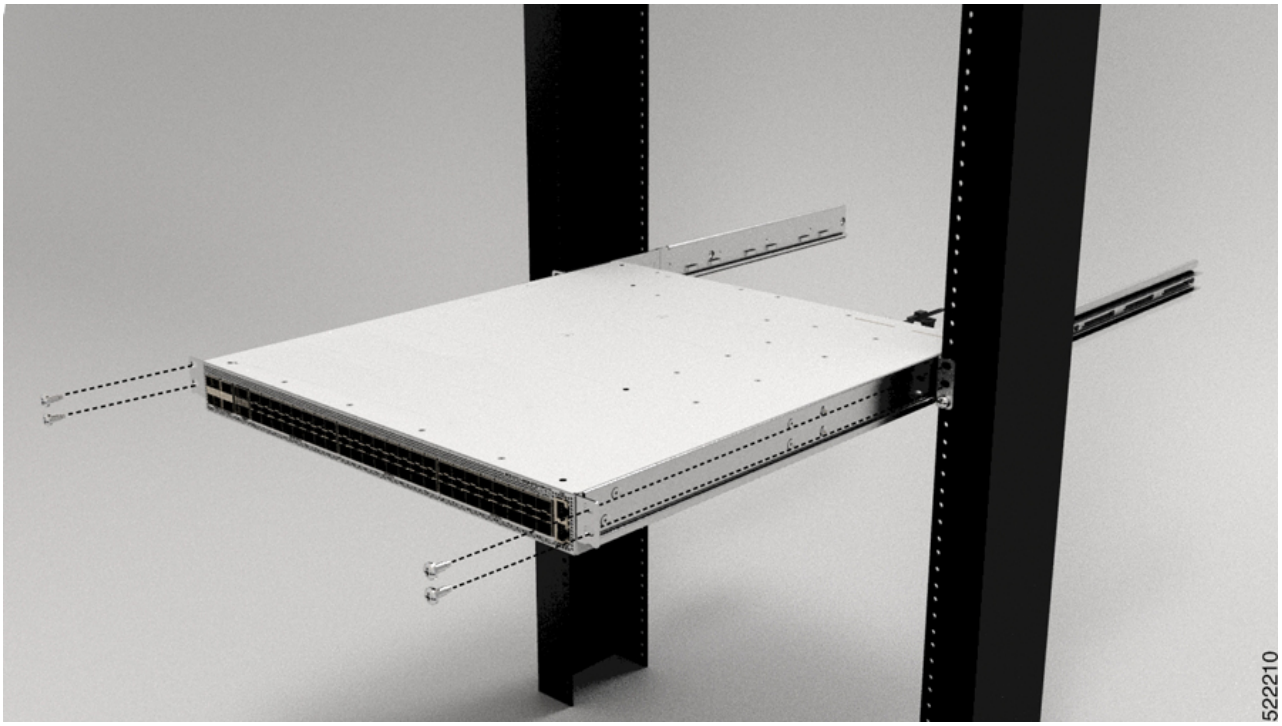
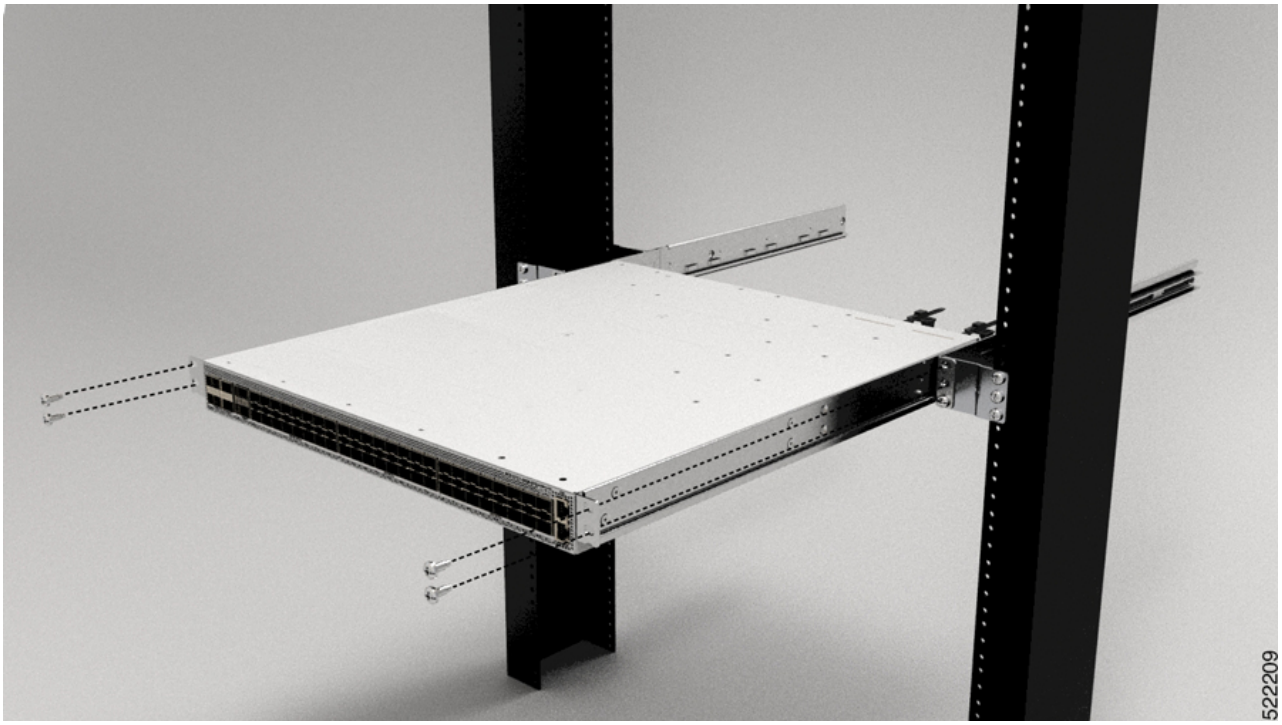


Figure 42: 23-inch 2-Post Rack Mount Chassis



Rack Mount the NCS-57C3-MOD Chassis in a 2-Post Rack

This section describes how to use the rack-mount kit provided with the chassis, to install the following chassis into a cabinet or a 2-post rack:

- NCS-57C3-MOD-S
- NCS-57C3-MOD-SE-S
- NCS-57C3-MOD-HX

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

The following table lists the items contained in the rack-mount kit provided with the routers.

Table 21: Router Rack-Mount Kit

Quantity	Part Description
2	Rack-mount brackets
12	M4 x 8-mm Phillips counter sink screws
2	M4 x 6-mm Phillips counter sink screws
12 - 14	10-32 pan head screws

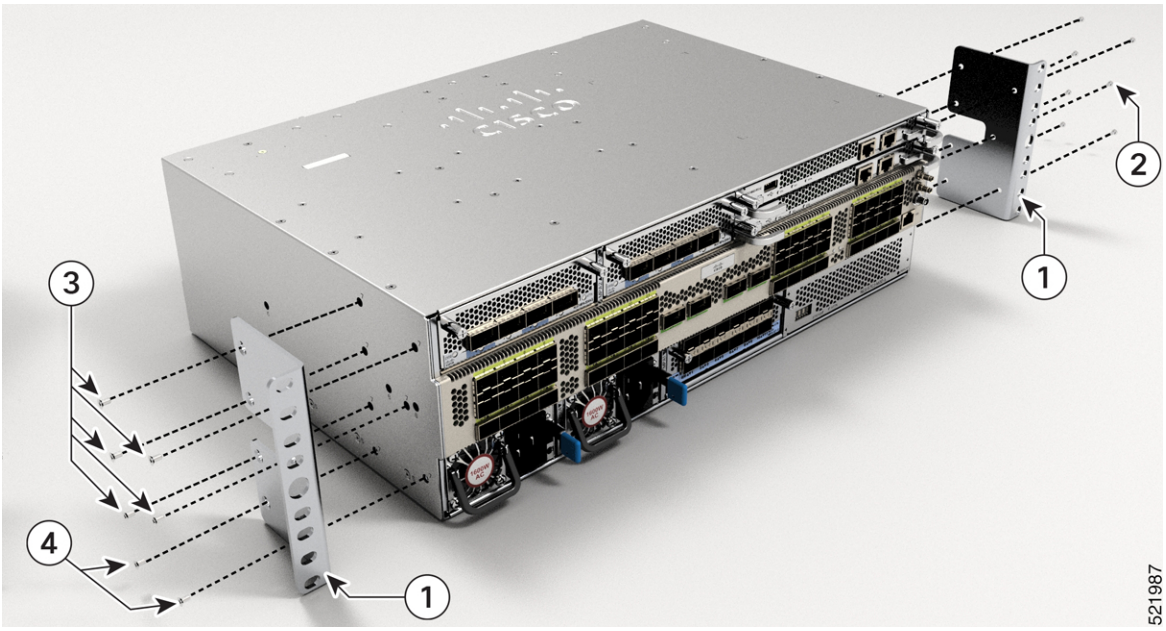
Note In order to install the air filter on the NCS-57C3 router (optional), you must only rack mount the router using the 19-inch bracket that is shipped with the air filter kit (PID: NCS-57C3-FR-KIT). To install the air filter, refer to the (Optional) Install the Air Filter on the NCS-57C3 Router.

Procedure

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

a) Position the router so that its ports will be in the cold aisle.
b) With the bracket ears aligned to the front of the chassis, position a rack-mount bracket on the side of the chassis so that the seven holes are aligned to seven of the screw holes on the side of the chassis.
c) Use seven M4 screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis
d) Repeat Steps 1b and 1c with the other rack-mount bracket on the other side of the router.

Figure 43: Rack-Mount Brackets

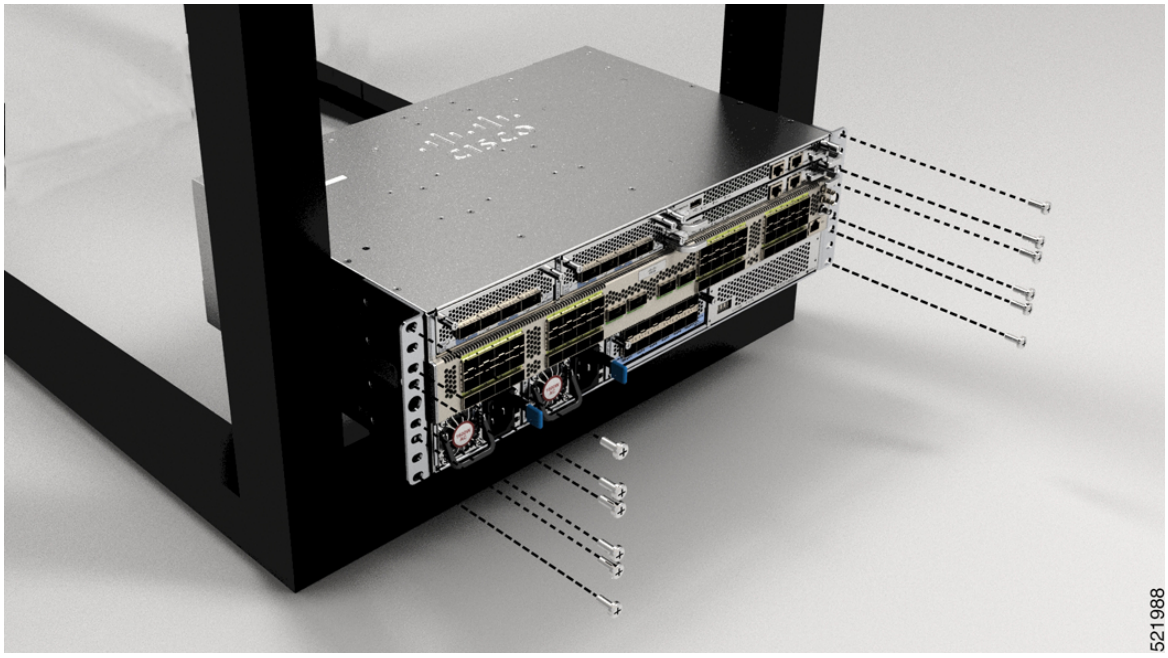


1	Rack-mount brackets	3	M4 x 8 mm Phillips counter sink screws (Quantity - 5)
2	M4 x 8 mm Phillips counter sink screws (Quantity - 7)	4	M4 x 6 mm Phillips counter sink screws (Quantity - 2)

Step 2 Install the router onto the 2-post rack as follows:

a) With two people, lift the router into position between the two rack posts.
b) Move the router until the rack-mount brackets come in contact with two rack posts.
c) Hold the chassis level while the second person inserts six screws (12-24 or 10-32, depending on the rack type) in each of the two rack-mount brackets (using a total of twelve screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Figure 44: 2-Post Rack Mount



Rack Mount the NCS-57D2 Chassis in a 2-Post Rack with Sliders

This section describes how to use the rack-mount kit provided with the NCS-57D2 chassis, to install the chassis into a cabinet or a 2-post 19-inch rack.

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

The following table lists the items contained in the rack-mount kit provided with the routers.

Table 22: 2 Post Rack-Mount Kit

Quantity	Part Description
2	Slider assembly - left and right
2	Slider brackets - left and right
20	12-24 Phillips pan-head screws
26	M4 x 5.7-mm Phillips flat head screws
4	(only 23-inch rack-mount kit) Extension brackets
1	Ground lug

Before you begin

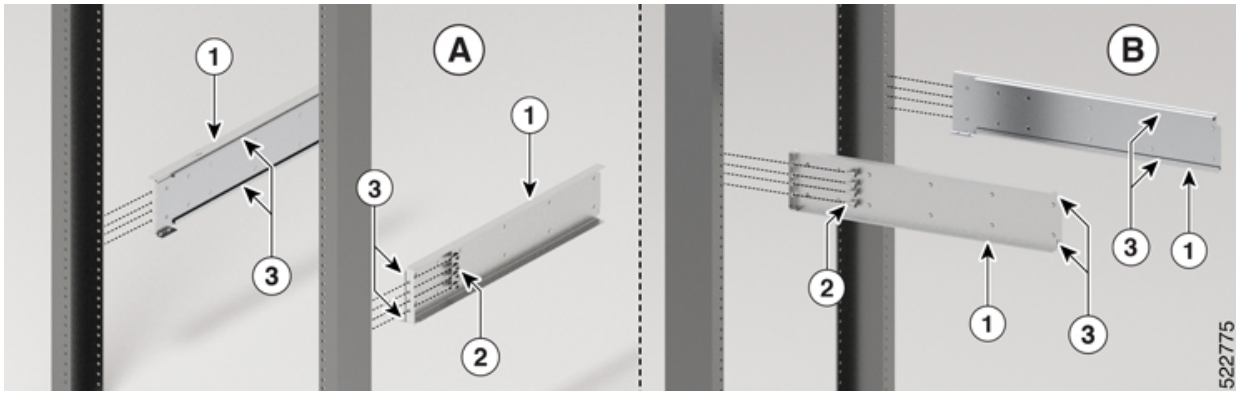
To install the router on a 23-inch rack, install the extension brackets on the 23-inch rack post (see Install the Extension Plate on 23-inch Rack Post) and then continue with this procedure.

Procedure

Step 1 Install the slider assembly on the rack as follows:

a) Align the left slider assembly to the rear post rack holes. The slider rail should be at the bottom.
b) Use four 12-24 Phillips pan-head screws with 30 in-lb (3.39 N.m) to attach the slider assembly to the rear post.
c) Repeat Steps 2a and 2b with the other slider assembly on the other side of the router.

Figure 45: Rack-Mount Slider Assembly on a 19-inch 2-Post Rack



1	Slider assembly	2	Screws
3	Slider rail		

Note
In case of a 23-inch 2-post rack, mount the slider assembly on the extension brackets following the same procedure outlined in Step 2.

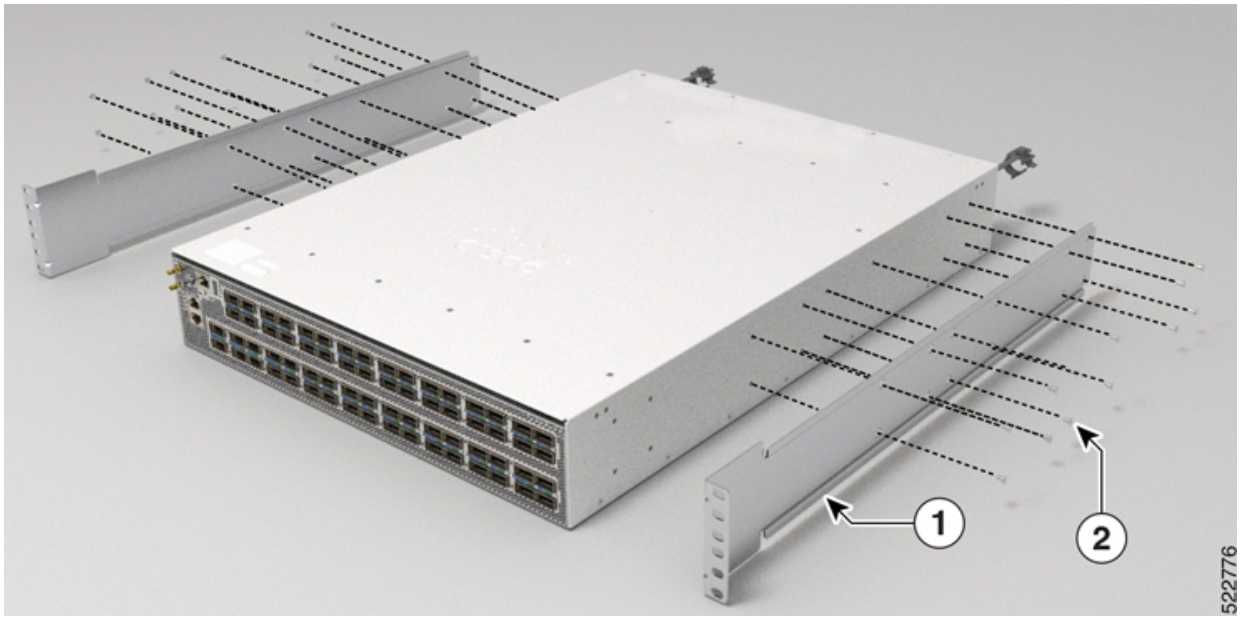
Step 2 Install slider brackets to the router as follows:

a) Determine which end of the chassis is to be located in the cold aisle as follows:

- If the router has port-side intake modules, position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules, position the router so that the fan and power supply modules are in the cold aisle.

b) With the slider bracket ears aligned to the front of the chassis as shown in the image, use twelve M4 x 5.7 mm flat head screws with 12 in-lbs (1.4 N-m). to attach the bracket to the chassis.
c) Repeat Step 3c with the other slider bracket on the other side of the router.

Figure 46: Mount Slider Brackets

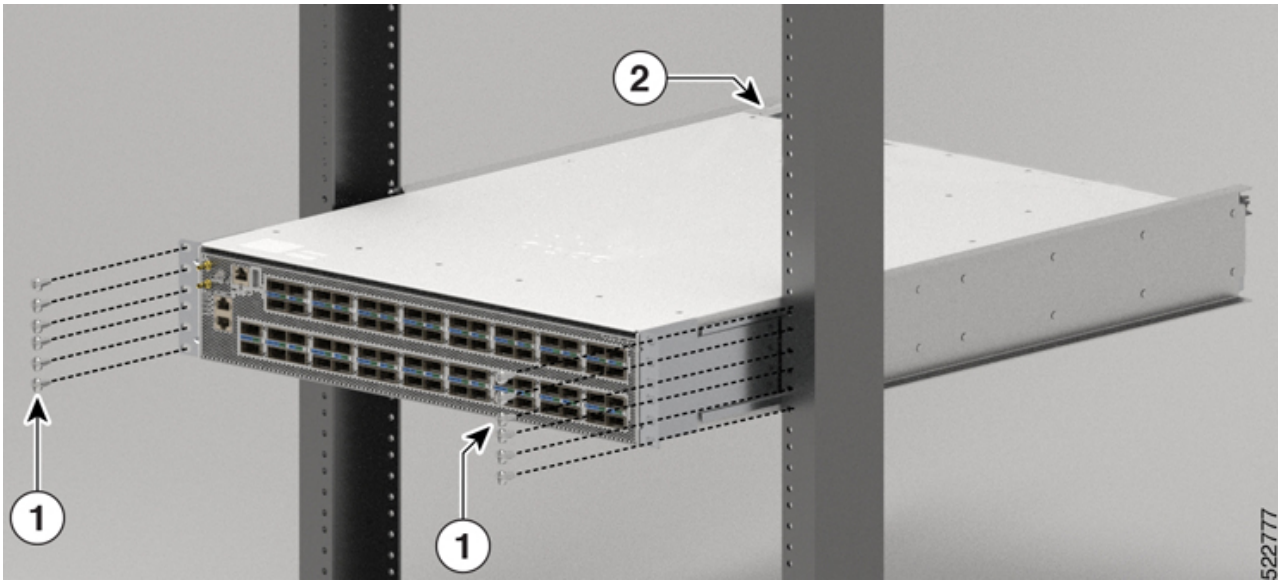


1	Slider brackets	2	Screws

Step 3 Install the router onto the 2-post rack as follows:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.
b) Move the router until the slider brackets come in contact with slider rails installed in the rack. Slide the slider brackets onto the slider rails, and then gently move the router all the way into the rack.
c) Hold the chassis level while the second person inserts six pan-head screws (12-24) in each of the two rack-mount brackets (using a total of twelve screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
d) Tighten the 12-24 Phillips pan-head screws to 30 in-lb (3.39 N.m).

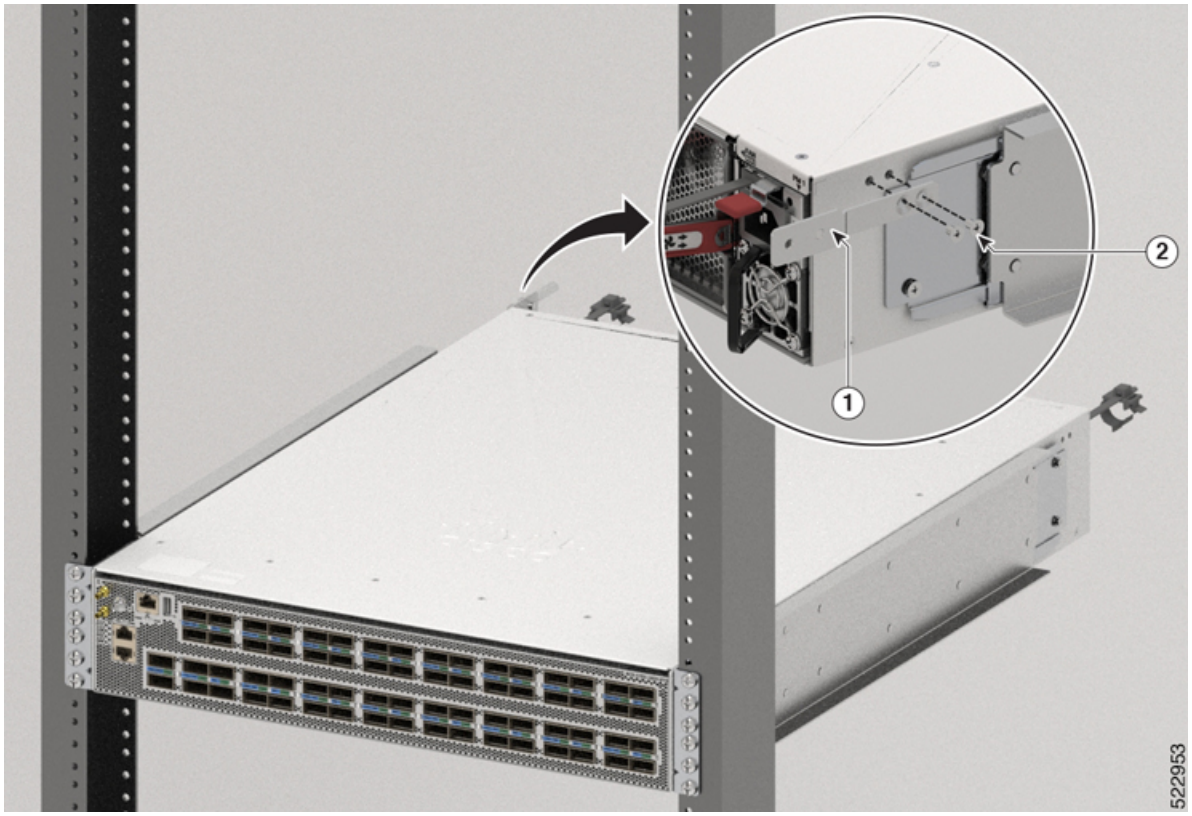
Figure 47: 19-inch 2-Post Rack Mount Chassis



1	Screws	2	Grounding pad location

Step 4 Install the grounding pad on the chassis. Use two M4 x 5.7 mm screws with 12 in-lbs (1.4 N-m).

Figure 48: Install the Grounding Pad



1	Grounding pad	2	Screws

Rack-Mount the NCS-57B1 Chassis in a 4-Post Rack

This section describes how to use the rack-mount kit that is provided with the router to install the router in a 4-post rack.

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

The following table lists the items that are contained in the rack-mount kit.

Table 23: NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS Router Rack-Mount Kit

Quantity	Part Description
2	Rack-mount brackets
18	M4 x 6-mm Phillips flat-head screws

Quantity	Part Description
2	M4 x 6-mm Phillips pan-head screws
2	Rack-mount guides
2	Rack-mount slider rails
1	Grounding lug
1	Grounding plate

Procedure

Step 1 Install the rack-mount brackets to the router as follows:

a) Determine which end of the chassis is to be located in the cold aisle as follows:

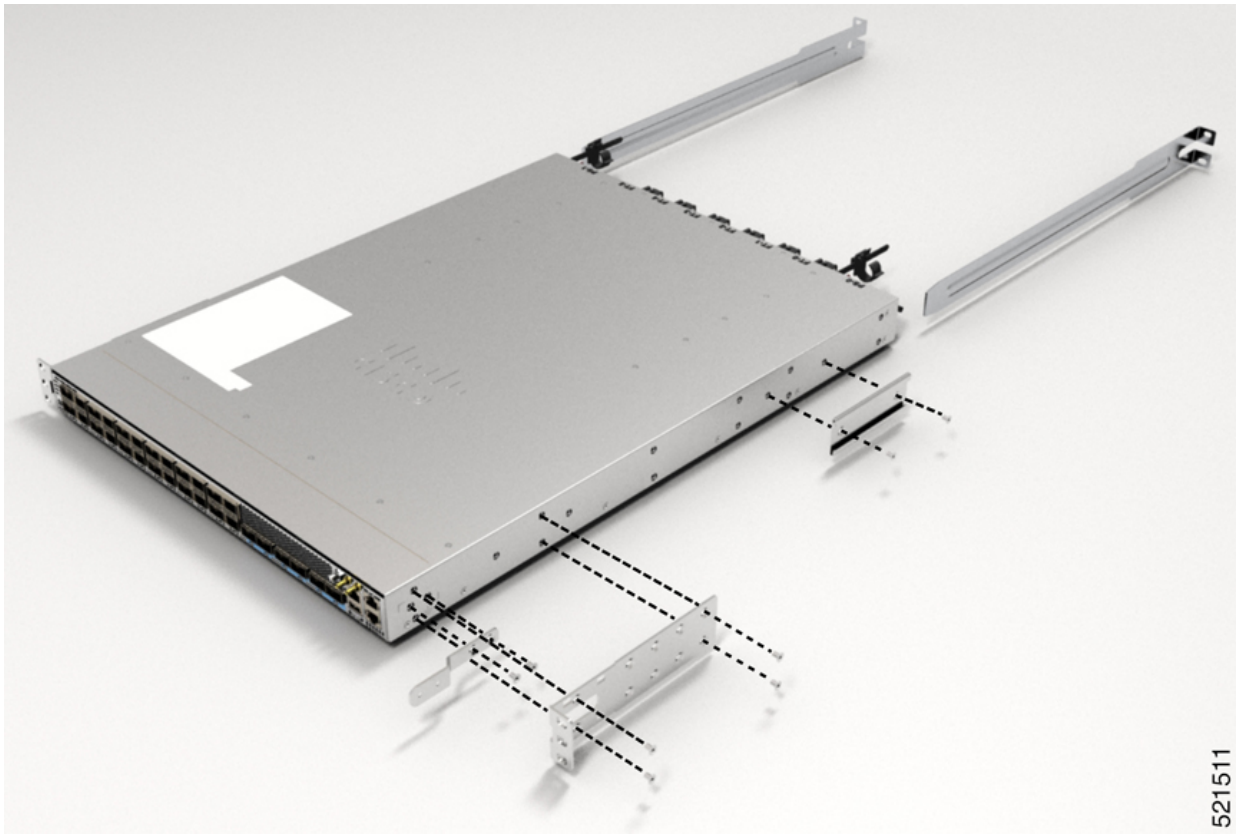
- If the router has port-side intake modules (fan modules with burgundy coloring), position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules (fan modules with blue coloring), position the router so that the fan and power supply modules are in the cold aisle.

b) Position a rack-mount bracket on the side of the chassis with its four holes that are aligned to four of the screw holes on the side of the chassis, and then use four M4 counter sink screws to attach the bracket to the chassis.

Note
Remove the grounding cover label and align the grounding cover plate with the grounding holes in the chassis and attach the rack mount brackets.

Note
You can align four of the holes in the rack-mount bracket to four of the screw holes on the front side of chassis or four of the screw holes on the rear side of the chassis. The holes that you use depend on which side your chassis need to be put in the cold aisle.

Figure 49: Rack-Mount Brackets — Port-Side Intake



1	Rack-mount bracket	3	Rack-mount guides
2	M4 x 6mm Phillips flat-head screws	4	Rack-mount slider rails

c) Repeat Step 1b with the other rack-mount bracket on the other side of the router.

Step 2 Install the two rack-mount guides on the chassis as follows:

a) Position a rack-mount guides on the side of the chassis with its two holes aligned to the two screw holes on the side of the chassis, and then use two M4 screws to attach the guides to the chassis.

b) Repeat with the other rack-mount guides on the other side of the router.

Step 3 Install the slider rails to the rack as follows:

a) Position the slider rails at the desired levels on the back side of the rack and use two 12-24 screws or two 10-32 screws, depending on the rack thread type, to attach the rails to the rack.

Note
For racks with square holes, you might need to position a 12-24 cage nut behind each mounting hole in a slider rail before using a 12-24 screw.

b) Repeat with the other slider rail on the other side of the rack.

c) Use a tape measure and level to verify that the rails are at the same height and horizontal.

Step 4 Insert the router into the rack and attach it as follows:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.

b) Align the two rack-mount guides on either side of the router with the slider rails installed in the rack. Slide the rack-mount guides onto the slider rails, and then gently slide the router all the way into the rack.

Note
If the router does not slide easily, try realigning the rack-mount guides on the slider rails.

c) Holding the chassis level, insert two screws (12-24 or 10-32, depending on the rack type) through the holes in each of the rack-mount brackets and into the cage nuts or threaded holes in the rack-mounting rail.
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Figure 50: 4-Post Rack Mount



Rack Mount the NCS-57C1 Chassis in a 4-Post Rack with Sliders

This section describes how to use the rack-mount kit provided with the NCS-57C1 chassis, to install the chassis into a cabinet or a 4-post rack.

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

The following table lists the items contained in the rack-mount kit provided with the routers.

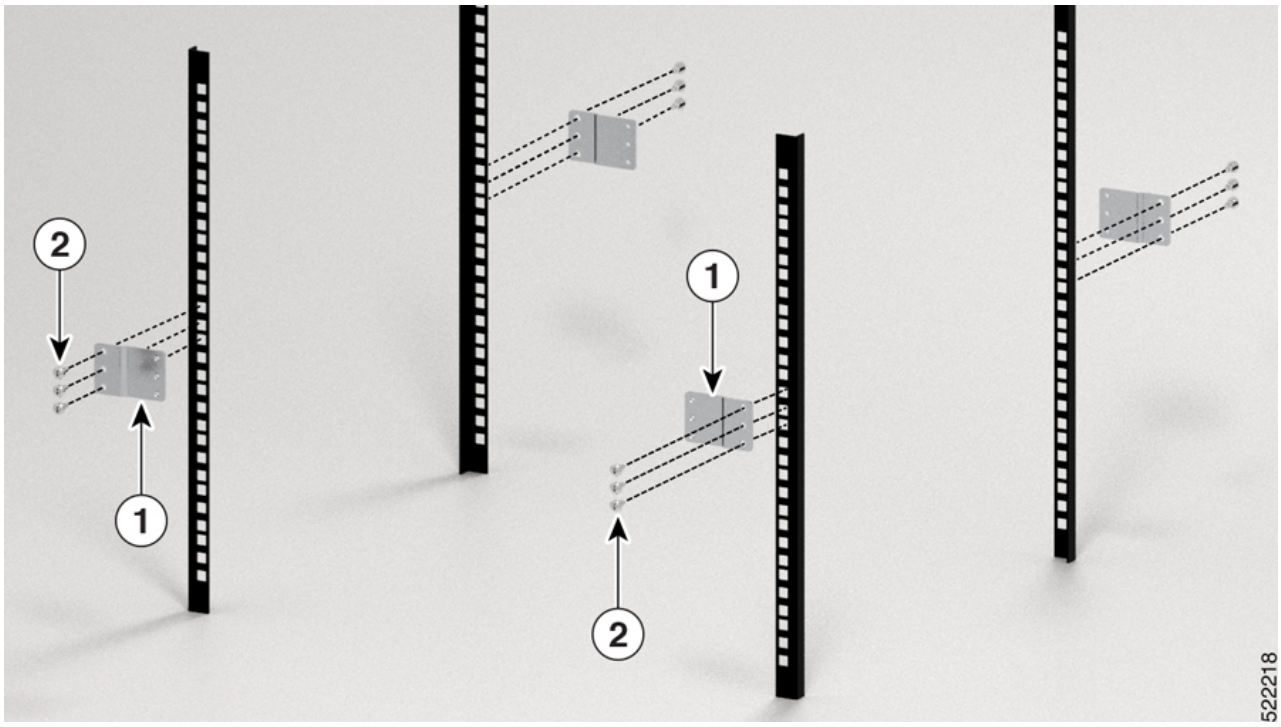
Table 24: 4 Post Rack-Mount Kit

Quantity	Part Description
2	Slider assembly - left and right
2	Slider brackets - left and right
12	12-24 Phillips pan-head screws
12	M4 x 6.5-mm Phillips flat head screws
2	M4 x 8-mm Phillips pan head screws
4	(only 23-inch rack-mount kit) Extension brackets
1	Ground lug

Procedure

Step 1 (Only 23-inch rack post) Mount the extension brackets on the 23-inch rack post. Use three 12-24 Phillips pan-head screws with 30 in-lb (3.39 N.m) to attach each extension bracket to the rear and front rack post on either sides.

Figure 51: Mount Extension Brackets on a 23-inch 4-Post Rack



1	Extension brackets	2	Screws

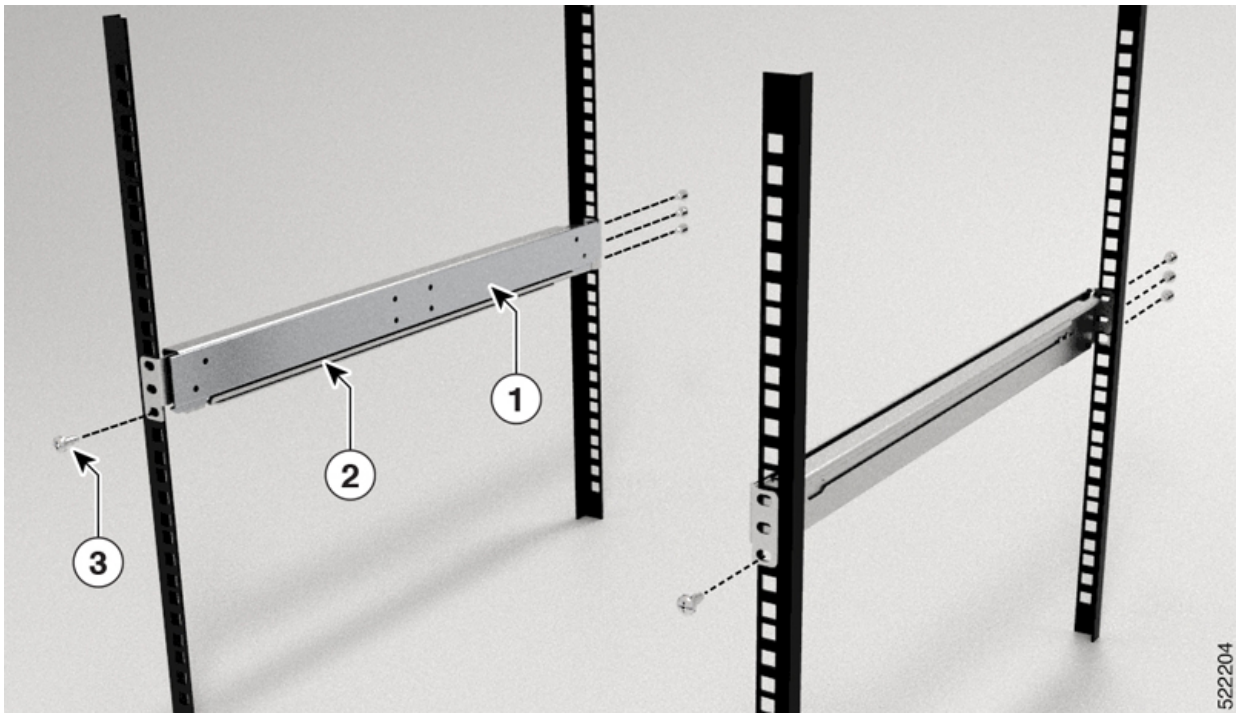
Step 2 Install the slider assembly on the rack as follows:

a) Align the outer slider of the left slider assembly to the rear post rack holes and the inner slider of the left slider assembly to the front post rack holes. The slider rail should be at the bottom.

b) Use four 12-24 Phillips pan-head screws (three on the rear side and one on the front side) with 30 in-lb (3.39 N.m) to attach the slider assembly to the rear and front rack post.

c) Repeat Steps 2a and 2b with the other slider assembly on the other side of the router.

