

Hardware Installation Guide for Cisco NCS 1014

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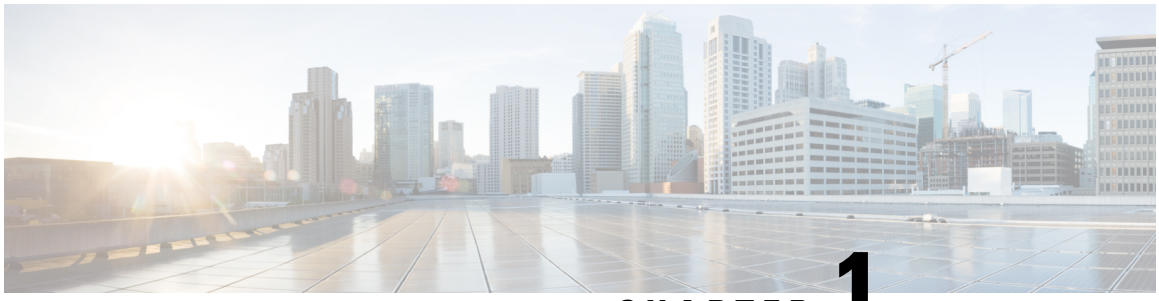
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CHAPTER 1

Cisco NCS 1014 Overview

This chapter provides an overview for the Cisco NCS 1014 chassis, its modules and line cards.

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Cisco NCS 1014 Chassis Overview

The Cisco NCS 1014 chassis is an advanced multihaul optical platform supporting transponders and line system cards. It is a 2RU chassis that delivers a universal transponder solution which provides excellent performance for metro, long-haul, and submarine applications.

Cisco NCS 1014 chassis has slots for the following modules:

- Removable controller
- Removable backup solid state drive (SSD)
- Two replaceable power supply units (PSU)
- Three replaceable fan modules
- Four line cards

The Cisco NCS 1014 chassis supports the following line cards.

Table 1: Supported Line Cards

Line Card	Description	Release
NCS1K14-2.4T-K9	2.4T DWDM Transponder Card	Cisco IOS XR Release 7.11.1
NCS1K14-CCMD-16-C	16-port Colorless Mux/Demux Card, C-band	Cisco IOS XR Release 7.11.1
NCS1K14-CCMD-16-L	16-port Colorless Mux/Demux Card, L-band	Cisco IOS XR Release 7.11.1

Line Card	Description	Release
NCS1K4-1.2T-K9	1.2T DWDM Transponder Card	Cisco IOS XR Release 7.11.1
NCS1K14-2.4-T-X-K9	2.4TX DWDM Transponder Card	Cisco IOS XR Release 24.1.1
NCS1K4-QXP-K9	3.2T DWDM Transponder Card	Cisco IOS XR Release 24.1.1
NCS1K4-1.2T-L-K9	1.2T DWDM Transponder Card - Licensed	Cisco IOS XR Release 24.4.1
NCS1K14-EDFA2	EDFA Terminal with Equalization Card	Cisco IOS XR Release 25.1.1
NCS1K4-2-QDD-C-K9 Line Card, on page 23	2-QDD-C DWDM line card	Cisco IOS XR Release 25.2.1
NCS1K14-2.4-T-A-K9	2.4TA DWDM Transponder Card	Cisco IOS XR Release 26.1.1

The Cisco NCS 1014 chassis supports the following line cards.

Table 2: Supported Passive Devices

Passive Devices	Description	Release
NCS1K-MD-32O-CE	32-channel Odd Mux/Demux Patch Panel, C-band Enhanced	Cisco IOS XR Release 25.1.1
NCS1K-MD-32E-CE	32-channel Even Mux/Demux Patch Panel, C-band Enhanced	Cisco IOS XR Release 25.1.1

The Cisco NCS 1014 chassis has two slots for field-replaceable AC and DC PSUs that support up to 2.5 kW per system and 580 W per line card slot.

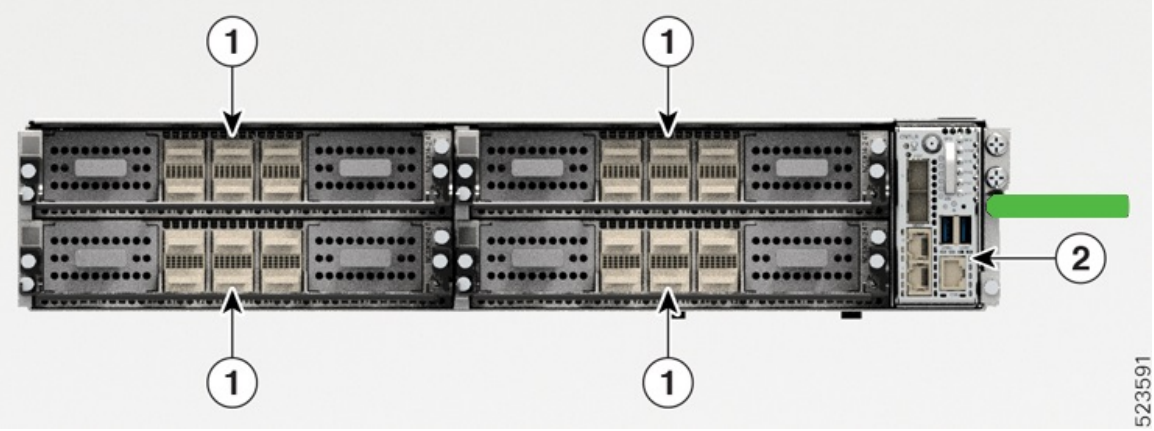
For more information about the Cisco NCS 1014 chassis, see Cisco NCS 1014 datasheet.

Note

- "2.4T" refers to the NCS1K14-2.4T-K9 line card.
- "CCMD-16-C" refers to the NCS1K14-CCMD-16-C C-band optical line card.
- "CCMD-16-L" refers to the NCS1K14-CCMD-16-L optical line card.
- "1.2T" refers to the NCS1K4-1.2T-K9 line card.
- "2.4TX" refers to the NCS1K14-2.4T-X-K9 line card.
- "QXP-K9" refers to the NCS1K4-QXP-K9 line card.

The controller is on the front side. The SSD, PSUs, and the fan modules are on the rear side of the chassis. You can insert the line cards into the four slots as shown in the following figure.

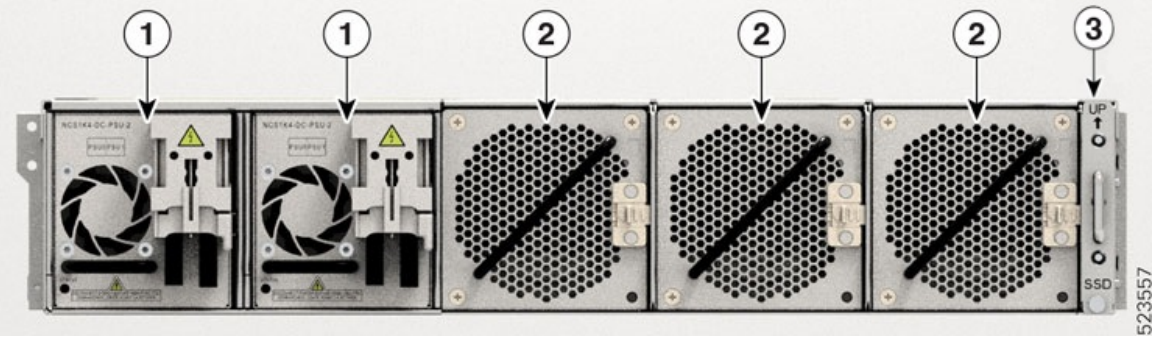
Figure 1: NCS 1014 Front View



Callout	Modules
1	Line Cards
2	Controller

The following figure shows the PSUs, fan modules, and SSD installed in the chassis.

Figure 2: NCS 1014 Rear View



Callout	Modules
1	Power Supply Units (Slots 0 and 1)
2	Fan Modules (Slots 0, 1, and 2)
3	SSD

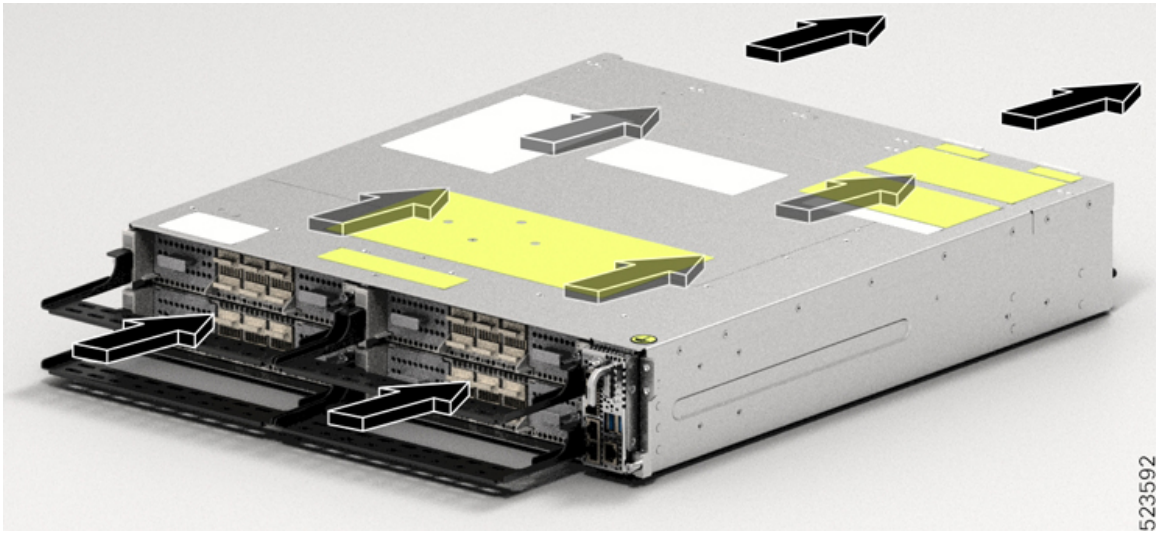
You must install AC or DC PSUs as the power supply modules. The chassis does not allow mixed PSU configuration.

Airflow in the Cisco NCS 1014 Chassis

The Cisco NCS 1014 chassis has a front-to-back airflow scheme. The air inlet is at the front side of the chassis and the exhaust is on the rear side. The fan modules cool down the line cards. Ensure that no object obstructs

or impedes the airflow as it can lead to reduced airflow in the system, causing components to operate at a higher temperature.

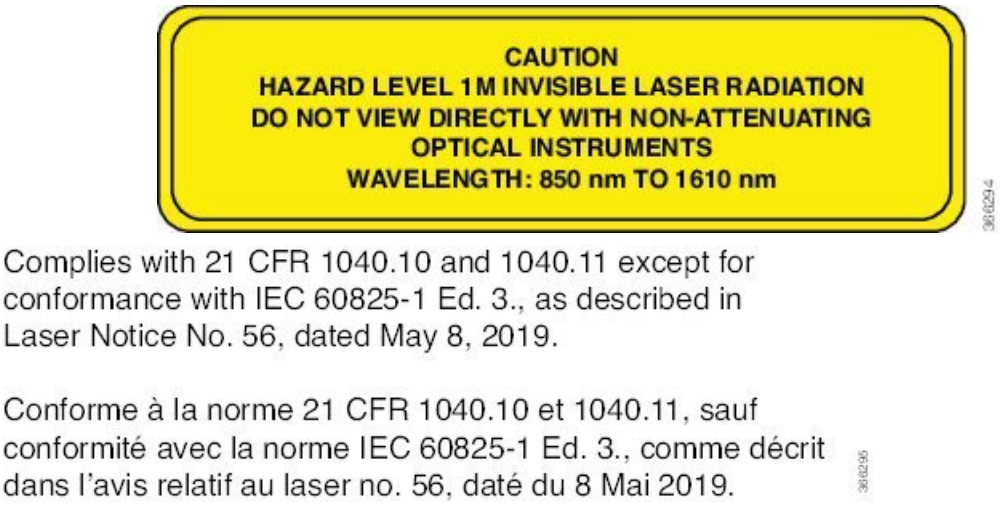
Figure 3: Airflow Through the Cisco NCS 1014 Chassis



Class 1M Laser Product Label

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

Figure 4: Class 1M Laser Product Label



Cooling System

The Cisco NCS 1014 cooling system actively regulates the chassis temperature using the three field-replaceable fan trays and the built-in fans within the PSU units. This system implements cooling in two different airflow paths:

- **Line Cards Cooling**

The three fan modules enable cooling for the line cards. The software monitors the chassis temperature and adjusts the fan speed according to the ambient temperature range.

- **Controller Card Cooling**

  The internal fans within the two PSUs cool the controller card. If any critical alarms arise due to controller temperature, the software overrides the PSU fan speed.

Note For normal operating conditions, the software does not control the PSU fans.

During the power cycle, each fan runs at maximum rotations per minute. After the chassis boots up, the fans return to their normal speed according to the ambient temperature.

Cooling profiles of the NCS 1014 chassis

Beginning with Release 25.2.1, the NCS 1014 chassis supports the programmable NCS1K14-FAN-P fan module, which runs two cooling profiles. The programmable fan changes its cooling profile depending on the installed line cards and pluggable modules. By default, the programmable fan uses the low-power, low-cooling profile.

Cooling profiles work only when you fill all fan slots with programmable fan modules.

The cooling profiles of the fans change based on the status of the NCS 1014 chassis. During controller Online Insertion and Removal (OIR), line card OIR, fan OIR, or fan failure, the fans run at maximum cooling profile speed.

Note During the INFRA POWER CYCLE, the system runs the fans at maximum speed for the low-cooling profile. Therefore, perform the INFRA POWER CYCLE only when the ambient temperature is less than or equal to 40°C. Perform line card or fan OIR, line card or fan replacement, or any software or FPD upgrade only at an inlet temperature less than or equal to 40°C. Use **show environment***0/Rack* to check inlet temperature.

From Release 26.3.1, a new high performance fan module NCS1K14-FAN-2 is introduced. This fan module is programmable with three adjustable cooling profiles, high, low, and medium. This dynamic cooling support is designed for the NCS 1014 and NCS 1014-2 chassis that supports high-power line cards like the OXP2-K9.

Legacy fans support a static cooling profile, while programmable fans support a dynamic cooling profile. The NCS 1014 offers three profiles: low cooling, high cooling, and legacy cooling. The inlet temperature sensors, SA_TEMP_CHASSIS_INLET0 and SA_TEMP_CHASSIS_INLET1, determine when to increase or decrease fan speed. For more information on fan RPM for each cooling profile, refer Fan modules, on page 28.

Programmable fans installed in pre-Release 25.2.1

If you install the programmable fans in a release earlier than 25.2.1, where they are not supported, the fan units do not appear in the **show inventory** output. The system raises the *Fan tray absent* alarm even though the fans continue to run in the chassis. It is recommended not to install the programmable fan units in the chassis running earlier releases.

Mixed fan configuration

A mixed fan configuration involves installing both legacy and programmable fan units together.

If both legacy and programmable fans are installed in the NCS 1014 fan slots during live traffic or card configuration, the system raises the *CONFIG MISMATCH* alarm. To clear the alarm, equip the fan slots with either the legacy or programmable fans. The mixed fan configuration is allowed only for a limited time during a fan upgrade. In this configuration, the legacy fan runs at 14,500 rpm and the programmable fan runs at 17,000 rpm.

Programmable fan speed implementation on NCS 1014 line cards

Table 3: Feature History

Feature Name	Release Description	Feature Description
NCS1K14-FAN-P Enhanced Fan Profile Support	Cisco IOS XR Release 25.2.1	The NCS1K14-FAN-P provides enhanced fan profile management for the NCS 1014 platform, enabling improved power efficiency and flexibility for various use cases. The system automatically adjusts the fan profile based on the line cards inserted in the chassis. For example, • if one or more transponder cards are detected, the fans automatically maintain a high-power fan profile. • if only a combination of NCS1K14-EDFA2, NCS1K14-CCMD-16-x, or filler cards is present, the fans automatically maintain a low-power fan profile. This dynamic fan profile enables optimal power consumption for Metro Open Line System (MOLS) 2.0 and NCS1K14-CCMD-16-x configurations.

Fan cooling profiles provide appropriate cooling for the NCS 1014 chassis based on the installed line cards. This dynamic cooling profile enables optimal power consumption for MOLS 2.0 and NCS1K14-CCMD-16-x configurations.

Table 4: Cooling profiles of programmable fans on different configurations

The fans maintain	For configuration on
low-cooling profile	MOL2.0, optical and OLS line cards. • NCS1K14-EDFA2 • NCS1K14-CCMD-16-C • NCS1K14-CCMD-16-L

The fans maintain	For configuration on
medium-cooling profile	transponders line cards. • NCS1K14-2.4T-K9 • NCS1K14-2.4T-X-K9 • NCS1K4-1.2T-K9 • NCS1K4-1.2T-L-K9 • NCS1K4-2-QDD-C-K9
high-cooling profile	NCS1K14-OXP2-K9

Table 5: Cooling profiles of programmable fans on different configurations

The fans maintain	For configuration on
low-cooling profile	MOL2.0, optical and OLS line cards. • NCS1K14-EDFA2 • NCS1K14-CCMD-16-C • NCS1K14-CCMD-16-L
medium-cooling profile	transponders line cards. • NCS1K14-2.4T-K9 • NCS1K14-2.4T-X-K9 • NCS1K4-1.2T-K9 • NCS1K4-1.2T-L-K9 • NCS1K4-2-QDD-C-K9
high-cooling profile	NCS1K14-OXP2-K9

Programmable fan speed implementation on NCS 1014 for coherent pluggables

Table 6: Feature History

Feature Name	Release Description	Feature Description
NCS1K14-FAN-P Smart Fan Implementation for Pluggable modules	Cisco IOS XR Release 25.2.1	The NCS1K14-FAN-P enhanced fan profile support is extended to pluggable modules on the transponder line cards. 1. CIM8 C- and L-band pluggable on NCS1K14-2.4T-K9 and NCS1K14-2.4T-X-K9 cards 2. Bright ZRP pluggable on the NCS1K4-QXP-K9 card with regen (regeneration) and without regen configurations.

The enhanced fan cooling profiles also apply to pluggable modules on the transponder line cards.

Table 7: Coherent pluggables with smart fan speeds

smart fan speed works for	in line cards
CIM8 C- and L-band pluggable modules • CIM8-C-K9 • CIM8-CE-K9 • CIM8-LE-K9	NCS1K14-2.4T-K9 and NCS1K14-2.4T-X-K9
Bright ZRP pluggable module with regen (regeneration) and without regen configurations • DP04QSDD-HK9 • DP04QSDD-LK9 • DP04QSDD-HE0 • DP04QSDD-HE0-A1	NCS1K4-QXP-K9

Cisco NCS 1014-2 chassis

The Cisco NCS 1014-2 chassis is a variant of the NCS 1014 chassis. It has been specifically designed for the NCS1K14-OXP2-K9 card, which is a double-slot line card. It features a new fan tray (NCS1K14-FAN-2=) that has modified grid for more airlflow.

Table 8: Feature History

Feature Name	Release Information	Feature Description
NCS1014-2= chassis	Cisco IOS XR Release 26.3.1	The Cisco NCS 1014-2 chassis is a variant of the NCS 1014 chassis, designed specifically to support the NCS1K14-OXP2-K9 double-slot line card in optical network environments. It features a new fan tray with improved air flow, and a removable divider that enables it to be configured either to support two double-slot line cards or four single-slot line cards, providing flexible deployment options. This design flexibility streamlines installation and enhances compatibility with optical line cards, facilitating efficient integration and improved performance to meet evolving optical network requirements.

Chassis configurations:

- With a removable divider and four single-slot filler cards and separately ordered OXP2-K9 card: This is an Assemble-to-Order (ATO) configuration that can serve as a replacement for the standard NCS 1014 chassis or support the OXP2-K9 card. You can order the OXP2-K9 card separately and use it with the chassis after removing the divider.
- Without a divider and with an OXP2-K9 card and a dual-width filler (NCS1K14-BLANK-2): This setup acts as an exclusive chassis for the OXP2-K9 card.
- Without a divider and two OXP2-K9 cards: This setup acts as an exclusive chassis for the OXP2-K9 card.

Figure 5: Front view of the NCS 1014-2 chassis with one OXP2-K9 card

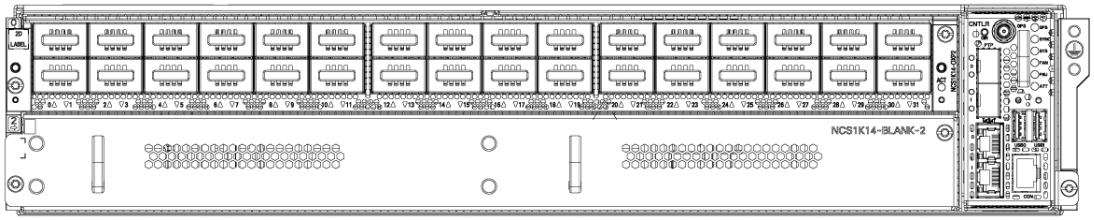
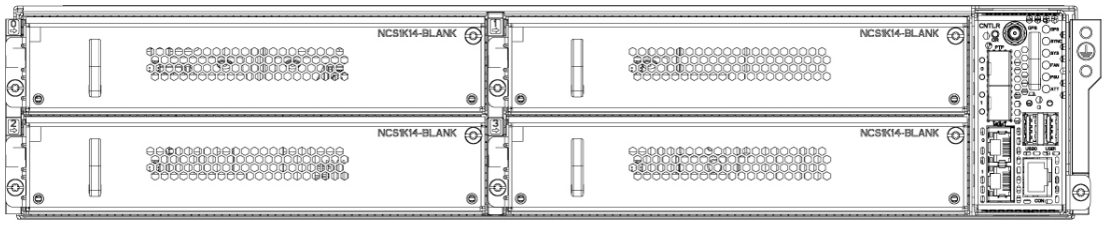


Figure 6: Perspective view of the NCS 1014-2 chassis with four single slot fillers and removable divider



Limitations

- If a spare NCS 1014-2 chassis arrives with the divider installed but needs to be used for dual-slot line cards, the divider can be removed in the field for this configuration. Once the divider is removed, it

cannot be reinserted into the chassis. Attempting to reinstall it may compromise the safety and quality of the chassis.

- After the chassis has been customized for dual-slot line card use, it cannot be upgraded again to support four single-slot line cards.
- The 2.5kW PSUs in the NCS 1014-2 chassis support a maximum of 24 TXPs (12 TXPs per OXP2-K9 card) when two OXP2-K9 cards are installed, and up to 16 TXPs when a single OXP2-K9 card is installed.

Cisco NCS 1014 Line Cards

The Cisco NCS 1014 chassis supports the following line cards:

2.4T Line Card

The 2.4T line card is a coherent optics Transponder and Muxponder for the Cisco NCS 1014 chassis. It is a single-slot card that supports C-band traffic at trunk ports. This line card delivers 400GE, 100GE, and OTU4 client traffic over two trunk ports operating at speeds ranging from 400G to 1.2T each.

Note In Release 7.11.1, the 2.4T line card supports only 400, 600, 800, and 1000G trunk payloads.

In the 2.4T card, the client and trunk ports support the pluggable form factor and data rates as shown in the following table.

Table 9: NCS1K14-2.4T-K9 Interfaces and Data Rates

Interfaces	Form Factor	Ports	Data Rates
Client	QSFP-DD56	1, 2, 3, 4, 5, 6	100, 200, 400G
	QSFP-DD112	2, 5, 6	100, 200, 400, 800G
Trunk	Coherent Interface Module 8 (CIM8)	0, 7	1.2T in each port

Note In Release 7.11.1, the ports 2, 5, and 6 support only up to 400GE data rates.

For more information about the 2.4T card, see datasheet.

The 2.4T card has two trunk ports and six client ports as shown in the following figure.

Figure 7: 2.4T Line Card Front View

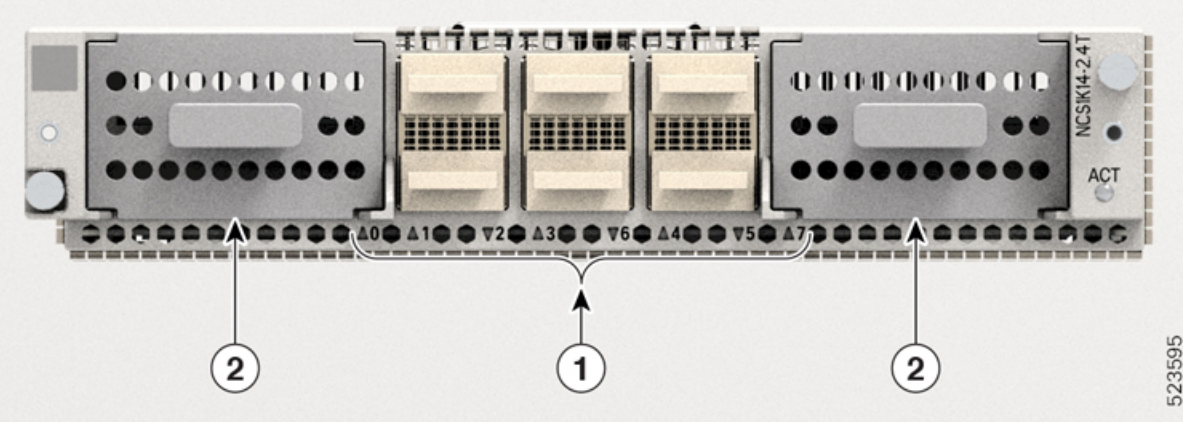


Table 10: 2.4T Line Card Interfaces

Callout	Interface
1	Client port
2	Trunk port

The following figure shows the mapping between the client and trunk ports.

Figure 8: 2.4T Card Client and Trunk Mapping

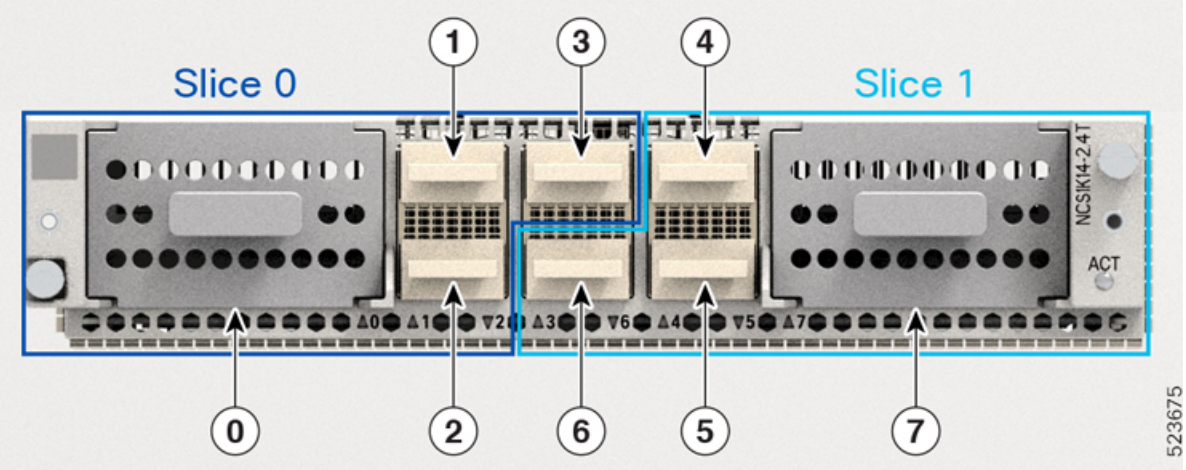


Table 11: Client-to-Trunk Port Mapping

Trunk Port	Client Ports
0	1, 2, 3
7	4, 5, 6

NCS 1000 16-Port Colorless Mux/Demux Optical Line Card

The NCS 1000 16-port Colorless Mux/Demux Optical Line Card is a multiplexing and demultiplexing unit with fixed gain EDFAs on both Add and Drop sections. The optical line card provides colorless functionality on the add/drop ports. It multiplexes any wavelength with the flexible options of baud rate and modulation format to the line side ROADM or amplifier units for transmission. It transmits and receives signals from optical line terminal (OLT) units.

In the Cisco NCS 1014 chassis, you can install the optical line card in one or more cardslots.

The optical line card has:

- Two line ports to transmit and receive using the same LC connectors.
- 16 ports for add/drop with LC connector-based interfaces

There are two variants of the optical line card:

- **NCS1K14-CCMD-16-C**

  The NCS1K14-CCMD-16-C line card is a C-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels. It supports any signal distribution between 191250 and 196200 GHz, for example, the 64 channels grid with 75-GHz spacing.

  The following table summarizes the central frequency of the first and the last channel of this specific grid.

  Table 12: C-Band Channel Wavelength Plan

Channel	Central Frequency (THz)	Wavelength (nm)
1	196.100	1528.77
64	191.375	1566.52

- **NCS1K14-CCMD-16-L**

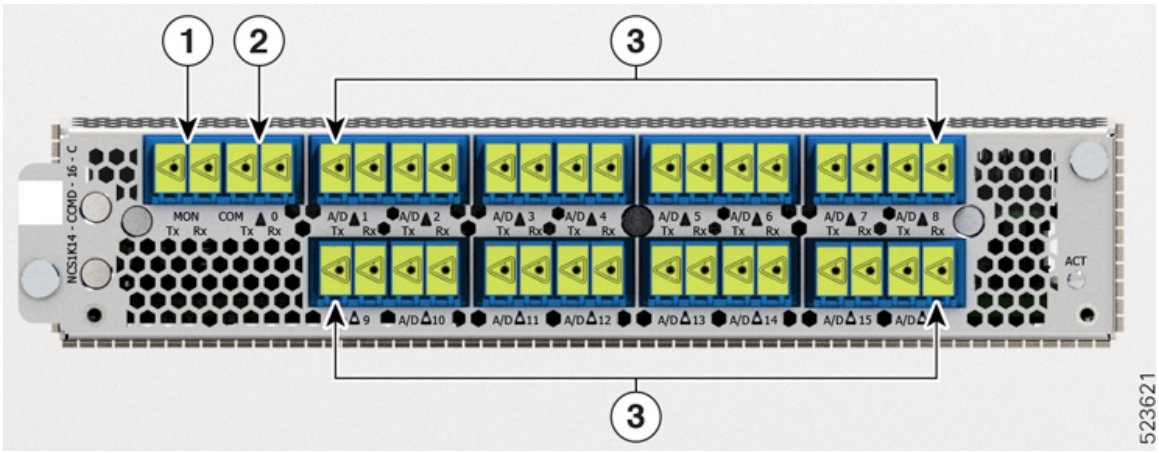
  The NCS1K14-CCMD-16-L line card is an L-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels. It supports any signal distribution between 186025 and 191000 GHz, for example, the 64 channels grid with 75-GHz spacing.

  The following table summarizes the central frequency of the first and the last channel of this specific grid.

  Table 13: L-Band Channel Wavelength Plan

Channel	Central Frequency (THz)	Wavelength (nm)
1	190.850	1570.83
64	186.125	1610.7

Figure 9: NCS1K14-CCMD-16 Line Card Front View



The following table shows the port names and their connector types for both CCDM-16-C and CCMD-16-L cards.

Table 14: Line Card Interface and Connector Assignment

Callout	Connector Label	Connector Type	Port Name
1	MON	LC	MON TX
			MON RX
2	COM	LC	COM TX
			COM RX
3	A/D 1…16	LC	A/D TX [1…16]
			A/D RX [1…16]

1.2T Line Card

Table 15: Feature History

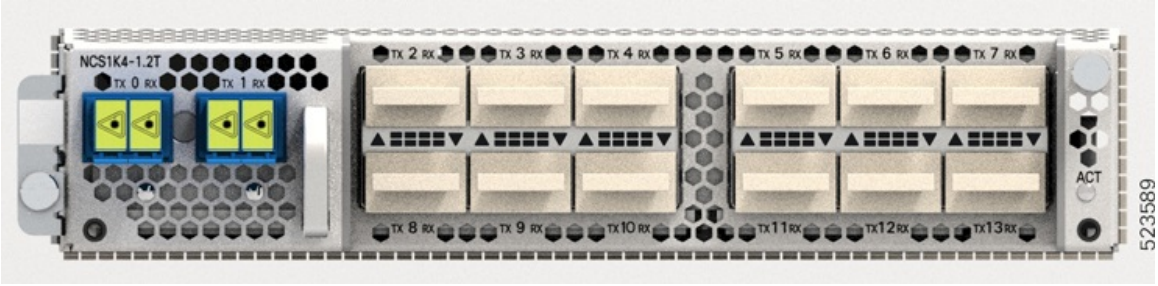
Feature Name	Release Information	Feature Description
NCS1K4-1.2T-L-K9 Line Card Support	Cisco IOS XR Release 24.4.1	The NCS 1014 chassis now supports the **NCS1K4-1.2T-L-K9** line card. This card is the licensed version of the NCS 1004 1.2T line card and offers a "pay as you grow" model. This card provides 4x 100G of unencrypted client capacity on day one. The licensed version of the card allows you to • purchase 100G incremental licenses to expand up to 12x 100G capacity for each card. • set line rates from 100 to 600G. • deploy long haul and subsea licenses in NCS 1014.

The 1.2T DWDM line card can provide up to 12 OTU4 or three 400G client ports.

The 1.2T DWDM line card is a transponder that has 12 client ports to deliver 100GE and OTU4 client traffic. This line card has two trunks that operate at any rate between 100G and 600G in 50G increments. It uses Advanced Encryption Standard with a 256-bit key length (AES256)-based Layer-1 encryption to encrypt client-side data for 100GE and OTU4. The NCS1K4-1.2T-K9 line card is a single-slot unit that supports C-band traffic.

Note From Release 24.4.1, the NCS 1014 chassis supports the NCS1K4-1.2T-L-K9 line card. This card is the licensed version of the 1.2T line card.

Figure 10: 1.2T DWDM Line Card Front View



For more information about the 1.2T card, see datasheet and card LEDs.

2.4TX line cards

Table 16: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-2.4T-X-K9 Line Card	Cisco IOS XR Release 24.1.1	The new **NCS1K14-2.4T-X-K9 line card** is a single-slot Transponder and Muxponder card that delivers up to 1.2T C-band traffic at each trunk port. It has six QDD client ports that support 400GE and 4x100GE traffic on each port. This card provides two trunk ports that support 1.2T traffic on each port. The **mxponder-slice** and **muxponder** keywords in the **hw-module** command enable this card to operate in the following modes. • **Muxponder slice mode:**The card virtually splits into two slices in this mode. It is possible to configure both trunks to carry different data rates. The supported trunk rates are 400G, 500G, 600G, 800G, 1000G, and 1200G. • **Muxponder mode:**The card acts as one unit in this mode, configuring both trunks to the same data rate. The supported trunk rates are 600G and 1000G. Additionally, the capacity of a specific shared client port is consumed by two trunk ports.

The 2.4TX line card is a coherent optics Transponder and Muxponder for the Cisco NCS 1014 chassis. It is a single-slot card that supports C-band traffic at trunk ports. This card delivers 400GE and100GE client traffic over two trunk ports operating at speeds ranging from 400G to 1.2T each.

This card operates in two card modes:

- **Muxponder mode:**the client traffic splits between the two trunk ports for 600G and 1000G payloads on port 2 and 3 respectively. In this mode, both trunk ports always carry the same data rate
- **Muxponder slice mode:**both trunk ports act independently, carrying different data rates in each trunk

Note In Release 24.1.1, the 2.4TX line card supports only 400, 500, 600, 800, 1000, and 1200G trunk payloads.

For more information about the 2.4TX card, see datasheet.

In the 2.4TX card, the client and trunk ports support the pluggable form factor and data rates as shown in the this table.

Table 17: NCS1K14-2.4T-X-K9 interfaces and data rates

Interfaces	Form factor	Ports	Data rates
Client	QSFP-DD56	1, 2, 3, 4, 5, 6	400G
	QSFP-DD112	2, 5	400, 800G

Interfaces	Form factor	Ports	Data rates
Trunk	Coherent Interface Module 8 (CIM8)	0, 7	up to 1.2T in each port

Note In Release 24.1.1, the ports 2 and 5 support only up to 400G data rates.

The 2.4TX card has two trunk ports and six client ports as shown in the this figure.

Figure 11: 2.4TX line card front view

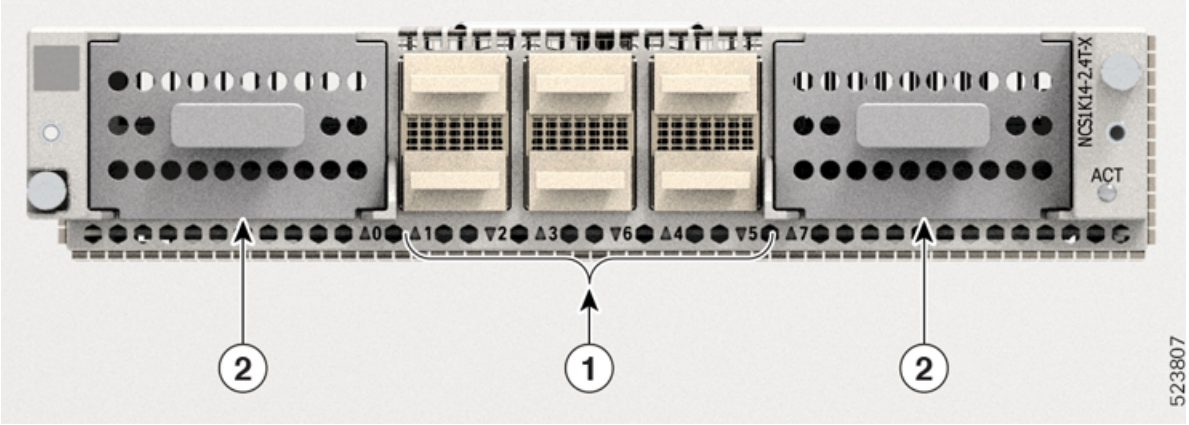


Table 18: 2.4TX line card interfaces

Callout	Interface
1	Client port
2	Trunk port

This figure shows the mapping between the client and trunk ports.

Figure 12: 2.4TX card client and trunk mapping

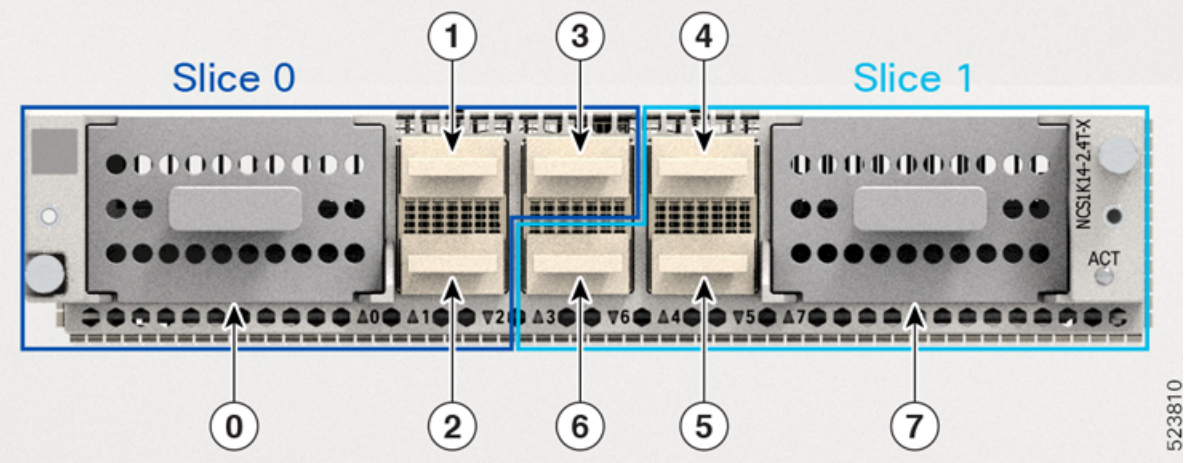


Table 19: Client-to-Trunk port mapping

Trunk port	Client ports
0	1, 2, 3
7	4, 5, 6

Note This client-to-trunk port mapping is only applicable for the mxponder-slice mode.

