

Hardware Installation Guide for Cisco NCS 1001

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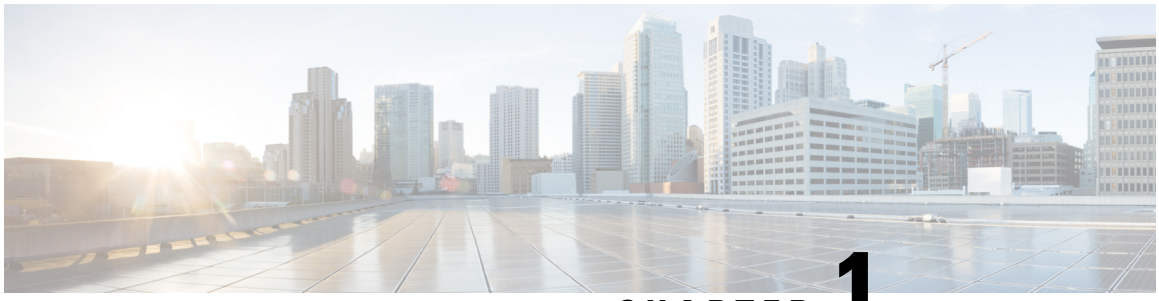
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CHAPTER 1

Cisco NCS 1001 Overview

This chapter provides an overview of Cisco NCS 1001.

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- Safety Labels, on page 4
- Optical Amplifier Module, on page 7
- Protection Switching Module, on page 9
- Optical Time Domain Reflectometer Module, on page 10
- Cisco NCS 1000 32-Channel Even Mux/Demux Patch Panel, on page 12
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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.

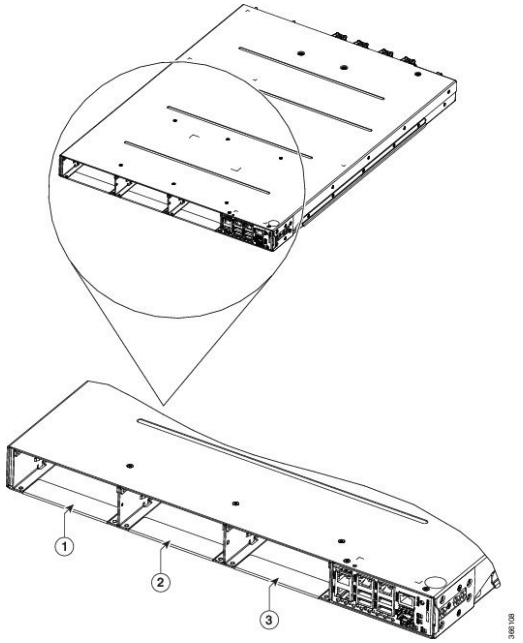
  The optical modules can be inserted in slots 1 to 3 as shown in the following figure. The optical modules can be inserted and removed from the slots while the system is operational. In amplified configuration, the Optical Amplifier module can be inserted in any slot. In (section) protected configuration,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

Cisco NCS 1001 Overview

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.

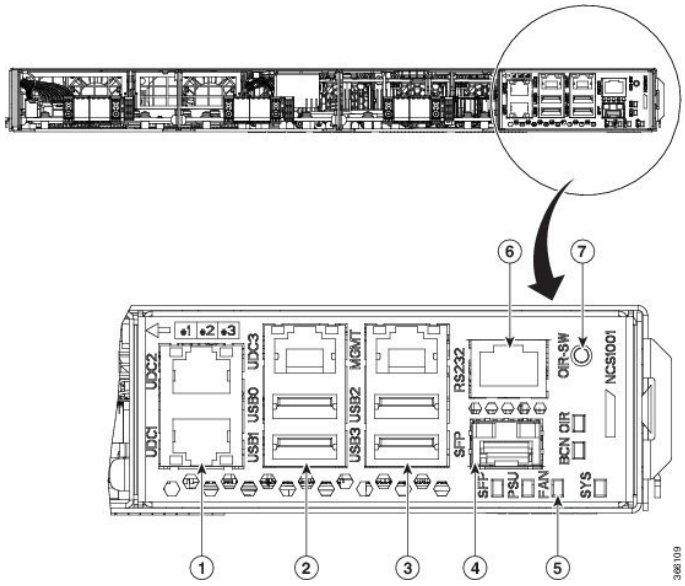
Figure 1: Cisco NCS 1001 Front View



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

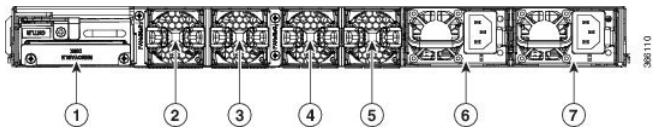
The slot numbers are also specified on the front panel label.

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



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



Optical Amplifier Module

Table 1: Feature History

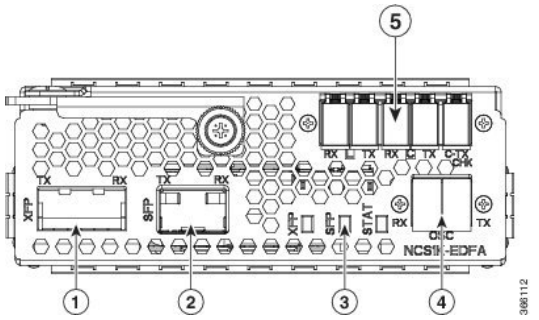
Feature Name	Release Information	Feature Description
Amplifier Behaviour	Cisco IOS XR Release 7.3.1	Grid mode configuration for the optical amplifier has been extended to support 75GHz spaced channels. You can optimize the optical spectrum and granularity using the gridless configuration. You can provision channels with arbitrary channel frequencies and channel widths. Up to 96 channels can be configured using the gridless configuration. Commands modified: • 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	• COM-RX (booster input) • COM-TX (preamplifier output)
Ots 0/slot/0/1	• LINE-RX (preamplifier input) • LINE-TX (booster output)
Ots 0/slot/0/2	• 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.

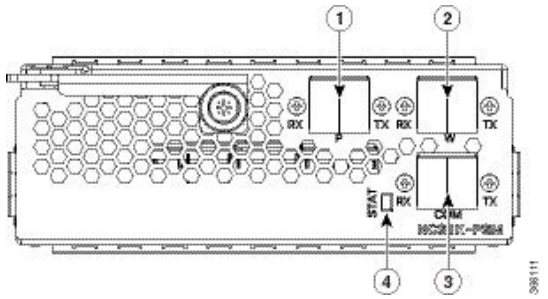
- If the output power on COM-TX is less than or equal to 20 dB, the com-check port may not be used and can be turned off. Also no physical connection between the pre COM-CHECK and Demux monitor port is required.
- Safety on pre is necessary in some cases such as large spans over high power requirements.
- 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

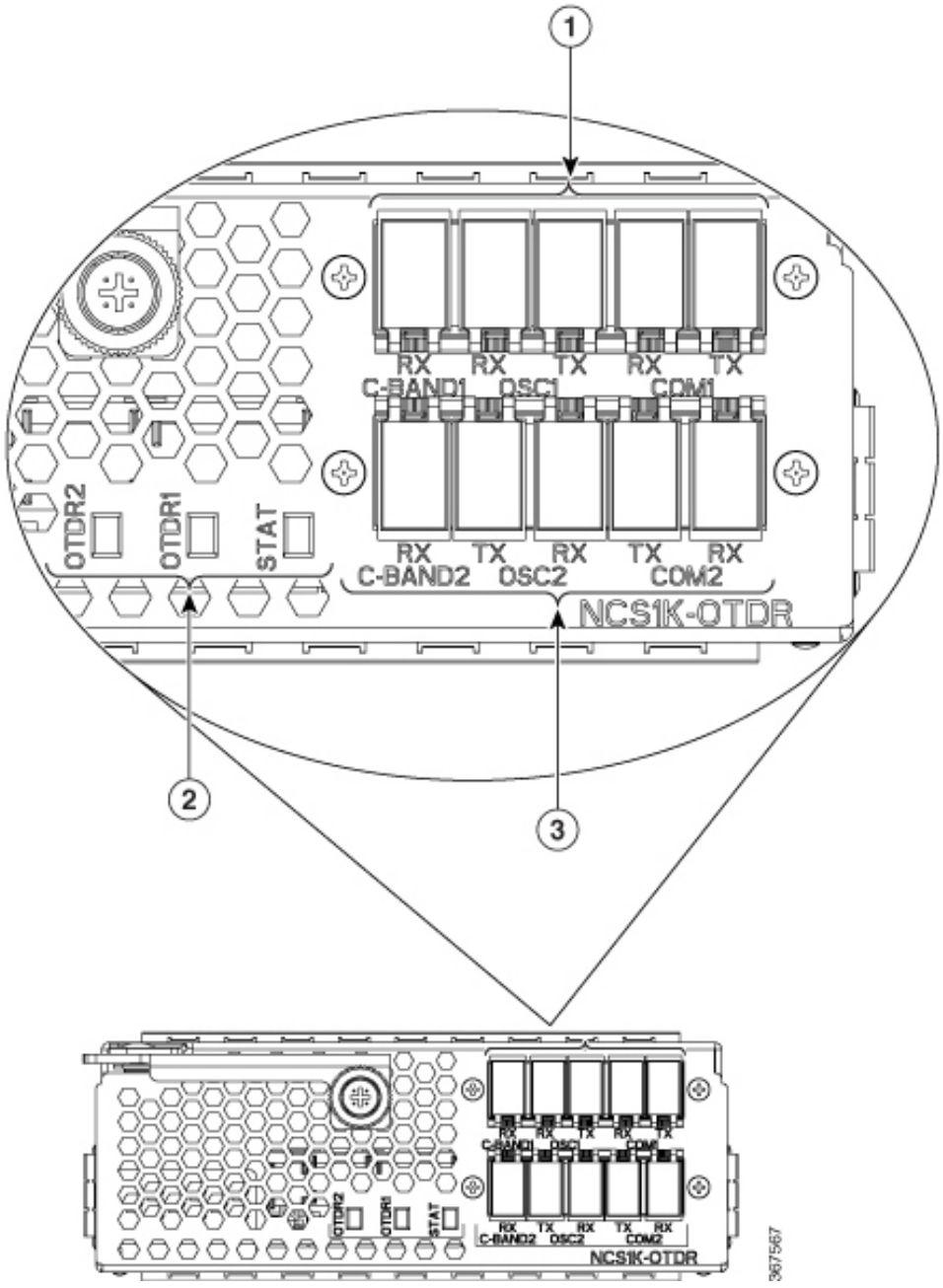
The following table describes the mapping of controllers and optical ports for the protection switching module.

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

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

NCS1K-MD-32x-CE mux/demux passive patch panels

NCS1K-MD-32x-CE mux/demux passive patch panels are a pair of optical patch panels that

- use passive Athermal Arrayed Waveguide Grating (AAWG) technology to multiplex and demultiplex signals across multiple channels,
- support 32 channels per panel with 150-GHz spacing and offer wide optical pass-band support, and
- enable add/drop functions for the NCS 1001 and NCS 1014 optical line systems and can be paired (ODD and EVEN panels) to achieve 64 channels with 75-GHz spacing.

Supported Panels:

- NCS1K-MD-32E-CE (EVEN panel)
- NCS1K-MD-32O-CE (ODD panel)

Key features and usage:

- Each mux/demux panel allows multiplexing and demultiplexing for 32 channels with a channel spacing of 150 GHz.
- When both ODD and EVEN panels are used together on the same NCS 1001 or NCS 1014 optical line system, the combined capacity becomes 64 channels with 75-GHz spacing.

- Each panel acts as an add/drop unit for 32 channels at 140 GBd in standalone mode.
- The panels operate fully in the C-band and are enhanced versions of the NCS1K-MD-32O/E-C patch panels.

Front panel of the MD-32x-CE

The interfaces of MD-32E-C patch panel is similar to the MD-32-O-CE patch panel.

Figure 12: MD-32x-CE interfaces

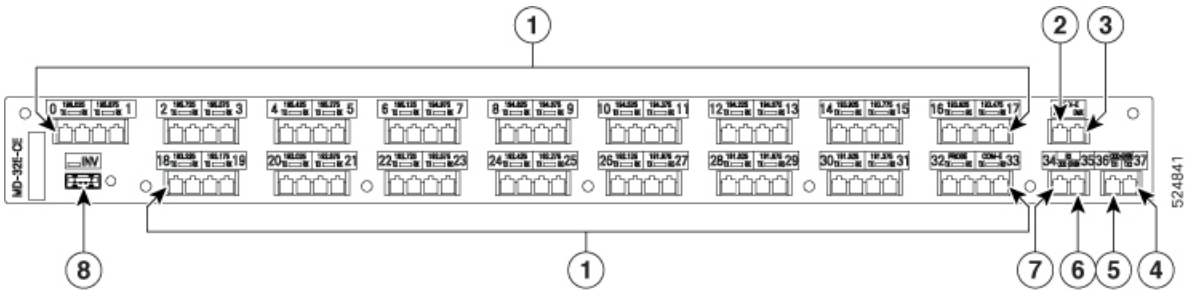


Table 4: Port Label Descriptions

Callout	Port label	Connector type	Description
1	CH-i TX/RX [i=0–31]	LC	Transmits and receives data through the 32 optical channels
	COM-x-TX/RX	LC	Transmits and receives the combined signals to multiplex or demultiplex. Its operating frequency range is 196.175–191.15 (1528.2–1568.4) [THz (nm)].
	PROBE-TX/RX	LC	Starts the coherent test probe signal in TX port and detects the signal in RX port to verify connection with the host card
2	MON-x-MUX	LC	Monitors the aggregrated signal flowing out of the patch panel. Its operating frequency range is 196.175–191.15 (1528.2–1568.4) [THz (nm)].
3	MON-x-DEMUX	LC	Monitors the aggregrated signal coming into the patch panel to demultiplex the signal. Its operating frequency is the same as MON-x-MUX port.
4	ODD+EVEN-TX2	LC	Transmits the ODD and EVEN optical channels
5	ODD+EVEN TX1	LC	Transmits the ODD and EVEN optical channels
6	RX-EVEN	LC	Receives the EVEN optical channels
7	RX-ODD	LC	Receives the ODD optical channels

Callout	Port label	Connector type	Description
8	INV	USB Type A receptacle connector	Establishes USB communication channel with the optical line system

Characteristics of MD-32x-CE

The MD32x-CE patch panel operates in C-band. It is the enhanced version of the NCS1K-MD-32O/E-C patch panel.