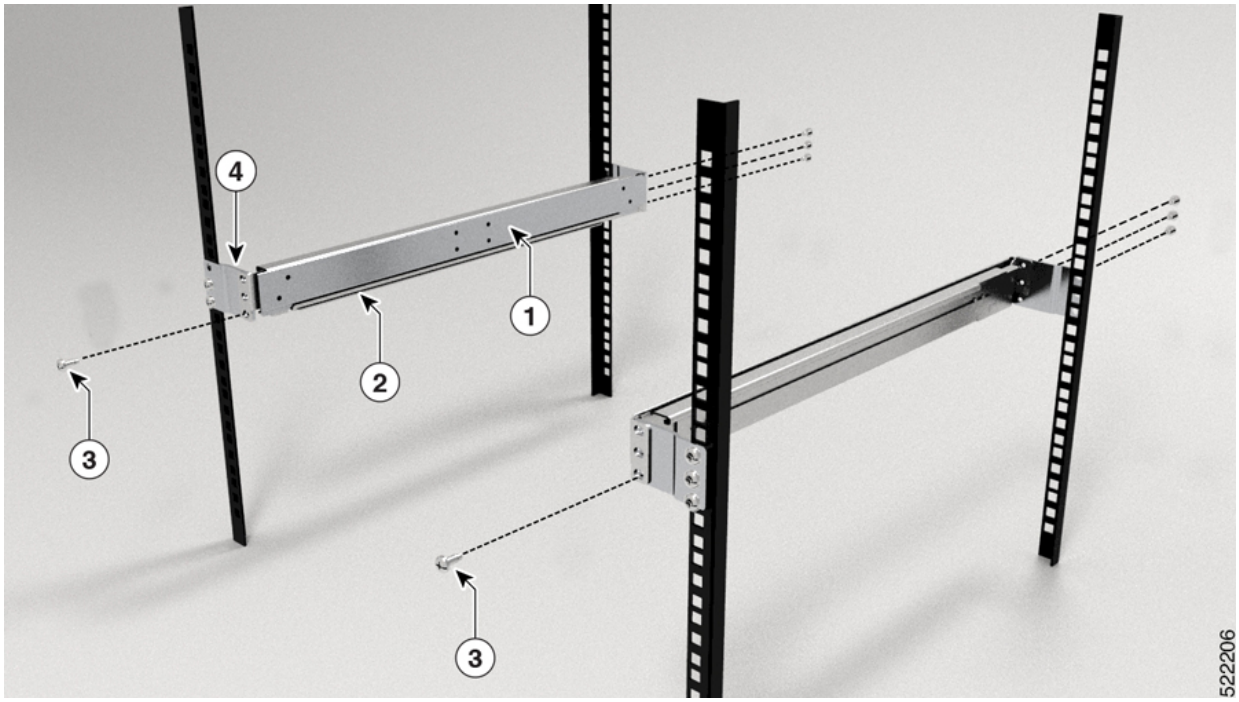
Figure 52: Rack-Mount Slider Assembly on a 19-inch 4-Post Rack



1	Slider assembly	2	Slider rail
3	Screws		

Note
In case of a 23-inch 2-post rack, mount the slider assembly on the extension brackets following the same procedure outlined in Step 2.

Figure 53: Rack-Mount Slider Assembly on a 23-inch 4-Post Rack



1	Slider assembly	2	Slider rail
3	Screws	4	Extension bracket

Step 3 Install slider brackets to the router as follows:

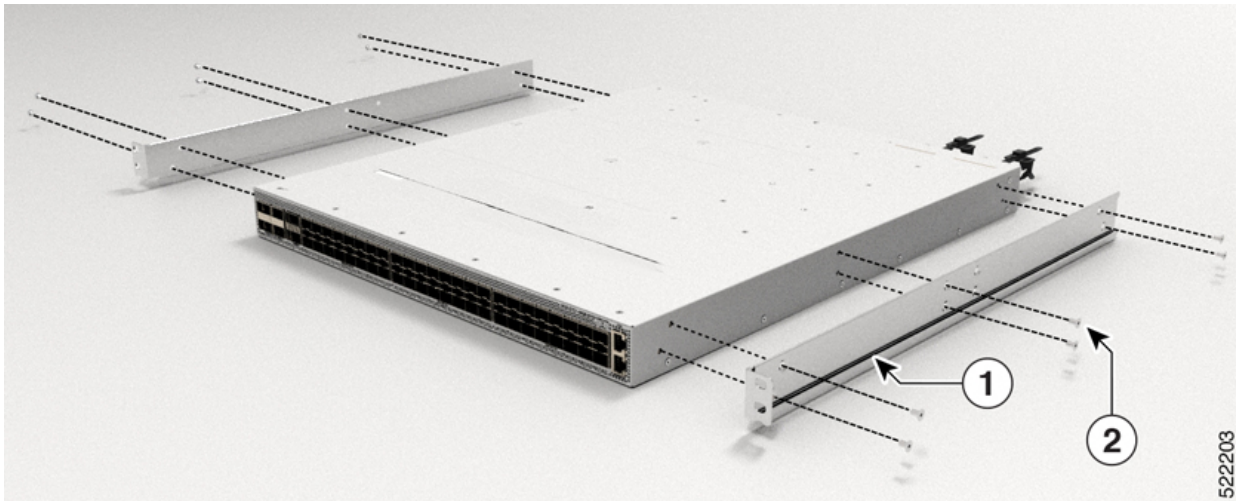
a) Determine which end of the chassis is to be located in the cold aisle as follows:

- If the router has port-side intake modules, position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules, position the router so that the fan and power supply modules are in the cold aisle.

b) With the slider bracket ears aligned to the front of the chassis as shown in the image, use six M4 flat-head screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis

c) Repeat Steps 3b and 3c with the other slider bracket on the other side of the router.

Figure 54: Mount Slider Brackets



1	Slider bracket	2	Screws

Step 4 Install the router onto the 4-post rack as follows:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.

b) Move the router until the slider brackets come in contact with slider rails installed in the rack. Slide the slider brackets onto the slider rails, and then gently move the router all the way into the rack.

c) Hold the chassis level while the second person inserts two screws (12-24) in each of the two rack-mount brackets (using a total of four screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.

d) Tighten the 12-24 screws (pan-head) to 30 in-lb (3.39 N.m).

Figure 55: 4-Post Rack Mount Chassis

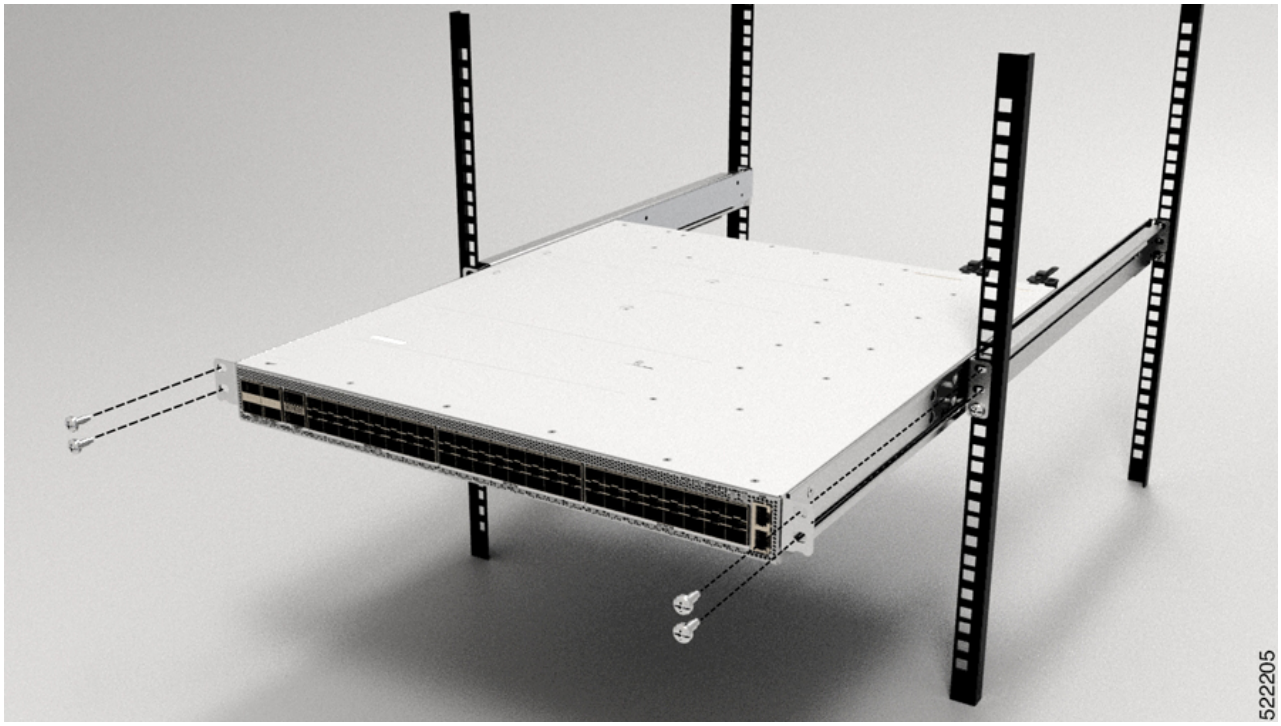
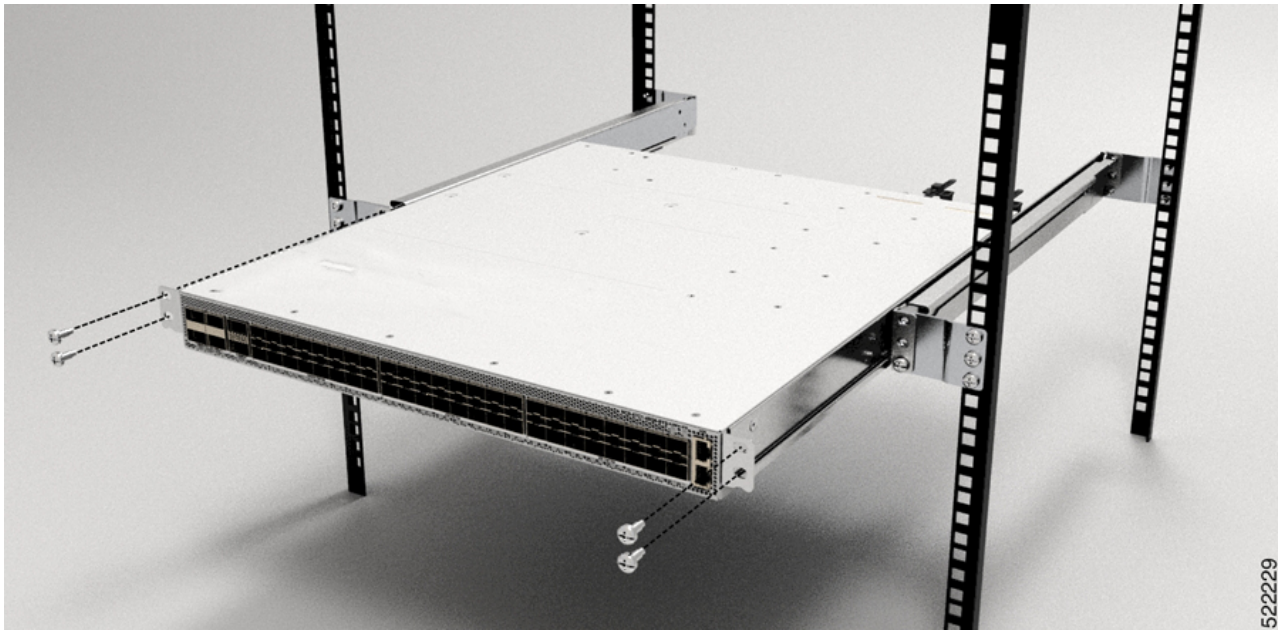


Figure 56: 23-inch 4-Post Rack Mount Chassis



Rack Mount the NCS-57C3-MOD Chassis in a 4-Post Rack using Sliders

This section describes how to install the Cisco NCS 57C3-MOD chassis on the 4-post rack, using sliders. The sliders are used to install the chassis on a 4-post rack. Sliders are used to access the fan trays in the chassis easily during maintenance.

Note To install the NCS 57C3-MOD chassis in a 4-post rack without using the sliders, use the 2-post rack mount procedure (Rack Mount the NCS-57C3-MOD Chassis in a 2-Post Rack, on page 62). In order to install the air filter on the NCS-57C3 router, you must only rack mount the router using the 19-inch bracket that is shipped with the air filter kit (PID: NCS-57C3-FR-KIT). To install the air filter, see (Optional) Install the Air Filter on the NCS-57C3 Router, on page 98.

- **NC55-2RU-ACC-SL1**—Designed for custom-made cabinets that are 476 mm wide (min. 650 x650 mm), or for cabinets with equivalent specifications. This slider is attached directly to the chassis.

  Rack Requirements to Install NC55-2RU-ACC-SL1:

  - 4-post rack
  - 476 cm wide center to center rail mounting.
  - The width between the front rack-mounting rails must be at least 17.75 inches (45.0 cm)
  - The minimum spacing for the bend radius for fiber-optic cables should have the front-mounting rails of the cabinet offset from the front door by a minimum of 4.7 inches (12.0 cm).
  - The minimum spacing between the front-mounting rails of the cabinet to the inner surface of the front door shall be min. 5.8 inches (14.7 cm). Depend on cabinet ambient thermal set-point this distance can change.
  - The distance between the outside face of the front mounting rail and the outside face of the back-mounting rail should be 16.0 to 19.9 inches (40.7to 50.5 cm) to allow for rear-bracket installation.

- **NC55-2RU-ACC-SL2**—Designed for 19-inch (min. 650 x650 mm) EIA cabinet standard 4-post rack. This slider uses a tray (PID: NC57C3-ACC-SL-TR) and the chassis is mounted to the tray.

  Rack Requirements to Install NC55-2RU-ACC-SL2:

  - Standard 19-inch (48.3 cm) (four-post EIA cabinet, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992.)
  - The width between the front rack-mounting rails must be at least 17.75 inches (45.0 cm.)
  - The minimum spacing between the front-mounting rails of the cabinet to the inner surface of the front door shall be min. 5.8 inches (14.7 cm). Depending on the cabinet ambient thermal set-point this minimum distance can change.
  - The minimum spacing for the bend radius for fiber-optic cables should have the front-mounting rails of the cabinet offset from the front door by a minimum of 4.7 inches (12.0 cm).
  - The distance between the outside face of the front mounting rail and the outside face of the back-mounting rail should be 16.5 to 19 inches (41.9 to 48.26 cm) to allow for rear-bracket installation.

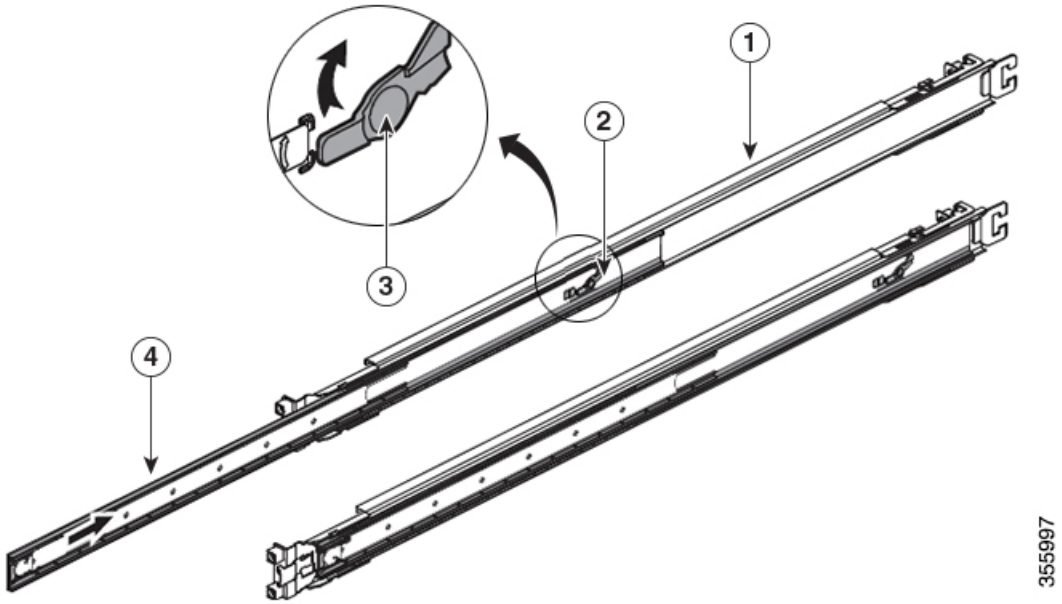
The slider assembly consists of three parts:

- Inner Slider Member
- Middle Slider Member
- Outer Slider Member

Note The front end of the outer slider member may vary between **NC55-2RU-ACC-SL1** and **NC55-2RU-ACC-SL2**.

The outer slider member of NC55-2RU-ACC-SL2 is mounted to the front post with 2 screws, whereas the outer slider member of NC55-2RU-ACC-SL1 is passed through the rack holes of the front post and latched to the rack.

Figure 57: Slider Assembly



1	Outer Slider Member	2	Middle Slider Member
3	Unlock Feature on the Middle Slider Member	4	Inner Slider Member

The following table lists the items that are contained in the Cisco NCS 57C3-MOD Router rack-mount kit.

Table 25: Router Rack-Mount Kit

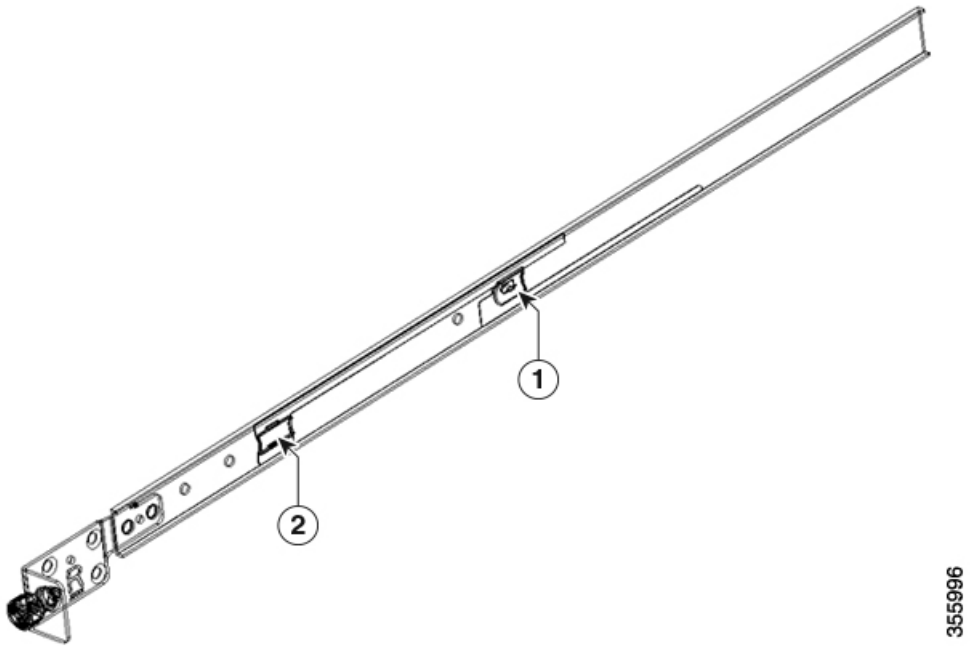
Quantity	Part Description
2	Rack-mount brackets
2	Rack-mount slider rails
8	M4 x 8-mm Phillips counter sink screws

Quantity	Part Description
2	M4 x 8-mm Phillips pan-head screws
1	Grounding lug
6	(Only NC55-2RU-ACC-SL1) M4 x 10-mm Phillips pan-head screws
6	(Only NC55-2RU-ACC-SL2) M4 x 8-mm Phillips flat-head screws
4	(Only NC55-2RU-ACC-SL2) washers
4	(Only NC55-2RU-ACC-SL2) 10-32 counter sink screws
4	(Only NC55-2RU-ACC-SL2) 9.1 mm rack mount pins
4	(Only NC55-2RU-ACC-SL2) 8.8 mm rack mount pins
1	Tray and screws (NC57C3-ACC-SL-TR), used with NC55-2RU-ACC-SL2 for the NCS-57C3-MOD chassis.

Procedure

Step 1 Remove the inner slider member from the slider assembly, by depressing the white tab present at the front of the slider assembly (on the outer slider member).

Figure 58: Remove the Inner Slider Member from the Slider Assembly



1	White Tab	2	Blue Tab

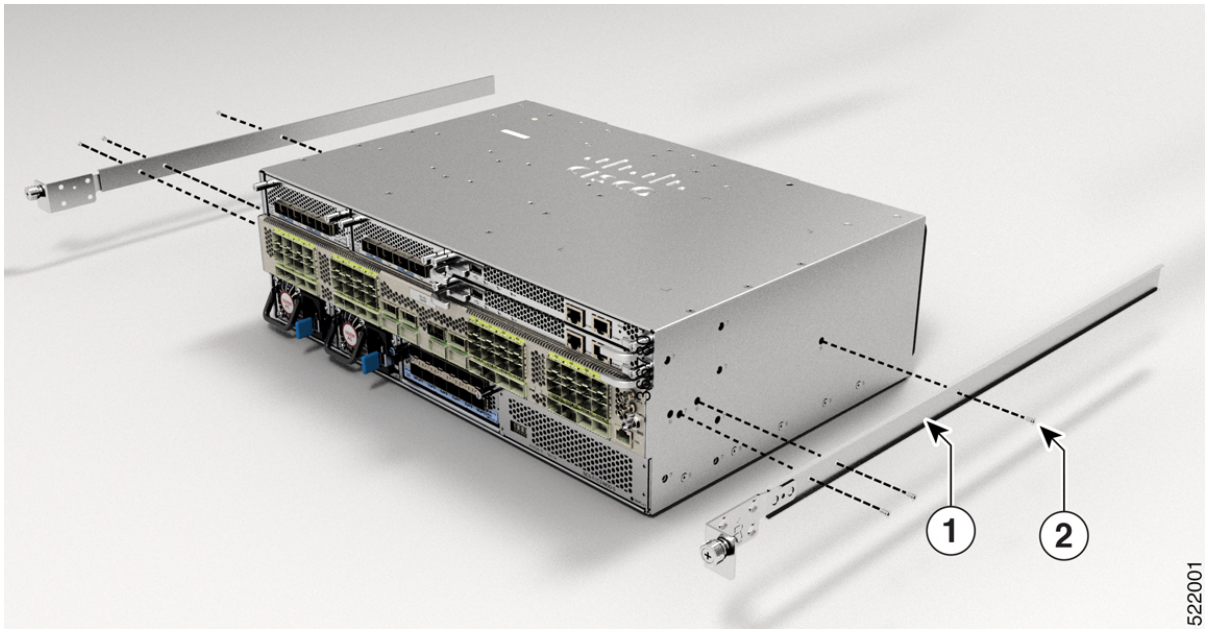
Step 2 Push the unlock feature of the middle slider member and slide the middle slider member back to the slider assembly.

Step 3 For **NC55-2RU-ACC-SL1**, attach the inner slider member to the sides of the chassis:

a. Align the inner slider member with one side of the chassis and use three M4 x 10-mm pan head screws and tighten the screws to 12 in-lbs (1.4 N-m).

b. Repeat this step to install the inner slider member to the other side of the chassis.

Figure 59: Install the Inner Slider Member to the Chassis



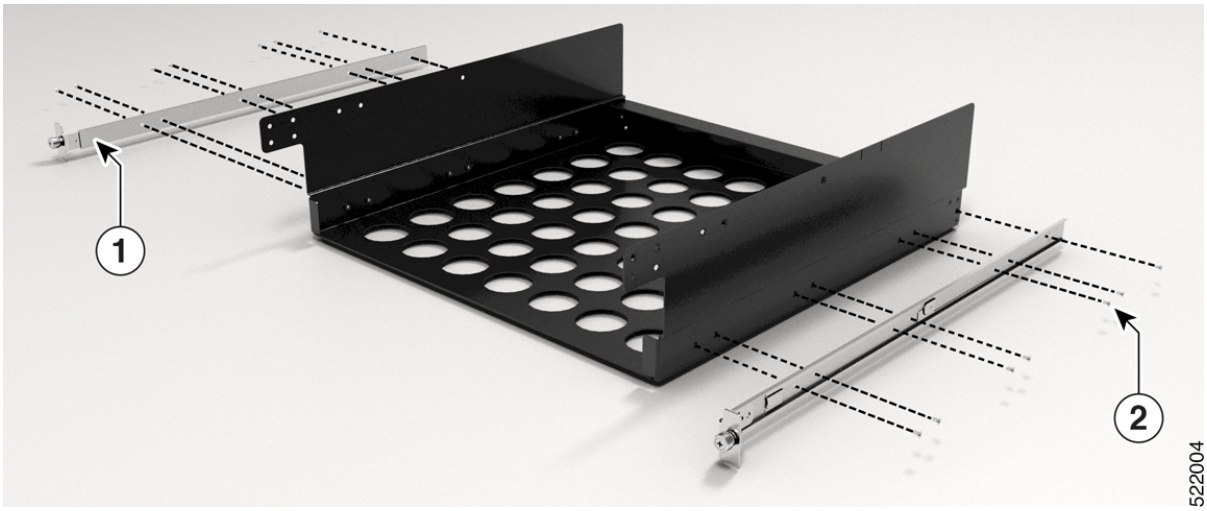
1	Inner slider member	2	M4 x 10-mm Phillips pan head screws.

For **NC55-2RU-ACC-SL2**, attach the inner slider member to the sides of the tray:

a. Align the inner slider member with one side of the tray and use seven M4 x 8-mm flat head screws and tighten the screws to 12 in-lbs (1.4 N-m).

b. Repeat this step to install the inner slider member to the other side of the tray.

Figure 60: Install the Inner Slider Member to the Tray



1	Inner slider member	2	M4 x 8-mm Phillips flat head screws.

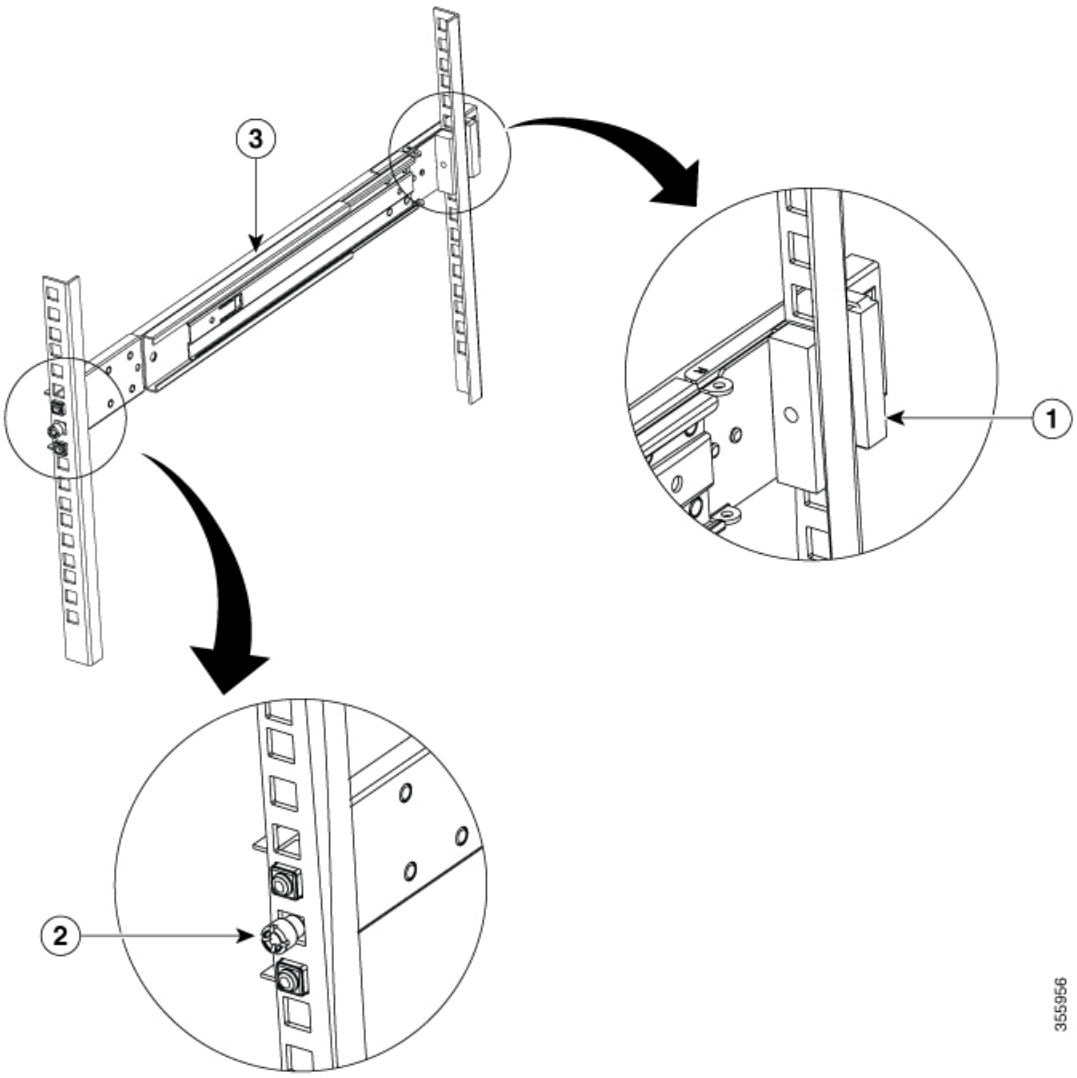
Step 4 Install the outer slider member to the rack:

a. Align the rack mount pins of the outer slider to the rear post rack holes.

Note
If the rack mount pins of the outer slider member do not fit the rack hole dimensions, use the pins that are provided in the package.

b. (**NC55-2RU-ACC-SL1**) The front end of the outer slider member passes through the screw holes of the rack and latches to the rack. See Rear and Front End (NC55-2RU-ACC-SL1) of the Outer Slider Member.

Figure 61: Rear and Front End (NC55-2RU-ACC-SL1) of the Outer Slider Member

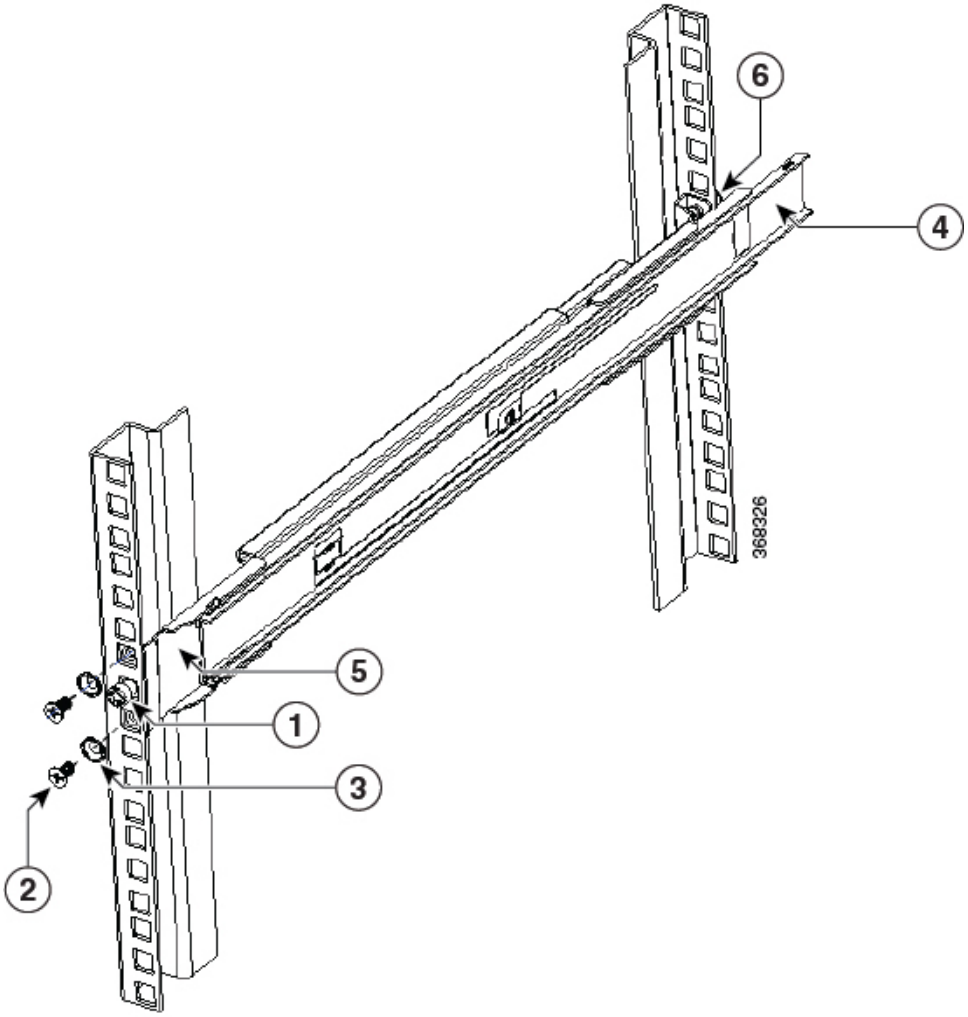


1	Rear End- Outer slider member	2	Screw thread adapter at the Front End- Outer slide
3	Outer slider member		

(**NC55-2RU-ACC-SL2**) Adjust the slider (push and pull) to place and fix the slider behind the front post. Attach the slider to the front post with 2 counter sink screws (10-32) and washers. See Rear and Front End (NC55-2RU-ACC-SL2) of the Outer Slider Member.

Note
Remove the screw thread adapter present at the front end of the outer slider member if you are unable to pass the slider through the rack holes. Tighten the screws later after passing the slider through the rack holes.

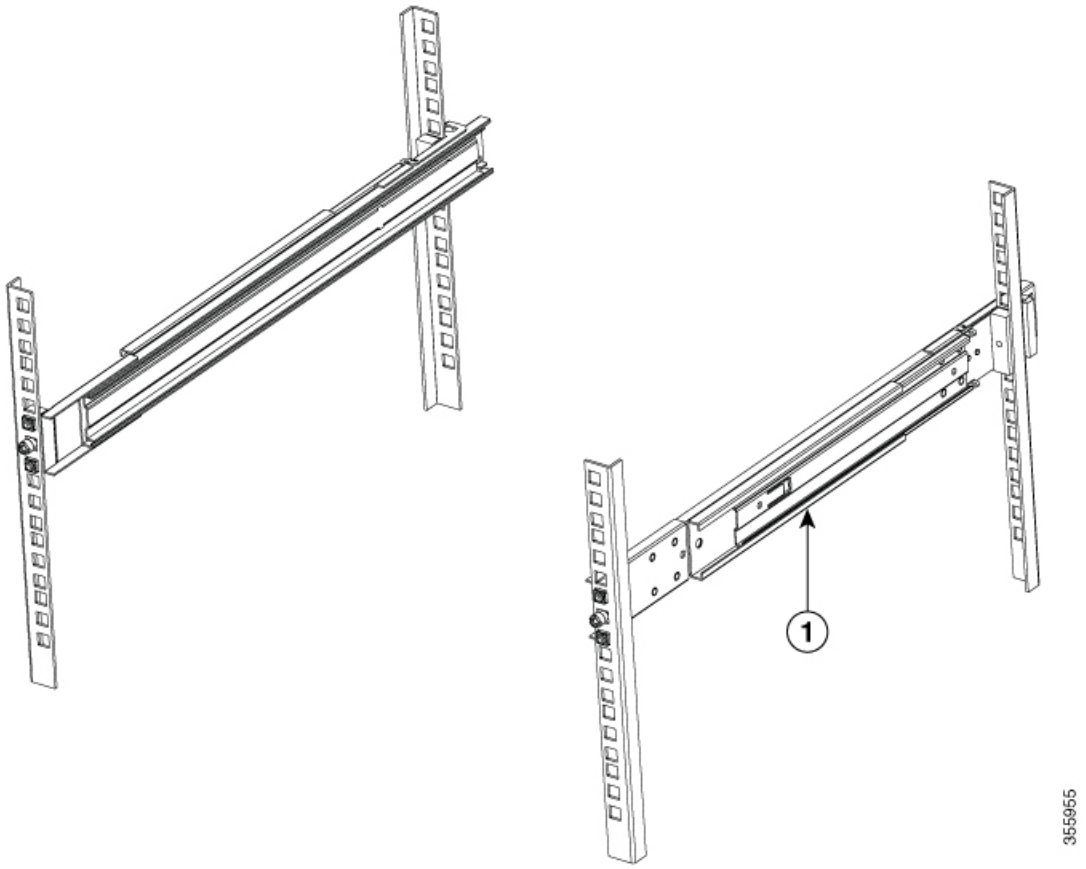
Figure 62: Rear and Front End (NC55-2RU-ACC-SL2) of the Outer Slider Member



1	Screw thread adapter at the Front End- Outer slider member	2	Counter sink screws
3	Washer	4	Rear end - Outer slider member
5	Front end - Outer slider member	6	Rear end - Rack mount pin

c. Repeat 4a through 4b to install the outer slider member to the other side of the chassis.

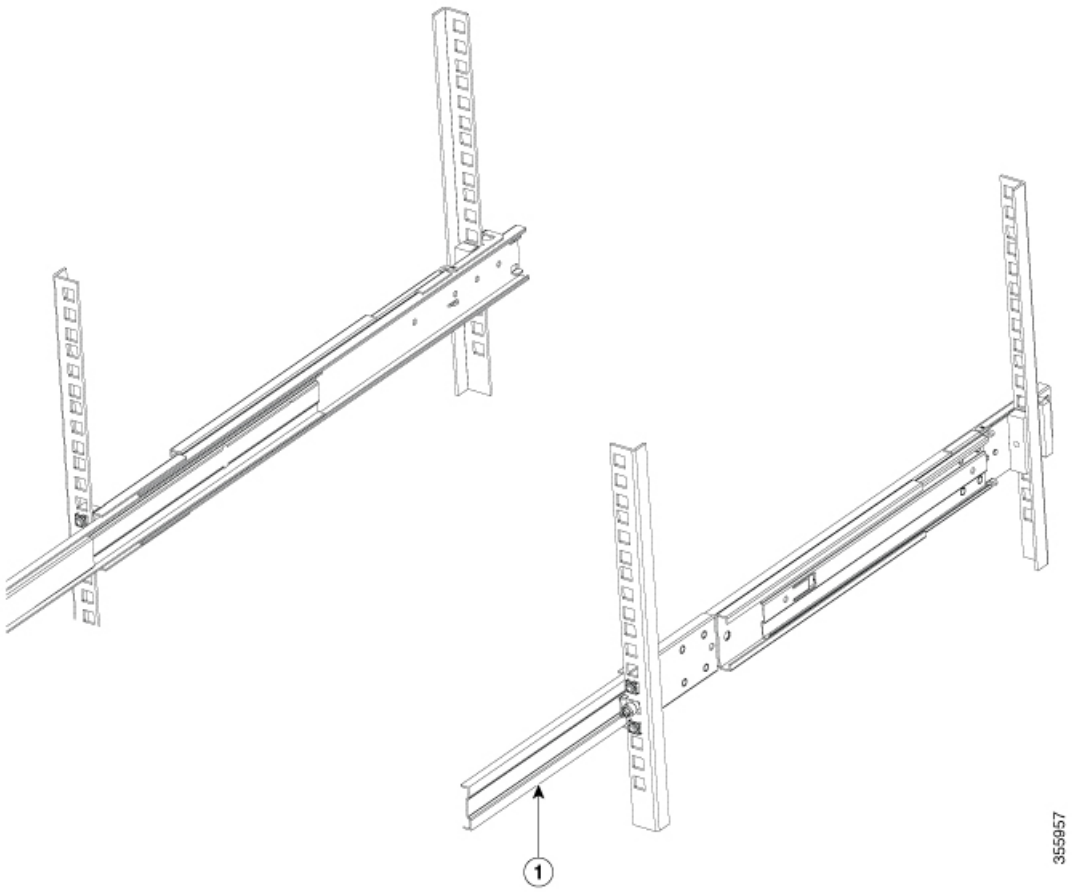
Figure 63: Install the Outer Slider Member to the Rack



1	Outer slider member

Step 5 Extend the middle slider member from the slider assembly.

