



Hardware Installation Guide for Cisco NCS 1001

First Published: 2017-11-13

Last Modified: 2024-09-05

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CHAPTER 1

Cisco NCS 1001 Overview

This chapter provides an overview of Cisco NCS 1001.

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- [Optical Amplifier Module, on page 7](#)
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Cisco NCS 1001 Overview

Cisco NCS 1001 (NCS1001-K9) is 1 RU chassis that addresses the growing bandwidth needs of data center DWDM applications. It provides a DWDM line system that is optimized for data center environments and is optimized for point-to-point applications at maximum capacity. NCS 1001 supports up to three optical modules. The modules can be amplifiers or protection switching modules.

NCS 1001 has the following components:

- Removable control card
- Four removable fans
- Two removable 600W AC/DC or DC/DC power supply modules (PSU)
- Three slots for optical modules. Two Optical Amplifier Modules (NCS1K-EDFA) and a Protection Switching Module (NCS1K-PSM) can be inserted in these slots.

The optical modules can be inserted in slots 1 to 3 as shown in the following figure. The optical modules can be inserted and removed from the slots while the system is operational. In amplified configuration, the Optical Amplifier module can be inserted in any slot. In (section) protected configuration, the protect Optical Amplifier module is inserted in slot 1, Protection Switching Module in slot 2, and working Optical Amplifier module in slot 3.

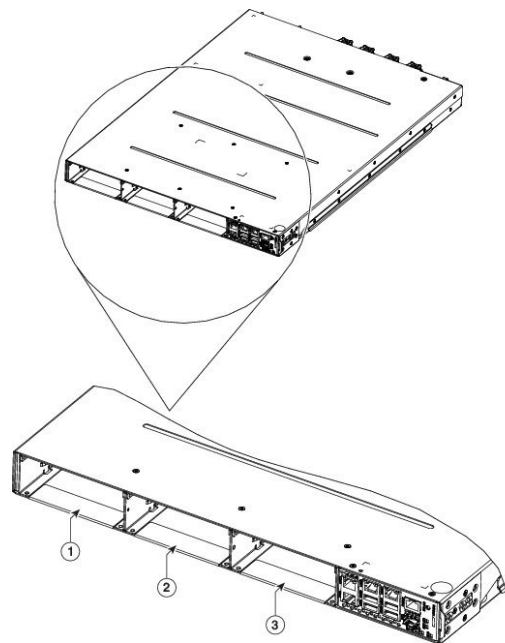


Caution Each optical module must be inserted in a slot only when the module in the adjacent slot is completely inserted and seated or the adjacent slot is empty. If an optical module is inserted in a slot without seating the adjacent module, the ejector might interfere with the adjacent module.



Caution The empty slots must be inserted with the filler optical modules or filler PSUs as appropriate to guarantee safety and system cooling compliance. See [Figure 1: Cisco NCS 1001 Front View, on page 2](#) and [Figure 3: Cisco NCS 1001 Rear View, on page 3](#) to identify the slots for optical modules and PSUs respectively.

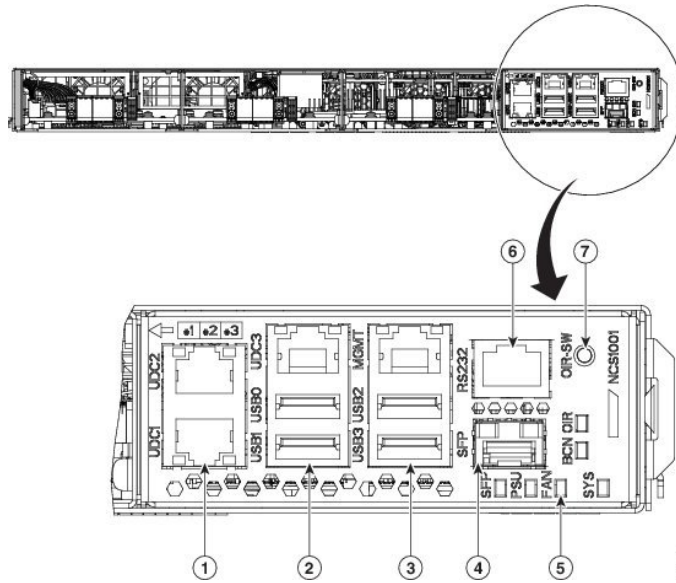
Figure 1: Cisco NCS 1001 Front View



1	Optical Module Slot 1
2	Optical Module Slot 2
3	Optical Module Slot 3

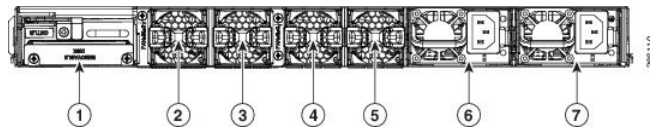
The slot numbers are also specified on the front panel label.

Figure 2: Cisco NCS 1001 Front View



1	UDC (user data channel) for optical modules 1 and 2
2	Two USB 2.0 ports and one UDC for optical module 3
3	Two USB 2.0 ports and one 10/100/1000 LAN electrical management interface
4	10/100/1000 LAN management interface (optical)
5	Status LED (SFP link, Power supply, Fan, System, Beacon, OIR)
6	RS232 console port of the control card
7	OIR switch

Figure 3: Cisco NCS 1001 Rear View



1	Control card and SSD (Solid State Disk)
2	Fan 3
3	Fan 2
4	Fan 1
5	Fan 0
6	600W AC/DC or DC/DC redundant power supply module (PSU 1)

7	600W AC/DC or DC/DC redundant power supply module (PSU 0)
---	---

Both the power supply modules shall be AC/DC or DC/DC. Mixed configuration is not allowed.

Benefits

NCS 1001 provides the following benefits.

- Up to 23dBm output power to allow for +3dBm per channel fiber launch power and maximum optical performance for high baud rate and higher order modulation format transponders.
- Switchable gain pre-amplifier up to 34db.
- Embedded Optical Channel Monitoring (OCM) module to monitor per channel power at all the input and output ports.
- Integrated pluggable optics based OSC and OTDR support.
- OSC supports user data channel transport as well as remote node management.
- Supports 96 channels of C-Band in 1 RU.
- Supports flex grid on OCM module.

Physical Characteristics

- Width: 17.44" (442.9 mm)
- Depth: 23.64" (600.5 mm)
- Height: 1 RU
- Weight without power supply unit: 8.2 kg
- Weight with two power supply units: 10.5 kg
- Weight of AC PSU: 1.162 kg
- Weight of Fan: 78 gms
- Weight of control card: 1.5 kg

For information about NCS 1001, see the [data sheet](#).

Safety Labels

Cisco NCS 1000 Series chassis is classified as Hazard Level 1M as per IEC 60825-2 and Laser Class 1M as per IEC 60825-1, since it includes pluggable optical modules Class 1 or Class 1M.

The Class 1/1M Laser Product label is shown in the following figure:

Figure 4: Class 1/1M Laser Product Label



This section explains the significance of the safety labels attached to the NCS 1001 chassis. The faceplates of the chassis are clearly labeled with warnings about the laser radiation levels.

You must understand all warning labels before working on the chassis.

Figure 5: Class 1M Laser Product Label



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Conforme à la norme 21 CFR 1040.10 et 1040.11, sauf conformité avec la norme IEC 60825-1 Ed. 3., comme décrit dans l'avis relatif au laser no. 56, daté du 8 Mai 2019.

Safety Precaution for Module Installation and Removal

Ensure to observe the following safety precautions when you are working with the chassis modules.

Invisible laser radiations present. Statement 1016.

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

Figure 6: Class 1/1M Laser Product Label



Safety Precaution for Laser Radiation

Cisco NCS 1000 Series chassis is classified as Hazard Level 1M as per IEC 60825-2 and Laser Class 1M as per IEC 60825-1, since it may include embedded or pluggable optical modules Class 1 or Class 1M.

Figure 7: Class 1M Laser Product Label



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Conforme à la norme 21 CFR 1040.10 et 1040.11, sauf conformité avec la norme IEC 60825-1 Ed. 3., comme décrit dans l'avis relatif au laser no. 56, daté du 8 Mai 2019.

Optical Amplifier Module

Table 1: Feature History

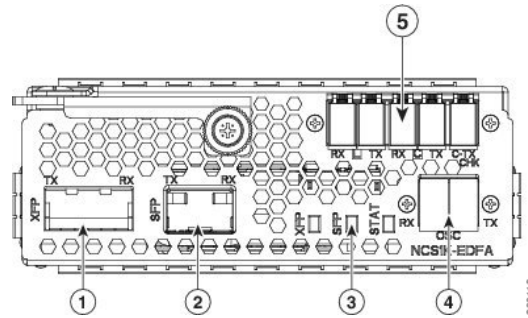
Feature Name	Release Information	Feature Description
Amplifier Behaviour	Cisco IOS XR Release 7.3.1	<p>Grid mode configuration for the optical amplifier has been extended to support 75GHz spaced channels.</p> <p>You can optimize the optical spectrum and granularity using the gridless configuration. You can provision channels with arbitrary channel frequencies and channel widths. Up to 96 channels can be configured using the gridless configuration.</p> <p>Commands modified:</p> <ul style="list-style-type: none"> • hw-module • show controllers

The optical amplifier module (NCS1K-EDFA) has pre-amplifier and booster amplifier.

The optical amplifier module provides the following functionality.

- Preamplifier (LINE-RX to COM-TX) - Single preamplifier variant, with switchable gain ranges, according to link loss:
 - Range # 1: 0 to 24 dB gain, Tilt control: 24 to 27 gain, with tilt uncontrolled
 - Range # 2: 20 to 34 dB gain, Tilt control: 34 to 37 dB gain, with tilt uncontrolled
 - 23dBm output power @ COM-TX port
- Booster amplifier (COM-RX to LINE-TX) - True variable gain booster amplifier
 - Gain range: 1 to 20. 20 to 25 uncontrolled tilt.
 - 23dBm output power @ LINE-TX port
- ADD/DROP OSC channel supports both 1510nm and 1610nm +/-10nm
- OCM assesses channel presence and Gain regulation and per channel power monitoring.

Figure 8: EDFA Front View



1	XFP for OSC and additional OTDR feature
2	SFP for OSC (Optical Service Channel)
3	Status LED
4	Service Channel input and output port [OSC - RX, TX]
5	PRE and BST amplifier inputs and output ports [L (LINE) - RX, TX] [C (COM) - RX, TX] [COM - CHECK]

The following table describes the mapping of controllers and optical ports for the optical amplifier module.

Controller	Optical Ports
Ots 0/slot/0/0	<ul style="list-style-type: none"> • COM-RX (booster input) • COM-TX (preamplifier output)
Ots 0/slot/0/1	<ul style="list-style-type: none"> • LINE-RX (preamplifier input) • LINE-TX (booster output)
Ots 0/slot/0/2	<ul style="list-style-type: none"> • OSC-RX • OSC-TX
Ots 0/slot/0/3	COM-CHECK

COM-CHECK CONFIGURATION

The COM-CHECK configuration is described below.

- Safety must be ensured to protect the fiber intra-node from the pre-amplifier to the Mux or Demux section for the total output power on COM-TX port upto 23 dB. This is required to compensate for an extremely lengthy span.

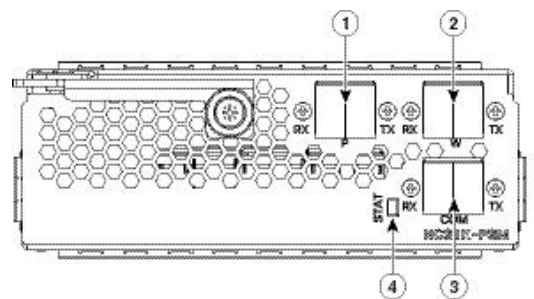
- If the output power on COM-TX is less than or equal to 20 dB, the com-check port may not be used and can be turned off. Also no physical connection between the pre COM-CHECK and Demux monitor port is required.
- Safety on pre is necessary in some cases such as large spans over high power requirements.
- The COM-CHECK PD9 is the safety port.
- The COM-RX like controller Ots 0/s/0/0 is not part of safety.
- The safety restart process is similar to the booster case, with some difference in the **APR Check** phase.

Protection Switching Module

The protection switching module (NCS1K-PSM) provides the following functionality.

- In TX section:
 - Splits input optical channels to both working and protection lines.
 - Forces the switch in the remote site by opening one of the two line paths (by putting the related VOA in AVS).
- In RX section:
 - Selects the signals from working or protection line. Each line is monitored through a PD.
 - Balances the two line losses by changing the VOA attenuation value at the same time of the switch change of state.

Figure 9: PSM Front View



1	Protected path input and output port [P - RX, TX]
2	Working path input and output port [W - RX, TX]
3	COM input and output port [COM - RX, TX]
4	Status LED

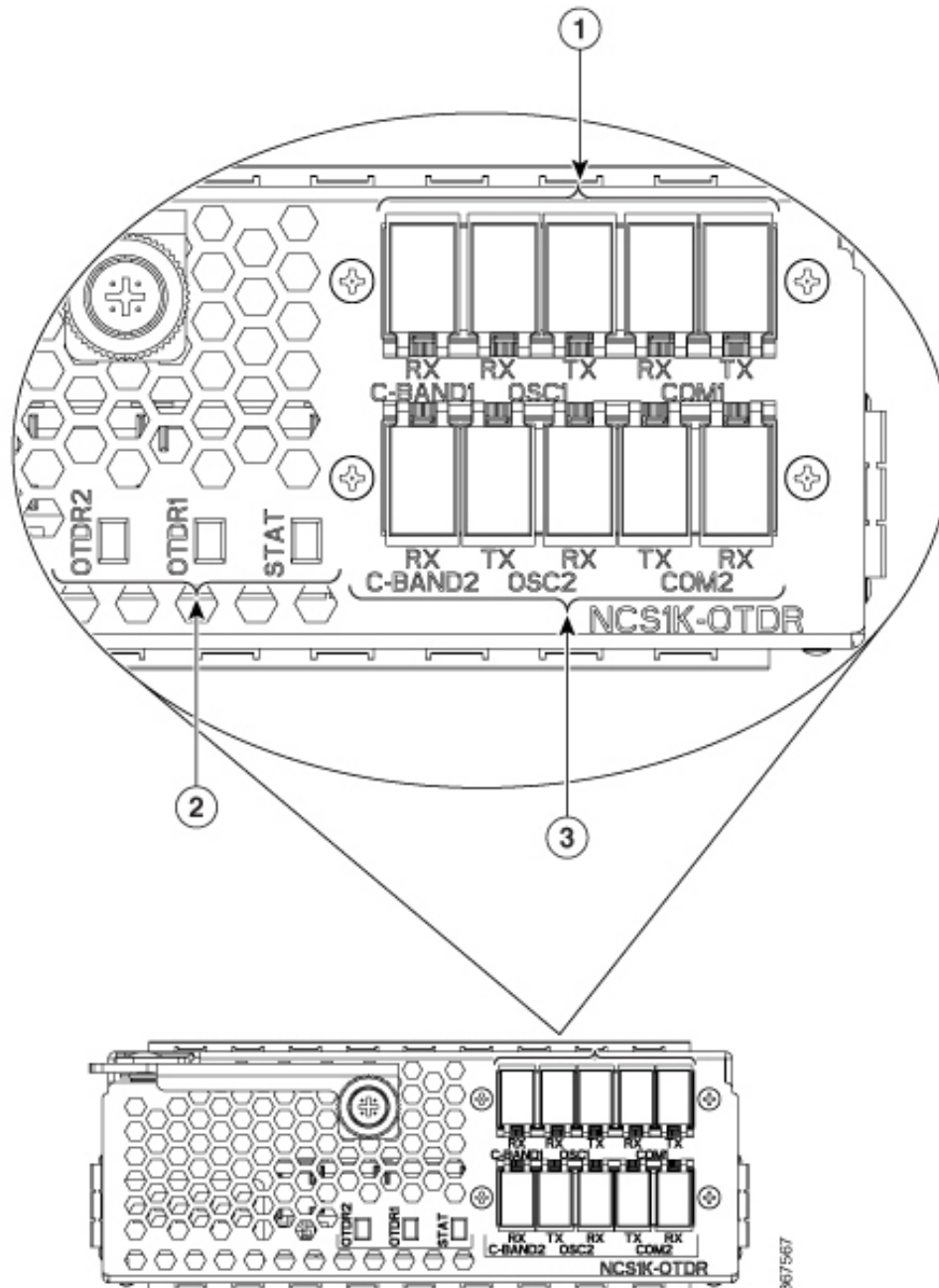
The following table describes the mapping of controllers and optical ports for the protection switching module.