Functionalities	NCS1K-MD-32E-CE	NCS1K-MD-32O-CE
Band type	C-band	
Loopback	Loopback is not supported.	
Frequency range (THz)	191.375 - 196.025	191.450 - 196.100
Embedded optical modules	optical coupler	optical splitter
Coherent probe testing	MD32x-CE patch panel has a dedicated PROBE port to detect test probe signal to verify connection with the host card.	

Communication with the NCS 1001 and NCS 1014 optical line system

The MD32x-CE patch panels communicate to the optical line system using a USB communication channel. The INV port is the dedicated USB 2.0 port in the patch panels that connect to the controllers to communicate.

The USB communication channel helps to retrieve the inventory data and the insertion loss of the optical paths.

Channel wavelength allocation

The table shows the frequency and wavelength allocated to each channel for both ODD and EVEN version of the MD-32x-C patch panels.

Table 5: C-Band channel wavelength allocation

Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
0	196.025	1529.36	196.100	1528.77
1	195.875	1530.53	195.950	1529.94
2	195.725	1531.70	195.800	1531.12
3	195.575	1532.88	195.650	1532.29
4	195.425	1534.05	195.500	1533.47

Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
5	195.275	1535.23	195.350	1534.64
6	195.125	1536.41	195.200	1535.82
7	194.975	1537.59	195.050	1537.00
8	194.825	1538.78	194.900	1538.19
9	194.675	1539.96	194.750	1539.37
10	194.525	1541.15	194.600	1540.56
11	194.375	1542.34	194.450	1541.75
12	194.225	1543.53	194.300	1542.94
13	194.075	1544.72	194.150	1544.13
14	193.925	1545.92	194.000	1545.32
15	193.775	1547.12	193.850	1546.52
16	193.625	1548.31	193.700	1547.72
17	193.475	1549.52	193.550	1548.91
18	193.325	1550.72	193.400	1550.12
19	193.175	1551.92	193.250	1551.32
20	193.025	1553.13	193.100	1552.52
21	192.875	1554.34	192.950	1553.73
22	192.725	1555.55	192.800	1554.94
23	192.575	1556.76	192.650	1556.15
24	192.425	1557.97	192.500	1557.36
25	192.275	1559.19	192.350	1558.58
26	192.125	1560.40	192.200	1559.79
27	191.975	1561.62	192.050	1561.01
28	191.825	1562.84	191.900	1562.23
29	191.675	1564.07	191.750	1563.45
30	191.525	1565.29	191.600	1564.68
31	191.375	1566.52	191.450	1565.90

Cisco ONS 15216 4 channel optical add/drop multiplexers

A Cisco ONS 15216 4 channel optical add/drop multiplexer is a passive optical networking device that

- enables the Cisco ONS 15454 Multiservice Transport Platform (MSTP) to address the network edge cost-effectively without sacrificing operational ease,
- is well suited for applications with minimal wavelength requirements and tight space and power constraints, such as cell site and customer premises terminations, and
- offers ten models covering a 40-channel 100-GHz channel plan.

The Cisco ONS 15216 4 channel OADMs support flexible deployment, especially where space and power are limited. These models allow edge optical networking to be extended economically, meeting both operational and environmental constraints.

In Release 25.4.1, NCS 1001 supports USB inventory only for Cisco ONS 15216 4 channel optical add/drop multiplexer.

USB passive inventories

A USB passive inventory is a system feature that

- automatically detects and collects key parameters (such as Product ID, Description, Serial Number, and Version ID) from passive optical modules when connected via USB,
- enables real-time inventory visibility and management for network administrators,
- ensures compatibility and traceability of passive modules within NCS 1001 hardware environments.

Table 6: 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.

Table 7: Feature History

Feature Name	Release	Description
USB inventory support	Cisco IOS XR Release 25.4.1	NCS 1001 can now retrieve information from additional passive devices connected to its USB ports. The feature extends support beyond previously supported passive devices, allowing you to access data from a wider range of connected equipment. The passive devices include: • NCS 1000 32 chs Even Mux/Demux Patch Panel (NCS1K-MD-32E-CE) • NCS 1000 32 chs Odd Mux/Demux Patch Panel (NCS1K-MD-32O-CE) • Cisco ONS 15216 4 Channel OADMs

How USB passive inventories work

When a supported passive unit is physically connected to one of the four available USB ports on the controller card of the NCS 1001, the inventory system automatically queries and retrieves the module's parameters. This information includes PID, Description, Serial Number, and Version ID. Only one passive unit can be inventoried at a time per USB port.

The inventory data is immediately accessible through operational commands such as show inventory in XR or through admin sessions. These commands provide clear module identification directly from the system interface. Inventory records can also be accessed through SNMP “entPhysicalEntity” objects, telemetry, and NETCONF using the yang model Cisco-IOS-XR-invmgr-oper.yang. This enables automated network management and monitoring.

From Release 25.4.1, NCS 1001 supports USB inventory management for these devices:

- NCS 1000 32 chs Even Mux/Demux Patch Panel (NCS1K-MD-32E-CE)
- NCS 1000 32 chs Odd Mux/Demux Patch Panel (NCS1K-MD-32O-CE)
- Cisco ONS 15216 4 Channel OADMs

Note For the MD32 patch panel, NCS1001 can only retrieve data from the inventory. It cannot access LED or photodiode status, nor can it configure the device in any way.

Table 8: 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
15216-FLD-4-30.3= 15216-FLD-4-33.4= 15216-FLD-4-36.6= 15216-FLD-4-39.7= 15216-FLD-4-42.9= 15216-FLD-4-46.1= 15216-FLD-4-49.3= 15216-FLD-4-52.5= 15216-FLD-4-55.7= 15216-FLD-4-58.9=	Cisco ONS 15216 4 Channel OADM
NCS1K-MD-32E-CE	NCS 1000 32 chs Even Mux/Demux Patch Panel
NCS1K-MD-32O-CE	NCS 1000 32 chs Odd Mux/Demux Patch Panel

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.

Example:

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


NAME: "0/RP0-USB0", DESCR: "NCS 1000 32 chs Even Mux/Demux Patch Panel - 150GHz - C-band"
PID: NCS1K-MD-32E-CE   , VID: V00 , SN: ACW2804YJ23

NAME: "0/RP0-USB1", DESCR: "NCS 1000 32 chs Odd Mux/Demux Patch Panel - 150GHz - C-band"
PID: NCS1K-MD-32O-CE   , VID: V00 , SN: ACW2804YH08