QXP-K9 Line Card

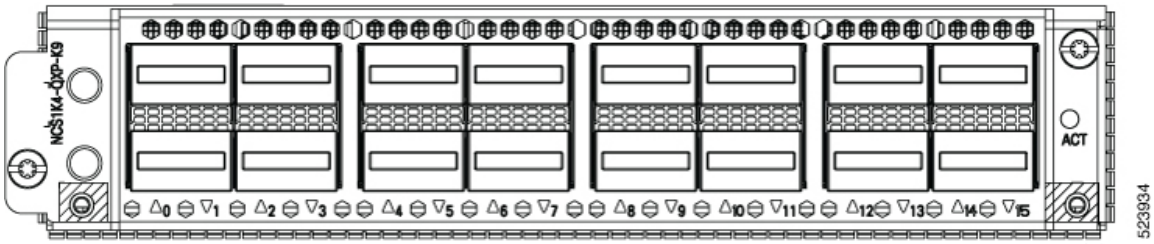
The QXP-K9 line card is a high-density QSFP-DD transponder that has eight client ports (QSFP-DD) and eight trunk ports (QSFP-DD ZR+). It is a single-slot card that supports 3.2T traffic through its eight QSFP-DD trunk ports. Each trunk port operates at speed up to 400G in a 50G increment. Each client port supports 400GE, 4x100GE, and 100GE without FEC client rates.

Table 20: QXP-K9 Interfaces

Interfaces	Form Factor	Ports
Client	QSFP-DD	1, 3, 5, 7, 9, 11, 13, 15
Trunk	QSFP-DD	0, 2, 4, 6, 8, 10, 12, 14

The QXP-K9 card has eight trunk ports and eight client ports as shown in the following figure.

Figure 13: QXP-K9 Line Card Front View



For more details of the QXP-K9 card, see the data sheet.

2.4TA Line Card

Table 21: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-2.4T-A-K9 NCS1K14-2.4T-AL-K9 Line Card	Cisco IOS XR Release 26.1.1	The **NCS1K14-2.4T-A-K9** and **NCS1K14-2.4TAL-K9** line cards are introduced as 2.4T DWDM coherent optics transponder and muxponder solutions for the NCS 1014 chassis. These line cards carry 100GE, 400GE and 800GE client traffic and enable networks to use C- and L-band frequencies for wider coverage.

The 2.4TA line card is a coherent optics Transponder and Muxponder for the Cisco NCS 1014 chassis. It is a single-slot card that supports C-band traffic at trunk ports. This line card delivers 400GE, 100GE, and 800G client traffic over two trunk ports operating at speeds ranging from 400G to 1.2T each.

Note In Release 26.1.1, the 2.4TA line card supports only 400, 600, 800, and 1000G trunk payloads.

In the 2.4TA card, the client and trunk ports support the pluggable form factor and data rates as shown in the following table.

Table 22: NCS1K14-2.4TA-K9 Interfaces and Data Rates

Interfaces	Form Factor	Ports	Data Rates
Client	QSFP-DD56	1, 2, 3, 4, 5, 6	100, 200, 400G
	QSFP-DD112	2, 5, 6	100, 400, 800G
Trunk	Coherent Interface Module 8 (CIM8)	0, 7	1.2T in each port

Note In Release 26.1.1, the ports 2, 5, and 6 support only up to 400GE data rates.

For more information about the 2.4TA card, see datasheet.

The 2.4TA card has two trunk ports and six client ports as shown in the following figure.

Figure 14: 2.4TA Line Card Front View

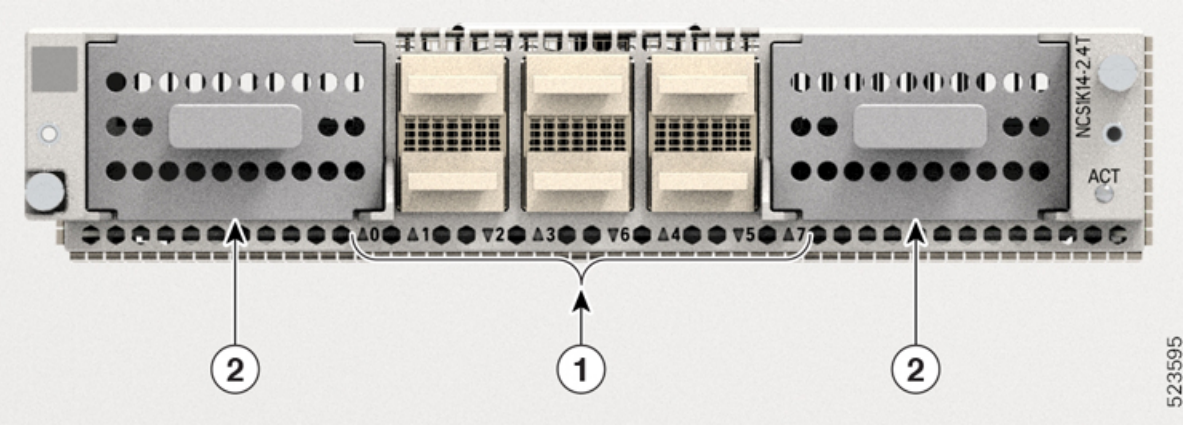


Table 23: 2.4TA Line Card Interfaces

Callout	Interface
1	Client port
2	Trunk port

This figure shows the mapping between the client and trunk ports.

Figure 15: 2.4TA Card Client and Trunk Mapping

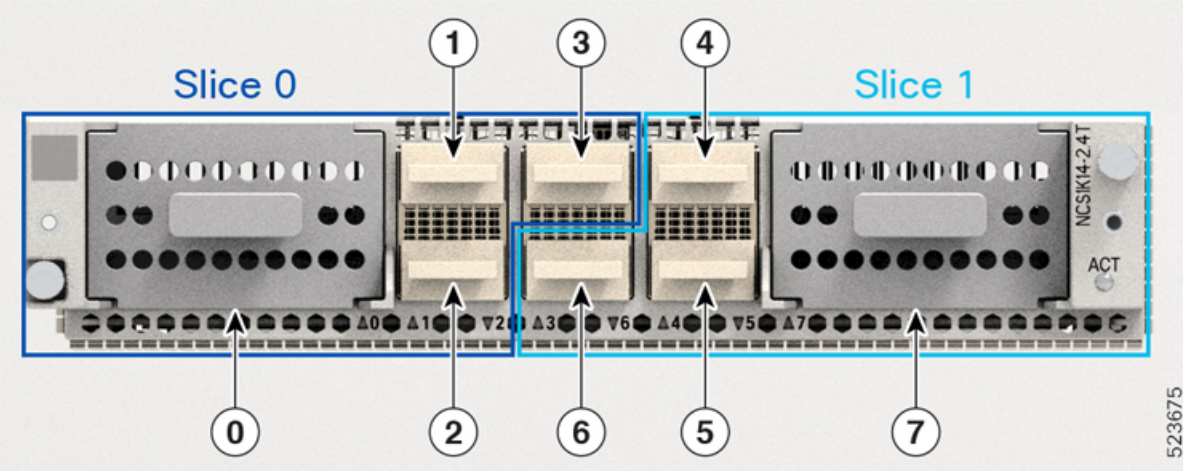


Table 24: Client-to-Trunk Port Mapping

Trunk Port	Client Ports
0	1, 2, 3

Trunk Port	Client Ports
7	4, 5, 6

NCS1K14-EDFA2 Optical Amplifier Line Card

Table 25: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-EDFA2 Line Card	Cisco IOS XR Release 25.1.1	NCS1K14-EDFA2 line card is an optical amplifier for the NCS1014 Chassis. It functions as a DWDM optical terminal and includes a C-band bidirectional amplifier with channel power control capabilities. This line card has a pair of booster amplifiers and a preamplifier. It operates in a frequency range from 191.200 to 196.175 THz. This card supports Optical Supervisory Channel (OSC), Coherent probe and Optical Time Domain Reflectometer (OTDR) functionalities.

Note EDFA2 refers to the NCS1K14-EDFA2 optical amplifier line card.

The EDFA2 line card is an optical amplifier for the NCS1014 chassis. It functions as a DWDM optical terminal and includes a C-band bidirectional amplifier with channel power control capabilities. This card supports Optical Supervisory Channel (OSC), Coherent probe, and Optical Time Domain Reflectometer (OTDR) functionalities. It operates in a frequency range of 4.975 THz from 191.200 to 196.175 THz.

EDFA2 line card has a pair of booster amplifiers and a preamplifier.

- The true variable gain preamplifier provides two different gain ranges:
  - Gain range 1: 0dB - 28dB
  - Gain range 2: 20dB - 39dB
- The two booster amplifiers are:
  - A fixed gain booster amplifier (BST1). It can switch between 8dB and 20dB gain setpoints with 0dB tilt. These setpoints can be finely tuned at +/-3dB.
  - A true variable gain booster amplifier (BST2), whose gain spans from 12 to 27 dB.

EDFA2 line card sections

The EDFA2 line card has:

- a monodirectional transmitter section (from COM-RX port to LINE-TX port) that:

- allows amplification with two switchable fixed gains and one true variable gain,
- equalizes or blocks the different C-band optical spectrum sections,
- regulates the signal power at the LINE-TX port,
- combines the OSC and the OTDR signals together with the C-band traffic, and
- assesses channel presence and gain regulation and per channel power monitoring of signals transmitted through the LINE-TX port.

- a monodirectional receiver section (from LINE-RX port to COM-TX port) that:
  - separates the OSC and the OTDR signals from the C-band traffic,
  - provides two programmable gain ranges,
  - regulates the signal power at the COM-TX port, and
  - assesses channel presence and gain regulation and per channel power monitoring of signals transmitted through the COM-TX port.

- a service section that includes:
  - the OSC termination ports (OSC-TX/RX) to regulate the transmitted and received OSC channel power,
  - an OTDR port to redirect the OTDR signal towards the two LINE ports, and
  - the optical safety signals termination ports (CHECK-2 and CHECK-3).

EDFA2 Interfaces

Figure 16: NCS1K14-EDFA2 optical amplifier line card

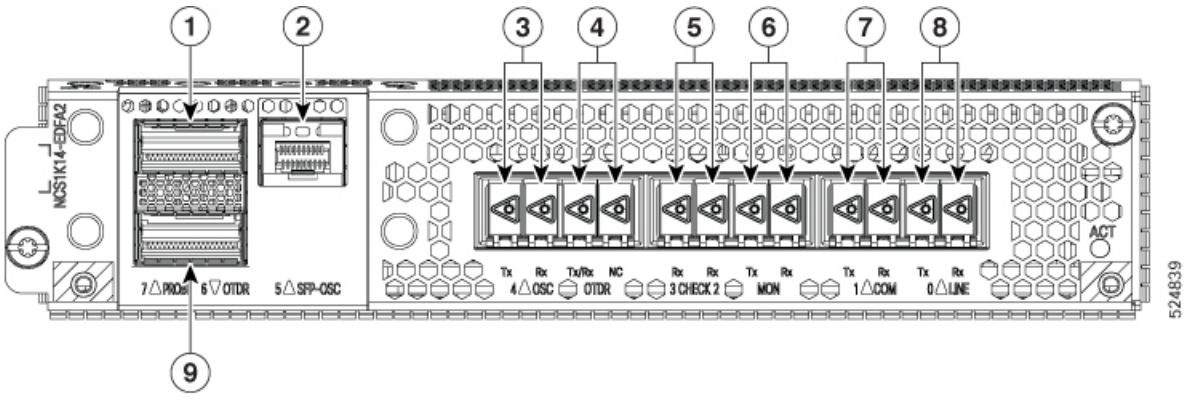


Table 26: EDFA2 line card interfaces

Callout	Connector label	Connector type	Port name
1	PROBE	QSFP-DD	Coherent probe 7
2	SFP-OSC	SFP28	OSC port 5

Callout	Connector label	Connector type	Port name
3	OSC	LC	OSC TX 4
			OSC RX 4
4	OTDR	LC	OTDR TX/RX
			OTDR NC
5	CHECK	LC	CHECK RX 2
			CHECK RX 3
6	MON	LC	MON TX
			MON RX
7	COM	LC	COM TX 1
			COM RX 1
8	LINE	LC	LINE TX 0
			LINE RX 0
9	OTDR	QSFP-DD	OTDR port 6

The card comprises 12 LC optical ports, two QSFP-DD ports for OTDR and coherent probe testing, one SFP port for OSC.

Table 27: Optical interfaces of EDFA2

Signal	Connector label	Port numbers	Operating frequency range [THz (nm)]	Note
LINE-TX/RX	**LINE TXLINE RX**	0	198.8 – 191.2 (1508–1568)	Combines C-band optical signals, coherent probe test channel, OSC channel, and OTDR signal
COM-TX/RX	**COM TX** **COM RX**	1	196.175 – 191.2 (1528.2 –1568)	Combines C-band optical signals and coherent probe channel
MON-TX/RX	**MON TX MON RX**	NA	198.8 – 191.2 (1508–1568)	Duplicates the LINE-TX/RX signals at ~20dB below the actual power levels. Both MON ports are output ports.
CHECK-2	**CHECK-RX**	2	196.175 – 191.2 (1528.2 –1568)	Optical safety termination ports. Both ports are input ports.
CHECK-3	**CHECK-RX**	3		
OTDR	**OTDR**	NA	197.45 (1518.32)	Bandwidth ± 3nm
OSC-TX/RX	**OSC TX** **OSC RX**	4	198.5 (1510.3)	Bandwidth ± 1.9nm

NCS1K4-2-QDD-C-K9 Line Card

Table 28: Feature History

Feature Name	Release Information	Description
NCS1K4-2-QDD-C-K9 C-Band Line Card	Cisco IOS XR Release 25.2.1	NCS 1014 now supports the NCS1K4-2-QDD-C-K9 C-Band line card. This card features eight client ports (QSFP28 and QSFP-DD) and two software-configurable DWDM dual sub-channel module trunk ports. Each trunk port supports line rates of 200, 300, and 400 Gbps with precise control over modulation format, baud rate, and forward error correction. Additionally, the line card supports both module and slice configurations, enhancing network flexibility and performance.

Note 2-QDD-C DWDM line card refers to NCS1K4-2-QDD-C-K9 C-band line card in this document.

2-QDD-C DWDM line card can provide up to eight QSFP client ports, six of which can support QSFP-28 based client ports and remaining two can support QSFP-28, QSFP-DD, QSFP-ZR, and QSFP-ZR+ client ports. For more details of the 2-QDD-C line card, see the Cisco NCS 1004 datasheet.

The eight client ports are divided into two sets of four slots each. The following two configurations are supported:

- A maximum of eight QSFP-28, four for each set, configured either as 100GE or 100G OTL4.4.
- A maximum of two QSFP-DD/ZR/ZR+, configured as 400GE.

The physical characteristics of the 2-QDD-C line card are:

- Height—40.4 mm
- Breadth—191.9 mm
- Depth—277 mm without the fiber management bracket; 297.97 mm with the fiber management bracket
- Weight—3.2 kg

For the LED details of the line card, see the 1.2T and 1.2T Licensed Line Cards LEDs1.2T, 1.2TL, and 2-QDD-C Line Cards LEDs, on page 144 section.

OXP2-K9 Line Card

Cisco NCS 1014 12.8T high-density OSFP multi-haul DWDM line card (NCS1K14-OXP2-K9, and NCS1K14-OXP2-L-K9) is a double-slot coherent optics transponder, muxponder, and regenerator line card for the NCS 1014 platform. Compatible with the NCS 1014-2 chassis, which supports dual-width line cards, OXP2-K9 line card provides advanced performance and flexibility for optical transport networks. For more inforamtion, refer to the datasheet.

The card supports16 slices with one-to-one mapping between client ports and trunk ports. Each trunk port accommodates OSFP variants of 800G Bright, supporting ZR and ZR+ options.

Features include:

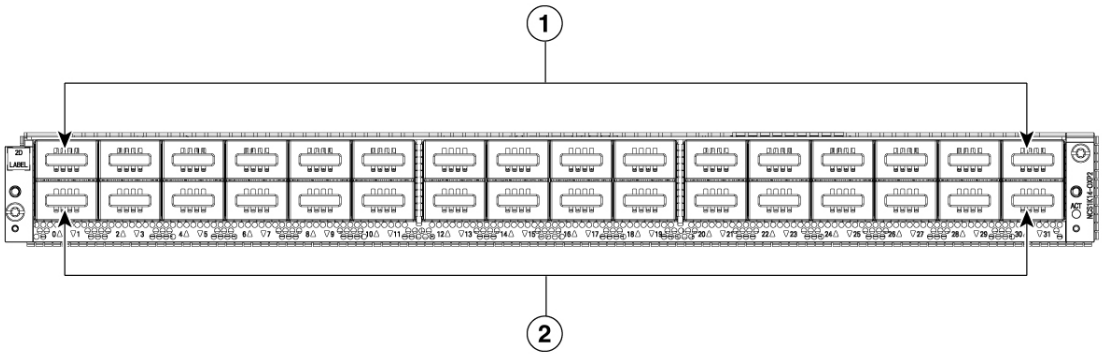
- 16 OSFP client ports support 100 Gbps, 400 Gbps, and 800 Gbps class payloads.
- In Relelase 26.3.1, only 800 Gbps payload is supported.
- 16 OSFP trunk ports offer tunable line rates from 400 Gbps to 800 Gbps, providing flexible modulation formats and baud rates.
- The system provides 16 slices with one-to-one mapping between client ports and trunk ports.
- Each trunk port accommodates OSFP variants of 800G Bright, supporting ZR and ZR+.

This design enables high-performance DWDM coherent optical transport and versatile connectivity options for advanced deployments.

Table 29: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-OXP2-K9 and NCS1K14-OXP2-L-K9 line cards	Cisco IOS XR Release 26.3.1	The NCS1K14-OXP2-K9 line card and its licensed version, NCS1K14-OXP2-L-K9, are double-slot modules designed to enhance optical processing within the Cisco NCS 1014-2 chassis. They support up to 12.8T C-band traffic. These line cards feature 16 OSPF client ports capable of handling 400GE, 800GE, and 4x100GE traffic on each port, and include 16 OSPF trunk ports that support 800G traffic. In this Release, clinet ports support only the 800GE payload. Optimized for high-capacity deployments, they offer superior flexibility, improved operational efficiency, and robust performance for demanding optical network environments. The new NCS1K14-OXP2-K9 line card supports these pluggables: • OSFP-800G-VR8 • OSFP-800G-DR8 • DP08SFP8-ZRB-A2

Figure 17: Front View of the OXP2-K9 card



1	Trunk ports
2	Client ports

Table 30: OXP2-K9 line card interfaces

Interfaces	Form Factor	Ports
Client	OSFP	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 (all ports in the bottom row)
Trunk	OSFP	0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 (all ports in the upper row)

Cisco NCS 1014 Modules

The Cisco NCS 1014 chassis supports the following modules:

Removable SSD

Table 31: Feature History

Feature Name	Release Information	Description
Removable NCS1K14-SSD Solid-State Disk (SSD)	Cisco IOS XR Release 7.10.1	The removable **NCS1K14-SSD** is the redundant SSD in the NCS 1014 chassis. At 2.5” in size, this SSD has 480 GB storage space to store running software and its configuration. This SSD acts as a backup storage to quickly recover the Cisco NCS 1014 chassis after an RP corruption or replacement.

The **NCS1K14-SSD** is the redundant chassis-based SSD in NCS 1014. It is field-replaceable and is accessible from the rear of the Cisco NCS 1014 chassis. This chassis SSD acts as the backup software storage in case the SSD inside the CPU fails. It has 480 GB storage space to store the running software and configuration.

This backup storage enables Cisco NCS 1014 to quickly recover to functional state if either route processor (RP) corruption or replacement occurs.

The chassis SSD is 2.5 inch (63.5 mm) and is removable.

Figure 18: Removable Chassis SSD

Fan modules

Table 32: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-FAN-2 programmable fan support	Cisco IOS XR Release 26.3.1	The new NCS1K14-FAN-2 programmable fan tray features a grid with wider gaps, enhancing airflow and providing improved cooling for high-power line cards like the OXP2-K9. This dynamic cooling support is designed for the NCS 1014 and NCS 1014-2 chassis. The programmable fans adjust their cooling profiles based on the status of the NCS 1014 chassis, the installed line cards, and the pluggable modules. The cooling profiles of the programmable fans are: • Low cooling • Medium cooling • High cooling

Table 33: Feature History

Feature Name	Release Information	Feature Description
NCS1K14-FAN-P Programmable Fan Support	Cisco IOS XR Release 25.2.1	The NCS1K14-FAN-P programmable fans provide dynamic cooling support to the NCS 1014 chassis. The programmable fans change cooling profiles based on the status of the NCS 1014 chassis, installed line cards, and pluggable modules. The cooling profiles of the programmable fans are: • Low cooling • High cooling The programmable fans run at a low cooling profile, consuming approximately 1 kW of power.

Fan modules are field-replaceable components in the Cisco NCS 1014 chassis that:

- maintains front-to-rear airflow to cool down the line cards, and
- is available in both legacy and programmable versions to support adaptive cooling, and
- occupies three fan slots at the rear of chassis to host the fan modules: FAN0, FAN1, and FAN2.

Redundant cooling design of the fan modules

Each fan module (**NCS1K14-FAN**, **NCS1K14-FAN-P**,and **NCS1K14-FAN-2**) has two counterrotating fans: an inlet fan and an outlet fan. Each fan has its own power rail with inrush controller to increase reliability. These counterrotating fans provide these benefits:

- Higher back-pressure than a single fan in each module
- Continued operation with five out of six fans if a single fan fails
- Prevention of airflow inversion by the remaining fan in the same module if a fan fails

Note The Cisco NCS 1004 fan modules and the Cisco NCS 1014 fan modules look identical. However, the Cisco NCS 1014 chassis does not support the Cisco NCS 1004 fan modules physically.

The legacy and programmable fans have the same form factor and look identical. The programmable fan displays the PID "NCS1K14-FAN-P" above the cross handle, and the letter "P" on an orange square appears on the side of the cross handle.

From R25.1.1, the NCS1K14-FAN-P fan module is a cooling option for the NCS 1014 chassis and its line cards. The NCS1K14-FAN-P is a programmable fan that provides dynamic cooling profiles for the chassis to save power. The default cooling profile is the lower cooling profile, which consumes approximately 1 kW of power.

From Release 26.3.1, the NCS1K14-FAN-2 fan module is introduced. It is a programmable fan module that features a grid with wider gaps to enhance airflow and provide improved cooling for high-power line cards such as the OXP2-K9. This dynamic cooling support is designed for the NCS 1014 and NCS 1014-2 chassis. The programmable fan has three cooling profiles: low, medium, and high.

You can check the speed of the running fan using the **show environment fan** command.

Table 34: Comparison of legacy and programmable fan modules

Fan attributes	NCS1K14-FAN-2	NCS1K14-FAN-P	NCS1K14-FAN
cooling profiles	supports dynamic cooling profile	supports dynamic cooling profile	supports legacy static cooling profile
inlet fan RPM	• low cooling: 3810 to 12698 rpm • medium cooling: 5397 to 17000 rpm • high cooling: 7231 to 15000 rpm	• low cooling: 3810 to 12698 rpm • high cooling: 5397 to 17000 rpm	legacy cooling: 5482 to 17000 rpm
outlet fan RPM	• low cooling: 3694 to 11313 rpm • medium cooling: 5054 to 15000 rpm • high cooling: 7231 to 15000 rpm	• low cooling: 3694 to 11313 rpm • high cooling: 5054 to 15000 rpm	legacy cooling: 5045 to 15000 rpm

Components of the fan modules

Each fan module has:

- a cross handle for lifting,
- a status LED, and
- a side lock lever for securing the module in the chassis.

Figure 19: Perspective view of fan module

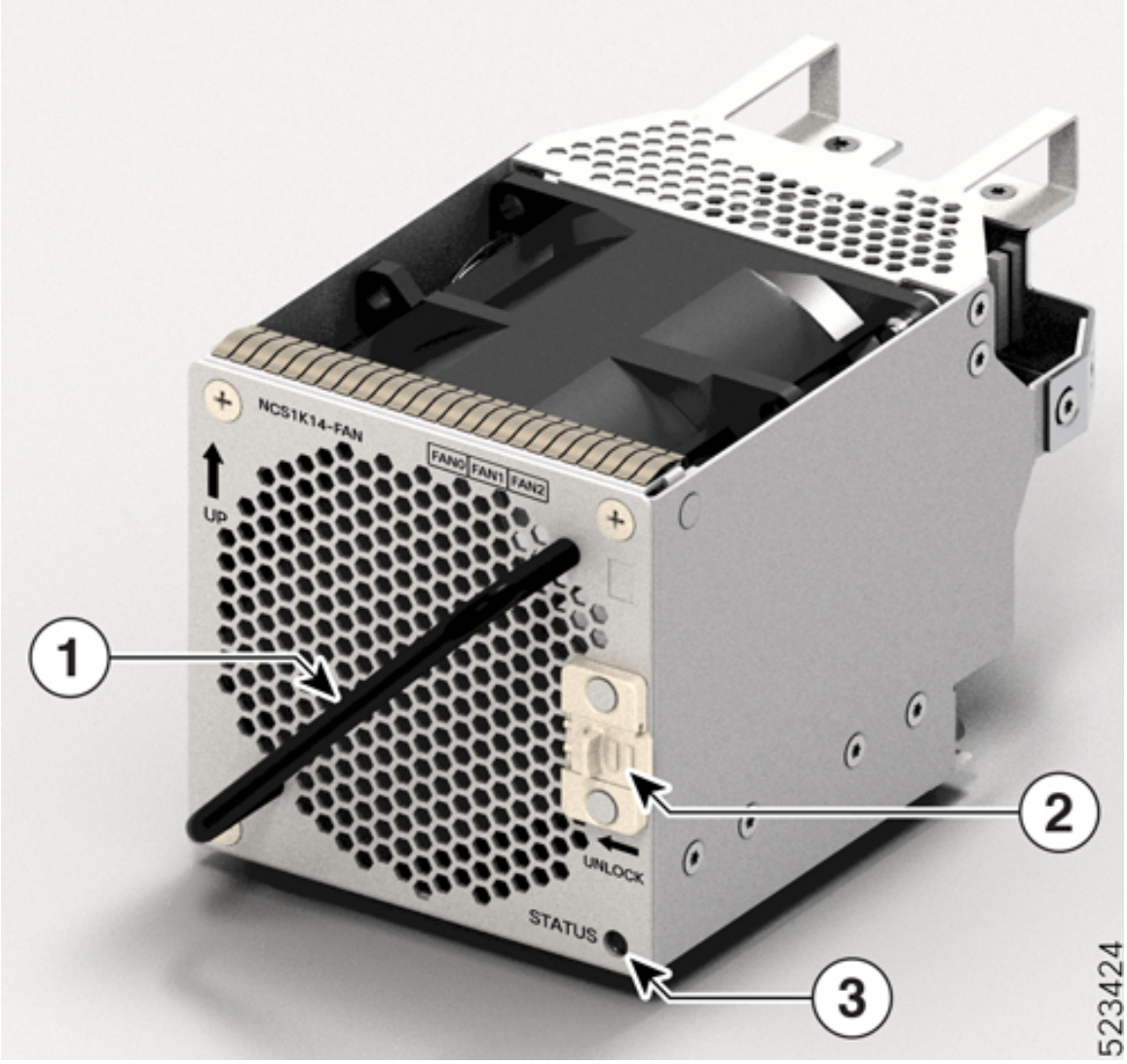
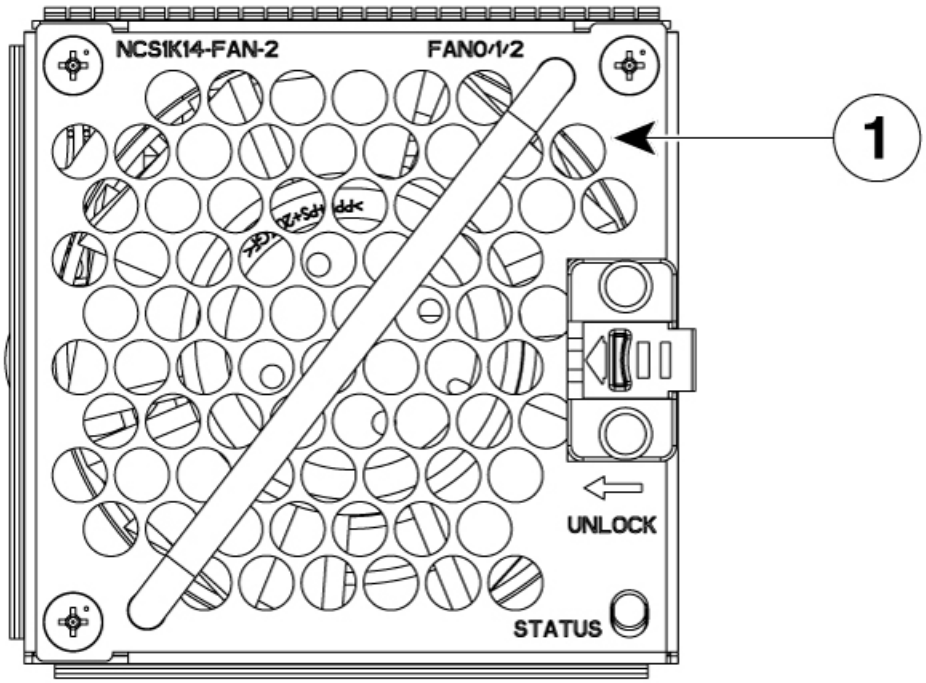


Table 35: Fan module components

Callout	Component
1	Cross handle

Callout	Component
2	Side lever lock
3	Status LED

Figure 20: Front view of NCS1K14-FAN-2



Callout	Component
1	Fan grid with wider gaps

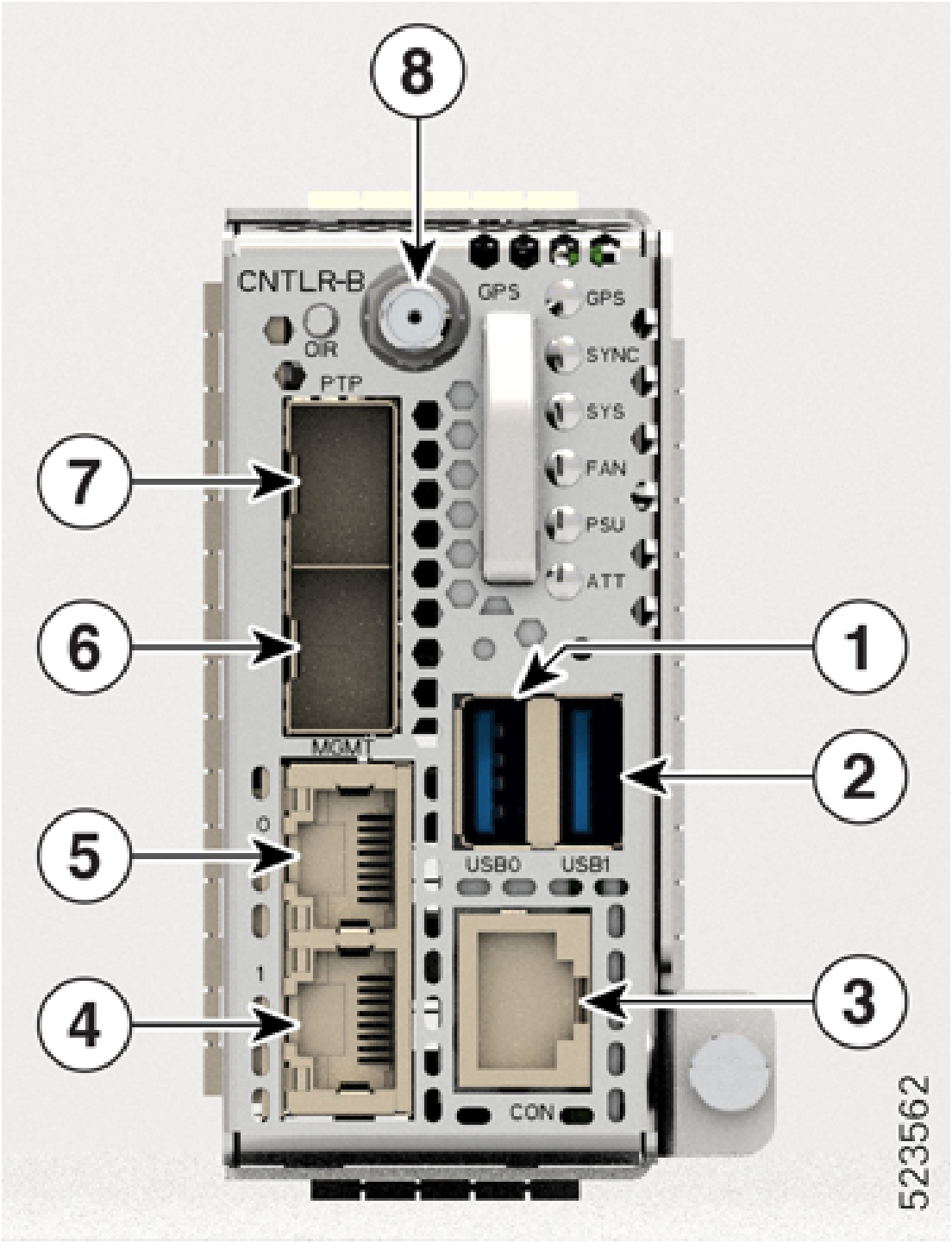
Controller Cards

The Cisco NCS 1014 chassis supports the following controller cards:

- **NCS1K14-CNTLR-B-K9**

  The NCS1K14-CNTLR-B-K9 controller card supports a default of 9600-baud rate on the RS-232 console port. The controller card has two USB 2.0, two 10/100/1000 Ethernet, one RS-232 console and two 1GE SFP ports. The SFP port of the controller card supports 1GE payload for PTP. It also has an OIR button and six status LEDs. The controller card provides encryption, remote console connection, PTP and SyncE timing, and GPS.

Figure 21: NCS1K14-CNTLR-B-K9 Controller Card



- **NCS1K14-CNTLR-K9**

  The NCS1K14-CNTLR-K9 controller card supports a default of 115200-baud rate on the RS-232 console port. The controller card has two USB 2.0, two 10/100/1000 Ethernet, one RS-232 console and two 1GE

SFP ports. The SFP port of the controller card supports 1GE payload for PTP. It also has an OIR button and six status LEDs. The controller card provides encryption, remote console connection, PTP and SyncE timing, and GPS.

Figure 22: NCS1K14-CNTLR-K9 Controller Card

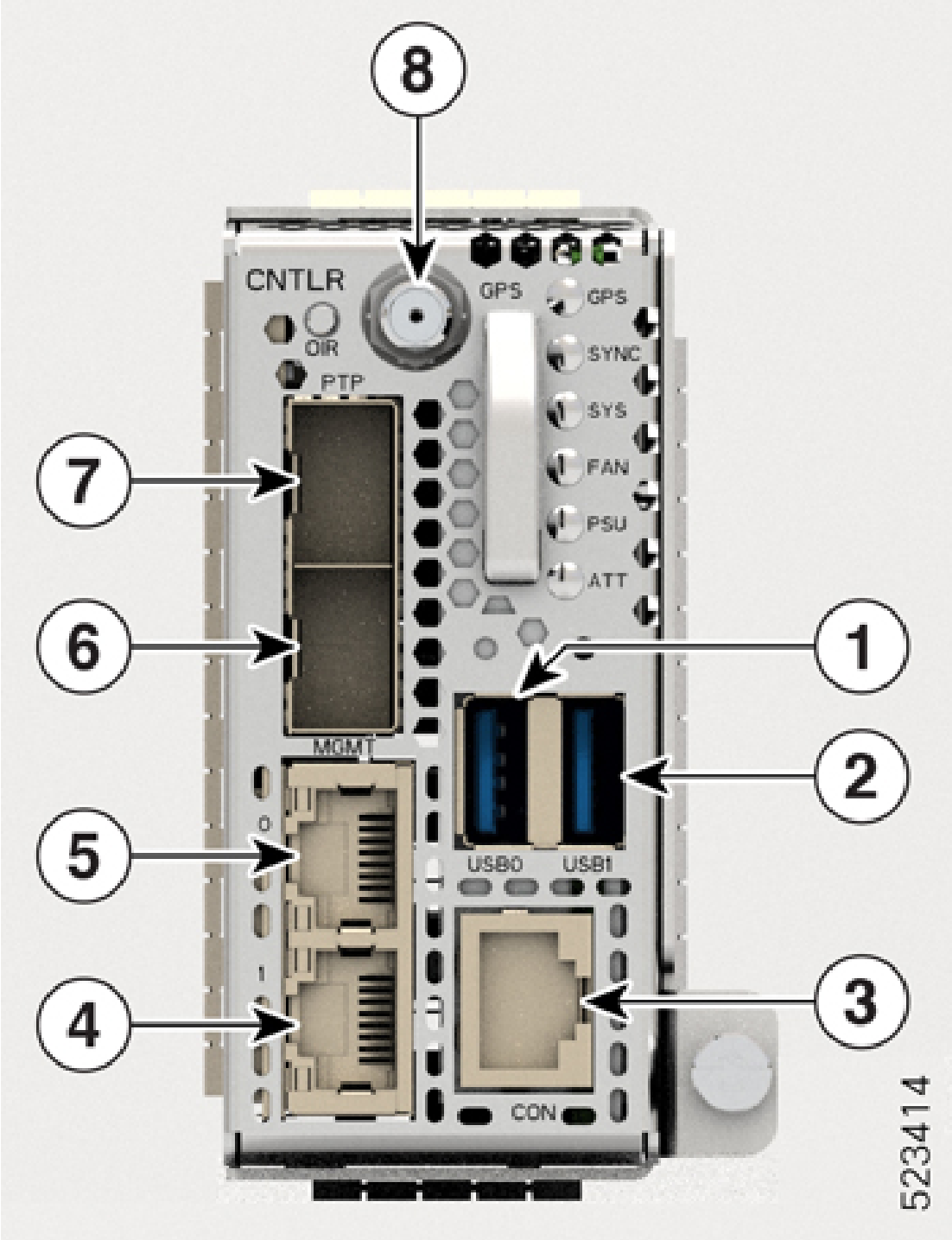


Table 36: Controller Card Interfaces

Callout	Interface	Description
1, 2	USB 0 and 1	External USB port. USB 2.0 type A, 1.8 A max at 12 V provides support to external passive optical modules (2x) The USB ports have following functions: • Essential—boot the image through pen drive (Only USB 2.0 sticks and pen drives are supported). • Optional—copy files to and from local devices (Only USB 2.0 sticks and pen drives are supported).
3	CON	Console interface (1x) **Note** Set the DTR (Data Terminal Ready) value to 1 to enable the CON interface.
4, 5	MGMT 0 and 1	10/100/1000 RJ-45 Ethernet management ports (2x)
7, 6	PTP 0 and 1	SFP for 1GE optical PTP ports (1588-nm PTP and SyncE) (2x)
8	GPS	Coaxial connector for GPS antenna RF input (with 5 V antenna power, if necessary) (1x)

Power Supply

The Cisco NCS 1014 chassis has two slots for 2.5-kW AC and 2.5-kW DC PSUs and 3.2-kW AC PSUs. Both the PSUs must always remain installed in the chassis, except during replacement. When the chassis has only one PSU installed, the system raises the *Power Module Redundancy Lost* alarm. The Cisco NCS 1014 chassis also supports 2-kW AC and DC PSUs.