Figure 64: Extend the Middle Slider Member



1	Middle slider member

Step 6 Insert the inner slider members (attached to the chassis or tray) to the middle slider member on the rack.

Step 7 Slide the chassis or tray into middle slider member until it cannot be pushed further.

Figure 65: Install the Chassis in the Rack

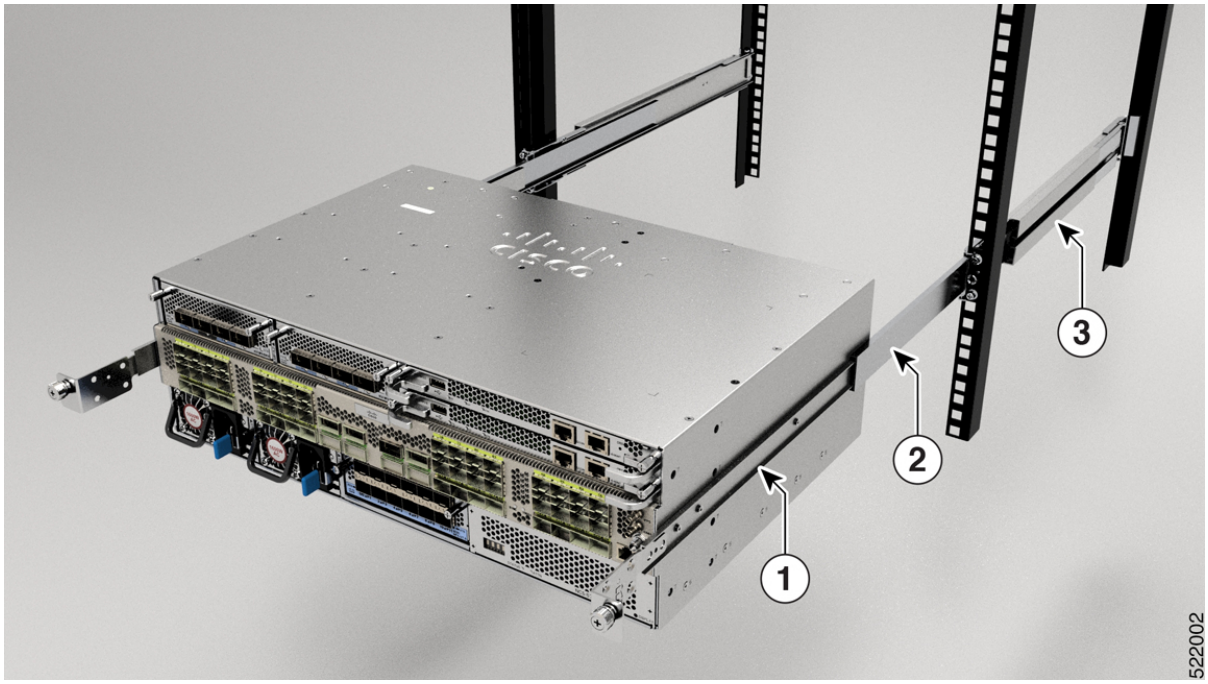
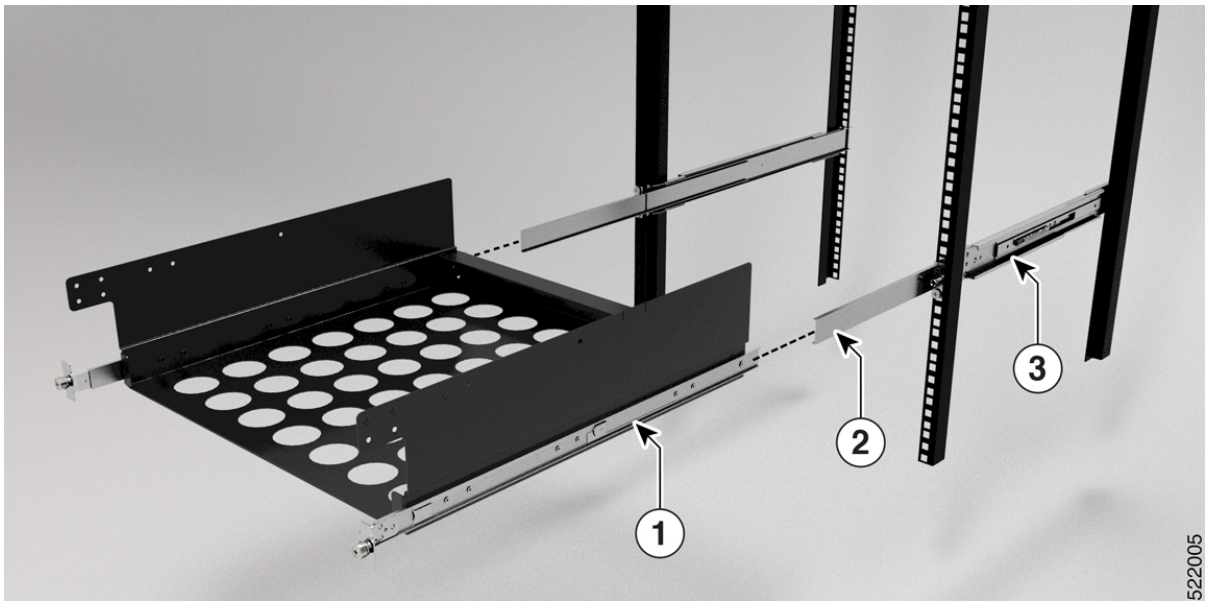


Figure 66: Install the Tray to the Rack



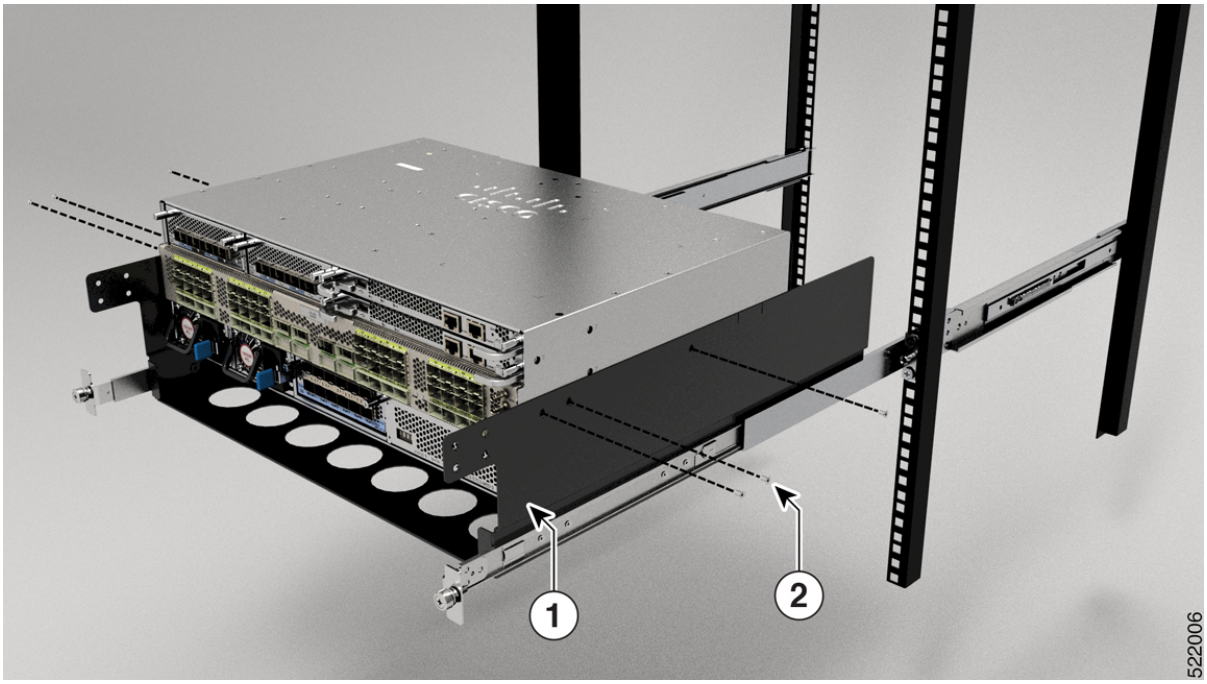
1	Outer slider member	2	Middle slider member
3	Inner slider member		

Step 8 For **NC55-2RU-ACC-SL2** with the tray, do the following:

a. Place the chassis on the tray and align the chassis with the screw holes on the tray.

b. Use six M4 x 8-mm pan head screws (three on each side) and tighten the screws to 12 in-lbs (1.4 N-m).

Figure 67: Install the Chassis to the Tray



1	Tray	2	Screw

Step 9 Pull the blue release tab on the inner slider member on both sides simultaneously to release the lock position. Continue to push the chassis to the rack.

Step 10 Tighten the thumbscrews on either side of the chassis, that is aligned with the screw thread adapter of the outer slider member through the rack holes.

Figure 68: Secure the Chassis to the Rack

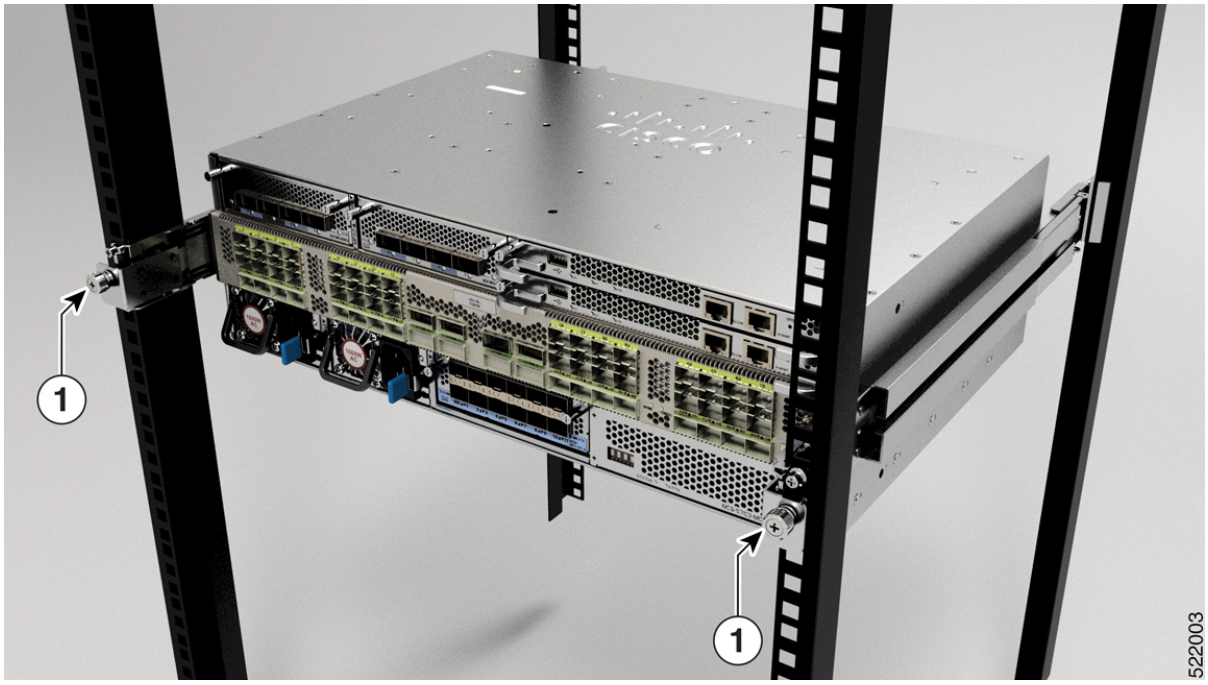
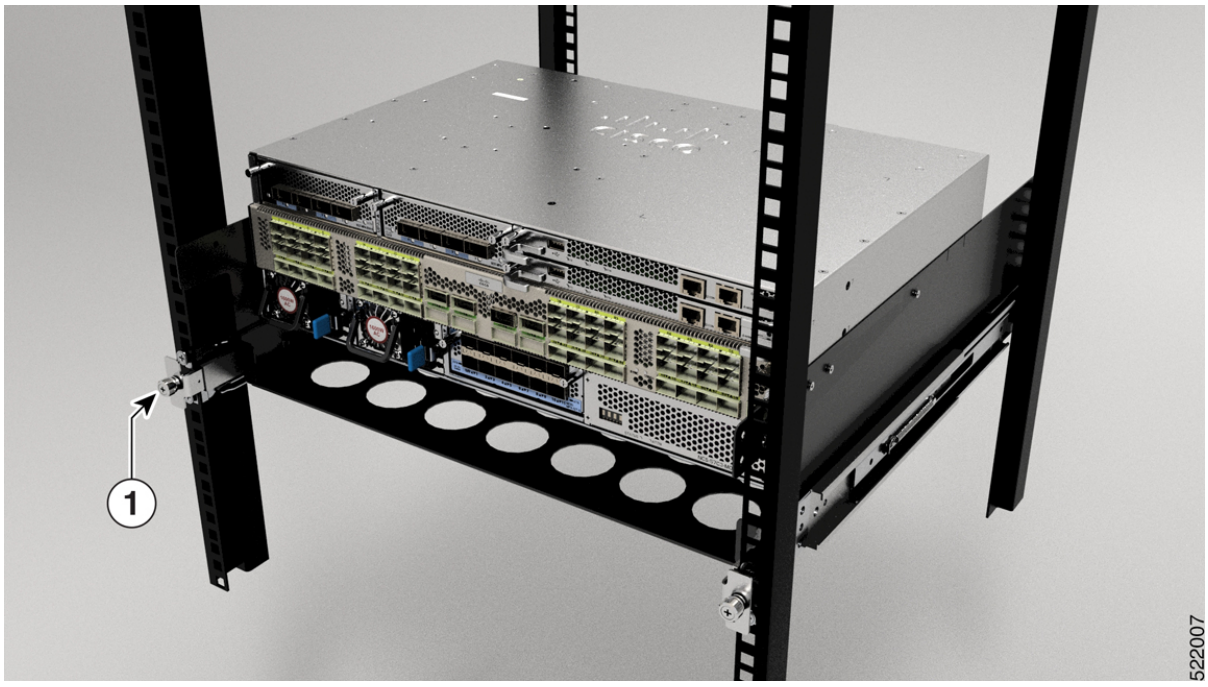


Figure 69: Secure the Tray to the Rack



1	Thumbscrew	

What to do next

Ground the chassis.

Rack Mount the NCS-57D2 Chassis in a 4-Post Rack with Sliders

This section describes how to use the rack-mount kit provided with the NCS-57D2 chassis, to install the chassis into a cabinet or a 4-post 19-inch rack.



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

The following table lists the items contained in the rack-mount kit provided with the routers.

Table 26: 4 Post Rack-Mount Kit

Quantity	Part Description
2	Slider assembly - left and right
2	Slider brackets - left and right
22	12-24 Phillips pan-head screws
22	M4 x 5.7-mm Phillips flat head screws
4	Extension brackets (only 23-inch rack-mount kit)
1	Ground lug

Before you begin

To install the router on a 23-inch rack, install the extension brackets on the 23-inch rack post (see Install the Extension Plate on 23-inch Rack Post) and then continue with this procedure.

Procedure

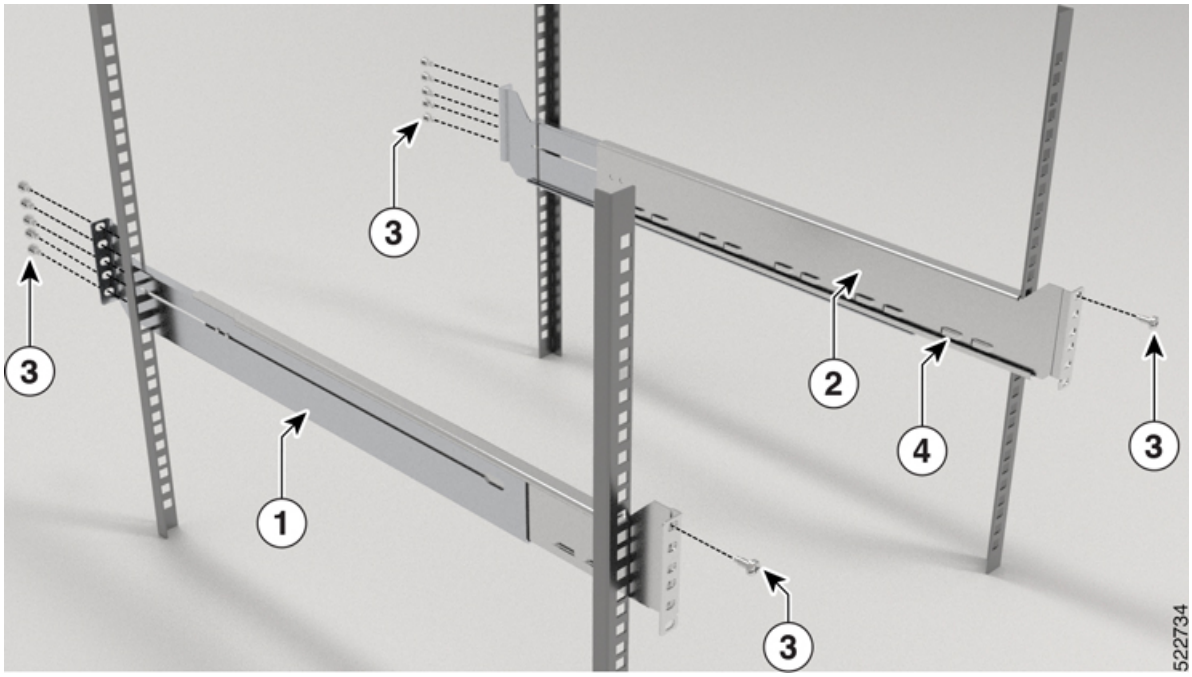
Step 1 Install the slider assembly on the rack as follows:

a) Align the outer slider of the left slider assembly to the rear post rack holes and the inner slider of the left slider assembly to the front post rack holes. The slider rail should be at the bottom.

b) Use six 12-24 Phillips pan-head screws (five on the rear side and one on the front side) with 30 in-lb (3.39 N.m) to attach the slider assembly to the rear and front rack post.

c) Repeat Steps 2a and 2b with the other slider assembly on the other side of the router.

Figure 70: Rack-Mount Slider Assembly on a 19-inch 4-Post Rack



1	Outer slider (of the slider assembly)	2	Inner slider (of the slider assembly)
3	Screws	4	Slider rail

Note
In case of a 23-inch 2-post rack, mount the slider assembly on the extension brackets following the same procedure outlined in Step 2.

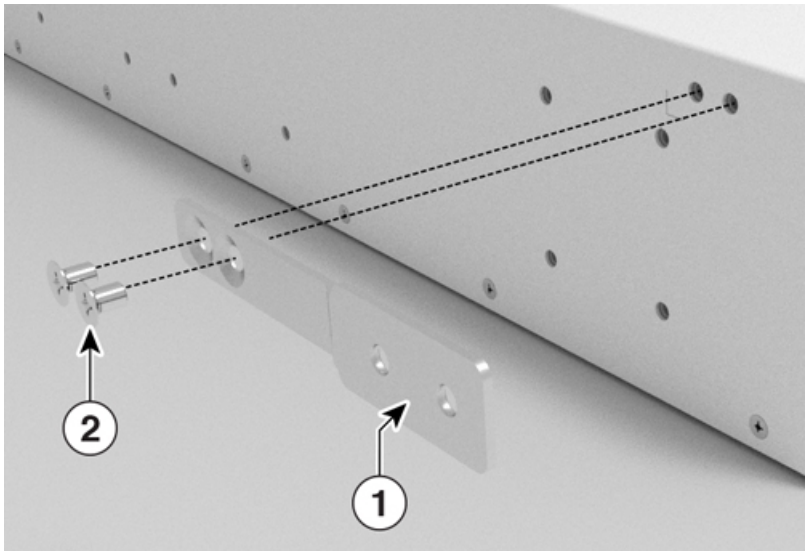
Step 2 Install slider brackets to the router as follows:

a) Determine which end of the chassis is to be located in the cold aisle as follows:

- If the router has port-side intake modules, position the router so that the ports are in the cold aisle.
- If the router has port-side exhaust modules, position the router so that the fan and power supply modules are in the cold aisle.

b) Install the grounding pad on the chassis. Use two M4 x 5.7 mm screws with 12 in-lbs (1.4 N-m).

Figure 71: Install the Grounding Pad

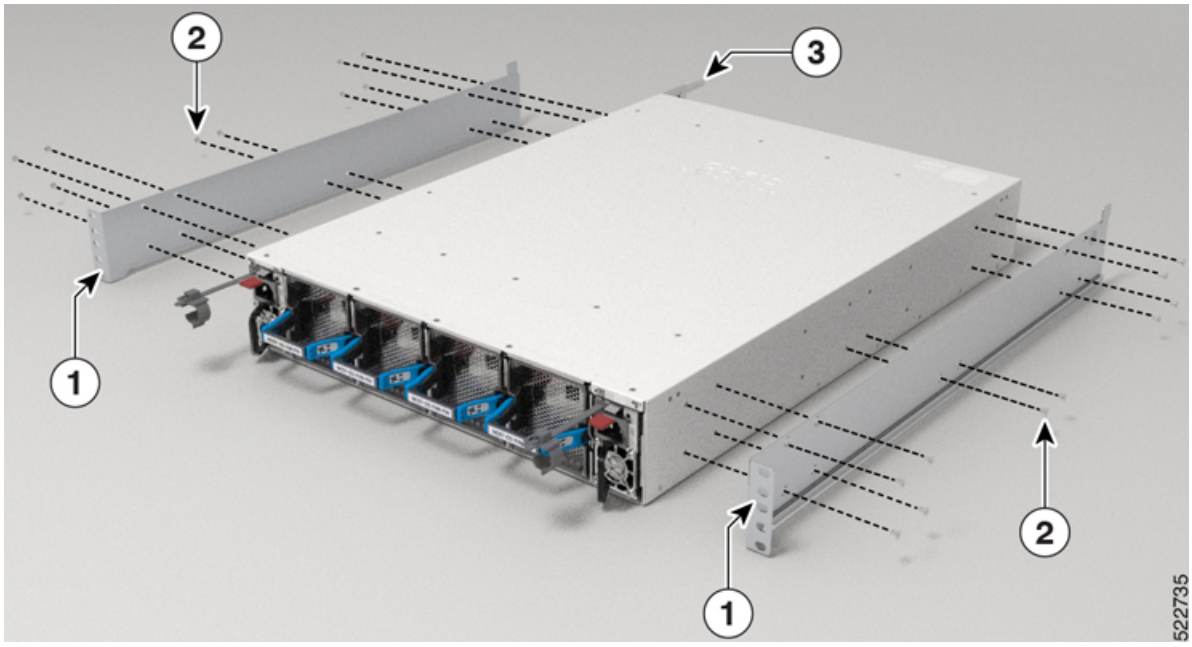


1	Grounding pad	2	Screws

c) With the slider bracket ears aligned to the front of the chassis as shown in the image, use ten M4 x 5.7 mm flat-head screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis.

d) Repeat 3c with the other slider bracket on the other side of the router.

Figure 72: Mount Slider Brackets

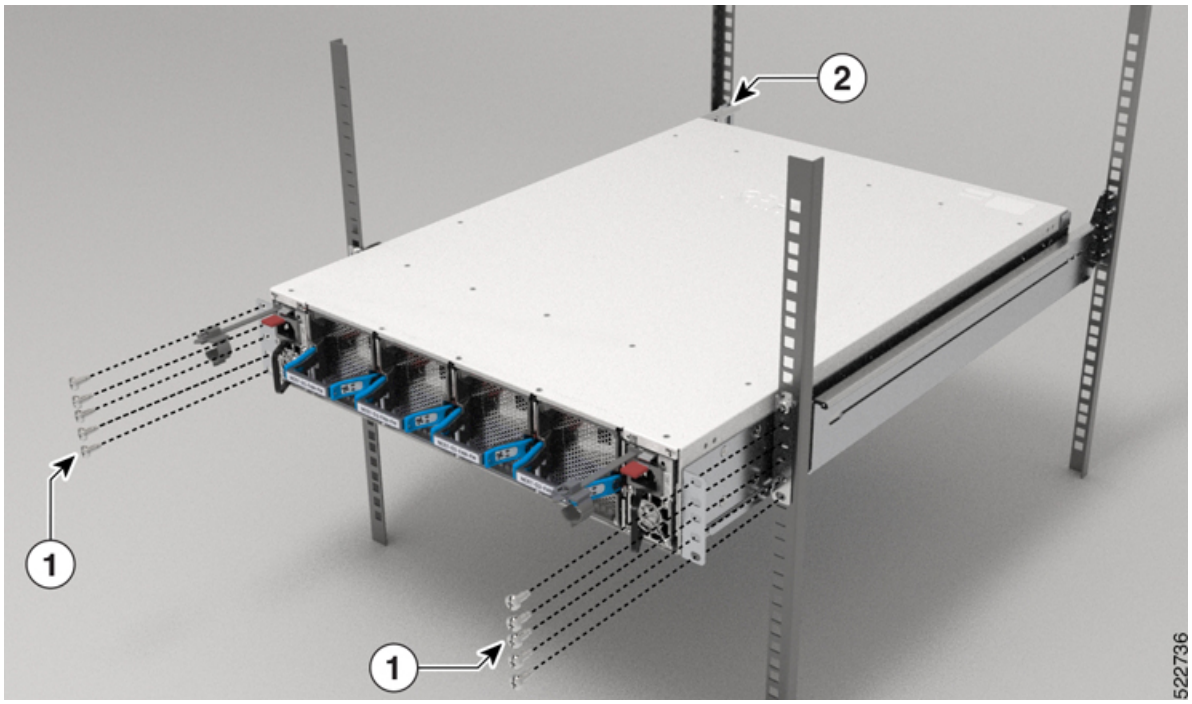


1	Slider bracket	2	Screws
3	Grounding pad		

Step 3 Install the router onto the 4-post rack as follows:

a) Holding the router with both hands, position the back of the router between the front posts of the rack.
b) Move the router until the slider brackets come in contact with slider rails installed in the rack. Slide the slider brackets onto the slider rails, and then gently move the router all the way into the rack.
c) Hold the chassis level while the second person inserts five screws (12-24) in each of the two rack-mount brackets (using a total of ten screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
d) Tighten the 12-24 screws (pan-head) to 30 in-lb (3.39 N.m).

Figure 73: 19-inch 4-Post Rack Mount Chassis



1	Screws	2	Grounding pad

(Optional) Install the Air Filter on the NCS-57D2 Router

This procedure explains the steps to install the air filter on the NCS-57D2 router mounted on the 2-post rack. The same procedure is applicable for installing air filter on the NCS-57D2 router mounted on the 4-post rack.

Note Inspect the air filter six months after its first installation, then continue with inspections every three months. Replace any filters that appear dirty and avoid reusing cleaned ones. Always use a new air filter as a replacement. If the location has high dust or moisture levels, plan for more frequent inspections, replacements, and regular maintenance. Air filters are consumable items and must be ordered separately by customers. Customers may contact TAC for assistance in identifying the correct air filter PID to order. We recommend having spare air filters in stock.

Procedure

Step 1 Remove four screws from each side of the slider bracket (attached to the chassis) as shown in the image. Save the screws for re-installation

Figure 74: Remove Screws from the Slider Bracket - Port Side Intake Configuration

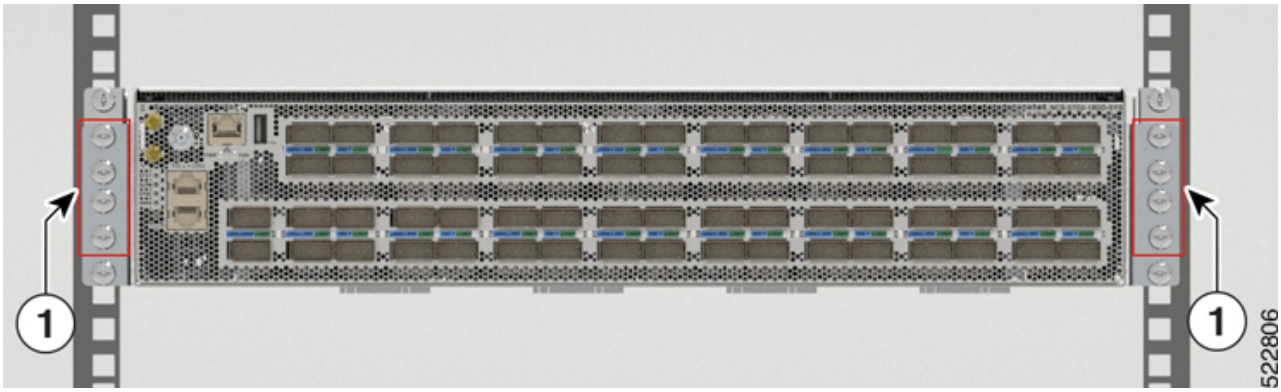


Figure 75: Remove Screws from the Slider Bracket - Port Side Exhaust Configuration



1	Screws

Step 2 Install the air filter support bracket on either sides of the slider bracket (attached to the chassis).

For port side intake configuration, use three screws on each side of the slider bracket as shown in the image. Tighten the 12-24 screws (pan-head) to 30 in-lb (3.39 N.m).

For port side exhaust configuration, use four screws on each side of the slider bracket as shown in the image. Tighten the 12-24 screws (pan-head) to 30 in-lb (3.39 N.m).

Figure 76: Install Air Filter Support Bracket - Port Side Intake Configuration

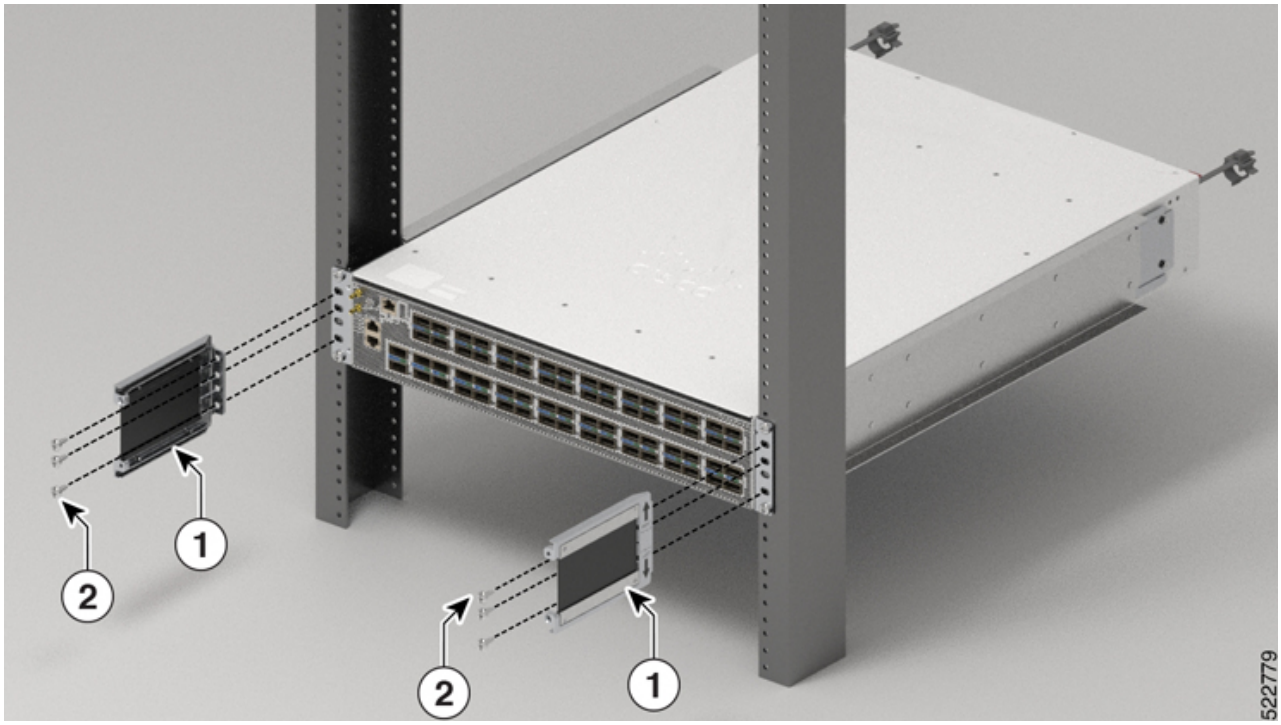
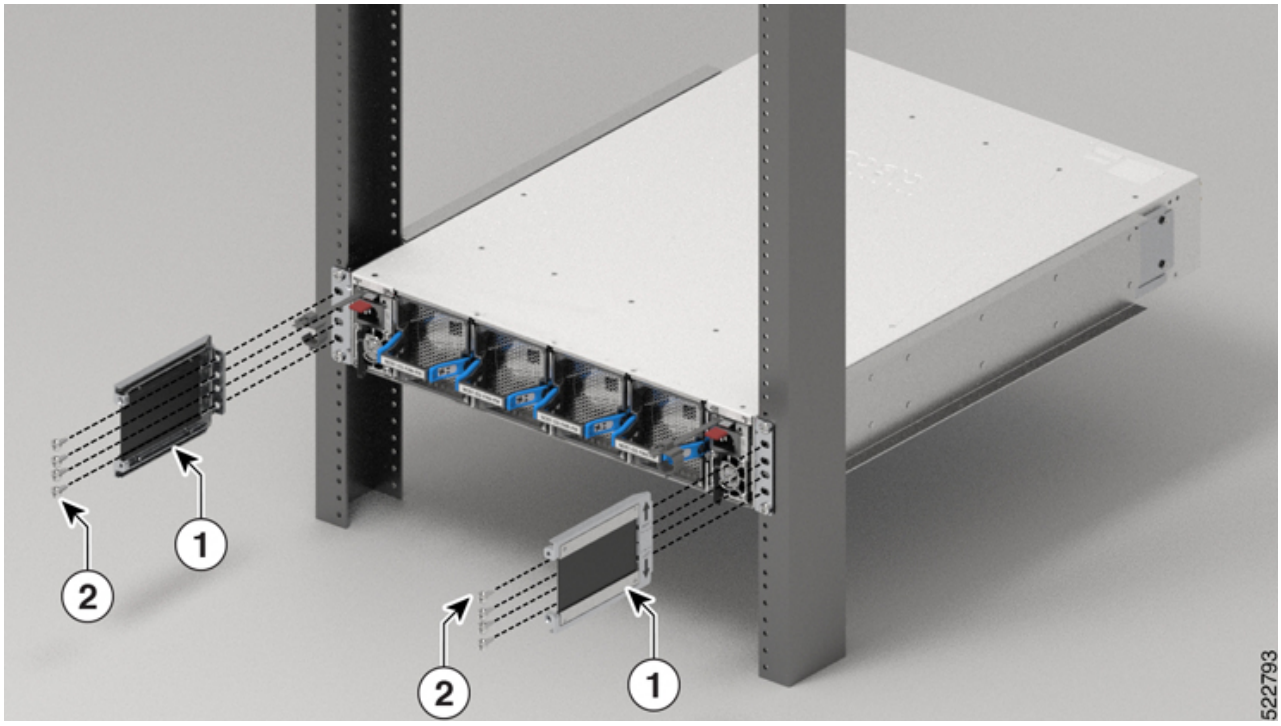


Figure 77: Install Air Filter Support Bracket - Port Side Exhaust Configuration



1	Air filter support bracket	2	Screws

Step 3 Insert the air filter enclosure using the guiding pins and tightening the thumbscrews as shown in the image.