NAME: "0/RP0-USB0", DESCR: "NCS 1000 4 Channel add drop multiplexer Module"
PID: 15216-FLD-4-55.7=   , VID: V00 , SN: OPL19380046
```

Product IDs

Table 9: 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-CNTLR2=	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

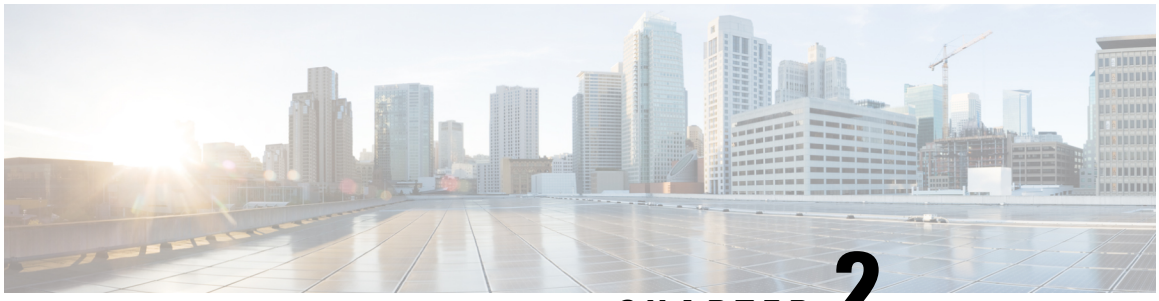
Product ID	Description
CWDM-SFP-1610	CWDM 1610-nm SFP; Gigabit Ethernet 1 and 2 Gb Fibre Channel
ONS-SC-Z3-1610=	SFP OC-48/STM-16/GE, CWDM, 1610 nm
ONS-SI-GE-LX=	SFP 1000BASE-LX Gigabit Ethernet, 1310 nm, SM, I-TEMP
ONS-SI-GE-SX=	SFP 1000BASE-SX Gigabit Ethernet, 850 nm, MM, I-TEMP
ONS-SI-GE-ZX=	SFP 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

Safety Guidelines

Before you perform any procedure in this publication, you must review the safety guidelines in this section to avoid injuring yourself or damaging the equipment. Note that this section contains *guidelines*, and does not include every potentially hazardous situation. During any installation procedure, always use caution and common sense.

Review the complete list of safety warnings available at Regulatory Compliance and Safety Information for *Cisco Network Convergence System 1001 and 1002*.

- Standard Warning Statements, on page 25
- Equipment Installation to Power Warnings, on page 27
- Ground Connection Warnings, on page 29
- Optical Connection (SFP) Warnings, on page 29
- Rack-Mount Warnings, on page 29
- Safety Precaution for Module Installation and Removal, on page 30
- Network Equipment-Building System (NEBS) Statements, on page 31

Standard Warning Statements

Take note of the following general safety warnings:



Warning

Statement 1071—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS



Note **Statement 407**—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品使用における安全上の注意〉

www.cisco.com/web/JP/techdoc/index.html

接続ケーブル、電源コードセット、**AC**アダプタ、バッテリなどの部品は、必ず添付品または指定品をご使用ください。添付品・指定品以外をご使用になると故障や動作不良、火災の原因となります。また、電源コードセットは弊社が指定する製品以外の電気機器には使用できないためご注意ください。

Warning **Statement 1015**—Battery Handling

To reduce risk of fire, explosion, or leakage of flammable liquid or gas:

- Replace the battery only with the same or equivalent type recommended by the manufacturer.
- Do not dismantle, crush, puncture, use a sharp tool to remove, short the external contacts, or dispose of the battery in fire.
- Do not use if battery is warped or swollen.
- Do not store or use battery in a temperature > 70° Celsius.
- Do not store or use battery in low air pressure environment < 10.1 PSIA.

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.

Warning **Statement 1073**—No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.



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.



Note **Statement 1089—**Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.



Warning **Statement 1090—**Installation by Skilled Person

Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person.



Warning **Statement 1091—**Installation by an Instructed Person

Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person.



Warning **Statement 9001—**Product Disposal

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

Equipment Installation to Power Warnings

Take note of the following power safety warnings:



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 1005—**Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than: 20 A for AC and 40 A for DC.