When two OXP2-K9 cards are deployed, a single power supply will not support them, resulting in no power supply redundancy.

Table 37: Feature History

Feature Name	Release	Description
NCS1K14-AC-PSU-3 support	Cisco IOS XR Release 26.3.1	The new AC PSU, NCS1K14-AC-PSU-3, introduced in this release, is a high power capacity power supply. It is designed to support high-power-consuming line cards such as the NCS1K14-OXP2-K9 line card and has a power rating of 3.2 kW. It is supported on both NCS 1014 and NCS 1014-2 chassis.

2.5-KW PSUs (NCS1K4-AC-PSU-2 and NCS1K4-DC-PSU-2)

2.5-kW PSU power derating and option table, including ambient temperature details are here. The power details are for output power.

- AC high voltage range output power—2500 W up to 40℃ for 1 PSU; 2500 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- AC low voltage range output power—1500 W up to 40℃ for 1 PSU; 1500 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- DC power supply—2500 W output power up to 40℃ for 1 PSU; 2500 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).

For DC-DC (2500 W at 12 Vout)

- Input Voltage Rating = –48…–60 Vdc
- Maximum Input current at –48 Vdc = 60 A
- Input Voltage range = –40…–72 Vdc (operating)
- Input turn ON Voltage = –41…–42 Vdc maximum
- Recommended protective device rating = 90 A maximum per feed

For the AC-DC (2500 W (HL) / 1500 W (LL) at 12 Vout)

- Input Low Line (LL) Nominal voltage = 100–120 V~
- Input High Line (HL) Nominal voltage = 200–230 V~
- Maximum Input current at 100 V~ = 16 A
- Maximum Input current at 200 V~ = 14 A
- Input frequency rating = 50/60 Hz
- Input LL voltage range = 90–140 V~
- Input HL voltage range = 180–264 V~
- Input frequency range = 47–63 Hz (nominal 50/60Hz)
- Minimum Input turn ON voltage = 85 V~ / 175 V~ (LL/ HL)
- Maximum Input turn ON voltage = 90 V~ / 180 V~ (LL/ HL)
- Recommended protective device (HL) = 16 A
- Recommended protective device (LL) = 20 A

2-KW PSUs (NCS1K4-AC-PSU and NCS1K4-DC-PSU)

2-kW PSU power derating and option table, including ambient temperature details are here. The power details are for output power.

- AC high voltage range output power—2000 W up to 40℃ for 1 PSU; 2000 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- AC low voltage range output power—1300 W up to 40℃ for 1 PSU; 1300 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- DC power supply—2000 W output power up to 40℃ for 1 PSU; 2000 W up to 55℃ for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).

Caution The NCS 1014 chassis must have both the PSUs at all times. In case one of the PSUs is not energized (due to a fault or missing mains), ensure that the system works at an ambient temperature of not more than 40℃.

For DC-DC (2000 W at 12 Vout)

- Input Voltage Rating = –48 Vdc / –60 Vdc
- Maximum Input current at 48 Vdc = 44 A
- Input Voltage range = 40.5–72 Vdc (operating)
- Input turn ON Voltage = –42 Vdc maximum
- Recommended protective device rating = 60 A maximum per feed

For the AC-DC (2000 W (HL) / 1300 W (LL) at 12 Vout)

- Input Low Line (LL) Nominal voltage = 100–127 V~
- Input High Line (HL) Nominal voltage = 200–240 V~
- Maximum Input current at 100 V~ = 15 A
- Maximum Input current at 200 V~ = 12 A
- Input frequency rating = 50/60 Hz
- Input LL voltage range = 90–140 V~
- Input HL voltage range = 180–264 V~
- Input frequency range = 47–63 Hz (nominal 50/60 Hz)
- Input turn ON voltage = 80 V~ / 175 V~ (LL/ HL)
- Recommended protective device (HL) = 16 A
- Recommended protective device (LL) = 20 A

For the trip time response, the breaker trip curve may be "D" or faster.

Power Supply Units (PSUs)

Table 38: Feature History

Feature Name	Release	Description
NCS1K14-AC-PSU-3 support	Cisco IOS XR Release 26.3.1	The new AC PSU, NCS1K14-AC-PSU-3, introduced in this release, is a high power capacity power supply. It is designed to support high-power-consuming line cards such as the NCS1K14-OXP2-K9 line card and has a power rating of 3.2 kW. It is supported on both NCS 1014 and NCS 1014-2 chassis.

The redundant, field-replaceable PSUs power the Cisco NCS 1014 chassis. The chassis has slots for two PSUs at the rear side. Each PSU supports up to 2.5 kW per system.

From Release 26.3.1, a high-capacity power supply (NCS1K14-AC-PSU-3) is supported on both NCS 1014 and NCS 1014-2 chassis. It is designed to support high power-consuming line cards, such as the NCS1K14-OXP2-K9 line card, and has a power rating of 3.2 kW.

The PSUs have internal fans to regulate the temperature inside the PSUs. The fans in the PSU receive power from the main PSU or the standby PSU. The PSUs are available in reverse airflow (RAF) direction meaning the airflow direction is from the output connector to the input connector.

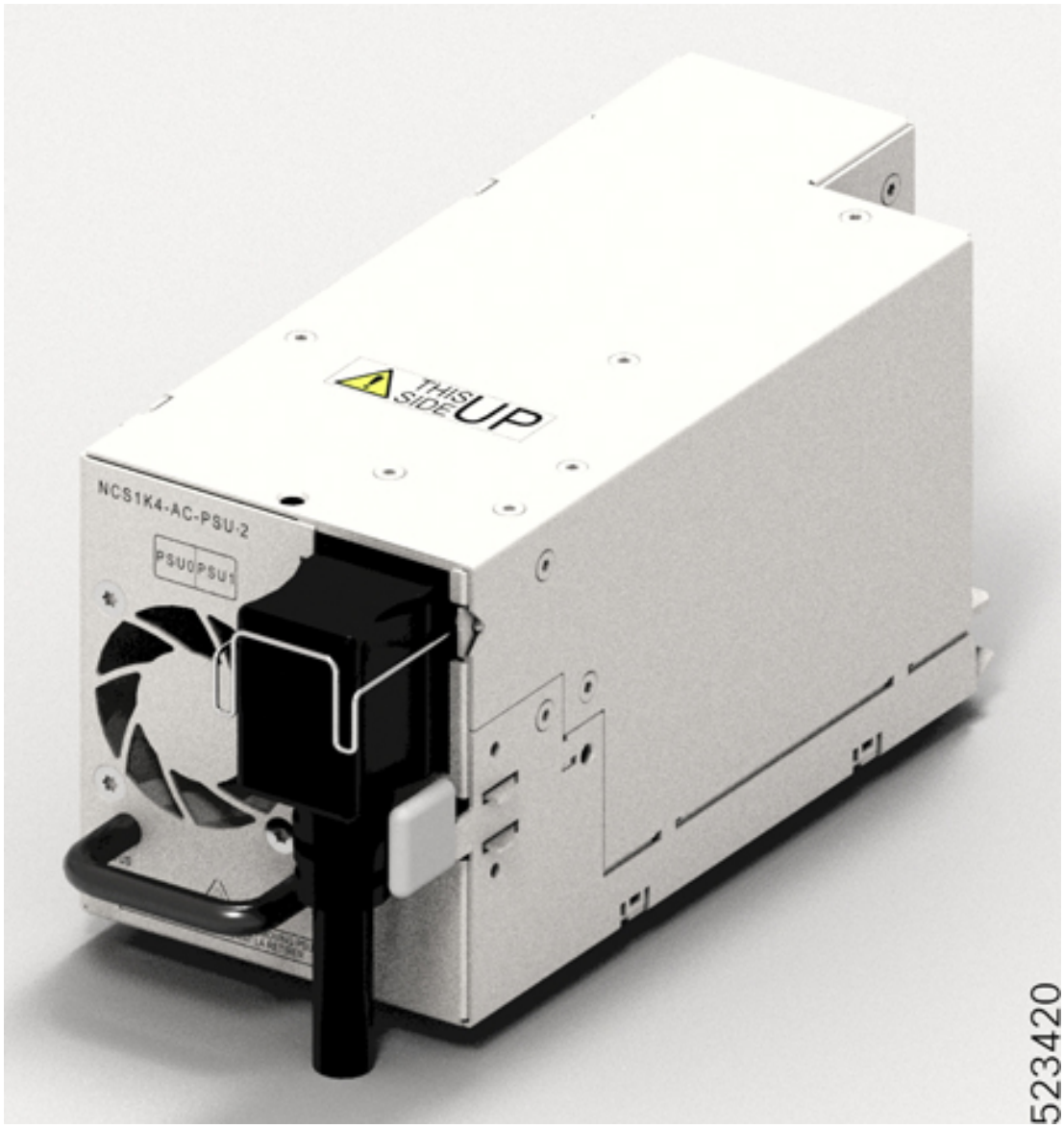
To ensure the necessary fan redundancy, the two PSUs implement a protection mechanism. When the mechanism detects a single PSU failure or if a PSU fails to power up, it triggers all the operational fans to run at maximum speed. This mechanism activates without intervention from the software.

The Cisco NCS 1014 chassis supports the following PSUs:

- **NCS1K4-AC-PSU-2**

  NCS1K4-AC-PSU-2 is a 2.5-kW AC to DC, power-factor-corrected (PFC) power supply that converts standard AC power into an output of 12 VDC (main) and 12 VDC (standby) output.

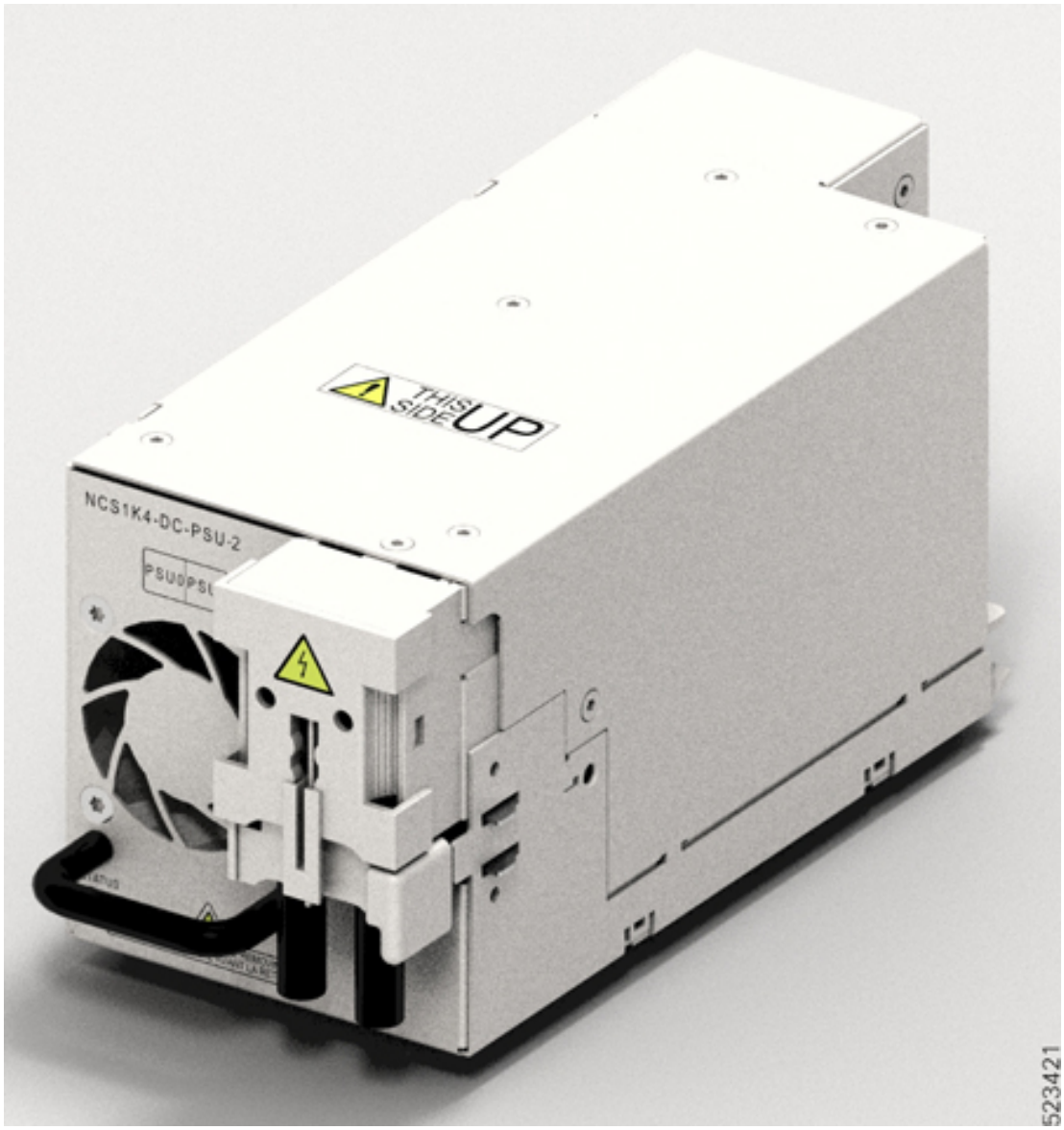
Figure 23: NCS1K4-AC-PSU-2



- **NCS1K4-DC-PSU-2**

  NCS1K4-DC-PSU-2 is a 2.5-kW DC to DC, PFC power supply with 12 VDC (main) and 12 VDC (standby) output.

Figure 24: NCS1K4-DC-PSU-2



- **NCS1K4-AC-PSU**

  NCS1K4-AC-PSU is a 2-kW AC to DC, PFC power supply that converts standard AC power into an output of 12 VDC (main) and 12 VDC (standby) output.

- **NCS1K4-DC-PSU**

  NCS1K4-DC-PSU is a 2-kW DC to DC, PFC power supply with 12 VDC (main) and 12 VDC (standby) output.

- **NCS1K14-AC-PSU-3**

  NCS1K4-AC-PSU-3 is a 3.2-kW AC to DC, PFC power supply that converts standard AC power into an output of 12 VDC (main) and 12 VDC (standby) output.

Air Filter

The air filter removes dust from the air that the fan units draw into the chassis. If the air filters become damaged, dirty, or clogged with dust, you must replace them with a new air filter. Failure to replace a compromised air filter can result in insufficient air circulation through the chassis and temperature-related environmental alarms.

The Cisco NCS 1014 air filter has the following components:

- Two air filter side brackets
- One air filter frame
- One air filter

You must order all the three components for the first-time installation. After first-time installation of the air filter unit, replace only the air filter. You reuse the air filter side brackets and the frame.

Note Inspect the air filters every three months and replace them as needed. Air filters should be disposed of and replaced when they become dirty. According to NEBS guidelines, washing or cleaning them is not allowed. Make sure to order these consumable items separately and keep a spare stock. For PID identification, contact TAC, as these parts cannot be replaced through the RMA process.

Supported Pluggables

Table 39: Feature History

Feature Name	Release	Description
Pluggable support	Cisco IOS XR Release 26.3.1	The new pluggable ONS-QSFP-PSM2, introduced in this release, integrates protection switching module capability with channel power detection directly into a pluggable QSFP-DD form factor module. This pluggable is supported on: • QSFP-DD ports of NCS1K14-2.4T-K9 and NCS1K14-2.4-T-X-K9 line cards • QSFP-DD ports of NCS1K4-QXP-K9 line card This module can be directly plugged into a TXP or router, eliminating the need for a separate line card. This integration allows for more streamlined and efficient channel and Mux/Path protection.

Feature Name	Release	Description
Pluggable support	Cisco IOS XR Release 26.3.1	The new NCS1K14-OXP2-K9 line card supports these pluggables: • OSFP-800G-VR8 • OSFP-800G-DR8 • DP08SFP8-ZRB-A2
Pluggable support	Cisco IOS XR Release 26.3.1	The NCS1K14-EDFA2 line card now supports these pluggables on the probe port: • DP04QSDD-E30-440 • DP04QSDD-E30-441 These pluggables enable 400G trunk rates with OFEC support. This support provides enhanced capabilities to monitor incoming traffic from the far end, ensuring greater network visibility and improved data reliability.
Pluggable support	Cisco IOS XR Release 26.2.1	The NCS1K14-EDFA2 line card now supports these pluggables on the probe port: • DP04QSDD-E30-440 • DP04QSDD-E30-441 These pluggables enable 400G trunk rates with OFEC support. This support provides enhanced capabilities to monitor incoming traffic from the far end, ensuring greater network visibility and improved data reliability.
Pluggable support	Cisco IOS XR Release 26.2.1	The NCS1K14-2.4T-K9, NCS1K14-2.4T-X-K9, and NCS1K14-2.4T-A-K9 line cards supports the QDD-8X100G-FR pluggable on the client port.
Pluggable support	Cisco IOS XR Release 26.2.1	The NCS1K4-QXP-K9 line card supports the DP04QSDD-HE0-A1 pluggable on the trunk port.
Pluggable support	Cisco IOS XR Release 25.4.1	The NCS1K14-EDFA2 line card now supports these pluggables: • DP04QSDD-E26-A1 • GLC-TE
Pluggable support	Cisco IOS XR Release 25.3.1	The NCS1K4-QXP-K9 line card now supports the new DP04QSDD-E26-A1 and DP04QSDD-ULH-A1 trunk pluggables. These trunk pluggables consume less power.

Feature Name	Release	Description
Pluggable support	Cisco IOS XR Release 25.2.1	The NCS1K4-QXP-K9 line card now supports the new ONS-QDD-OLS optical amplifier pluggable.
Pluggable support	Cisco IOS XR Release 25.1.1	The new NCS1K14-EDFA2 card supports: • ONS-QSFP-OTDR • DP01QSDD-ZT5-A1 • ONS-SC-PTP-1510
Pluggables Support	Cisco IOS XR Release 24.3.1	This client pluggable is supported on the QXP card: • QDD-400G-LR4-S This trunk pluggable is supported on the QXP card: • QDD-400G-ZR-S These client pluggables are supported on the 2.4TX card: • QDD-2X100-CWDM4-S • QDD-2X100-LR4-S These trunk pluggables are supported on the 2.4TX card: • CIM8-CE-K9= • CIM8-LE-K9=
Pluggables Support	Cisco IOS XR Release 24.2.11	The following pluggables are supported on the NCS1K14-2.4-T-X-K9 card: • QDD-400G-LR4-S • QDD-4X100G-FR-S

2.4TA Line Card Pluggables

The 2.4TA line card supports the following pluggables:

Table 40: 2.4TA Line Card Pluggables

Client Pluggables	Trunk Pluggables
• QDD-400G-FR4-S • QDD-400G-AOCxM • QDD-400G-DR4-S • QDD-4X100G-LR-S • QDD-4x1000G-FR-S • QDD-400G-LR4-S • QDD-8X100G-FR	• CIM8-C-K9= • CIM8-CE-K9= • CIM8-LE-K9=

For more information on the 400G client pluggables, see Cisco 400G QSFP-DD Cable and Transceiver Modules Data Sheet.

2.4TX Line Card Pluggables

The 2.4TX line card supports the following pluggables:

Table 41: 2.4TX Line Card Pluggables

Client Pluggables	Trunk Pluggables
• QDD-400G-FR4-S • QDD-400G-AOCxM • QDD-400G-DR4-S • QDD-4X100G-LR-S • QDD-400G-LR4-S • QDD-4X100G-FR4-S • QDD-2X100-CWDM4-S • QDD-2X100-LR4-S • QDD-8X100G-FR • ONS-QSFP-PSM2	• CIM8-C-K9= • CIM8-CE-K9= • CIM8-LE-K9=

2.4T Line Card Pluggables

The 2.4T line card supports the following pluggables:

Table 42: 2.4T Line Card Pluggables

Client Pluggables	Trunk Pluggables
• QDD-400G-FR4-S • QDD-400G-AOCxM • QDD-400G-DR4-S • QDD-4X100G-LR-S • QDD-8X100G-FR • ONS-QSFP-PSM2	• CIM8-C-K9=

For more information on the 400G client pluggables, see Cisco 400G QSFP-DD Cable and Transceiver Modules Data Sheet.

1.2T Line Card Pluggables

The 1.2T line card supports the following pluggables:

- QSFP-100G-SR4-S
- QSFP-100G-CWDM4-S
- QSFP-100G-SM-SR
- QSFP-100G-AOC-1M
- QSFP-100G-AOC-3M
- QSFP-100G-AOC-10M
- QSFP-100G-LR4-S
- QSFP-100G-CU1M
- QSFP-100G-CU2M
- QSFP-100G-CU3M
- QSFP-100G-CU5M
- QSFP-100G-DR-S
- QSFP-100G-FR-S
- QSFP-100G-LR-S
- ONS-QSFP28-LR4
- QSFP-40/100-SRBD
- QSFP-100G-ER4L-S

QXP Line Card Pluggables

The QXP line card supports the following pluggables:

Table 43: QXP Line Card Pluggables

Client Pluggables	Trunk Pluggables
• QDD-400G-FR4-S • QDD-400G-DR4-S • QDD-400-AOCxM • QDD-4x100G-LR-S • QDD-400G-LR4-S	• DP04QSDD-HK9 • DP04QSDD-LK9 • DP04QSDD-HE0 • DP04QSDD-HE0-A1 • QDD-400G-ZR-S • QDD-400G-ZRP-S • DP04QSDD-E26-A1 • ONS-QSFP-PSM2

EDFA2 Line Card Pluggables

The EDFA2 line card supports the pluggables:

- DP04QSDD-E26-A1
- GLC-TE
- ONS-QSFP-OTDR
- DP01QSDD-ZT5-A1
- ONS-SC-PTP-1510
- DP04QSDD-E30-440
- DP04QSDD-E30-441

NCS1K4-2-QDD-C-K9 Line Card Pluggables

The NCS1K4-2-QDD-C-K9 card provides six QSFP-DD client ports. These ports support 100GE, 400GE, and OTU4 traffic. Because QSFP-DD is backward compatible, the ports can also support standard QSFP28 optics for 100G services.

The NCS1K4-2-QDD-C-K9 line card supports the following pluggables:

PSM optics:

- ONS-QSFP-PSM2

400G Client Optics (QSFP-DD)

- QDD-400G-FR4-S
- QDD-400G-DR4-S

- QDD-400-AOCxM
- QDD-400G-LR4-S

100G Client Optics (QSFP-DD / QSFP28)

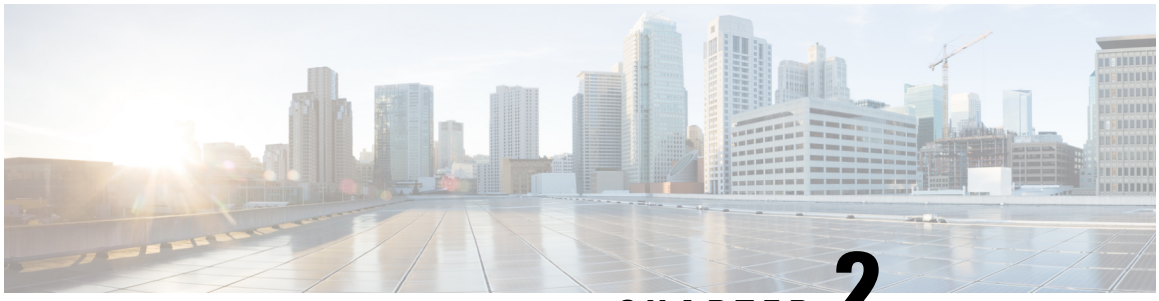
- QDD-4x100G-LR-S
- QDD-4x100G-FR-S
- QSFP-100G-SR4-S
- QSFP-100G-LR4-S
- QSFP-100G-CWDM4-S

OXP2-K9 Line Card Pluggables

The OXP2-K9 line card supports the following pluggables:

Table 44: OXP2-K9 Line Card Pluggables

Client Pluggables	Trunk Pluggables
• OSFP-800G-VR8 • OSFP-800G-DR8	• DP08SFP8-ZRB-A2



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 NCS 1014 Series*.

- Standard Warning Statements, on page 47
- General Safety Guidelines for Personal Safety and Equipment Protection, on page 49
- Safety Precaution for Module Installation and Removal, on page 49
- Safety with Electricity, on page 50
- Power Connection Guidelines , on page 51
- Personal Safety Guidelines for Rack Mounting, on page 52
- Safety Precaution for Laser Radiation, on page 52
- Prevent Electrostatic Discharge Damage , on page 53
- Network Equipment-Building System (NEBS) Statements, on page 54

Standard Warning Statements

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.

Statement 1015

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 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 9001—Product Disposal

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

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.

General Safety Guidelines for Personal Safety and Equipment Protection

Follow these safety guidelines:

- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always unplug power cables when performing maintenance or working on the chassis, unless the replacement part is hot swappable and designed for online insertion and removal (OIR).
- Keep the work area clear and dust free during and after installation.
- Keep tools and chassis components away from walkways and equipment rack aisles.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the equipment.
- Fasten your tie or scarf and sleeves.
- Operate Cisco equipment safely by using it in accordance with its electrical ratings and product usage instructions.
- Do not work alone if potentially hazardous conditions exist.
- Ensure that the installation of the router is in compliance with national and local electrical codes: in the United States, National Fire Protection Association (NFPA) 70, United States National Electrical Code; in Canada, Canadian Electrical Code, part I, CSA C22.1; in other countries, International Electrotechnical Commission (IEC) 364, part 1 through part 7.

Safety Precaution for Module Installation and Removal

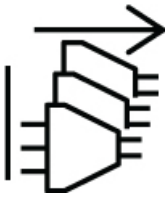
Ensure to observe the following safety precautions when you are working with the chassis modules.

Warning **Statement 1091—**Installation by an Instructed Person or Skilled 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 person or skilled person.

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.



Safety with Electricity

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 60 A for 2 KW DC power supply and 90 A for 2.5 KW DC power supply.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

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 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.

Power Connection Guidelines

Check the power at your site to ensure you are receiving clean power (free of spikes and noise).

Ensure to observe the following safety guidelines while connecting the device power supplies.



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.

Personal Safety Guidelines for Rack Mounting



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 Laser Radiation

Cisco NCS 1014 is classified as Hazard Level 1M as per IEC 60825-2 and Laser Class 1/1M as per IEC 60825-1, since it may include Class 1 or Class 1M Laser sources.

Figure 25: Class 1M Laser Product Label



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.



Prevent Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD may occur when electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. When removing and replacing modules, always follow these ESD prevention procedures:

- Ensure that the device chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact.
- Handle components by only their handles or edges; do not touch the printed circuit boards or connectors.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.

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 Cisco NCS 1014:



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:

RJ-45 Copper Ethernet Port



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:

RJ-45 Copper Ethernet Port



Warning **Statement 7011—**Surge Protection Device Requirements for GR-1089 Antenna Ports

Protect equipment antenna ports, that are classified as Type 6 according to GR-1089-CORE, with lightning surge protectors that are rated at a minimum of 600 V peak surge of 1.2/50 uS duration.

Connecting a Cable to the GNSS Antenna Interface

- GNSS modules have built-in ESD protections on all pins, including the RF-input pin. However, additional surge protection is required if an outdoor antenna is being connected. The Lightning Protector must be able to provide a low clamping voltage (less than 600V).
- A lightning protection must be mounted at the place where the antenna cable enters the building. The primary lightning protection must be capable of conducting all potentially dangerous electrical energy to PE (Protective Earth).
- Surge arrestors should support DC-pass and suitable for the GPS frequency range (1.575GHz) with low attenuation.

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 8015—**Installation Location Network Telecommunications Facilities

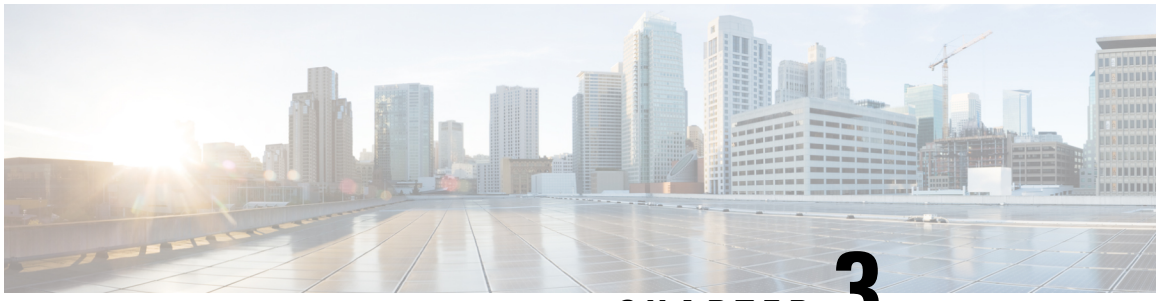
This equipment is suitable for installation in network telecommunications facilities.

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

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

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.



CHAPTER 3

Prepare to Install Cisco NCS 1014

This chapter explains how to prepare for the Cisco NCS 1014 installation.

- Shipping and Receiving, on page 57
- Shipping and Receiving of NCS 1014-2 Chassis, on page 64
- Unpack and Verify the Cisco NCS 1014 Chassis, on page 66

Shipping and Receiving

You can order the Cisco NCS 1014 as an assembled chassis (NCS1K14-SYS) along with the components. You can order the spare modules as well. See PIDs for all PIDs of the NCS 1014 components.

The shipped package contains the following:

- Cisco NCS 1014 chassis. See Assembled Chassis.
- Accessory kit (53-100873-02) that has all the installation hardware.

Note From R24.4.1, you can order the NCS1K14-S-KIT accessory kit for 19-inch racks that are up to 40-inch in depth.

Note The **NCS1K14-ACC-KIT=** is the orderable spare kit for the standard accessory components originally shipped with the NCS 1014 chassis. Order this spare kit only if the components in the original kit are misplaced.

Table 45: Accessory Kit Contents

Accessory Kit	Contents
NCS1K14-ACC-KIT (53-100873-02)	This kit has the following items for chassis installation: • Double hole 90-degree ground lug for chassis (1x). **Note** We recommend that you use the 90-degree ground lug for NCS 1014. • Double hole straight ground lug for chassis (1x) • M4 Phillips flat-head mounting screws for mounting brackets (12x) • M5 pan-head screws for ground lug (2x) • External tooth lock washers for ground lug (2x) • 12–24 pan head mounting screws for slide rails (24x) • Left mounting bracket for chassis (1x) • Right mounting bracket for chassis (1x) • 23" rack to 19" rack adapters (4x) • ETSI rack to 19" rack adapters (4x) • Two-post left slide rail (1x) • Two-post right slide rail (1x) • Four-post left slide rail (1x) • Four-post right slide rail (1x)
NCS1K14-S-KIT	This kit has the following items for chassis installation: • Four-post (30-40") left slider rail (1x) • Four-post (30-40") right slider rail (1x) • Fiber management bracket for power cable (1x) • Double hole straight ground lug for slider rail (1x) • External tooth lock washers for ground lug (2x) • Hex lock nuts for ground lug (2x) • M3 Phillips flat-head mounting screws for fiber manager bracket (4x) • 12–24 pan head mounting screws for slide rails (24x)

• Spare Serial Number label.

- Two PSUs—AC or DC. Installation of PSUs is discussed in the Install Cisco NCS 1014 Modules, on page 91 chapter.
- AC and DC power cables that you have ordered.

  AC chassis—while ordering for an AC chassis, select the power cable type (straight, 90-degree, or jumper) and P1 connector (NEMA or CEE). Based on your choice, you will get a pair of 90 degree, straight, or jumper cables with NEMA or CEE connector for each PSU.

Table 46: Power Cables for the AC Chassis

Type of Cable	Voltage	P1 Connector	P2 Connector	PID	Specs	Cable Length (m)
Straight cable	240 V	NEMA L6-20P	IEC 60320 – C21	NCS1K4-AC-PSU-CBL=	16 A, 250 V	4.250
	240 V	CEE 7/7 (Europe)	IEC 60320 – C21	NCS1K4-AC-CBL-EU=	16 A, 250 V	4.250
90-degree cable	240 V	CEE 7/7 (Europe)	IEC 60320 – C21	NCS1K4-AC-CBL-EU=	16 A, 250 V	4.250
	240 V	NEMA L6-20P	IEC 60320 – C21	NCS1K4-AC-PSU-CBL	16 A, 250 V	4.250
Straight jumper	240 V	IEC 60320 – C14	IEC 60320 – C21	NCS1K4-CBL-4.25M=	15 A, 250 V	4.250 (North America use only)
	240 V	IEC 60320 – C14	IEC 60320 – C21	NCS1K4-C21-C14-2M=	15 A, 250 V	2 (North America use only)
Straight jumper	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-5F-NA=	16 A, 250 V	1.6 (North America)
	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-5F-EU=	16 A, 250 V	1.6 EU)
	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-5F-IN=	16 A, 250 V	1.6 (India)
Straight jumper	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-4M-NA=	16 A, 250 V	4.25 (North America)
	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-4M-EU=	16 A, 250 V	4.25 (EU)
	240 V	IEC 60320 – C20	IEC 60320 – C21	N1K4-C2021-4M-IN=	16 A, 250 V	4.25 (India)

Figure 26: 90-degree Cable (CEE 7/7)

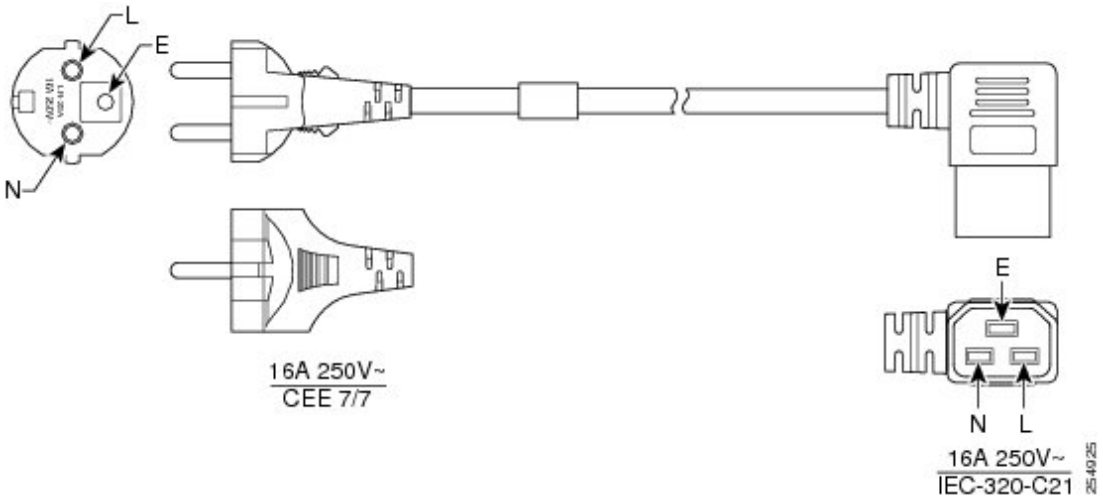


Figure 27: 90-degree Cable (NEMA L6-20P)

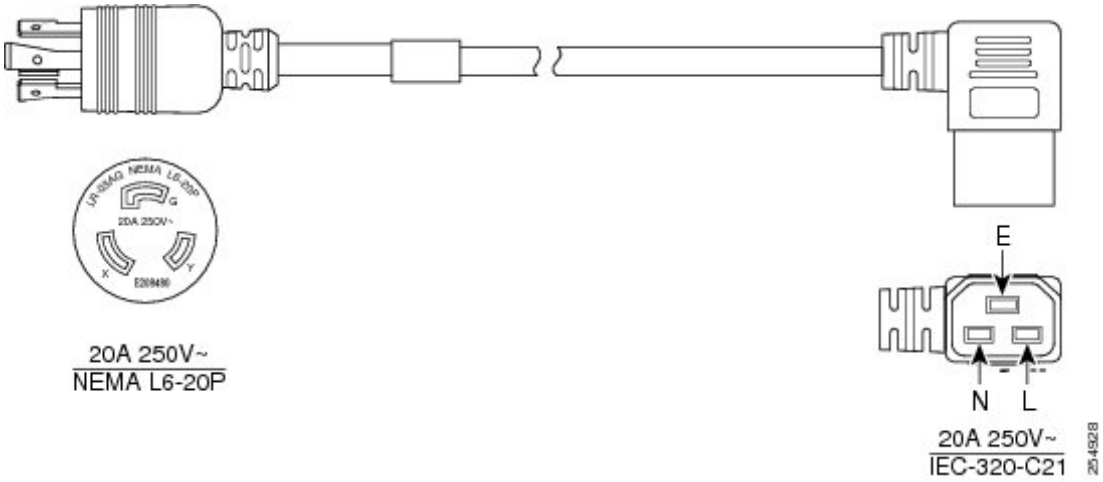


Figure 28: Straight Cable (NEMA L6-20P)

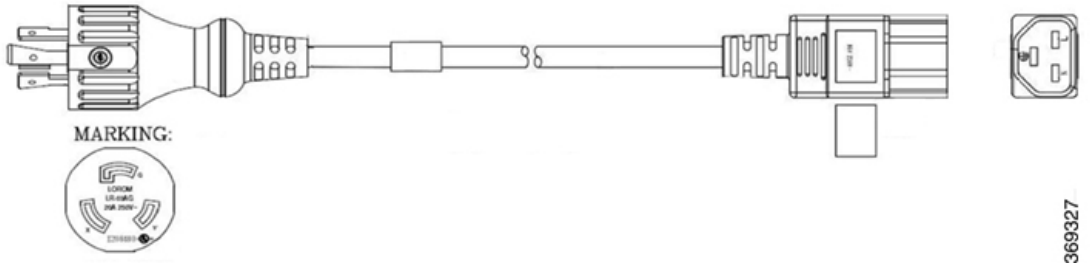
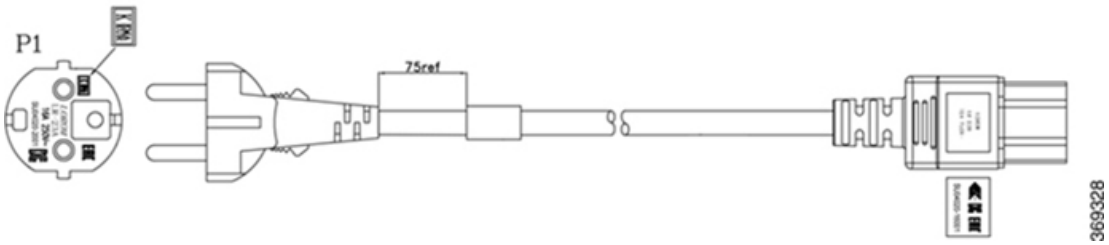


Figure 29: Straight Cable (CEE 7/7)



DC chassis—when you order for a DC chassis, you get four power lugs for each PSU (a pair of 90-degree and a pair of 180-degree lugs). The power lugs are included in the DC PSU package for spare-order. For Assemble-to-order, the power lugs are included in the Accessory kit.