Controller	Optical Ports
Ots 0/slot/0/0	COM-TX
Ots 0/slot/0/1	Working path input and output port [W - RX, TX]
Ots 0/slot/0/2	Protected path input and output port [P - RX, TX]

Optical Time Domain Reflectometer Module

Optical Time Domain Reflectometer (OTDR) is a line card supported in NCS 1001. The line card contains 2x bidirectional OTDRs and 2x filter that combines C-band, OSC, and OTDR filters and splits OSC and OTDR. Each internal OTDR can perform measurements on both TX and RX fiber by using an internal optical switch. OTDR line card is connected to the OSC port on the optical amplifier. The OTDR line card can be inserted in any slot of NCS 1001.

Figure 10: OTDR Front View



1	OTDR1 interface
2	LED status
3	OTDR2 interface

For more information about the OTDR module, see the [data sheet](#).

Cisco NCS 1000 32-Channel Even Mux/Demux Patch Panel

The Cisco NCS 1000 32-Channel Even Mux/Demux patch panel (PID: N1K-MD-32E-C) is a pair of passive Athermal Arrayed Waveguide Grating (AAWG) based modules.



Note "Patch panel" refers to N1K-MD-32E-C Even Mux/Demux patch panel.

The patch panel has 32 channels and works as an add/drop unit for its 32 channels at 140 GBd. Each even patch panel allows the multiplexing and demultiplexing of 32 channels with 150-GHz spacing. The patch panel provides a wide spectrum of optical wavelengths support.

The N1K-MD-32E-C patch panel operates in C-band. This even patch panel is fully passive.

Figure 11: N1K-MD-32E-C Patch Panel Front View



Port Label Descriptions

The even patch panel has 34-port LC-duplex connectors.

Table 2: Even Mux/Demux Patch Panel Port Interfaces

Port	Connector Type	Connector Label	Operating Frequency Range [THz (nm)]	Note
COM-RX COM-TX	LC	COM TX RX	191.3–196.1 (1528.77–1567.13)	—
MON-RX MON-TX	LC	MON TX RX	196.175–191.15 (1528.2–1568.4)	Both are output ports. Replica of COM-RX/TX signals ~20dB attenuated.
CH-i TX/RX [i=0–31]	LC	<frequency> TX RX	For more information on EVEN channels, see Channel Wavelength Allocation , on page 13	—

Port	Connector Type	Connector Label	Operating Frequency Range [THz (nm)]	Note
INV	USB Type A receptacle connector	INV	—	USB inventory port.

Channel Wavelength Allocation

The following table describes the C-band channel wavelength plan for the patch panel.

Table 3: C-Band Channel Wavelength Plan

Channel Label	N1K-MD-32E-C	
	Frequency (THz)	Wavelength (nm)
0	196.025	1529.36
1	195.875	1530.53
2	195.725	1531.70
3	195.575	1532.88
4	195.425	1534.05
5	195.275	1535.23
6	195.125	1536.41
7	194.975	1537.59
8	194.825	1538.78
9	194.675	1539.96
10	194.525	1541.15
11	194.375	1542.34
12	194.225	1543.53
13	194.075	1544.72
14	193.925	1545.92
15	193.775	1547.12
16	193.625	1548.31
17	193.475	1549.52
18	193.325	1550.72

Channel Label	N1K-MD-32E-C	
	Frequency (THz)	Wavelength (nm)
19	193.175	1551.92
20	193.025	1553.13
21	192.875	1554.34
22	192.725	1555.55
23	192.575	1556.76
24	192.425	1557.97
25	192.275	1559.19
26	192.125	1560.40
27	191.975	1561.62
28	191.825	1562.84
29	191.675	1564.07
30	191.525	1565.29
31	191.375	1566.52

USB Passive Inventory

Table 4: Feature History

Feature Name	Release	Description
Inventory Support	Cisco IOS XR Release 7.3.1	A new passive device with PID NCS1K-MD-64-C (NCS 1000 64 channels Odd Multiplexer or Demultiplexer Patch Panel-C-band) is supported.

There are passive units that are part of NCS 1001 hardware configuration. It is possible to have information about these passive units as soon as they are connected with a proper USB cable through one of the four available USB ports on the controller card of the box itself.

In this case their basic parameters are displayed in the output of “show inventory” command by XR or admin session.

The following passive modules are supported in NCS 1001:

Table 5: Passive modules supported in NCS 1001

PID	Description
15216-MD-48-ODDE	ONS Multiplexer/Demultiplexer Patch Panel Even Extended
15216-MD-48-EVENE	ONS Multiplexer/Demultiplexer Patch Panel Odd Extended
15216-MD-48-CME	ONS Coupler and Splitter
15216-FLD-OSC	OSC Combiner and Splitter
NCS1K-MD-64-C	NCS 1000 64 channels Odd Multiplexer/Demultiplexer Patch Panel-C-band
N1K-MD-32E-C	NCS 1000 32 channels Even Multiplexer/Demultiplexer Patch Panel, No-loopback - 150GHz - C-band



Remember **N1K-MD-32E-C** and **NCS1K-MD-32E-C** are 32-channel even multiplexer/demultiplexer patch panels. The **N1K-MD-32E-C** does not have a loopback function and is compatible only with the NCS 1001. The **NCS1K-MD-32E-C** supports a loopback function and is compatible only with the NCS 1010.

When the supported passive module is connected to the front panel port of NCS 1001, the module is discovered and the inventory data is read from the USB device. The user can view the details of passive module such as PID, Description, Serial Number, and Version ID using the show inventory command. Only one passive unit information can be retrieved in the inventory of the box, if it is connected to the box itself through a cable to one of the available four USB ports.

The same parameter plus others are also obtainable in the response to SNMP get on “entPhysicalEntity” objects

Example

```
RP/0/RP0/CPU0:MYS-127#show inventory
Wed May 23 08:24:07.350 CEST.....

NAME: "0/RP0-USB0", DESCR: "ONS Mux/Demux Patch Panel Even Extended"
PID: 15216-MD-48-EVENE , VID: V01 , SN: NSZ19510021

NAME: "0/RP0-USB1", DESCR: "OSC Combiner-Splitter Module"
PID: 15216-FLD-OSC= , VID: V00 , SN: OPL17190305

NAME: "0/RP0-USB2", DESCR: "ONS Mux/Demux Patch Panel Odd Extended"
PID: 15216-MD-48-ODDE , VID: V01 , SN: NSZ19510003

NAME: "0/RP0-USB3", DESCR: "ONS Coupler and Splitter Pluggable"
PID: 15216-MD-48-CME , VID: V01 , SN: NSZ20159002
```

Product IDs

Table 6: Feature History

Feature Name	Release Information	Feature Description
ONS-SE-155-1510 Support	Cisco IOS XR Release 7.3.2	A new SFP pluggable optics module with PID ONS-SE-155-1510 SFP is supported.

The following table describes the product IDs of the components.

Product ID	Description
NCS1001-K9=	Network Convergence System 1001 line system 3 slots
NCS1K-CNTRLR2=	Network Convergence System 1001 Control card
NCS1K-EDFA=	Network Convergence System 1001 amplifier module
NCS1K-PSM=	Network Convergence System 1001 protection module
NCS1K-OTDR=	Network Convergence System 1001 OTDR module
NCS1K-2KW-AC2=	Network Convergence System 1001 AC power supply unit - 2KW normal operating temperature, 600W short term high temperature
NCS1K-2KW-DC=	Network Convergence System 1001 DC power supply unit - 2KW normal operating temperature, 600W short term high temperature
NCS1K1-FAN=	Network Convergence System 1001 line system Fan
NCS1K-SSD=	SSD
ONS-SC-Z3-1510=	SFP OC-48/STM-16/GE, CWDM, 1510 nm
ONS-SE-155-1510	SFP OC-3/STM-1, CWDM, 1510 nm EXT; SFP Pluggable Optics Module
CWDM-SFP-1510	CWDM 1510-nm SFP; Gigabit Ethernet 1 and 2 Gb Fibre Channel
CWDM-SFP-1610	CWDM 1610-nm SFP; Gigabit Ethernet 1 and 2 Gb Fibre Channel
ONS-SC-Z3-1610=	SFP OC-48/STM-16/GE, CWDM, 1610 nm
ONS-SI-GE-LX=	SFP 1000BASE-LX Gigabit Ethernet, 1310 nm, SM, I-TEMP
ONS-SI-GE-SX=	SFP 1000BASE-SX Gigabit Ethernet, 850 nm, MM, I-TEMP
ONS-SI-GE-ZX=	SFP 1000BASE-ZX Gigabit Ethernet, 1550 nm, SM, I-Temp
ONS-SC-Z3-1510=	SFP OC-48/STM-16/GE, CWDM, 1510 nm
ONS-SC-Z3-1610=	SFP OC-48/STM-16/GE, CWDM, 1610 nm

LEDs in Cisco NCS 1001

LED	State	Description
SYS	Green	The unit is operating correctly.
	Yellow	The unit has one or more errors detected.
	Off	Power is not applied to the unit.
BCN	Blue	The unit needs attention.
	Off	The unit does not need attention.
SFP	Green	The SFP link is up.
	Yellow	The link is down, active alarms are present on this port, or a hardware failure has occurred.
	Off	The port is not provisioned by the software, the optics module is missing, or the port does not have power.
PSU and FAN	Green	The unit is operating correctly.
	Red	The unit has one or more errors detected.
OIR	Off	The control card is not present or not properly inserted.
	Amber Blinking	The software is not operating correctly as the control card may not be correctly inserted.
	Amber Solid	The control card, BIOS, and software are functional.

32-Channel Even Mux/Demux Panel LEDs

The behaviour of the 32-channel even mux/demux pannel LEDs are similar to the 32-channel mux/demux patch panel LEDs. For information, see [Mux/Demux Patch Panel LEDs](#).



CHAPTER 2

Prepare to Install Cisco NCS 1001

This chapter explains how to prepare for the Cisco NCS 1001 installation.

- [Review Safety Warnings, on page 19](#)
- [Unpack and Verify Cisco NCS 1001, on page 19](#)
- [Prepare to Install 32-Channel Even Mux/Demux Patch Panel, on page 20](#)

Review Safety Warnings

Review the safety warnings available at *Regulatory Compliance and Safety Information for Cisco NCS 1000 Series*.

Unpack and Verify Cisco NCS 1001

Procedure

- Step 1** When you receive Cisco NCS 1001 equipment at the installation site, open the top of the box. The Cisco Systems logo is on the side of the box.
- Step 2** Remove accessories and foam inserts from the box. The box contains Cisco NCS 1001 and other items needed for installation.
- Step 3** To remove the shelf, grasp the side of the shelf and lift the shelf out of the box.
- Step 4** Verify that you have all items.

Table 7:

Item Number	Description
502-00195-01	PKG, BAG, PE, A/S, FLAT, 24, 34, 2MIL
53-100688-01	ACCESSORY KIT and SLIDE RAILS
800-46433-03	ASY-TOP, CHASSIS
NCS1K SW OPT 2	Software Options

Item Number	Description
NCS1K1 SW OPT	Software Download - RTU not included

Step 5

Verify the following:

- Cisco NCS 1001 is not damaged.
- The cable connectors, management ports, console ports, and power connectors are not damaged.
- The SFP cages on the front panel are not damaged.
- Verify that outstanding scratch, mark, bend, discoloration or deformation has not occurred to NCS 1001.

Step 6

If there is any damage, call your Cisco sales engineer for a replacement.

Prepare to Install 32-Channel Even Mux/Demux Patch Panel

See [Prepare to Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel](#) for the site preparation information to install the even mux/demux patch panel.



CHAPTER 3

Install Cisco NCS 1001

This chapter describes the procedures to install Cisco NCS 1001.