Warning **Statement 1017—**Restricted Area

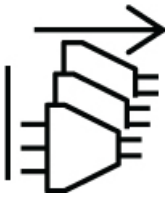
This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area.

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 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



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.

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.

Ground Connection Warnings

Take note of the following ground connection warnings:

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 1101—**Connected To Grounded Outlet

In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

Optical Connection (SFP) Warnings

Take note of the following optical connection warnings:

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.

Warning **Statement 1055—**Class 1/1M Laser

Invisible laser radiation is present. Do not expose to users of telescopic optics. This applies to Class 1/1M laser products.



Rack-Mount Warnings

Take note of the following rack-mount safety warnings:

Warning **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

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

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

Warning **Statement 1032—**Lifting the Chassis

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.

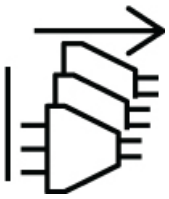
Warning **Statement 1098—**Lifting Requirement

2 people are required to lift the heavy parts of the product. To prevent injury, keep your back straight and lift with your legs, not your back.

Safety Precaution for Module Installation and Removal

Warning **Statement 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning **Statement 1073—**No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Note **Statement 1089—**Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.

Warning **Statement 1090—**Installation by Skilled Person

Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person.

Warning **Statement 1091—**Installation by an Instructed Person

Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person.

Network Equipment-Building System (NEBS) Statements

NEBS describes the environment of a typical United States Regional Bell Operating Company (RBOC) central office. NEBS is the most common set of safety, spatial, and environmental design standards applied to telecommunications equipment in the United States. It is not a legal or regulatory requirement, but rather an industry requirement.

The following NEBS statements apply to the Cisco NCS 1001:

Note **Statement 7001—**ESD Mitigation

This equipment may be ESD sensitive. Always use an ESD ankle or wrist strap before handling equipment. Connect the equipment end of the ESD strap to an unfinished surface of the equipment chassis or to the ESD jack on the equipment if provided.

Warning **Statement 7003**—Shielded Cable Shielded Cable Requirements for Intrabuilding Lightning Surge

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

The following port(s) are considered intrabuilding ports on this equipment:

Management Ethernet Ports

Warning **Statement 7005**—Intrabuilding Lightning Surge and AC Power Fault

The intrabuilding port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intrabuilding 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 to connect these interfaces metallically to OSP wiring.