Important We recommend that you use the 180-degree power lugs for ETSI racks to maintain a footprint of 600 mm. Ensure that there is a minimum gap of 50 mm for routing the cables.

Figure 30: DC Power Cable Lug (180-degree)

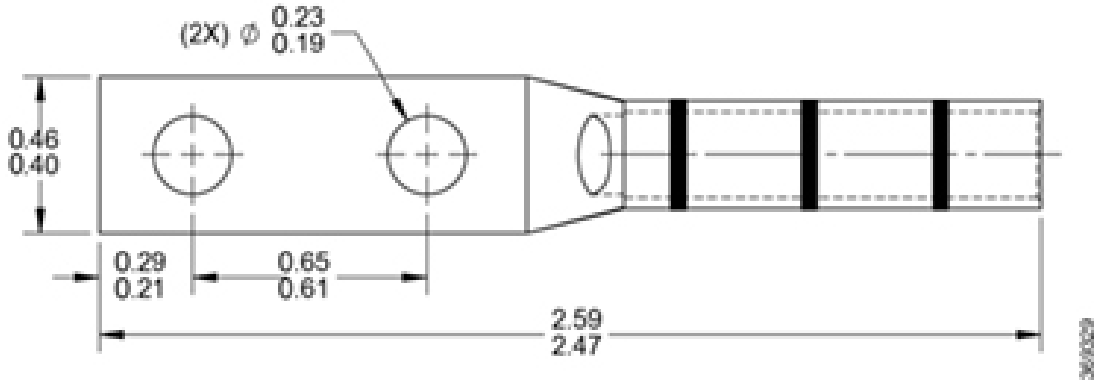
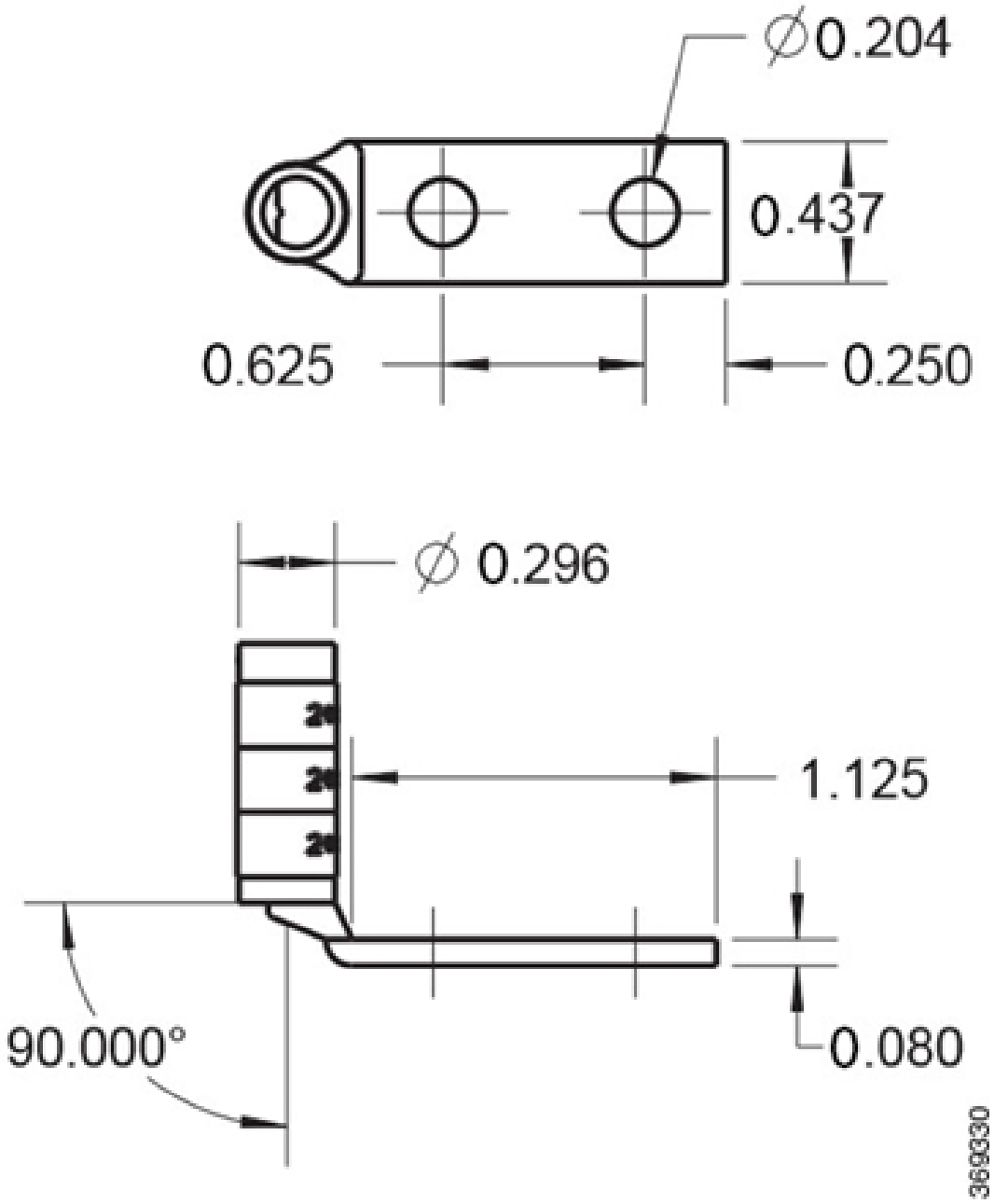


Figure 31: DC Power Cable Lug (90-degree)



Assembled Chassis

The chassis is shipped in one of the following ways:

- **Chassis with Filler Cards and Line Cards**

  You will receive the chassis with preinstalled line cards, based on the number of line cards that you have ordered, and filler cards in the rest of the card slots. If you have preordered four line cards, then the

chassis does not contain any filler cards. Four fiber management brackets come in the package, for each of the line card or filler cards preinstalled in the chassis. The controller, SSD, and three fan modules are also preinstalled. The chassis package includes only the accessory kit and PSUs.

Figure 32: Chassis Shipped with Line Cards



- **Chassis with Only Filler Cards**

  You will receive the chassis with four filler cards in the card slots. The chassis package includes four fiber management brackets, one bracket for each of the filler cards. If you order one or more line cards as spare items, you will receive each of them separately, with an extra fiber management bracket in each package. The controller, SSD, and three fan modules are preinstalled. The chassis package includes only the accessory kit and PSUs. You must order the line cards separately.

Shipping and Receiving for Bundle options

From R25.4.1, you can order the Cisco NCS 1014 EDFA2 card (NCS1K14-EDFA2) along with its mux/demux patch panels and pluggable modules as a bundle. For more information on NCS 1014 EDFA2 PIDs, see PIDs.

Table 47: Accessory Kit Contents

Accessory Kit	Contents
NCS1K14-MOLS-SK	This EDFA2 bundle has the following items for installation: • NCS1K14-EDFA2 (1x) • ONS-QSFP-OTDR (1x) • ONS-SC-PTP-1510 (1x) • NCS1K-MD-32O-CE (1x) • NCS1K-MD-32E-CE (1x) • DP04QSDD-E26-A1 (1x)

Shipping and Receiving of NCS 1014-2 Chassis

You can order the Cisco NCS 1014-2 as an assembled chassis (NCS1K14-2SYS) that has one or two OXP2-K9 cards installed, or as as an ATO chassis filled with filler cards and a removable divider, along with the OXP card. You can order the spare modules as well. See PIDs for all PIDs of the NCS 1014-2 components.

The shipped package contains the following:

- Assembled Chassis
  - Cisco NCS 1014-2 chassis.
  - Accessory kit (53-100873-02) that has all the installation hardware.

Note You can order the NCS1K14-S-KIT accessory kit for 19-inch racks that are up to 40-inch in depth.

Note The **NCS1K14-ACC-KIT=** is the orderable spare kit for the standard accessory components originally shipped with the NCS 1014 chassis. Order this spare kit only if the components in the original kit are misplaced.

- ATO chassis with OXP2-K9 line card
  - Cisco NCS 1014-2 chassis with filler and divider
  - OXP2-K9 line card
  - Accessory kit (53-100873-02) that has all the installation hardware.

Note You can order the NCS1K14-S-KIT accessory kit for 19-inch racks that are up to 40-inch in depth.

The **NCS1K14-ACC-KIT=** is the orderable spare kit for the standard accessory components originally shipped with the NCS 1014 chassis. Order this spare kit only if the components in the original kit are misplaced.

Table 48: Accessory Kit Contents

Accessory Kit	Contents

NCS1K14-ACC-KIT
(53-100873-02)
	This kit has the following items for chassis installation:
	• Double hole 90-degree ground lug for chassis (1x).
	Note We recommend that you use the 90-degree ground lug for NCS 1014.
	• Double hole straight ground lug for chassis (1x)
	• M4 Phillips flat-head mounting screws for mounting brackets (12x)
	• M5 pan-head screws for ground lug (2x)
	• External tooth lock washers for ground lug (2x)
	• 12–24 pan head mounting screws for slide rails (24x)
	• Left mounting bracket for chassis (1x)
	• Right mounting bracket for chassis (1x)
	• 23" rack to 19" rack adapters (4x)
	• ETSI rack to 19" rack adapters (4x)
	• Divider (For the ATO chassis)
	• Slide rails
	  • Two-post left slide rail (1x)
	  • Two-post right slide rail (1x)
	  • Four-post left slide rail (1x)
	  • Four-post right slide rail (1x)

NCS1K14-S-KIT	This kit has the following items for chassis installation: • Four-post (30-40") left slider rail (1x) • Four-post (30-40") right slider rail (1x) • Fiber management bracket for power cable (1x) • Double hole straight ground lug for slider rail (1x) • External tooth lock washers for ground lug (2x) • Hex lock nuts for ground lug (2x) • M3 Phillips flat-head mounting screws for fiber manager bracket (4x) • 12–24 pan head mounting screws for slide rails (24x)

Table 49: OXP2-K9 line card

Line card package	Contents
OXP2-K9 line card	• Line card • Hooks (2x)

Table 50: Power Cables for the AC Chassis with NCS1K14-AC-PSU-3

Type of Cable	Voltage	P1 Connector	P2 Connector	PID	Specs	Cable Length (m)
Straight jumper	240 V	NEMA L6-20P	IEC 60320 – C21	NCS1K4-C20SA-CBL	20 A, 250 V	4.250 (North America and Europe use only)
	240 V	SAF-D-GRID	IEC 60320 – C20	N1K4-C20SA-R-IN(=)	20 A, 250 V	1.6 (India use only)
	240 V	SAF-D-GRID	IEC 60320 – C20	N1K4-C20SA-B-IN(=)	20 A, 250 V	1.6 (India use only)
	240 V	SAF-D-GRID	IEC 60320 – C20	CAB-AC-20A-SG-C20	20 A, 250 V	4.250
Straight cable	240 V	NEMA 6-20P	SAF-D-GRID	CAB-AC-20A-SG-US2	20 A, 250 V	4.250
	240 V	NEMA L6-20P	SAF-D-GRID	CAB-AC-20A-SG-US3	20A, 250 V	4.250
	240 V	SABS 164-1	SAF-D-GRID	CAB-AC-16A-SG-IND	20A, 250 V	4.250
	240 V	CEE 7-7	SAF-D-GRID	CAB-AC-16A-SG-EU	20A, 250 V	4.250

Unpack and Verify the Cisco NCS 1014 Chassis

Use this procedure to unpack the shipment and verify that you have all the chassis modules that are required for installation.

Procedure

Step 1 When you receive the Cisco NCS 1014 equipment at the installation site, open the top of the box.

Step 2 Remove accessories and foam inserts from the box. The box contains Cisco NCS 1014 chassis and other items that are needed for installation.

Step 3 To remove the chassis from the packaging, grasp the side of the chassis and lift it out of the box.

Use these lifting guidelines to avoid injury to yourself or damage to the equipment:

- Do not lift equipment alone. Have another person help you to lift the equipment.

  A fully loaded chassis can weigh as much as 28.7 kg (63.3 lbs).

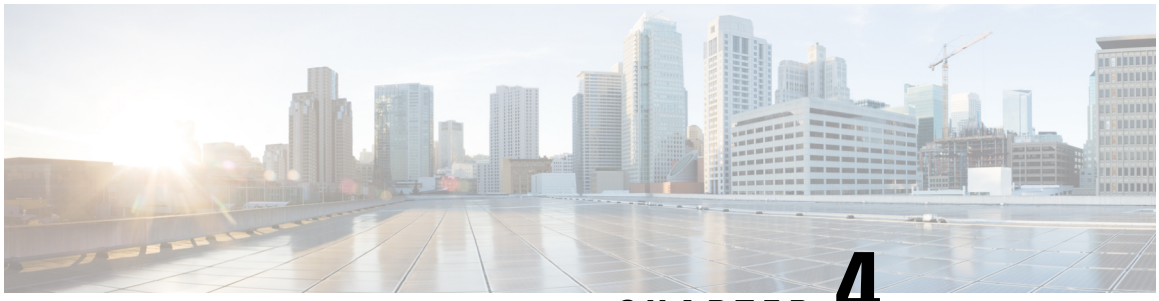
- Ensure that your footing is solid; balance the weight of the object between your feet.
- Lift the equipment slowly; never move suddenly or twist your body as you lift.

- Keep your back straight and lift with your legs, not your back. When bending down to lift equipment, bend at the knees (not at the waist), to reduce the strain on your lower back muscles.

Step 4 Verify the following:

- The Cisco NCS 1014 chassis is undamaged. Check the chassis for scratches, bends, discolorations, or deformations.
- The other modules that are shipped with the chassis or separately are undamaged.

Step 5 If you notice any damage to the chassis or the modules, call your Cisco sales engineer for a replacement.



CHAPTER 4

Install the Cisco NCS 1014 Chassis

This chapter contains procedures to install the Cisco NCS 1014 chassis.

- Rack Compatibility, on page 69
- Install the Cisco NCS 1014 or NCS 1014-2 Chassis on an EIA/ANSI/ETSI Rack, on page 71
- General Power and Grounding Requirements, on page 85
- Attach the Fiber Management Bracket to the Slider Rail, on page 88

Rack Compatibility

This section provides rack compatibility details for the Cisco NCS 1014.

Figure 33: 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 34: Four Post Rack Type

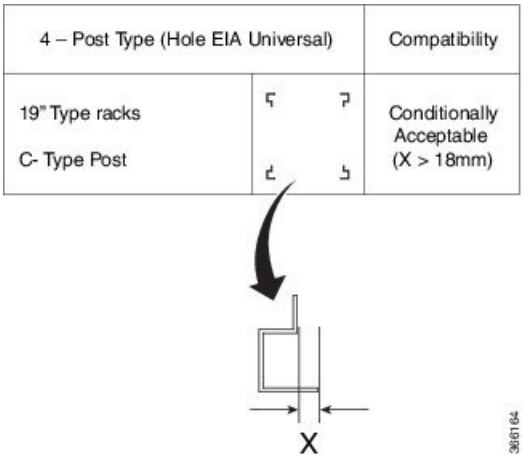


Figure 35: Two Post Rack Type

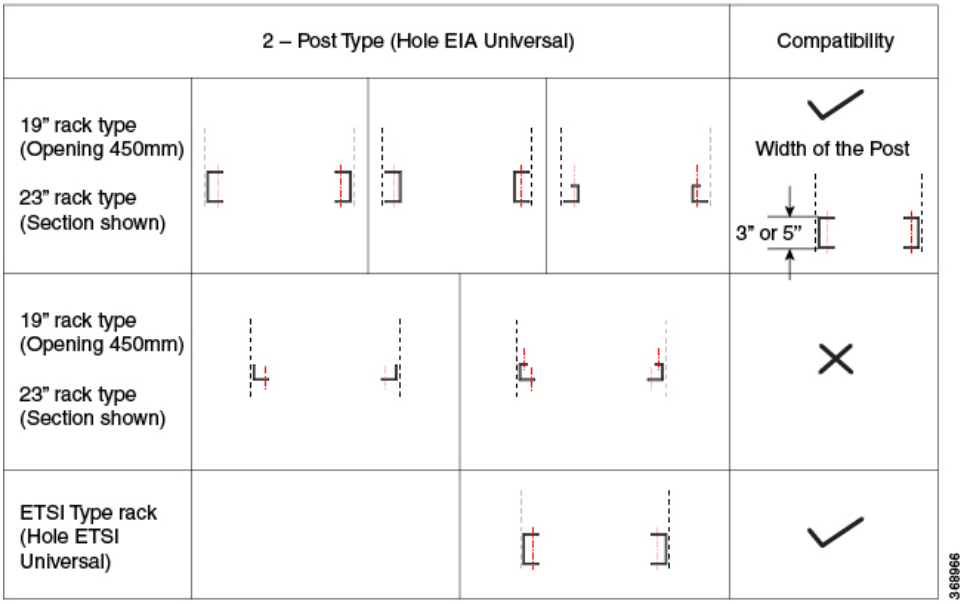
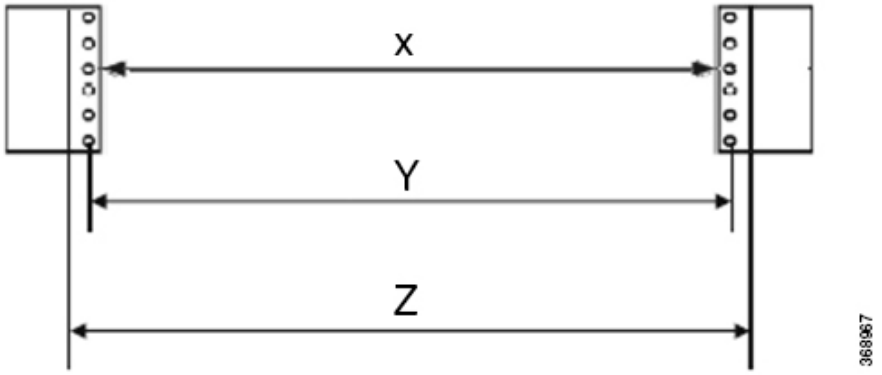


Figure 36: Rack Specification



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")
ETSI racks	500.0mm(19.68")	515.0mm(20.276")	533.4mm(21")

Note The distance between the front and the rear post in a four post rack is 427 mm (closed position) and 707 mm (open position).

Install the Cisco NCS 1014 or NCS 1014-2 Chassis on an EIA/ANSI/ETSI Rack

Use this procedure to mount the Cisco NCS 1014 chassis or NCS 1014-2 on an EIA/ANSI/ETSI rack.

Warning

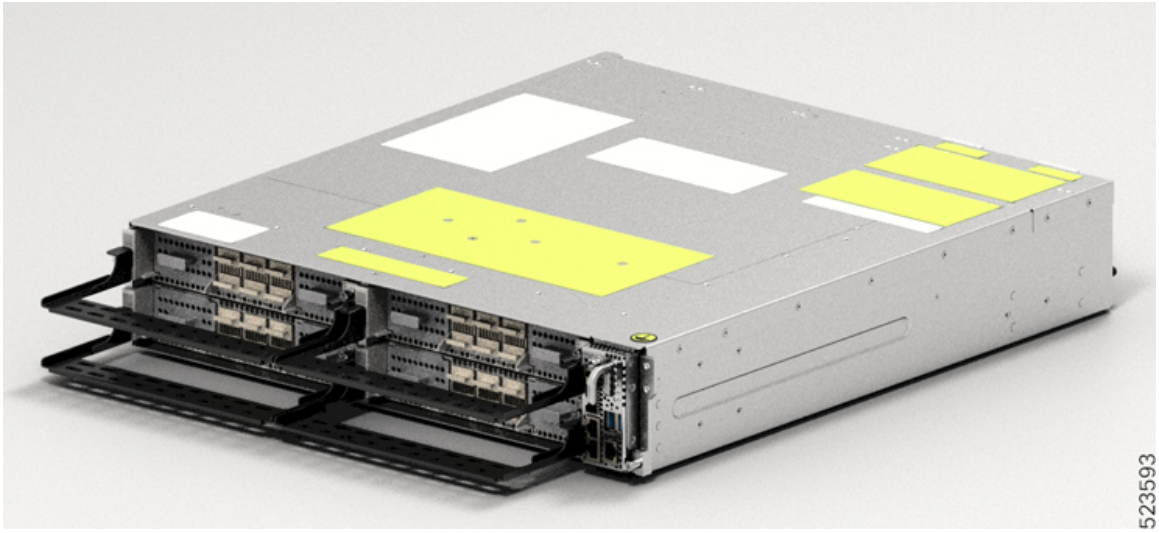
Rack Mount Instructions

The following or similar rack-mount instructions are included with the installation instructions:

- Elevated Operating Ambient: If installed in a closed or multirack assembly, the operating temperature of the rack environment may be greater than room temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified.
- Reduced Air Flow: Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading: Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing: Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

It is mandatory to fix the fiber management brackets for all the cards in the chassis before you install the Cisco NCS 1014 chassis onto the rack. See Attach Fiber Management Bracket section for the detailed procedure.

Figure 37: Line Cards fitted with Fiber Management Bracket



Note In ETSI racks, to maintain a footprint of 600 mm, do not install the cabinet door and maintain the horizontal bar of the fiber management bracket at the shortest length. See Adjusting the Fiber Management Bracket.

Caution Use the sliding rail only for first chassis positioning. You must fix the chassis with screws on the front side.

Caution Use only the fastening hardware provided with Cisco NCS 1014 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Before you begin

Ensure that the rack is compatible. See the Rack Compatibility, on page 69 section.

If you are installing an NCS 1014-2 that has four single slot fillers and a divider, remove the fillers as described in Install the Line Card, on page 101and remove the divider as described in Remove the divider from the NCS 1014-2 chassis, on page 123.

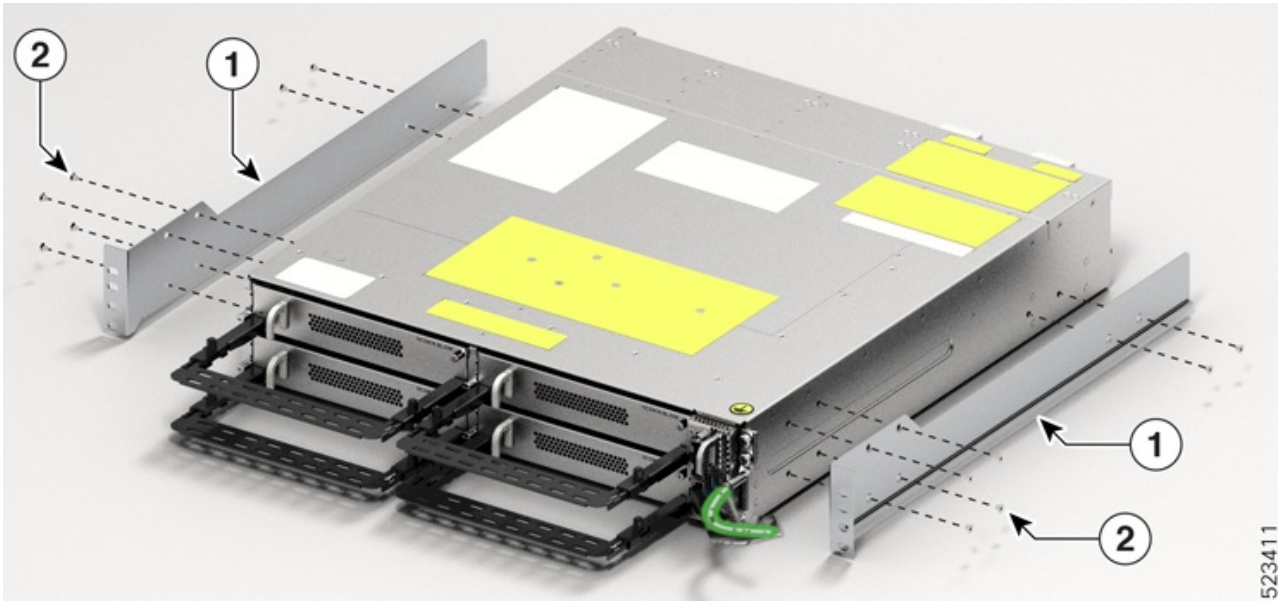
If you are installing an NCS 1014-2 chassis that has preinstalled OXP2-K9 line card, remove the card and the filler as described in Remove and replace OXP2-K9 line card, on page 124 to reduce the weight of the chassis before installation.

Procedure

Step 1 Attach the left and right mounting brackets to the chassis using the M4 Phillips flat-head mounting screws for mounting brackets (48-2029-01) and tighten them to torque value of 1.5 N-m (13.3 lbs-in).

The left and right brackets are marked accordingly.

Figure 38: Fixing the Brackets



Callout	Component
1	M4 Phillips flat-head mounting screws for mounting brackets (48-2029-01)
2	Right Bracket (700-116388-01) and Left Bracket (700-116386-01)

Step 2 Install the four post slider or two post slider on the rack.

a) Install Two Post Slider into an EIA/ ANSI Rack
b) Install Four Post Slider into an EIA/ ANSI Rack
c) Install Two Post Slider into an ETSI Rack
d) Install Four Post Slider into an ETSI Rack

Step 3 Insert the chassis (with brackets) onto the sliders assembled on the rack.

Step 4 After completely inserting the chassis, fasten it with four 12–24 Pan head mounting screws (48-101524-01) on each side of the bracket.

See Install the Air Filter, on page 115 for the air filter installation procedure, before you fasten the chassis to the rack.

Step 5 Using a number-2 Phillips screwdriver, tighten the screws to a torque value of 4.65 N-m (41 lbs-in).

Install the Two Post Slider into an EIA/ANSI Rack

Use this procedure to install the two post slider into an EIA/ANSI rack.

Before you begin

Tools required:

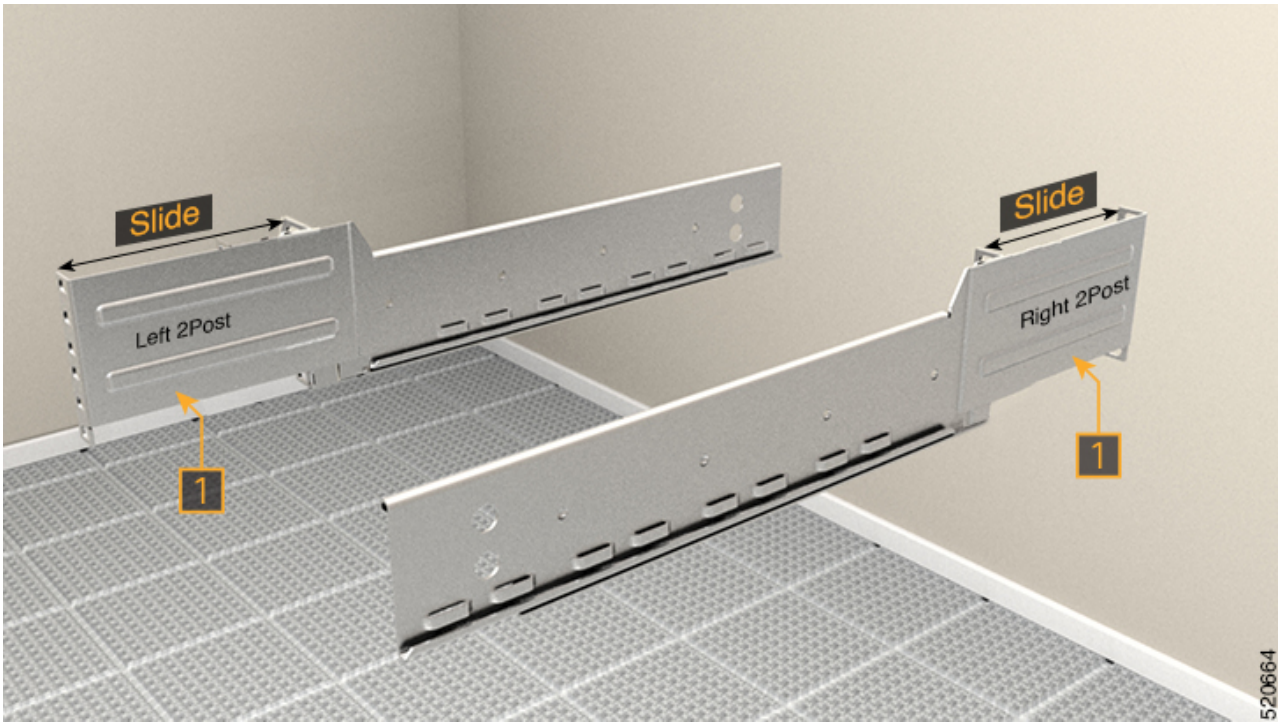
- Customer-supplied screwdriver
- Two-post left slide rail (800-48743-01)
- Two-post right slide rail (800-48744-01)
- 23" rack to 19" rack adapter (700-116871-01)
- 12–24 Pan head mounting screw for slide rails (48-101524-01)

Procedure

Step 1 Identify the two post slider and adjust the length of the slider (3" to 5").

Slide the inner sliders and adjust the length to mate with the rack surface.

Figure 39: Two Post Slider Identification

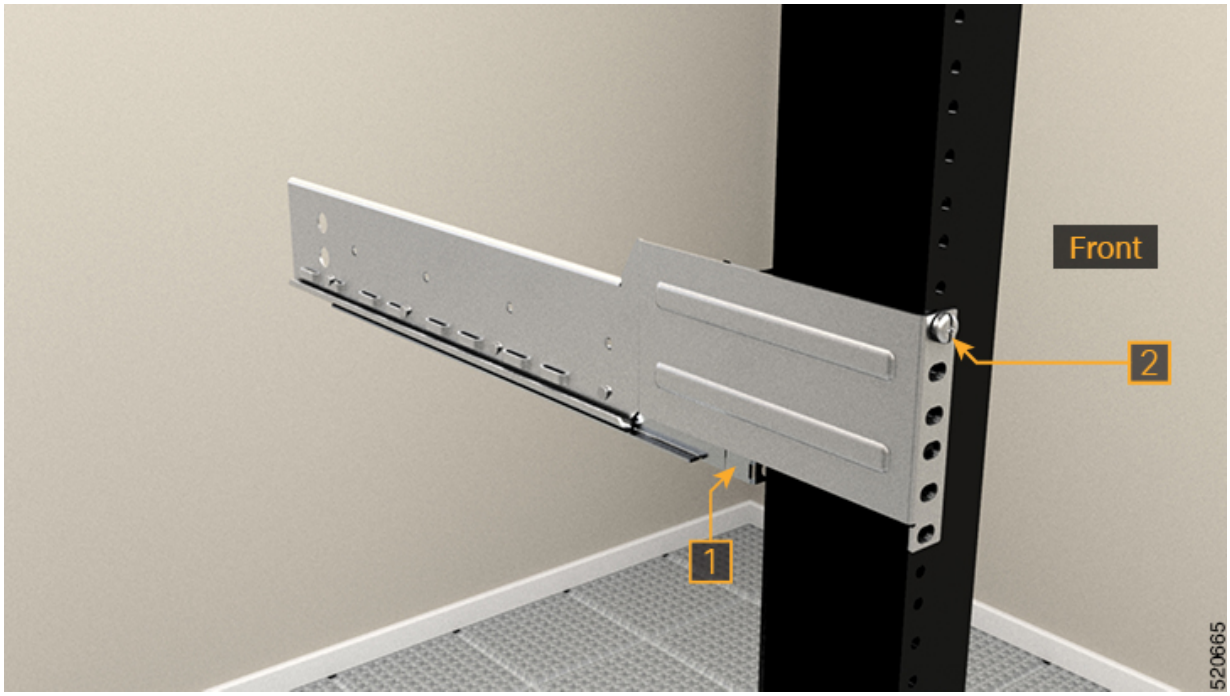


1	Two-post left slide rail (800-48743-01) Two-post right slide rail (800-48744-01) Check for marking on the sliders; the markings indicate the right and the left sliders.

Step 2 Integrate the two post slider with the rack. Perform one of the following actions:

- For the 19" rack, you can directly fit the slider on to the rack. Perform the following steps:
  - **a.** On the front side, insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01) at the top-most screw hole of the slider.
  - **b.** Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).
  - **c.** Similarly, on the rear side, insert three 12–24 Pan head mounting screws for slide rails (48-101524-01) and tighten them to torque value of 4.65 N-m (41 lbs-in).

Figure 40: Two Post Slider Integration in the 19" Rack



1	Inner surface of the sliding bracket.
2	12–24 Pan head mounting screw for slide rails (48-101524-01)

- For the 23" rack, you can fit the slider on to the rack using an adapter. Perform the following steps: (refer the following image).

  The formed surface must always face the inner side of the rack post.

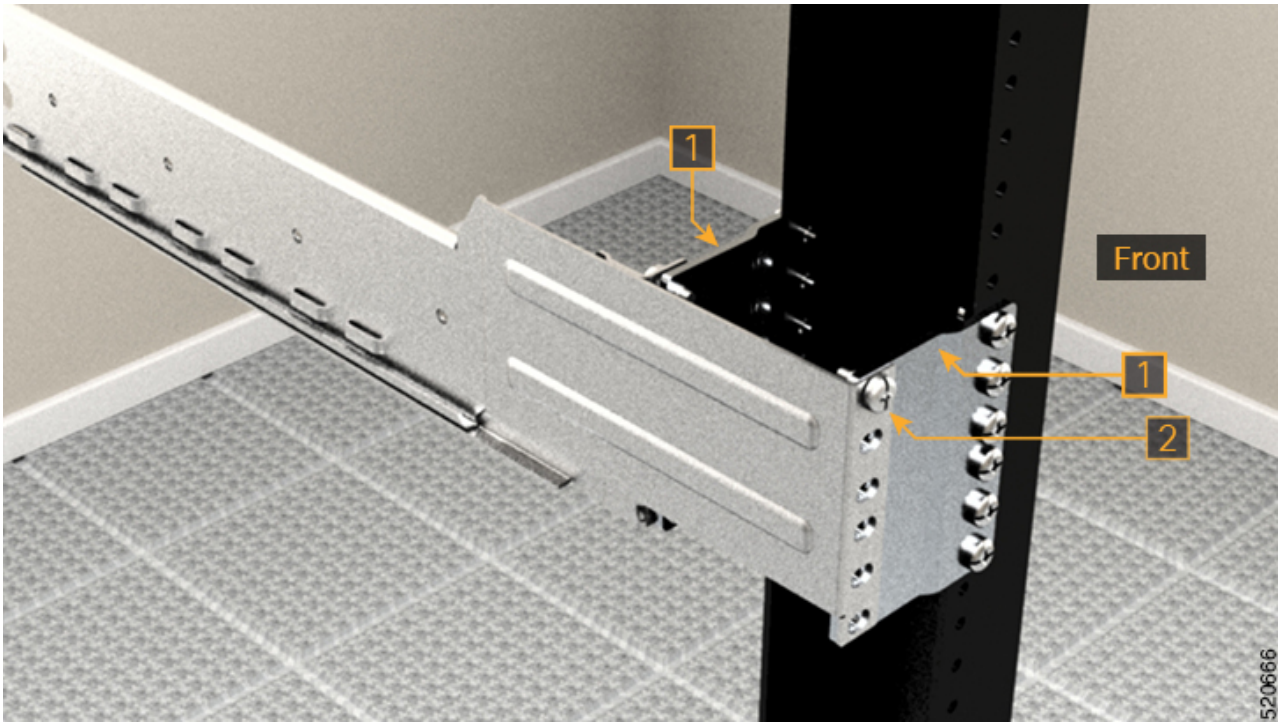
  a. Towards the chassis on the front side of the 23" rack to 19" rack adapter (700-116871-01), at the top-most screw hole of the slider, insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01).

  b. Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).

  c. Similarly, on the rear side towards the chassis, insert three 12–24 Pan head mounting screw for slide rails (48-101524-01) and tighten them to a torque value of 4.65 N-m (41 lbs-in).

  For the adapter portion which is towards the rack, you must fit all the six screws on the front and rear side.

Figure 41: Two Post Slider Integration in the 23" Rack



1	23" rack to 19" rack adapter (700-116871-01)
2	12–24 Pan head mounting screw for slide rails (48-101524-01)

Install the Four Post Slider into an EIA/ANSI Rack

Use this procedure to install the four post slider into an EIA/ANSI rack.

Before you begin

Tools required:

- Customer-supplied screwdriver
- 12–24 Pan head mounting screw for slide rails (48-101524-01)
- Four-post right slide rail (800-48786-01) and four-post left slide rail (800-48787-01)

  Or

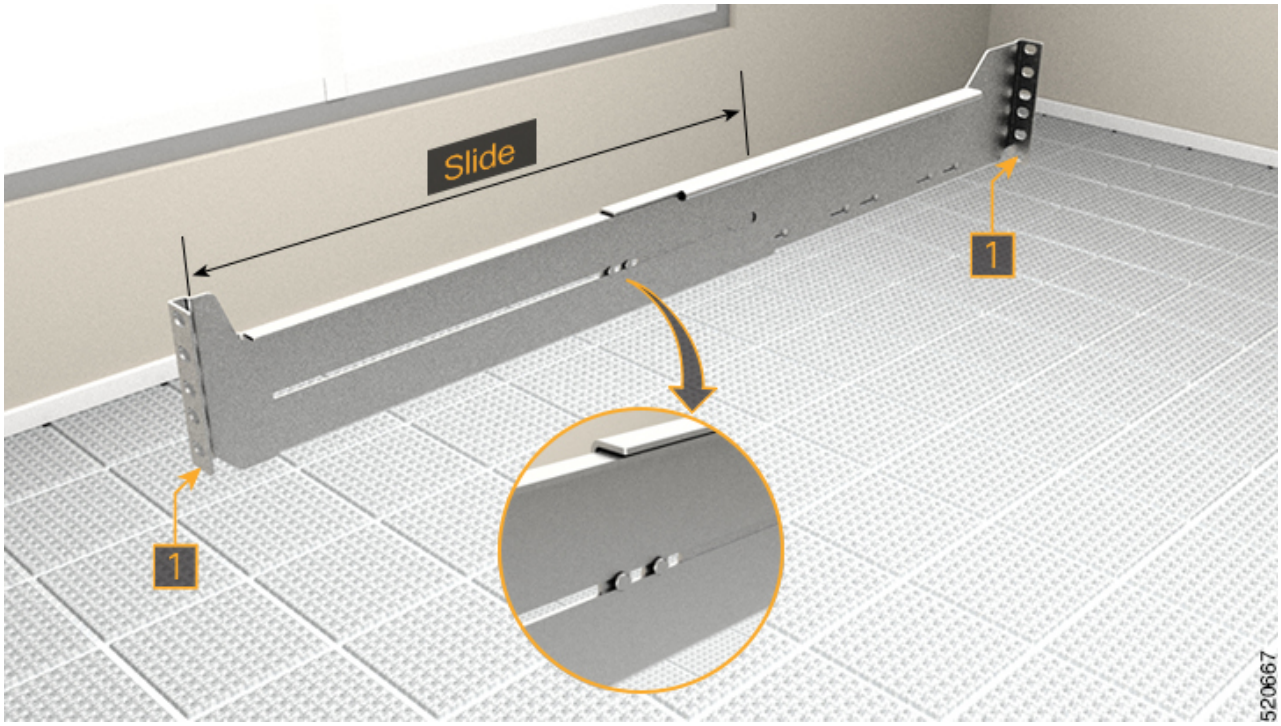
  Four-post (30-40") left slide rail (800-51869-01) and four-post (30-40") left slide rail (800-51870-01)
- 23" rack to 19" rack adapters (700-116871-01). These adapters are applicable only for four-post right slide rail (800-48786-01) and four-post left slide rail (800-48787-01).