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- [Install NCS 1001-K9 into EIA/ANSI Rack](#), on page 23
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Rack Compatibility

Figure 12: Four Post Rack Type

4 – Post Type (Hole EIA Universal)	Compatibility
All 23" Type rack	✓
19" Type rack L-Type Post	✓
19" Type Racks Flat-Post	✓
19" Type racks C- Type Post	✗
ETSI Type rack (Hole ETSI Universal)	✓

Figure 13: Four Post Rack Type

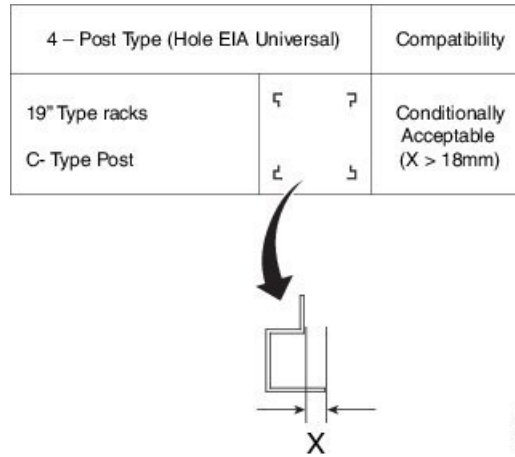


Figure 14: Two Post Rack Type

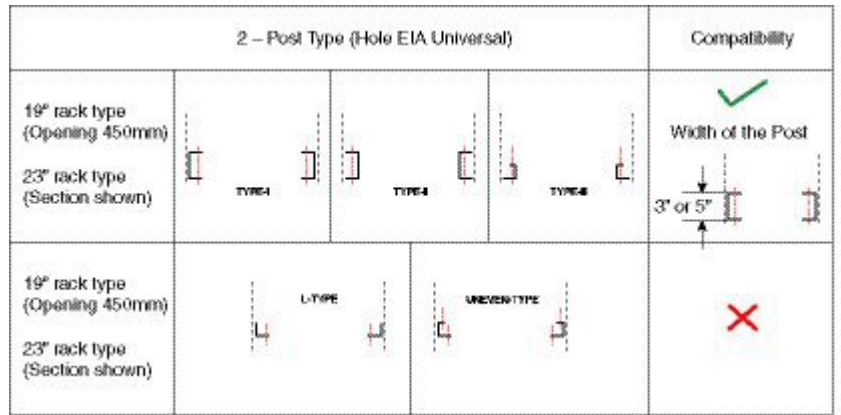
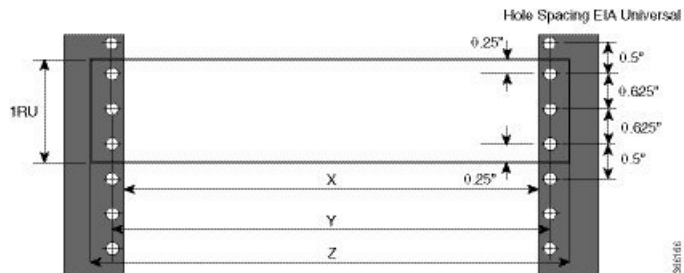
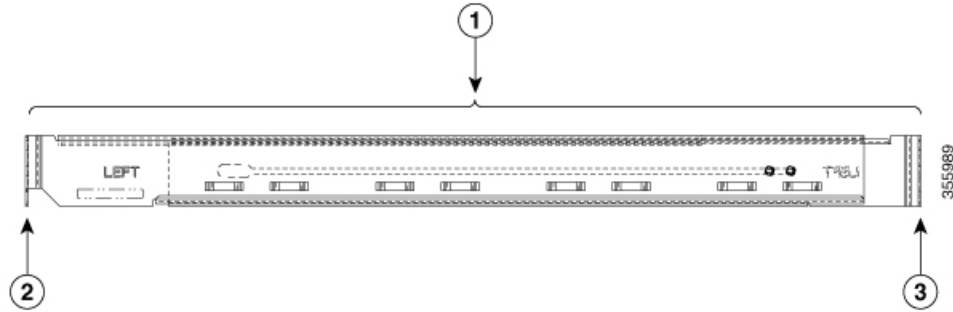


Figure 15: EIA/ANSI (19" and 23") Rack specification



Rack Type	Rack Front Opening X	Rack Mounting Hole Center-Center Y	Mounting Flange Dimension Z
19" racks	450.8mm (17.75")	465mm (18.312")	482.6mm (19")
23" racks	552.45mm (21.75")	566.7mm (22.312")	584.2mm (23")

Figure 16: Four Post Left/Right Side Slide Rails



1	Mounting depth - Minimum is 547 mm and Maximum is 847 mm
2	Front rail mating surface
3	Rear rail mating surface

The front and rear vertical rails of four post racks must be within this range (547 to 847 mm) to install NCS 1001. NCS 1001 cannot be installed on a four post rack if the distance between rails is outside this limit.

Install NCS 1001-K9 into EIA/ANSI Rack

In an EIA/ANSI rack, NCS 1001 can be installed in the front position.



Note The rack is not provided by Cisco. Cisco provides only the chassis and the sliding rail.



Caution Use only the fastening hardware provided with NCS 1001-K9 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

It is required to have 100 mm (3.94") space on the front and rear side of the rack to provide sufficient clearance for cable routing and cooling of the system.

In case of a closed cabinet, the cabinet must support the thermal management or front/rear doors need to have 70% perforation. Closed cabinets must have adequate airflow to dissipate maximum power from equipments in a fully-equipped cabinet.

NCS 1001-K9 shall be installed maintaining a minimum clearance of 5mm above and below the chassis.

Before you begin

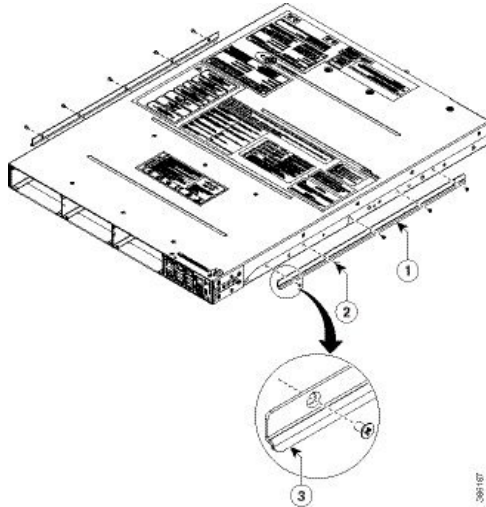
Ensure the rack is compatible. See the Rack Comatibility section.

Procedure

Step 1 Identify and attach the sliding edge for the 2/4 post rack.

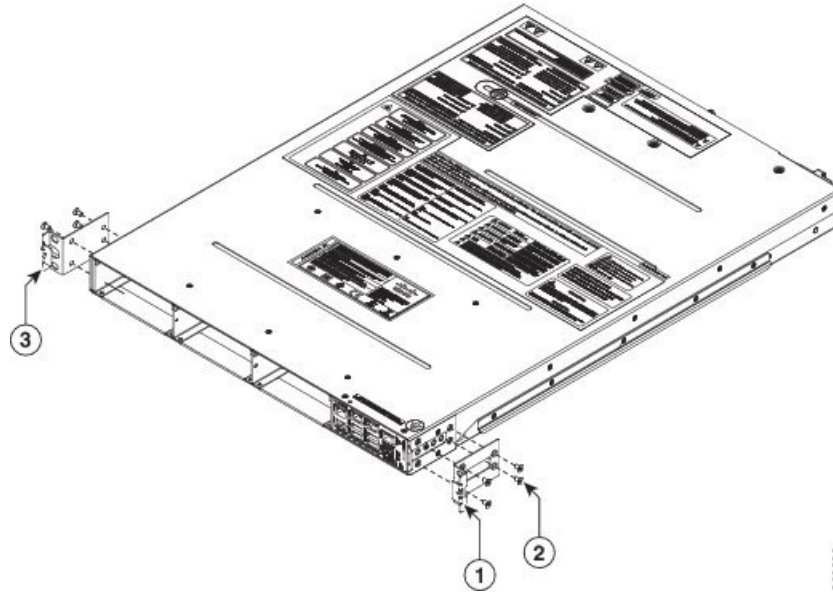
Step 2 Attach the sliding rail and L bracket to the left and right of the chassis using the screws (48-0471-01 and 48-2406-01) and tighten them to a torque value of 0.65 N-m (5.9 in-lbs) for 48-0471-01 screws and torque value of 1.5 N-m (13.25 in-lbs) for 48-2406-01 screws.

Figure 17: Sliding Edge



1	Sliding edge
2	Screws for sliding edge (part number - 48-0471-01)
3	The edge always need to be facing bottom side on both the sides.

Figure 18: Fixing L Bracket

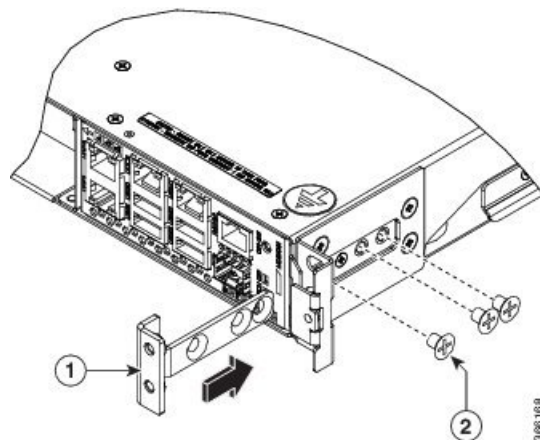


1	Right L Bracket
2	Screws for L Bracket (part number - 48-2406-01)
3	Left L Bracket

Step 3 Fix the Grounding extender to the chassis with the screws (48-1142-01) and tighten them to a torque value of 2.5 - 3.4 N-m (22.0 - 30.0 in-lbs).

Note The grounding extender must be assembled before installing NCS 1001 into the rack.

Figure 19: Grounding Extender



The counter sink surface must face outside as per the figure.

1	Grounding extender
---	--------------------

2	Extender screws (part number - 48-1142-01)
---	--

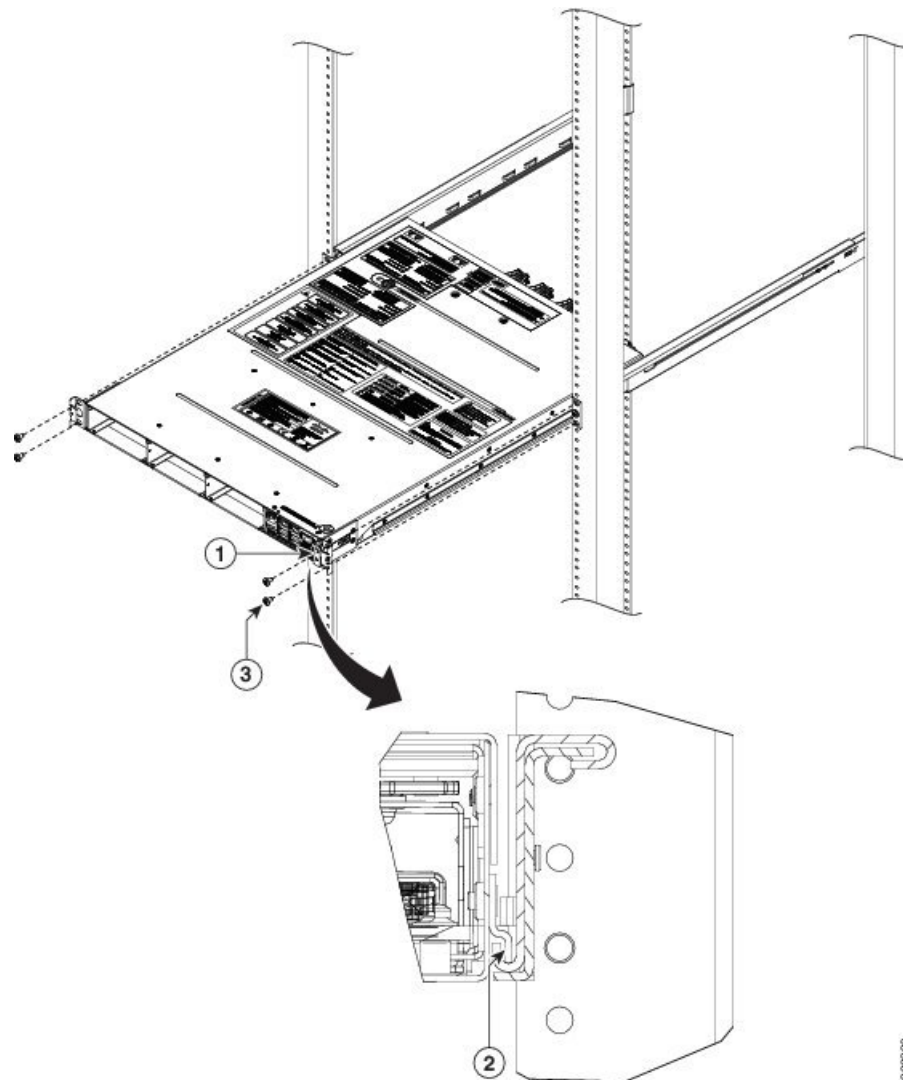
Step 4 Install four post slider or two post slider as required.

- a) [Install Four Post Slider into EIA/ANSI Rack, on page 27](#)
- b) [Install Two Post Slider into EIA/ANSI Rack, on page 31](#)

Step 5 Insert the chassis onto the sliding rail assembled on the two or four post 19" or 23" rack.

It is recommended to assemble the empty chassis to the rack for easy handling.

Figure 20: NCS 1001 Chassis Assembly into Two or Four Post 19" or 23" Rack



1	Ground lug extender must be assembled before inserting the chassis. See Figure 19: Grounding Extender, on page 25 .
2	During assembly of the unit, rest the sliding edge on the sliding rail groove on either side. Push the chassis gently onto the rack until the faceplate makes in contact with the rack surface.

3	Slider fixing screws (part number - 48-101524-01).
---	--

Step 6 As soon as the chassis is completely inserted, fasten the chassis with two screws (48-101524-01) on each side of the bracket and tighten them to a torque value of 3.4 N-m (30 in-lbs).

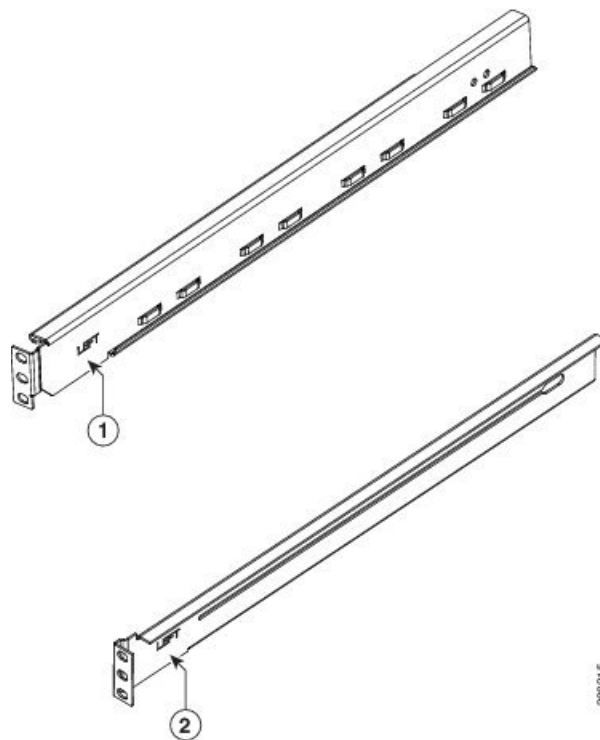
Caution The sliding rail must be used only during the first mounting process and it serves only to push the chassis into the rack and not for sliding purpose. The chassis must be fixed with screws on the front side.