This statement applies to the intrabuilding ports listed below:

Management Ethernet Ports

UDC Ports

Warning **Statement 7012—**Equipment Interfacing with AC Power Ports

Connect this equipment to AC mains that are provided with a surge protective device (SPD) at the service equipment that complies with NFPA 70, the National Electrical Code (NEC).

Note **Statement 7013—**Equipment Grounding Systems—Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

Note **Statement 7016**—Battery Return Conductor

Treat the battery return conductor of this equipment as Isolated DC return (DC-I).

Note **Statement 7018—**System Recover Time

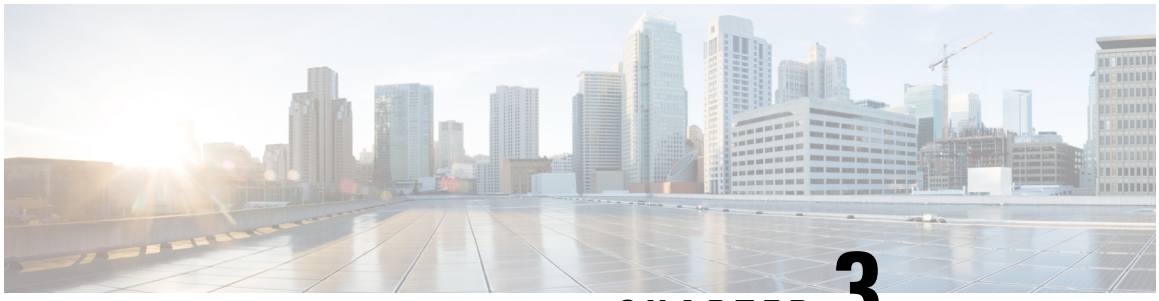
The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

Note **Statement 8015—**Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Note **Statement 8016—**Installation Location Where the National Electric Code (NEC) Applies

This equipment is suitable for installation in locations where the NEC applies.



CHAPTER 3

Prepare to Install Cisco NCS 1001

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

- Review Safety Warnings, on page 33
- Unpack and Verify Cisco NCS 1001, on page 33
- Prepare to Install 32-Channel Even Mux/Demux Patch Panel, on page 34

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 10:

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

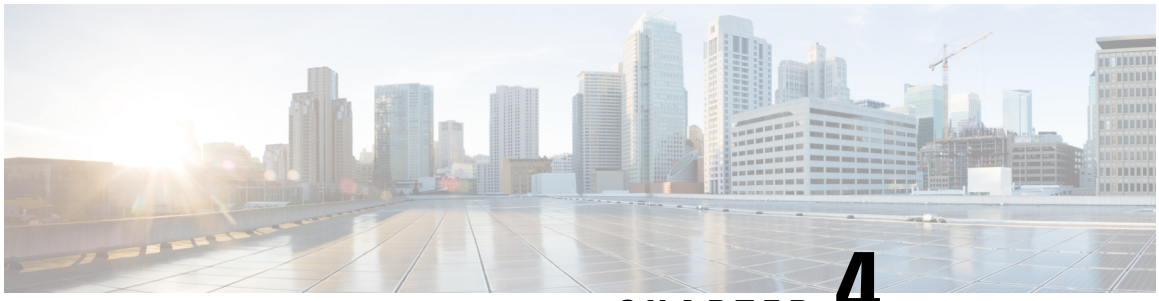
Step 5 Verify the following:

- 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 4

Install Cisco NCS 1001

This chapter describes the procedures to install Cisco NCS 1001.

- Rack Compatibility, on page 35
- Install NCS 1001-K9 into EIA/ANSI Rack, on page 37
- Install Four Post Slider into EIA/ANSI Rack, on page 41
- Install Two Post Slider into EIA/ANSI Rack, on page 45
- Ground NCS 1001, on page 51
- Cable Guide, on page 52
- Power Supply, on page 53
- Connect AC Power to NCS 1001, on page 54
- Connect DC Power to NCS 1001, on page 56
- Related Information, on page 57

Rack Compatibility

Figure 13: 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 14: Four Post Rack Type

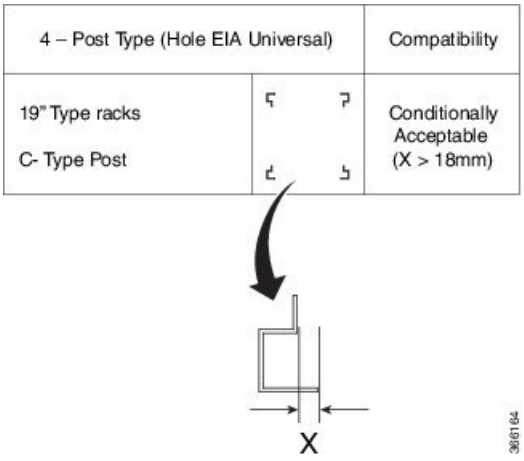


Figure 15: Two Post Rack Type

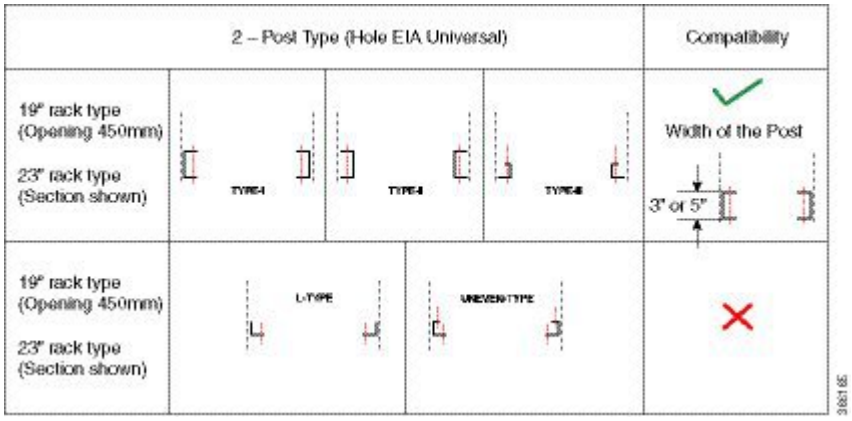
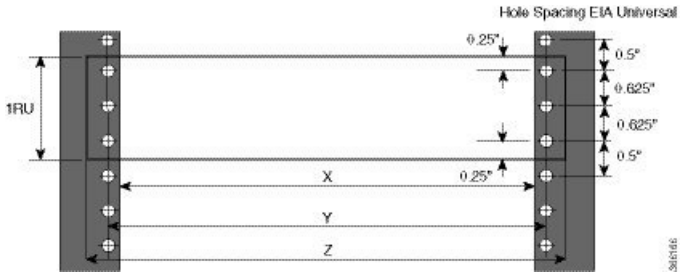
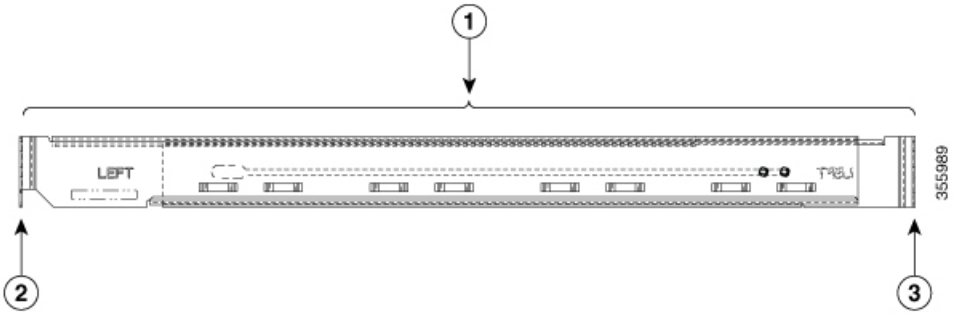


Figure 16: EIA/ANSI (19" and 23") Rack specification



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 17: 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

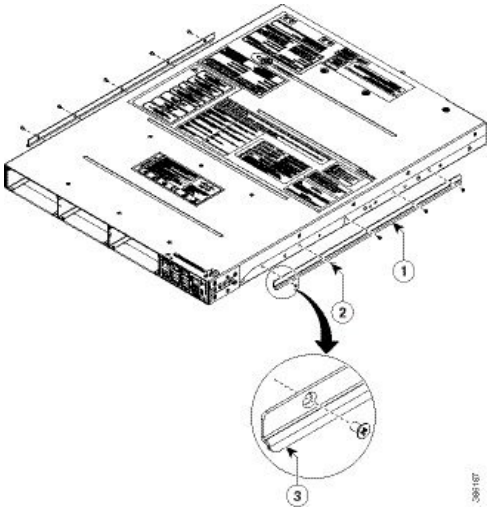
Ensure the rack is compatible. See the Rack Comatibility section.

Procedure

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

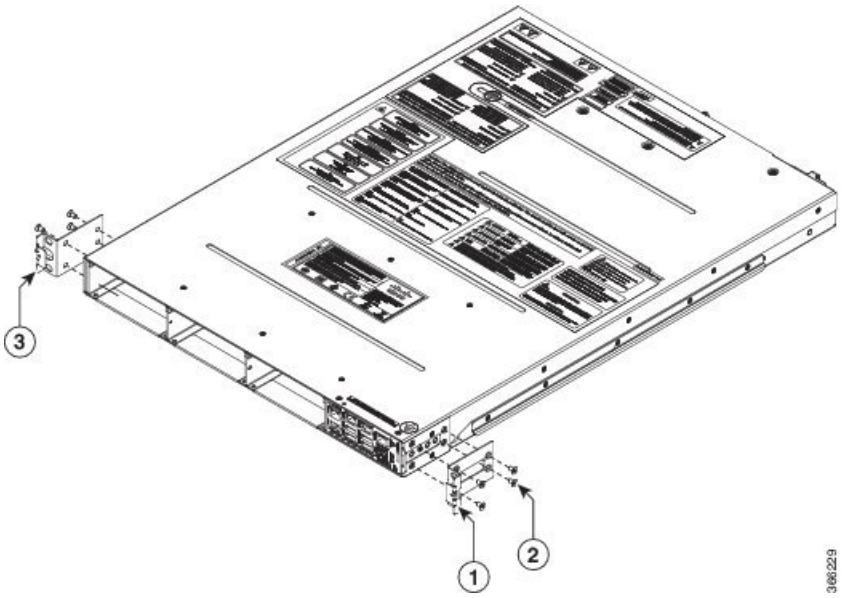
Step 2 Attach the sliding rail and L bracket to the left and right of the chassis using the screws (48-0471-01 and 48-2406-01) and tighten them to a torque value of 0.65 N-m (5.9 in-lbs) for 48-0471-01 screws and torque value of 1.5 N-m (13.25 in-lbs) for 48-2406-01 screws.

Figure 18: 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 19: Fixing L Bracket

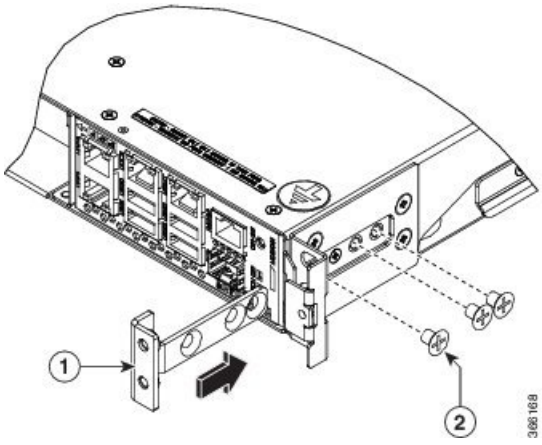


1	Right L Bracket
2	Screws for L Bracket (part number - 48-2406-01)
3	Left L Bracket

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 20: 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.

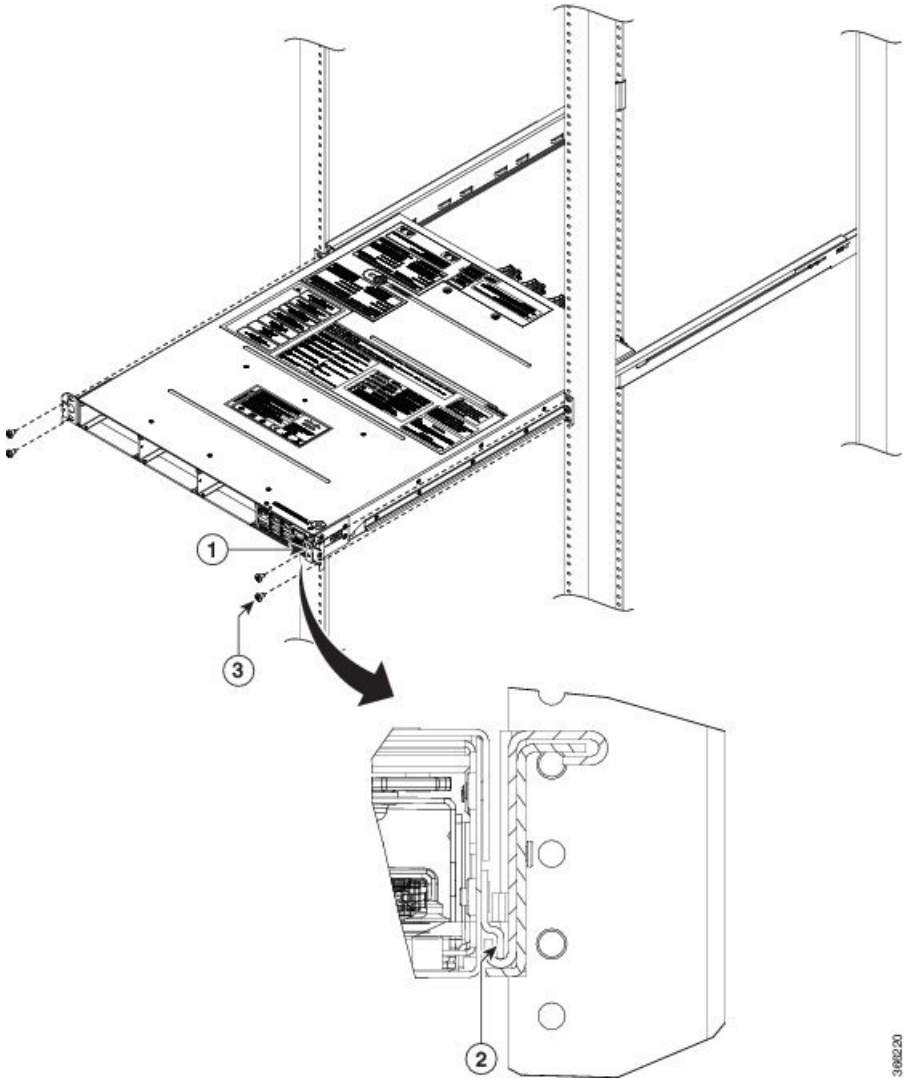