Procedure

Step 1 Identify the four post slider and adjust the length of the slider.

Slide the inner slider arm and adjust the length to mate with the rack surface.

Figure 42: Four Post Slider Identification



1	Four-post right slide rail (800-48786-01) Slide and adjust the length of the slider arm.

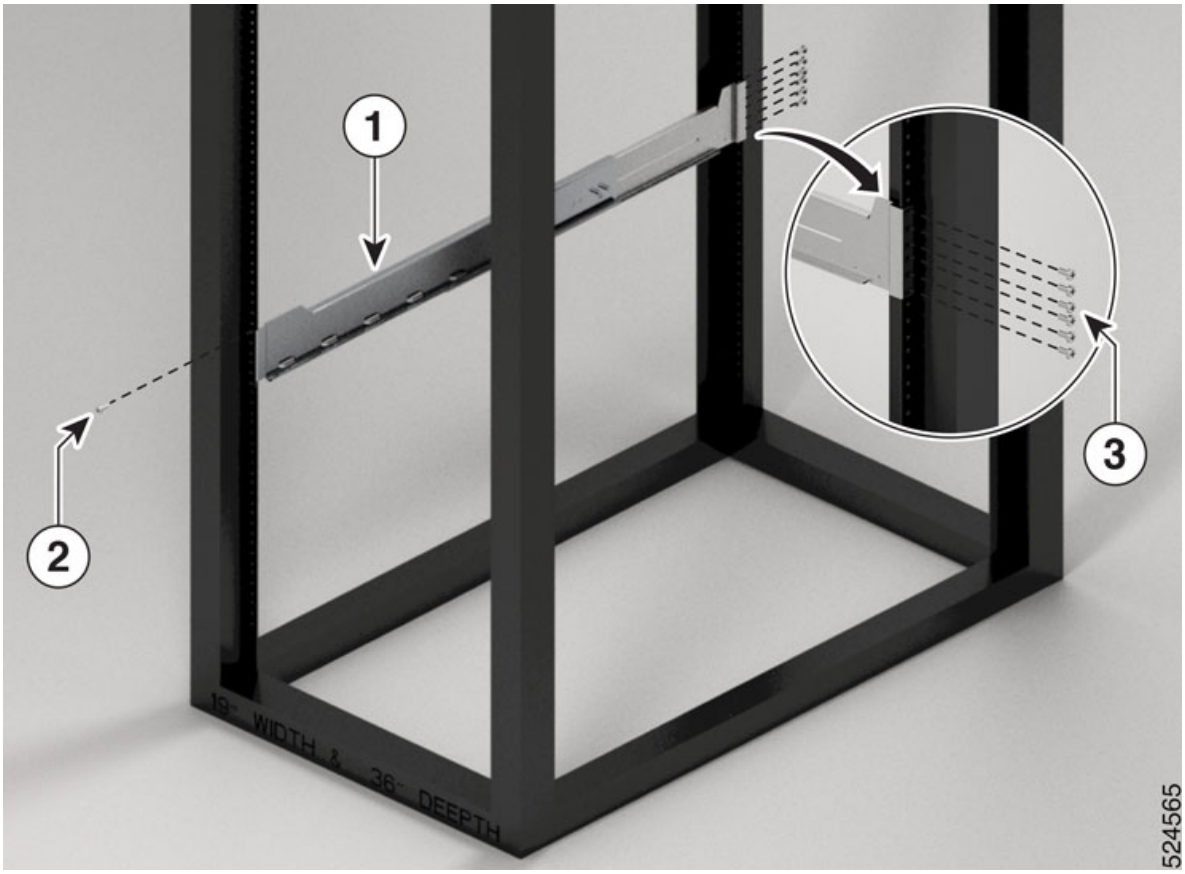
Step 2 Integrate the four post slider with the rack. Perform one of the following actions:

- For the 19" rack, you can directly fit the slider on to the rack. Perform the following steps:
  - **a.** On the front side, insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01) at the top-most screw hole of the slider.
  - **b.** Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).
  - **c.** Similarly, on the rear side, insert five 12–24 Pan head mounting screws for slide rails (48-101524-01) and tighten them to torque value of 4.65 N-m (41 lbs-in).

Figure 43: Four Post Slider Integration in the 19" Rack



Figure 44: Four Post 30-40" Slider Integration in the 19" Rack



1	Four-post (30-40") left slide rail (800-51869-01)	3	12–24 Pan head mounting screws for slide rails (48-101524-01)
2	12–24 Pan head mounting screws for slide rails (48-101524-01)		

- For the 23" rack, you can fit the slider on to the rack using an adapter. Perform the following steps: (refer the following image).

Note
These steps are applicable only for four-post right slide rail (800-48786-01) and four-post left slide rail (800-48787-01).

The formed surface must always face the inner side of the rack post.

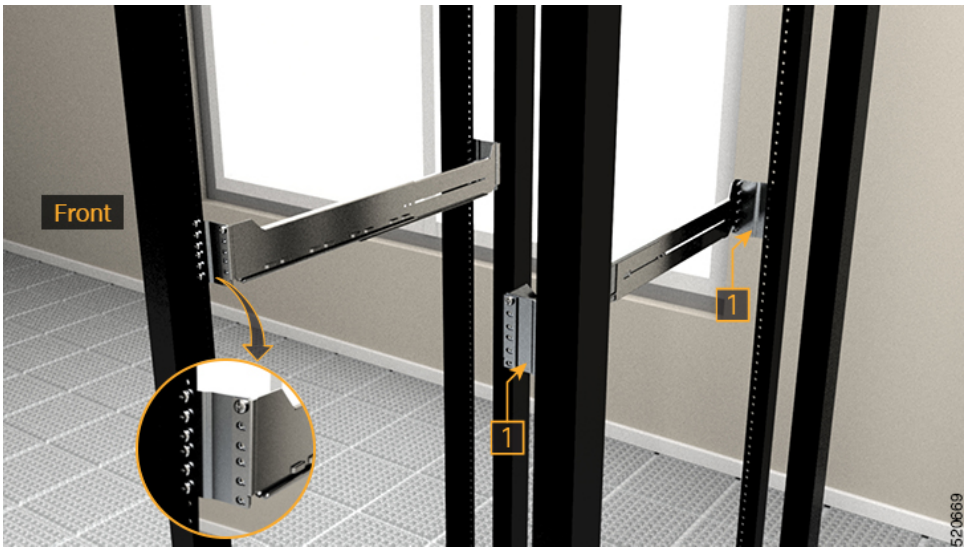
a. Towards the chassis, on the front side of the 23" rack to 19" rack adapter (700-116871-01), insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01) at the top-most screw hole of the slider.

b. Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).

c. Similarly, on the rear side towards the chassis, insert five 12–24 Pan head mounting screw for slide rails (48-101524-01) and tighten them to a torque value of 4.65 N-m (41 lbs-in).

For the adapter portion which is towards the rack, you must fit all the six screws on the front and rear side.

Figure 45: Four Post Slider Integration in the 23" Rack



1	23" rack to 19" rack adapter (700-116871-01)

Install the Two Post Slider into an ETSI Rack

Use this procedure to install the two post slider into an ETSI rack.

Before you begin

Tools required:

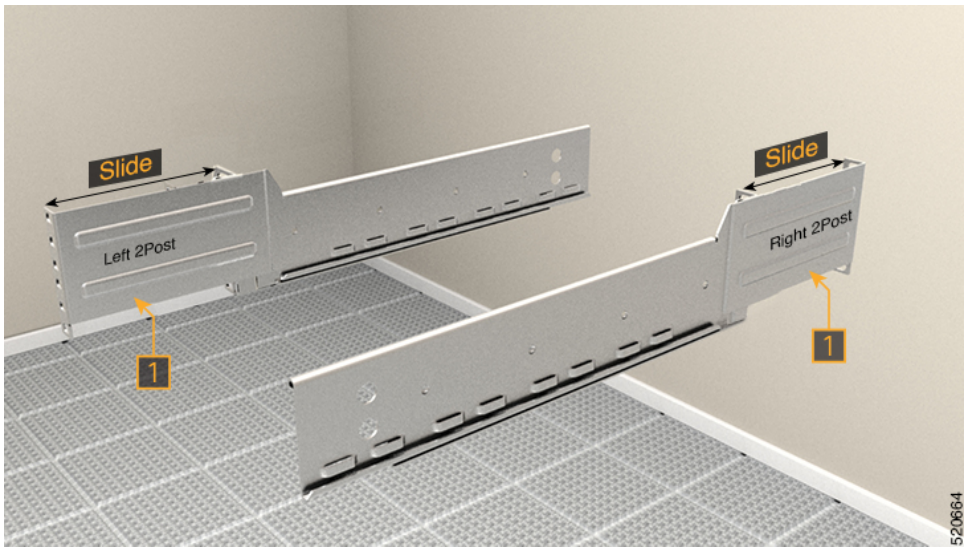
- Customer-supplied screwdriver
- Two-post left slide rail (800-48743-01)
- Two-post right slide rail (800-48744-01)
- ETSI rack to 19" rack adapter (700-116872-01)
- 12–24 Pan head mounting screw for slide rails (48-101524-01)

Procedure

Step 1 Identify the two post slider and adjust the length of the slider (3" to 5").

Slide the inner sliders and adjust the length to mate with the rack surface.

Figure 46: Two Post Slider Identification



1	Four-post right slide rail (800-48786-01) Check for marking on the sliders; slide the inner sliders to adjust the length.

Step 2 Integrate the two post slider with the ETSI rack using the ETSI rack to 19" rack adapter (700-116872-01).

The formed surface must always face the inner side of the rack post.

a. On the front side, insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01) at the top-most screw hole of the slider.

b. Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).

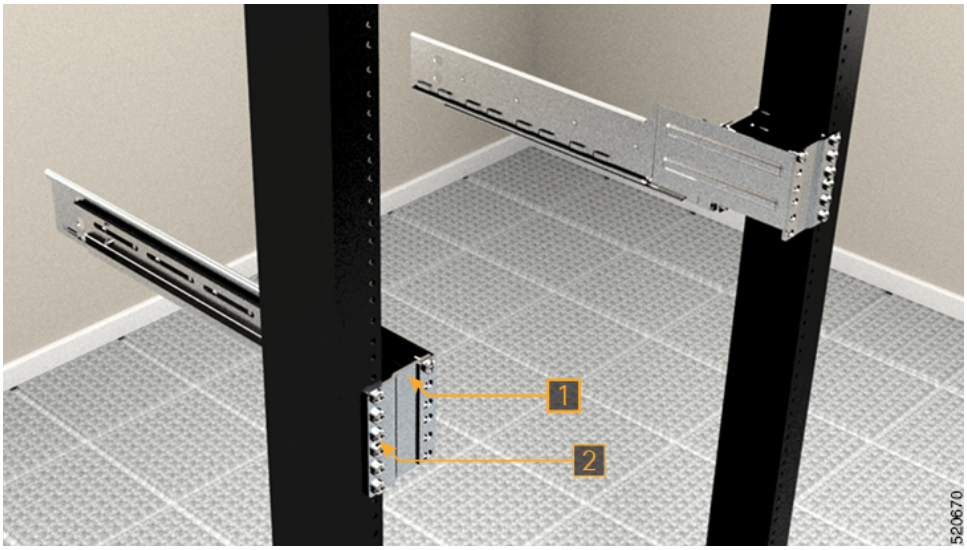
c. Similarly, on the rear side, insert three 12–24 Pan head mounting screws for slide rails (48-101524-01) and tighten them to torque value of 4.65 N-m (41 lbs-in).

a. On the front side, insert only the top-most screw of the slider (48-101524-01).

b. Tighten the screw to torque value of 4.65 N-m (41 lbs-in).

c. Similarly, on the rear side, insert three screws (48-101524-01) and tighten them to torque value of 4.65 N-m (41 lbs-in).

Figure 47: Two Post Slider Integration - ETSI Rack



1	ETSI rack to 19" rack adapter (700-116872-01)
2	12–24 Pan head mounting screw for slide rails (48-101524-01)

Install the Four Post Slider into an ETSI Rack

Use this procedure to install a four post slider into an ETSI rack.

Before you begin

Tools required:

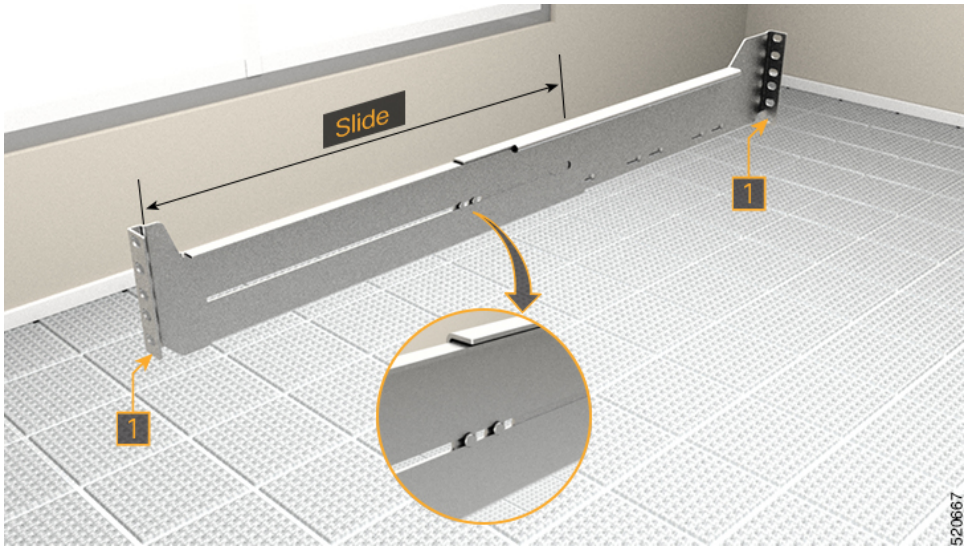
- Customer-supplied screwdriver
- Four-post right slide rail (800-48786-01)
- Four-post left slide rail (800-48787-01)
- ETSI rack to 19" rack adapter (700-116872-01)
- 12–24 Pan head mounting screw for slide rails (48-101524-01)

Procedure

Step 1 Identify the four post slider and adjust the length of the slider.

Slide the inner slider arm and adjust the length to mate with the rack surface.

Figure 48: Four Post Slider Identification



1	Four-post right slide rail (800-48786-01) Slide and adjust the length of the slider arm.

Step 2 Integrate the four post slider with the ETSI rack using the ETSI rack to 19" rack adapter (700-116872-01).

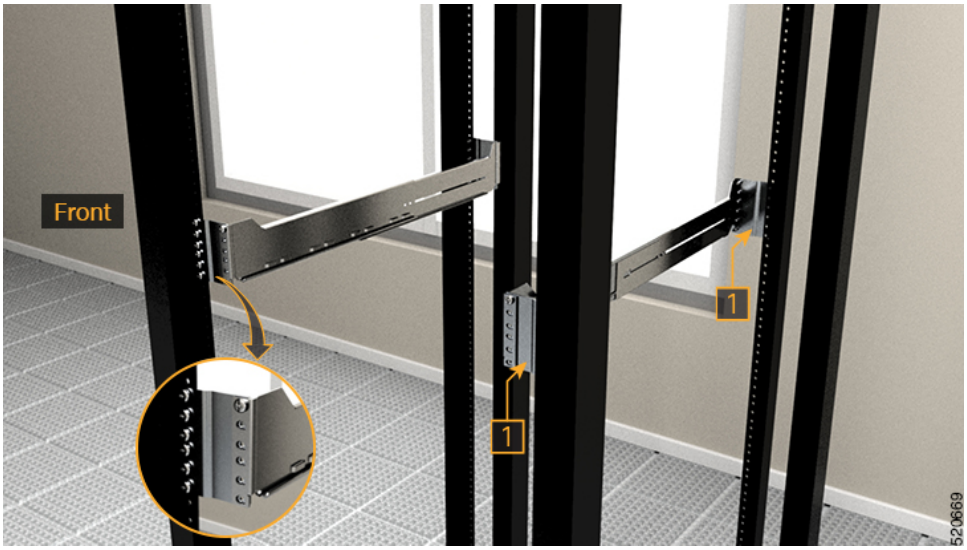
The formed surface must always face the inner side of the rack post.

a. On the front side of the ETSI rack to 19" rack adapter (700-116872-01), insert only one 12–24 Pan head mounting screw for slide rails (48-101524-01) at the top-most screw hole of the slider.

b. Tighten the screw to a torque value of 4.65 N-m (41 lbs-in).

c. Similarly, on the rear side, insert five 12–24 Pan head mounting screw for slide rails (48-101524-01) and tighten them to a torque value of 4.65 N-m (41 lbs-in).

Figure 49: Four Post Slider Integration in the ETSI Rack



1	ETSI rack to 19" rack adapter (700-116872-01)

General Power and Grounding Requirements

General power and grounding requirements are:

- Installation of the routing system must follow national and local electrical codes:
  - In the United States: United States National Fire Protection Association (NFPA) 70 and United States National Electrical Code (NEC).
  - In Canada: Canadian Electrical Code, part I, CSA C22.1.
  - In other countries: International Electrotechnical Commission (IEC) 60364, parts 1 through 7.
- Two separate and independent AC or DC power sources are needed to provide N+N redundancy for system power. Each power source requires its own circuit breaker.
- Each power source must provide clean power to the site. If necessary, install a power conditioner.
- The site must provide short-circuit (over-current) protection for devices.
- Proper grounding is required at the site to ensure that equipment is not damaged by lightning and power surges.

Note The unit must be grounded using the Protective Earthing grounding point of the system.

- Site power planning must include the power requirements for any external terminals and test equipment you will use with your system.

Note Be sure to review the safety warnings in the Cisco Network Convergence System *Regulatory Compliance and Safety Information for the Cisco Network Convergence System 1014* before attempting to install the chassis.

Ground the Cisco NCS 1014 Chassis

Use this task to ground the Cisco NCS 1014 chassis. In the installation of the chassis, connect the ground lug first.

The NCS 1014 chassis has one grounding point at the front. The following warning label is affixed on the chassis.

Tip If you are using the NCS1K14-S-KIT accessory kit, an alternative grounding point is provided to ground the NCS 1004 chassis at the rear of the chassis.

Warning High leakage current, earth connection essential before connecting supply.

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

Before you begin

If you are using the Protective Earth Grounding point at the front of the chassis and the air filter, make sure you install the air filter first and then install the ground lug onto the Cisco NCS 1014 chassis. See Install the Air Filter, on page 115.

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. If you are attaching the double hole ground lug to the rack rail, then clean the mating surfaces and apply the appropriate antioxidant compound.

Step 3 Attach one end of the ground cable (no. 6 AWG cable) to the double hole lug connector.

Step 4 Align the double hole ground lug to the chassis ground point at the front or slide rail at the rear of the chassis.

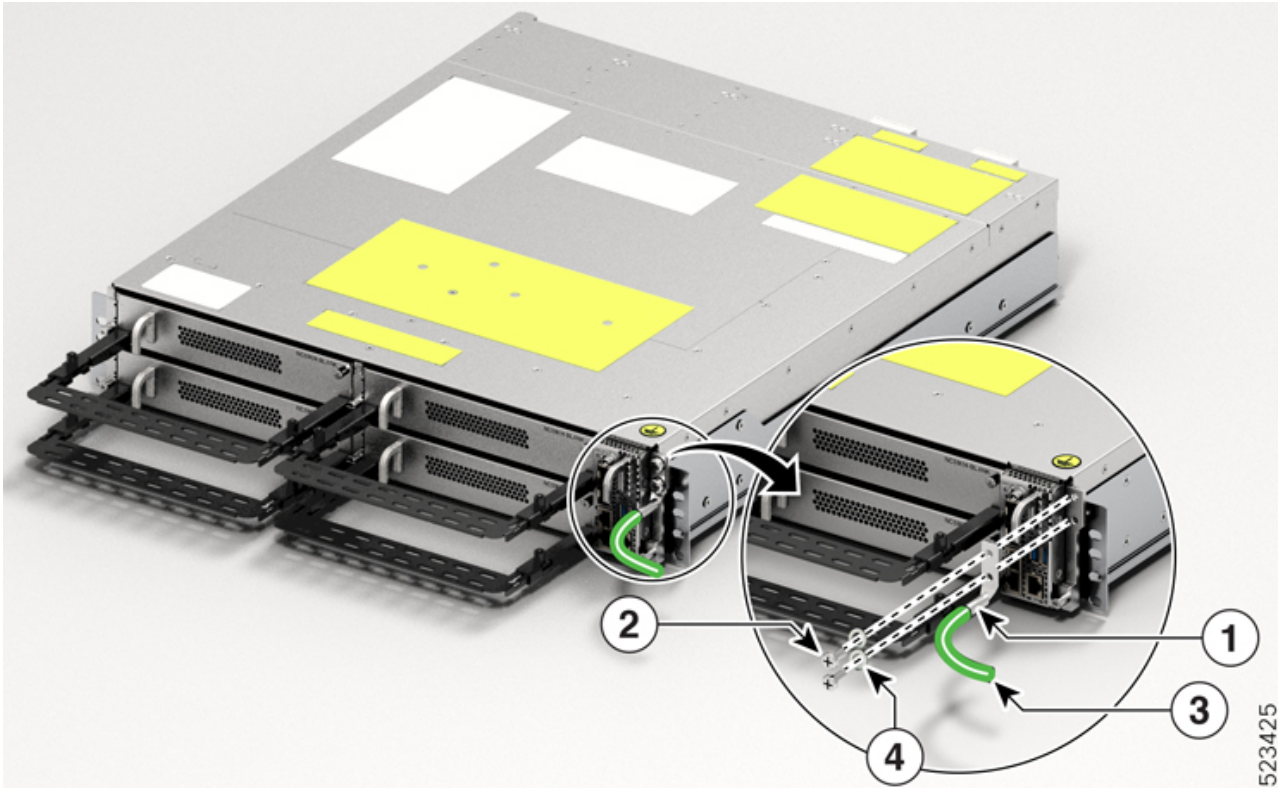
To ground the chassis at front, perform the steps:

a. Align the double hole ground lug to the chassis ground point.

b. Insert the two M5 pan-head screws for ground lug (48-1169-01) through the two external tooth lock washers for ground lug (49-100371-01) into the double hole lug for chassis (32-100125-01).

c. Tighten the two M5 pan-head screws (48-1169-01) to a torque value of 3.1 N-m (27.4 lbs-in).

Figure 50: Front grounding point - attaching NCS 1014 ground lug to the chassis



1	Double hole lug for chassis (32-100125-01)	3	Ground cable
2	M5 pan-head screw for ground lug (48-1169-01)	4	External tooth lock washer for ground lug (49-100371-01)

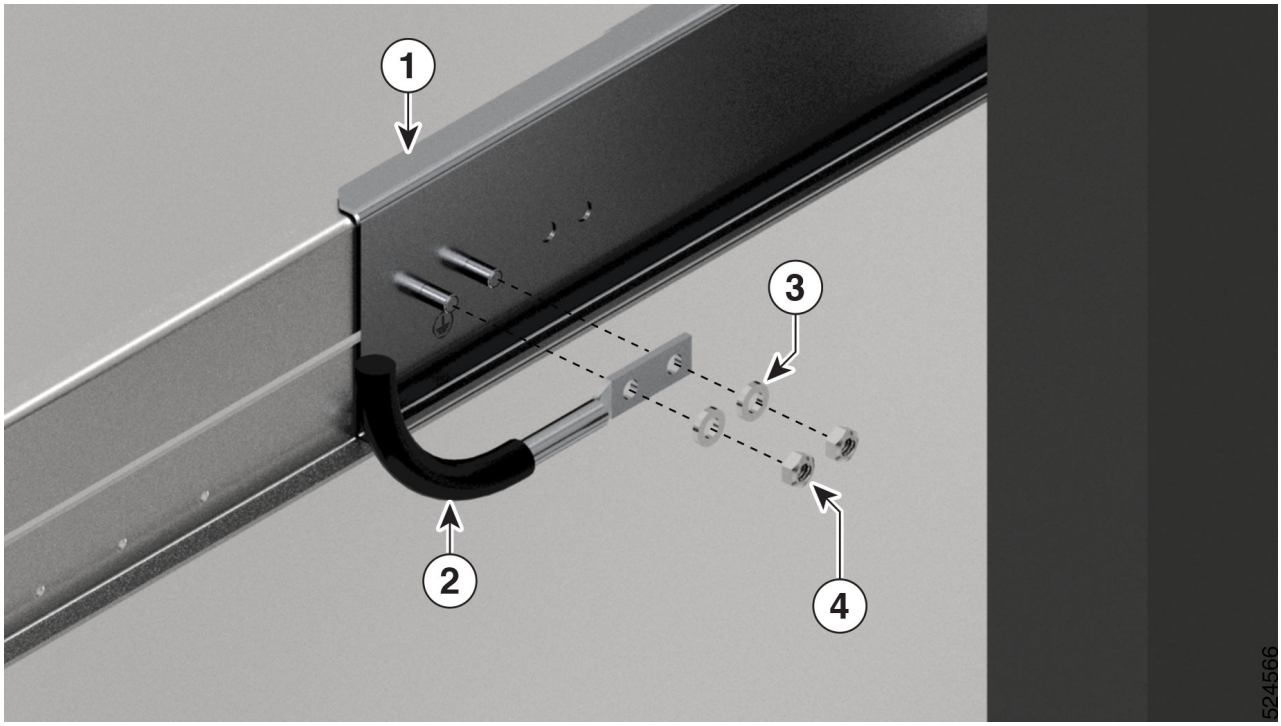
To ground the chassis at rear, perform the steps:

a. Using the two studs inside the slider rail, align the double hole ground lug for slider rail to the slider rail ground point and push it onto the preinstalled studs in the slider rail.

b. Push the two external tooth lock washers for ground lug (49-100371-01) and the two M5 locking hex nuts for ground lug (49-0510-01) through the preinstalled studs to lock the double hole lug for slider rail (32-100132-01).

c. Tighten the two M5 hex lock nuts for ground lug (49-0510-01) to a torque value of 3.1 N-m (27.4 lbs-in).

Figure 51: Rear grounding point - attaching NCS 1014 ground lug to the 30-40" slide rail



1	Four-post (30-40") left slide rail (800-51869-01)	3	External tooth lock washers for ground lug (49-100371-01)
2	Ground cable	4	M5 hex lock nuts for ground lug (49-0510-01)

Remember
The orientation of the lug cable for

- front chassis grounding is always at the bottom side.
- rear slider rail grounding is always outwards.

Step 5 Attach the other end of the ground cable to the bay frame using a dual-hole lug connector, according to the equipment rack frame specifications.

Attach the Fiber Management Bracket to the Slider Rail

If you are attaching the fiber management bracket from NCS1K14-S-KIT, use this procedure to attach the bracket to the four-post 30–40" slider rail.

Before you begin

Install the chassis and its modules

Tools required:

- Customer-supplied screwdriver
- Fiber management bracket (700-136629-01) from NCS1K14-S-KIT
- M3 Phillips flat-head mounting screws for fiber management bracket (48-102306-01)

Procedure

Step 1 Before attaching the fiber management bracket, make sure the bracket flanges point upwards to orient the bracket.

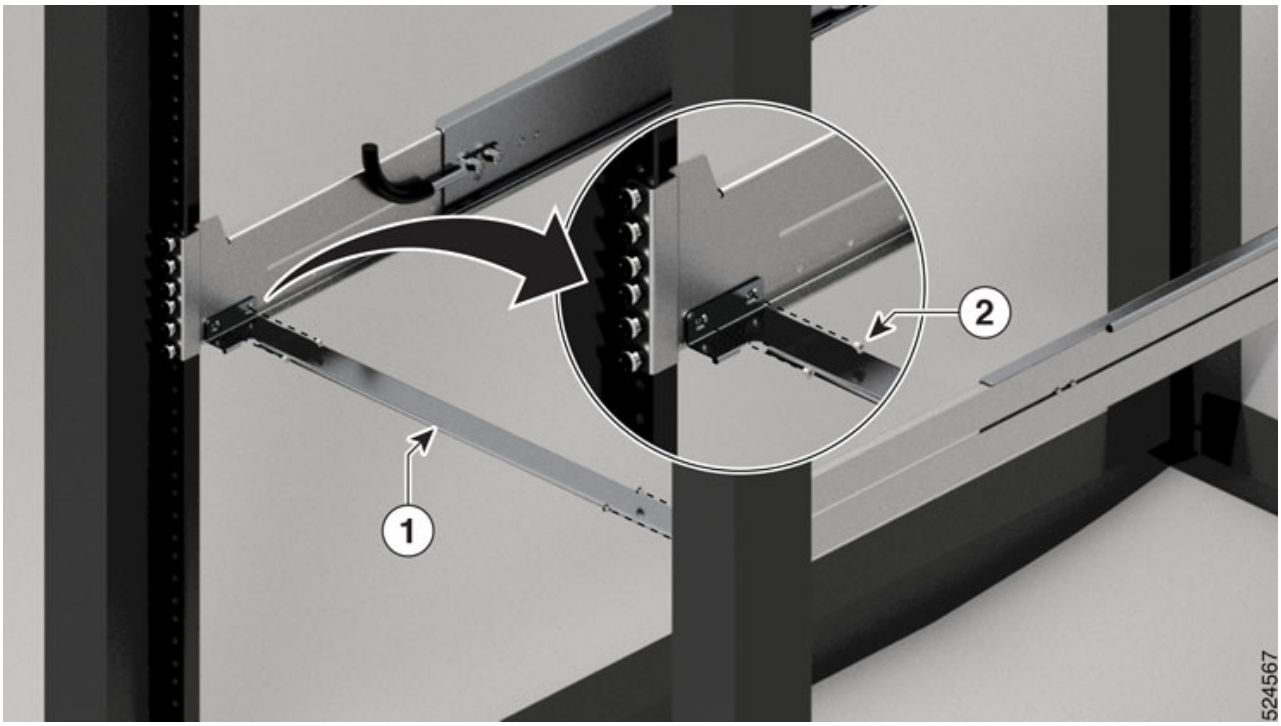
Step 2 Align the screw holes of the fiber management bracket with the screw holes of the slider rail.

Tip
You can align the fiber management bracket (700-136629-01) in any position in the slider rail. The slider rail allows attaching the fiber management bracket in five different positions.

Step 3 From the inside of the fiber management bracket, insert the two M3 Phillips flat-head mounting screws for the fiber management bracket (48-102306-01) through the bracket screw holes into the slider rail to hold the bracket with the slider rail.

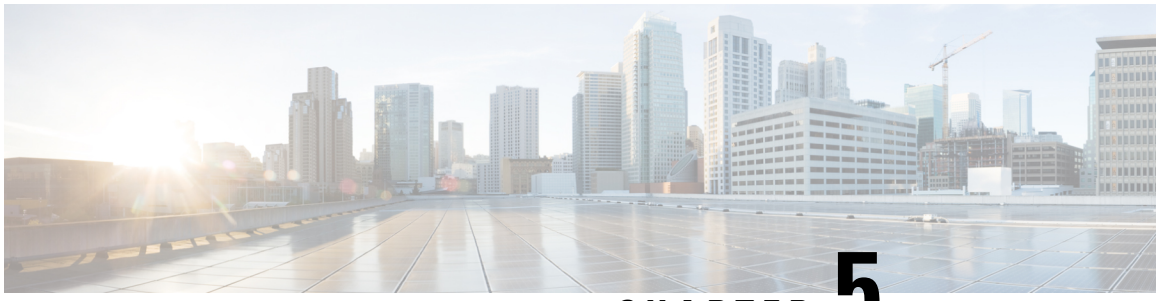
Step 4 Using a screwdriver, tighten the screws to a torque value of 0.65 N-m (5.75 lbs-in).

Figure 52: Attaching the M3 Phillips flat-head mounting screws to the fiber management bracket



1	Fiber management bracket (700-136629-01)	2	M3 Phillips flat-head mounting screw for fiber management bracket (48-102306-01)

Step 5 Similarly, on the other slider rail, insert the remaining two M3 Phillips flat-head mounting screws (48-102306-01) and tighten them to a torque value of 0.65 N-m (5.75 lbs-in).



CHAPTER 5

Install Cisco NCS 1014 Modules

This chapter contains procedures to install the modules of Cisco NCS 1014.

Caution All the modular slots in the NCS 1014 chassis should always be populated with respective modules (line cards, controllers, PSUs, and fan units). Empty line card slots should be populated with filler modules, which are shipped with the chassis. The replacement or upgrade of the modules (Online Insertion or Removal, OIR) should be performed only when the ambient temperature is below 30℃. The OIR of modules should be completed within five minutes to prevent overheating of the components.

WARNING: DO NOT INTRODUCE BODY OR OBJECT IN THE CHASSIS / PSU / FAN TRAY / LC SLOTS WHEN INSTALLING OR REMOVING A MODULE. EXPOSED CIRCUITRY IS AN ENERGY HAZARD.

ATTENTION: ÉVITEZ TOUT CONTACT ENTRE VOTRE CORPS OU UN OBJET EXTERNE ET L'INTÉRIEUR DU CHÂSSIS, DU BLOC D'ALIMENTATION, LA FENTE DE VENTILATION DU PLATEAU, OU DE LA FENTE PDS LORSQUE VOUS INSTALLEZ OU RETIREZ UN MODULE. LES CIRCUITS EXPOSÉS CONSTITUENT UN RISQUE D'ÉLECTROCUTION.

520496

Install the NCS1K14-2.4T-K9 Line Card and its Pluggables Quick Video

For a quick video demonstration, from attaching the fiber management brackets to installing the NCS1K14-2.4T-K9 line card and its pluggables, check out the video.

- Install the Solid State Drive (SSD), on page 92
- Install the Fan Unit, on page 93
- Install the Controller, on page 95
- Attach the Fiber Management Bracket, on page 98
- Adjust the Fiber Management Bracket, on page 100
- Install the Line Card, on page 101
- Install the OXP2-K9 line card, on page 103
- Install the Power Supply Units (PSUs), on page 104
- Install the Pluggables, on page 113
- Install the Air Filter, on page 115

Install the Solid State Drive (SSD)

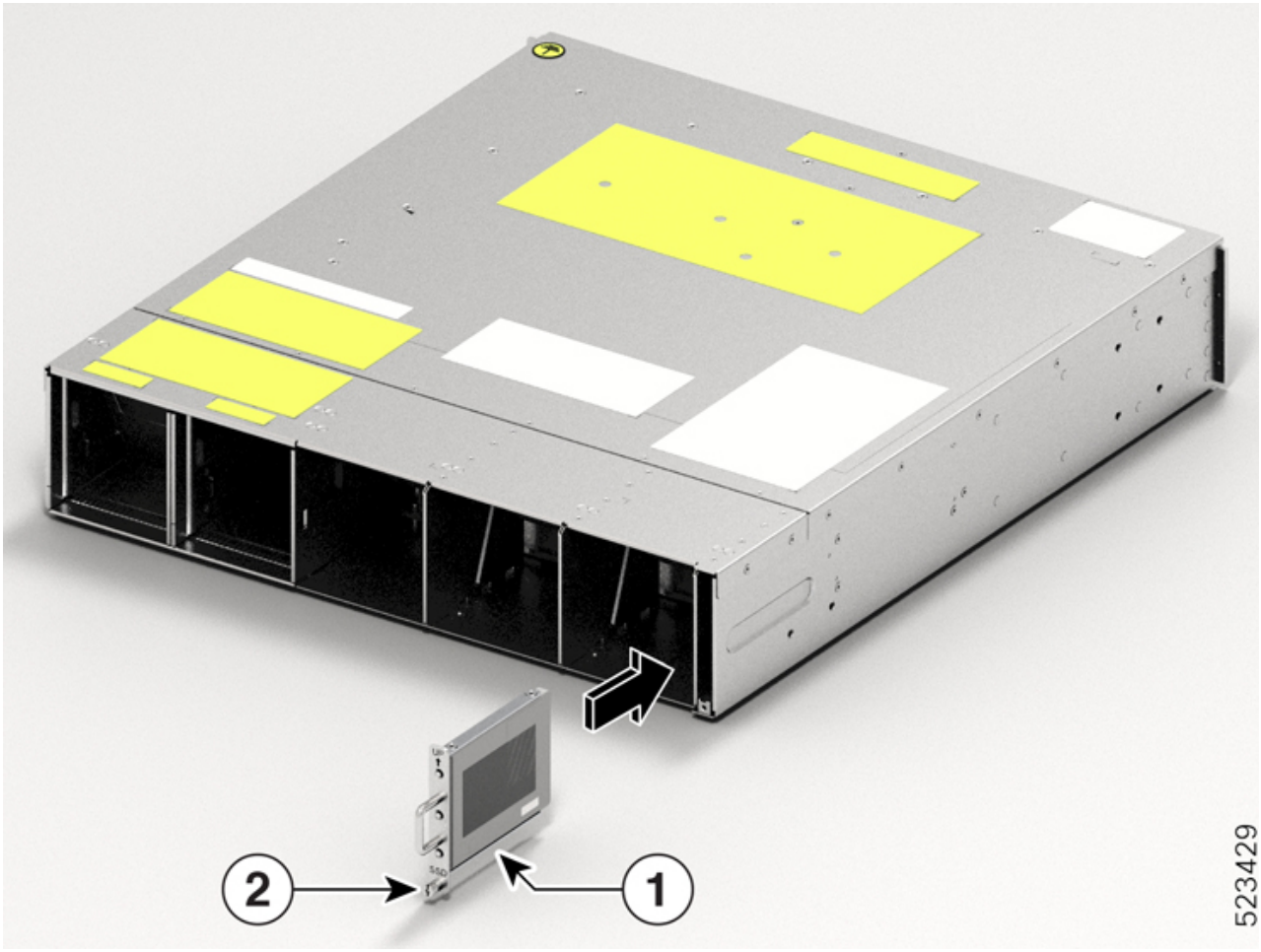
Use this procedure to install the SSD into the Cisco NCS 1014 chassis.

Procedure

Step 1 Before inserting the SSD into the slot, use the *UP* label to help you orient the module correctly.

Step 2 Grasp the front handle and slide the SSD into the slot.