Install Four Post Slider into EIA/ANSI Rack

Procedure

Step 1 Identify the four post slider.

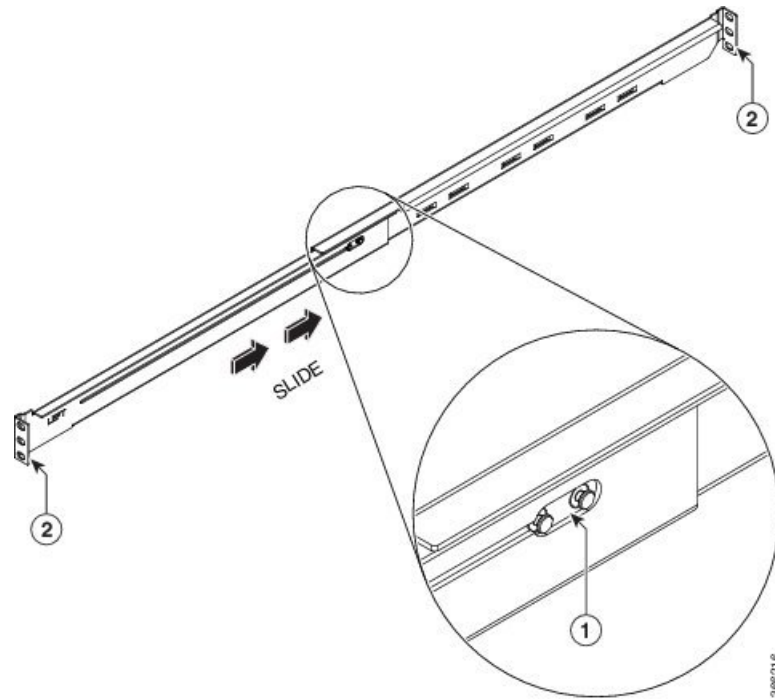
Figure 21: Four Post Slider Identification



1	Check for the left/right marking on the sliders. This is left front sliding rail.
2	Check for the left/right marking on the sliders. This is left rear sliding rail.

Step 2 Prepare the four post slider.

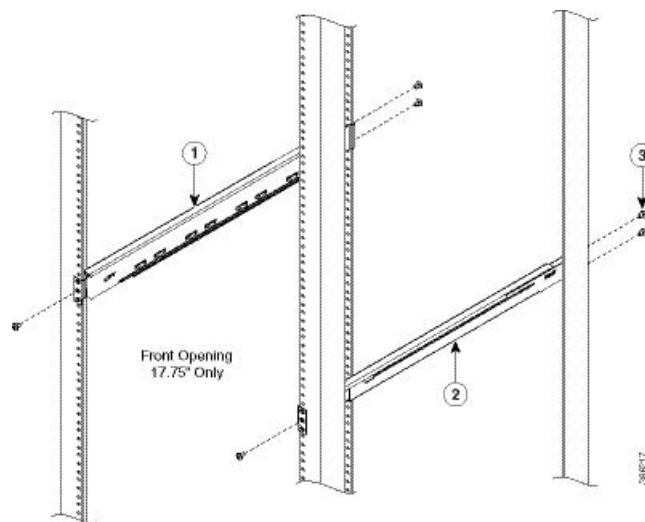
Figure 22: Four Post Slider Preparation



1	Align the sliders left front-left rear or right front-right rear as shown.
2	Flange facing side during assembly.
SLIDE	Once the shoulder rivets are aligned, slide in the sliders as shown in the arrow mark.

Step 3 Integrate the slider to the four post 19" rack.

Figure 23: Slider Integration to the Four Post 19" Rack



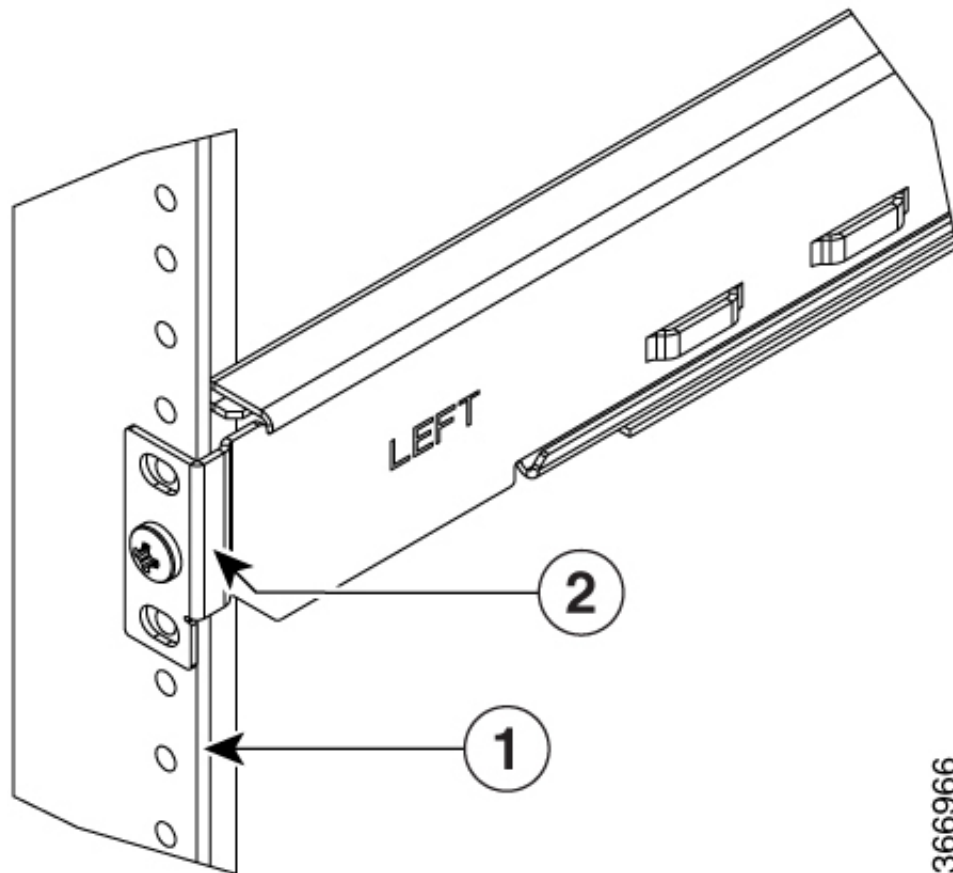
1	Left side four-post slide assembly
---	------------------------------------

2	Right side four-post slide assembly
3	Slider fixing screws (part number - 48-101524-01)

Note Ensure that the edge surface of the 19" rack and the inner surface of the sliding rail are properly mated while assembling the sliding rail.

Figure 24: Mating for the Four Post 19" Rack

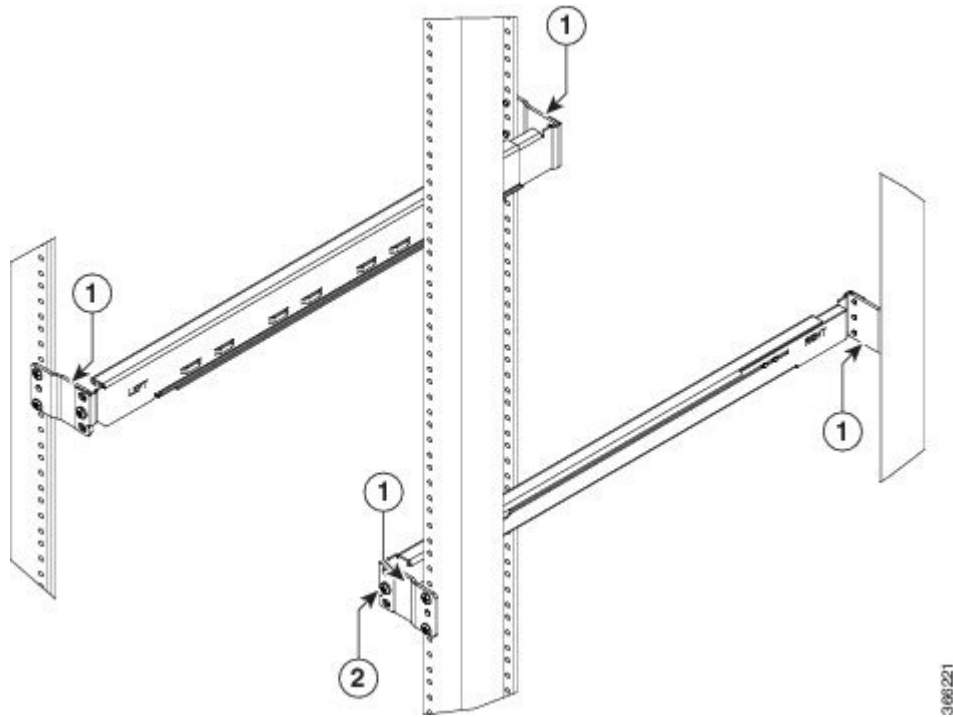
19" 4-Post



1	Edge surface of the rack
2	Inner surface of the sliding bracket

Step 4 Integrate the slider to the four post 23" rack.

Figure 25: Slider Integration to the Four Post 23" Rack



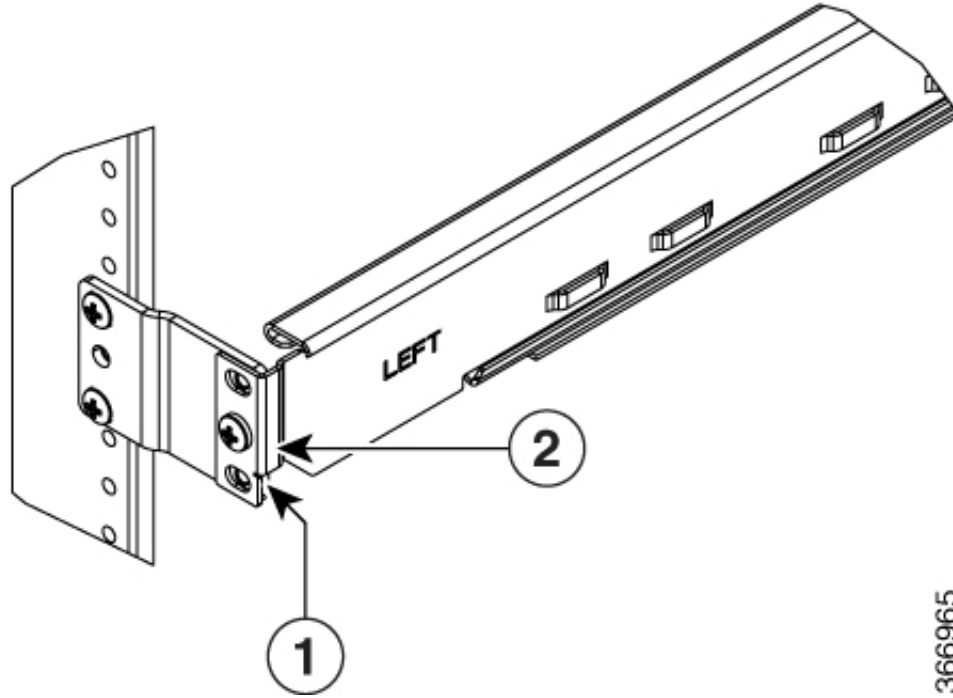
3/6/2021

1	The formed surface must always face the inner side of the rack post
2	Slider fixing screws (part number - 48-101524-01)

Note (For 23" rack) Ensure that the edge surface of the adapter and the inner surface of the sliding rail are properly mated while assembling the sliding rail.

Figure 26: Mating for the Four Post 23" Rack

23" 4-Post



366965

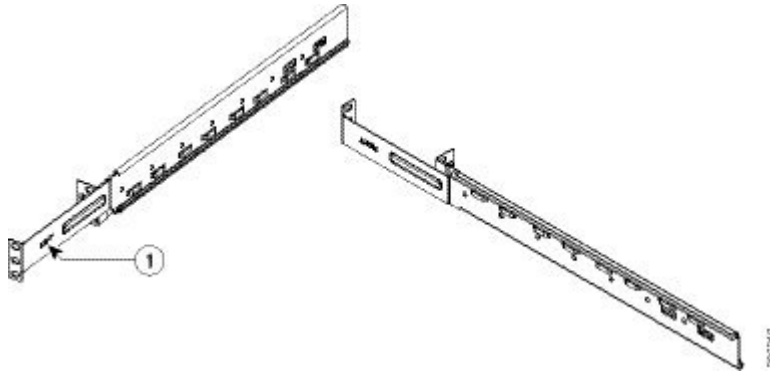
1	Edge surface of the adapter
2	Inner surface of the sliding bracket

Install Two Post Slider into EIA/ANSI Rack

Procedure

- Step 1** Identify the two post slider.