Figure 78: Insert the Air Filter Enclosure - Port Side Intake Configuration

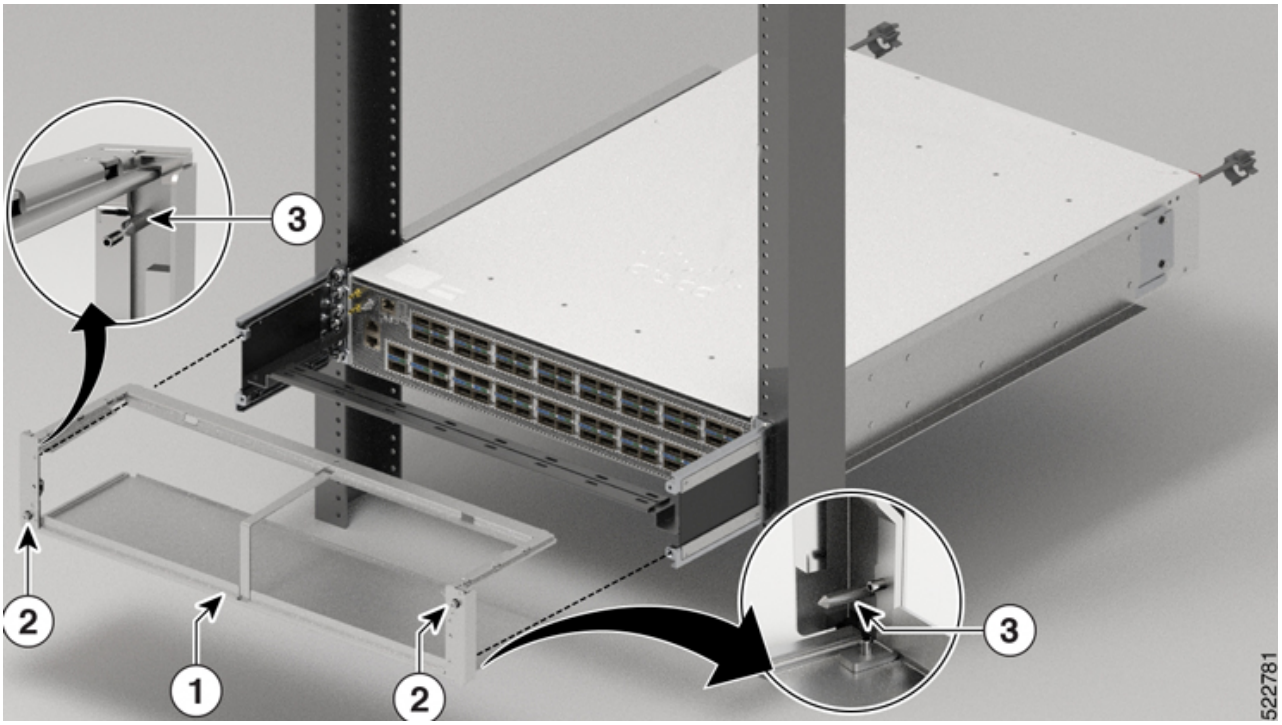
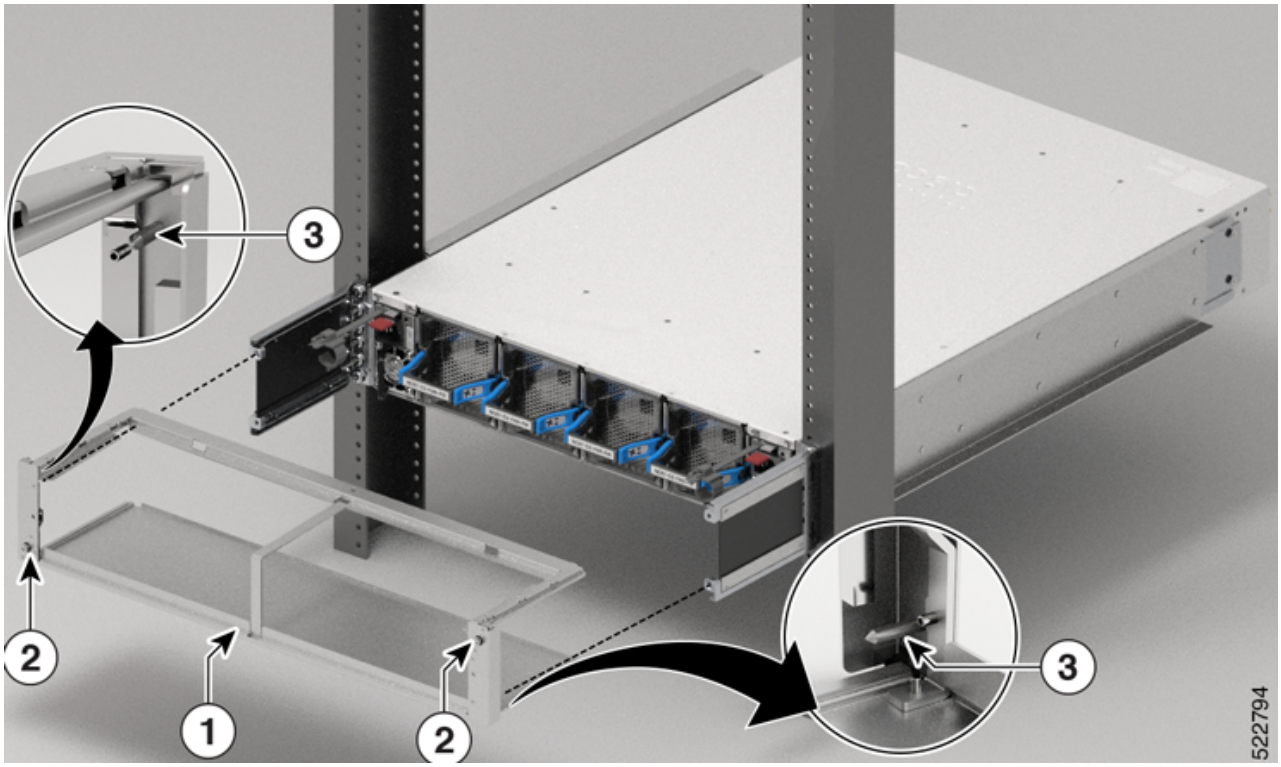


Figure 79: Insert the Air Filter Enclosure - Port Side Exhaust Configuration



1	Air filter enclosure	3	Guiding pins
2	Thumbscrew		

Step 4 Install the air filter on the air filter enclosure using the thumbscrew as shown in the image.

Figure 80: Install the Air Filter - Port Side Intake Configuration

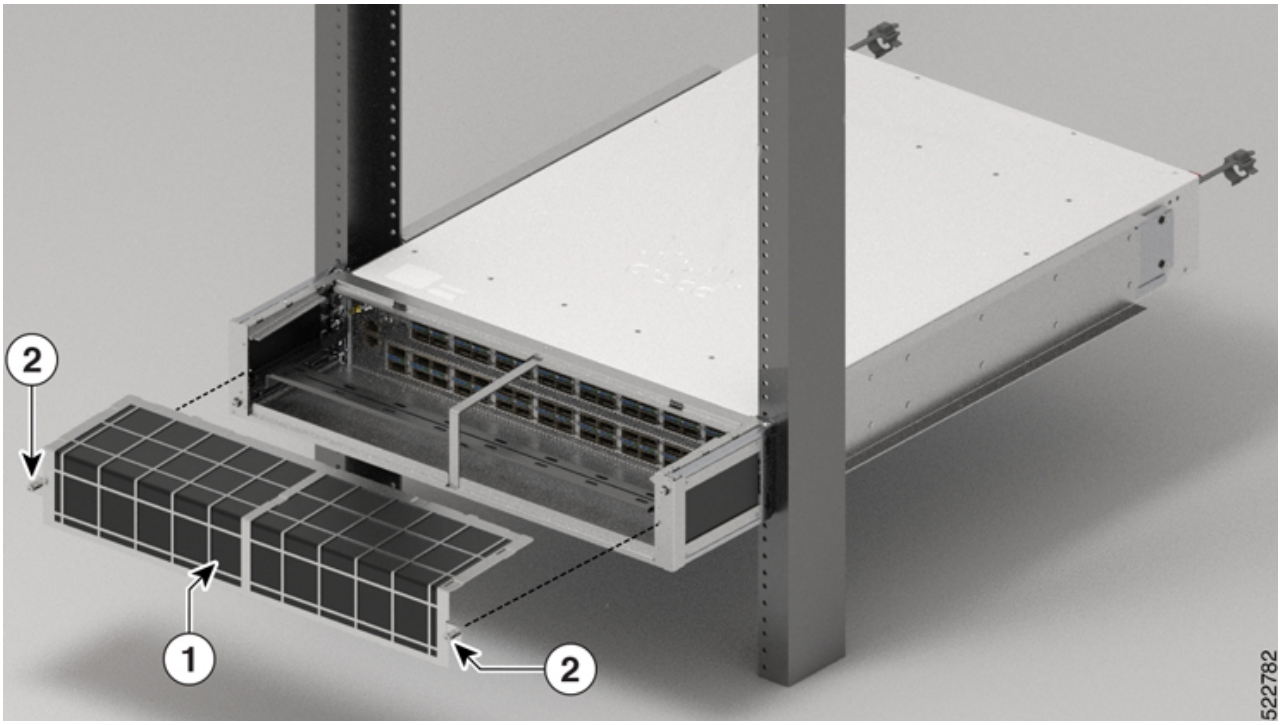
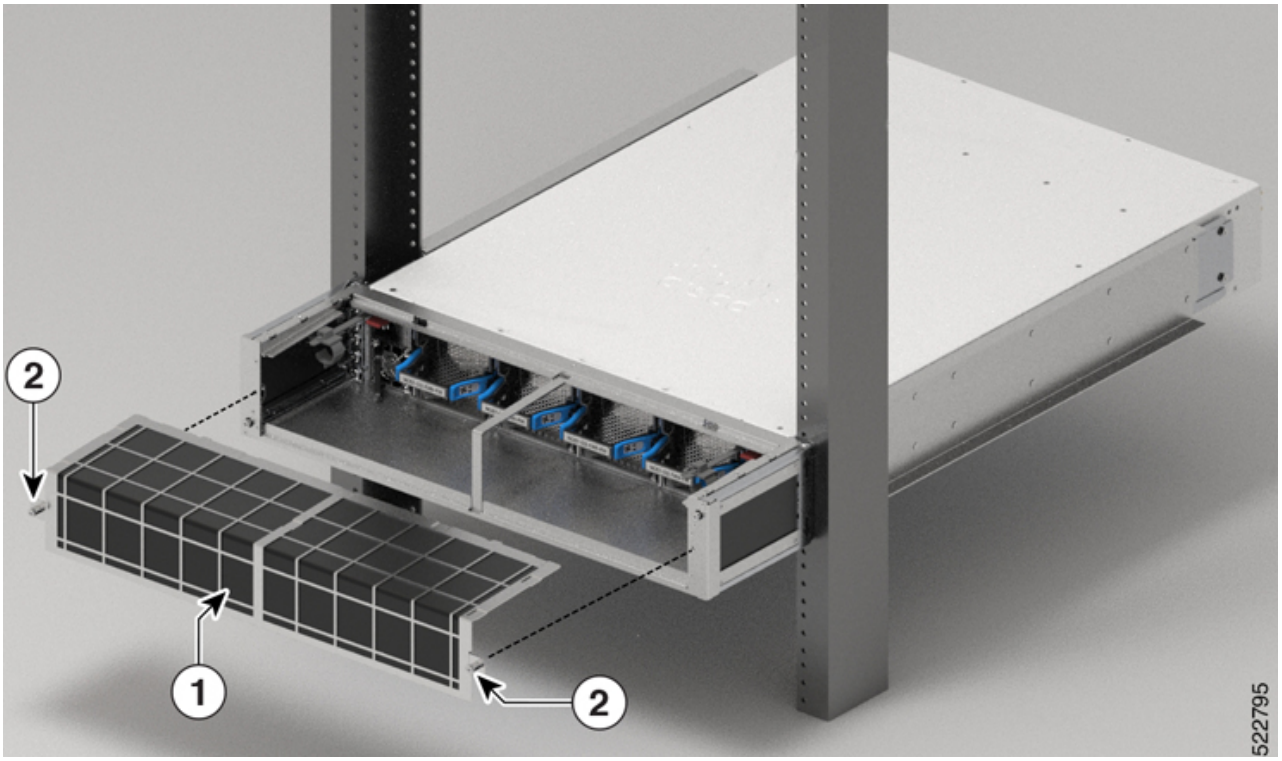


Figure 81: Install the Air Filter - Port Side Exhaust Configuration



1	Air filter	2	Thumbscrew

(Optional) Install the Air Filter on the NCS-57C3 Router

Note Inspect the air filter six months after its first installation, then continue with inspections every three months. Replace any filters that appear dirty and avoid reusing cleaned ones. Always use a new air filter as a replacement. If the location has high dust or moisture levels, plan for more frequent inspections, replacements, and regular maintenance. Air filters are consumable items and must be ordered separately by customers. Customers may contact TAC for assistance in identifying the correct air filter PID to order. We recommend having spare air filters in stock.

Note In order to install the air filter on the NCS-57C3 router, you must only rack mount the router using the 19-inch bracket that is shipped with the air filter kit (PID: NCS-57C3-FR-KIT).

Table 27: Air Filter Kit

Quantity	Part Description
2	Rack-mount brackets
2	Air Filter Support Bracket
1	Air Filter
12	M4 x 8-mm Phillips counter sink screws
2	M4 x 6-mm Phillips counter sink screws
8	M3 x 8-mm Phillips pan head screws
12 - 14	10-32 pan head screws

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

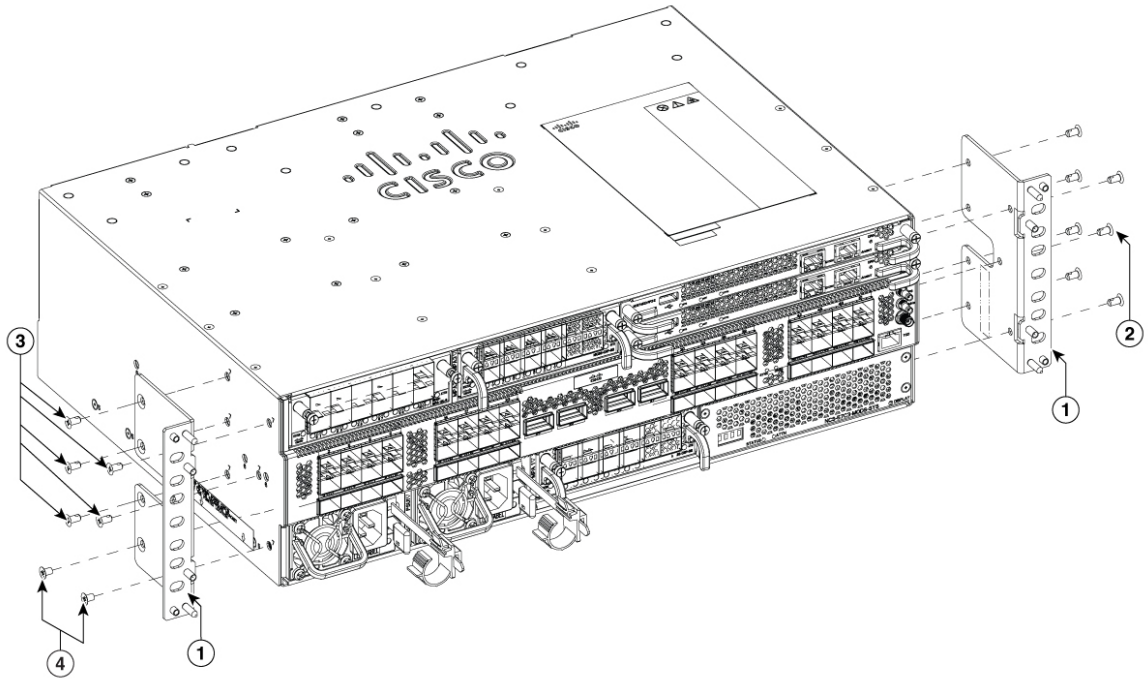
Procedure

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

a) Position the router so that its ports will be in the cold aisle.

b) With the bracket ears aligned to the front of the chassis, position a rack-mount bracket on the side of the chassis so that the seven holes are aligned to seven of the screw holes on the side of the chassis.
c) Use seven M4 screws with 12 in-lbs (1.4 N-m) to attach the bracket to the chassis
d) Repeat Steps 1b and 1c with the other rack-mount bracket on the other side of the router.

Figure 82: Rack-Mount Brackets for Air Filter Installation



1	Rack-mount brackets for air filter installation	3	M4 x 8 mm Phillips counter sink screws (Quantity - 5)
2	M4 x 8 mm Phillips counter sink screws (Quantity - 7)	4	M4 x 6 mm Phillips counter sink screws (Quantity - 2)

Step 2 Install the router onto the 2-post rack as follows:

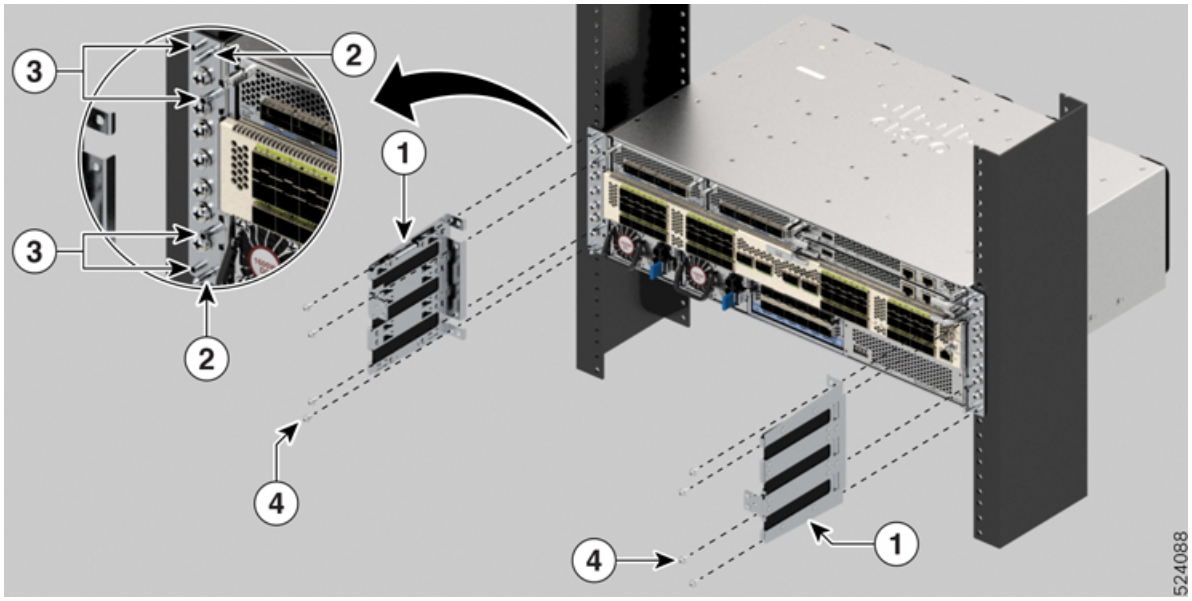
a) With two people, lift the router into position between the two rack posts.
b) Move the router until the rack-mount brackets come in contact with two rack posts.
c) Hold the chassis level while the second person inserts six screws (12-24 or 10-32, depending on the rack type) in each of the two rack-mount brackets (using a total of twelve screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails.
d) Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

Step 3 Install the air filter support bracket on either sides of the 19-inch bracket attached to the chassis, using four screws on each side:

a. Align the holes on the air filter support bracket to the threaded standoffs and guiding pins on the 19-inch bracket.

b. Insert and tighten four M3 screws to a torque value of 5.75 in-lb (0.65 N.m), to secure the air filter support bracket on each side.

Figure 83: Align and Install the Air Filter Support Bracket

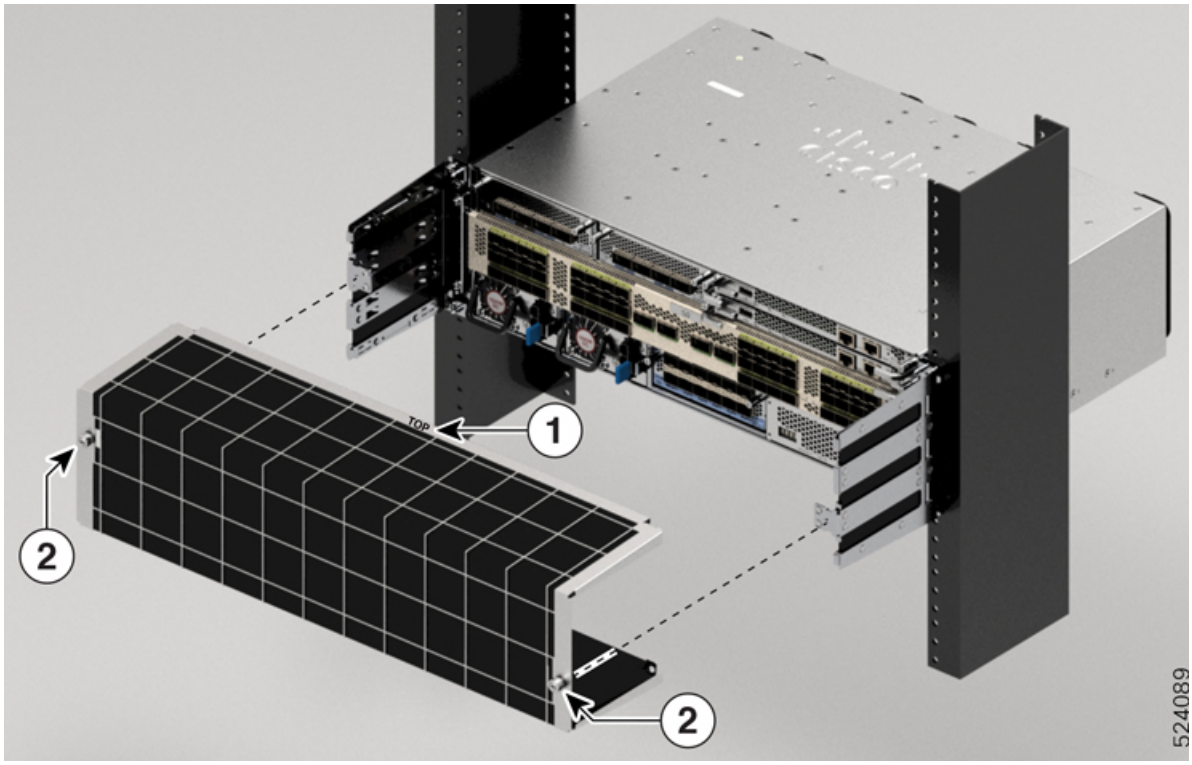


1	Air filter support bracket	3	Threaded standoffs
2	Guiding pins	4	M3 x 8-mm pan head screws (Quantity - 8)

Step 4 Install the air filter.

a. Place the air filter as shown in the below figure.

Figure 84: Install the Air Filter



1	Air filter	3	TOP marking on the air filter
2	Thumbscrews		

b. Insert and tighten the two thumbscrews to a torque value of 5.75 in-lb (0.65 N.m), to secure the air filter.

Watch Install the Air Filter on the Cisco NCS-57C3 Router (video).

(Optional) Install the Cable Management Bracket on NCS-57C1 Chassis

This section describes how to install the cable management bracket on the NCS-57C1 chassis.

Before you begin

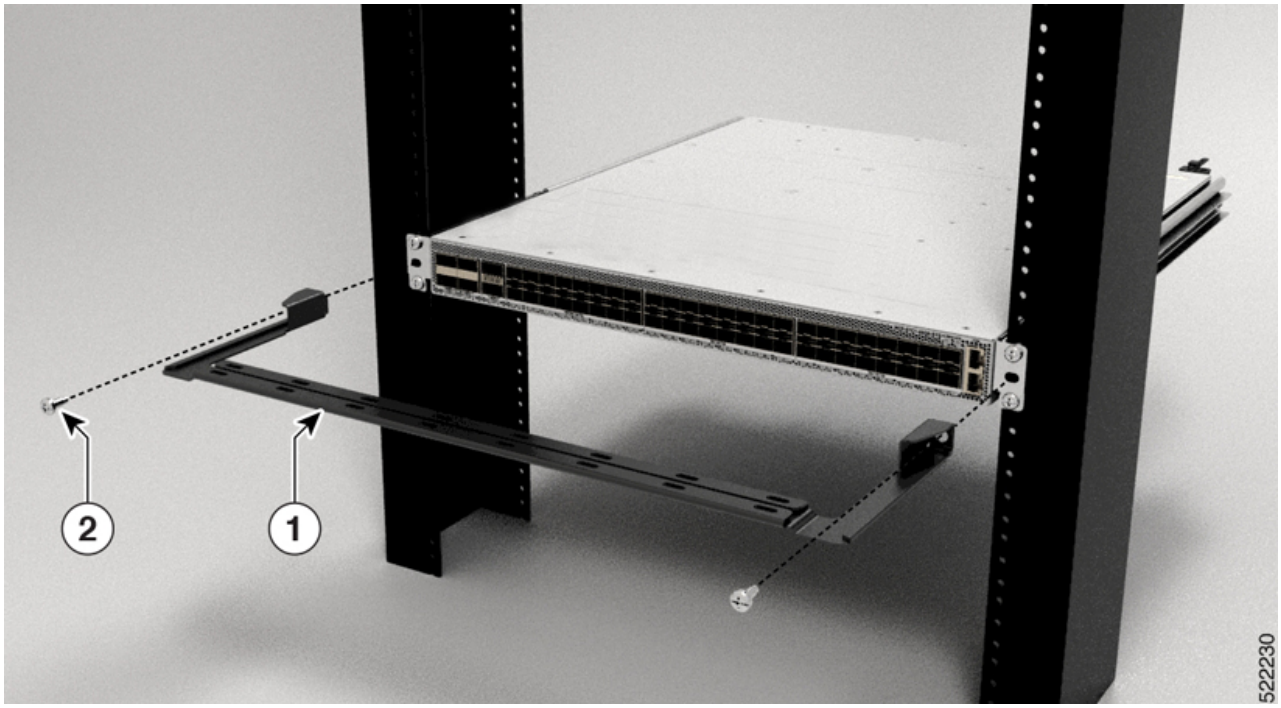
The chassis must be installed and secured to the rack.

Procedure

Step 1 Remove the middle screws from either sides of the chassis. Save the screws for re-installation.

Step 2 Align the cable management bracket with the chassis as shown in the image.

Figure 85: Install Cable Management Bracket on NCS-57C1 Chassis



Step 3 Tighten the 12-24 screws to 30 in-lb (3.39 N.m) on either sides.

Ground the Chassis

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Caution Grounding the chassis is required, even if the rack is already grounded. A grounding pad with two threaded holes is provided on the chassis for attaching either a grounding lug or grounding cover plate. The ground lug must be NRTL-listed. In addition, a copper conductor (wires) must be used and the copper conductor must comply with NEC code for ampacity.

Caution When terminating the frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick connect connectors, or other friction-fit connectors.

Procedure

Step 1 Use a wire-stripping tool to remove approximately 0.75 inches (19 mm) of the covering from the end of the #6 AWG grounding cable.

Step 2 Insert the stripped end of the grounding cable into the open end of the grounding lug.

Step 3 Use the crimping tool to secure the grounding cable in the grounding lug.

In NCS-57D2-18DD-SYS routers, vertical crimping is required to secure the grounding cable.

Step 4 Attach the ground cable:

a) Remove the adhesive label from the grounding pad on the chassis.

b) Place the grounding lug against the grounding pad so that there is solid metal-to-metal contact, and insert the provided screws with washers through the holes in the grounding lug and into the grounding pad.

Figure 86: NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS Ground Lug

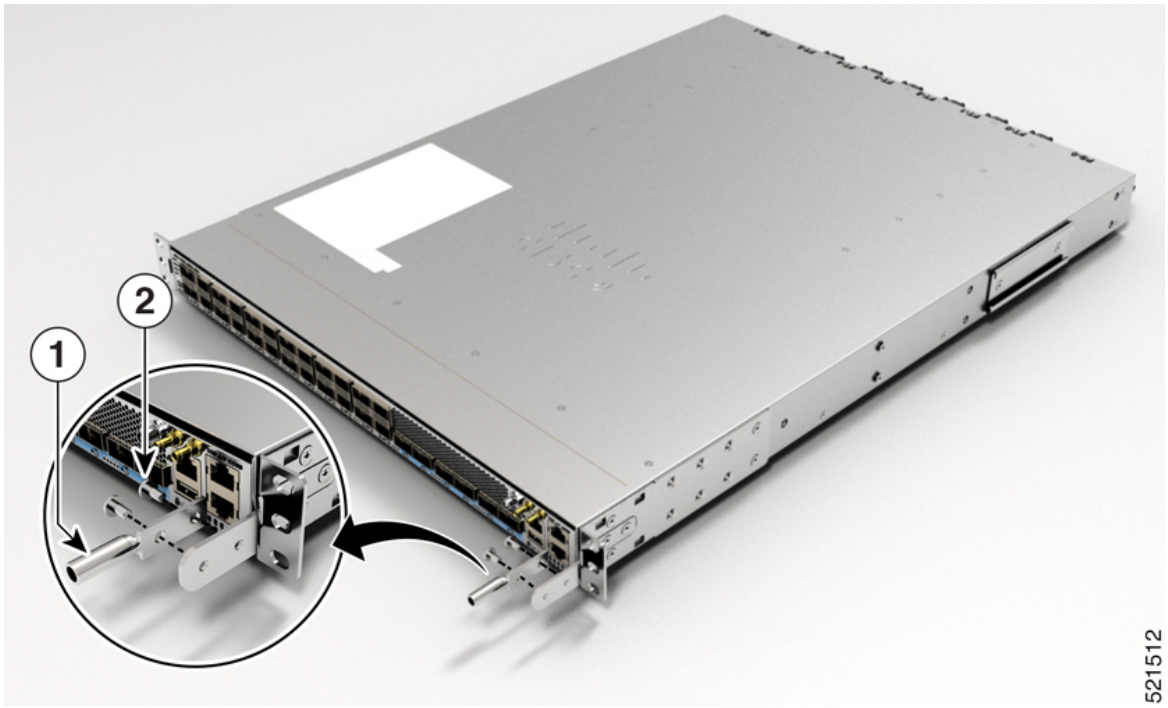


Figure 87: NCS-57C1 Ground Lug (Chassis Rear Side)

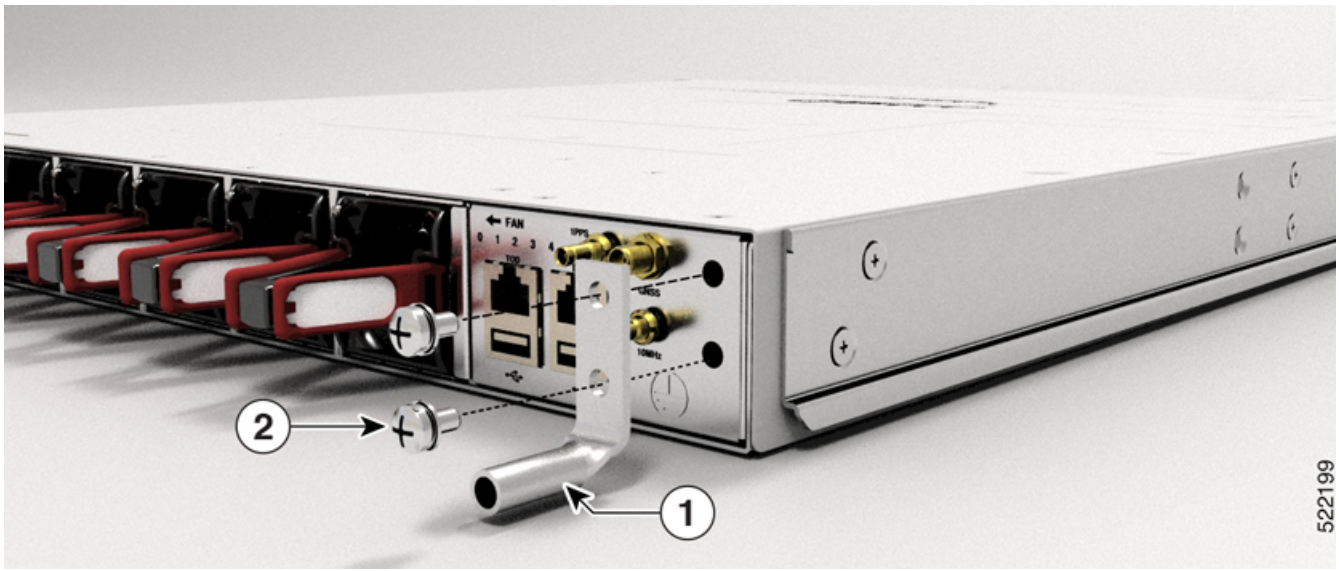


Figure 88: NCS-57C3-MOD Ground Lug

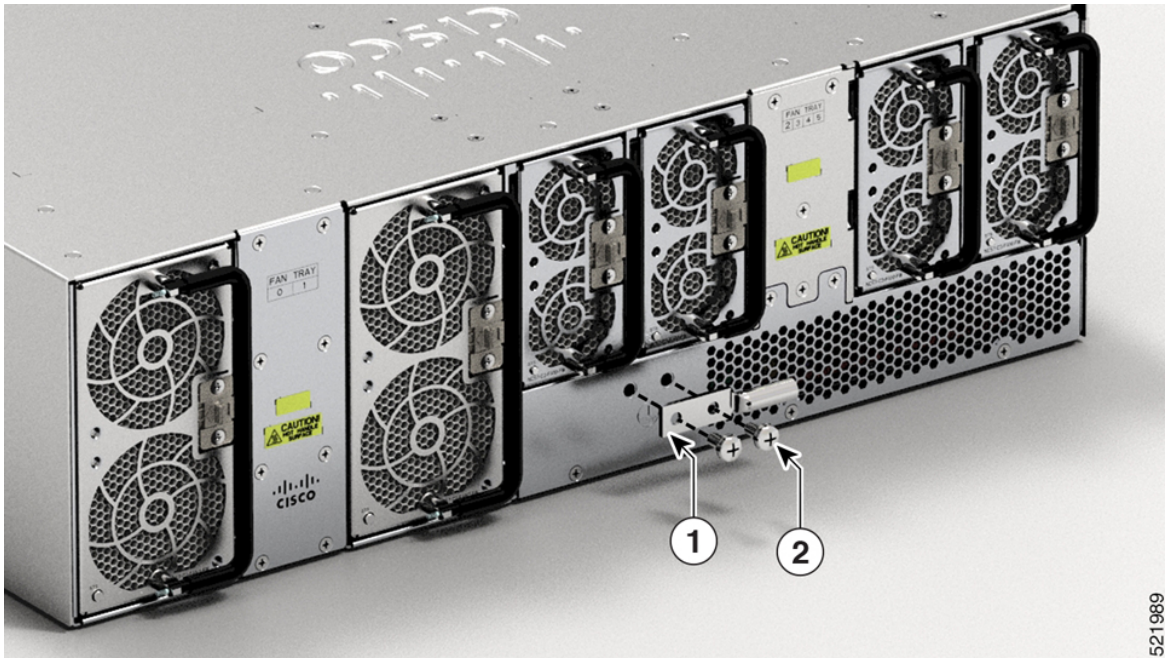
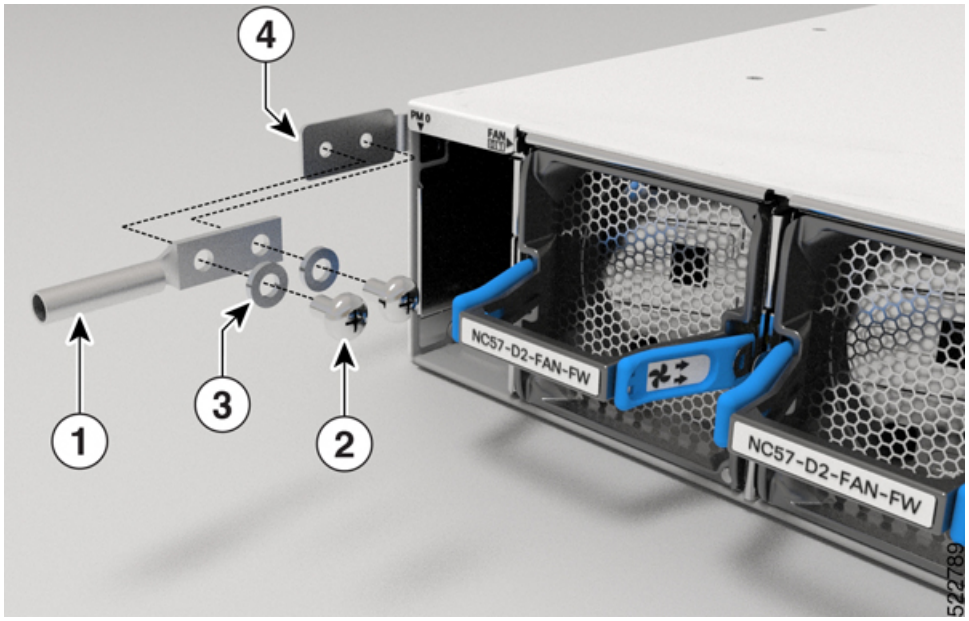


Figure 89: NCS-57D2-18DD-SYS Ground Lug



1	Ground lug	2	Pan-head screws
3	Washer	4	Grounding pad

c) Attach one end of the shelf ground cable (#6 AWG cable) to the grounding cover plate using the specified dual-hole lug connector.

Step 5 Tighten the pan-head screws to torque value of 11.5 in-lbs (1.3 N-m).

Step 6 Ensure that the lug and cable do not interfere with other equipment.

Step 7 Prepare the other end of the grounding cable and connect it to an appropriate grounding point in your site to ensure adequate earth ground.

Connect AC Power to the Chassis

Caution The chassis relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and national electrical codes.

Caution In low-line applications (90-140V AC), redundancy is not guaranteed. Therefore, we recommend to use both AC power supplies.

Note To obtain full output power of the PSU, the nominal voltage rating value varies, depending on the standards in various countries.

Note A dual pole breaker is needed for the installation. The rating of the dual pole breaker for 110 V is 20 A and for 220 V is 16 A. The minimum cable size is 14 AWG for 110 V and 16 AWG for 220 V.

Procedure

Step 1 Verify that the AC cable is installed in the correct AC source panel.

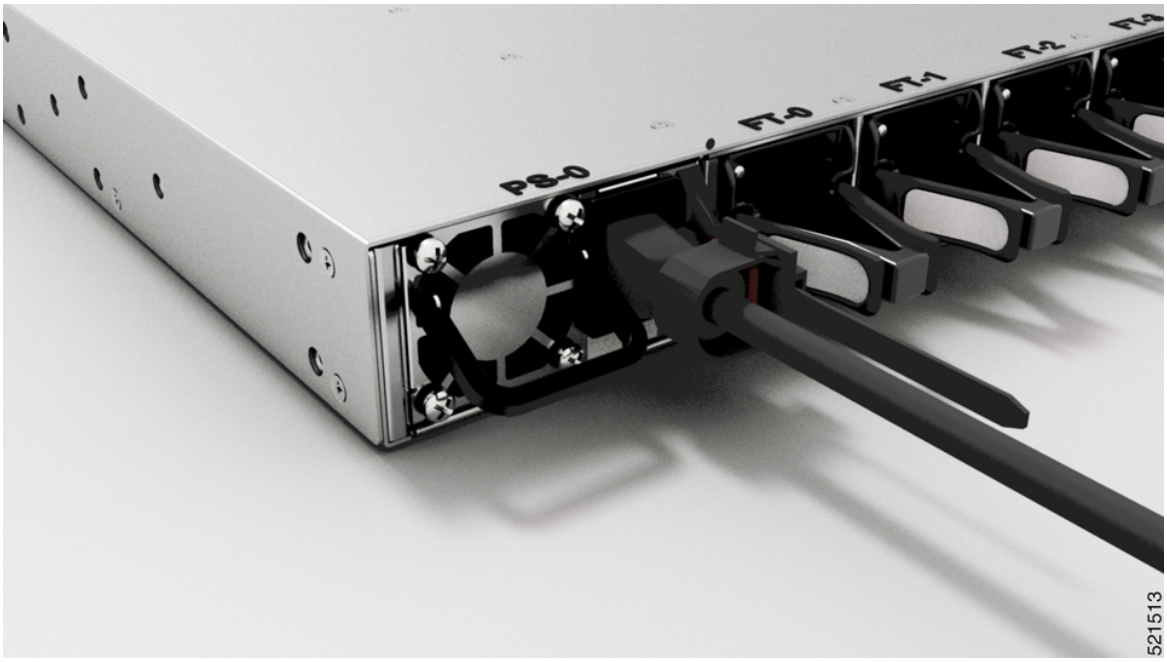
Step 2 Attach the AC power cable to the cable connector in the AC power module.