Figure 53: Installing the SSD

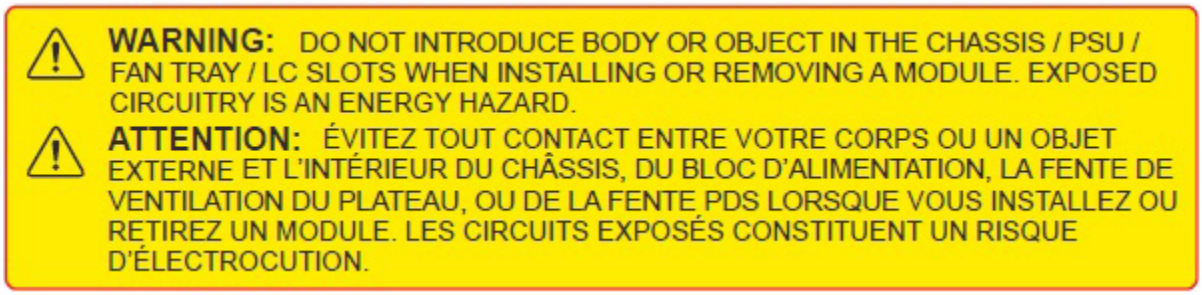


Callout	Component
1	SSD
2	M3 T15 screw

Step 3 Using a T15 six lobe/slot screwdriver, tighten the lone captive screw to a torque value of 0.65 N-m (5.75 lbs-in).

Install the Fan Unit

Follow these steps to install the fan units into the Cisco NCS 1014 chassis.



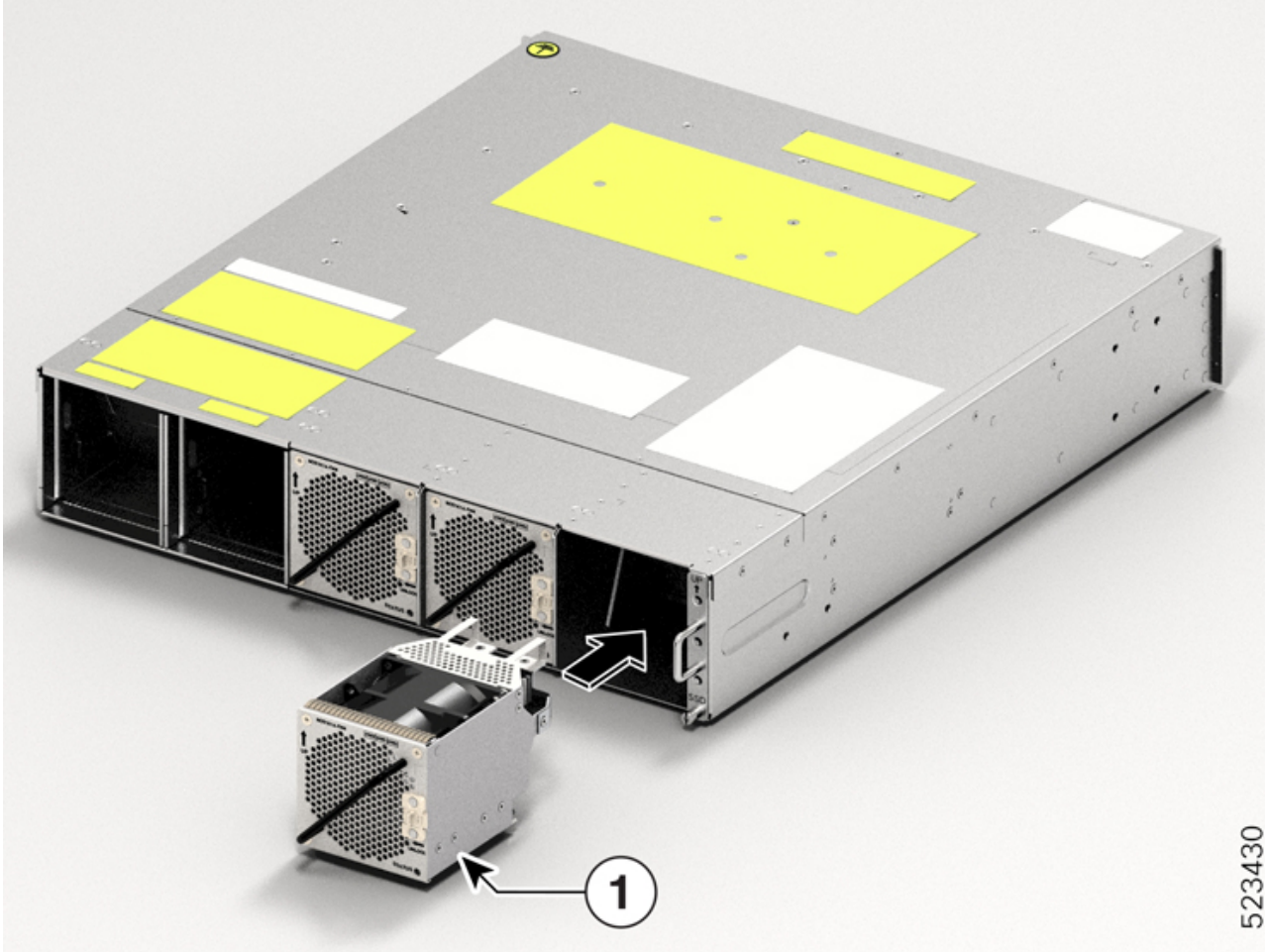
Procedure

Step 1 Before inserting the fan unit, use the *This Side Up* label to help yourself orient the fan unit correctly.

Step 2 Use one hand to support the fan unit. Then use the other hand to hold the front handle and insert the fan unit in to the slot.

While inserting the fan unit, use your thumb to push the spring-loaded lever to the left and hold it in the unlock position.

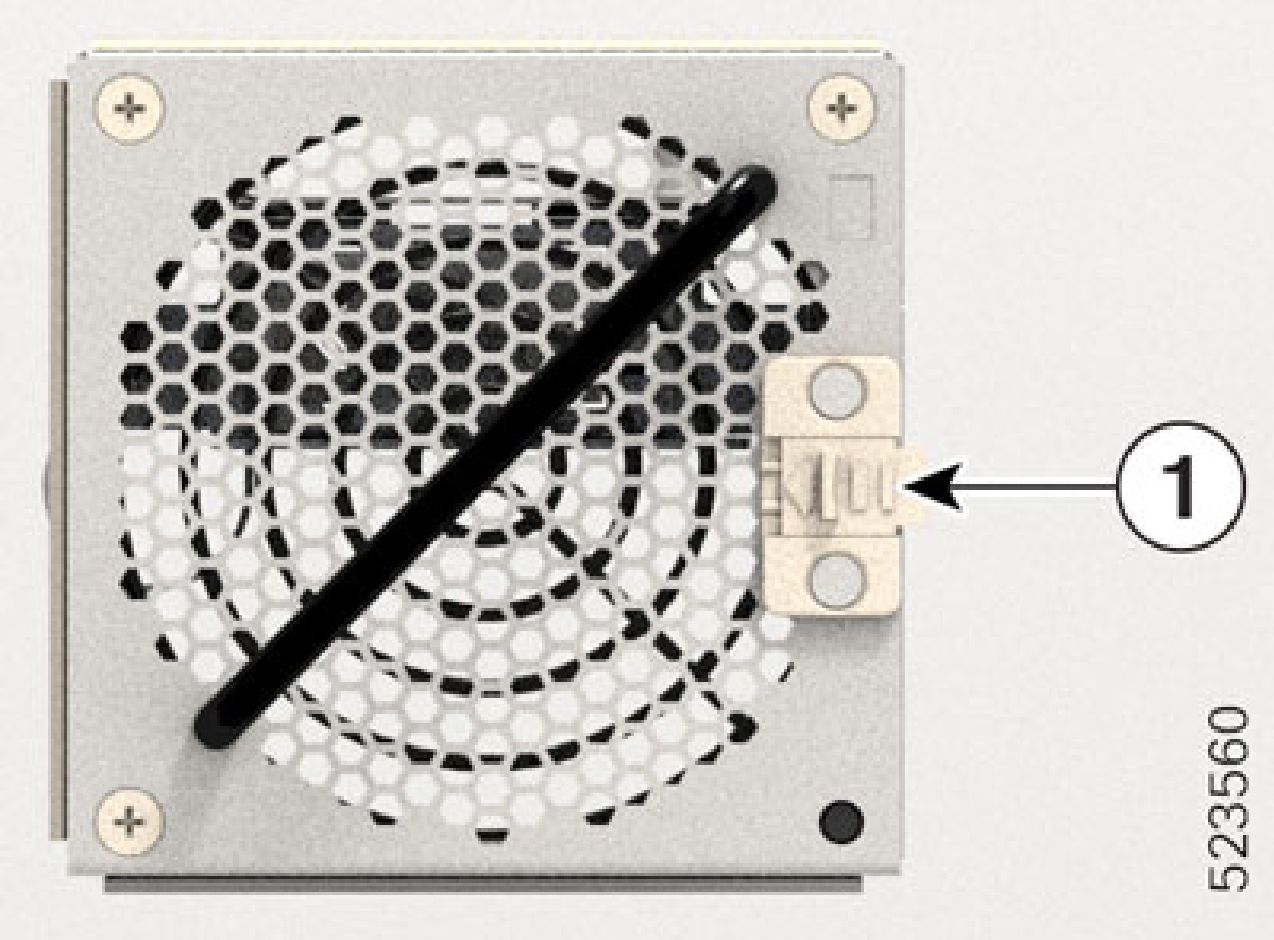
Figure 54: Inserting a Fan Tray



Callout	Component
1	Fan Tray

Step 3 Release the spring-loaded lever to lock the fan unit in its position.

Figure 55: Spring-loaded Lever in Released Condition



Callout	Component
1	Sping-loaded lever

Step 4 Repeat the above steps until you complete installing all the fan units.

Install the Controller

Follow these steps to install the controller into the Cisco NCS 1014 chassis.

Procedure

Step 1 Before inserting the controller, use the *This Side Up* label to help yourself orient the controller correctly.

Figure 56: Perspective View of NCS1K14-CNTLR-K9 Controller



Figure 57: Perspective View of NCS1K14-CNTLR-B-K9 Controller

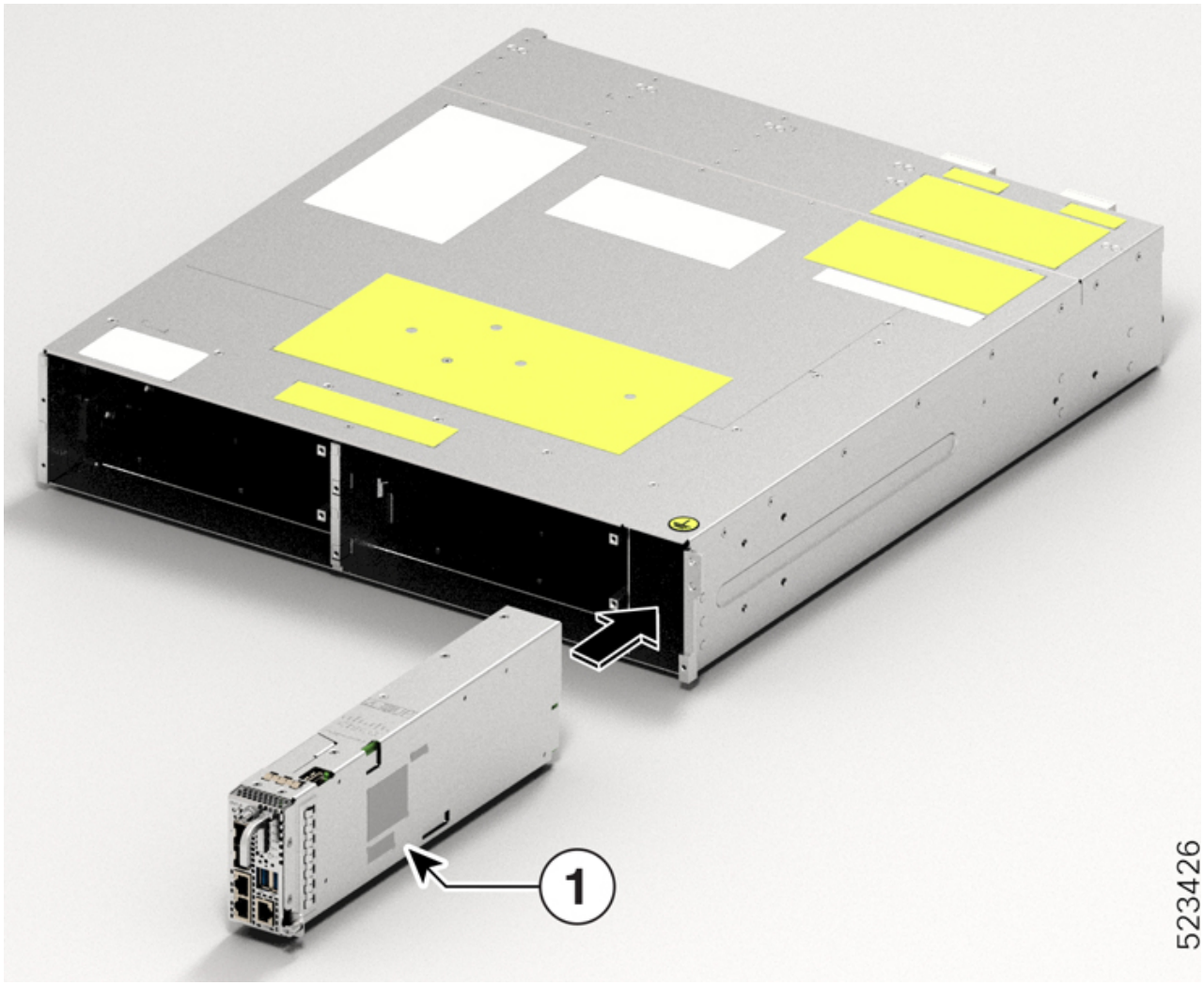


Step 2 Slide the controller into the slot. To slide the controller:

a. With one hand, support the controller at the bottom.

b. With the other hand, hold the front handle and push the controller into the slot.

Figure 58: Inserting the Controller



Callout	Module
1	Cisco NCS 1014 Controller Card (NCS1K14-CNTLR-K9)

Step 3 Using a T15 Torx screwdriver, tighten the two M3 T15 Torx screws to a torque value of 0.65 N-m (5.75 lbs-in).

Attach the Fiber Management Bracket

Use this procedure to attach a fiber management bracket to a line card or filler card.

The fiber management brackets are available in the package. Each line card or filler card comes with its own fiber management bracket. Do not interchange the fiber management brackets. The CCMD-16-C, CCMD-16-L,

and 1.2T cards have adjustable fiber management brackets. The 2.4T DWDM card has a fixed-length fiber management bracket.

Procedure

Step 1 Attach the fiber management bracket to the card (line card or filler card). To attach:

a. Orient the captive screws in the fiber management bracket to the line card.

Ensure that the fiber management bracket is in the correct orientation. Incorrect orientation obstructs accessibility to the ports.

b. Seat the bracket captive screws in the line card screw holes.

Figure 59: Attaching the Fiber Management Brackets to the 2.4T Card

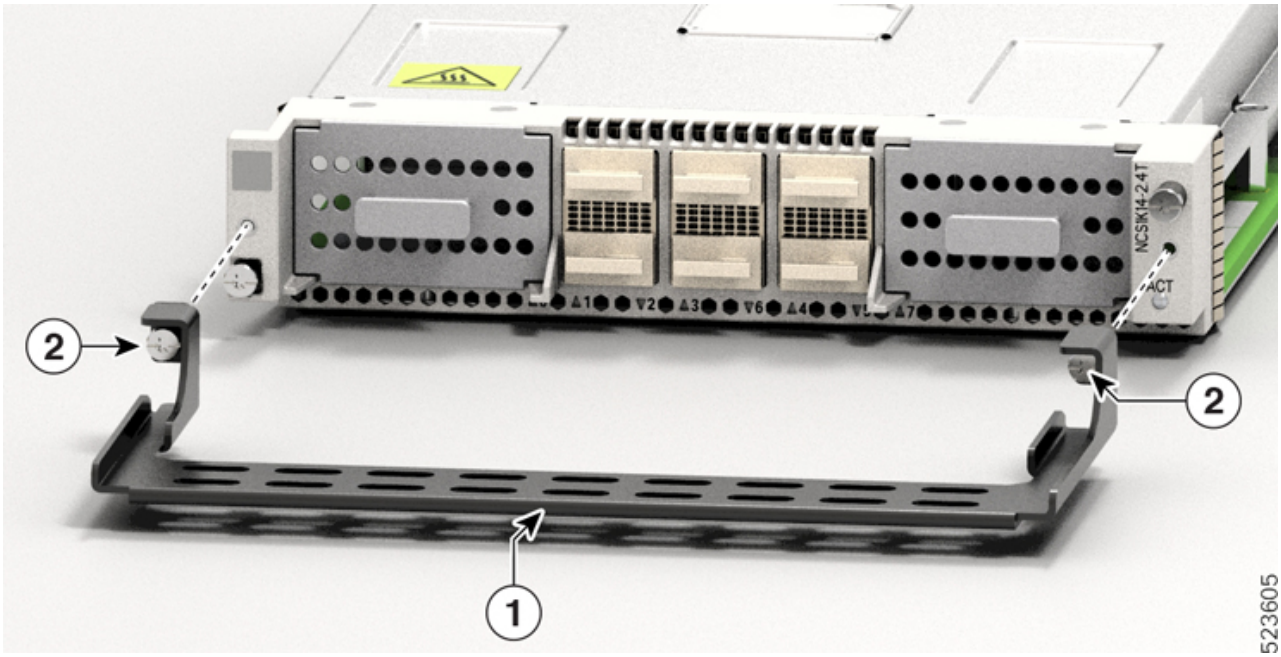


Table 51: 2.4T Card Accessories

Callout	Accessory
1	Fiber management bracket
2	Captive screws

Step 2 Using a torque-limiting T15 Torx screwdriver, tighten the two M3 T15 Torx screws of the fiber management bracket to a torque value of 0.65 N-m (5.75 lbs-in).

We recommend that you do not remove the fiber management brackets after installing the line card into the chassis.

The subsequent section describes the procedure to adjust the length of the fiber management bracket.

Adjust the Fiber Management Bracket

Note This procedure is not applicable for the 2.4T line card that has a fixed-length fiber management bracket. You can skip this procedure.

Use this task to adjust the length of the fiber management bracket of the following cards:

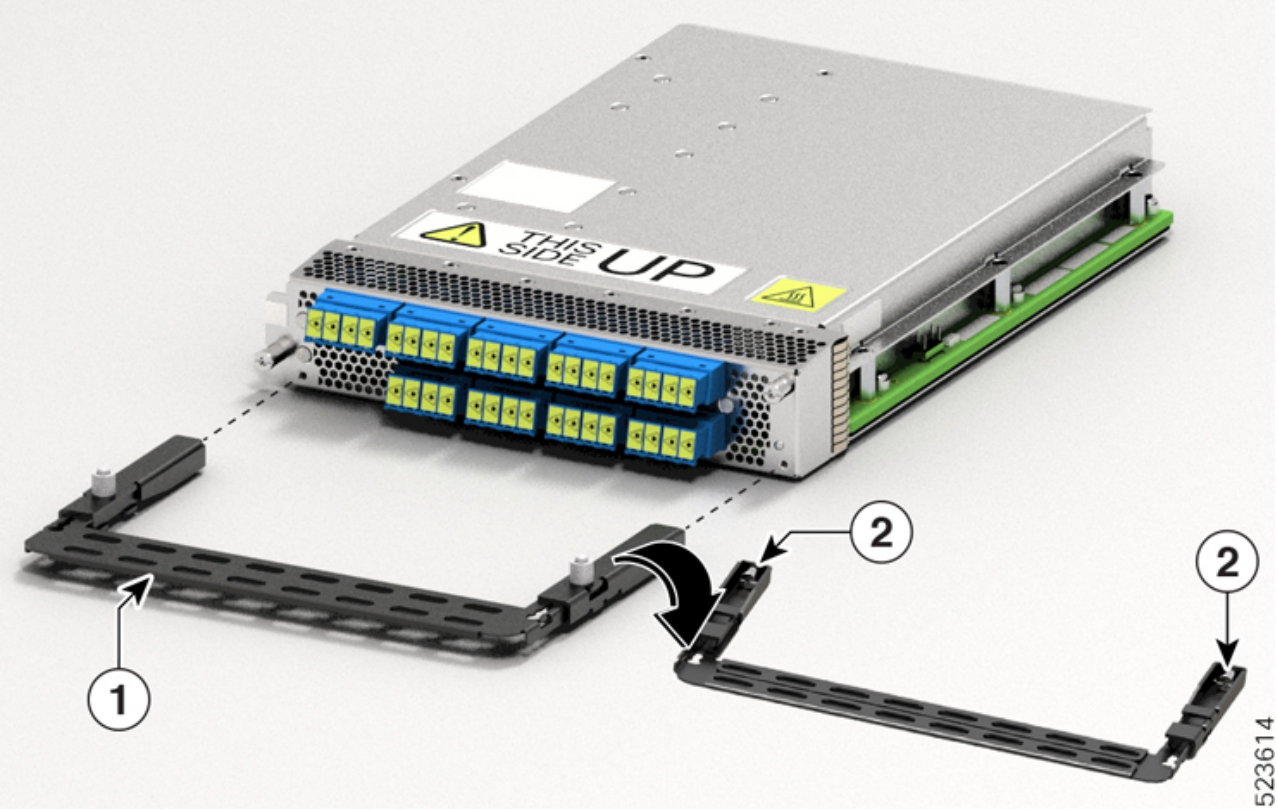
- CCMD-16-C
- CCMD-16-L
- 1.2T
- Filler card

Note We recommend that you maintain the fiber management bracket in the shorter position for ETSI racks, to maintain a 600-mm footprint. We also recommend that you adjust the bracket length before installation.

Procedure

Step 1 Disengage the horizontal bar in the bracket. To do this, push down the plunger pins on both sides of the bracket.

Figure 60: Adjusting the Fiber Management Bracket



1	Horizontal bar
2	Plunger pins

Step 2 Pull the horizontal bar of the fiber management bracket outwards to increase the length of the bracket.

The plunger pins lock the bracket when the horizontal bar is fully extended.

You can verify whether the plunger pins are locked based on the visibility of their grooves.

- If both grooves are visible, the pins are disengaged.
- If no groove is visible, the bar is in the transient stage.
- If one groove is visible, the bar is correctly installed and locked.

Install the Line Card

Use this task to install a line card into the Cisco NCS 1014 chassis. The Cisco NCS 1014 chassis supports a maximum of four line cards.

Before you begin

It is mandatory to attach the fiber management brackets to the filler cards and line cards before you install the chassis onto a rack. For a detailed procedure, see Attach Fiber Management Bracket.

Note The following procedure presumes that you ordered the Cisco NCS 1014 chassis preinstalled with filler cards only.

The following procedure also applies to filler cards installation.

Procedure

Step 1 Loosen the Torx screws of the filler card using a T15 Torx screwdriver.

Step 2 Holding the fiber management bracket of the filler card with one hand and supporting it with the other, pull the filler card from the chassis.

Step 3 Before inserting the line card into the slot, use the *This Side Up* label to help yourself orient the line card correctly.

Figure 61: Perspective View of NCS1K14-2.4T-K9 Line Card



Step 4 Use both the hands while inserting a line card. To insert the line card, perform the following actions:

a. Use one hand to support the bottom of the line card.

b. Use the other hand to hold the fiber management bracket.

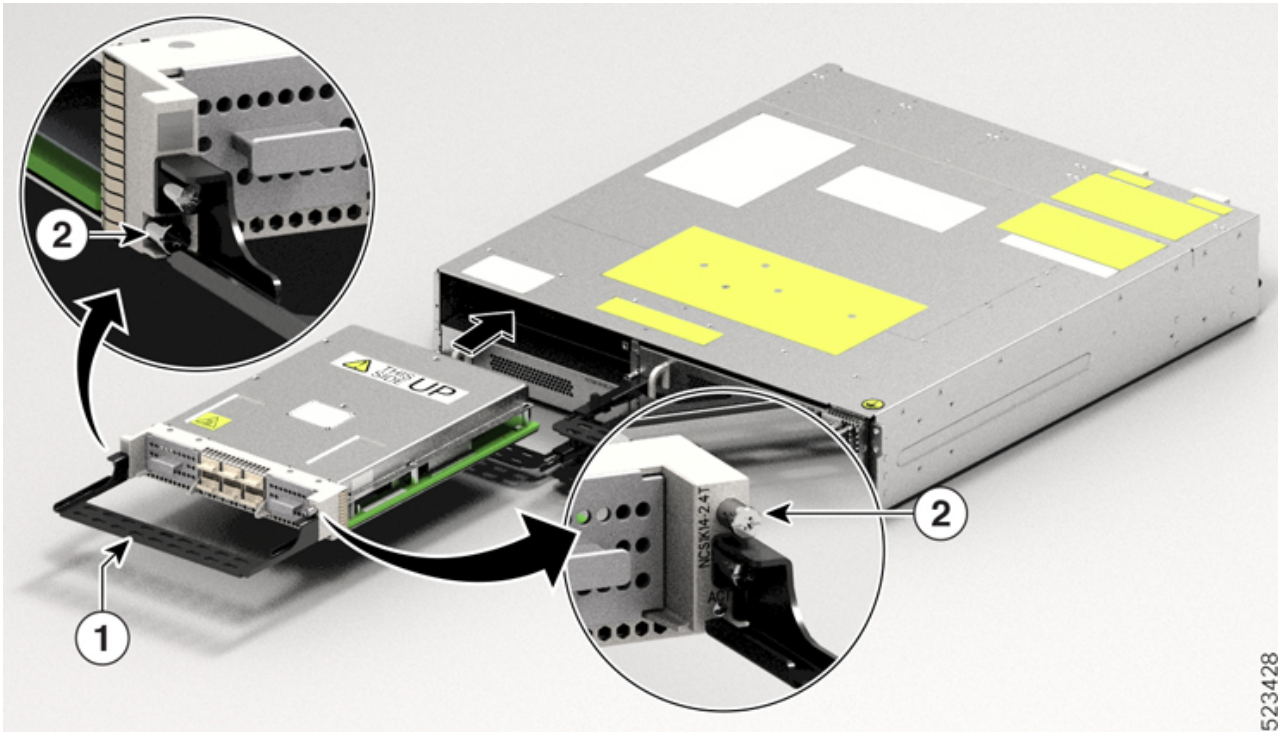
c. With both hands, guide the line card into the slot.

Caution
Use the fiber management brackets only for pulling out or pushing in the line cards or filler cards. Do not use the fiber management brackets to carry the cards. Always support the line card and filler card at the bottom with your hand.

Step 5 Slide the line card completely inside, into the slide guide till it engages in the chassis.

Step 6 Using the torque-limiting T-15 six lobe/slot screwdriver, tighten the two captive screws of the line card to a torque value of 0.44 N-m (3.89 lbs-in) to secure the line card.

Figure 62: Inserting the NCS1K14-2.4T-K9 Line Card



Callout	Accessory
1	Use the fiber management bracket for holding the line card.
2	Captive screws

Install the OXP2-K9 line card

Install the OXP2-K9 line card or filler card into the Cisco NCS 1014-2 chassis.

You can use this procedure for filler card installation as well.

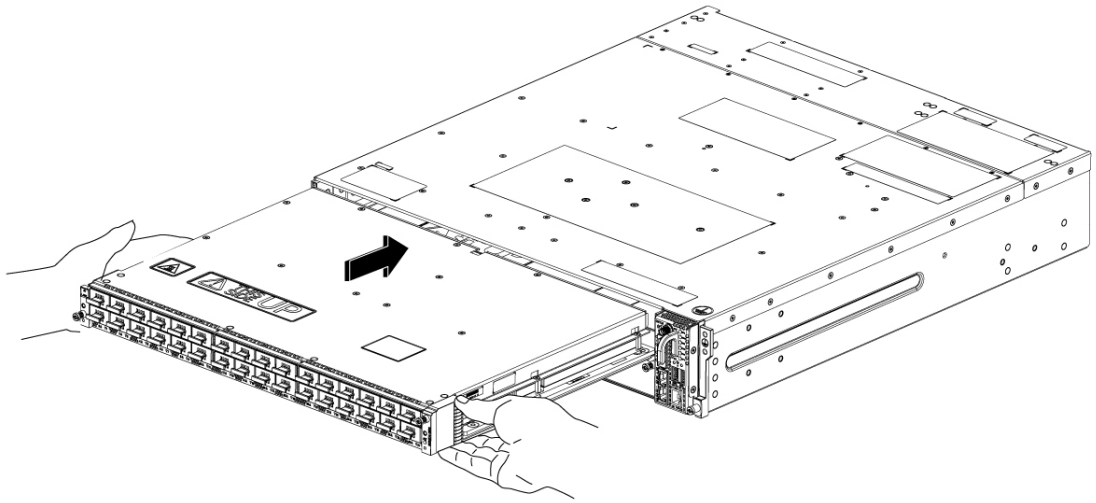
Note If you plan to use only one OXP2-K9 card, install the filler (NCS1K14-BLANK-2=) in the empty slot prior to the line card installation.

Procedure

Step 1 Orient the line card so the *This Side Up* label is facing you and clearly visible.

Step 2 Hold the line card with one hand on each side to guide the line card into the slot.

Figure 63: Installing the OXP2-K9 card



Step 3 Slide the line card completely inside, into the card guide.

Step 4 Using the torque-limiting T-15 six lobe/slot screwdriver, tighten the two captive screws of the line card to a torque value of 0.44 N-m (3.89 lbs-in) to secure the line card.

The OXP2-K9 line card (or filler card) is securely installed in the Cisco NCS 1014-2 chassis, ready for network operation.

Install the Power Supply Units (PSUs)

Use this procedure to install the PSUs into the Cisco NCS 1014 chassis.

Procedure

Step 1 Orient the PSU correctly before inserting. Check for the *This Side Up* label.

Figure 64: Perspective View of NCS1K4-DC-PSU-2

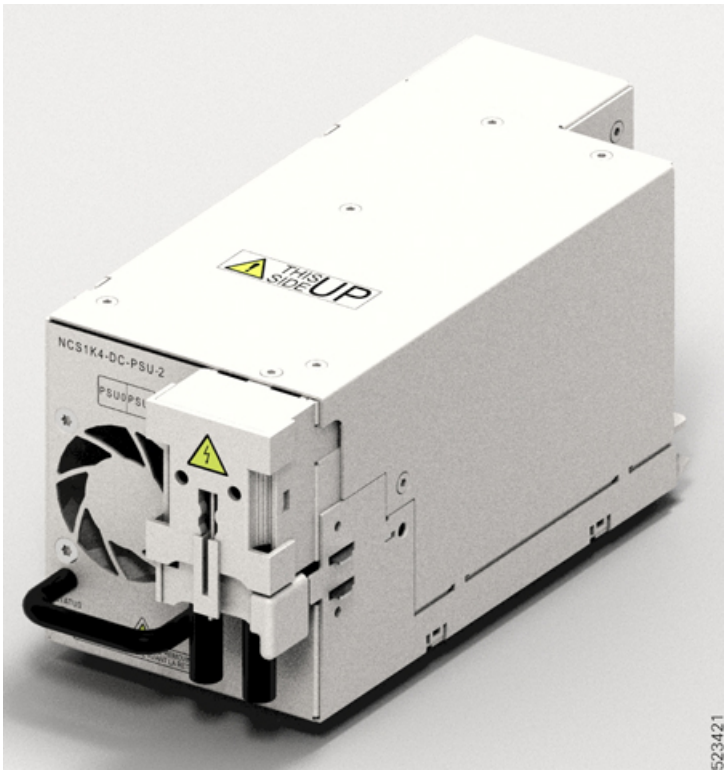
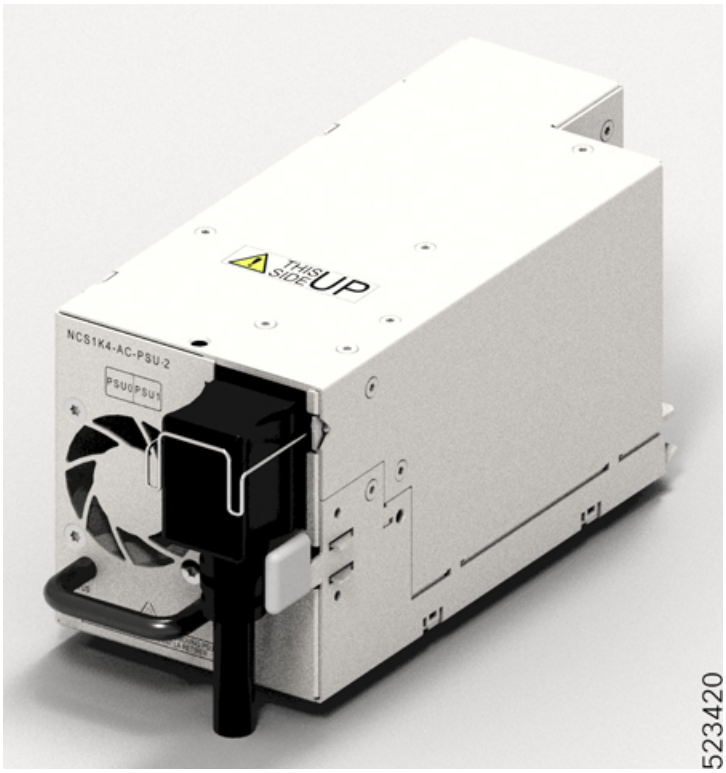


Figure 65: Perspective View of NCS1K4-AC-PSU-2



Step 2 Slide the PSU into the slot as follows:

a. Support the PSU at the bottom with one hand.

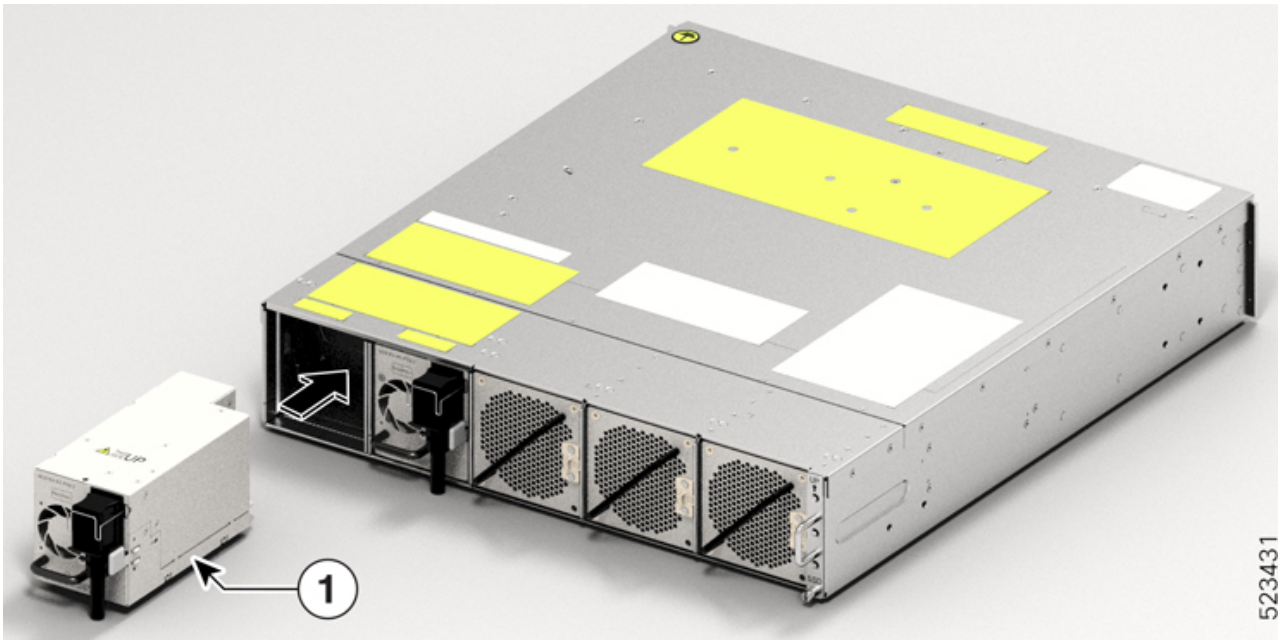
b. Hold the handle with your other hand.

c. Push the PSU in until you hear a *click* sound; see the following figure for direction of insertion.

The click sound indicates that the unit has latched.

Note
Press and release the locking latch only for removing the PSU.

Figure 66: Inserting the PSU

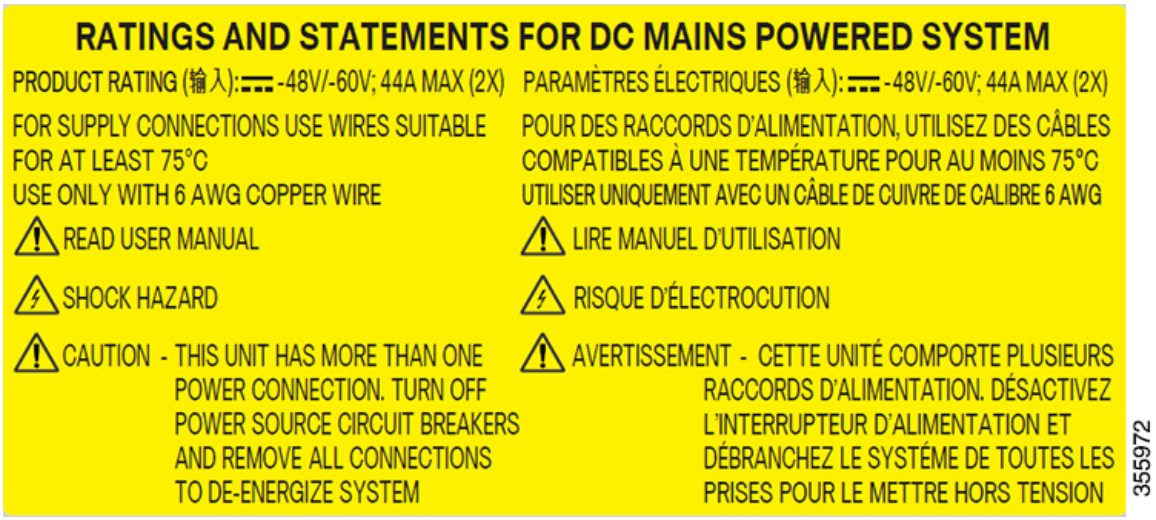


1	PSU

Connect DC Power to the Cisco NCS 1014 Chassis

Caution The Cisco NCS 1014 chassis relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and National Electrical Codes (NEC).

Figure 67: Rating Label for DC Power



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 the Cisco NCS 1014 chassis from the fuse panel.

Step 3 Dress the power according to local practice.