a) Install Four Post Slider into EIA/ANSI Rack, on page 41

b) Install Two Post Slider into EIA/ANSI Rack, on page 45

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 21: 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 20: Grounding Extender, on page 39.
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).

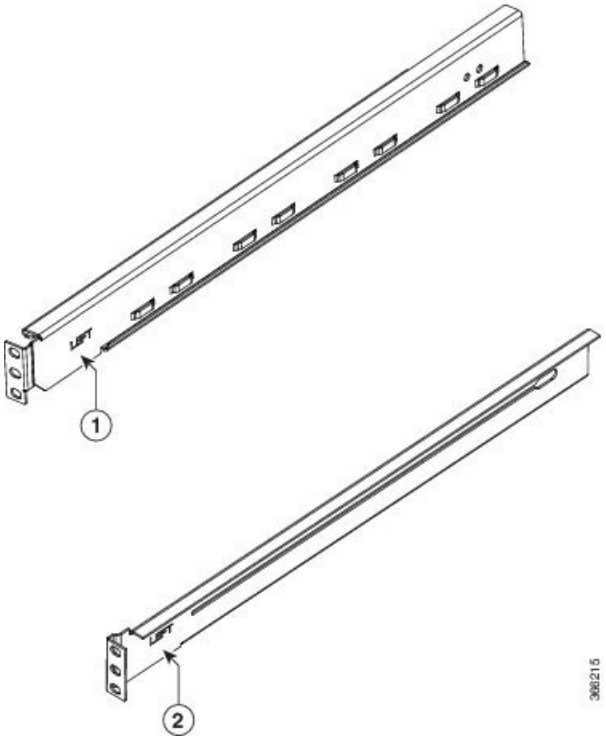
Caution
The sliding rail must be used only during the first mounting process and it serves only to push the chassis into the rack and not for sliding purpose. The chassis must be fixed with screws on the front side.

Install Four Post Slider into EIA/ANSI Rack

Procedure

Step 1 Identify the four post slider.

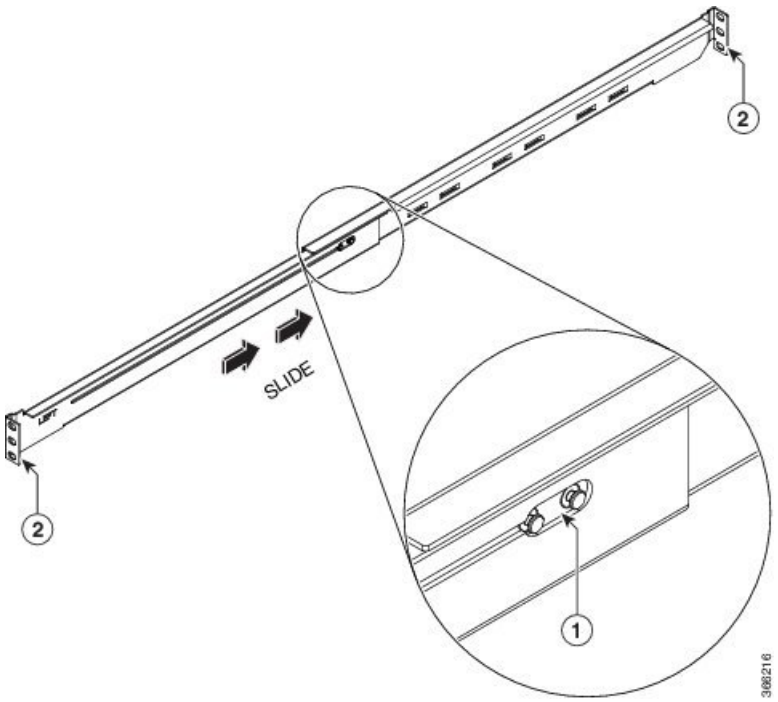
Figure 22: Four Post Slider Identification



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.

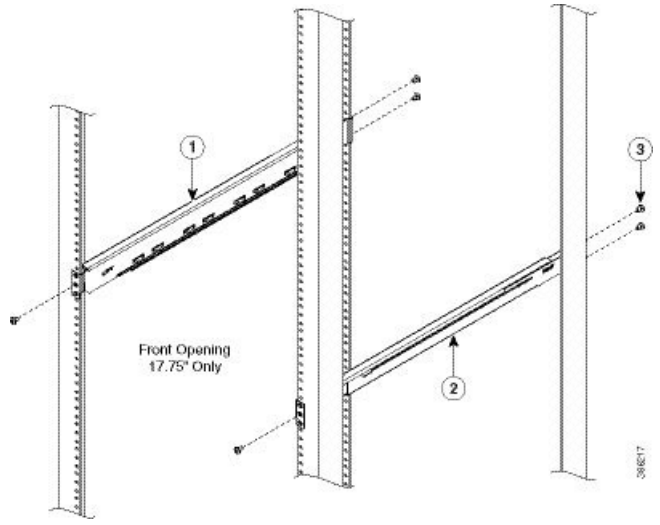
Figure 23: Four Post Slider Preparation



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 24: Slider Integration to the Four Post 19" Rack

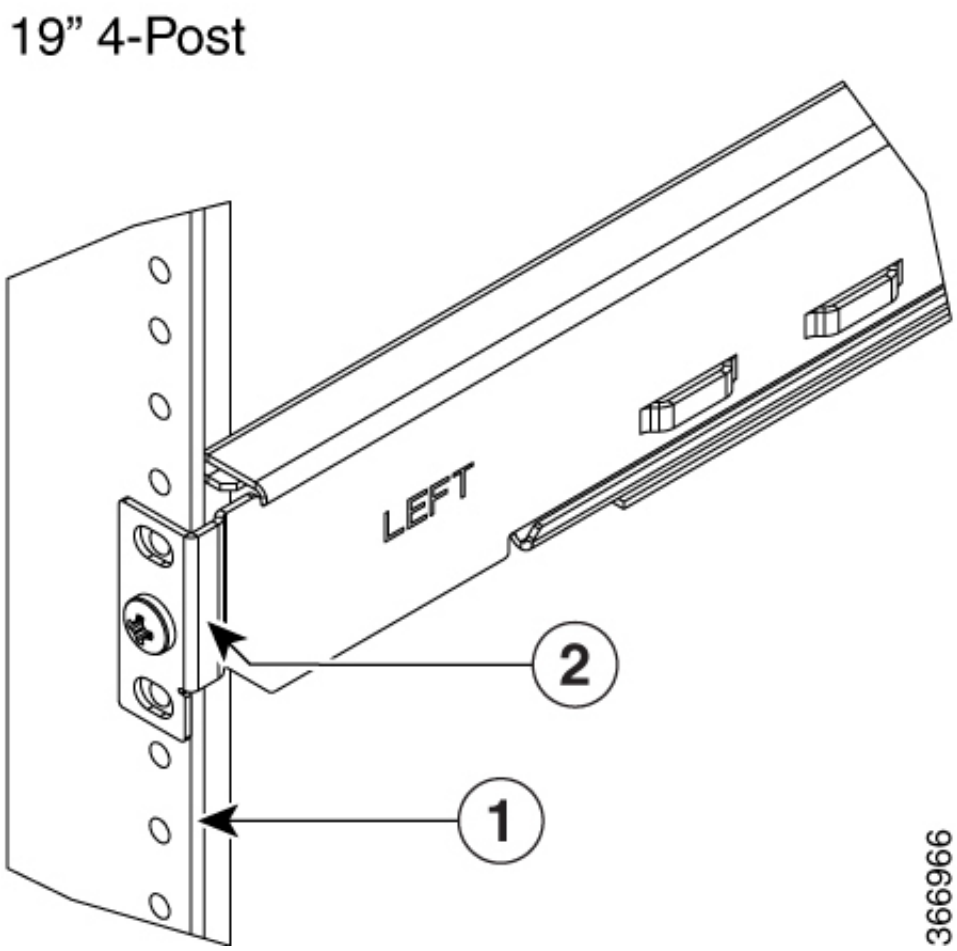


1	Left side four-post slide assembly

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.

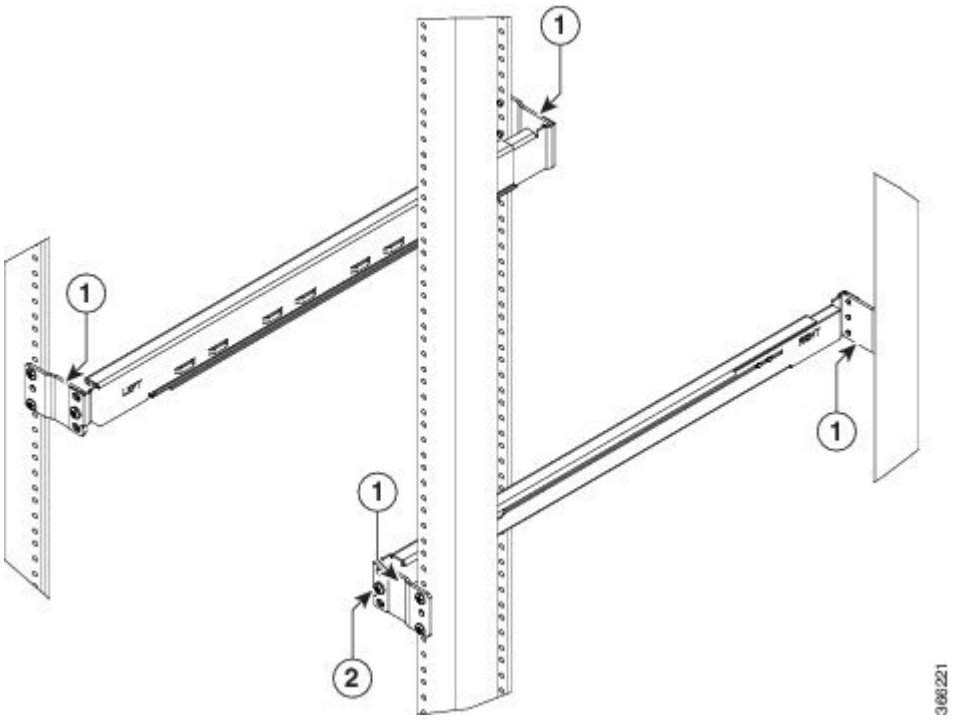
Figure 25: Mating for the Four Post 19" Rack



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

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

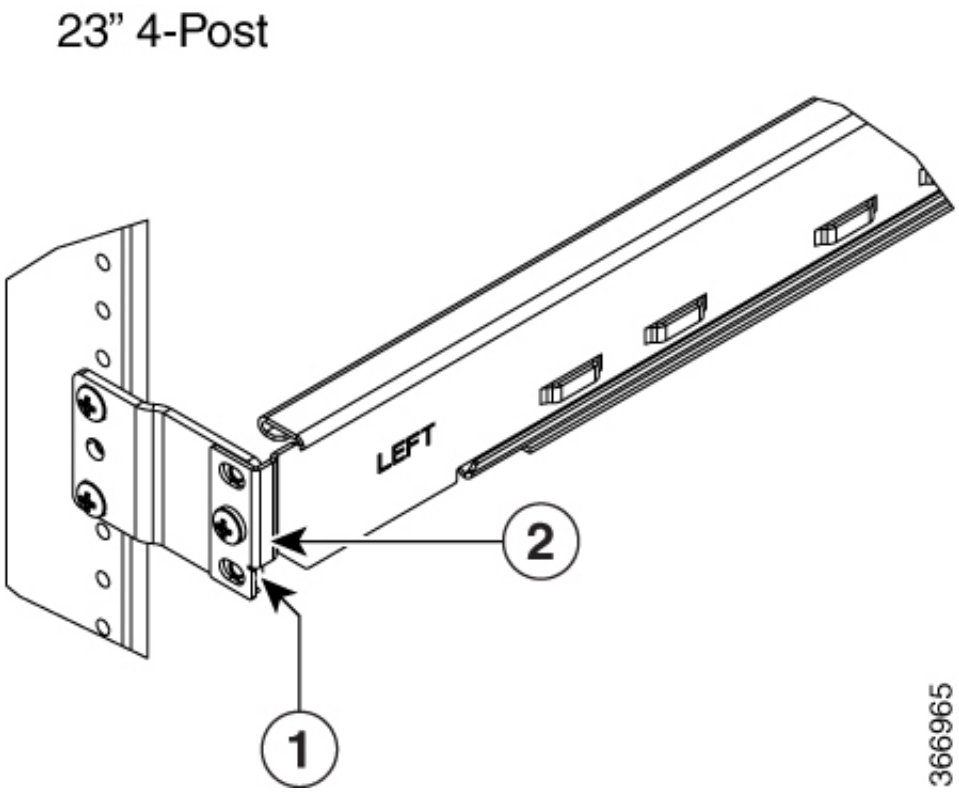
Figure 26: Slider Integration to the Four Post 23" Rack



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 27: Mating for the Four Post 23" Rack



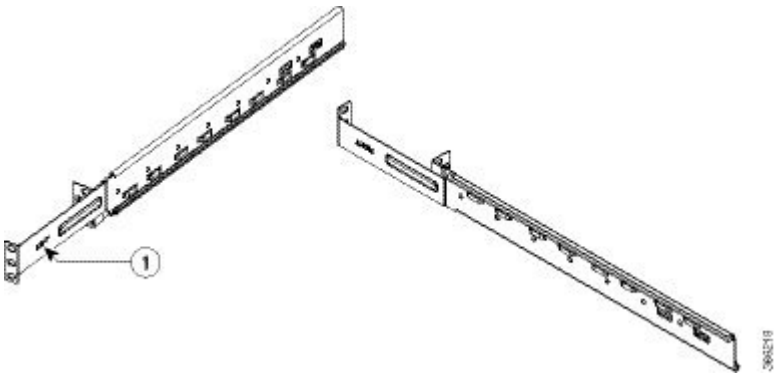
1	Edge surface of the adapter
2	Inner surface of the sliding bracket

Install Two Post Slider into EIA/ANSI Rack

Procedure

Step 1 Identify the two post slider.

Figure 28: Two Post Slider Identification

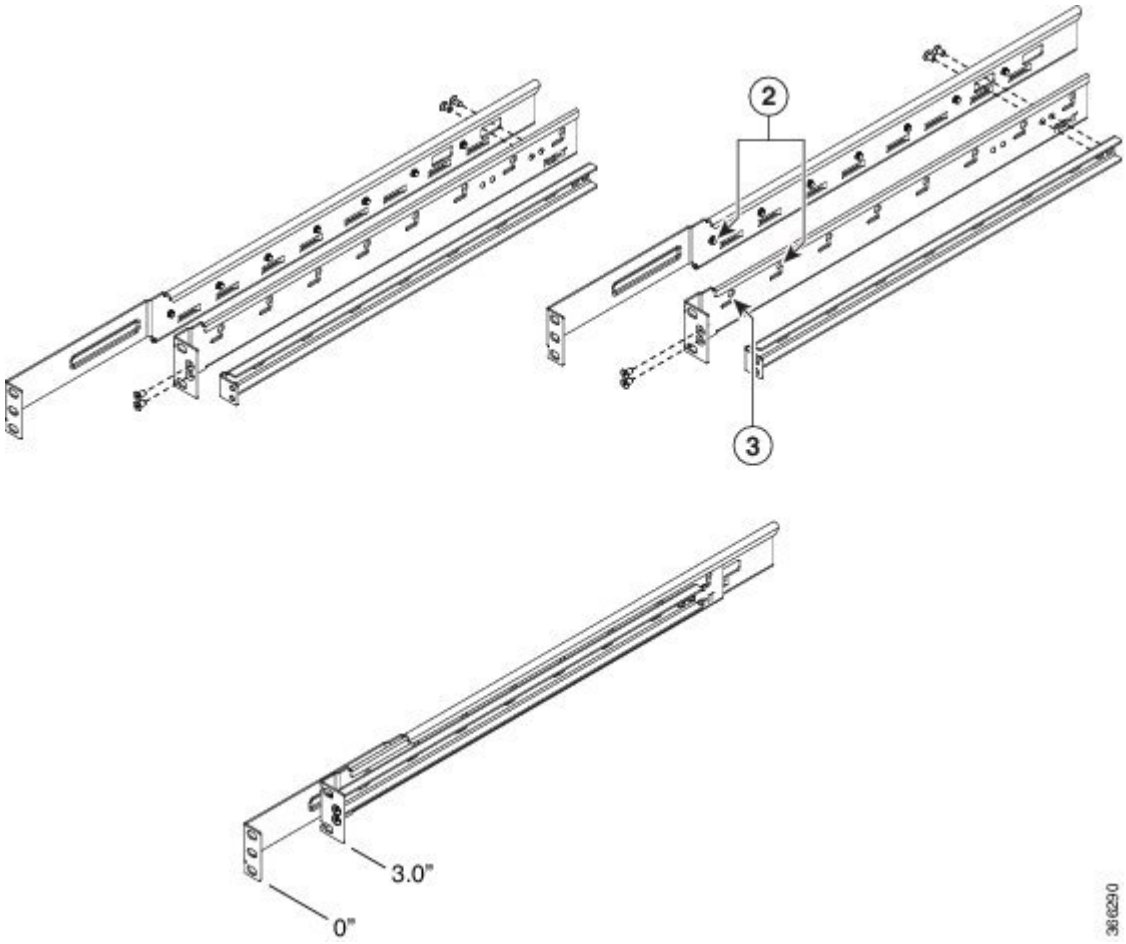


1	Check for the left/right marking on the sliders.

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 29: Two Post Slider Preparation



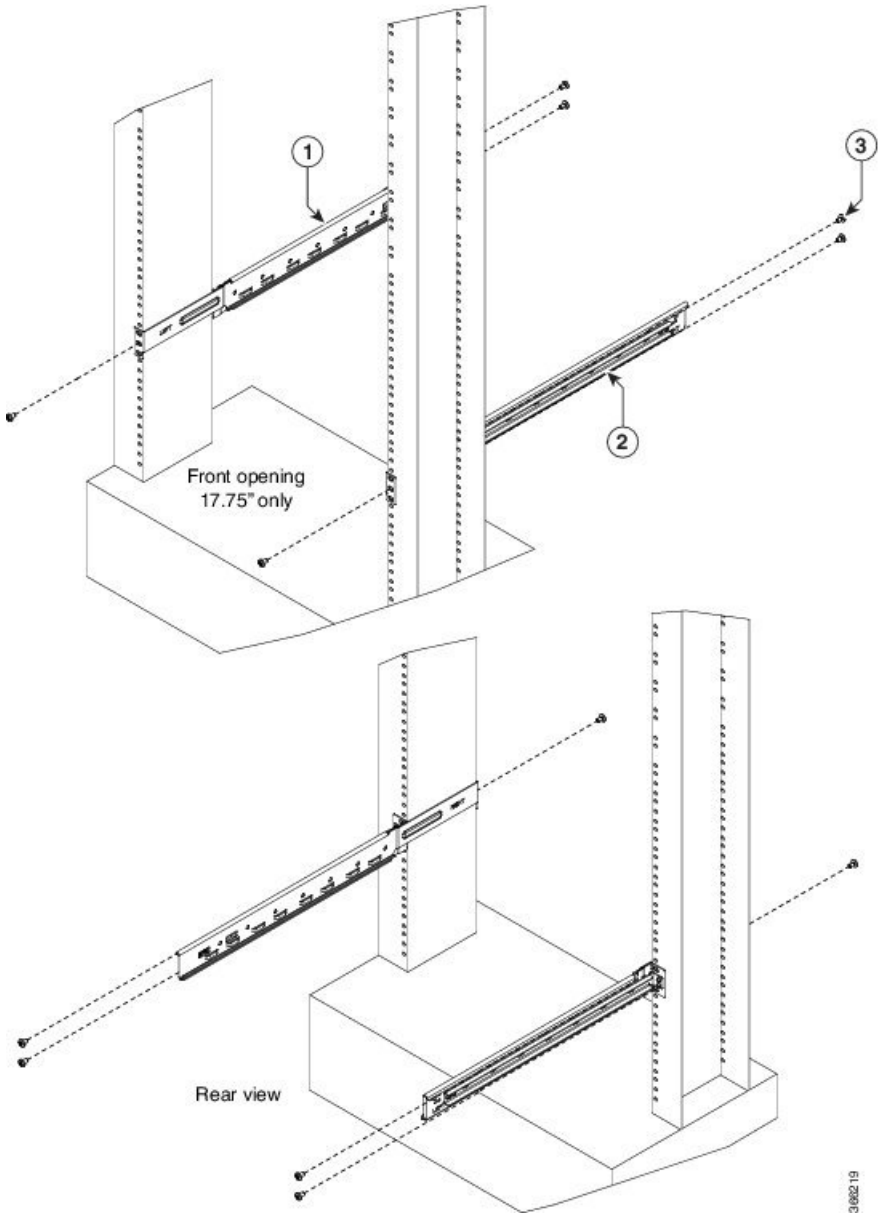
2	Align the rivet with key hole.
3	Do not insert any rivet inside this.

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.

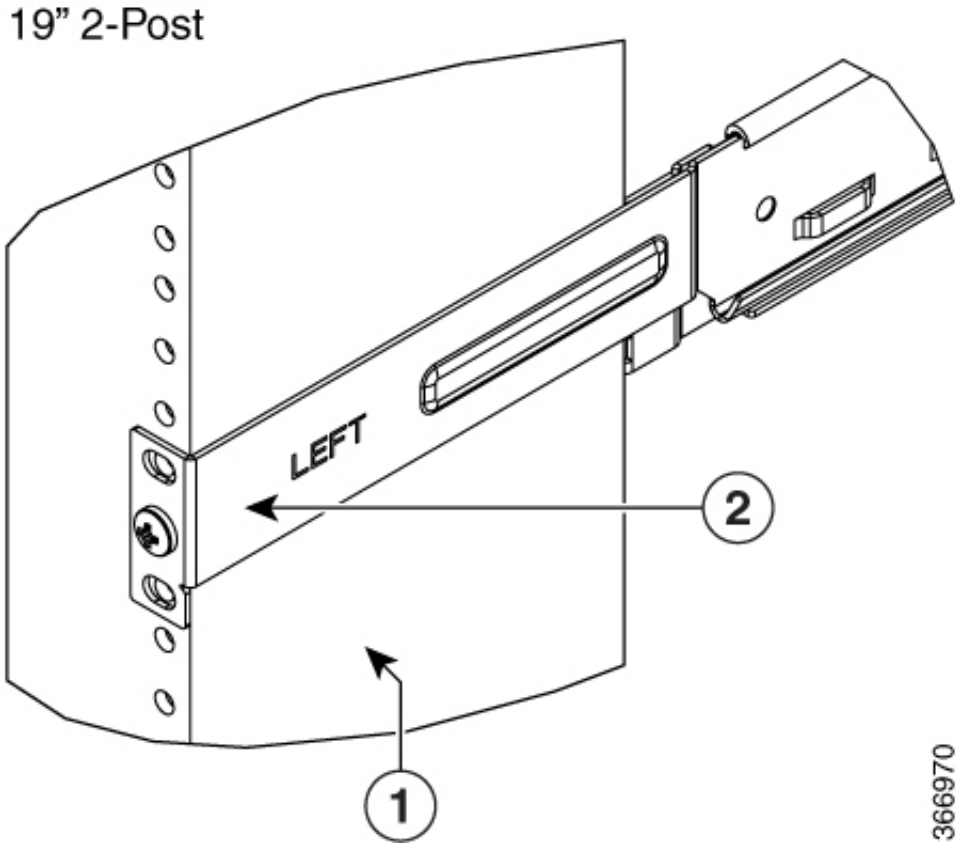
Figure 30: Slider Integration to the Two Post 19" Rack



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.

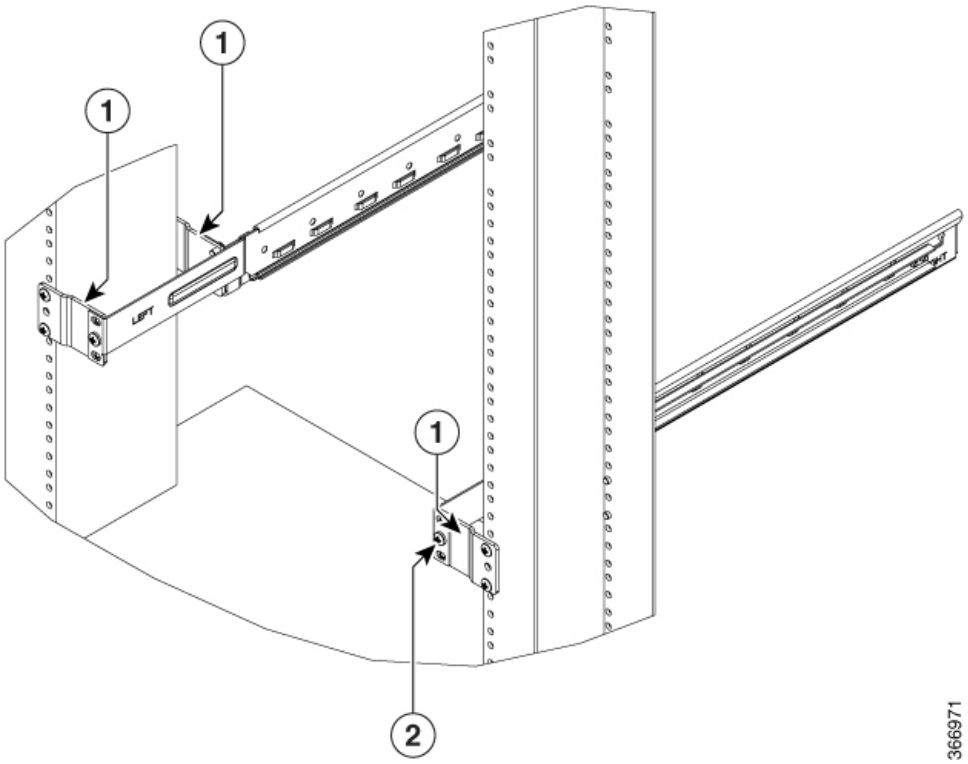
Figure 31: Mating for the Two Post 19" Rack



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

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

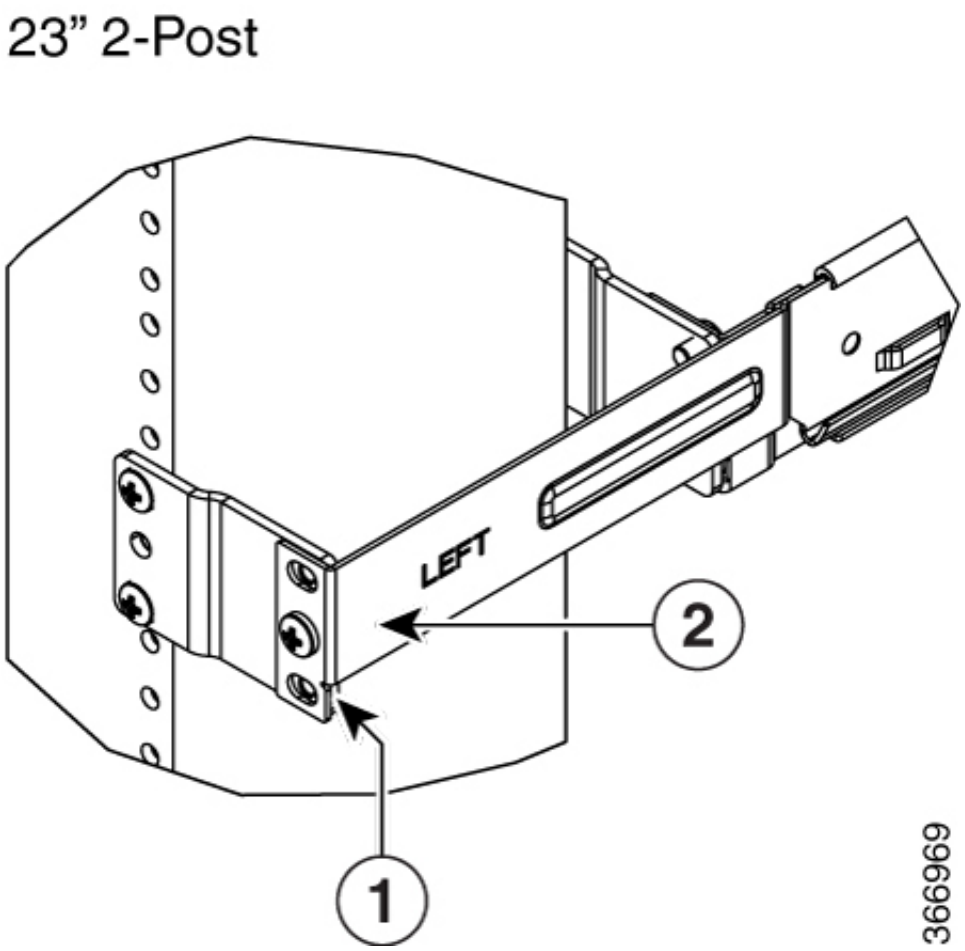
Figure 32: Slider Integration to the Two Post 23" Rack



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 33: Mating for the Two Post 23" Rack



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.

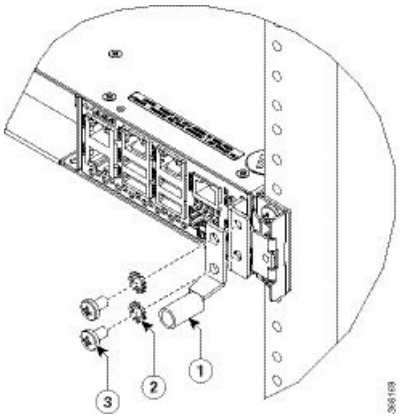
Procedure

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 20: Grounding Extender, on page 39.

Figure 34: 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)

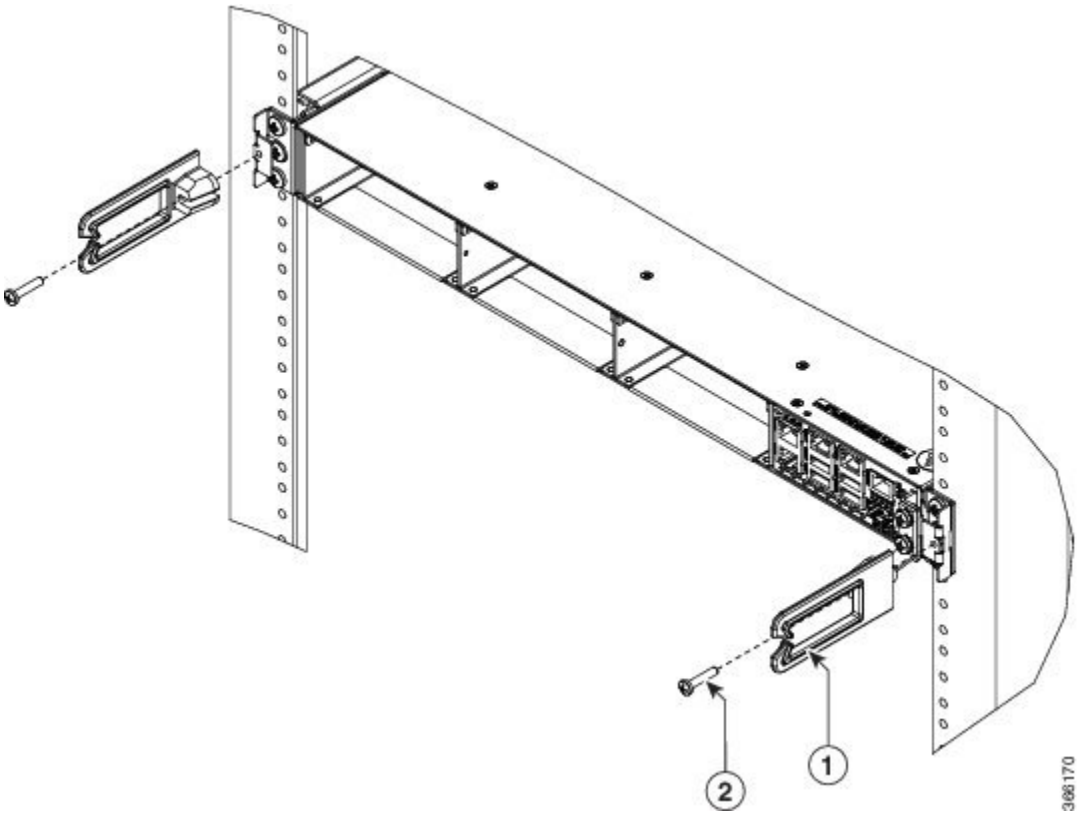
Step 4 Tighten the M4 pan-head screw to torque value of 1.3 N-m (11.5 in-lbs).

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 35: 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 36: Hot Area on PSU Faceplate



Procedure

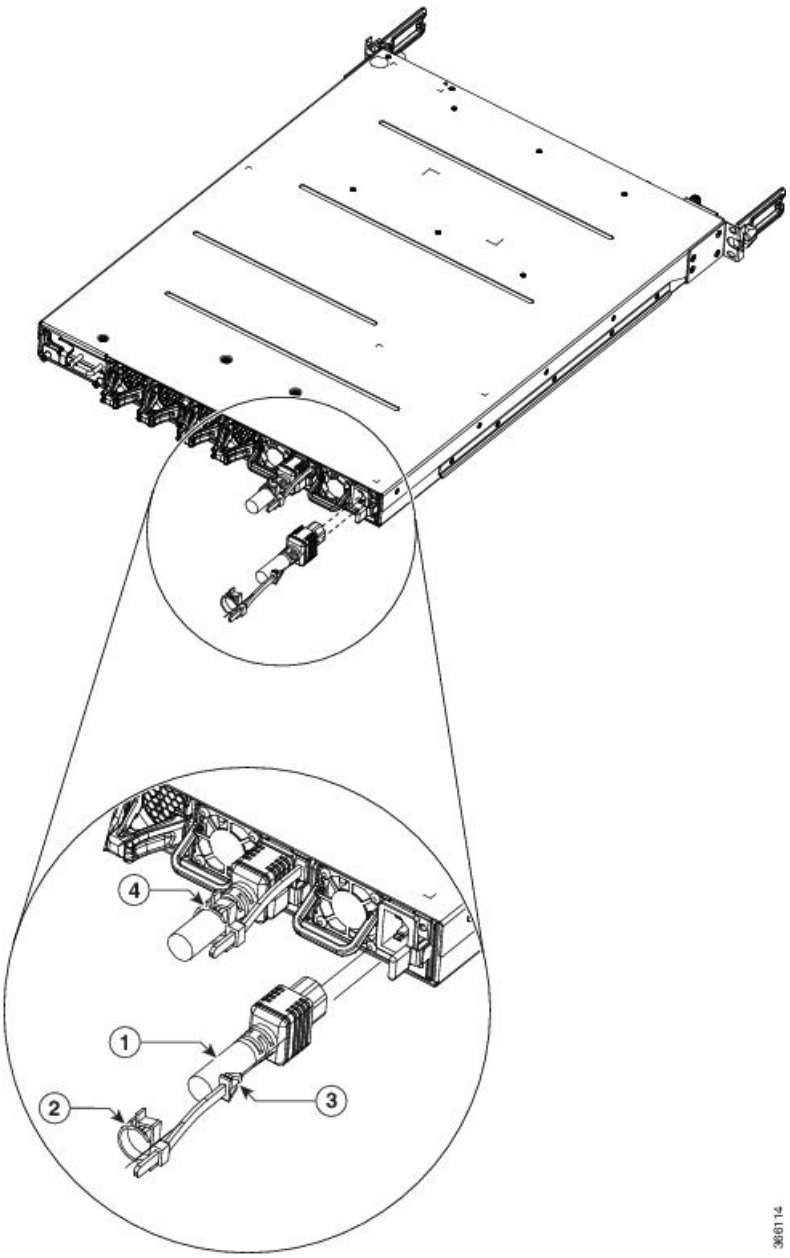