Figure 27: Two Post Slider Identification

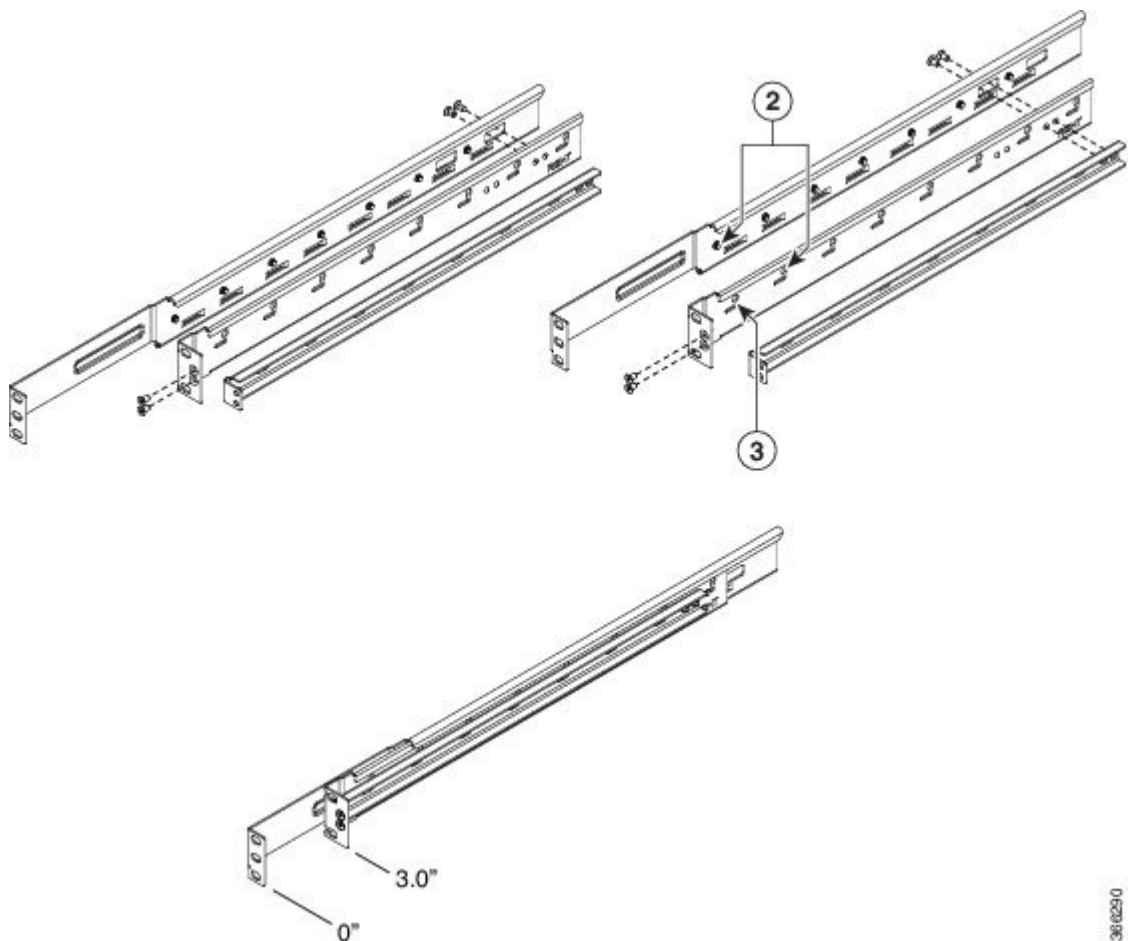


1	Check for the left/right marking on the sliders.
---	--

- a) Check whether the two post width is 5" OR 3". If the width is 5", use the default slider assembly for 5".
- b) If the post width is 3", modify the right/left sliders as shown below.

Step 2 Prepare the two post slider.

Figure 28: Two Post Slider Preparation



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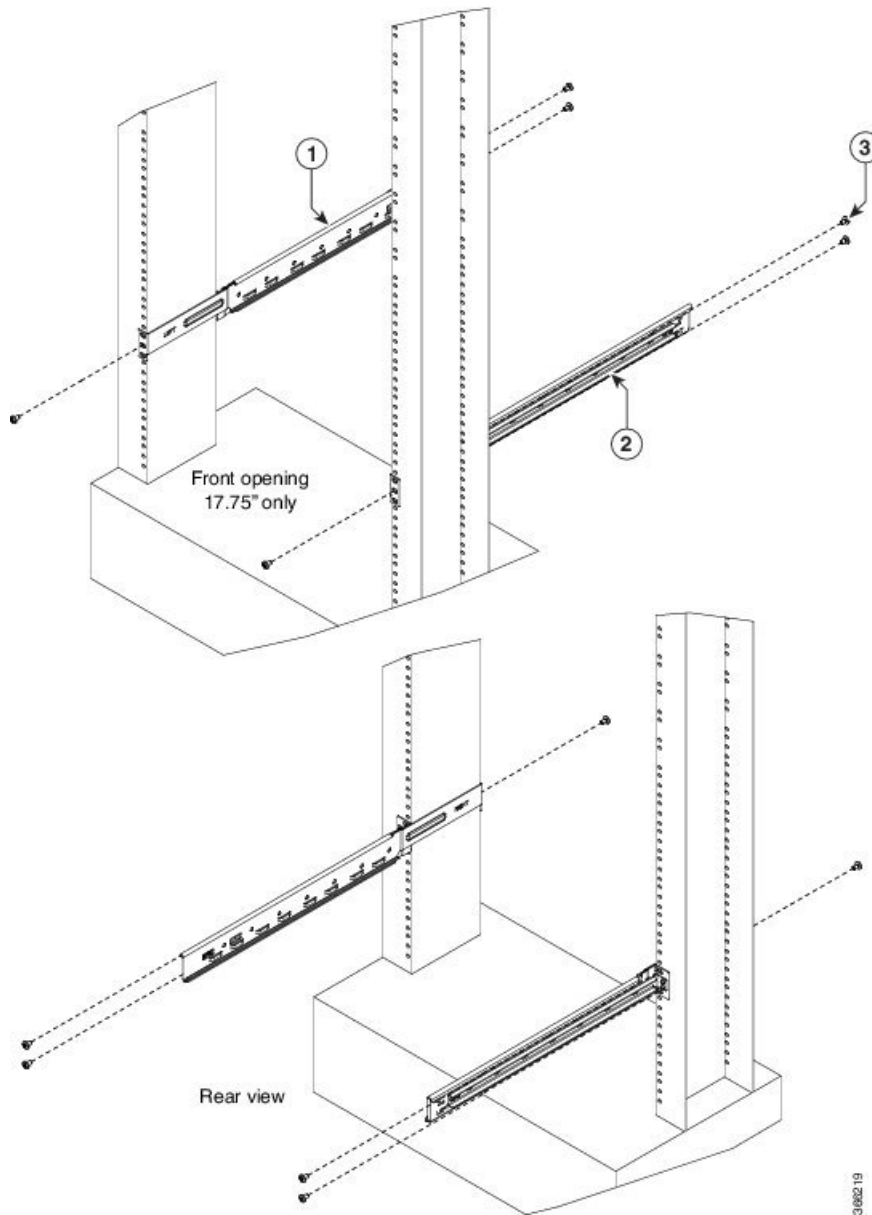
2	Align the rivet with key hole.
3	Do not insert any rivet inside this.

- a) Unfasten the 4X screws as shown above.
- b) Align the shoulder rivet with the key hole as shown.
- c) Fasten all the 4X screws again.

The two post slider is ready to use on 3" width post. This assembly procedure is the same for right or left sliders.

Step 3 Integrate the slider to the two post 19" rack.

Figure 29: Slider Integration to the Two Post 19" Rack

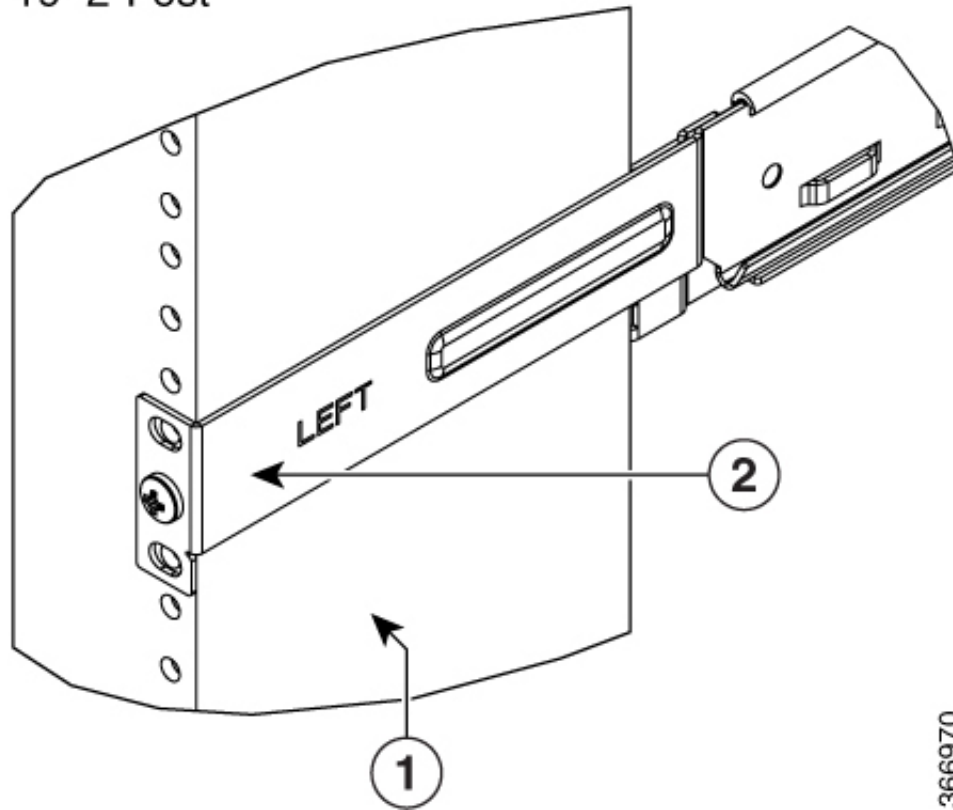


1	Left side four post slide assembly
2	Right side four post slide assembly
3	Slider fixing screws (part number - 48-101524-01)

Note Ensure that the edge surface of the 19" rack and the inner surface of the sliding rail are properly mated while assembling the sliding rail.

Figure 30: Mating for the Two Post 19" Rack

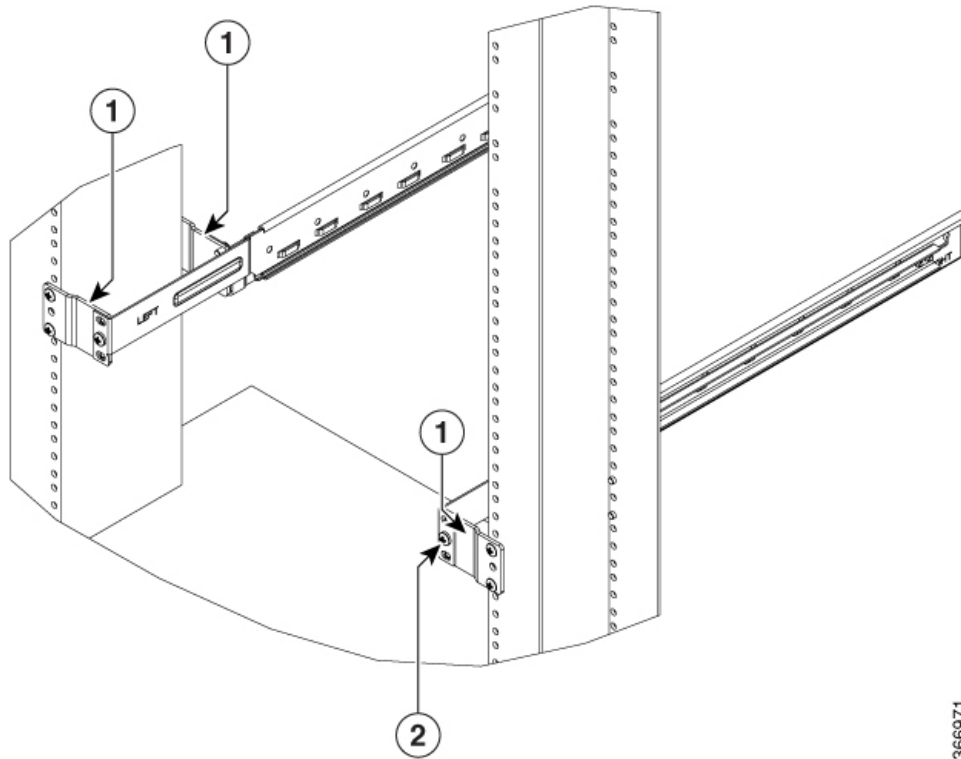
19" 2-Post



1	Edge surface of the rack
2	Inner surface of the sliding bracket

Step 4 Integrate the slider to the two post 23" rack.

Figure 31: Slider Integration to the Two Post 23" Rack



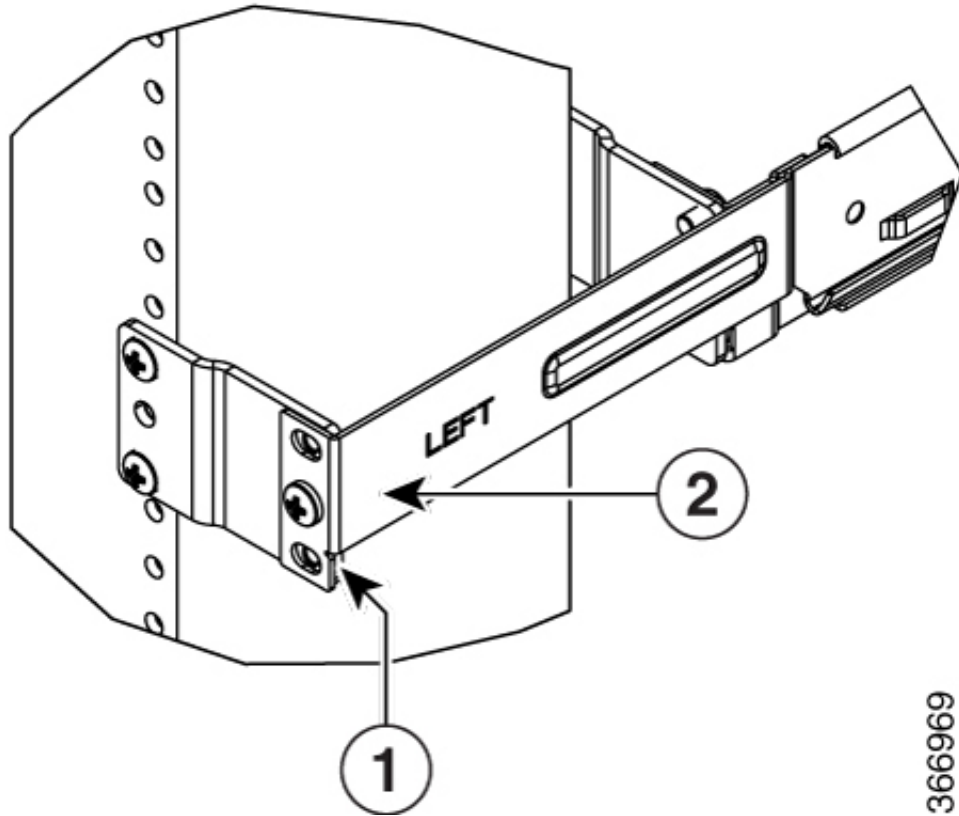
366971

1	The formed surface must always face the inner side of the rack post
2	Slider fixing screws (part number - 48-101524-01)

Note (For 23" rack) Ensure that the edge surface of the adapter and the inner surface of the sliding rail are properly mated while assembling the sliding rail.