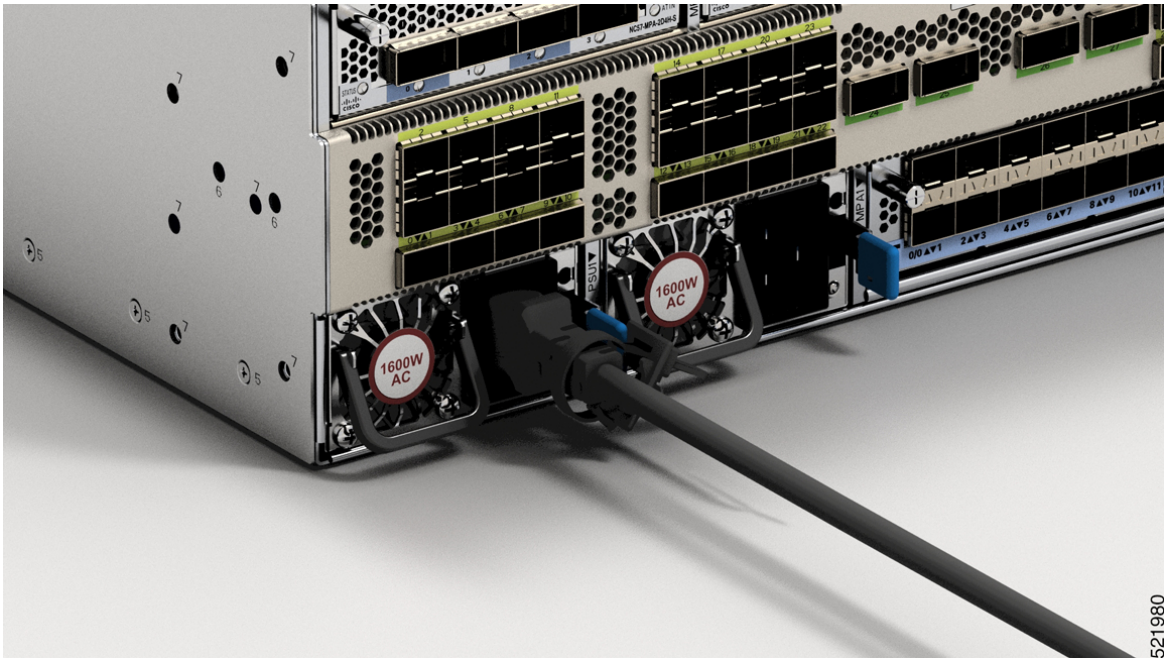
Step 3 Place the cable through the opening in the cable clamp.

Step 4 Slide the cable clamp toward the plug.

Step 5 Close the cable clamp on the shoulder of the power cable to secure the power cable.

Figure 90: Cable Clamp: Examples







1	Cable

Connect DC Power to the Chassis

Warning **Statement 1003**—DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC power before removing or replacing components or performing upgrades.

Warning **Statement 1022**—Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1046**—Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Before installing a DC power supply to the switch, you will need to attach DC connection wires that you provide to the DC power connector included in the DC power supply's accessory kit. For 240-380 VDC power supply, the dual-pole breaker or fuse rating is 20 A. For 40-72 VDC power supply, the single breaker or fuse is 40 A.

The following combinations of power supplies are supported on NCS-57B1:

- PSU2KW-DCPI/PSU2KW-DCPI= , port-side intake airflow

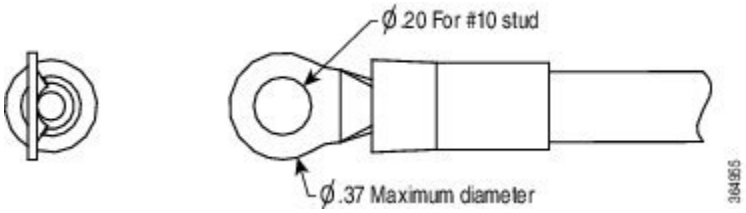
The following combinations of power supplies are supported on NCS-57C1:

- NCS-950W-DCFW/NCS-950W-DCFW=, port-side intake airflow
- NCS-1100W-DCRV/NCS-1100W-DCRV=, port-side exhaust airflow

Before you begin

Each DC input power cable is terminated at the power distribution unit (PDU) by a cable lug, as shown in the following figure.

Figure 91: DC Input Power Cable Lug



Note To avoid hazardous conditions, all components in the area where DC input power is accessible must be properly insulated. Therefore, before installing the DC cable lugs, be sure to insulate the lugs according to the manufacturer's instructions.

Procedure

Step 1 Verify that the correct fuse panel is installed in the top mounting space.

Step 2 Ensure that the DC circuit is powered down (either breaker turned off or fuse pulled) and proper lockout tag out procedures are followed. Use the cable supplied with the power supply. If you prefer to use your own cable, the cable size must be 6 AWG.

Step 3 Dress the power according to local practice.

Step 4 Connect the office battery and return cables according to the fuse panel engineering specifications.

Step 5 (Only NCS-57B1, NCS-57C3, and NCS-57D2) Insert the DC connector into the DC receptacle on the power supply.

- After connecting to the NCS-57B1 router, the black color (DC positive) wire appears on top.
- After connecting to the NCS-57C3 router, the red color (DC negative) wire appears on top.

Note
To connect the PSU2KW-DCPI power supply module with the power source, you must procure the PWR-2KW-DC-CBL power cord.

Note
To connect the NC57-1600W-DCFW power supply module with the power source, you must procure the CAB-48DC-40A-8AWG power cord.

Note
To connect the NCS-950W-DCFW power supply module with the power source, use a copper wire that is 14AWG or lesser in size.

Figure 92: NCS-57B1 - Connecting DC Power

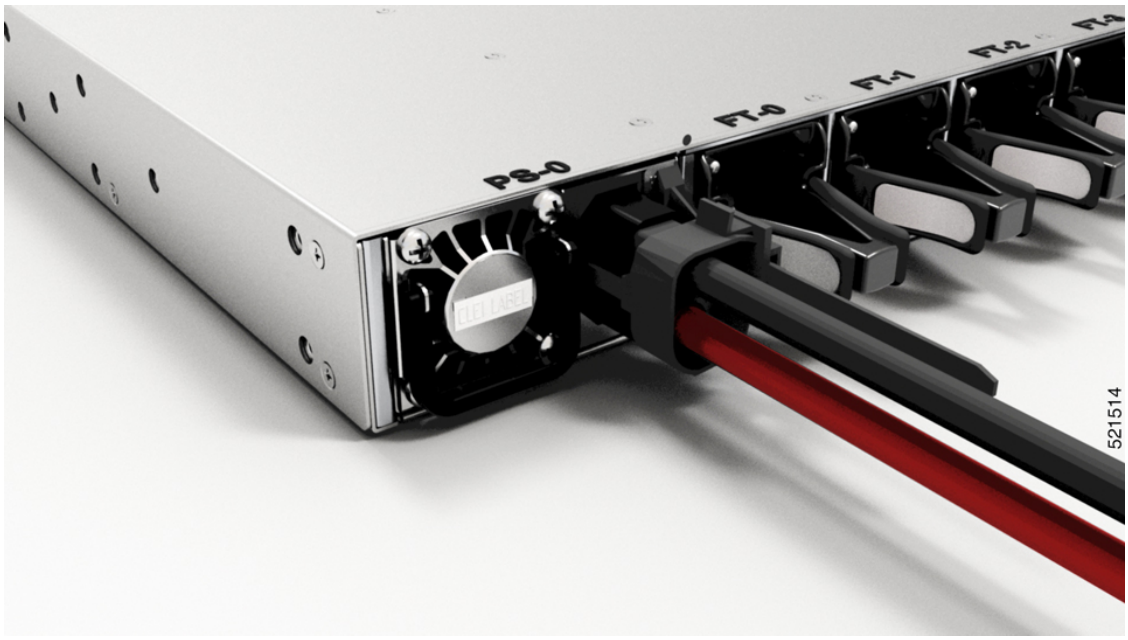


Figure 93: NCS-57C3-MOD - Connecting DC Power

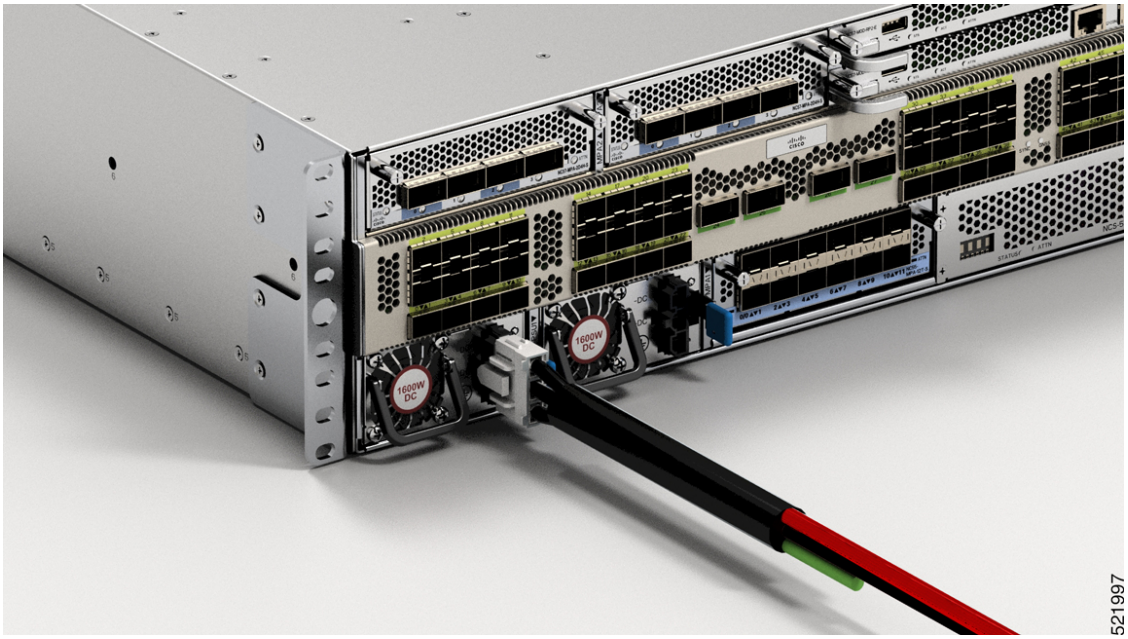


Figure 94: NCS-57D2 - Connecting DC Power Cable

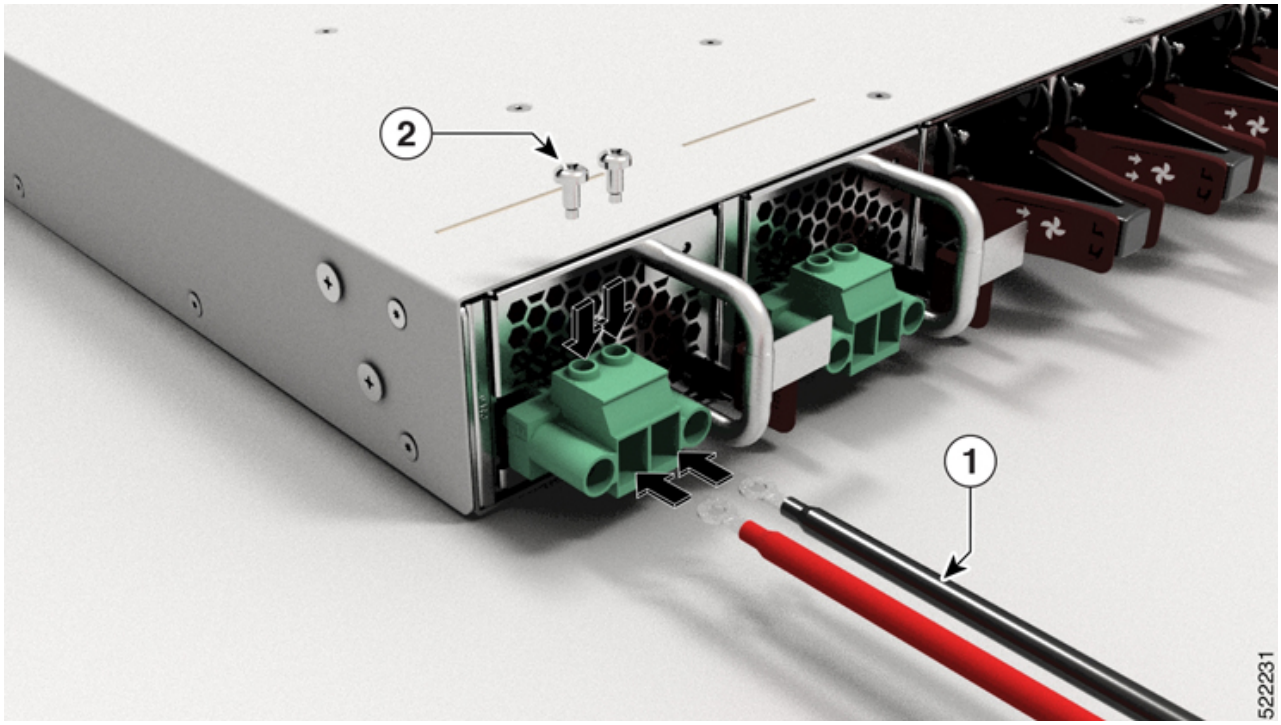


1	Cable

Step 6 (Only NCS-57B1, NCS-57C3, and NCS-57D2) Ensure that the locking mechanism has engaged to secure the cable.

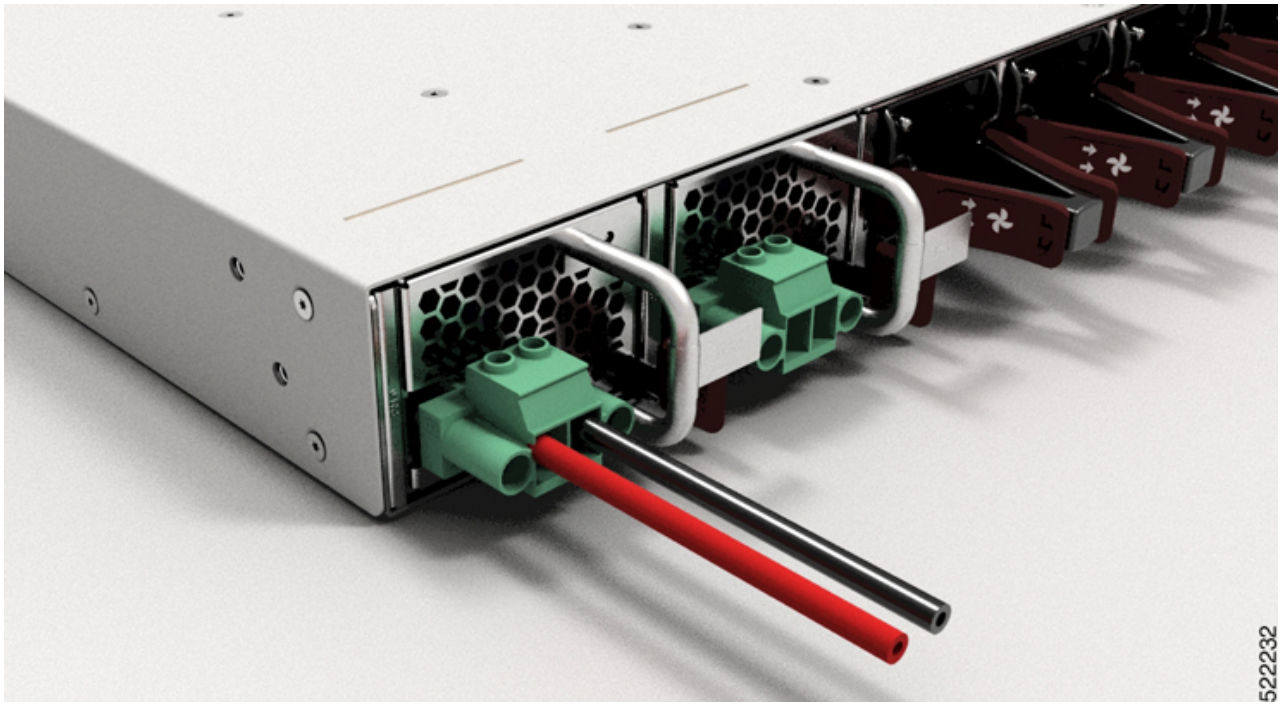
Step 7 (Only NCS-57C1) Insert the cables into the connectors and tighten them using the screws as shown in the following figures:

Figure 95: NCS-57C1 - Connecting DC Power Cable



1	Cable	2	Screw

Figure 96: NCS-57C1 - Connecting DC Power Cable



Step 8 Turn on the circuit breaker at the power source.

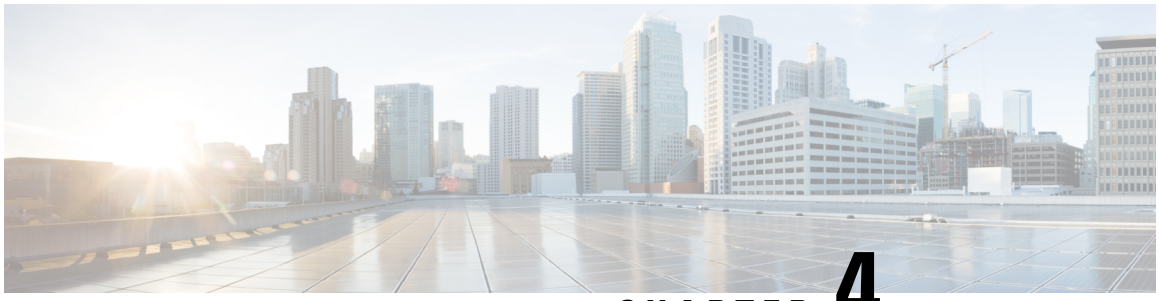
Power Supply Unit Input and Output Ranges

This table summarises input and output power ranges for PSU low line and nominal applications:

Table 28: Input and output power ranges for PSUs

Routers	Power Supply Unit PIDs	Input Voltage	Input Current (Max)	Output Power	Output
NCS-57B1-6D24-SYS, NCS-57B1-5DSE-SYS, NCS-57D2-18DD-SYS	PSU2KW-ACPI For low line applications	100 to 127V ac	12A	1000W	12V/84A
NCS-57C3-MOD	NC57-1600W-DCFW	-48V to -60V DC	38A	1600W	12V/133.3A
NCS-57C3-MOD	NC57-1600W-ACFW	100 to 240V AC	20A to 10A (Mainland China, Taiwan) 16A to 10A	1600W	12V/133.3A
NCS-57B1-6D24-SYS, NCS-57B1-5DSE-SYS, NCS-57D2-18DD-SYS	PSU2KW-ACPI For nominal voltage application	200 to 240V ac	12A	2000W	12V/167A
NCS-57D2-18DD-SYS	PSU2KW-ACPE	100V AC to 127V AC	12A	2000W	12V/167A
NCS-57D2-18DD-SYS	PSU2KW-ACPE	200V AC to 240V AC	10A	2000W	12V/167A
NCS-57B1-6D24-SYS, NCS-57B1-5DSE-SYS, NCS-57D2-18DD-SYS	PSU2KW-DCPI	-40V to -72V DC	40A	2000W	12V/167A
NCS-57B1-6D24-SYS, NCS-57B1-5DSE-SYS, NCS-57D2-18DD-SYS	PSU2KW-DCPE	-48V DC to -60V DC	55A	2000W	12V/167A
NCS-57C1	NCS-1100W-ACFW For port side intake For nominal voltage application	100V to 240V ac	12A	1100W	12V/90A

Routers	Power Supply Unit PIDs	Input Voltage	Input Current (Max)	Output Power	Output
NCS-57C1	NCS-950W-DCFW For port side intake For nominal voltage application	-40V to - 72V DC	26A	950W	12V/79A



CHAPTER 4

Connect Router to the Network

- Port Connection Guidelines , on page 115
- Interfaces and Port Description, on page 116
- Connect to the Console Port, on page 116
- Create the Initial Router Configuration, on page 117
- Connect to the Management Ethernet Port, on page 119
- Install and Remove Transceiver Modules, on page 121
- Connect Interface Ports, on page 134
- Connecting a Cable to the GNSS Antenna Interface , on page 135
- Maintain Transceivers and Optical Cables, on page 136

Port Connection Guidelines

Depending on the chassis, you can use Quad Small Form-Factor Pluggable Plus (QSFP+), QSFP28, SFP28, and RJ-45 connectors to connect the ports on the router to other network devices.

To prevent damage to the fiber-optic cables, Cisco recommends that you keep the transceivers disconnected from their fiber-optic cables when installing the transceiver in the router. Before removing a transceiver from the router, remove the cable from the transceiver.

To maximize the effectiveness and life of your transceivers and optical cables, do the following:

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever handling transceivers. The router is typically grounded during installation and provides an ESD port to which you can connect your wrist strap.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep the transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and to prevent damage to the connectors. Attenuation (loss of light) is increased by contamination and should be kept below 0.35 dB.
    - Clean these parts before installation to prevent dust from scratching the fiber-optic cable ends.
    - Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors when they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedures.

- Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.

- Inspect routinely for dust and damage. If you suspect damage, clean and then inspect fiber ends under a microscope to determine if damage has occurred.

Warning **Statement 1051—**Laser Radiation

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

Interfaces and Port Description

Note For location of ports on the routers, see Network Interfaces, on page 21.

Connect to the Console Port

Before you create a network management connection for the router or connect the router to the network, you must create a local management connection through a console terminal and configure an IP address for the router. You also can use the console to perform the following functions (each of which can be performed through the management interface after you make that connection):

- Configure the router using the command-line interface (CLI).
- Monitor network statistics and errors.
- Configure Simple Network Management Protocol (SNMP) agent parameters.
- Download software updates.

The system console port is an RJ-45 receptacle for connecting a data terminal to perform the initial configuration of NCS 5700 chassis.

Follow this procedure to connect a data terminal to the console port.

Before you begin

- The router must be fully installed in its rack, connected to a power source, and grounded.
- The necessary cabling for the console, management, and network connections must be available.
  - An RJ-45 rollover cable and DB9F/RJ-45 adapter.
  - Network cabling should already be routed to the location of the installed router.

Procedure

Step 1 Set your terminal to these operational values: 115200 bps, 8 data bits, no parity, 1 stop bits (115200 8N1).

Step 2 Attach the terminal end of the cable to the interface port on the data terminal.

Step 3 Attach the other end of the cable to the console port.

Table 29: RJ-45 Straight-through Cable Pin-outs

RJ-45 Pin	Signal
1	—
2	—
3	Tx
4	Ground (GND)
5	GND
6	Rx
7	—
8	—

Create the Initial Router Configuration

You must assign an IP address to the router management interface so that you can then connect the router to the network.

After you boot the router, follow the guided setup/prompts to configure the router. To enable you to connect the router to the network, you can use the default choices for each configuration except for the IP address, which you must provide.

Note These routers are designed to boot up in less than 30 minutes, provided the neighboring devices are in full operational state.

Note Note down the router's unique name. It helps to identify the router among the devices in the network.

Before you begin

- Connect a console device with the router.
- Connect a power source to the router.
- Determine the IP address and netmask needed for the Management interfaces: `MgmtEth0/RP0/CPU0/0` and:`MgmtEth0/RP1/CPU0/0`

Procedure

Step 1 Power up the router.

The LEDs on each power supply light up (green) when the power supply units are sending power to the router. The Administrative User Dialog prompt appears.

Step 2 When the system is booted up for the first time, you must enter root-system username. Use the default username and password that is provided to you. Later, you can create new username and password. The following prompt appears:

```
!!!!!!!!!!!!!!!!!!! NO root-system username is configured. Need to configure root-system username.
 !!!!!!!!!!!!!!!!!!!

--- Administrative User Dialog ---


Enter root-system username:
% Entry must not be null.

Enter root-system username: cisco
Enter secret:
Use the 'configure' command to modify this configuration.
User Access Verification

Username: cisco
Password:


RP/0/RP0/CPU0:ios#
```

Note
Username is cisco. Reach out to your accounts team to obtain the password. You can later modify the password in Step 3.

Step 3 Enter a new password to use for this router.

The software checks the security strength of your password and rejects your password if it is not considered to be a strong password. To increase the security strength of your password, make sure that it adheres to the following guidelines:

- At least eight characters
- Minimizes or avoids the use of consecutive characters (such as "abcd")
- Minimizes or avoids repeating characters (such as "aaa")
- Does not contain recognizable words from the dictionary

- Does not contain proper names
- Contains both uppercase and lowercase characters
- Contains numbers as well as letters

Note
Clear text passwords cannot include the dollar sign ($) special character.

Tip
If a password is trivial (such as a short, easy-to-decipher password), the software rejects the password configuration. Be sure to configure a strong password as explained in this step. Passwords are case sensitive.

If you enter a strong password, the software asks you to confirm the password.

Step 4 Reenter the password.

When you enter the same password, the software accepts the password .

Step 5 Enter the IP address for the management interface.

Step 6 Enter a network mask for the management interface.

Step 7 The software asks if you need to edit the configuration. Enter **no** to not edit the configuration.

Step 8 The software asks if you need to save the configuration. Enter **yes** to save the configuration.

Connect to the Management Ethernet Port

The management Ethernet port provides out-of-band management, which enables you to use the command-line interface (CLI) to manage the router by its IP address. This port uses a 10/100/1000 Ethernet connection with an RJ-45 interface.

Note To prevent an IP address conflict, do not connect the management Ethernet port until the initial configuration is complete.

To connect cables to the system management port, attach Category 5 cables directly to the RJ-45 receptacle on the management Ethernet port.

Note To comply with GR-1089-CORE, Railway EN 50121, Smartgrid IEC 61850, and IEEE 1613, the intra-building port(s) of the equipment must use shielded intra-building cabling/wiring that is grounded at both ends.

Before you begin

You must have completed the initial router configuration.

Procedure

Step 1 Plug the cable directly into the RJ-45 receptacle.

Step 2 Connect the network end of your RJ-45 cable to a switch, hub, repeater, or other external equipment.

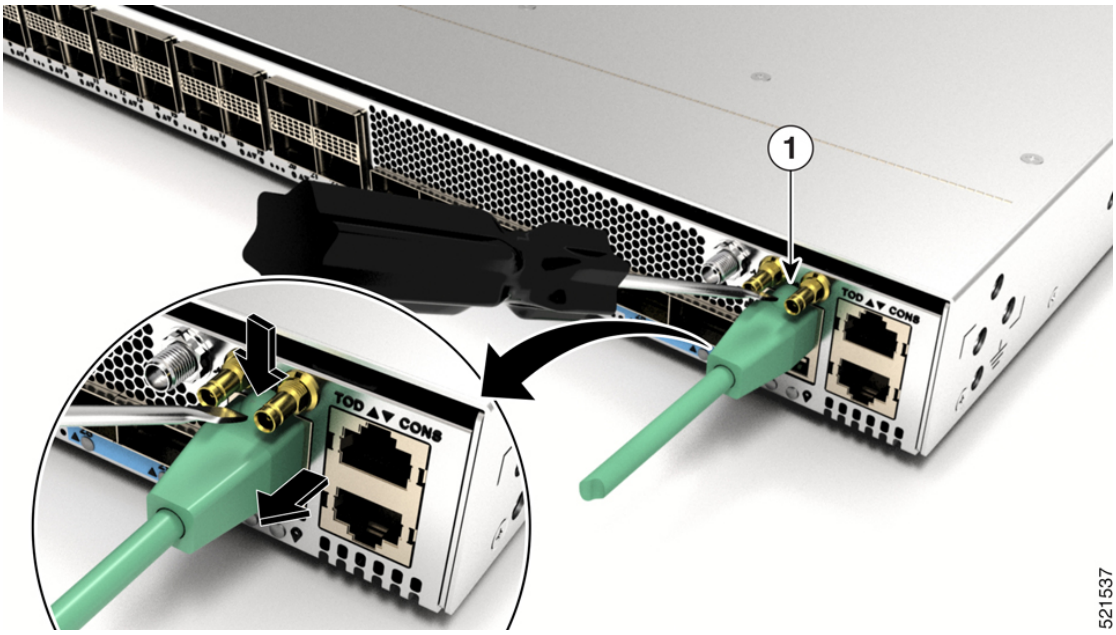
Accessing RJ-45 Cable

The RJ-45 cable is available on the Management port. To access the RJ-45 cable, perform the following steps:

Note When the router is fully operational, all ports are populated with cables. It becomes difficult to access the RJ-45 cable using bare hands. Hence the below procedure is recommended to remove RJ-45 cable from the management port.

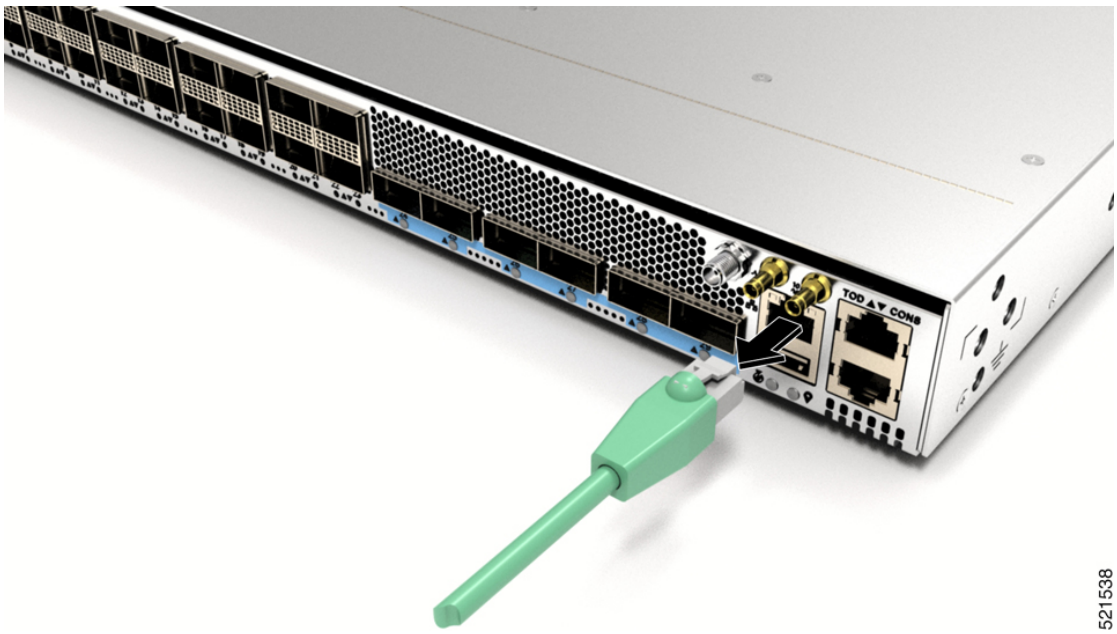
1. Insert the Philips flat-head screwdriver in between the timing ports.

Figure 97: Inserting a screwdriver between the timing ports



2. Press the clip on the RJ-45 jack downwards and pull the RJ-45 jack from the port. This releases the RJ-45 cable from the port.

Figure 98: Remove RJ-45 Cable from the Jack



Install and Remove Transceiver Modules

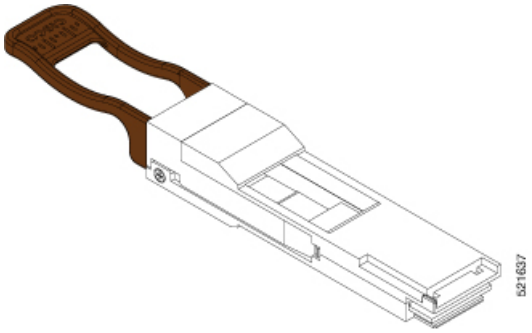
Install and Remove SFP28 and SFP+ Modules

Before you remove or install an SFP28 or SFP+ module, read the installation information in this section.

Note The Cisco NCS 57B1 router has only QSFP-DD sockets, therefore you need QSA module (QSFP to SFP+ Adapter) CVR-QSFP-SFP10G to support SFP+ module.

Note The Cisco NCS-57C3-MOD router has three rows of SFP28 ports. In the top row, install SFP28 transceivers with the electrical connectors on the bottom. In the two bottom rows, install SFP28 transceivers with the electrical connectors on the top.

Figure 99: QSFP to SFP+ Adapter



Insert CVR-QSFP-SFP10G in to the QSFP-DD port of the line card, followed by the insertion of the SFP+ pluggable.

Use the **show inventory** command to get details of the Cisco devices that are installed in the router. The adapter details are displayed.

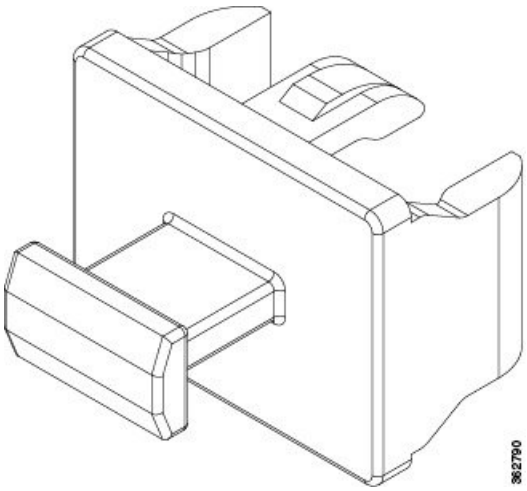
Note The CVR-QSFP-SFP10G support is expected in a future release. Therefore, in release 7.3.15 SFP+ modules can't be used.

Warning **Statement 1051—**Laser Radiation

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

Caution Protect the line card by inserting a clean SFP+ module cage cover, shown in the figure below, into the optical module cage when there is no SFP+ module installed.

Figure 100: SFP+ Module Cage Cover



Caution Protect the SFP+ modules by inserting clean dust covers into them after the cables are removed. Be sure to clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another module. Avoid getting dust and other contaminants into the optical ports of your SFP+ modules, because the optics do not work correctly when obstructed by dust.

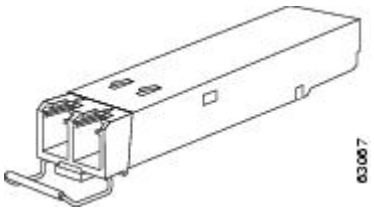
Caution We strongly recommended that you do not install or remove the SFP+ module with fiber-optic cables attached to it because of the potential of damaging the cable, the cable connector, or the optical interfaces in the module. Disconnect all cables before removing or installing an SFP+ module. Removing and inserting a module can shorten its useful life, so you should not remove and insert modules any more than is absolutely necessary.

Note When installing an SFP+ module, you should hear a click as the triangular pin on the bottom of the module snaps into the hole in the receptacle. The click indicates that the module is correctly seated and secured in the receptacle. Verify that the modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP+ module.

Bale Clasp SFP+ Module

The bale clasp SFP+ module has a clasp that you use to remove or install the module (see the figure below).

Figure 101: Bale Clasp SFP+ Module



Install a Bale Clasp SFP+ Module

To install this type of SFP+ module, follow these steps:

Procedure

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

Step 2 Close the bale clasp before inserting the SFP+ module.

Step 3 Insert the QSA module (CVR-QSFP-SFP10G) in to the port. Line up the SFP+ module with the QSA module and slide it into the module.

Note
When installing an SFP+ module, you should hear a click as the triangular pin on the bottom of the SFP+ module snaps into the hole in the receptacle. This click indicates that the module is correctly seated and secured in the receptacle. Verify that the SFP+ modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP+ module. Use the QSA adapter for using SFP+ modules.

Remove a Bale Clasp SFP+ Module

To remove this type of SFP+ module, follow these steps:

Procedure

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

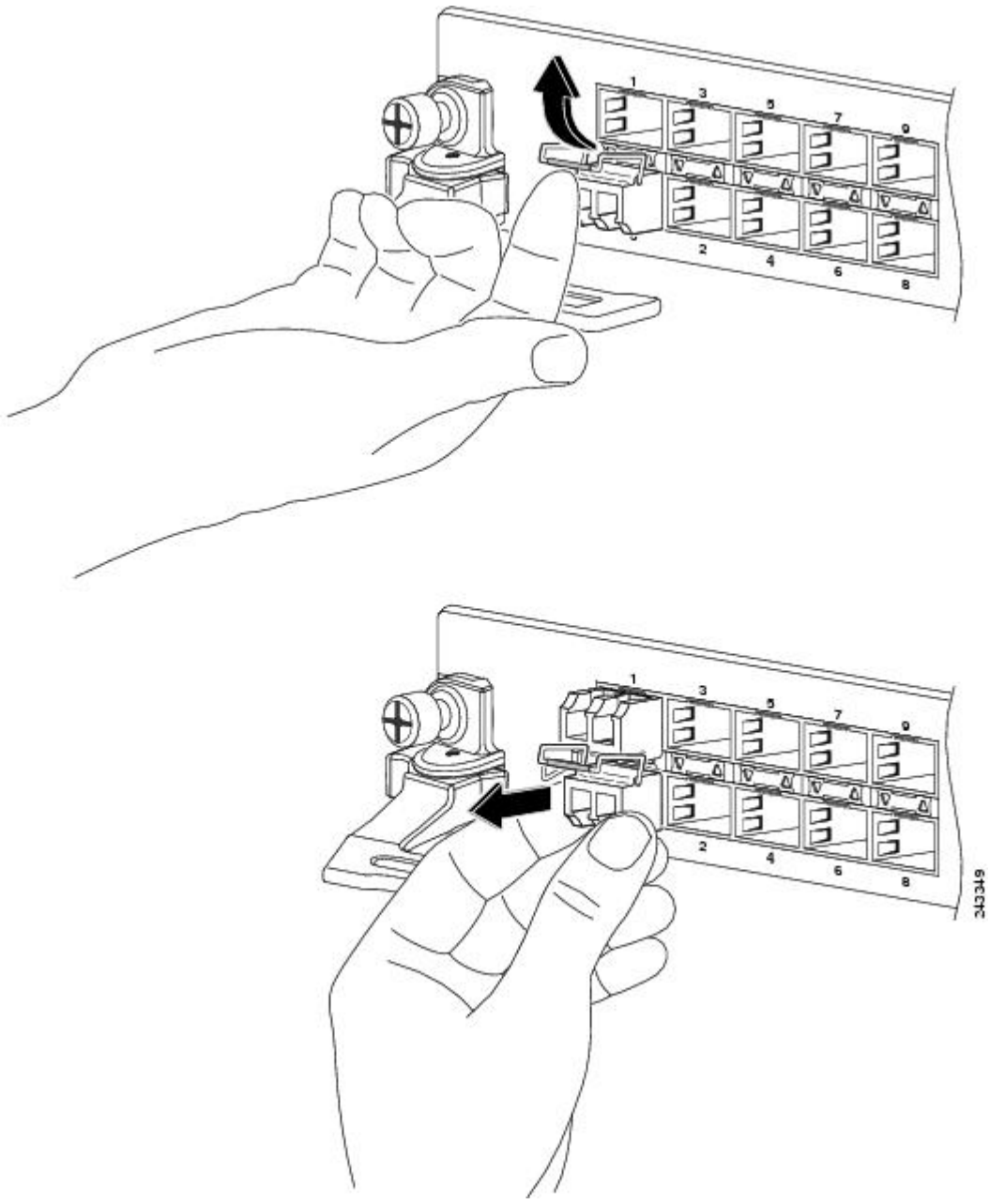
Step 2 Disconnect and remove all interface cables from the ports; note the current connections of the cables to the ports on the line card.