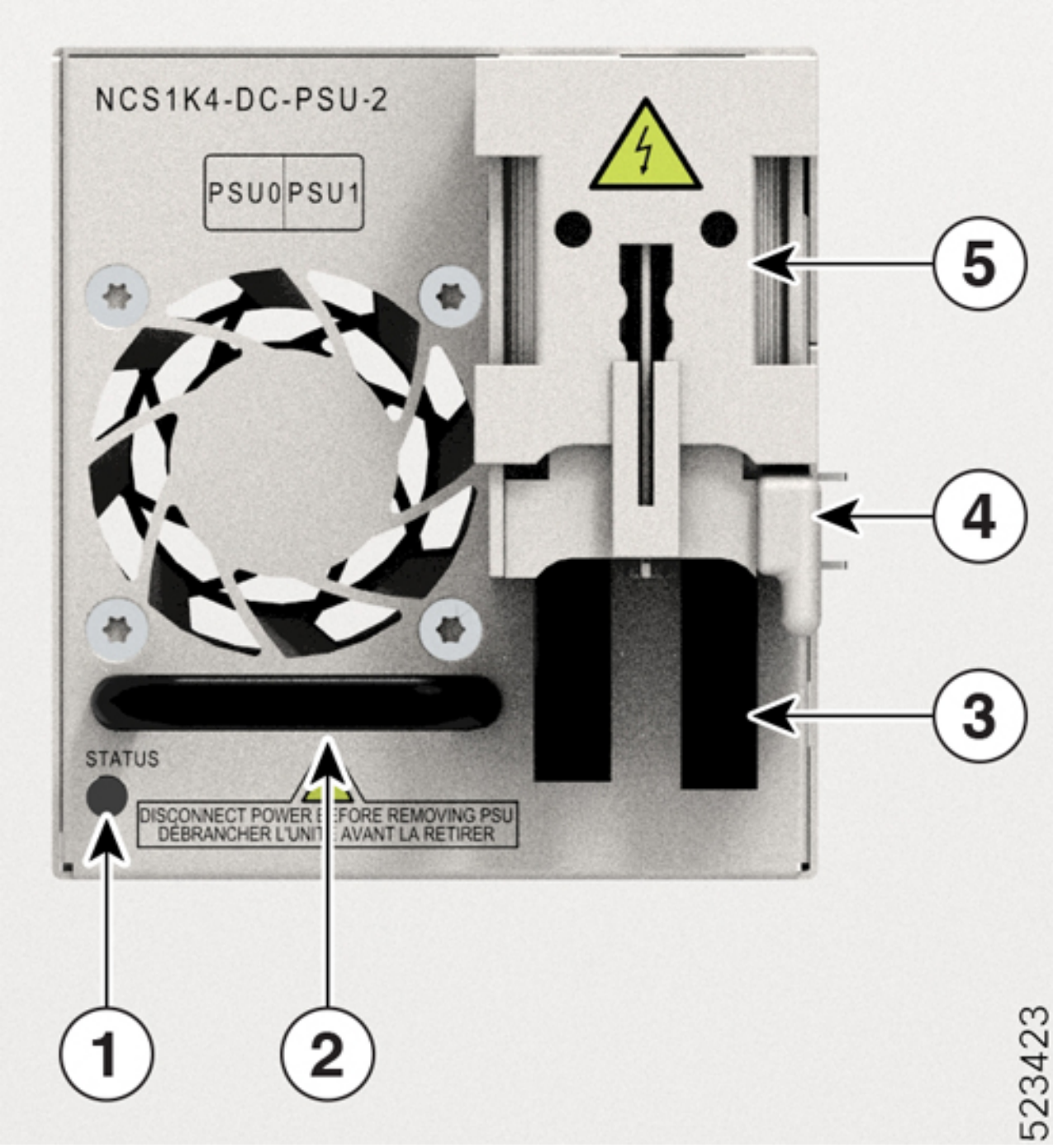
Step 4 Connect the office battery and return cables according to the fuse panel engineering specifications.

Step 5 Affix the power lug on the unit with two screws. Tighten the screws using torque of 2.7 N-m ± 0.3 N-m (21.69–28.09 lbs-in.).

Caution
Torque level greater than 3.0 N-m can damage the unit.

Use #6AWG cables. Ensure a minimum gap of 50 mm below the chassis for routing the cables. For ETSI racks, use 180-degree power lugs to maintain 600-mm footprint.

Figure 68: NCS1K4-DC-PSU-2 with 180-degree Power Lug Cable Connection



Callout	Component	Callout	Component
1	Status LED	4	Locking latch
2	PSU Handle	5	Protective cover

Callout	Component	Callout	Component
3	6AWG 180-degree exit cables		

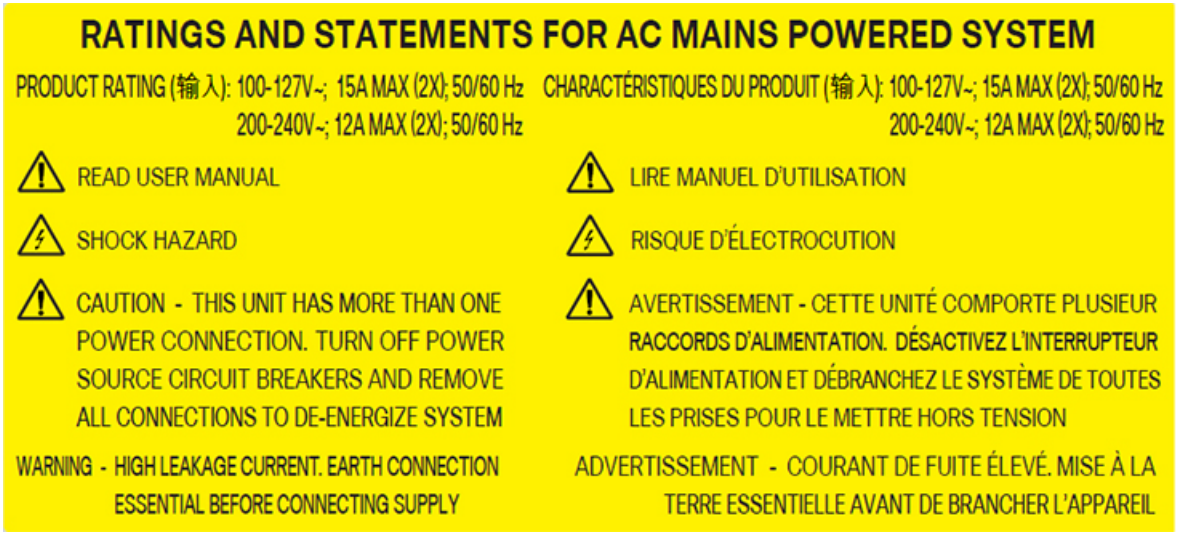
Step 6 Use protection covers to keep the lugs in place.

Snap fit the protection cover towards the top for 90-degree lugs and push it down for straight (180-degree) lugs.

Connect AC Power to the Cisco NCS 1014 Chassis

Caution The Cisco NCS 1014 chassis relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and National Electrical Codes.

Figure 69: Rating Label for AC Power



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

Note You need a dual pole breaker for the installation. The rating of the dual pole breaker for each feed is 16 A for input voltage 200–240 V~, and 20 A for input voltage 100–127 V~.

This procedure applies to the high-capacity power supply (NCS1K14-AC-PSU-3) also.

Procedure

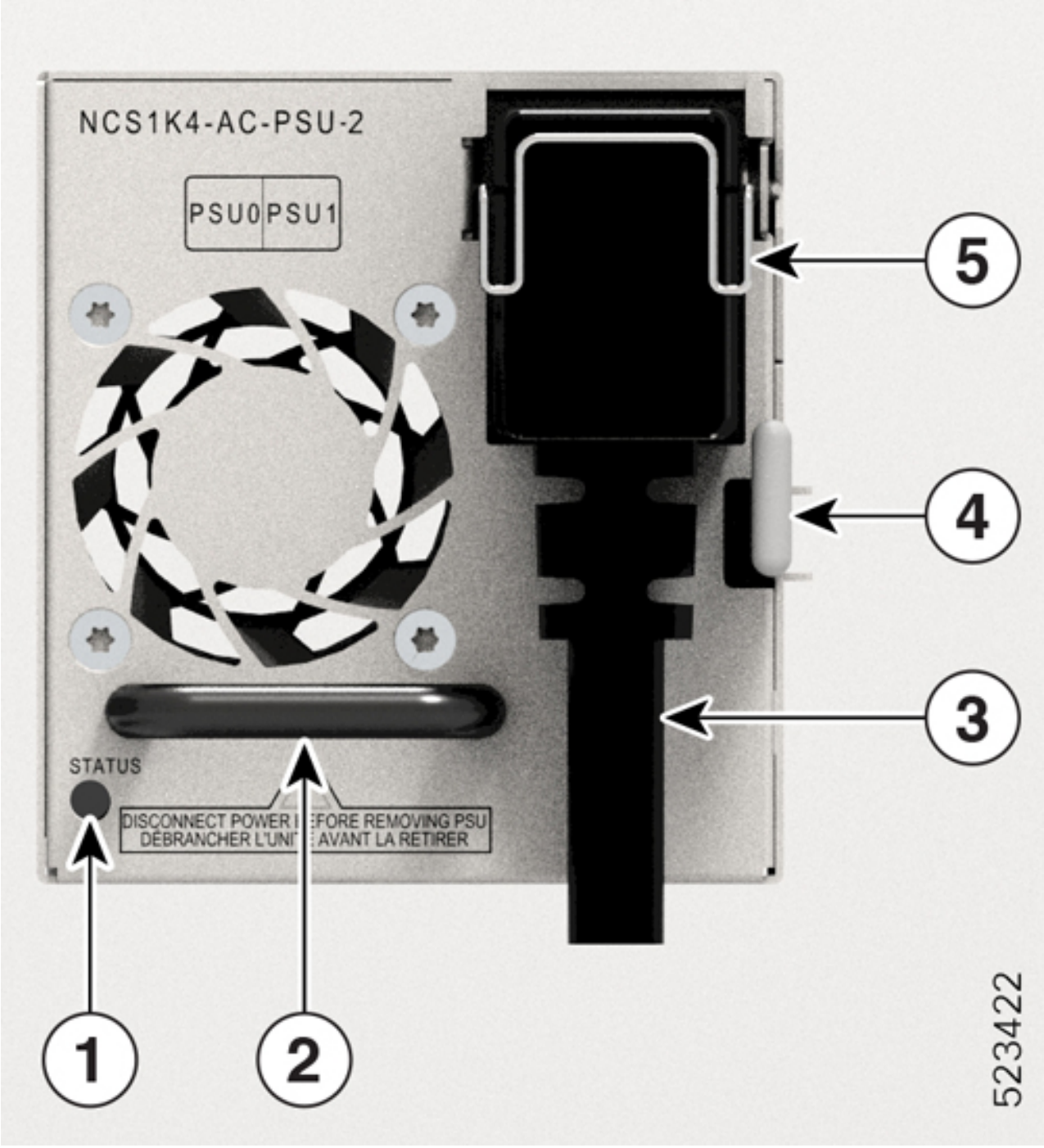
Step 1 Verify that the AC cable is installed in the correct AC source panel. Ensure that either the fuse is removed or the circuit breaker is in the *off* position and locked out.

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

Note
Ensure that there is a minimum gap of 50 mm for routing the cables. Use a 180-degree exit cable to maintain a footprint of 600 mm for ETSI racks.

Step 3 Close the cable retention clips to secure the power cables and to prevent their accidental removal.

Figure 70: NCS1K4-AC-PSU-2 with 180-Degree Cable Connection



Callout	Component	Callout	Component
1	Status LED	4	Locking latch
2	PSU Handle	5	Protective cover

Callout	Component	Callout	Component
3	6AWG 180-degree exit cable		

Install the Pluggables

Use this task to install the pluggables on a line card. The line card ships with pluggable caps.

Caution To protect the line card, insert pluggable caps into the pluggable slots when no pluggable is inserted.

Transceivers, fiber-optic cables, and optical ports on the line cards must stay clean and free of dust to maintain high signal accuracy and to prevent damage to the connectors. Cover them with pluggable cap when not in use.

Procedure

Step 1 Remove the pluggable caps.

You can retain and reuse the pluggable caps.

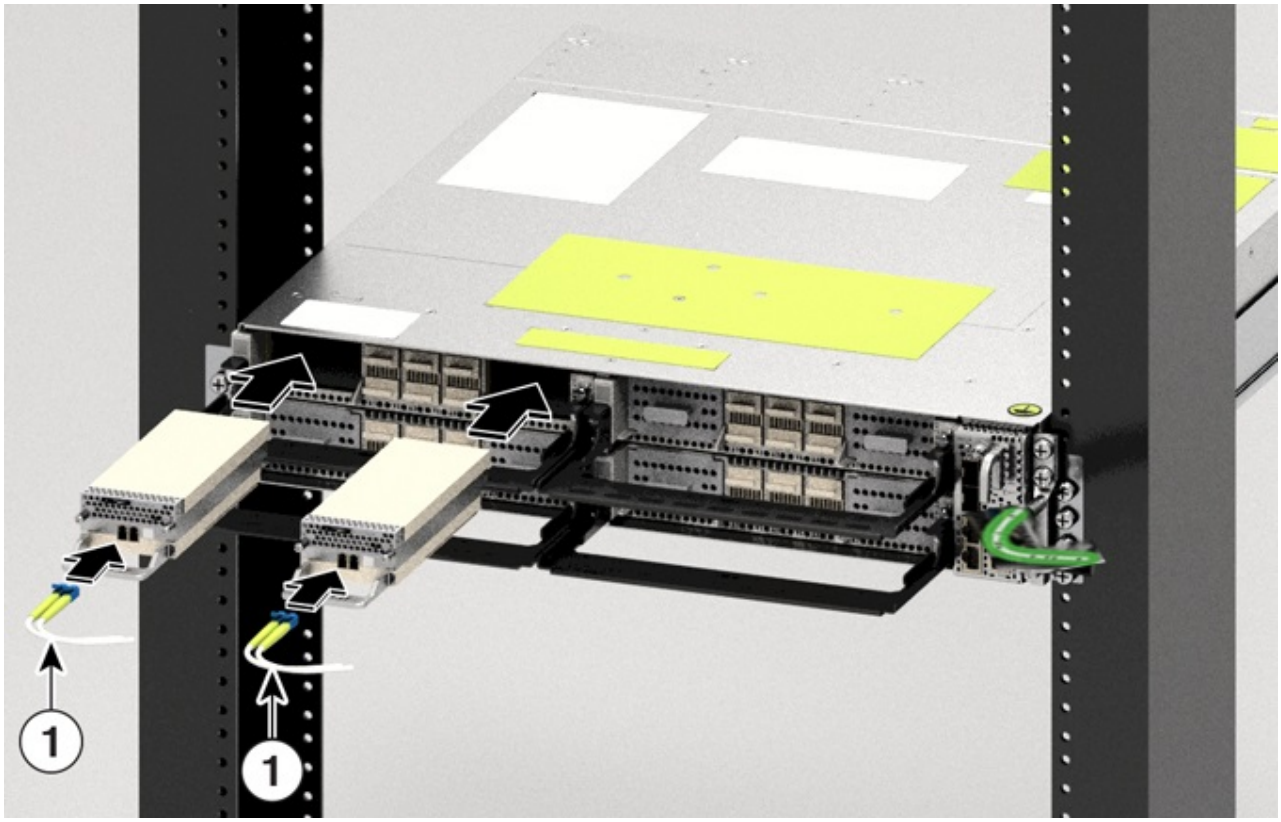
Step 2 Attach the optical fiber to the pluggables.

See the pluggable labels for Tx and Rx polarity to attach the optical fibers.

Step 3 Orient the pluggable to the correct slot.

For installing the CIM8 module in the 2.4T line card, use the fiber management bracket for navigation support.

Figure 71: Inserting the CIM8 Module in the 2.4T Card



Step 4 Insert the pluggables until the pluggables fully engage in their respective ports to ensure proper connection to the line card.

While inserting the CIM8 module, ensure that the screws are protruding out as much as possible.

Step 5 If you are installing the CIM8 module in the 2.4T line card, tighten the two captive screws to secure it in the port, else skip to the next step.

See the CIM8 module label for the correct torque to apply to tighten the screws. Use the T15 Torx screwdriver to tighten the CIM8 module. You must avoid extra torque application on the CIM8 screw. Excess application of torque can damage the screws. Only after both screws are tightened properly, the system detects the CIM8 pluggable. Even for the OIR of CIM8, you must be careful to avoid any damage to the CIM8 screws.

Step 6 Check whether you have installed all the required pluggables before routing the cables.

Step 7 Route the cables emerging from the pluggables over the fiber management bracket.

Guidelines for managing the fibers and cables:

- Use Velcro tapes to tie the fibers to the fiber management bracket.
- Fibers from the left line cards must exit from the left and fibers from the right line cards must exit from the right.
- Fibers and cables from the controller must exit from the right. Maintain sufficient slack to extract the controller during online insertion and removal (OIR).
- Cables from the PSU must exit from the left (when viewed from the rear side).

Important
For ETSI racks, route the 180-degree power cables in the 50-mm space below the chassis to maintain a chassis footprint of 600 mm.

- Ground cable must exit from the right.
- Rest the fibers exiting from the pluggables on the cable support bracket. Pass a Velcro tape in the gap provided in the cable support bracket to tie the fibers.

Install the Air Filter

Use this procedure to install the air filter.

We recommend that you include the air filter installation as part of the chassis installation.

Precautions to take while installing air filters

- Ensure that you have not installed the ground lug onto the chassis.
- Ensure that the pull tabs of the pluggables do not get damaged during installation.
- Ensure that the Velcro of the fiber management bracket does not interfere with the air filter.
- To remove a chassis placed in the middle, in a stacked configuration, you must remove the air filters of the chassis above and below also to avoid accidental scratches on the surface of the chassis.
- Ensure the cables from the controller exit from the right. Maintain sufficient slack to enable easy removal and insertion of the controller during online insertion and removal (OIR).

Procedure

Step 1 After inserting the chassis in the rack, fix the air filter side brackets on either side of the chassis using the following actions:

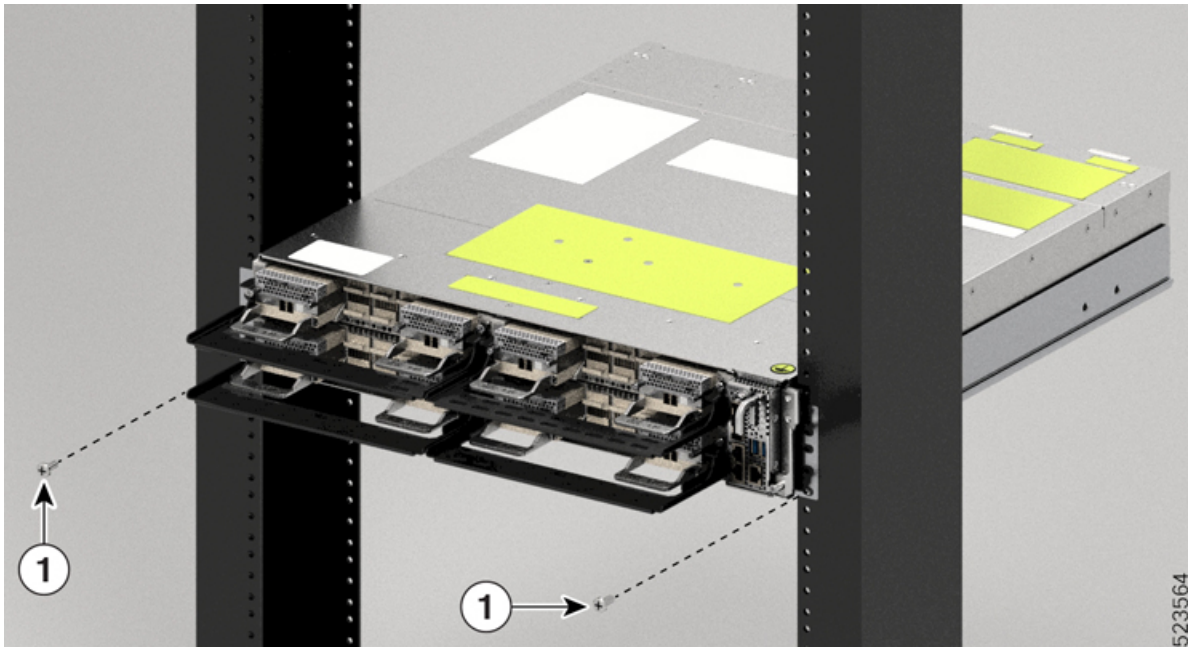
a. Check for the arrow indications on the side of the brackets.

b. Using the Phillips screws on either side, bind the chassis and the air filter side brackets to the rack.

c. Tighten the Phillips screws (48-101524-01) using a number-2 Phillips screwdriver, to a torque value of 4.65 N-m (41 lbs-in).

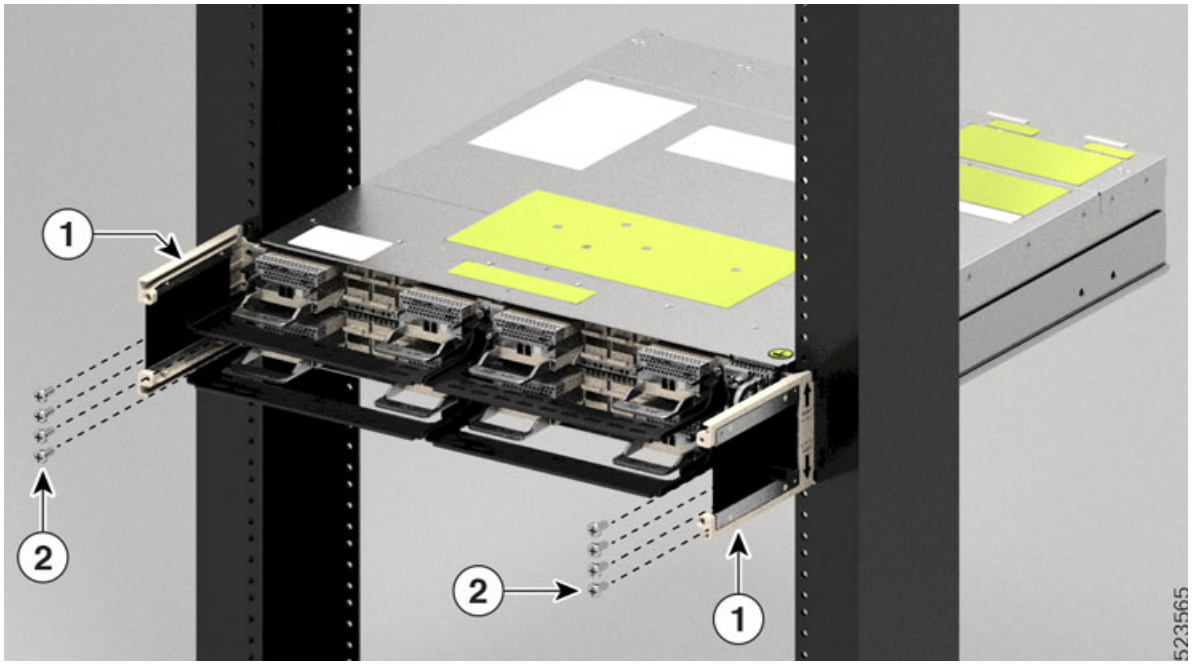
Note
In case you are installing the air filter after you installed the chassis, then unscrew and remove the four screws on either side that bind the chassis to the rack. After fixing the air filter side brackets, you need only three screws on either side to bind the chassis and air filter side brackets to the rack.

Figure 72: Screws to Secure the Cisco NCS 1014 Chassis on to the Rack



Callout	Component
1	Torx screw

Figure 73: Installing the Air Filter Side Brackets



Callout	Component
1	Air filter side brackets
2	Torx screws

Step 2 Install the ground lug. See Ground the Cisco NCS 1014 Chassis, on page 86.

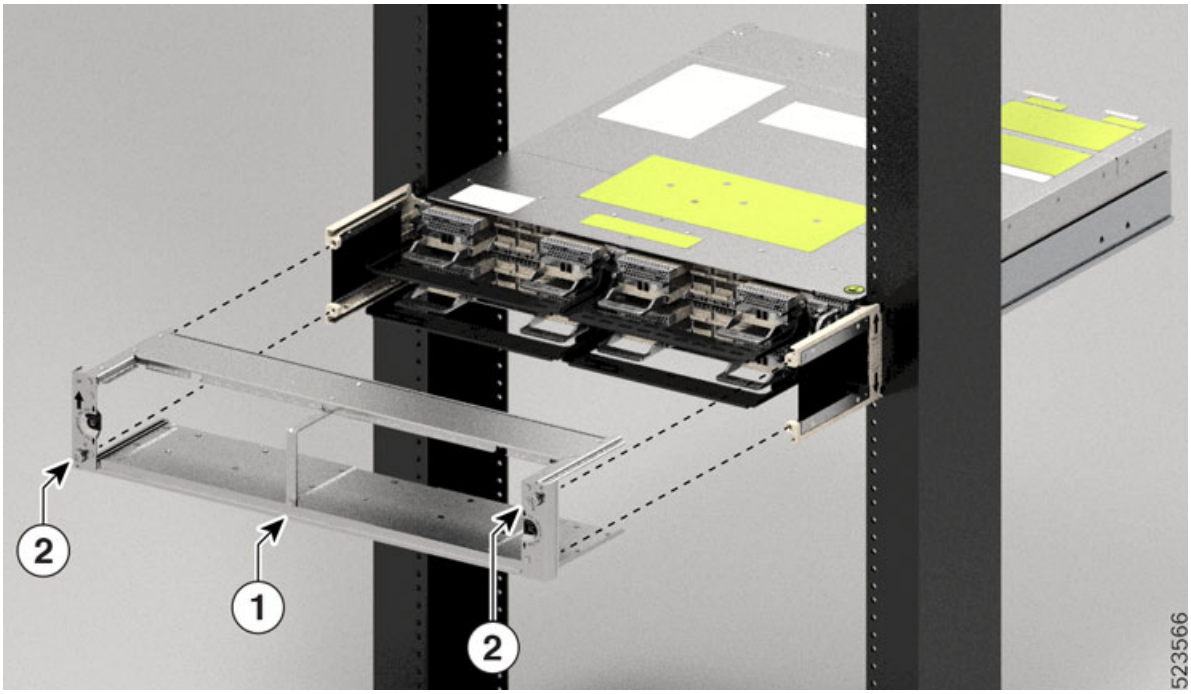
Remember
Install the ground lug before installing the air filter frame.

Step 3 Slide the air filter frame into the air filter side brackets.

Caution
Make sure that you tagged the air filter frame to a specific chassis and not mixed with other chassis.

Caution
Before placing the spare label on the air filter frame, verify that the serial number on the spare label matches with the serial number on top of the chassis. If the serial numbers do not match, there can be inconsistencies in inventory management.

Figure 74: Installing the Air Filter Frame

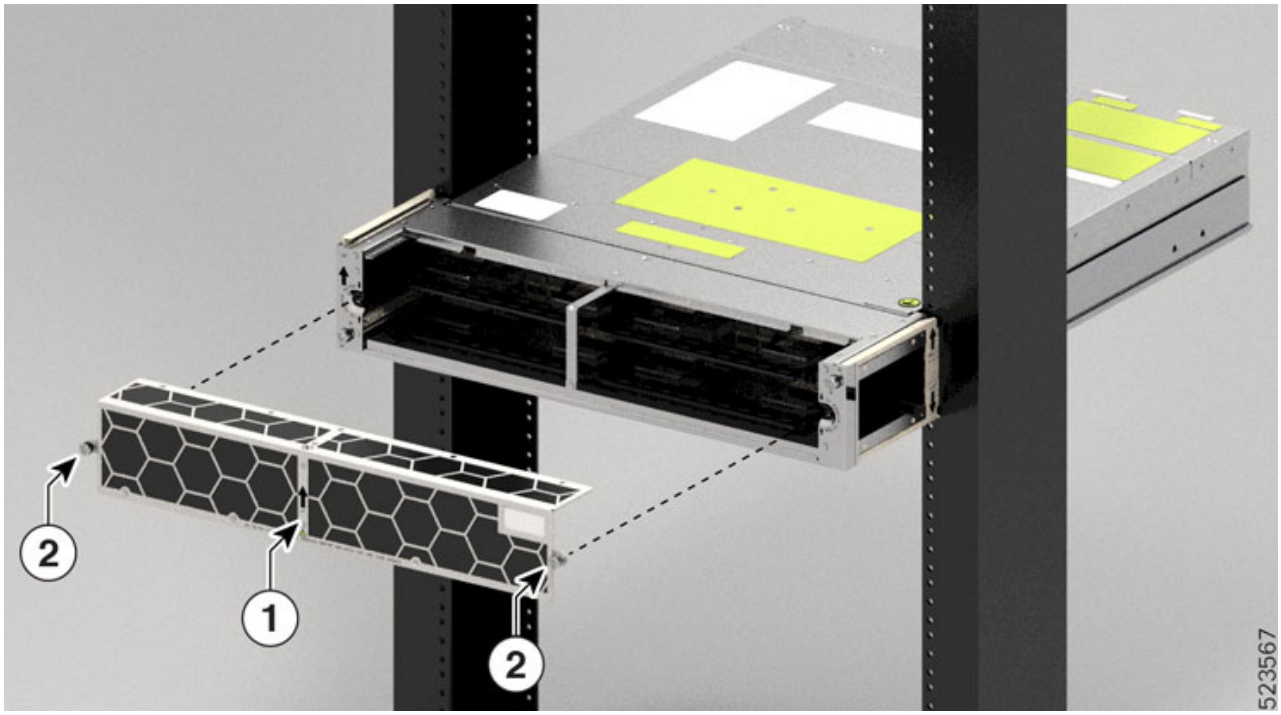


Callout	Component
1	Air filter frame
2	Captive screw

Step 4 Using a T15 Torx screwdriver, tighten the screws on either side (placed diagonally) to a torque value of 0.65 N-m (5.6 lbs-in).

Step 5 Orient the air filter correctly. The arrow must point upwards.

Figure 75: Installing the Air Filter

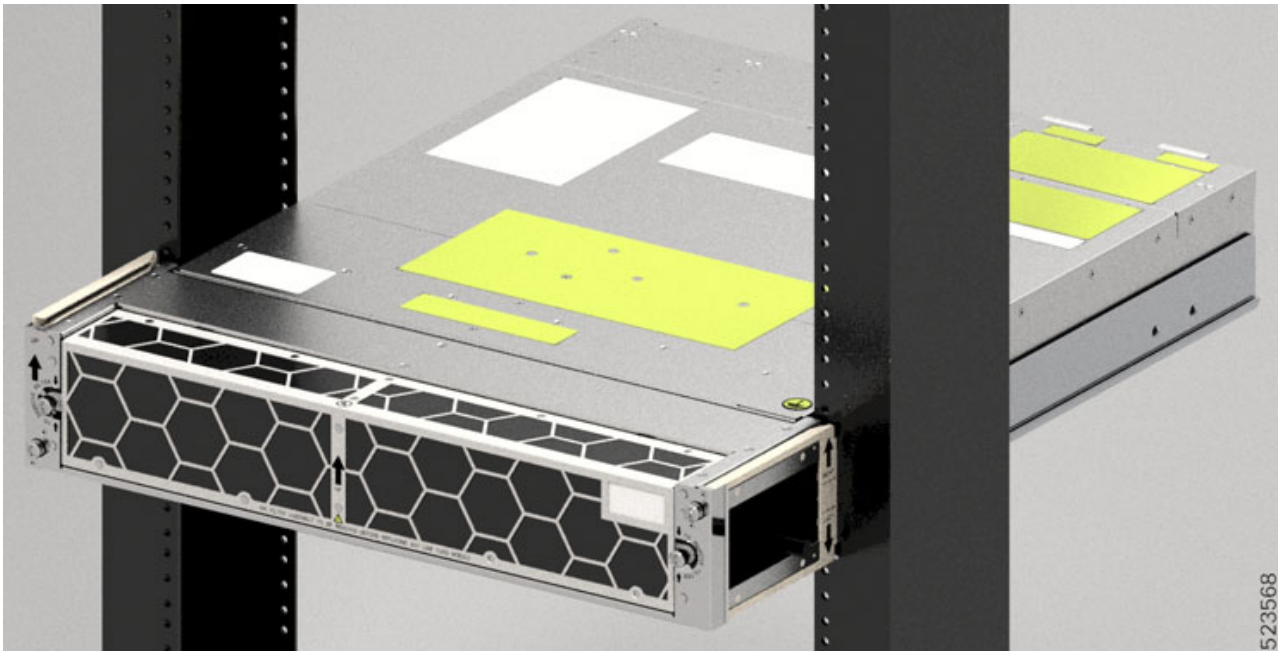


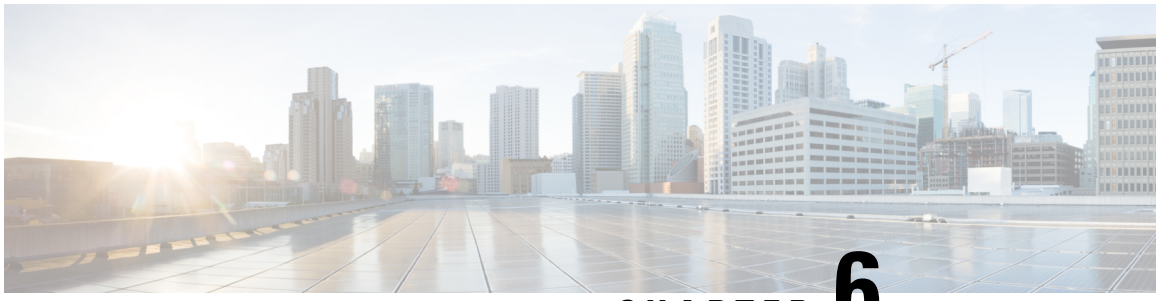
Callout	Component
1	Air filter arrow
2	Captive screws

Step 6 Push the air filter onto the frame and adjust so that it engages with the edges of the frame.

Step 7 Using a T15 Torx screwdriver, tighten the screw on either side of the air filter to a torque value of 0.65 N-m (5.6 lbs-in).

Figure 76: Installed Air Frame





CHAPTER 6

Remove and Replace Cisco NCS 1014 Modules

This chapter describes the procedures to replace Cisco NCS 1014 modules.

Caution All the modular slots in the NCS 1014 chassis should always be populated with respective modules (line-cards, controller, PSU & fan units). Empty line card slots to be populated with filler modules, which are shipped with the chassis. The replacement or upgrade of the modules (Online Insertion or Removal, OIR) to be performed only when the ambient temperature is below 30-degree C. The OIR of modules should be completed within five minutes to prevent overheating of the components.

WARNING: DO NOT INTRODUCE BODY OR OBJECT IN THE CHASSIS / PSU / FAN TRAY / LC SLOTS WHEN INSTALLING OR REMOVING A MODULE. EXPOSED CIRCUITRY IS AN ENERGY HAZARD.

ATTENTION: ÉVITEZ TOUT CONTACT ENTRE VOTRE CORPS OU UN OBJET EXTERNE ET L'INTÉRIEUR DU CHÂSSIS, DU BLOC D'ALIMENTATION, LA FENTE DE VENTILATION DU PLATEAU, OU DE LA FENTE PDS LORSQUE VOUS INSTALLEZ OU RETIREZ UN MODULE. LES CIRCUITS EXPOSÉS CONSTITUENT UN RISQUE D'ÉLECTROCUTION.

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- Remove and Replace the Pluggables in the 2.4T Line Card, on page 121
- Remove and Replace a Line Card, on page 122
- Remove the divider from the NCS 1014-2 chassis, on page 123
- Remove and replace OXP2-K9 line card, on page 124
- Remove and Replace the Power Supply Unit (PSU), on page 126
- Remove and Replace the Controller, on page 129
- Remove and Replace the Fan Module, on page 130
- Remove and Replace the Solid State Drive (SSD), on page 132
- Remove and replace the RTC battery in the controller, on page 133
- Wipe Data in Disk Using Secure Erase, on page 136

Remove and Replace the Pluggables in the 2.4T Line Card

Use this procedure to remove and replace the pluggables in the 2.4T DWDM line card.

Note This procedure is applicable to replacing pluggables in other line cards too.

Procedure

Step 1 Unfasten the Velcro tapes holding the fibers to the fiber management bracket and free up space to remove the required pluggable.

Step 2 If you want to remove the CIM8 module, then loosen the two screws, else continue with the next step.

Step 3 Use the pull tabs to pull out the required pluggable.

Step 4 Remove the fibers from the required pluggable.

Step 5 Repeat the previous steps until you complete removing all the required pluggables.

Step 6 (Optional) Insert pluggable caps into the pluggable slots when the slots have no pluggable.

What to do next

Install the Pluggables, on page 113

Remove and Replace a Line Card

Use this procedure to remove and replace the line card or filler card in the Cisco NCS 1014 chassis.

Caution Perform the removal and replacement procedure for a line card or filler card only when the ambient temperature is below 30℃ (80℉). Complete the procedure within five minutes to prevent overheating of the chassis components.

Procedure

Step 1 Using the T-15 six lobe/slot screwdriver, loosen the captive screws available in the line card.

Step 2 Holding the fiber management bracket with one hand and supporting the line card with the other, pull it from the slot.

Caution
Use the fiber management brackets only for pulling out or pushing in the line cards or filler cards. Do not use the fiber management brackets to carry the cards. Always support the line card or filler card at the bottom with your hand.

What to do next

Install the Line Card, on page 101

Remove the divider from the NCS 1014-2 chassis

Enable installation of two-slot line cards, such as the OXP2-K9, by adapting the NCS 1014-2 chassis.

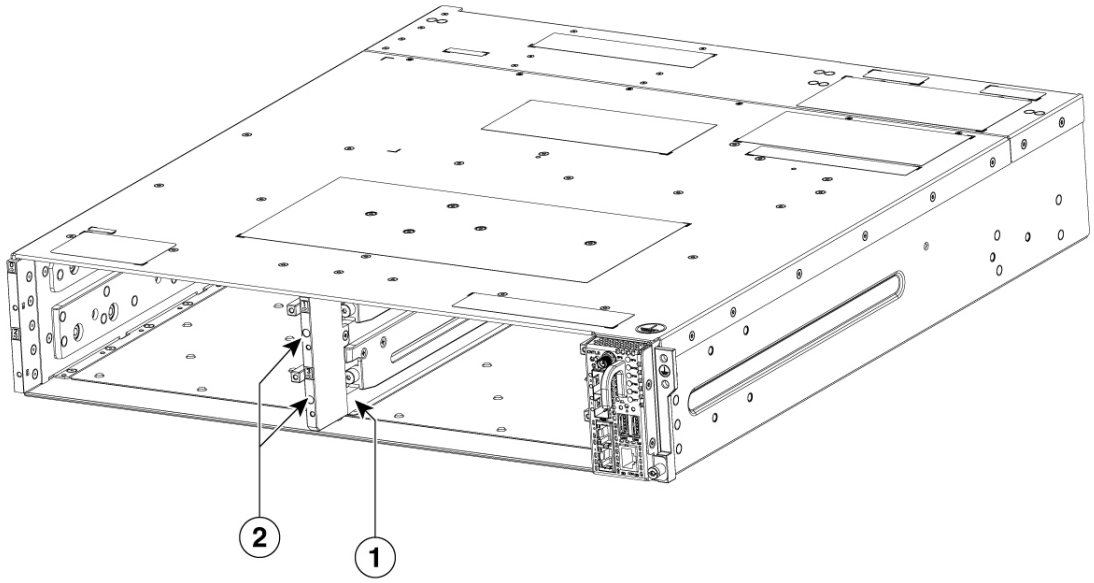
When your chassis includes four single-slot filler cards and a removable internal divider, and you plan to install a dual-slot line card like the OXP2-K9, the internal divider must be removed to accommodate the new card.

Follow these steps to remove the divider from the NCS 1014-2 chassis:

Procedure

Step 1 Identify the screw access holes in the divider.