Figure 32: Mating for the Two Post 23" Rack

23" 2-Post



1	Edge surface of the adapter
2	Inner surface of the sliding bracket

Ground NCS 1001



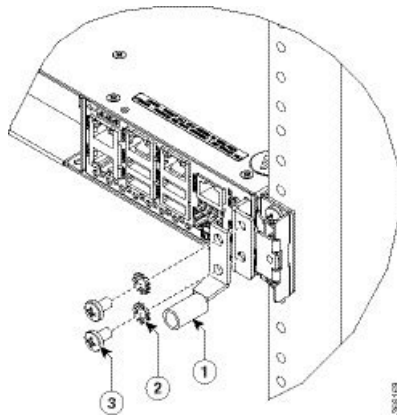
Caution

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** Verify that the office ground cable is connected to the top of the rack and the office ground, according to local site practice.
- Step 2** Remove any paint and other nonconductive coatings from the surfaces between the shelf ground and bay frame ground point. Clean the mating surfaces and apply appropriate antioxidant compound to the bare conductors.
- Step 3** Attach one end of the shelf ground cable (#8 AWG cable) to the ground point using the specified dual-hole lug connector. See [Figure 19: Grounding Extender](#), on page 25.

Figure 33: NCS 1001 Ground Lug



The orientation of the lug cable is always at the bottom side.

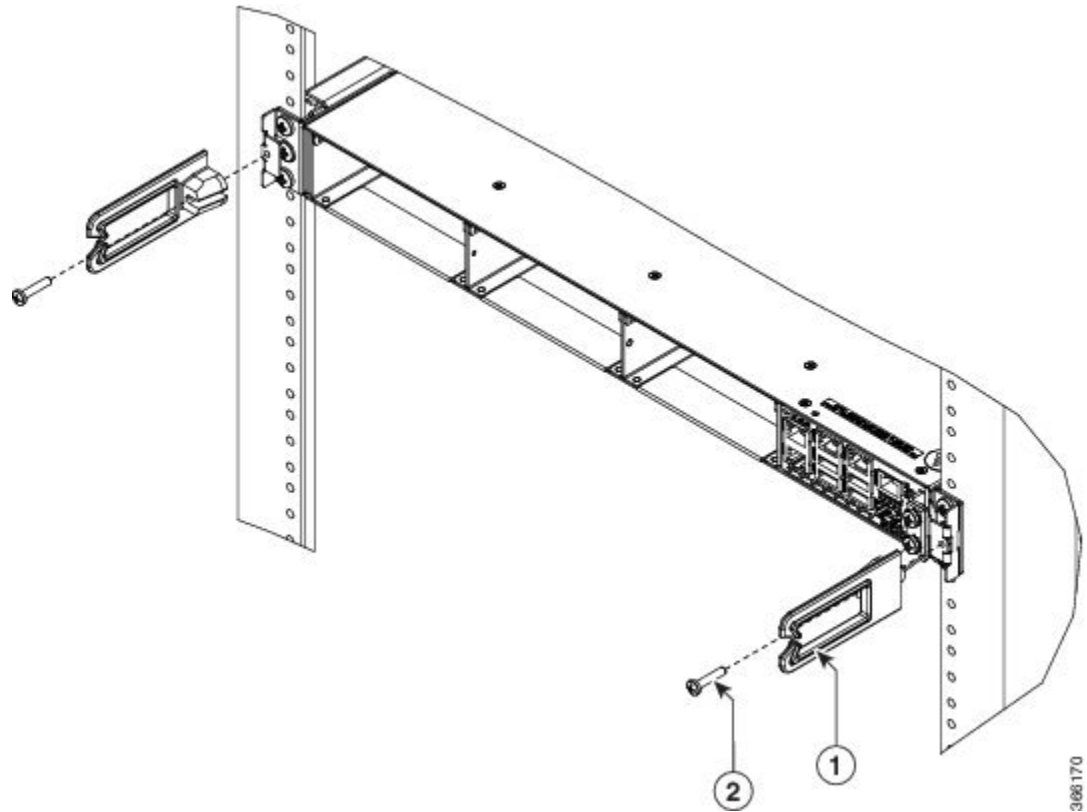
1	Ground lug
2	Star washer (part number - 48-1354-01)
3	Screws for lug (part number - 48-2835-01)

- Step 4** Tighten the M4 pan-head screw to torque value of 1.3 N-m (11.5 in-lbs).
- Step 5** Attach the other end of the shelf ground cable to the bay frame using a dual-hole lug connector according to the equipment rack frame specifications.

Cable Guide

The attachment of the cable guide is as shown below.

Figure 34: Cable Guide



1	Cable guide
2	Guide screws (part number - 48-0654-01)

The cable guide screw holding dome must face the inner side. Apply the torque value of 1.3 - 1.7 N-m (11.5 - 15.0 in-lbs) for 48-0654-01 screws. Based on the installation requirement, the cable guide can also be attached by rotating it by 180 degrees.

Power Supply

NCS 1001 has two slots for 600W AC redundant Power Supply Units (PSU). It is sufficient to have a single PSU inserted in the chassis to support all the features and provide power to all the pluggable modules. When only one PSU is inserted in the chassis, the Power Module Redundancy Lost major alarm is raised.



Caution In case of single PSU, the other PSU slot must be inserted with the PSU filler module to guarantee safety and system cooling compliance.

Connect AC Power to NCS 1001



Caution NCS 1001 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.

The voltage rating value for AC power ranges either between 200 V to 240 V or between 100 V to 127 V depending on the standards in various countries.



Note A dual pole breaker is needed for the installation. The rating of the dual pole breaker is 16A for International and 20A for USA and Canada.

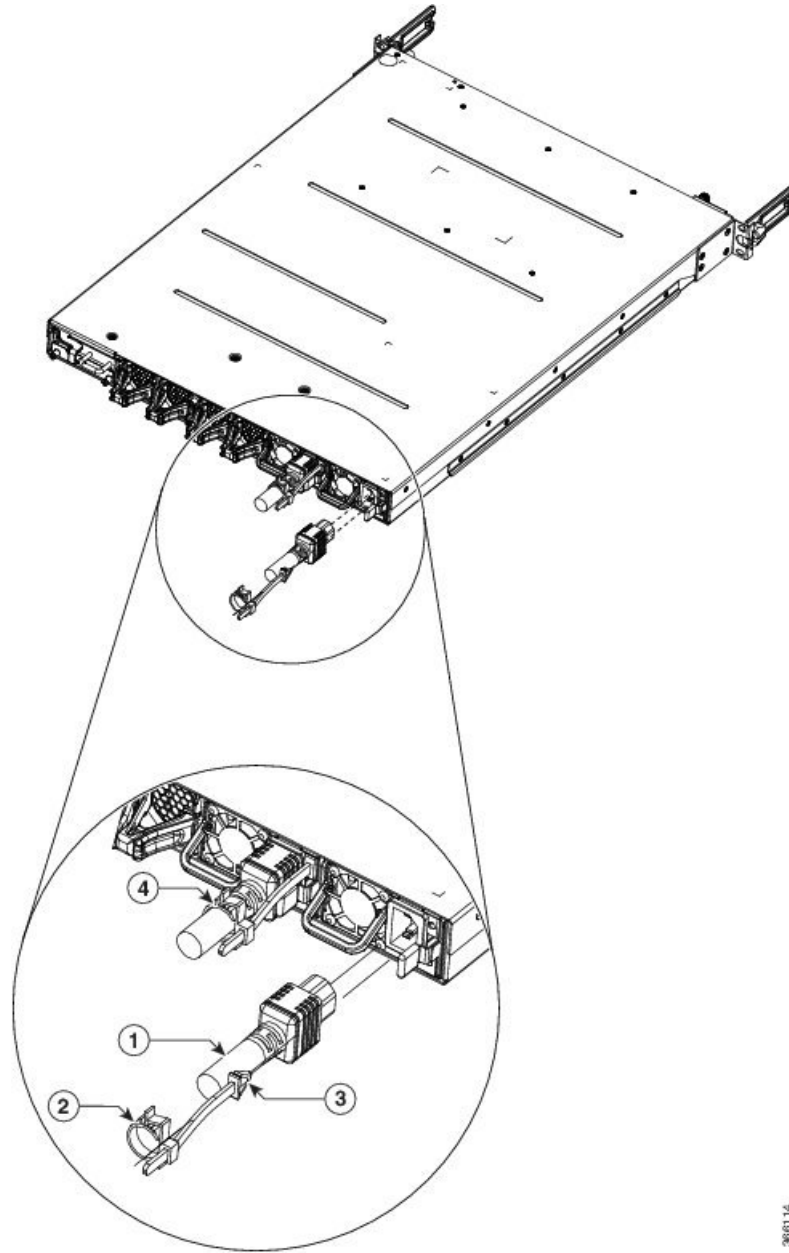
Figure 35: Hot Area on PSU Faceplate



Procedure

- Step 1** Verify that the AC cable is installed in the correct AC source panel. Ensure that either the fuse is removed or the circuit breaker is in the off position and locked out.
- Note** For an AC power supply, fuse or breaker rating must not exceed 20A.
- Step 2** Attach the AC power cable to the cable connector in the AC power module.
- Step 3** Close the cable clamp to secure the power cable.

Figure 36: Connecting AC Power



386114

1	AC power cord
2	Cable clamp
3	Tie mount
4	Final assembly

- Step 4** Ensure that the lockout device is removed if installed and turn on the circuit breaker(s) to the shelf. Verify that the Green LED on the PSU is on.
-

Connect DC Power to NCS 1001



Caution NCS 1001 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.

The system accepts a nominal input voltage of -48 VDC or -60 VDC at 15A, with an operational tolerance range of -40.5 to -72 VDC. A dual pole breaker per each power feed is needed for the installation. The rating of the breaker is 20A.

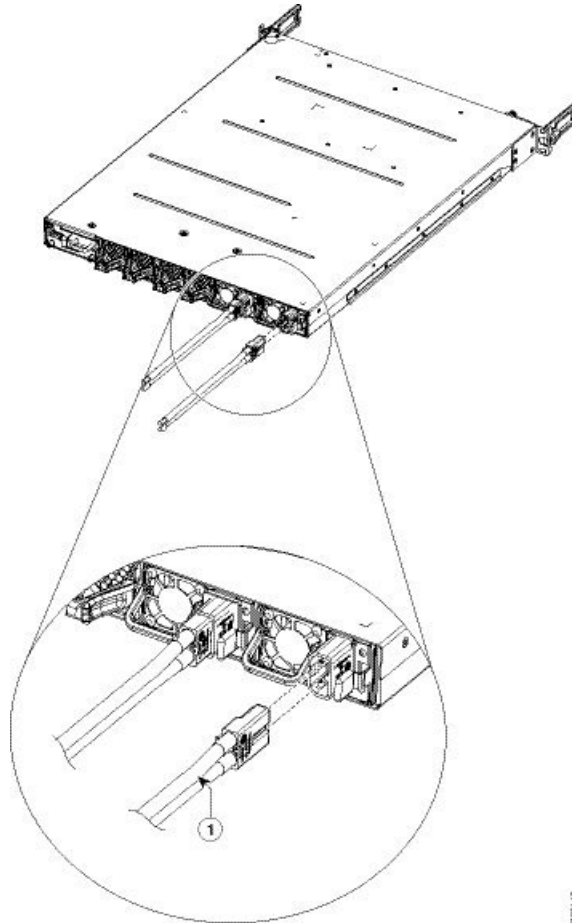
Figure 37: Hot Area on PSU Faceplate



Procedure

- Step 1** Verify that the correct fuse panel is installed in the top mounting space.
- Step 2** Measure and cut the cables as needed to reach NCS 1001 from the fuse panel.
- 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** Insert the DC connector into the DC receptacle on the power supply.

Figure 38: Connecting DC Power



1	DC Power Cord
---	---------------

Step 6 Ensure that either the fuse is inserted or the circuit breaker is in the ON position. Verify that the Green LED on the PSU is on.

Related Information

For more information on NCS 1001 including specifications, see the [data sheet](#).



CHAPTER 4

Replace Cisco NCS 1001 Components

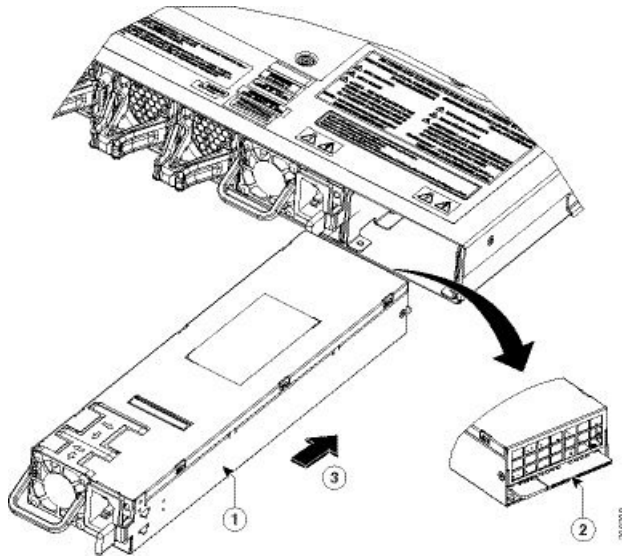
This chapter describes the procedures to replace Cisco NCS 1001 components.

- [Insert Power Supply, on page 45](#)
- [Remove Power Supply, on page 46](#)
- [Insert Fans, on page 47](#)
- [Remove Fans, on page 48](#)
- [Insert Control Card, on page 48](#)
- [Remove Control Card, on page 50](#)
- [Remove and Replace SSD, on page 52](#)
- [Insert Optical Modules, on page 53](#)
- [Remove Optical Modules, on page 54](#)
- [Filler Modules, on page 55](#)
- [Cable Routing, on page 56](#)
- [Install 32-Channel Even Mux/Demux Patch Panel, on page 57](#)
- [Remove 32-Channel Even Mux/Demux Patch Panel, on page 57](#)
- [Wipe Data in Disk Using Secure Erase, on page 57](#)

Insert Power Supply

Use this procedure to insert the power supply units.

Figure 39: Insert Power Supply



1	Insert the PSU into the cage on the rear side of the unit in the direction shown (slots 0 or 1)
2	The PSU connecting PCB must always face the bottom during insertion
3	Direction to insert the power supply

Remove Power Supply



Note The inlet temperature of the system during replacement must be less than 40 deg Celsius at sea level. The replacement time decreases for higher altitudes.



Note In case of PSU failure, the failed PSU must be physically replaced within 2 minutes.

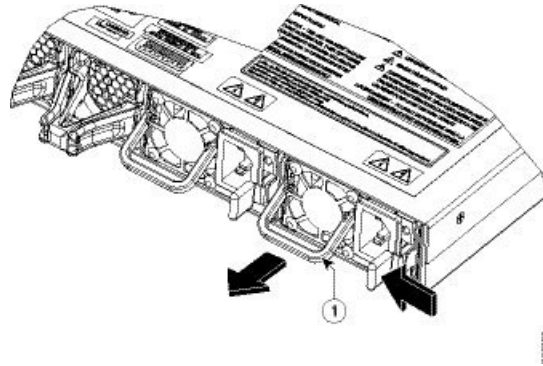


Note The PSU is hot-swappable. While replacing a failed PSU, ensure that the other PSU remains plugged into the chassis to avoid impacting traffic.