Step 1 Verify that the AC cable is installed in the correct AC source panel. Ensure that either the fuse is removed or the circuit breaker is in the off position and locked out.

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 37: Connecting AC Power



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 38: Hot Area on PSU Faceplate



Procedure

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

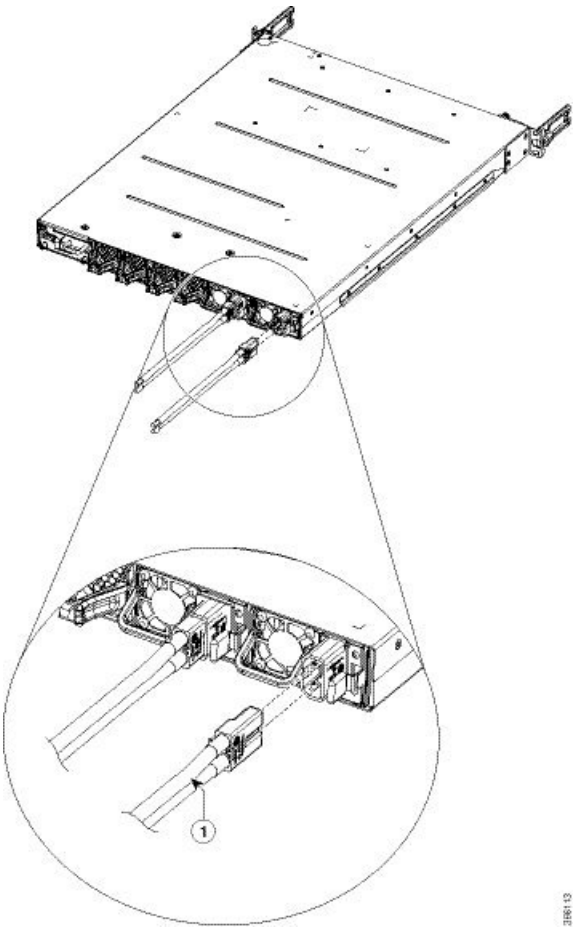
Step 2 Measure and cut the cables as needed to reach NCS 1001 from the fuse panel.

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 39: Connecting DC Power

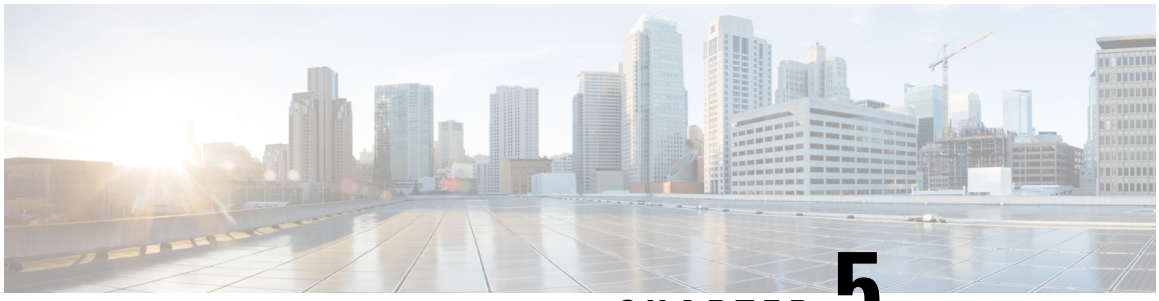


1	DC Power Cord

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 5

Replace Cisco NCS 1001 Components

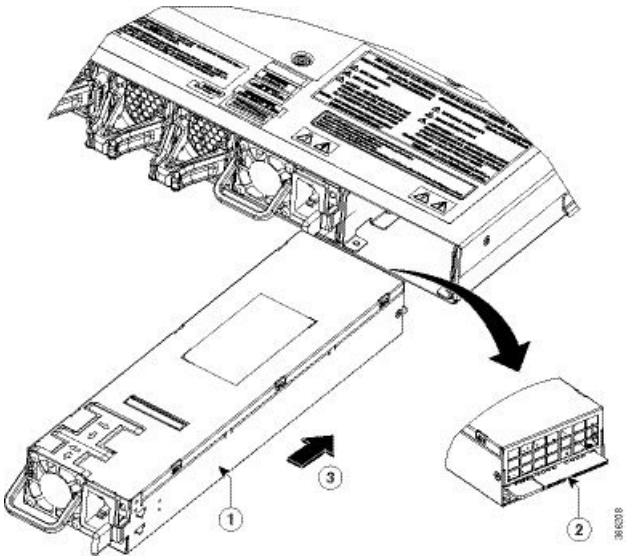
This chapter describes the procedures to replace Cisco NCS 1001 components.

- Insert Power Supply, on page 59
- Remove Power Supply, on page 60
- Insert Fans, on page 61
- Remove Fans, on page 62
- Insert Control Card, on page 62
- Remove Control Card, on page 64
- Remove and Replace SSD, on page 66
- Insert Optical Modules, on page 67
- Remove Optical Modules, on page 68
- Filler Modules, on page 69
- Cable Routing, on page 70
- Install 32-Channel Even Mux/Demux Patch Panel, on page 71
- Remove 32-Channel Even Mux/Demux Patch Panel, on page 71
- Install 32-Channel Even Mux/Demux Patch Panel-Enhanced, on page 71
- Remove 32-Channel Even Mux/Demux Patch Panel-Enhanced, on page 71
- Remove and replace the RTC battery in the controller, on page 72
- Wipe Data in Disk Using Secure Erase, on page 74

Insert Power Supply

Use this procedure to insert the power supply units.

Figure 40: 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

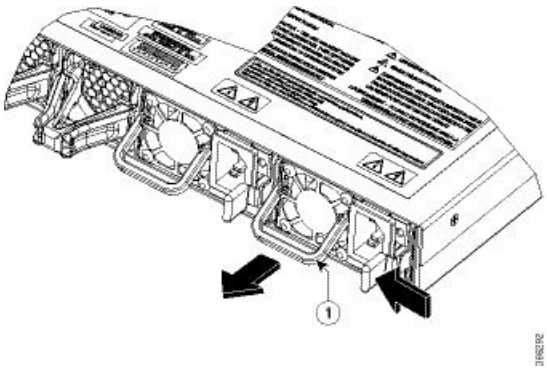
Note The inlet temperature of the system during replacement must be less than 40 deg Celsius at sea level. The replacement time decreases for higher altitudes.

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 41: Hot Area on PSU Faceplate

Figure 42: Remove Power Supply

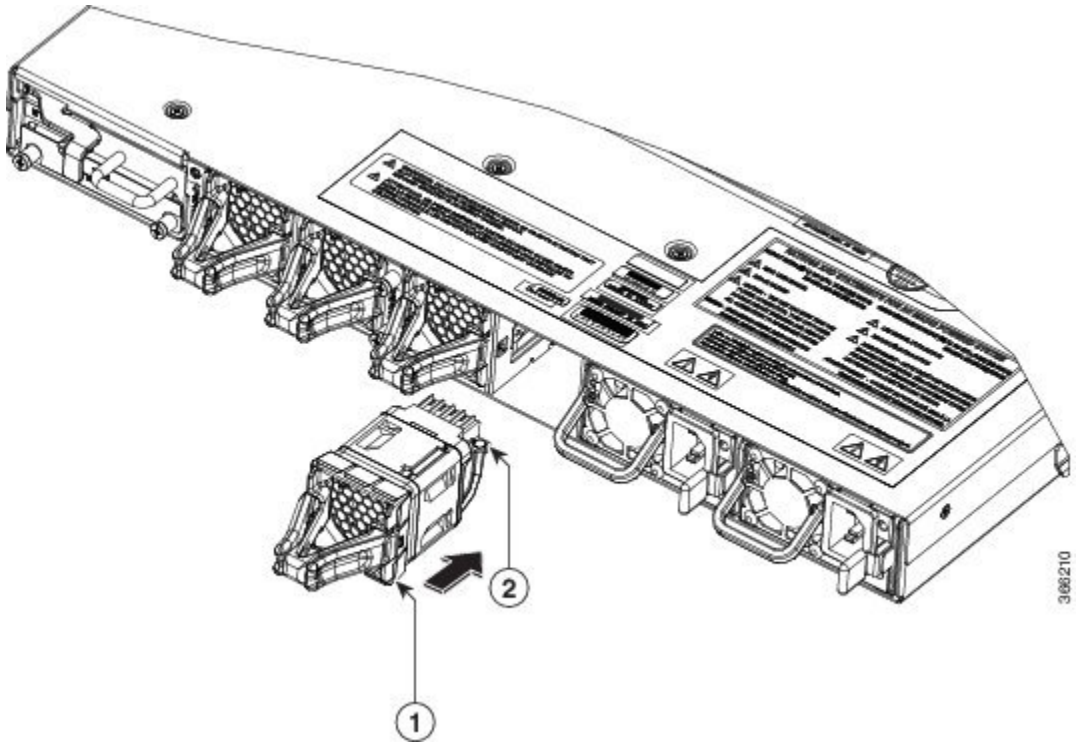


1	Release the lock of the PSU in the direction that is shown and pull the PSU gently using the handle.

Insert Fans

Use this procedure to insert the fans.

Figure 43: 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

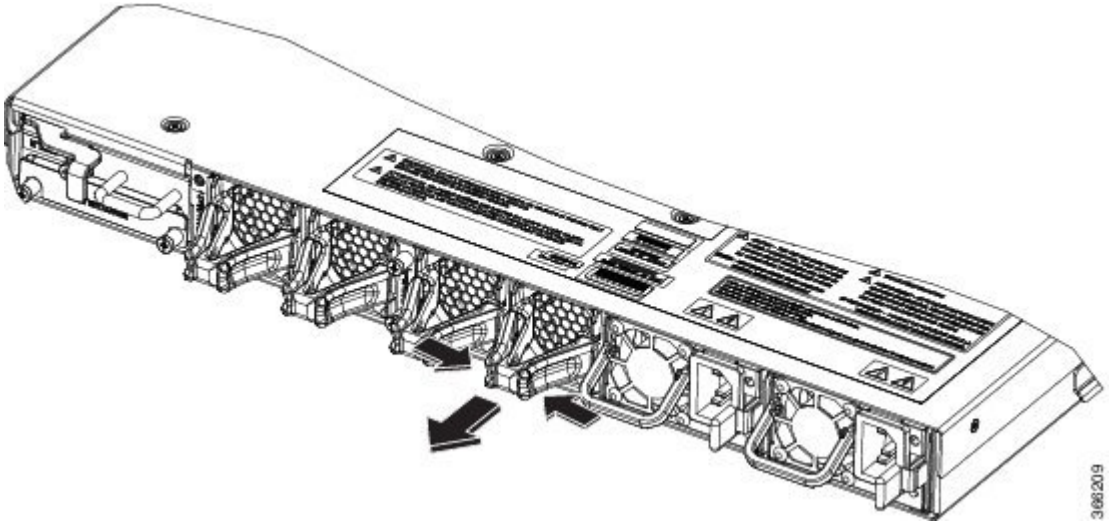
Remove Fans

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 44: Remove Fans

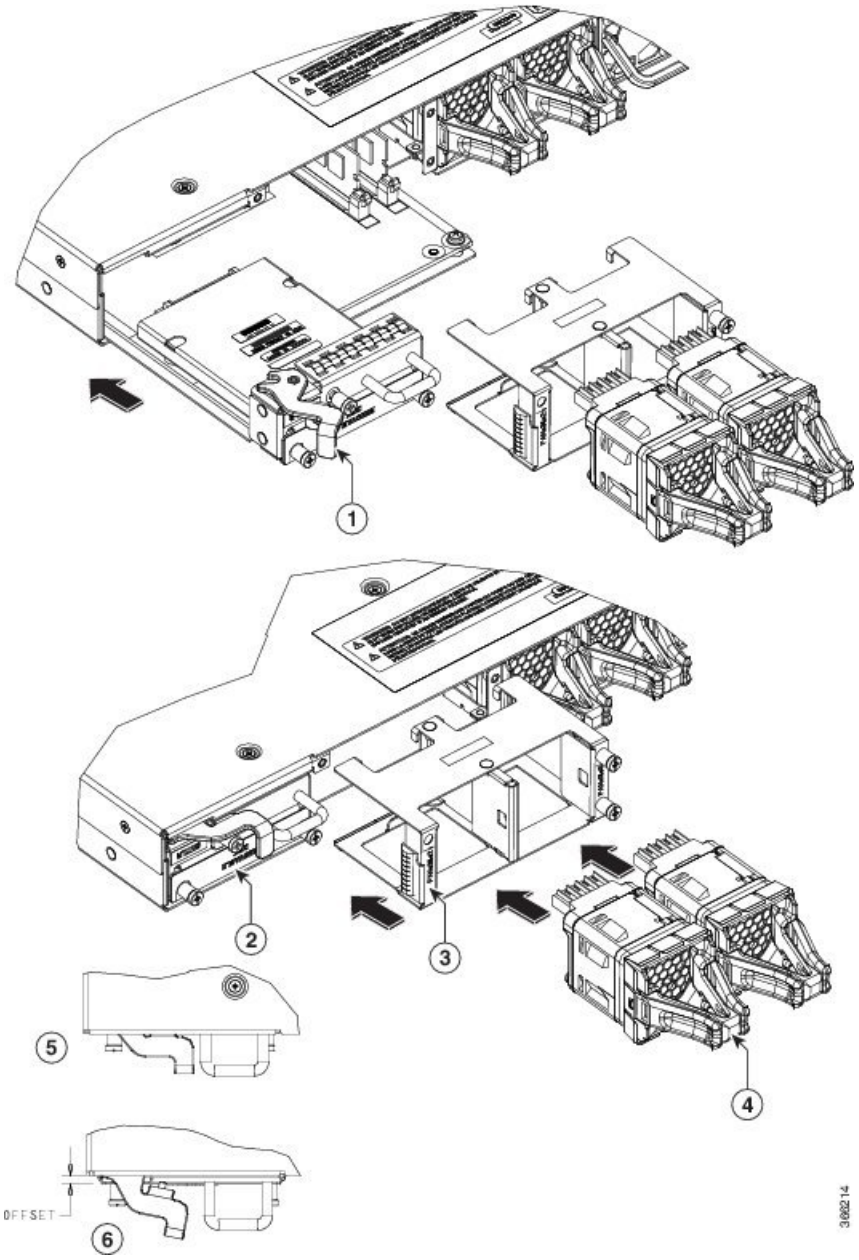


Press the lever of the fan and pull it to remove the fan out as shown.

Insert Control Card

Use this procedure to insert the control card.

Figure 45: 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 61.

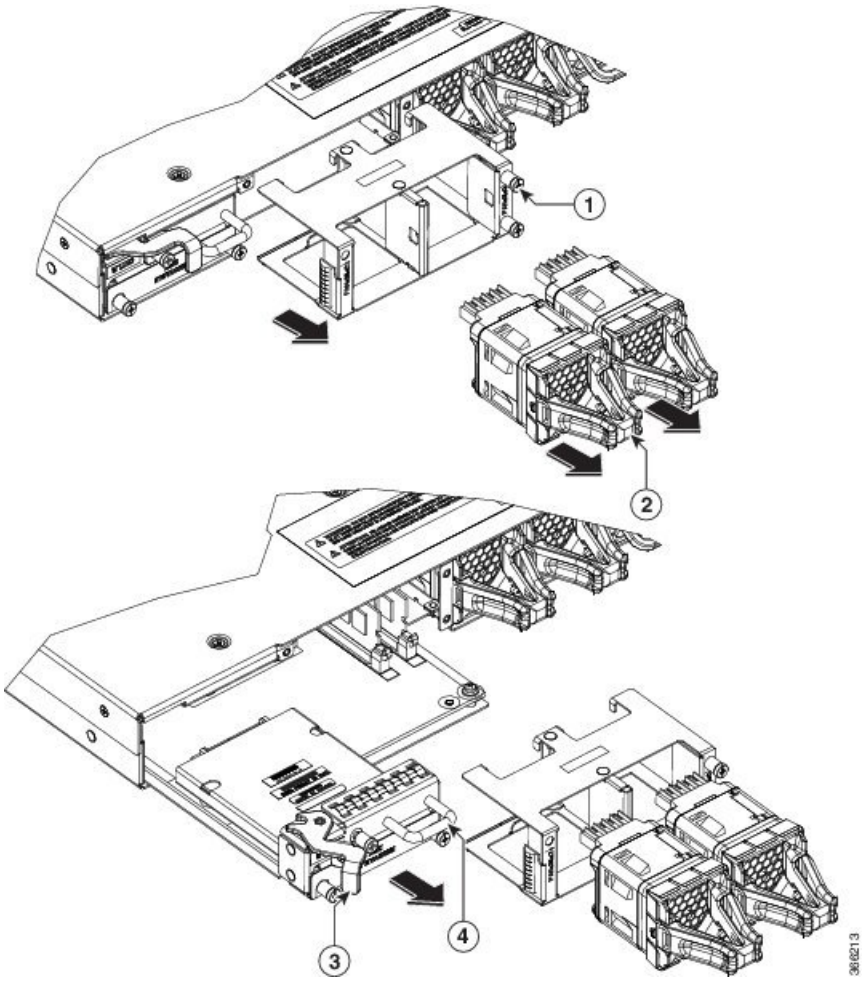
Remove Control Card

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 46: 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 62.

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.

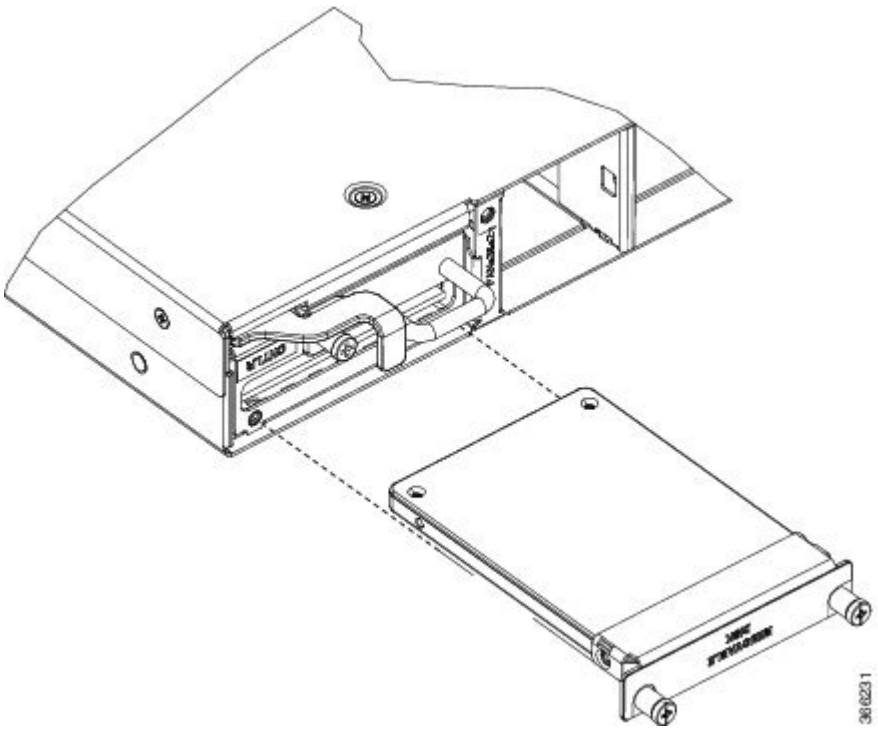
To remove a SSD:

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 47: 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

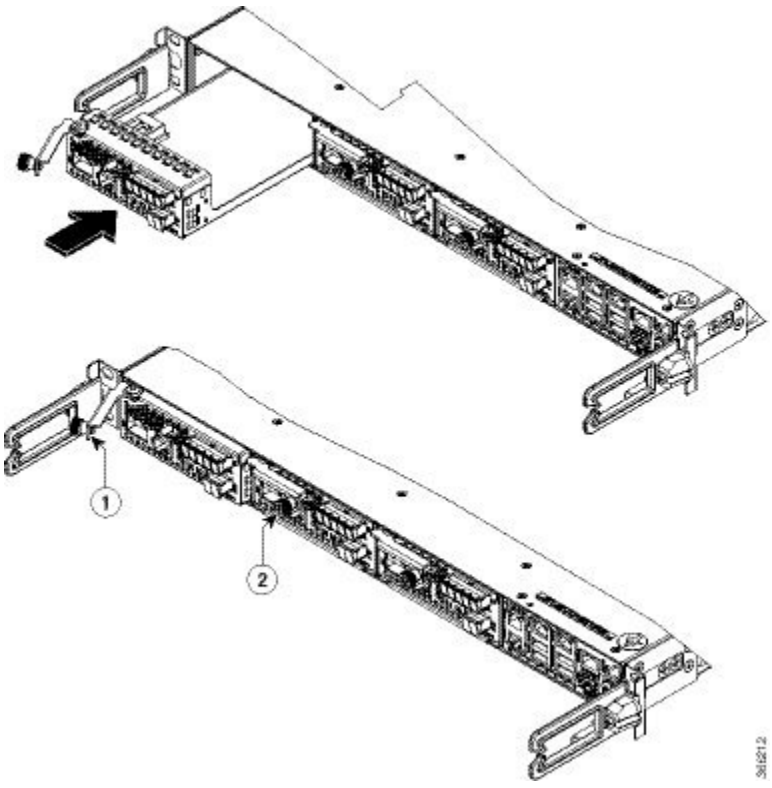
Step 1 Arrange the ejector lever of the optical module approximately at 60 degrees as shown.

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 48: 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.