Step 3 Open the bale clasp on the SFP+ module with your index finger, as shown in the figure below. If the bale clasp is obstructed and you cannot use your index finger to open it, use a small flat-blade screwdriver or other long, narrow instrument to open the bale clasp.

Step 4 Grasp the SFP+ module between your thumb and index finger and carefully remove it from the port, as shown in the figure below.

Note
This action must be performed during your first instance. After all the ports are populated, this may not be possible.

Figure 102: Removing a Bale Clasp SFP+ Module



Step 5 Place the removed SFP+ module on an antistatic mat, or immediately place it in a static shielding bag if you plan to return it to the factory.

Step 6 Protect your line card by inserting a clean SFP+ module cage covers into the optical module cage when there is no SFP+ module installed.

Install and Remove QSFP-DD Transceiver Modules

This section provides the installation, cabling, and removal instructions for the QSFP-DD transceiver modules. The modules are hot-swappable I/O devices that connect the system's module port electrical circuitry with either a copper or a fiber-optic network.

The following figure shows a 400-Gigabit QSFP-DD optical transceiver. The transceiver is used primarily in short reach applications in switches, routers, and data center equipment where it provides higher density than SFP+ modules. The 100GE/400GE QSFP-DD optical transceiver and 100-Gigabit QSFP28 optical transceiver are similar to the 40-Gigabit QSFP+ optical transceiver.

Figure 103: 400-Gigabit QSFP-DD Transceiver Module - Front view

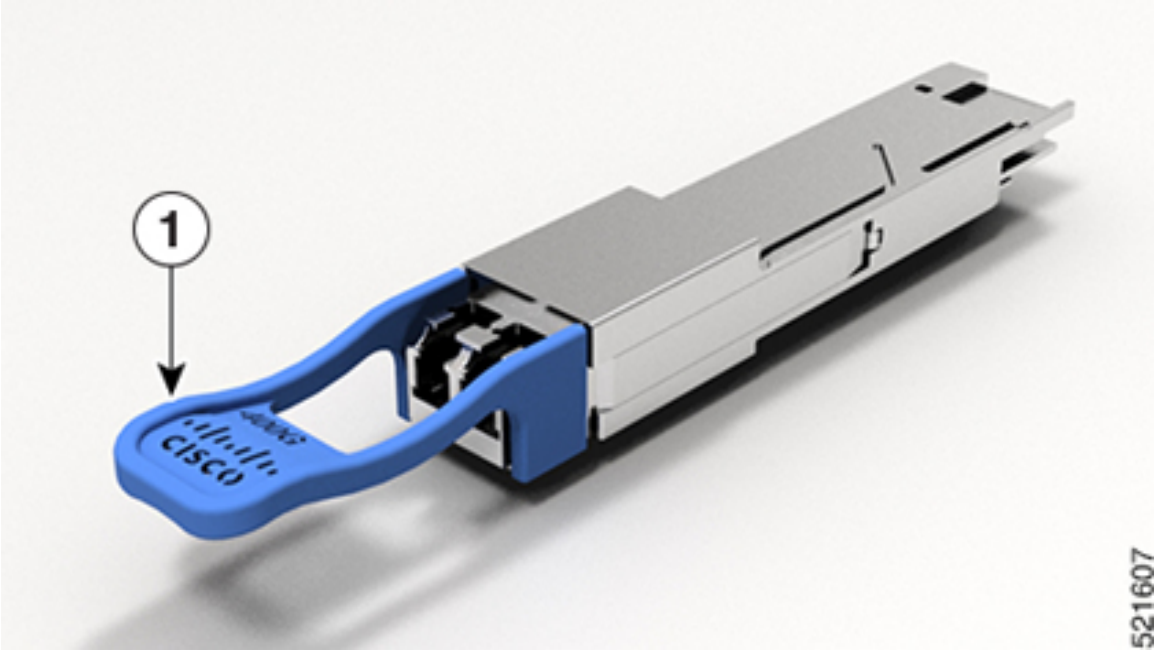
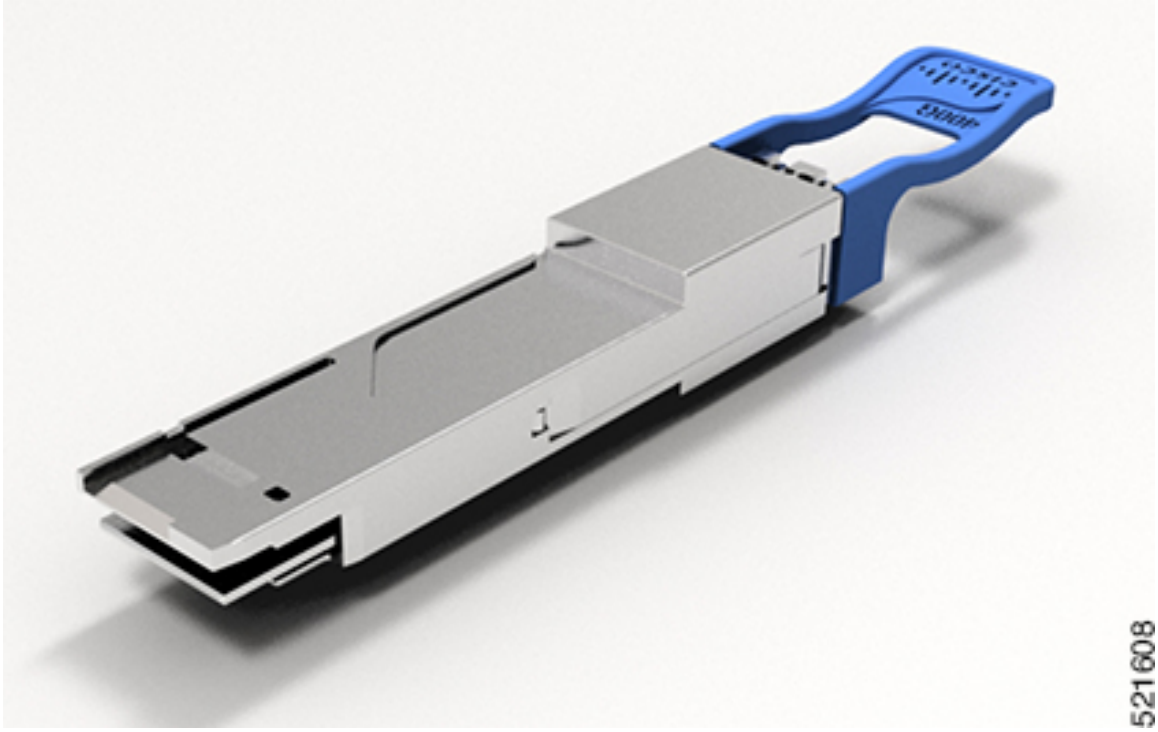


Figure 104: 400-Gigabit QSFP-DD Transceiver Module - Rear view



1	Pull-tab latch.

Caution The QSFP-DD transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling QSFP-DD transceiver modules or coming into contact with system modules.

The QSFP-DD transceiver module has a pull-tab latch.

To install the QSFP-DD transceiver module, follow these steps:

Before you begin

You need these tools to install the transceiver modules:

- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment. See Inspection and Cleaning Procedures for Fiber-Optic Connections.

Procedure

Step 1 Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.

Step 2 Remove the QSFP-DD transceiver module from its protective packaging.

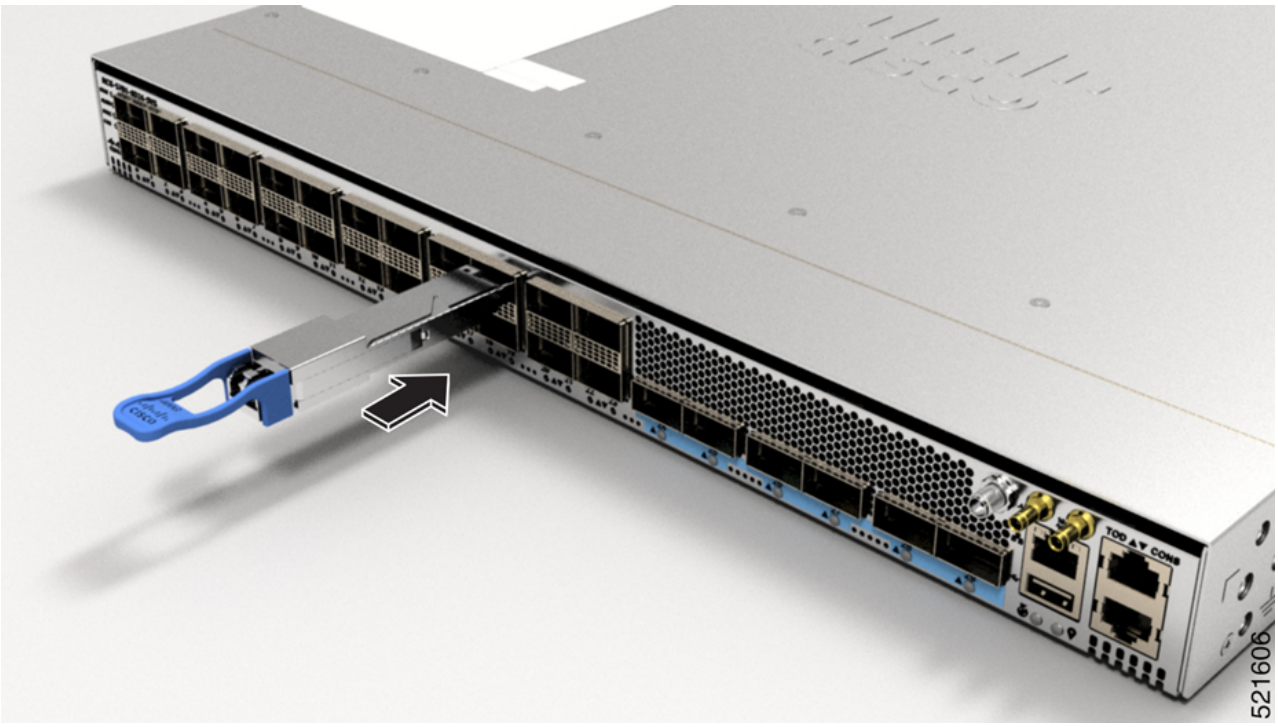
Step 3 Check the label on the QSFP-DD transceiver module body to verify that you have the correct model for your network.

Note
Do not remove the dust plug until you're ready to attach the network interface cable.

Step 4 Hold the QSFP-DD transceiver module by the pull-tab.

Step 5 Align the QSFP-DD transceiver module in front of the module's transceiver socket opening and carefully slide the transceiver into the socket until the transceiver contact with the socket electrical connector.

Figure 105: Inserting QSFP-DD Transceiver Module



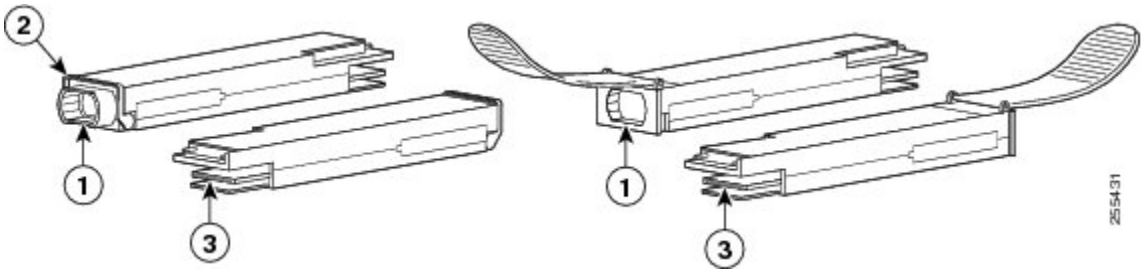
Step 6 Holding the pull-tab, fully seat the transceiver in the module's transceiver socket until it clicks.

Install and Remove QSFP+/QSFP28 Transceiver Modules

This section provides the installation, cabling, and removal instructions for the 40-Gigabit Quad Small Form-Factor Pluggable Plus (QSFP+) and 100 Gigabit (QSFP28) transceiver modules. The modules are hot-swappable input/output (I/O) devices that connect the system's module port electrical circuitry with either a copper or a fiber-optic network.

The following figure shows the 40-Gigabit optical QSFP+ transceiver. The transceiver is used primarily in short reach applications in switches, routers, and data center equipment where it provides higher density than SFP+ modules. The 100-Gigabit optical QSFP28 transceiver is similar to the 40-Gigabit optical QSFP transceiver.

Figure 106: 40-Gigabit QSFP+ Transceiver Module (Optical)



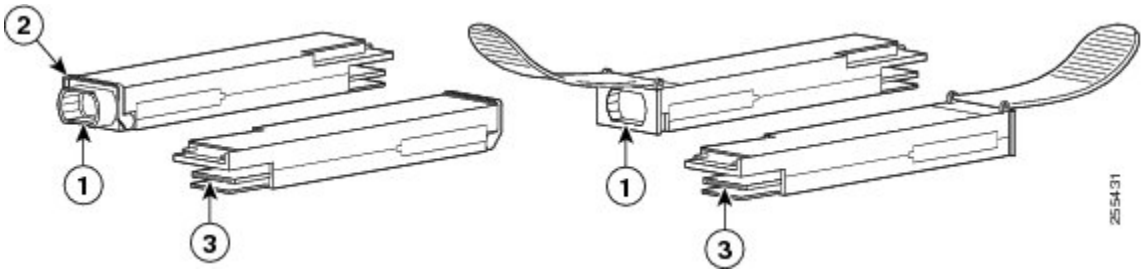
1	40GBASE QSFP+ transceiver body	3	Electrical connection to the module circu
2	Bail-clasp latch		

Overview

The 40-Gigabit (GE) QSFP+ and 100 Gigabit (QSFP28) transceiver module is a hot-swappable, parallel fiber-optical module with 4 independent optical transmit and receive channels. These channels can terminate in another 40-Gigabit QSFP+ transceiver, or the channels can be broken out to 4 separate 10-Gigabit SFP+ transceivers. The QSFP+ transceiver module connects the electrical circuitry of the system with an optical external network.

The following figure shows the 40-Gigabit optical QSFP+ transceiver. The transceiver is used primarily in short reach applications in switches, routers, and data center equipment where it provides higher density than SFP+ modules. The 100-Gigabit optical QSFP28 transceiver is similar to the 40-Gigabit optical QSFP transceiver.

Figure 107: 40-Gigabit QSFP+ Transceiver Module (Optical)



1	40GBASE QSFP+ transceiver body	3	Electrical connection to the module circu
2	Bail-clasp latch		

Required Tools and Equipment

You need these tools to install the 40-Gigabit QSFP+ / 100-Gigabit QSFP28 transceiver modules:

- Wrist strap or other personal grounding device to prevent ESD occurrences.

- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment.

Installing the 40-Gigabit QSFP+ or 100-Gigabit Transceiver Module

The QSFP+ or QSFP28 transceiver module can have either a bail-clasp latch or a pull-tab latch. Installation procedures for both types of latches are provided.



Caution The QSFP+ or QSFP28 transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling QSFP+ or QSFP28 transceiver modules or coming into contact with system modules.

To install an QSFP+ or QSFP28 transceiver module, follow these steps:

Procedure

Step 1 Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.

Step 2 Remove the QSFP+ or QSFP28 transceiver module from its protective packaging.

Step 3 Check the label on the QSFP+ or QSFP28 transceiver module body to verify that you have the correct model for your network.

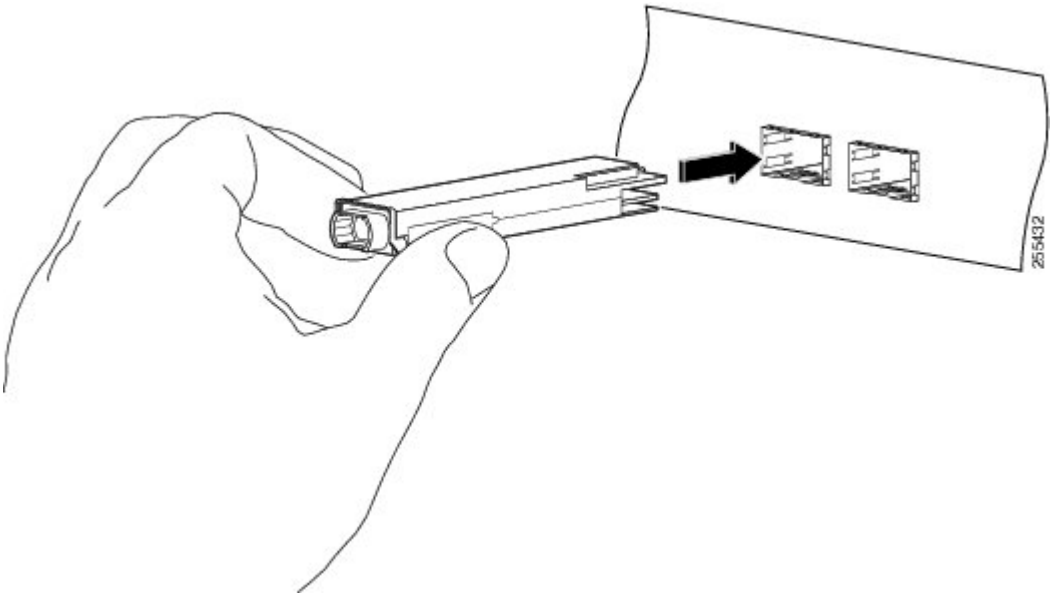
Step 4 For optical QSFP+ or QSFP28 transceiver modules, remove the optical bore dust plug and set it aside.

Step 5 For QSFP+ or QSFP28 transceiver modules equipped with a pull-tab, hold the transceiver so that the identifier label is on the top.

Step 6 For QSFP+ or QSFP28 transceiver modules equipped with a bail-clasp latch, keep the bail-clasp aligned in a vertical position.

Step 7 Align the QSFP+ or QSFP28 transceiver module in front of the module's transceiver socket opening and carefully slide the QSFP+ or QSFP28 transceiver into the socket until the transceiver makes contact with the socket electrical connector (see the figure below).

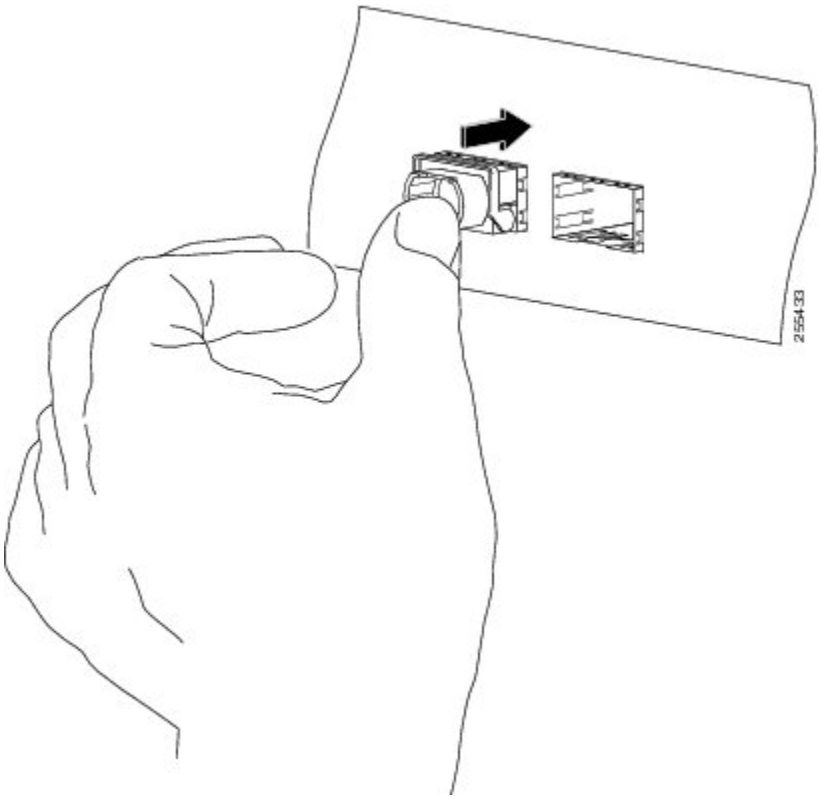
Figure 108: Installing the 40-Gigabit QSFP+ or 100-Gigabit QSFP28 Transceiver Module (Optical Transceiver Equipped with a Bail-Clasp Latch Shown)



Step 8 Press firmly on the front of the QSFP+ or QSFP28 transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see the below figure).

Caution
If the latch is not fully engaged, you might accidentally disconnect the QSFP+ or QSFP28 transceiver module.

Figure 109: Seating the 40-Gigabit QSFP+ or 100-Gigabit QSFP28 Transceiver Module (Optical Transceiver Equipped with a Bail-Clasp Latch Shown)



Step 9 For optical QSFP+ or QSFP28 transceiver modules, reinstall the dust plug into the QSFP+ or QSFP28 transceivers optical bore until you are ready to attach the network interface cable. Do not remove the dust plug until you are ready to attach the network interface cable.

Attach the Optical Network Cable

Before you begin

Before you remove the dust plugs and make any optical connections, follow these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the MPO connector end faces just before you make any connections.
- Grasp the MPO connector only by the housing to plug or unplug a fiber-optic cable.

Note 40-Gigabit QSFP+ or QSFP28 transceiver modules are keyed to prevent incorrect insertion.

Note The multiple-fiber push-on (MPO) connectors on the optical QSFP+ or QSFP28 transceivers support network interface cables with either physical contact (PC) or ultra-physical contact (UPC) flat polished face types. The MPO connectors on the optical QSFP+ or QSFP28 transceivers do not support network interface cables with an angle-polished contact (APC) face type.

Procedure

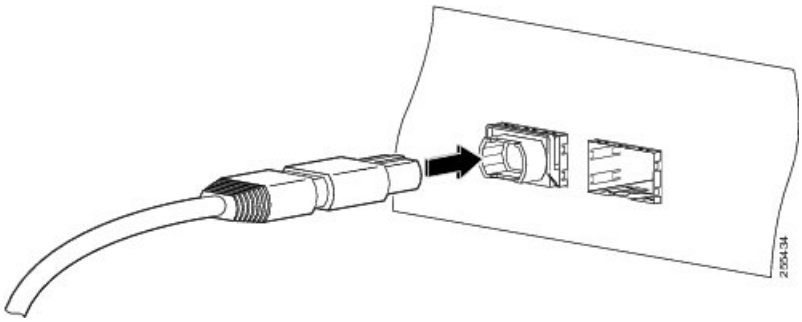
Step 1 Remove the dust plugs from the optical network interface cable MPO connectors. Save the dust plugs for future use.

Step 2 Inspect and clean the MPO connector's fiber-optic end faces.

Step 3 Remove the dust plugs from the QSFP+ or QSFP28 transceiver module optical bores.

Step 4 Immediately attach the network interface cable MPO connectors to the QSFP+ or QSFP28 transceiver module (see the figure below).

Figure 110: Cabling a 40-Gigabit QSFP+ or QSFP28 Transceiver Module



Removing the 40-Gigabit QSFP+ or 100-Gigabit QSFP28 Transceiver Module

Caution The QSFP+ or QSFP28 transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling QSFP+ or QSFP28 transceiver modules or coming into contact with modules.

To remove a QSFP+ or QSFP28 transceiver module, follow these steps:

Procedure

Step 1 For optical QSFP+ or QSFP28 transceiver modules, disconnect the network interface cable from the QSFP+ or QSFP28 transceiver connector.

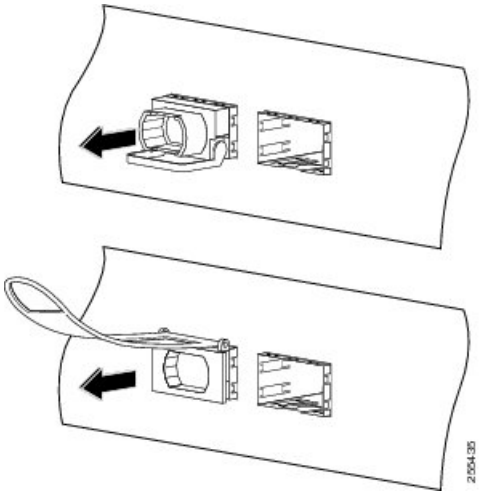
Step 2 For QSFP+ or QSFP28 transceiver modules equipped with a bail-clasp latch (see the below figure, top view):

a) Pivot the bail-clasp down to the horizontal position.
b) Immediately install the dust plug into the transceivers optical bore.
c) Grasp the sides of the QSFP+ or QSFP28 transceiver and slide it out of the module socket.

Step 3 For QSFP+ or QSFP28 transceivers equipped with a pull tab latch (see the below figure, bottom view):

a) Immediately install the dust plug into the transceiver's optical bore.
b) Grasp the tab and gently pull to release the transceiver from the socket.
c) Slide the transceiver out of the socket.

Figure 111: Removing the 40-Gigabit QSFP+ or 100-Gigabit QSFP28 Transceiver Module



Step 4 Place the QSFP+ or QSFP28 transceiver module into an antistatic bag.

Connect Interface Ports

You can connect optical interface ports on line cards with other devices for network connectivity.

Connect a Fiber-Optic Port to the Network

Depending on the line card model that you are using, you can use either QSFP+ or QSFP28 transceivers. Some transceivers work with fiber-optic cables that you attach to the transceivers and other transceivers work with pre-attached copper cables. When installing fiber-optic cables for a port, you must install SFP transceivers for 1-Gigabit optical ports or install SFP+ transceivers for 10-Gigabit optical ports or QSFP+ transceivers for 100-Gigabit ports before installing the fiber-optic cable in the transceivers.

Caution Removing and installing a transceiver can shorten its useful life. Do not remove and insert transceivers any more than is absolutely necessary. We recommended that you disconnect cables before installing or removing transceivers to prevent damage to the cable or transceiver.

Disconnect Optical Ports from the Network

When you need to remove fiber-optic transceivers, you must first remove the fiber-optic cables from the transceiver before you remove the transceiver from the port.

Connecting a Cable to the GNSS Antenna Interface

Depending on the router, the GNSS LED is located on the front or the rear side of the router.

Procedure

Step 1 Connect one end of a shielded coaxial cable to the GNSS RF IN port.

Step 2 Connect the other end of the shielded coaxial cable to the GNSS antenna after the primary protector.

Note
The GNSS RF In port should have a primary protector installed to meet the Local Safety guidelines.

The GNSS RF In coaxial cable shield must be connected to the Facility Equipment Ground through the chassis. The chassis must have the ground wire connected to the Facility Equipment Ground.

GPS Port Pinouts

The platform is capable of receiving or sourcing GPS signals of 1 PPS & 10 MHz. These interfaces are provided by two mini-coax 50-Ohm, 1.0/2.3 DIN series connector on the front panel. Similarly there are two mini-coax 50-Ohm connectors provided in the front panel to output this 1PPS and 10MHz.

The table below summarizes the GPS port pinouts.

Table 30: GPS Port Pinouts

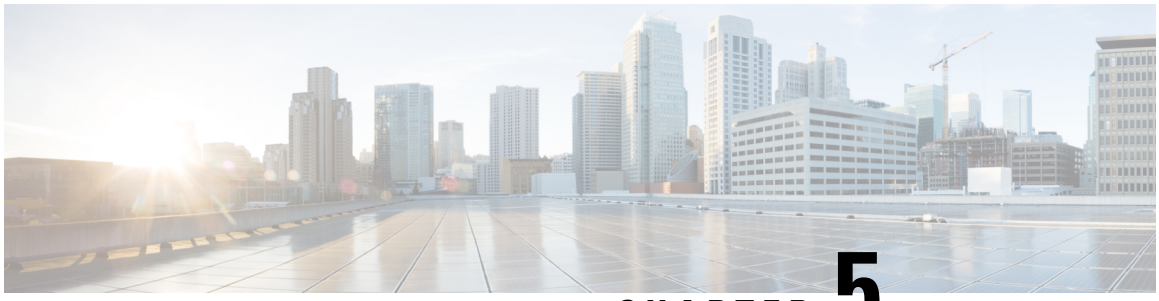
	10 MHz (Input and Output)	**1PPS (Input and Output)**
Waveform	Input—Sine wave Output—Square wave	Input—Rectangular pulse Output—Rectangular pulse
Amplitude	Input— > 1.7 volt p-p(+8 to +10 dBm) Output— > 2.4 volts TTL compatible	Input— > 2.4 volts TTL compatible Output— > 2.4 volts TTL compatible
Impedance	50 ohms	50 ohms
Pulse Width	50% duty cycle	26 microseconds
Rise Time	Input—AC coupled Output—5 nanoseconds	40 nanoseconds

Maintain Transceivers and Optical Cables

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

Consider the following maintenance guidelines:

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



CHAPTER 5

Replace Chassis Components

Before you begin this task, ensure that you have read and understood the safety warnings in the Safety with Electricity section of the Safety Warnings handout topic.

- Replace Fan Modules and Fan Trays, on page 137
- Replace Power Supply, on page 141
- Replace a Route Processor Card, on page 147
- Installing and Removing Modular Port Adapters, on page 149

Replace Fan Modules and Fan Trays

Caution (NCS-57B1 and NCS-57C3-MOD) If you cannot replace a fan module or fan tray within three minutes, we recommend that you leave it in the chassis until you are prepared to replace it within that specified time limit.

Caution (NCS-57C1) If you cannot replace a fan module within five minutes, we recommend that you leave it in the chassis until you are prepared to replace it within that specified time limit.

Note If you remove more than one fan module or fan tray at a time during operations, the router allows up to 2 minutes of operations before shutting down, unless you replace extra missing fan modules or fan trays within that time. If the router senses an over temperature condition when multiple fan modules or fan trays are removed, the shutdown can occur in less than 2 minutes.

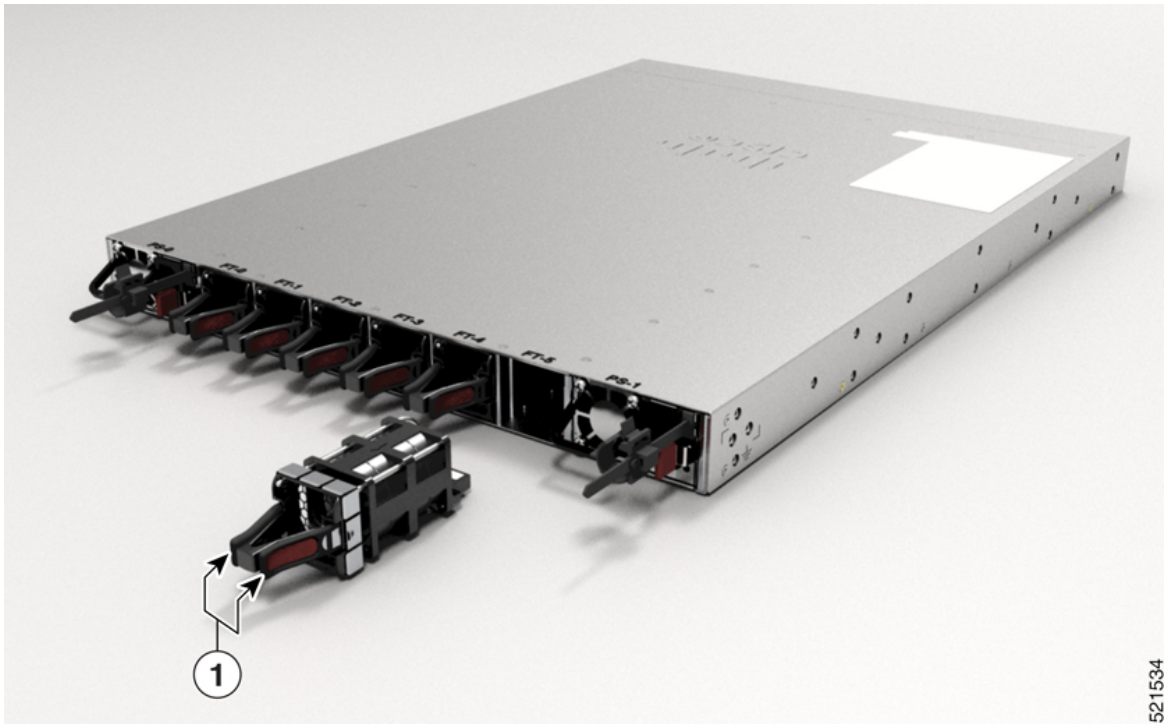
Procedure

Step 1 For NCS-57B1/NCS-57C1/NCS-57D2 routers, do the following:

a) Press both the latches on the fan module to disengage the fan module connection from the chassis.

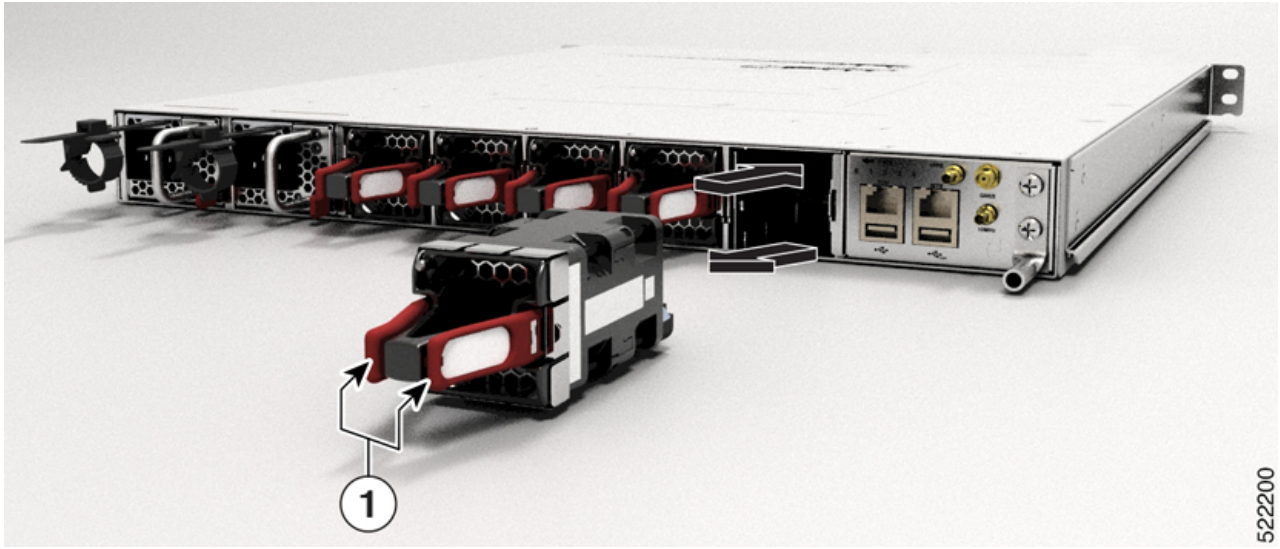
b) Simultaneously press the latches, and pull the fan module fully out of the chassis.

Figure 112: Remove Fan Module from the NCS 57B1 Chassis



1	Latched fan module

Figure 113: Remove Fan Module from the NCS-57C1 Chassis

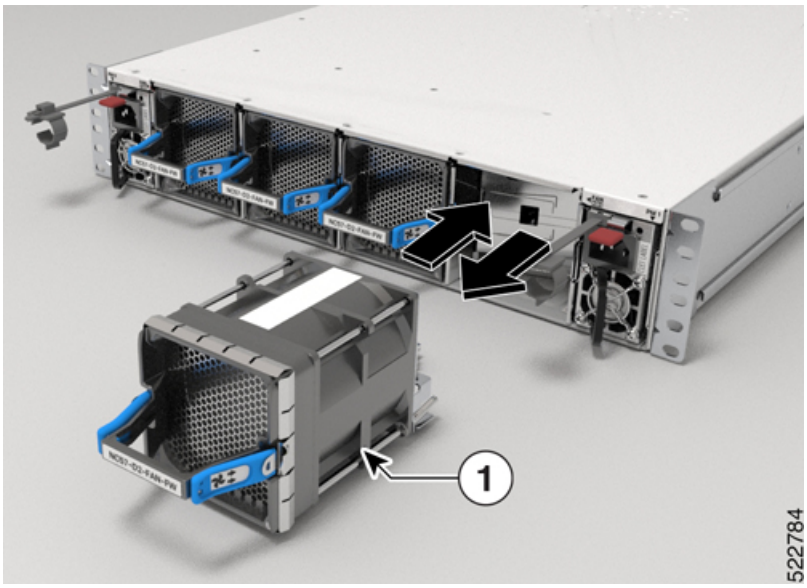


1	Latched fan module

Note

The NCS-57C1 chassis fan modules are FAN-1RU-PI-V2 for front-to-back airflow and FAN-1RU-PE-V2 for back-to-front airflow.

Figure 114: Remove Fan Module from the NCS-57D2 Chassis



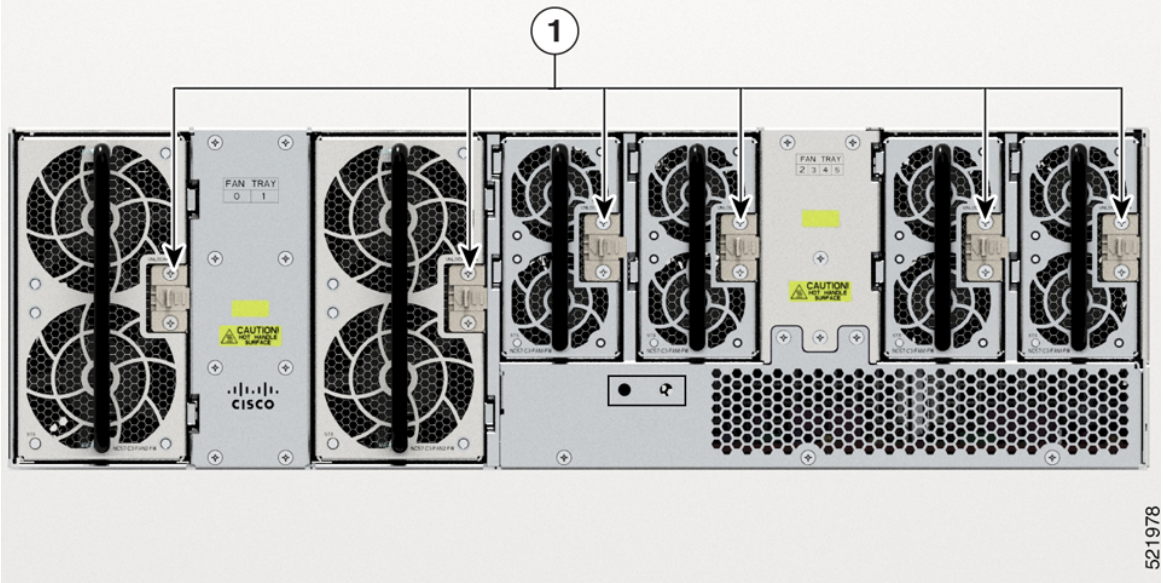
1	Latched fan module

Note
The NCS-57D2 chassis fan modules are NC57-D2-FAN-FW for front-to-back airflow and NC57-D2-FAN-RV for back-to-front airflow.