Figure 40: Hot Area on PSU Faceplate



Figure 41: Remove Power Supply

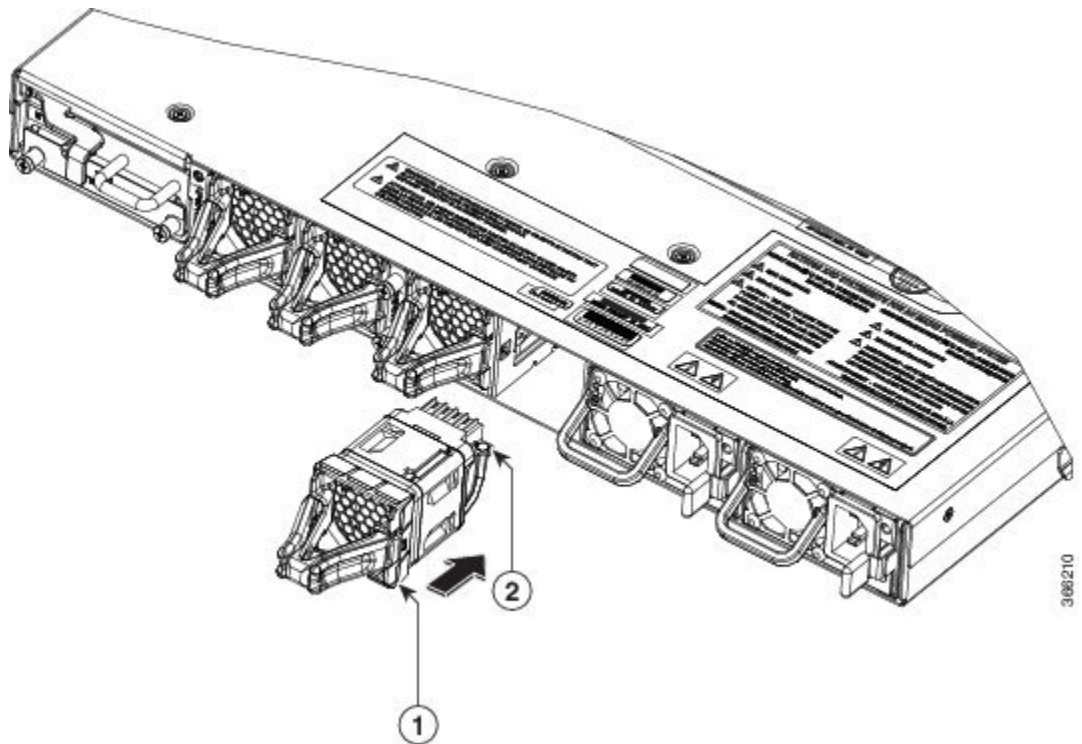


1	Release the lock of the PSU in the direction that is shown and pull the PSU gently using the handle.
---	--

Insert Fans

Use this procedure to insert the fans.

Figure 42: Insert Fans



1	Push the fan into the fan slot as shown (slots 0, 1, 2, or 3)
2	Ensure that the fan connector always faces upwards

Remove Fans



Note Cisco NCS 1001 has a fan redundancy protection mechanism against a single fan failure for up to 96 hours. The inlet temperature of the system during replacement must be less than 40 deg Celsius at sea level. The replacement time decreases for higher altitudes.

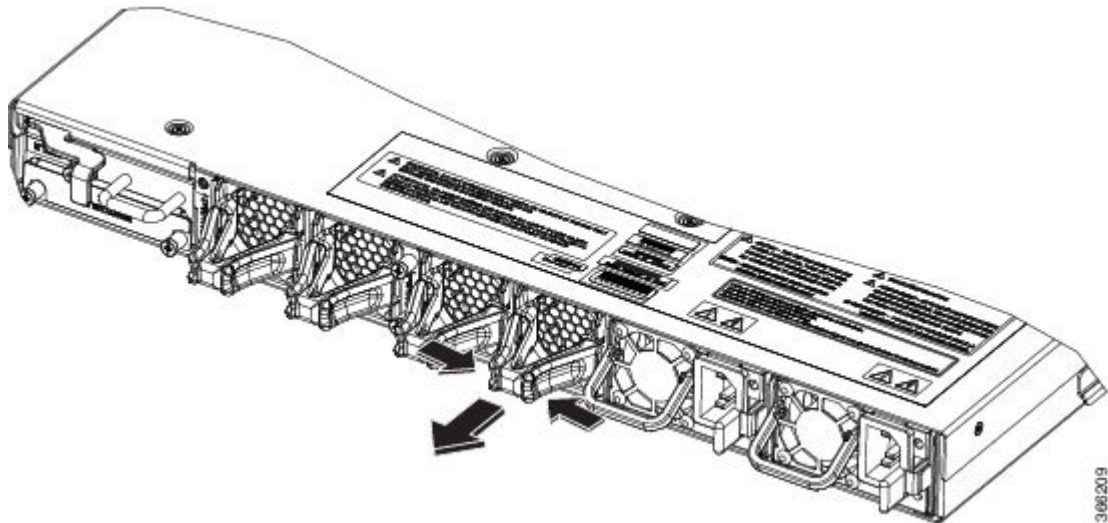


Note It is not recommended to remove two fans simultaneously. When the failed fan is replaced, the new fan must be physically placed within 5 minutes. Otherwise, the performance of the system is affected.



Note NCS 1001 fans are hot-swappable. When replacing a failed fan, ensure that the other fans remain plugged into the chassis to avoid impacting traffic.

Figure 43: Remove Fans

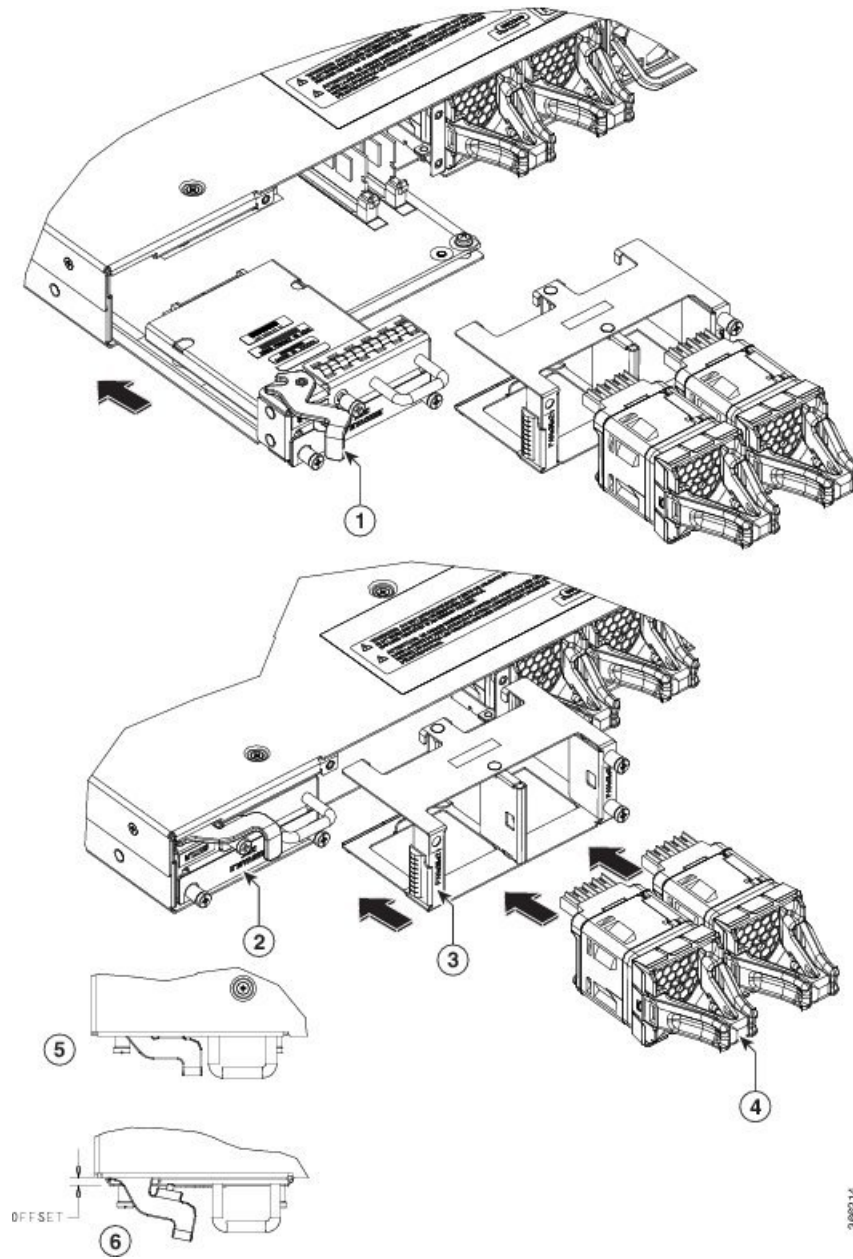


Press the lever of the fan and pull it to remove the fan out as shown.

Insert Control Card

Use this procedure to insert the control card.

Figure 44: Insert Control Card



1	Ejector lever. Rotate and push ejector lever to engage control card to the connector.
2	Control card faceplate. Push this surface area with additional force needed to engage control card.
3	Fan tray
4	Fans
5	The control card is properly seated.

6	The control card is not properly seated. Repeat the instructions mentioned in callout 2 to push the control card.
---	---

Procedure

- Step 1** Insert the control card in the NCS 1001 box guides.
 - Step 2** Slide the control card while keeping the ejector open until the faceplate is close to the box and the ejector is engaged.
 - Step 3** Press the ejector to insert the control card partially.
 - Step 4** Apply pressure on the control card faceplate to complete the insertion.
 - Step 5** Ensure that the control card faceplate is aligned to the top cover edge of NCS 1001.
 - Step 6** Verify that the position of the ejector is final.
 - Step 7** Fix the screw to lock the ejector.
 - Step 8** Push the fan tray inside the chassis.
 - Step 9** Ensure that the captive screws are aligned properly and fasten the captive screws.
 - Step 10** Insert the fans inside the cage. See [Insert Fans, on page 47](#).
-

Remove Control Card



Note The inlet temperature of the system during replacement must be less than 40 deg Celsius at sea level. The replacement time decreases for higher altitudes.

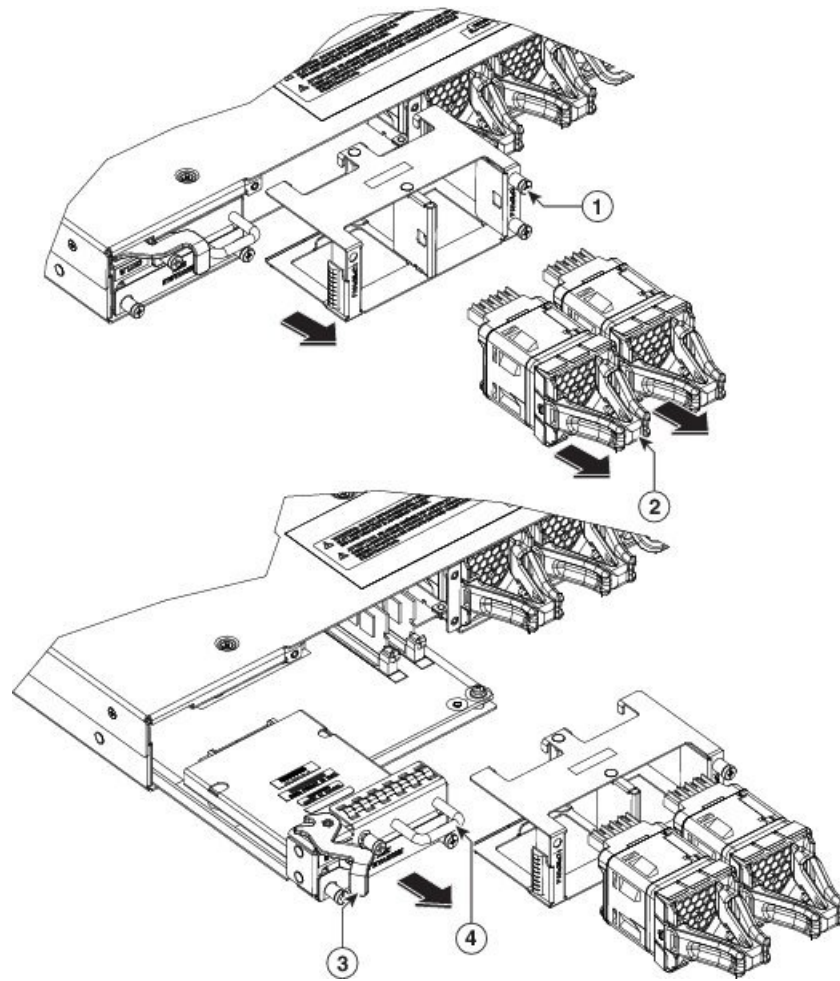


Note In case of card failure, the failed control card must be physically replaced within 2 minutes. Otherwise, the performance of the system is affected.



Note The control card is hot-swappable. NCS 1001 supports headless operation, which ensures continuous traffic flow even with a nonfunctional CPU for up to 2 minutes. This headless operation allows you to replace the failed control card without powering down the device.

Figure 45: Remove Control Card



1	Fan tray screws
2	Fans
3	Ejector lever
4	Control card handle.

Procedure

- Step 1** Remove the fans from slots 2 and 3. See [Remove Fans](#), on page 48.
- Step 2** Unfasten the fan tray screws as shown.
- Step 3** Pull out the fans from the chassis as shown.
- Step 4** Use the ejector lever to eject the control card from the chassis.