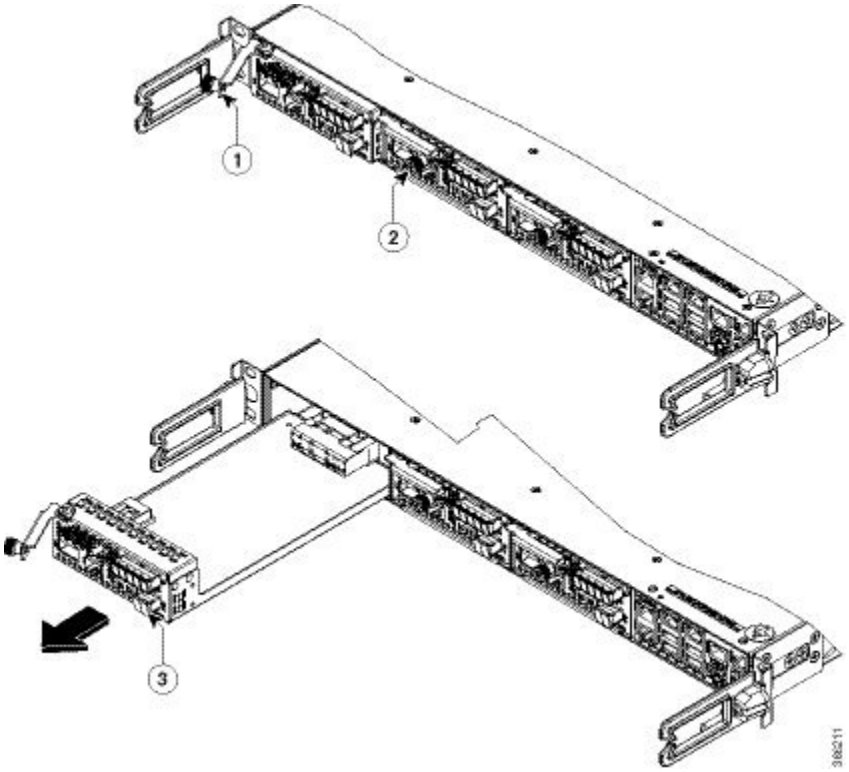
Procedure

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.

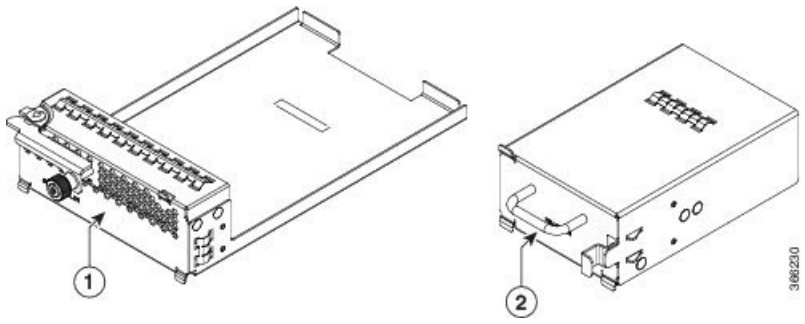
Figure 49: Remove Optical Modules



1	Ejector lever
2 and 3	Captive screw

Filler Modules

Figure 50: Filler Modules



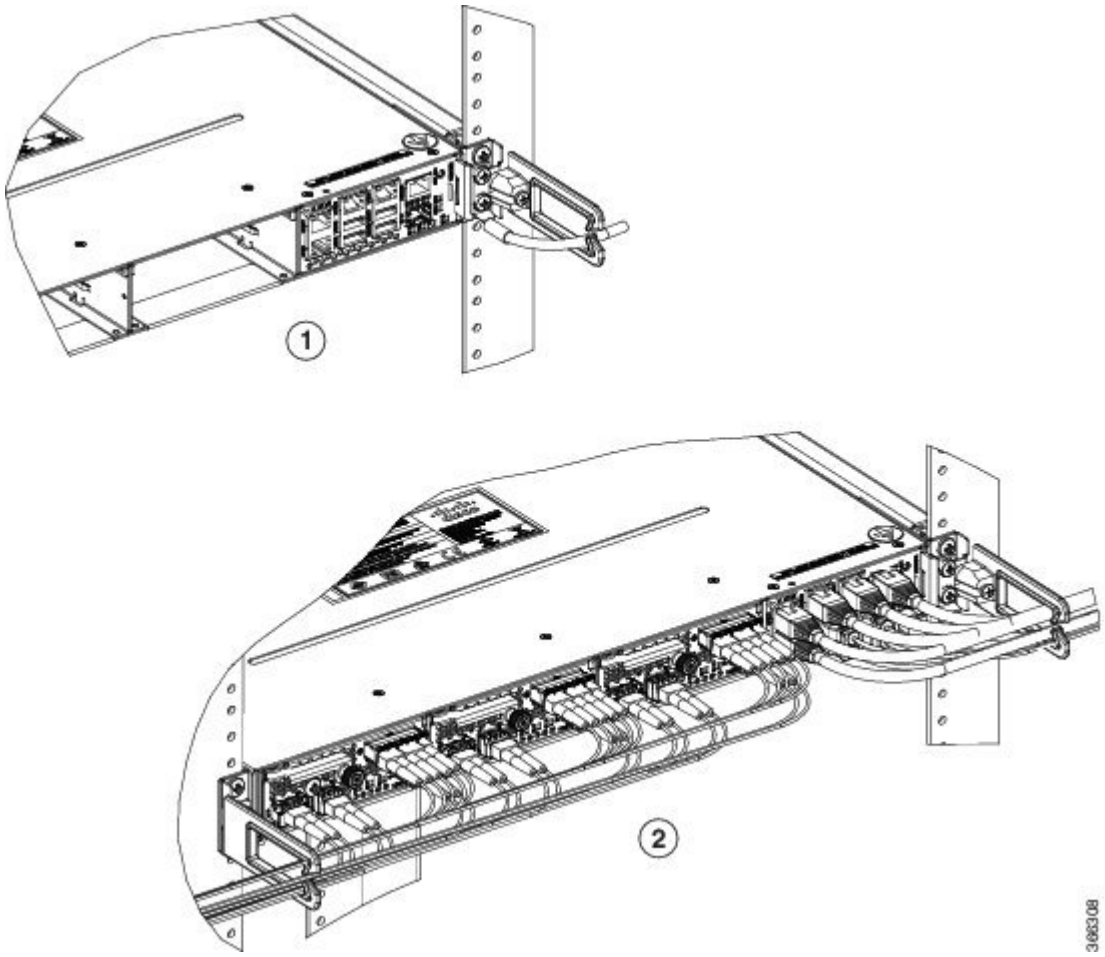
1	Optical filler module

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 51: 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.

Install 32-Channel Even Mux/Demux Patch Panel-Enhanced

Use this procedure to install Cisco NCS 1000 32-Channel Mux/Demux patch panels.

Before you begin

Prepare to Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced

Procedure

Follow the steps as described in Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced to install the mux/demux patch panel-enhanced.

Remove 32-Channel Even Mux/Demux Patch Panel-Enhanced

Use this procedure to remove Cisco NCS 1000 32-Channel Mux/Demux patch panels.

Procedure

Follow the steps as described in Remove Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced to install the mux/demux patch panel-enhanced.

Remove and replace the RTC battery in the controller

Use this procedure to remove and replace the controller RTC battery.

Before you begin

Ensure you have these tools and equipment.

- Plastic spudger/pry tool
- Plastic or ceramic tweezers
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat
- Replacement battery – Choose any one from the options:
  - CR-2032L/BN — Panasonic
  - 06032 101 501 — Varta Microbattery Inc.
  - 100272 — Renata

Caution Handle all components only by the carrier edges. Always use an ESD wrist-strap or grounding device to avoid damaging static-sensitive components.

Warning Ensure the system is shut down and power is removed before you begin.

There is danger of explosion if the RTC battery is replaced incorrectly. Replace the RTC battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

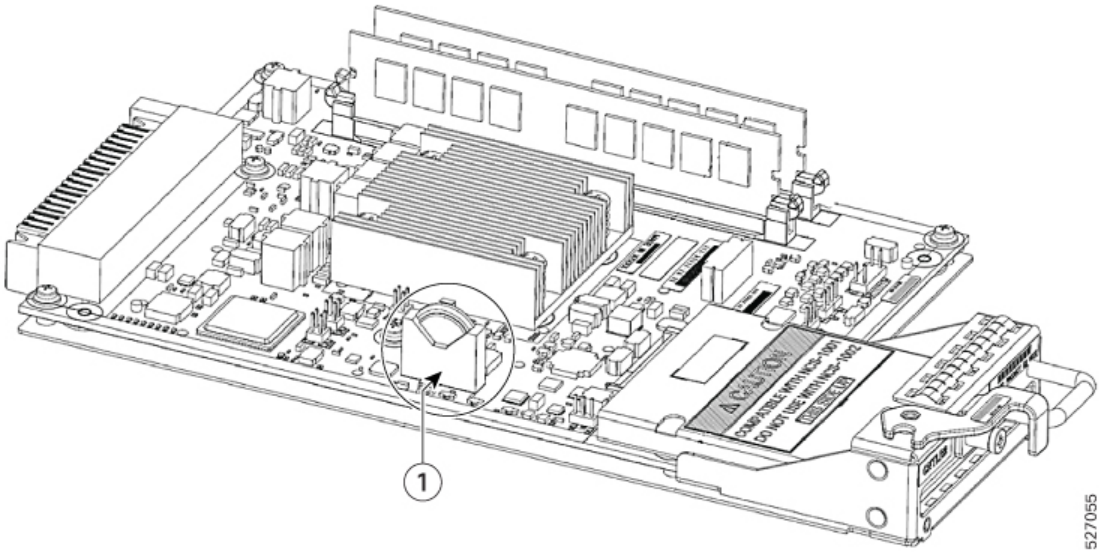
Follow these steps to remove and replace the RTC battery in the controller.

Procedure

Step 1 Remove the RTC battery.

a) Locate the vertical RTC battery socket in the controller.

Figure 52: Locating the vertical RTC battery socket



1	Vertical RTC battery socket

b) Using a plastic spudger tool, gently push against the socket's spring tab to release the battery.
c) Carefully lift the battery from the socket with plastic or ceramic tweezers.

Step 2 Install the new RTC battery.

a) Identify the battery polarity.

The positive side has the "CR2032" text and a plus sign (+). The negative side is flat.

b) Insert the battery at a slight angle around 30-degrees to the holder's opening, with the flat negative side facing the internal lower spring contact.
c) Gently push the battery inward toward the spring, then press down until it clicks securely under the retaining tabs.

Note
Ensure the battery is seated snugly and correctly.

The positive side should face the retainer clip or tab in the vertical holder.

The new RTC battery is correctly installed and seated. The controller is ready for reassembly and power-up.

What to do next

- Power on the controller and verify that it recognizes the new RTC battery and no battery errors are reported.
- Safely dispose the old battery according to local practices.

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.