Step 2 For NCS-57C3-MOD routers, do the following:

a) Press the latch on the right side of the fan tray to disengage the fan tray connection from the chassis.
b) Simultaneously press the latch and pull the fan tray fully out of the chassis.

Figure 115: Remove Fan Tray from the NCS-57C3-MOD Chassis



1	Fan tray latch

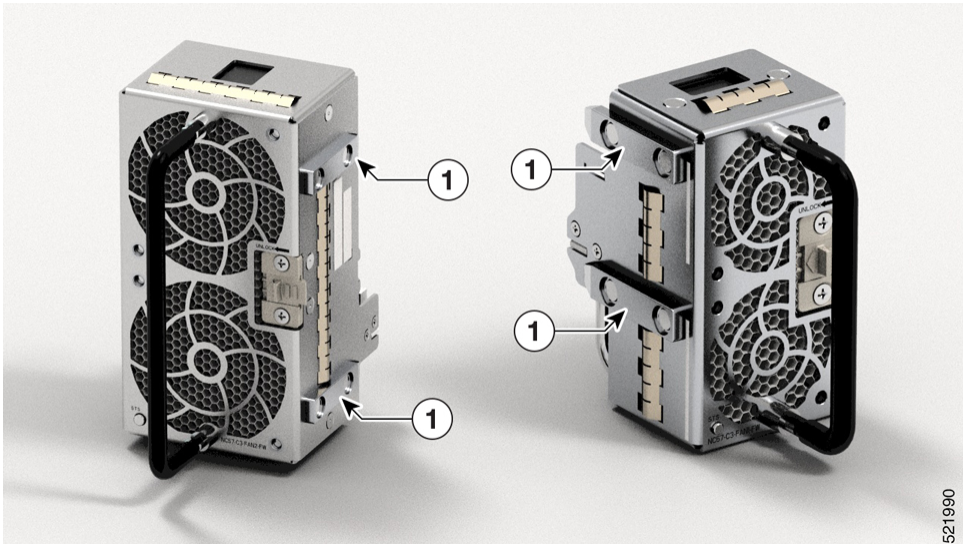
Step 3 For NCS-57B1 and NCS-57C1 fan modules, hold the fan module with the LED and PID label at the top.

Step 4 For NCS-57C3-MOD fan trays, hold the fan tray with the latch on the right.

Step 5 Align the fan module or fan tray to the open fan slot in the chassis and press the module all the way into the slot until the latches click and lock on the chassis.

Note
On the NCS-57C3-MOD, the 2x60mm fan trays (NC57-C3-FAN2-FW/NC57-C3-FAN2-HX) have alignments guides along the right side of the tray; the 2x40mm fan trays (NC57-C3-FAN1-FW/NC57-C3-FAN1-HX) have alignments guides along the left side of the tray.

Figure 116: Alignment Guides



1	Fan tray alignment guides

Step 6 If the chassis is powered on, listen for the fans. You should immediately hear them in operation. If you do not hear them, ensure that the fan module is inserted completely in the chassis.

Step 7 Verify that the fan module LED is green. If the LED is not green, one or more fans are faulty.

Note
After installation, we recommend that you move the fan handles to the right side so that the fan module LED is visible.

Replace Power Supply

The router provides the choice of two different power supplies:

- DC power—The DC power supply uses 2-position terminal block-style connector with positive latching/securing and labeled connections for +24/48V, GRD, -24/48V. The terminal block connector is of suitable size to carry the appropriate AWG wire size to handle the input current of the power supply. No ON/OFF switch is provided.
- AC power—The AC power supply has an IEC 320-type power receptacle and a 15 Amp service connector. You can use standard right angle power cords with the AC power supply. The power supply includes a power cord retainer. No ON/OFF switch is provided.

You can install dual power supplies for redundancy.

Caution In low-line applications (90-140V AC), redundancy is not guaranteed. Therefore, we recommend to use both AC and DC power supplies.

Note Products that have an AC power connection are required to have an external SPD provided as part of the building installation to comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety.

Caution Do not use interface module and power supply ejector handles to lift the chassis; using the handles to lift the chassis can deform or damage the handles.

Note In case of port-side exhaust configuration, to replace the power supply unit (PSU) in the router with air filters, you must first remove the air filter and then the PSU.

Note In NCS-57D2 routers, while installing or removing the PSU, exercise caution so that the PSU does not touch the grounding lug.

Remove the DC Power Supply Module

This section provides information about removing and replacing the DC power supply.

Warning **Statement 1003—**DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC power before removing or replacing components or performing upgrades.

Follow these steps to remove and replace the DC power supply:

Procedure

Step 1 Before servicing the power supply, switch off the circuit breaker in your equipment area. As an additional precaution, tape the circuit-breaker switch in the Off position.

Step 2 Slip on the ESD-preventive wrist strap that was included in the accessory kit.

Step 3 Switch the power supply circuit-breaker switch to the Off (O) position.

Step 4 Pull the terminal block plug connector out of the terminal block head in the power supply. See the following figure.

Step 5 Grasp the power supply handle. Simultaneously press the power supply locking tab towards the left and pull the power supply out from the chassis while supporting it with the other hand.

Install the DC Power Supply Module

This equipment is suitable for installation in Network Telecommunications Facilities and locations where the NEC applies.

This equipment is suitable for installations utilizing the Common Bonding Network (CBN).

The grounding architecture of this product is DC-Isolated (DC-I) for DC-powered products. DC-powered products have a nominal operating DC voltage of 48 VDC.

Perform the following procedure to install the power supply module:

Procedure

Step 1 Ensure that the system (earth) ground connection has been made.

Step 2 If necessary, remove the blank power supply filler plate from the chassis power supply slot. .

Step 3 Verify that power to the DC circuit connected to the power supply you are installing is off. To ensure that power has been removed from the DC circuits, locate the circuit breakers for the DC circuits, switch the circuit breakers to the OFF position, and tape the circuit-breaker switches in the OFF position.

Step 4 Grasp the power supply handle with one hand. Place your other hand underneath the power supply.

Step 5 Slide the power supply into the power supply slot. Make sure that the power supply is fully seated in the slot and that the locking tab locks with the chassis.

Figure 117: Install DC Power Supply Module

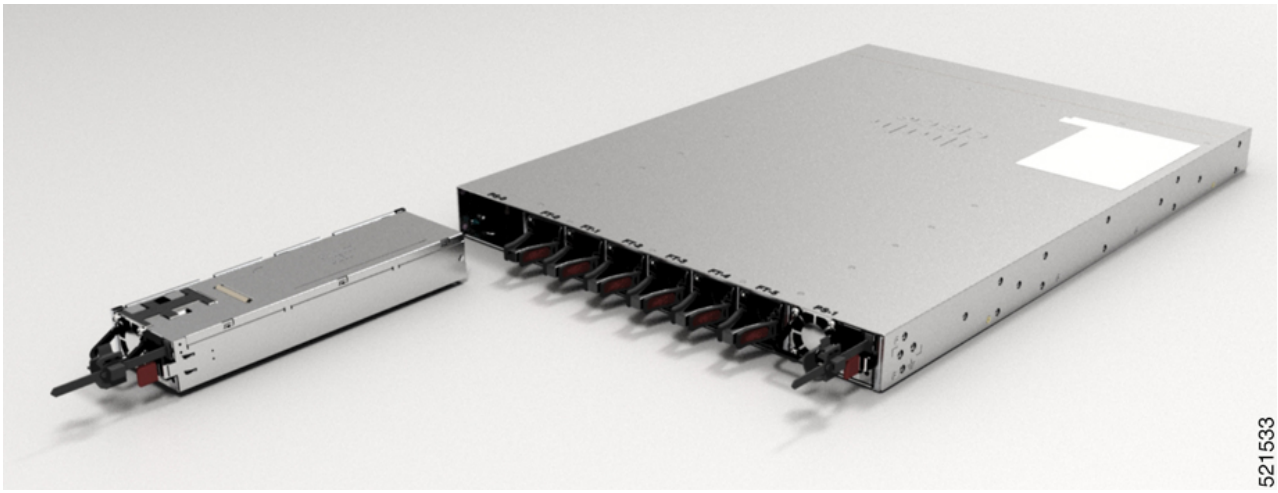


Figure 118: NCS-57C1 - Install DC Power Supply Module

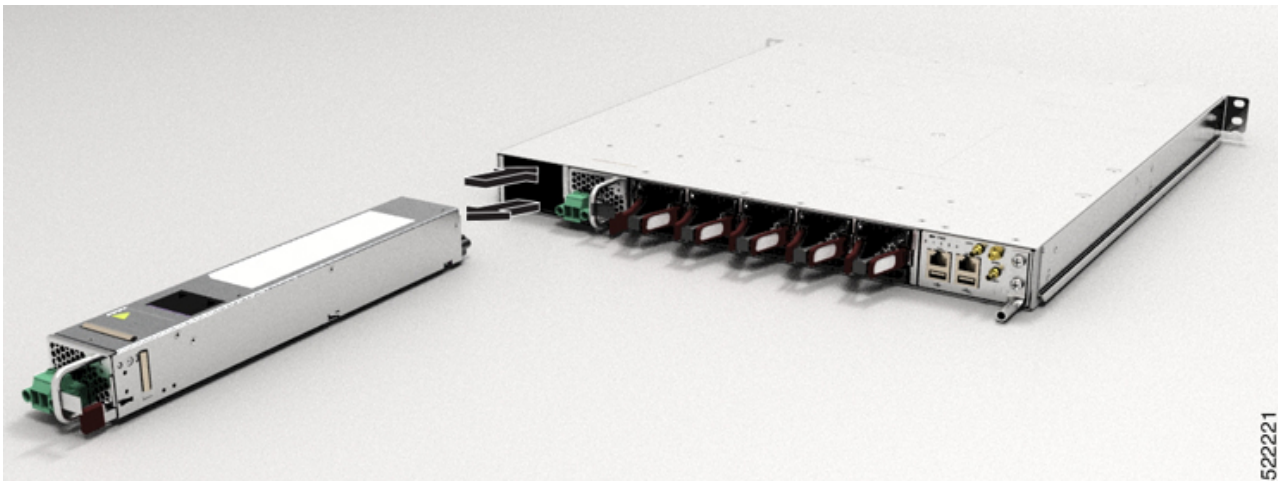
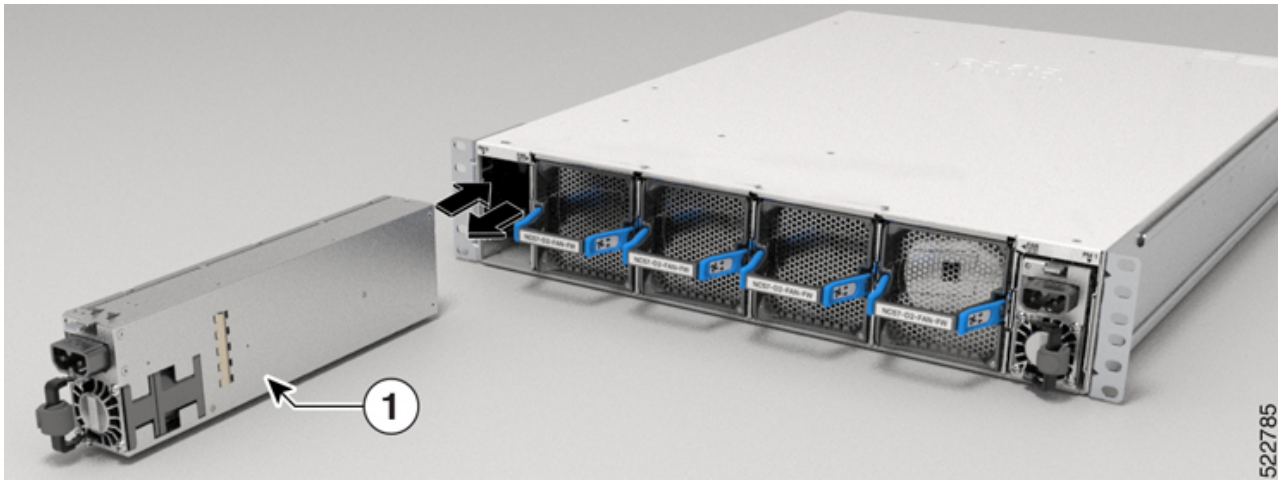


Figure 119: NCS-57D2 - Install DC Power Supply Module



1	DC power supply unit

Remove the AC Power Supply Module

This section describes how to remove and replace the AC power supply.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Follow these steps to remove and replace the AC power supply:

Procedure

Step 1 Disconnect the power cord from the power source. Do not touch any metal on the power cord when it is still connected to the power supply.

Step 2 Loosen the tie and remove the power cord from the tie-and holder.

Step 3 Remove the power cord from the power connection on the power supply. Do not touch the metal prongs embedded in the power supply.

Step 4 Grasp the power supply handle. Simultaneously press the power supply lock towards the left and pull the power supply out from the chassis while supporting it with the other hand.

Install the AC Power Supply Module

Follow these steps to install the AC power supply module:

Procedure

Step 1 Ensure that the system (earth) ground connection has been made.

Step 2 If necessary, remove the blank power supply filler plate from the chassis power supply slot opening by loosening the captive installation screws.

Step 3 Grasp the power supply handle with one hand. Place your other hand underneath the power supply. Slide the power supply into the power supply slot. Make sure that the power supply is fully seated in the slot. See the following figure.

Figure 120: NCS-57B1 - Install AC Power Supply Module

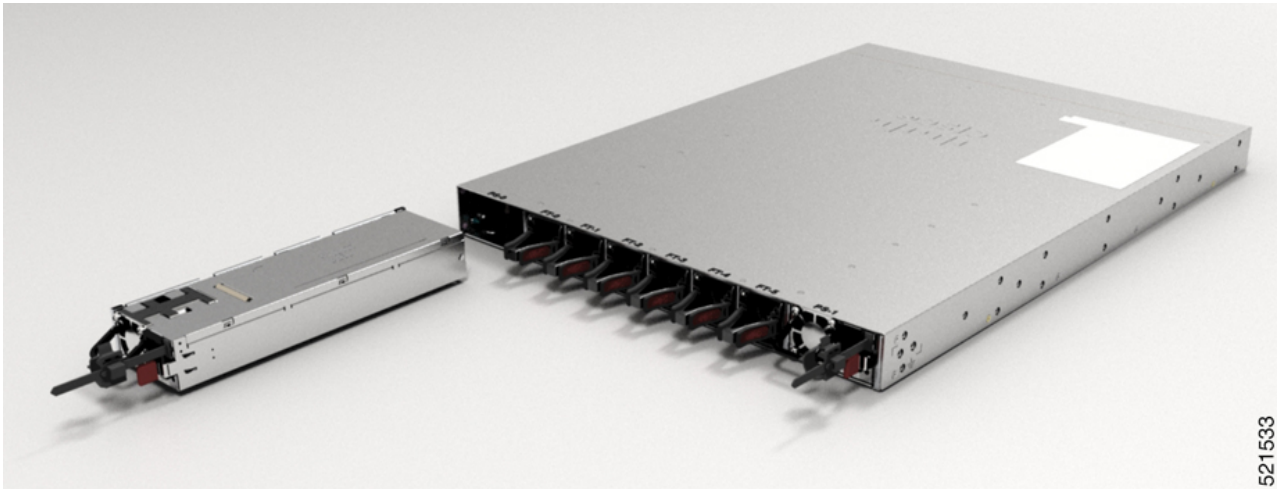


Figure 121: NCS-57C1 - Install AC Power Supply Module

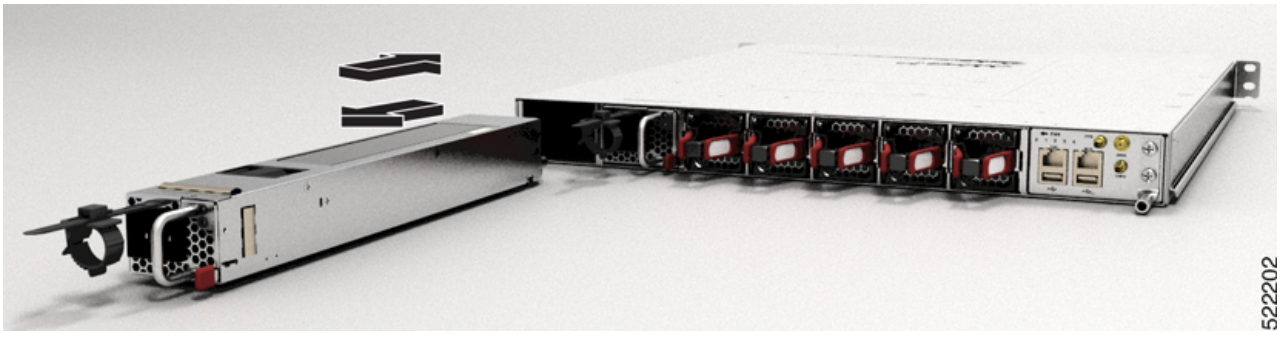


Figure 122: NCS-57C3-MOD - Install AC Power Supply Module

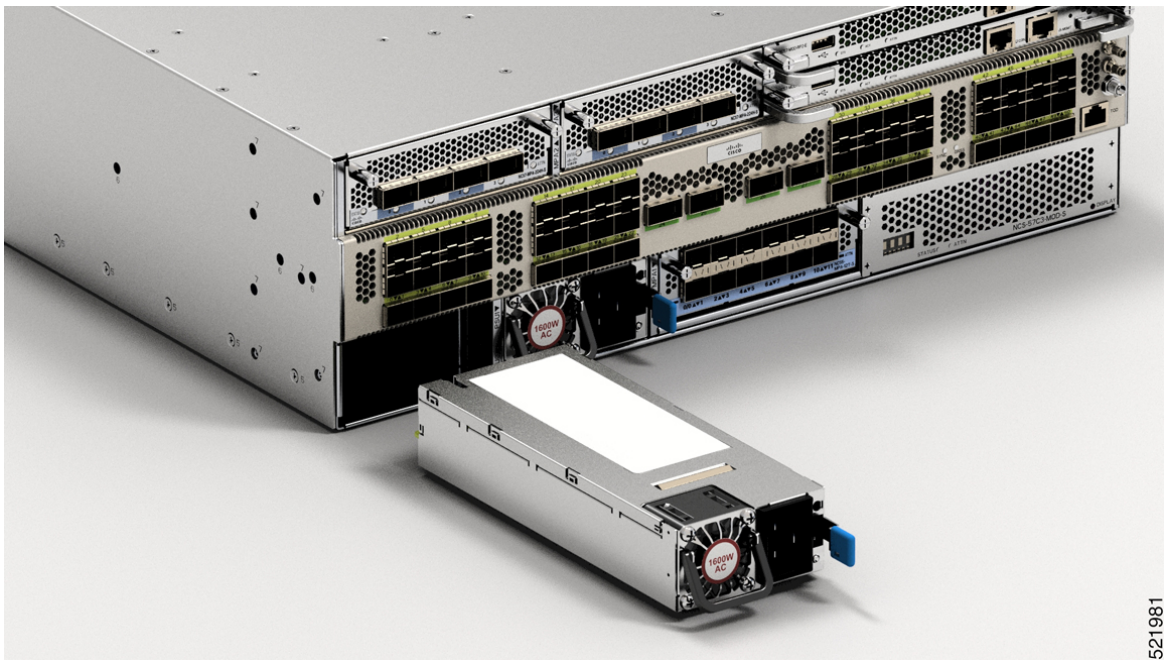
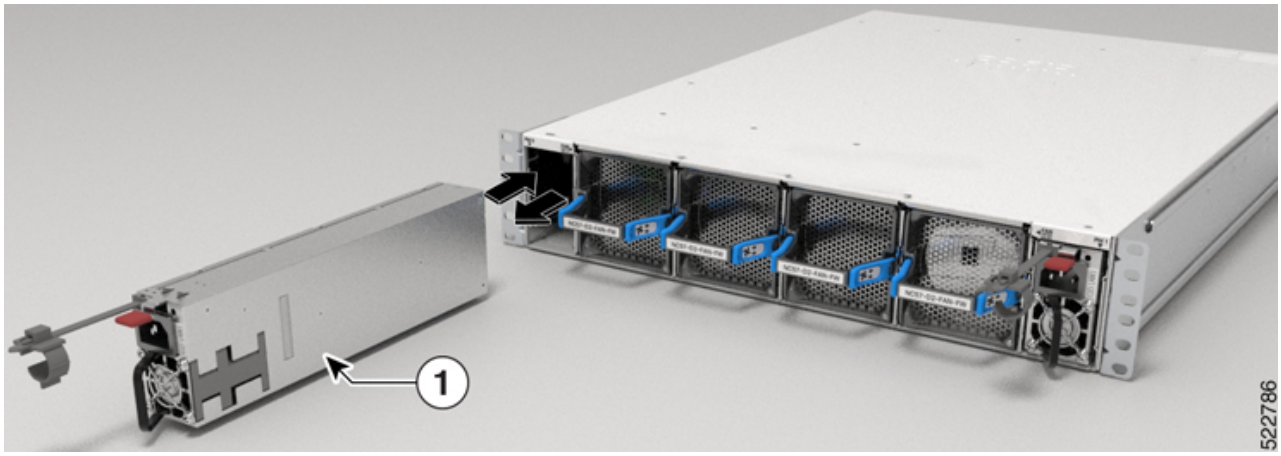


Figure 123: NCS-57D2 - Install AC Power Supply Module



1	AC power supply unit

Step 4 Slide the AC power supply cord inside the tie of the tie-and-holder and tighten the tie around the power supply cord.

Step 5 Plug the power supply cord into the AC power supply.

Replace a Route Processor Card

The NCS-57C3-MOD router supports up to two redundant route processor (RP) cards. When two RP cards are installed in the router, one acts as an active card and the other as the standby card. When the active RP card is removed, the router automatically makes the standby RP card active and the card that you are removing, the standby RP. If the router has only one RP card installed, a new RP can be installed in the empty RP slot during operation.

Warning **Statement 1029—**Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Note Before replacing the card, you must perform a graceful shutdown of the card to avoid disk corruption.

Procedure

Step 1 Open the packaging for the new RP card, inspect the card for damage, and verify that the card is the same type as the other RP card installed in the chassis.

If the card is damaged, alert the Technical Assistance Center (TAC).

Step 2 If you are installing the card in an empty slot, remove the blank card that is already in that slot by unscrewing its captive screw and pulling it out of the slot. Go to Step 4.

Step 3 If you are replacing a card that is currently in the chassis, remove the existing card from the chassis by following these steps:

a) Disconnect the following cables from the card:

- Console cable
- Ethernet Management cable

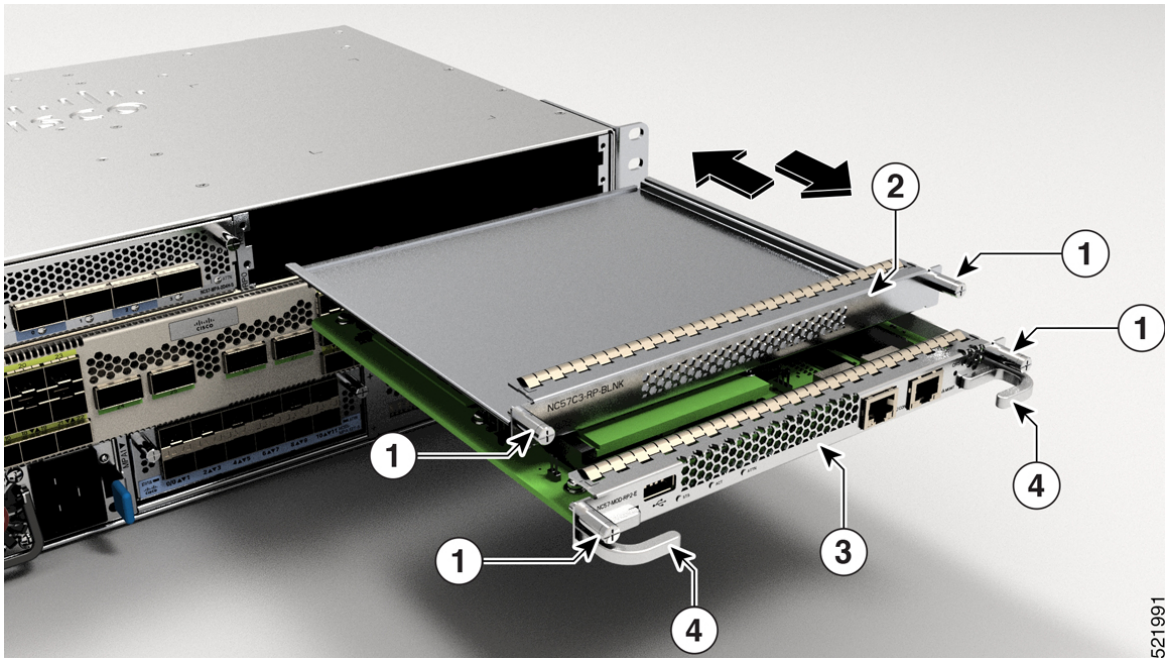
b) If there are any external drives attached to the card through its USB ports, detach those drives.

c) Run the **hw-module location** <*loc*> **shutdown** command in admin EXEC mode, which gracefully shuts down RP module to prevent any of the file systems from being corrupted.

d) Verify that the RP LED for the slot that you specified turns off. Also, you can verify that the card is in powered off state running the **show platform** command to verify the status of the card to be POWERED_OFF.

e) Use a number 2 Phillips screwdriver to loosen the captive screws on either side of the RP.

Figure 124: Remove RP and Blank from Chassis



1	Captive screws	2	Blank card
3	Route Processor	4	RP handles

f) Use one hand to hold the front of the card, place your other hand under the card to support its weight, pull the card out of the chassis, and set it on an antistatic surface or inside an antistatic bag.

Step 4 To install a new card, follow these steps:

a) Hold the front of the card with one hand and place your other hand under the card to support its weight.

b) Align the back of the card to the guides in the open route processor slot and slide the card all the way into the slot.

c) Screw in the two captive screws to secure the card to the chassis. Tighten the screws to 8 in-lb (0.9 N·m) of torque.

d) Attach the following cables to the card:

- Console cable—Attach to the Console port.
- Management cable—Attach to the Management Ethernet port.

e) Verify that the route processor card LEDs turn on and appear as follows:

- The STATUS LED blinks in amber color, then turns to solid amber color, and later turns to green color.
- The Active (ACT) LED is amber or green.

Installing and Removing Modular Port Adapters

The following sections describe how to install or remove an MPA on the NCS-57C3 routers.

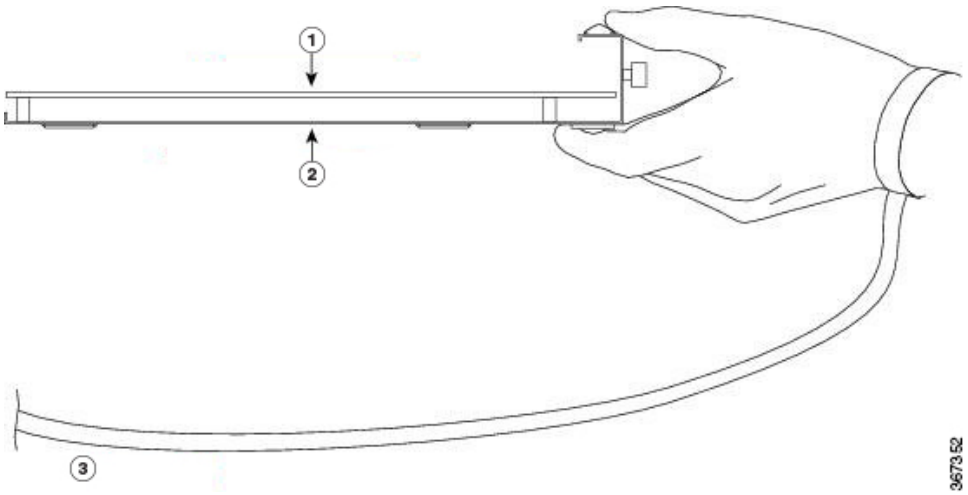
Handling Modular Port Adapters

Each modular port adapter (MPA) circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage.

Caution Always handle the MPA by the carrier edges; never touch the MPA components or connector pins (See the figure below).

When a MPA slot is not in use, a blank MPA Slot Filler must fill the empty slot to allow the router to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed modules. If you plan to install a MPA in a slot that is not in use, you must first remove the blank.

Figure 125: Handling a Modular Port Adapter



1	Printed Circuit Board	2	Metal Carrier
3	ESD Strap		

Online Insertion and Removal

Cisco NCS 5700 series modular port adapters (MPAs) support online insertion and removal (OIR).

Modular port adapters (MPAs) support the following types of OIR:

- Soft OIR

Soft OIR uses the IOS XR **hw-module subslot** *rack/slot/subslot* **reload**, **hw-module subslot** *rack/slot/subslot* **shutdown**, and **no hw-module subslot** *rack/slot/subslot* **shutdown** commands to complete online insertion and removal.

- Managed OIR

  A managed online insertion and removal of Modular port adapters (MPAs) is comprised of the following steps:

  - Shut down the MPA with the **hw-module subslot** *rack/slot/subslot* **shutdown** command.
  - Confirm that the LEDs have gone from green to off.
  - Execute the **do show platform** command to verify that the MPA to be removed is in the disabled state.
  - Physically remove the MPA to be replaced.
  - Physically insert the replacement MPA. After inserting the MPA in the slot, tighten the MPA screw located on the right side within 10 seconds. Ensure that you first tighten the right screw and then the left.

Note Tighten the captive screws on the MPA within 10 seconds. Otherwise, the MPA shuts down and moves to **Disabled** state. To recover the MPA, tighten both the captive screws and then execute the **hw-module subslot** *rack/slot/subslot* **reload** command.

  - Return the MPA to the up state with the **no hw-module subslot** *rack/slot/subslot* **shutdown** command.

- Hard OIR

  You can perform the OIR in a running system by performing the following steps, without executing any commands:

  - Loosen the right ejector screw.
  - Loosen the left ejector screw.
  - Remove and replace the MPA.

Modular Port Adapter Installation and Removal

This section provides step-by-step instructions for removing and installing a modular port adapter (MPA) in a Cisco NCS-57C3 routers.

Note After you unscrew both ejector screws, wait for 15 seconds before removing MPA from the slot.

Note After you remove the MPA from the slot, wait for 60 seconds before you reinsert the MPA. From Cisco IOS XR Software Release 26.3.1 onward, the MPA can be replaced immediately without any delay.

To remove and install a MPA, do the following:

1. To insert the MPA, locate the guide rails inside the chassis that hold the MPA in place. They are at the bottom left and bottom right of the MPA slot and are recessed about an inch.
2. Carefully slide the MPA all the way in the chassis until the MPA is firmly seated in the MPA interface connector. When fully seated, the MPA might be slightly behind the faceplate.

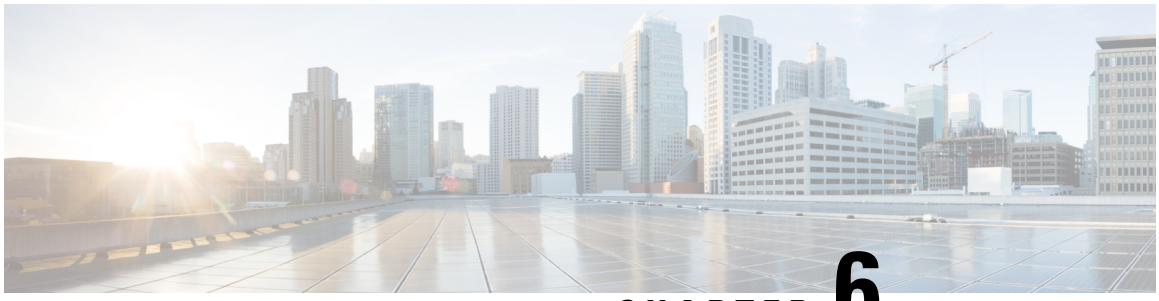
Note The MPA will slide easily into the slot if it is properly aligned on the tracks. If the MPA does not slide easily, do NOT force it. Remove the MPA and reposition it, paying close attention to engaging it on the tracks. Push the MPA inside the slot until you hear a click. Continue to push the MPA further until you hear a second click. The MPA is fully seated only after the second click is heard.

3. After the MPA is properly seated, use a number 2 Phillips screwdriver to tighten the captive screws on the MPA. Ensure that you first tighten the right screw and then the left.

Note Tighten the captive screws on the MPA within 10 seconds. Otherwise, the MPA shuts down and moves to **Disabled** state. To recover the MPA, tighten both the captive screws and then execute the **hw-module subslot** *rack/slot/subslot* **reload** command.

Note Avoid over torquing the MPA captive screws when installing the MPA. Tighten the captive screws on the MPA to a torque of 5 inch-pound.

4. To remove the MPA from the chassis, use a number 2 Phillips screwdriver to loosen the captive screws on the MPA. Ensure that you first loosen the right screw and then the left.
5. Grasp the MPA and pull the MPA from the chassis. (You have already disconnected the cables from the MPA.)



CHAPTER 6

Verify Chassis Installation

- Verify Device Installation, on page 153

Verify Device Installation

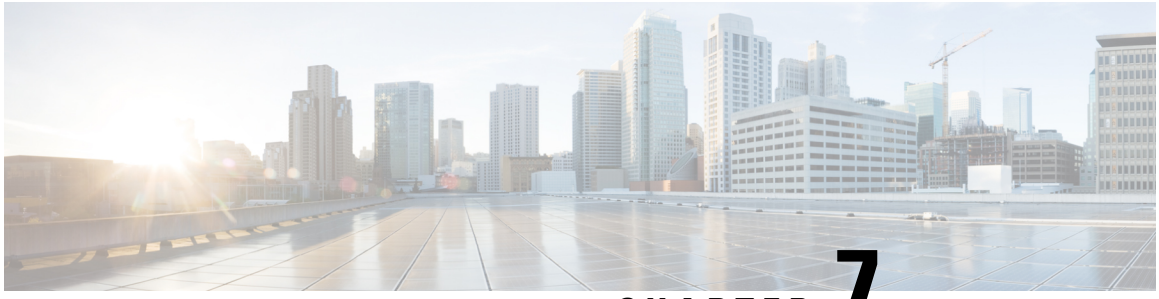
After installing the Cisco NCS 5700 Router, you can use the **show** commands to verify the installation and configuration. If any issue is detected, take corrective action before making further configurations.

Command	Description
show inventory	Displays information about the field replaceable units (FRUs), including product IDs, serial numbers, and version IDs. **Note** The FAN-1RU-PI-V2 and FAN-1RU-PE-V2 are also used on the Cisco 8000 series and will display as "Cisco 8000 Series 1RU Fan" in the output description.
show platform	Displays the operational status of the node
show version	Displays the version of the router.
admin show environment	Displays all environment-related router information.

show environment temperature	Displays temperature readings for card temperature sensors. Each system controller, route processor, line card, and fabric card has temperature sensors with two thresholds:
	• Minor temperature threshold: when a minor threshold is exceeded, a minor alarm occurs and the following actions occur for all four sensors:
	  • System messages displayed
	  • SNMP notifications (if configured) sent

Command	Description
	• Log environmental alarm event triggered (can be reviewed by running the show alarm command). • Major temperature threshold: when a major threshold is exceeded, a major alarm occurs and the following actions occur: • For sensors 1, 3, and 4 (outlet and onboard sensors), the following actions occur: • System messages displayed • SNMP notifications (if configured) sent • Log environmental alarm event triggered (can be reviewed by running the show alarm command). • For sensor 2 (intake sensor), the following actions occur: • If the threshold is exceeded in a switching card, only that card is shut down. • If the threshold is exceeded in an active route processor card with HA-standby or standby present, only that route processor card is shut down and the standby route processor card takes over. • If you do not have a standby route processor card in your router, you have up to 2 minutes to decrease the temperature. During this interval, the software monitors the temperature every 5 seconds and continuously sends system messages as configured. **Note** We recommend that you install dual route processor cards. If you are using a router without dual route processor cards, we recommend that you immediately replace the fan card even if just one fan is not working.
hw-module location <loc> shutdown or **[no] hw-module shutdown location <loc>**	Powers up or shuts down a card.

Command	Description
show environment power	Displays the power usage information for the entire router.
show environment voltage	Displays the voltage for the entire router.
show environment current	Displays the current environment status.
show environment fan	Displays the status of the fan trays.



CHAPTER 7

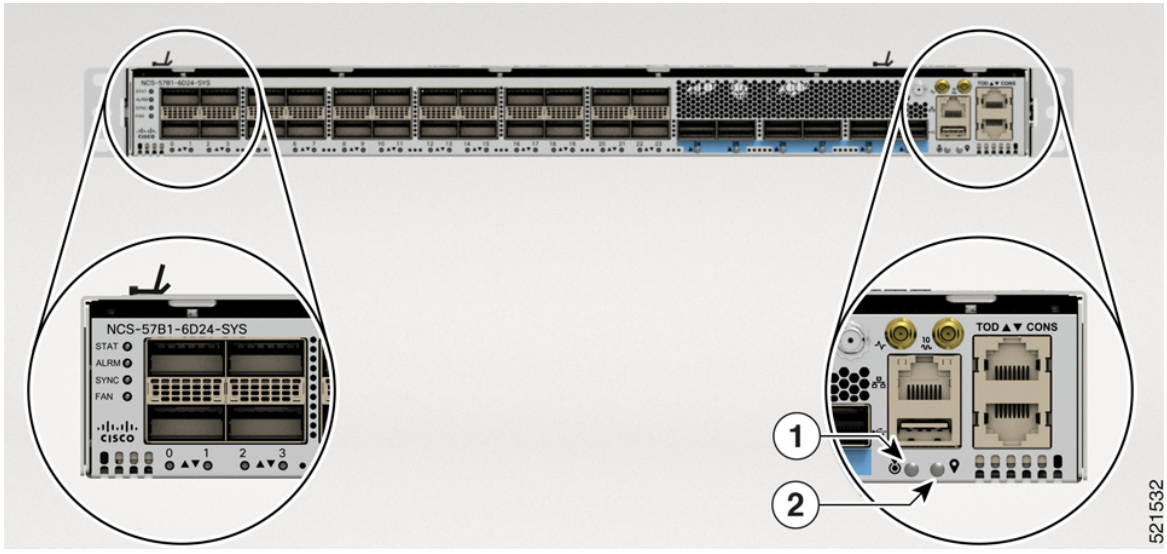
LEDs

- Chassis LEDs, on page 157
- Route Processor Card LEDs, on page 161
- Port Status LEDs, on page 163
- Port Status LED Display, on page 163
- MPA LEDs, on page 164
- Management Port LEDs, on page 165
- Fan Module and Fan Tray LED, on page 168
- Power Supply LED, on page 169

Chassis LEDs

On the NCS-57B1 chassis, the STATUS, ALARM, SYNC, and FAN LEDs are located at the far-left of the front panel. Power and GNSS LEDs are located at the far-right of the front panel, just below the USB port.