- Step 5** Use the control card handle to remove the control card completely.
-

Remove and Replace SSD



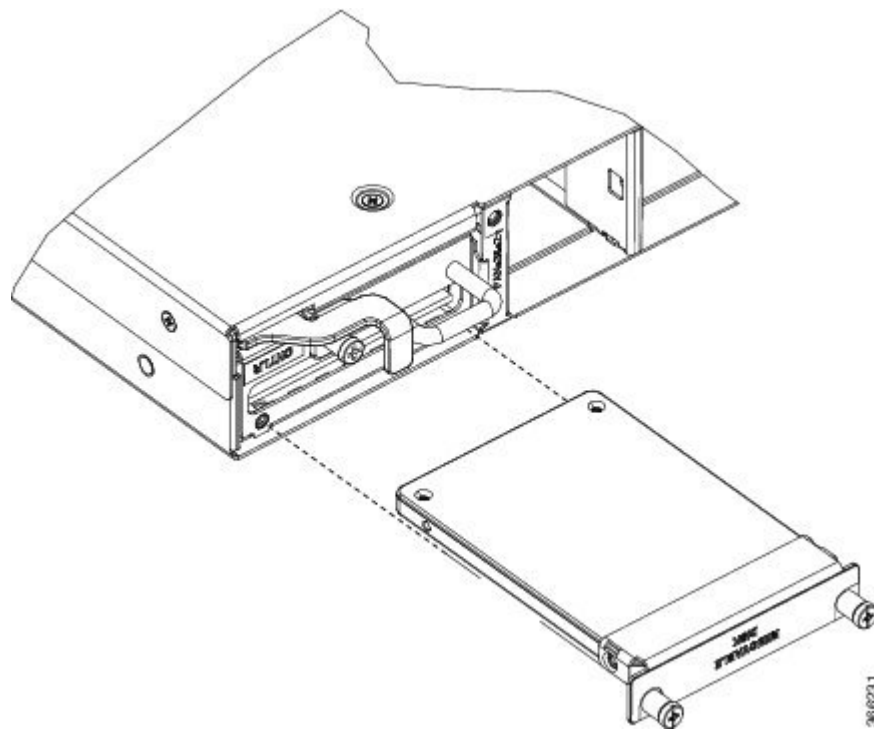
Note If the SSD is removed, it needs to be physically replaced within 10 minutes. If NCS 1001 runs without the SSD, the SSD metallic cover must be placed to close the SSD slot.

To remove a SSD:

Procedure

- Step 1** Loosen the two captive screws in the Removable Disk slot on the back side.
Step 2 Slide out the SSD from the Removable Disk slot.

Figure 46: Remove SSD



To replace a SSD:

- Step 3** Slide the SSD into the Removable Disk slot.
Step 4 Tighten the two captive screws to secure the SSD into place.
-

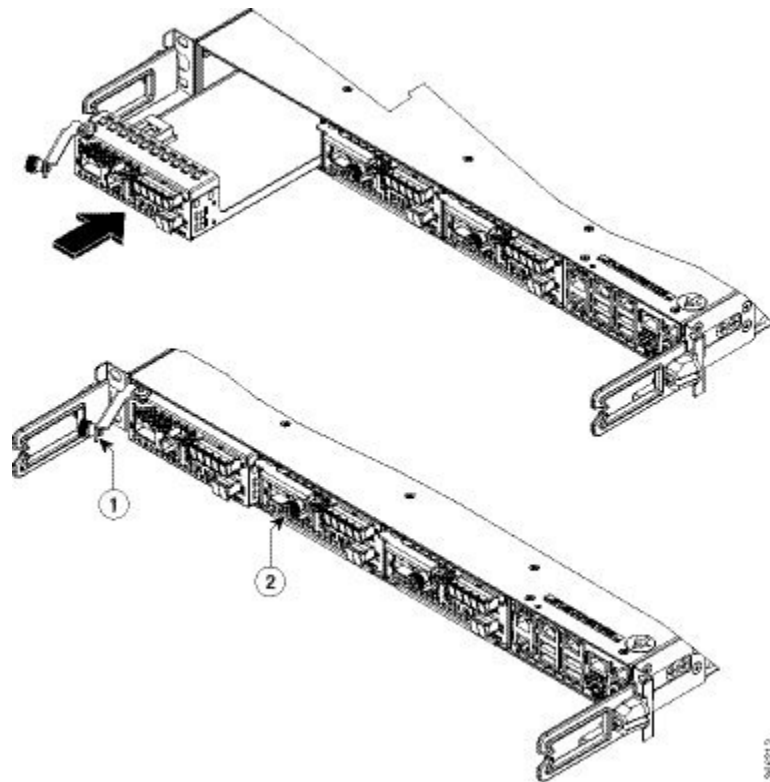
Insert Optical Modules

Use this procedure to insert the optical modules.

Procedure

- Step 1** Arrange the ejector lever of the optical module approximately at 60 degrees as shown.
- Step 2** Push the module gently inside the slot (1, 2, or 3) with the ejector lever on top.
- Step 3** Use the ejector lever force to push the module inside.
- Step 4** When the ejector is aligned to the faceplate, fasten the captive screw in the clockwise direction to complete the assembly.

Figure 47: Insert Optical Modules



1	Ejector lever
2	Captive screw

Remove Optical Modules

Use this procedure to remove the optical modules.

Before you begin



Note When you plan to replace a configured optical module with a different type of optical module, you must clear the configurations of the old module before you install the new module. For example, when replacing a configured EDFA module with a PSM in the same slot, clear the EDFA configurations.

In general, configurations in a card equipped in an NCS 1001 slot include:

- Card configuration—hw-module parameters configuration related to the slot *S* where the card is equipped
- OTS controller configurations
- Optics controller configurations—only for EDFA cards

The following commands clear the configurations in the previous card.

1. `no hw-module location 0/RP0/CPU0 slot <S>`

Clear the card parameters configuration.

2. `no controller ots Rack/Slot/Instance/Port`

Clear each OTS controller configuration.

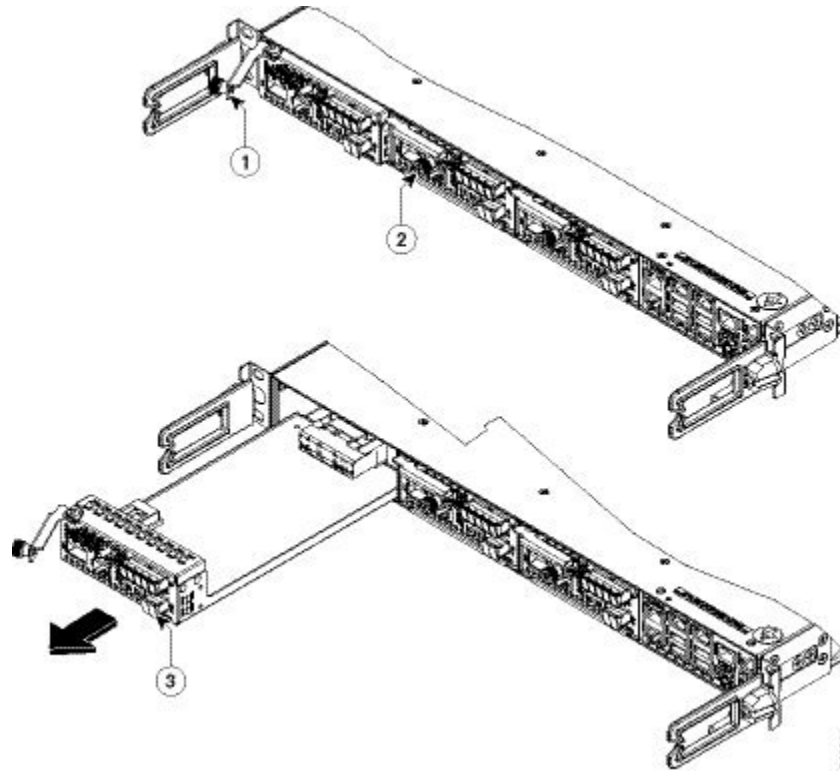
3. `no controller optics Rack/Slot/Instance/Port`

(Optional) Clear the controller optics configurations. This must be done only if the card previously equipped in slot *S* was an EDFA.

Procedure

- Step 1** Unfasten the captive screws in an anticlockwise direction.
- Step 2** Use the ejector lever to pull the module outside.
- Step 3** When the module is partially out, pull the module from the chassis.

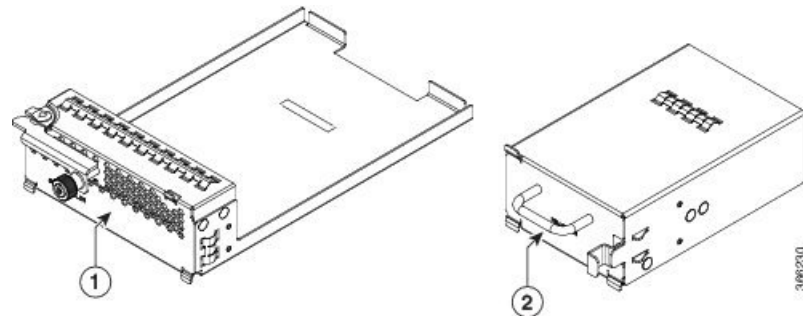
Figure 48: Remove Optical Modules



1	Ejector lever
2 and 3	Captive screw

Filler Modules

Figure 49: Filler Modules



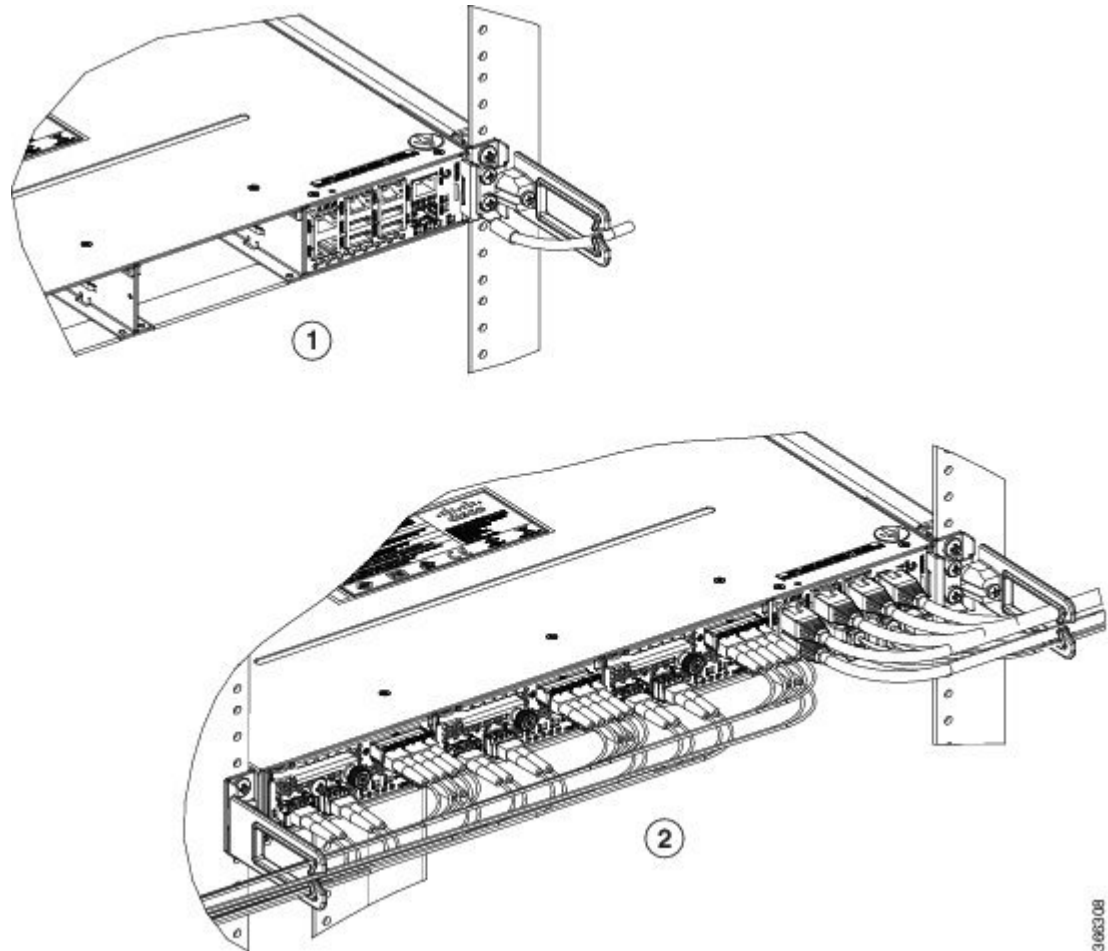
1	Optical filler module
---	-----------------------

2	PSU filler module
---	-------------------

The insertion and removal procedure of the optical filler modules (left) and the PSU filler modules (right) is the same as the module replacement.

Cable Routing

Figure 50: Cable Routing



Routing of ground cable: If there is a requirement to route ground cable separately from other electrical cables, it can be passed under the cable managed bracket and tied with bracket arm.

Routing of other cables: If there is a requirement of separate routing of fibre and copper cables, there are several 1 RU fibre management trays available which can be made use of during installation.

Install 32-Channel Even Mux/Demux Patch Panel



Note Before proceeding to even mux/demux panel installation, see [Safety Guidelines for Mux/Demux Patch Panel](#) for Safety Guidelines.

Installation procedure for the 32-Channel Even Mux/Demux Patch Panel is similar to the 32-Channel Mux/Demux Patch Panel. Follow the steps as described in [Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel](#) to install the even mux/demux patch panel.

Remove 32-Channel Even Mux/Demux Patch Panel

Removal procedure for the 32-Channel Even Mux/Demux Patch Panel is similar to the 32-Channel Mux/Demux Patch Panel. Follow the steps as described in [Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel](#) to remove the even mux/demux patch panel.

Wipe Data in Disk Using Secure Erase

When NCS 1001 becomes faulty, contact TAC to open a Return Material Authorization (RMA) request. Before opening a RMA request, the user can securely wipe data in NCS 1001 disks using the Secure Erase feature. The Secure Erase feature is supported from BIOS version v13.10.



Warning Use this procedure only during RMA.

Before you begin

The NCS 1001 unit that is planned for RMA must be taken out of the data center and the network. The user must access NCS 1001 only using the console port.

Procedure

Step 1 When NCS 1001 boots (power cycle), the following message appears.

```
Version 2.17.1245. Copyright (C) 2016 American Megatrends, Inc.  
BIOS Date: 03/22/2016 11:19:42 Ver: 0ACBZ1310  
Press <DEL> or <ESC> to enter setup.
```

Press DEL or ESC key to enter BIOS.

Step 2 Select the **Security** tab using the arrow keys.

The disk security details such as setting Hard Disk Drive (HDD) password and erasing HDD are displayed in the Security tab.

Step 3 Select **Set HDD Password** to set the new HDD password.

The HDD password can contain only ASCII characters and is not case sensitive. The HDD password needs to be provided after power reset and the password can be set or changed after power reset. The disk security is enabled after setting the HDD password.

Warning When HDD password is set, the user must remember the password. If the password is lost, the data in HDD cannot be recovered.

Warning When HDD password is set, BIOS prompts for HDD password to unlock the HDD after each power reset.

Step 4 Select **Erase HDD** using the arrow keys.

The Erase HDD screen appears.

Step 5 Enter the HDD password in the Erase HDD field.

Step 6 Select **OK** in the Erase Confirmation screen that indicates the data in the disk has been securely wiped.

The disk security settings are reverted to factory defaults after the secure erase. The configured HDD password is also wiped.