Figure 126: NCS-57B1 Chassis LEDs



1	POWER LED	2	GNSS LED

On the NCS-57C3-MOD chassis, the STATUS and ATTN LEDs are located on the lower-right of the chassis. The SYNC and GNSS LEDs are located below the RPs.

See Route Processor Card LEDs, on page 161 for the NC57-MOD-RP2-E/NC57-MOD-RP2-E-HX route processor LEDs.

Figure 127: NCS-57C3-MOD Chassis LEDs

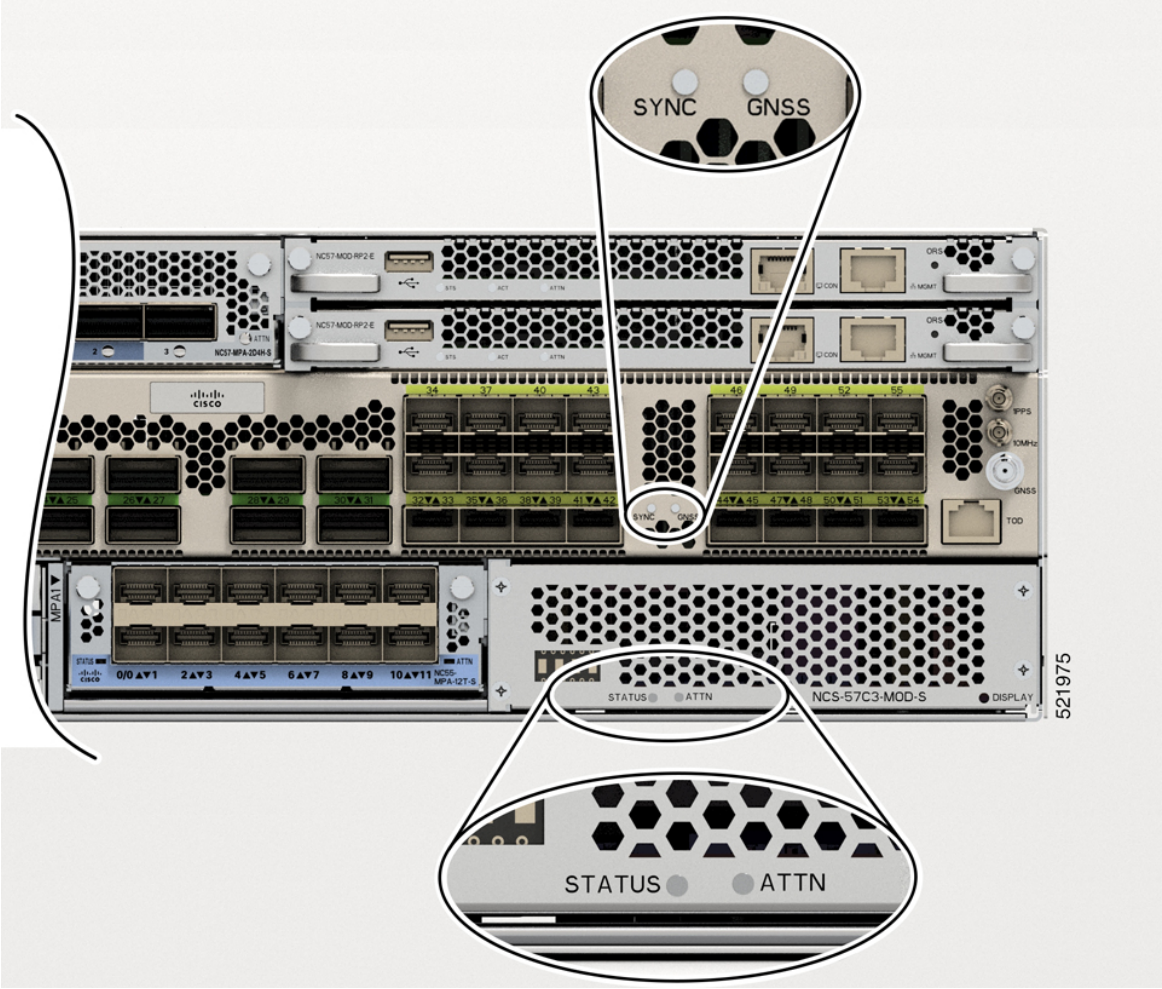
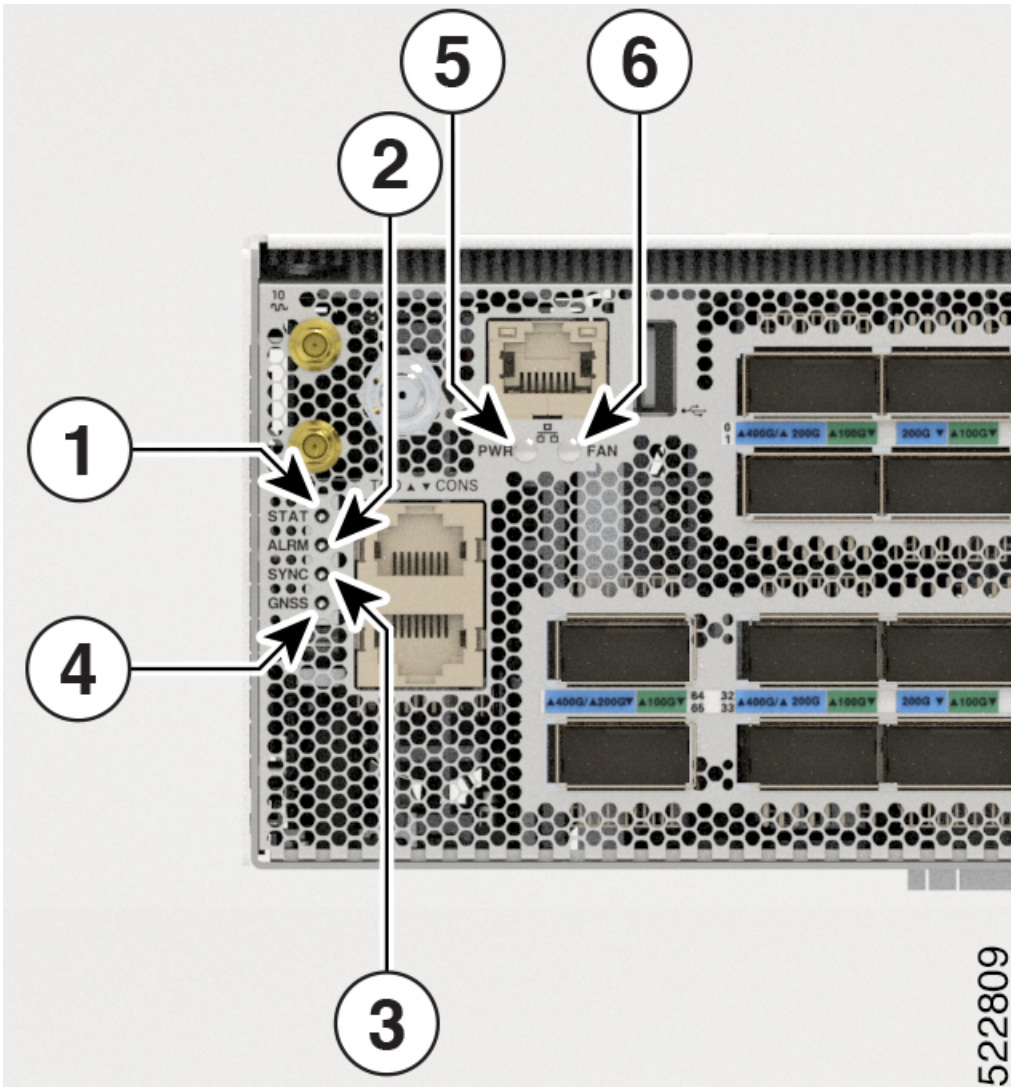


Figure 128: NCS-57D2 Chassis LEDs



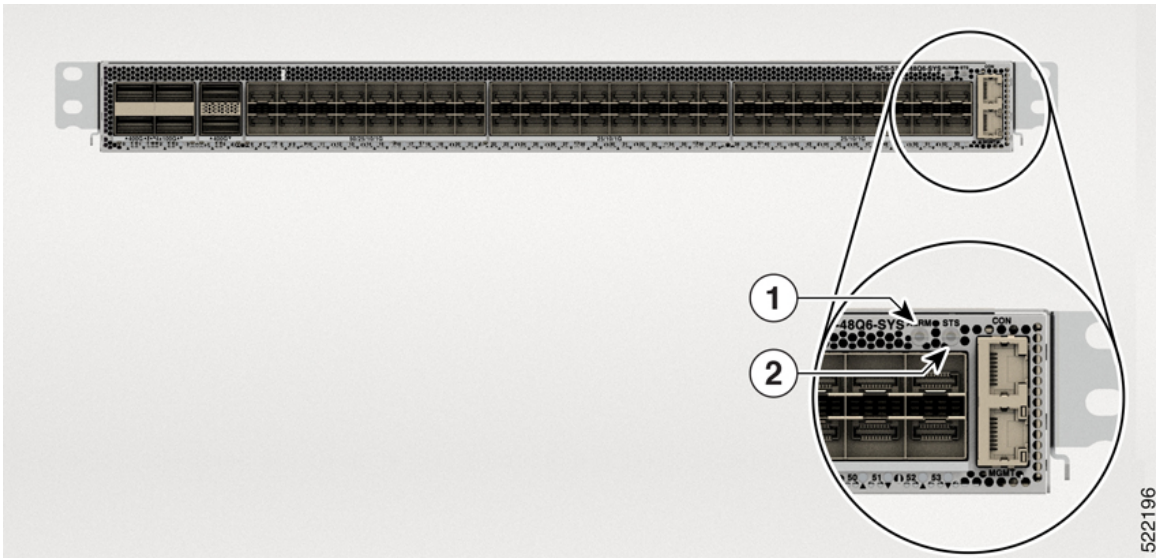
1	STAT LED	4	GNSS
2	ALRM	5	PWR
3	SYNC	6	FAN

Table 31: LED Descriptions

LED	Color	Status
STAT	Green	The module is operational and has no active major or critical alarms.
	Blinking Amber	The module is booting up.
	Amber	Host kernel booted and is ready to start XR.
	Off	The module is powered-off.
ALRM (ALARM)	Red	Critical alarm - system-scope (including RP0).
	Amber	Major alarm - system-scope (including RP0).
	Off	No alarm.
SYNC	Green	SyncE PLL is locked to an input source.
	Amber	SyncE PLL not-locked to any input source.
	Off	SyncE not configured.
FAN	Green	Fans are working normally.
	Amber	System is operating with one fan failure.
	Red	Missing a fan or multiple fan failures.
POWER (PWR)	Off	Chassis not receiving power.
	Green	Chassis powered on and normal.
	Amber	Chassis powered off and in retry mode due to thermal or fan failure.
	Red	Chassis power failure. Power supply failure, due to one of the following conditions: • Over voltage • Over current • Over Temperature • Fan failure
GNSS	Off	GNSS is not configured.
	Green	GNSS is locked to an RF input (Satellites).
	Amber	GNSS Receiver not-locked RF input (Satellites).

On the NCS-57C1 chassis, the STS (status) and ALM (alarm) LEDs are located at the top right corner of the front panel. No LEDs are present for SYNC and GNSS interfaces.

Figure 129: NCS-57C1 Chassis LEDs



1	STS LED	2	ALM LED

Table 32: LED Descriptions

LED	Color	Status
STS (STATUS)	Green	The module is operational.
	Blinking Amber (slow)	The module is booting up.
	Blinking Amber (fast)	The module is booting up, shutting down, or the SysAdmin VM is being reloaded.
	Off	The module is powered-off.
ALM (ALARM)	Red	Critical alarm.
	Amber	Major alarm.
	Blinking Amber	Minor alarm.
	Off	No alarm.

Route Processor Card LEDs

On the NC57-MOD-RP2-E/NC57-MOD-RP2-E-HX route processor card, the Status (STS), Active (ACT), and Attention (ATTN) LEDs are located on the lower left front of the route processor card. The management port link and active LEDs are located immediately below the port on the front of the module.

Figure 130: NC57-MOD-RP2-E/NC57-MOD-RP2-E-HX LEDs



1	STS (Status) LED
2	ACT (Active) LED
3	Attention (ATTN) LED

Table 33: Route Processor Card LED Descriptions

LED	Color	Status
STS (Status)	Green	This module is operational.
	Flashing amber	The module is booting up or shutting down.
	Flashing red	The module has active major or critical alarms.
	Amber	Host kernel booted and is ready to start System Administrator VM.
	Red	Either of the following conditions: • The module has detected a slot ID parity error and will not power on or boot up. • The module is not fully inserted.
	Off	The module is not receiving power.
ACT (Active)	Green	XR VM is operational and is in the active redundancy role on this module.
	Amber	XR VM is operational and is in the standby redundancy role on this module.
	Off	XR VM is not operational on this module.
ATTN (Attention)	Flashing blue	The operator has activated this LED to identify this module in the chassis.
	Off	This module is not being identified.
Management port LINK	Green	The management port is linked up.
	Off	The management port is not linked up.

LED	Color	Status
Management port ACT	Flashing green	The management port is transmitting or receiving.
	Off	The management port is not transmitting or receiving.

Port Status LEDs

The front panel of the NCS-57B1 chassis consists of the following ports for data path connectivity through optical modules:

- NCS-57B1-5DSE-SYS: x24 QSFP28 ports, x5 QSFP-DD
- NCS-57B1-6D24-SYS: x24 QSFP28 ports, x6 QSFP-DD

The front panel of the NCS-57C1 chassis consists of the following ports for data path connectivity through optical modules:

- NCS-57C1: x6 QSFP-DD ports, x16 SFP-50G ports, and x32 SFP-25G ports

Note In the NCS-57C1 routers, there are additional thermal vent perforations next to the port status LEDs. These perforations are meant to provide additional air flow for cooling the chassis. The LED status of a port can be viewed from these perforations as well.

The front panel of the NCS-57D2 chassis consists of the 66 QSFP-DD ports for data path connectivity through optical modules:

Each port consists a bi-color (Green and Amber) LED for indicating various status information of the optical ports.

Table 34: NCS-57B1, NCS-57C1, NCS-57D2 Port Status LEDs (one per port)

LED Color	Description
Off	Port is administratively shut down.
Green	Port is administratively enabled and the link is up.
Amber	Port is administratively enabled and the link is down.

Port Status LED Display

The NCS-57C3-MOD front panel LED display shows the status of the ports.



1	Port Status LED Display	2	DISPLAY Mode Button

The display uses a ##BB format that shows the port number (##) and the status (BB). Status can be green (GN) or yellow (YL) or red (RD). The display cycles through each port number in 1-second intervals.

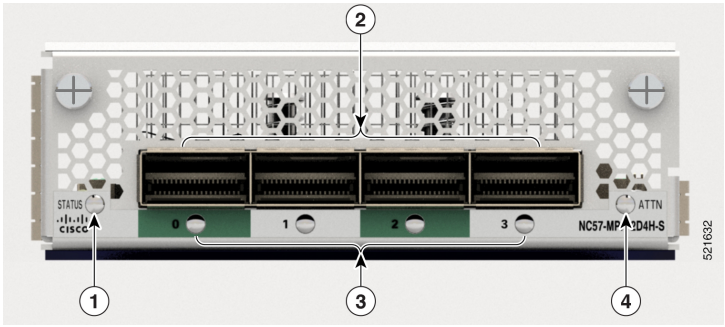
By default, the display shows all ports and their status. You can change the display mode to show only ports that are in yellow (YL) state by pressing the DISPLAY button for less than 4 seconds and release. To return to the default behavior, press and hold the DISPLAY button for more than 5 seconds and release.

Table 35: NCS-57C3 Port Status LED Display

LED Display	Description	XR Show Controller LED Status
GN	Port is administratively enabled, link is up.	Green
YL	Port is administratively enabled, link is down.	Yellow
RD	Port is administratively shut down.	No option to print

MPA LEDs

The STATUS LED is located on the front left of the MPA and the attention (ATTN) is located on the front right of the MPA. The Link LED for each port is located either between the two rows of ports (each of these LEDs is a triangle pointing to the port above or below the LED) or under the port.

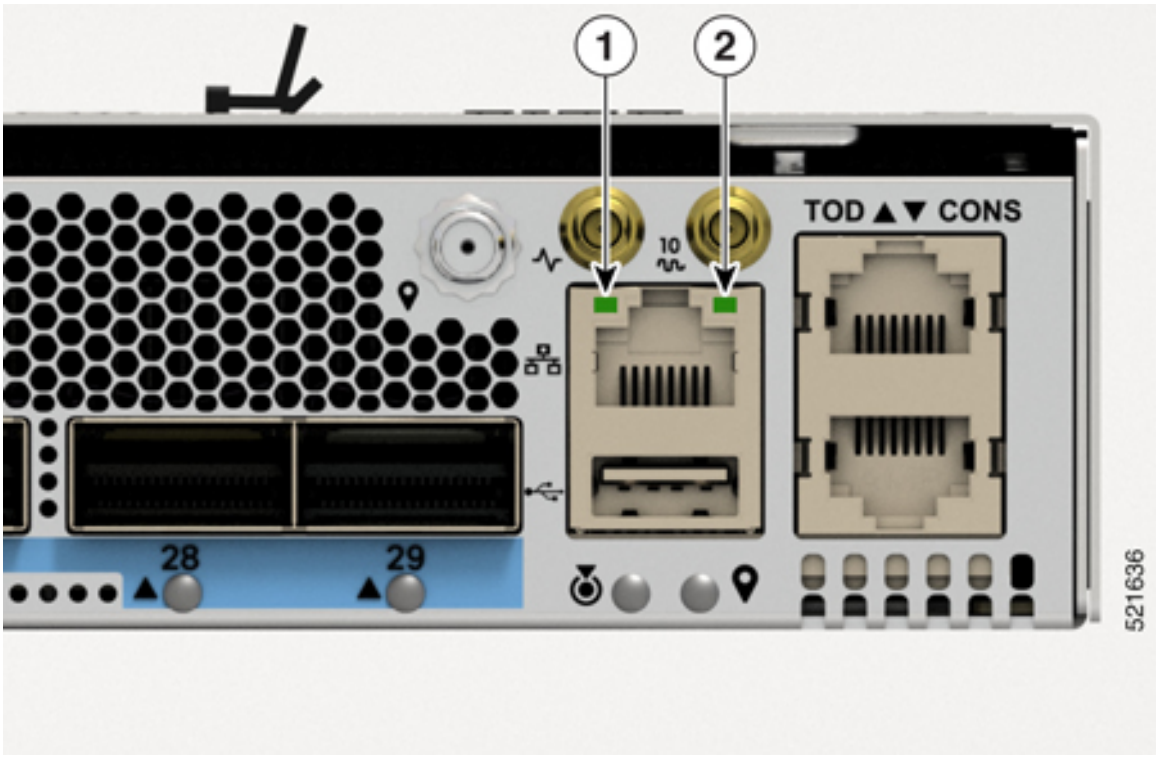


LED	Color	Status
ATTN	Flashing blue	The operator has activated this LED to identify this MPA in the chassis.
	Off	This LED is not being used.
STATUS	Green	This MPA is operational.
	Amber	Either of the following conditions: • The MPA has detected a slot ID parity error and will not power on or boot up. • The MPA is not fully inserted.
	Flashing amber	The MPA is booting up or shutting down.
	Off	The MPA is powered-off and can now be safely removed.
Link (for each port)	Green	The port is active.
	Orange	The port is disabled by the operator or is not initializing.
	Flashing orange	The port is faulty and disabled.
	Off	The port is not active or the link is not connected.

Management Port LEDs

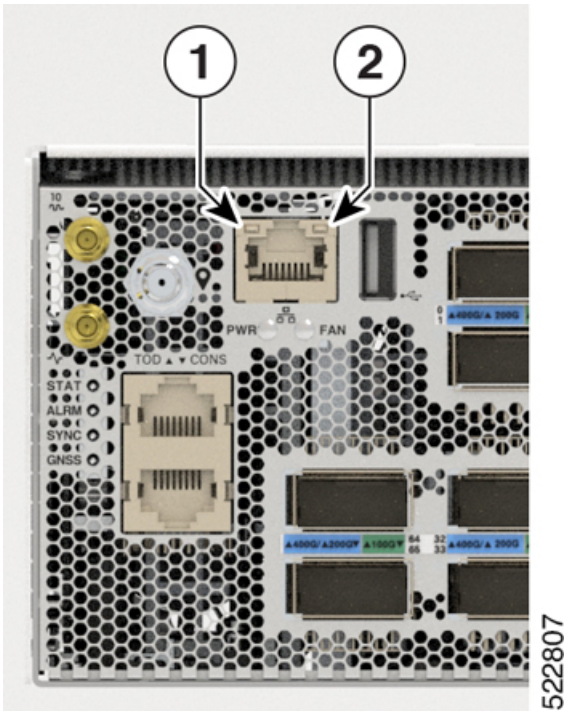
The Management Port LEDs are located at the right-side on the front panel of the NCS-57B1 and NCS-57C3 chassis.

Figure 131: NCS-57B1 and NCS-57C3 Management Port LEDs



The Management Port LEDs are located at the left-side on the front panel of the NCS-D2 chassis.

Figure 132: NCS-57D2 Management Port LEDs



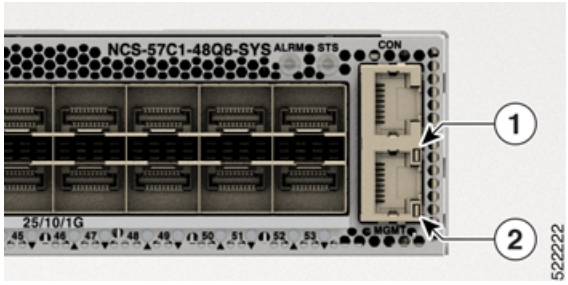
1	Port Activity
2	Port Link

Table 36: NCS-57B1, NCS-57C3, and NCS-57D2 Management Port LEDs Description

LED	Color	Status
Port Activity	Green	The ethernet link is up and operational.
	Off	The ethernet link is down.
Port Link	Green Blinking	The port is either receiving or transmitting packets.
	Off	No packets are being received or transmitted.

The Management Port LEDs are located at the bottom right-side on the front panel of the NCS-57C1-48Q6-SYS chassis.

Figure 133: NCS-57C1 Management Port LEDs



1	Port Activity
2	Port Link

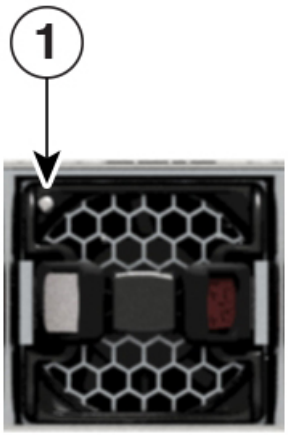
Table 37: NCS-57C1 Management Port LEDs Description

Color	Status
Green	The 1000M link is up and operational.
Green Blinking	The port is either receiving or transmitting packets at 1000M.
Green and Red	The 100M link is up and operational.
Green and Red Blinking	The port is either receiving or transmitting packets at 100M.
Red	The 10M link is up and operational.
Red Blinking	The port is either receiving or transmitting packets at 100M.
Off	The link is down.

Fan Module and Fan Tray LED

The NCS-57B1 and NCS-57C1 fan module LED is located on the top-left corner of the module.

Figure 134: NCS-57B1 or NCS-57C1 Fan Module LED



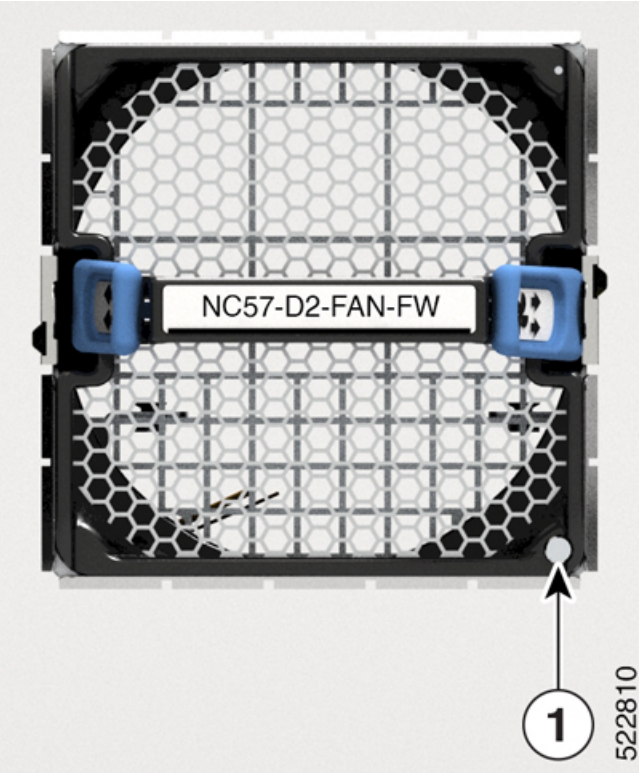
The NCS-57C3-MOD fan tray LED is located on the bottom-left corner of the module.

Figure 135: NCS-57C3-MOD Fan Tray LED



The NCS-57D2 fan tray LED is located on the bottom-right corner of the module.

Figure 136: NCS-57D2 Fan Tray LED



1	Status LED location

LED	Color	Status
STATUS	Green	Fan is operating normally.
	Red	Fan failure.
	Off	Fan is not receiving power.

Power Supply LED

In NCS 57B1 and NCS-57C3-MOD routers, the power supply LED is located on the lower-right corner portion of the power module.

Figure 137: NCS 57B1 Power Supply LED

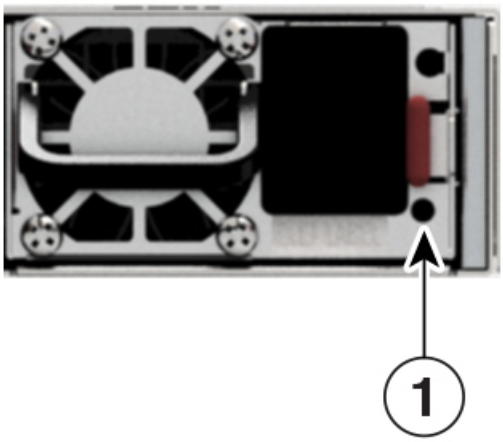
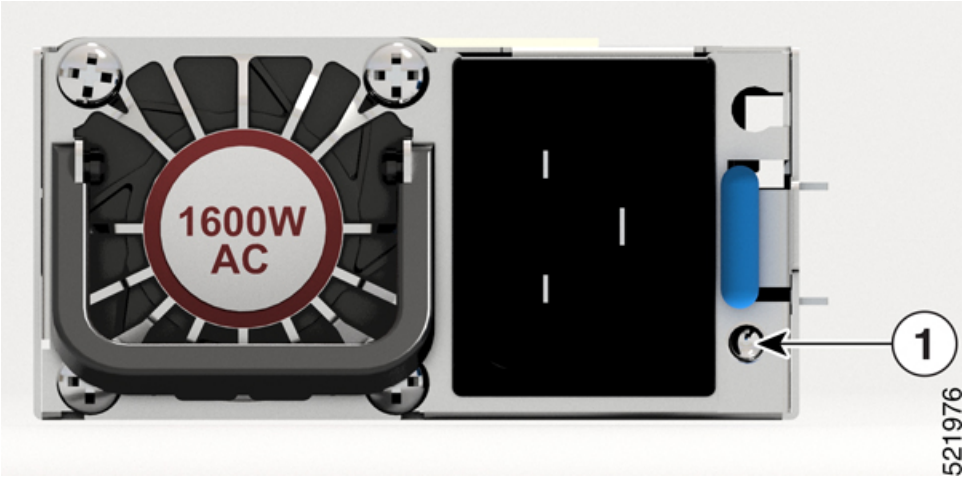


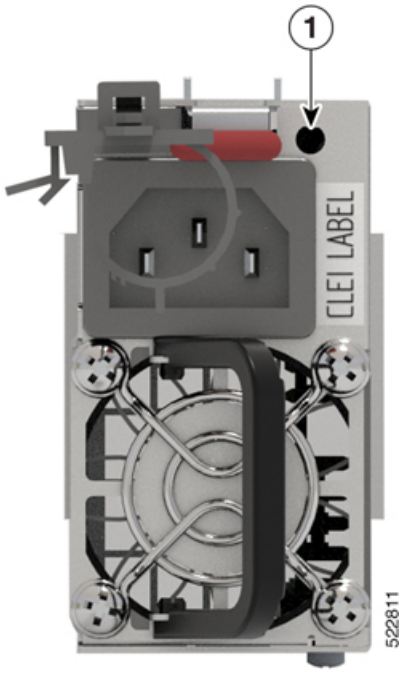
Figure 138: NCS-57C3-MOD Power Supply LED



1	Power supply LED

In the NCS-57D2 router, the DC power supply LED is located on the top-right corner portion of the power module.

Figure 139: NCS-57D2 DC Power Module



1	Power supply LED

In the NCS-57D2 router, the AC power supply LED is located on the top-right corner portion of the power module.

Figure 140: NCS-57D2 AC Power Module



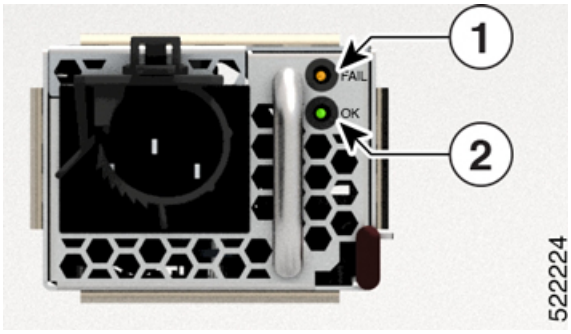
1	Power supply LED

Table 38: Power Supply LED Descriptions

LED	Color	Status
STATUS	Green	Power supply is on and transmitting power to the router.
	Blinking Green	Power supply is connected to input power source but not transmitting power to the router.
	Amber	Power supply failure, due to one of the following conditions: • Over Voltage • Over Current • Over Temperature • Fan Failure
	Blinking Amber	Power supply is operating but a warning condition has occurred, due to one of the following conditions: • High temperature • High power • Slow fan
	Off	Power supply units are not receiving power.

In the NCS-57C1 router, the power supply LEDs are located on the top-right corner portion of the power module. Each power module has an OK and a FAIL LED.

Figure 141: NCS-57C1 Power Supply LED

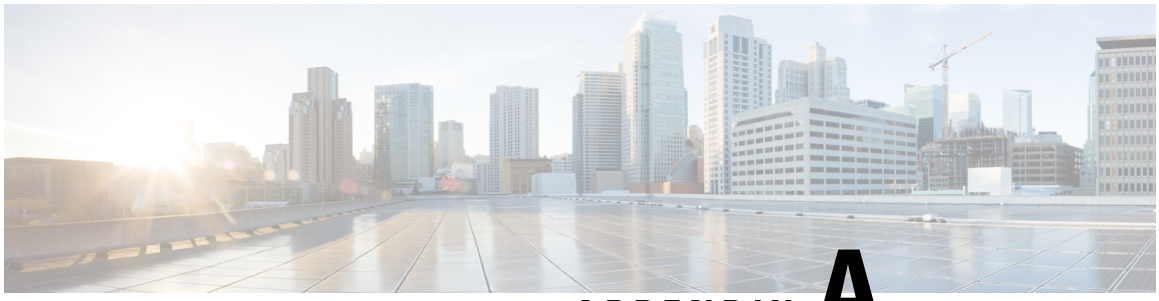


1	Fail	2	OK

Table 39: NCS-57C1 Power Supply LED Descriptions

OK LED	FAIL LED	Status
Green	Off	Power supply is on and supplying power to the router.

OK LED	FAIL LED	Status
Flashing green	Off	Power supply is connected to input power source but not supplying power to the router. The power supply might not be properly installed in the chassis.
Off	Off	Either all of the installed power supplies are not receiving power or an uninstalled power supply is not receiving power.
Off	Flashing amber	Power supply is operating but a warning condition has occurred—possibly one of the following conditions: • High temperature • High power • Slow power supply fan • Low voltage • Power supply is installed in the chassis but was disconnected from the power source
Off	Amber	Power supply failure—possibly one of the following conditions: • Over voltage • Over current • Over temperature • Power supply fan failure



APPENDIX A

System Specification

This chapter describes the system specifications for Cisco NCS 5700 router.

- Weight and Power Consumption, on page 175
- Environmental Specifications, on page 175
- Thermal Limitations, on page 176
- RJ-45 Connectors, on page 176
- Management Pinouts, on page 177
- Time-of-Day Port Pinouts, on page 177
- USB Flash or MEM Port Pinouts, on page 178
- Console Port Pinouts, on page 178
- Power Supply Power Cord Specifications, on page 179

Weight and Power Consumption

For information on physical specifications and power consumption, refer to the following data sheets:

- NCS-57B1 Fixed Chassis Data Sheet
- NCS-57C3 Fixed Chassis Data Sheet
- NCS-57C1 Fixed Chassis Data Sheet
- NCS-D2 Fixed Chassis Data Sheet

Environmental Specifications

For information on environmental specifications, see table *Environmental properties* in the following data sheets:

- NCS-57B1 Fixed Chassis Data Sheet
- NCS-57C3 Fixed Chassis Data Sheet
- NCS-57C1 Fixed Chassis Data Sheet
- NCS-D2 Fixed Chassis Data Sheet

Thermal Limitations

The optics listed below have different temperature specifications, as described below:

Table 40: Thermal Limitations

Optical Module	Platform	Ports Supported	Supported Temperature
QSFP-100G-ZR4-S	NCS-57C3-MODS-S, NCS-57C3-MOD-HX fixed ports, with NC57-MPA-2D4H-S, NC57-MPA-2D4H-H-S and NC55-MPA-4H-S	• MPA1 - 4 Ports • MPA2 - 4 Ports • MPA3 - 4 Ports **Note** Not supported on fixed ports of NCS-57C3-MOD-S/NCS-57C3-MOD-HX.	50°C
	NCS-57C3-MODS-S fixed ports, with NC57-MPA-2D4H-S, NC57-MPA-2D4H-H-S and NC55-MPA-4H-S	• MPA1 - 4 Ports • MPA2 - 4 Ports • MPA3 - 4 Ports **Note** Not supported on fixed ports of NCS-57C3-MODS-S.	50°C
	NCS-5501-SE	4 Fixed ports	50°C
CFP2-DCO Coherent Optical Module	NCS-57C3 fixed ports, with NC55-MPA-2TH-S and NC55-MPA-1T2H-S	• MPA1 - 2 Ports • MPA2 - 2 Ports • MPA3 - 2 Ports	45°C
400G Digital Coherent QSFP-DD Optical Module	NCS-57C3 fixed ports, with NC57-MPA-2D4H-S and NC57-MPA-2D4H-H-S	• MPA1 - 1 Ports • MPA2 - 2 Ports • MPA3 - 2 Ports	40°C

RJ-45 Connectors

The RJ-45 connector connects Category 3, Category 5, Category 5e, Category 6, or Category 6A foil twisted-pair or unshielded twisted-pair cable from the external network to the following module interface connectors:

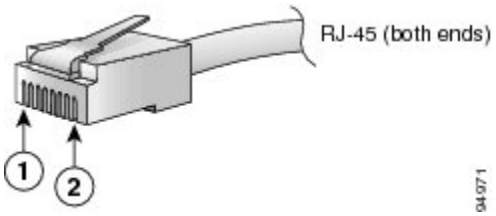
- Router chassis
  - CONSOLE port

- MGMT ETH port

Caution To comply with GR-1089 intrabuilding, lightning immunity requirements, you must use a foil twisted-pair (FTP) cable that is properly grounded at both ends.

The following figure shows the RJ-45 connector.

Figure 142: RJ-45 Connector



1	Pin 1	2	Pin 2

Management Pinouts

The following table summarizes the Management Ethernet port pinouts.

Table 41: Management Ethernet Port Pinouts

Pin	Signal Name
1	TRP0+
2	TRP0-
3	TRP1+
4	TRP1-
5	TRP2+
6	TRP2-
7	TRP3+
8	TRP3-

Time-of-Day Port Pinouts

The following table summarizes the ToD/1-PPS port pinouts.

Table 42: RJ-45 ToD/1-PPS Port Pinouts

Pin	Signal Name	Direction	Description
1	–	–	–
2	–	–	–
3	1PPS_N	Output or Input	1PPS RS422 signal
4	GND	–	–
5	GND	–	–
6	1PPS_P	Output or Input	1PPS RS422 signal
7	TOD_N	Output or Input	Time-of-Day character
8	TOD_P	Output or Input	Time-of-Day character

USB Flash or MEM Port Pinouts

The following table summarizes the USB flash or MEM port pinouts.

Table 43: USB Flash or MEM Port Pinouts

Pin	Signal Name	Description
A1	Vcc	+5 VDC
A2	D-	Data -
A3	D+	Data +
A4	Gnd	Ground

Console Port Pinouts

The following table summarizes the Console port pinouts.

Table 44: Console Port Pinouts

Pin	Signal Name	Direction	Description
1	Loop1	NA	Loopback 1
2	Loop2	NA	Loopback 2
3	TxD	Output	Console RS232 transmit
4	Gnd	NA	Ground

Pin	Signal Name	Direction	Description
5	Gnd	NA	Ground
6	RxD	Input	Console RS232 receive
7	Loop2	NA	Loopback 2
8	Loop1	NA	Loopback 1

Power Supply Power Cord Specifications

For more information on the supported power cables, see *Ordering information for power cables supported on NCS 5700* on the Cisco Network Convergence System 5700 Router Data Sheet.