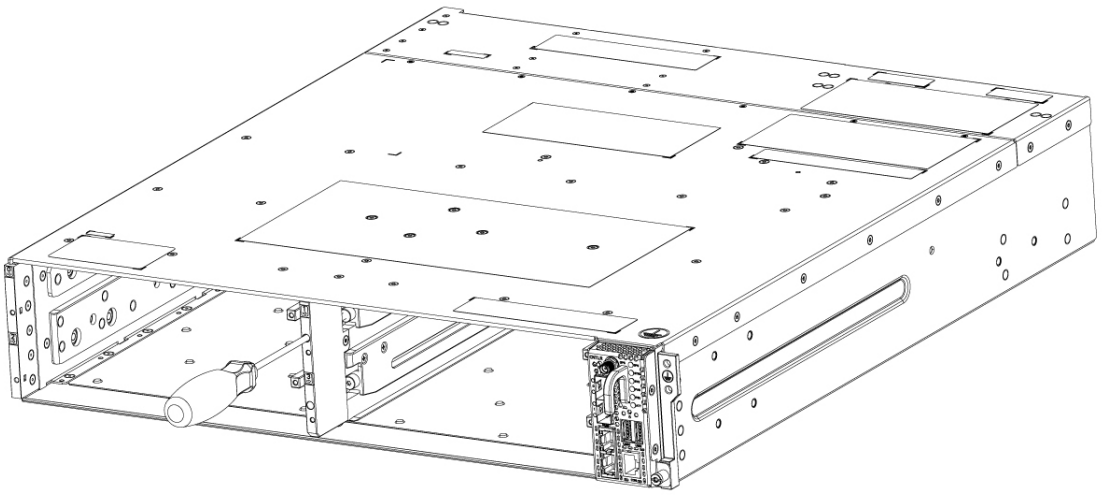
Figure 77: NCS 1014-2 chassis with divider



Callout	Component
1	Divider
2	Screw access holes

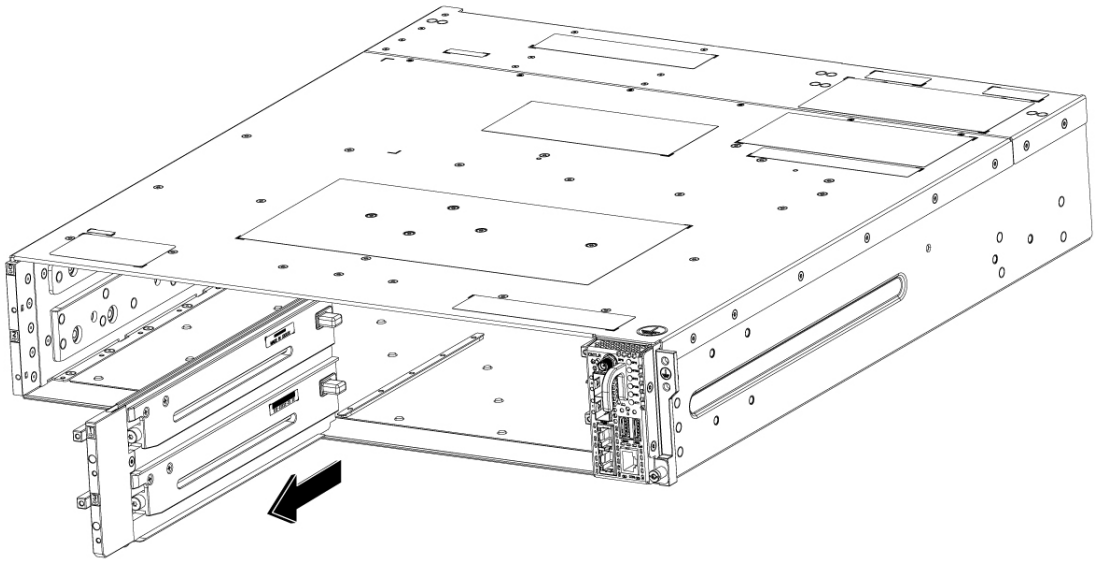
Step 2 Insert the T15 screw driver into a screw access hole and loosen the screw. Repeat for the other screw access hole.

Figure 78: Inserting the screw driver into the screw access hole of the divider



Step 3 Carefully pull the divider straight out of the chassis.

Figure 79: Removing the divider



The divider is successfully removed, and the chassis is ready to accommodate two-slot line cards such as the OXP2-K9 line card.

Remove and replace OXP2-K9 line card

Remove a faulty OXP2-K9 line card to maintain device operation or prepare the chassis for installation.

Removing the OXP2-K9 line card is necessary when the card is faulty or prior to chassis installation, preventing excessive weight and making the process safer.

Also use the same procedure to remove the filler card.

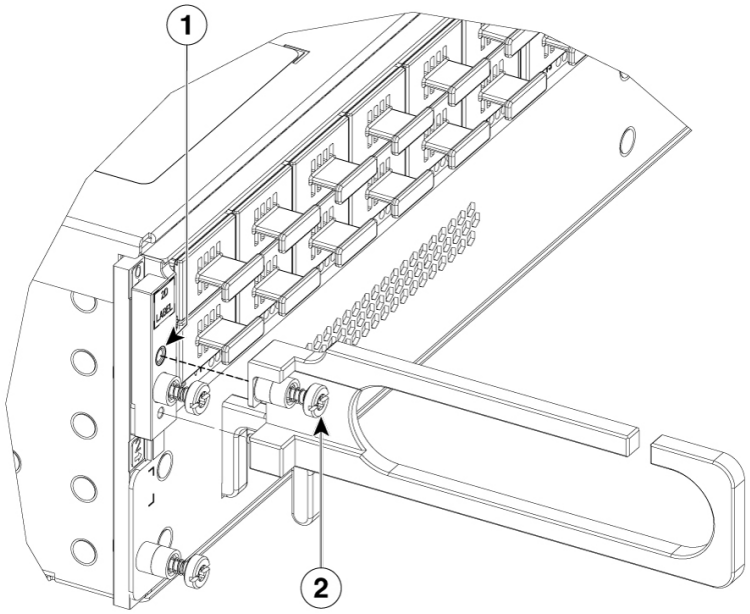
Procedure

Step 1 Identify the alignment holes on the sides of the OXP2-K9 line card.

Step 2 Insert the alignment pin into the hole, place the hook onto the card, and tighten the captive screw to securely fasten the hook.

A pair of hooks used to remove the OXP2-X9 line card are included as accessories in the OXP2-K9 line card package.

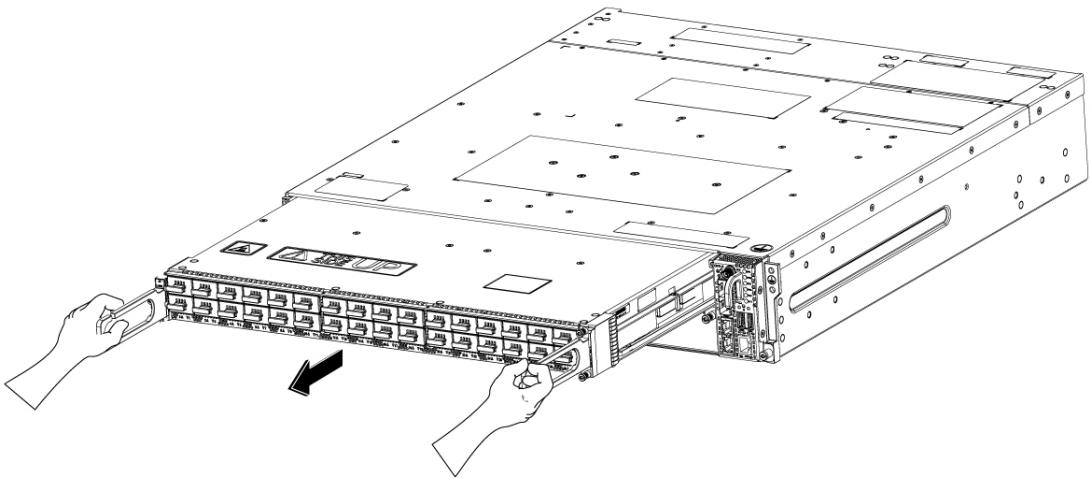
Figure 80: Removing the OXP2-K9 line card



Step 3 Repeat steps 1–2 for the hook on the opposite side of the card.

Step 4 Firmly grip both hooks and gently pull the line card out of the chassis.

Figure 81: Removing the OXP2-K9 line card



The OXP2-K9 line card is removed.

What to do next

Install the OXP2-K9 line card, on page 103

Remove and Replace the Power Supply Unit (PSU)

Use this procedure to remove and replace a PSU in the Cisco NCS 1014 chassis.

Before you begin

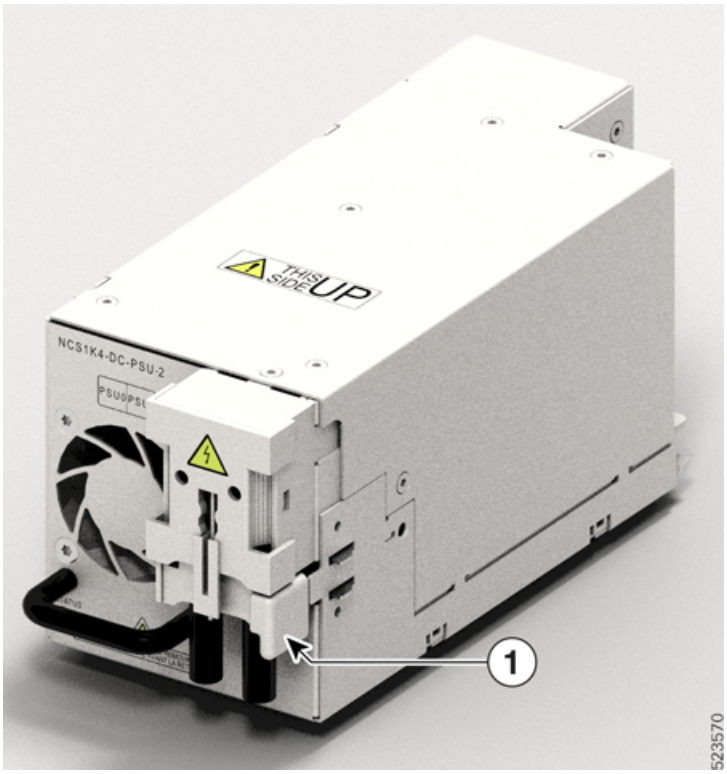
Remove the connections to the power supply:

- Disconnect power from the breaker before disconnecting power from the power supply unit.
- Remove the cable retainers and the power cables, in case of an AC power supply unit.
- Remove the protection covers, fasteners, and lugs, in case of a DC power supply unit.

Procedure

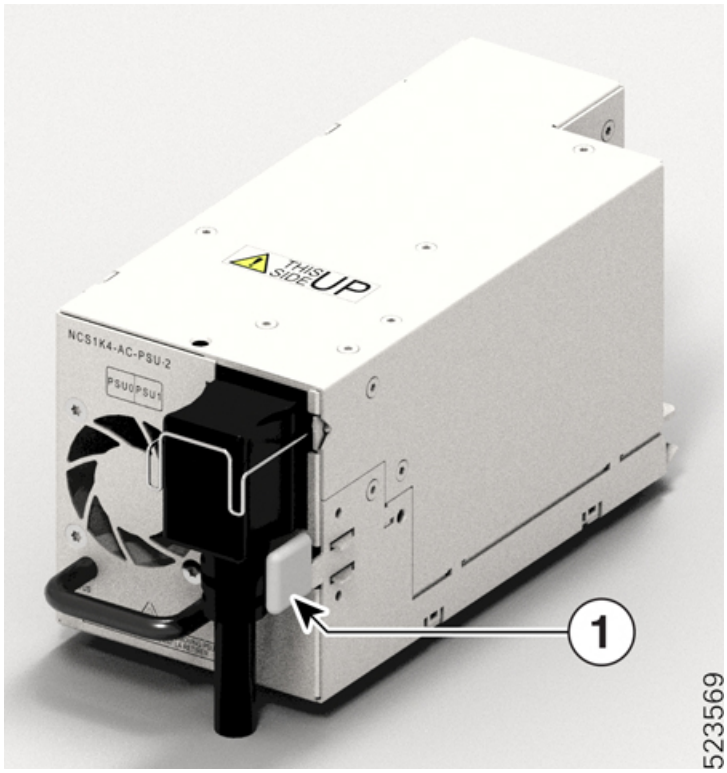
Step 1 Press the locking latch towards the left to release the lock.

Figure 82: Locking Latch on the DC PSU



1	Locking latch

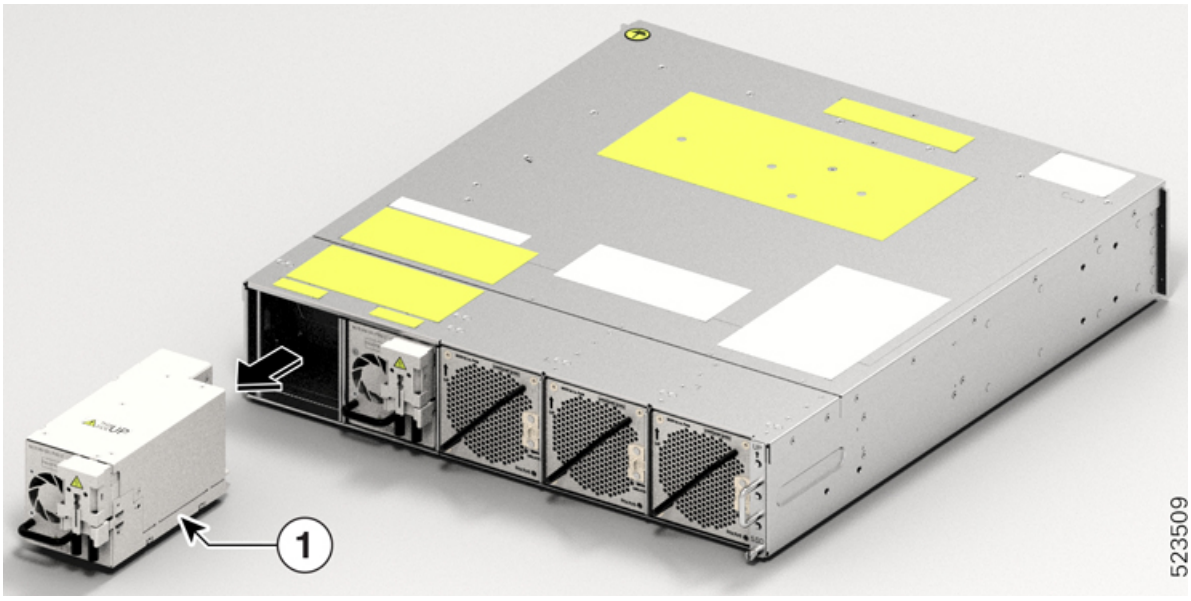
Figure 83: Locking Latch on the AC PSU



1	Locking latch

Step 2 Holding the handle with one hand and supporting the PSU with the other, gently pull out the PSU from the slot.

Figure 84: Removing the PSU



What to do next

Install the Power Supply Units (PSUs), on page 104.

Remove and Replace the Controller

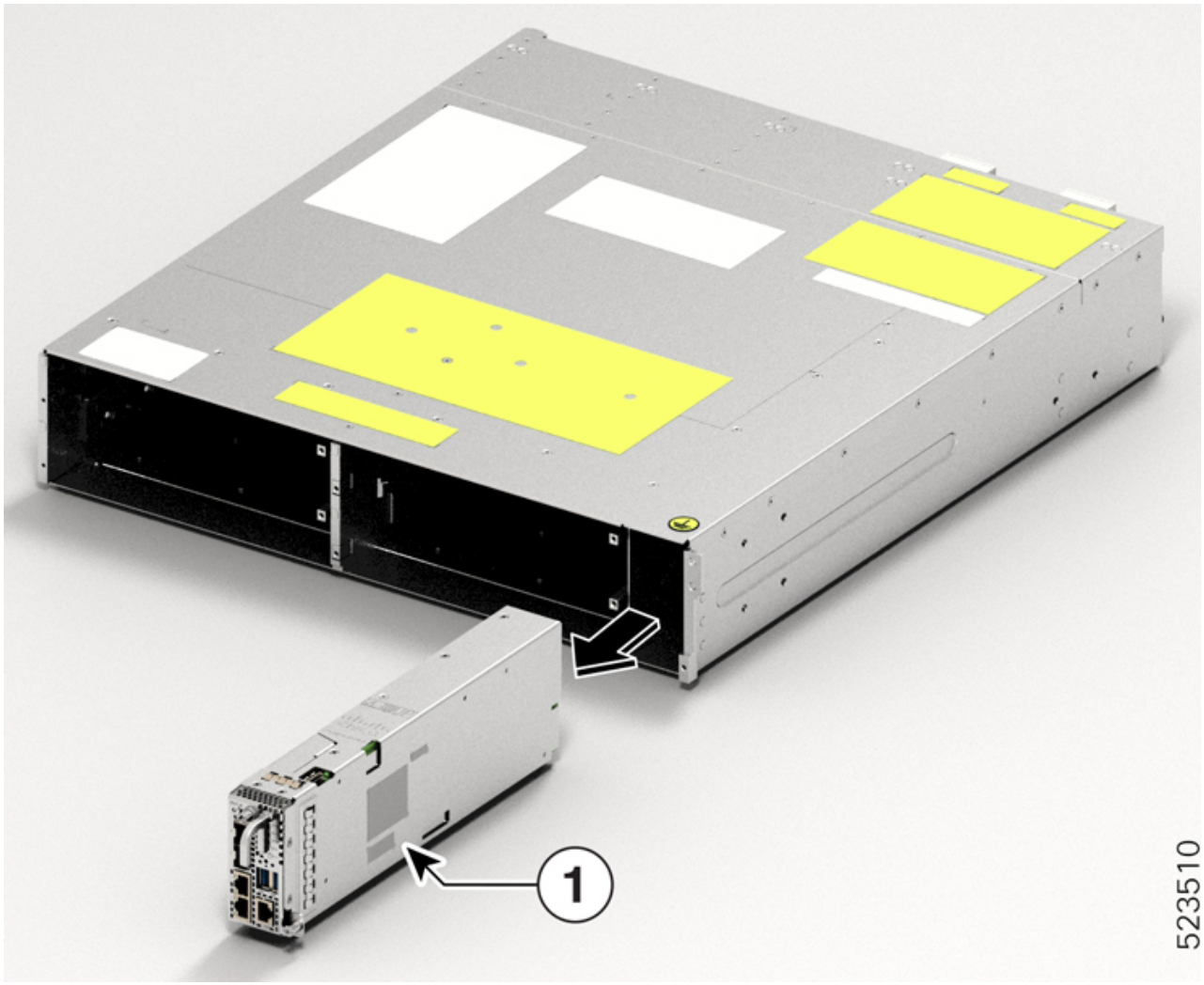
Use this procedure to remove and replace the controller in the Cisco NCS 1014 chassis.

Procedure

Step 1 Using a T15 six lobe/slot screwdriver, unfasten the two screws on the controller.

Step 2 Holding the handle with one hand and supporting the controller with the other, gently pull the controller from the slot.

Figure 85: Removing the Controller



1	Controller Card

What to do next

Install Controller

Remove and Replace the Fan Module

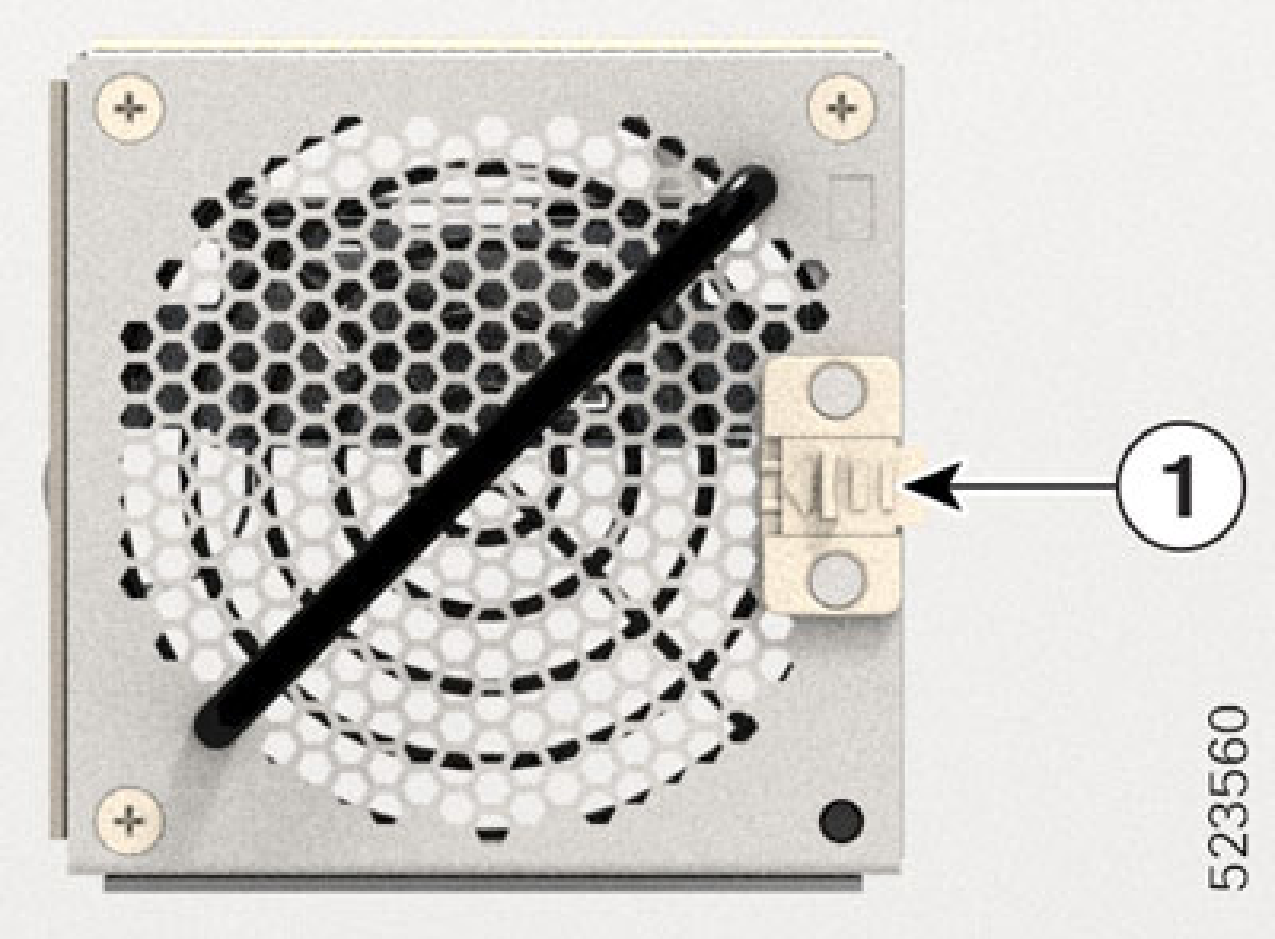
Use this procedure to remove and replace a fan module in the Cisco NCS 1014 chassis.

Caution Online insertion and removal (OIR) duration for the fan module at 30℃ ambient temperature is five minutes.

Procedure

Step 1 Push and hold the spring-loaded lever toward the left with your thumb (unlock position).

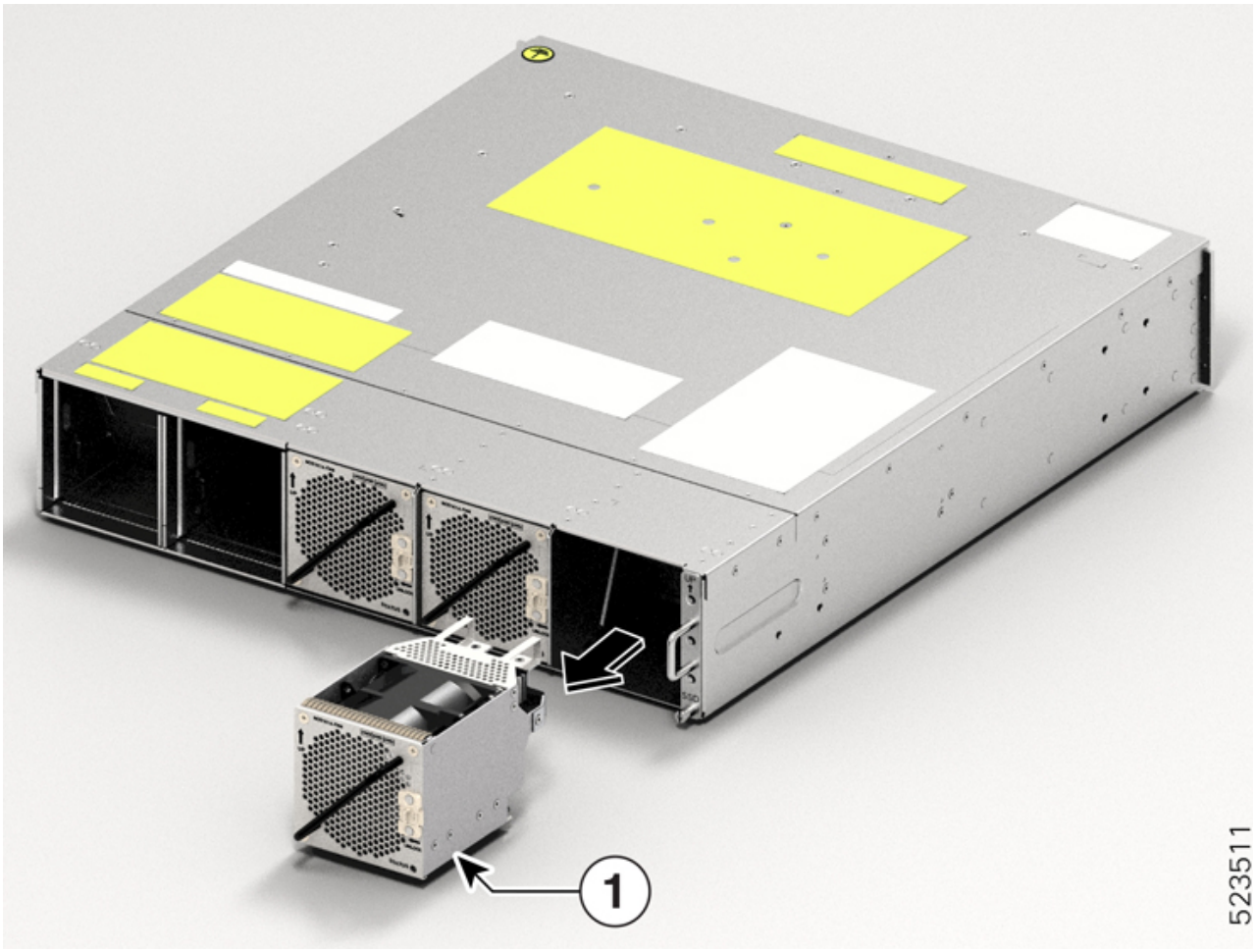
Figure 86: Spring-Loaded Lever in Holding or Unlock Position



1	Sping-loaded lever

Step 2 Holding the handle with one hand and supporting the fan module with the other hand, gently pull it out of the chassis.

Figure 87: Removing the Fan Module



1	Fan module

What to do next

Install Fan Module.

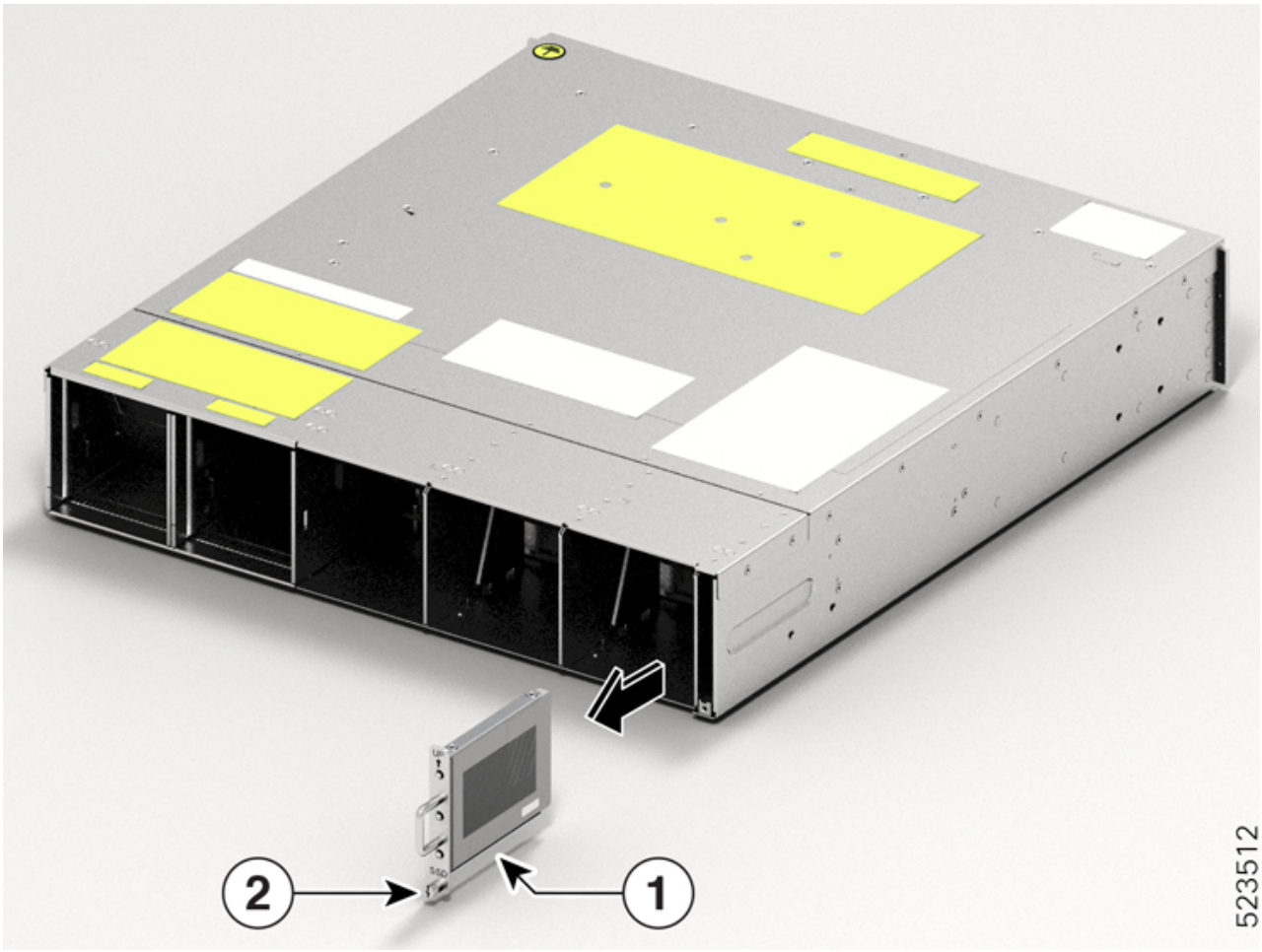
Remove and Replace the Solid State Drive (SSD)

Use this procedure to remove and replace the SSD in the Cisco NCS 1014 chassis.

Procedure

Step 1 Using a T15 six lobe/slot screwdriver, loosen the lone captive screw on the SSD.

Figure 88: Removing the SSD



Callout	Component
1	SSD
2	Captive screw

Step 2 Remove the SSD. To remove, gently pull out the SSD from the slot.

What to do next

Install the Solid State Drive (SSD), on page 92

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.

- T-8 Torx torque screwdriver
- 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:
  - 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

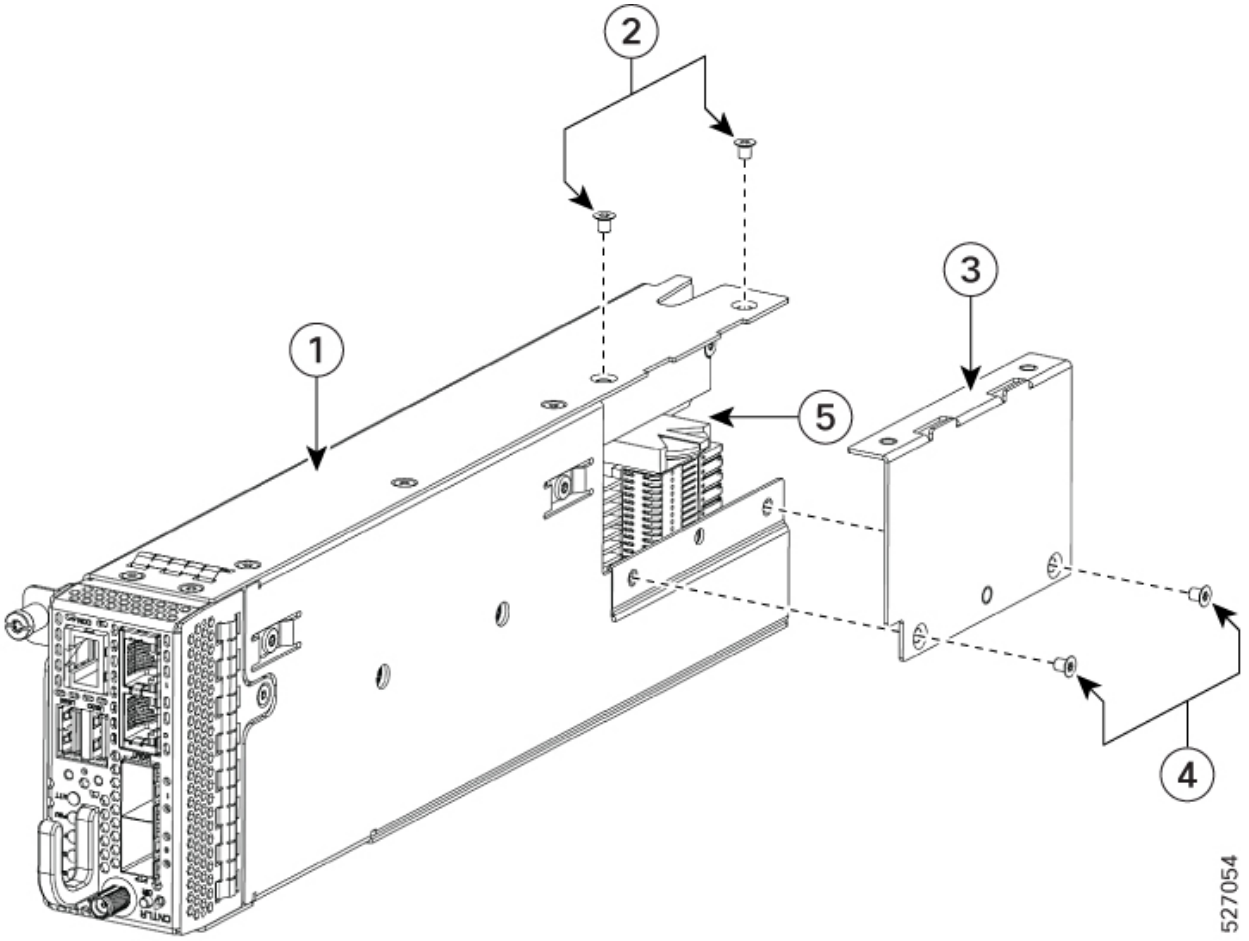
Step 1 Turn the controller upside down so the *This Side Up* label faces the grounded mat.

Before turning over the controller, use the *This Side Up* label to help yourself orient the controller correctly.

Step 2 Remove the side cover.

a) Use a T-8 Torx driver to loosen the four screws—two on the side and two on the top.
b) Gently pull out the side cover.

Figure 89: Removing the side cover



1	Base of the controller
2	Two T-8 Torx screws
3	Side cover
4	Two T-8 Torx screws
5	Vertical RTC battery socket

Step 3 Locate the vertical RTC battery socket directly beneath the side cover.

Step 4 Remove the RTC battery.

a) Use a plastic spudger to gently push against the spring and release the battery from the socket.
b) Carefully lift and remove the battery using plastic or ceramic tweezers.

Step 5 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 into place under the retaining tabs.
d) Ensure the battery is seated snugly and correctly. The positive side of the battery should face the retainer clip/tab when installed in the vertical holder.

Step 6 Reattach the side cover, tightening the four screws with the T-8 Torx driver to a torque value of 5.5 ± 0.5 in-lbs.

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

If the NCS 1014 unit becomes faulty and must be returned, contact Cisco TAC to open a Return Material Authorization (RMA) request. Before opening an RMA request, you can securely erase data in NCS 1014 disks using the Secure Erase feature.

Warning Use this procedure only during RMA.

Before you begin

Take out the NCS 1014 unit that you planned for RMA out of the data center and the network. Access NCS 1014 only using the console port.

Procedure

Step 1 When NCS 1014 boots (power cycle), the following message appears.

```
Version 2.19.1266. Copyright (C) 2023 American Megatrends, Inc.
BIOS Date: 07/31/2023 14:01:08 Ver: 0ACHI0460
Press <DEL> or <ESC> to enter setup.
Press DEL or ESC key to enter BIOS.
```

Press **DEL** or **ESC** key to enter BIOS.

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

The disk security details such as HDD Secure Erase are displayed in the Advanced tab.

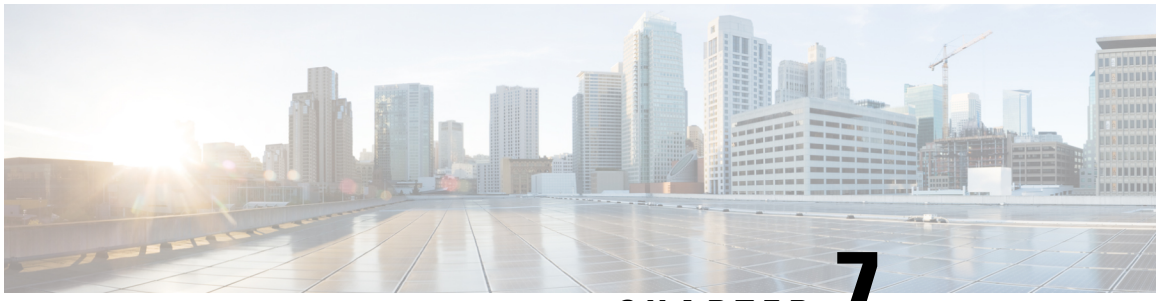
Step 3 Select **HDD Secure Erase** to securely erase data.

The list of SSDs that support Secure Erase is displayed. D:13 is CPU SSD and D:14 is Chassis SSD.

Step 4 Select the SSD from which you want to erase data using the arrow keys.

Step 5 Select **Yes** in the Confirmation screens.

The system proceeds to securely erase data in the selected SDD after these confirmations.



CHAPTER 7

LEDs

This section provides details of the LEDs in the Cisco NCS 1014 modules, controller unit and line card.

- Line Card LEDs, on page 139
- Controller LEDs, on page 149
- Power Supply Unit (PSU) LED, on page 152
- Fan Module LED, on page 153

Line Card LEDs

The Cisco NCS 1014 line cards use LEDs to indicate the overall state of the cards and help you verify the status of specific connections, ports, and system components. The following topics identify these LEDs and explain what they mean.

Note

- "2.4T" refers to the NCS1K14-2.4T-K9 line card.
- "CCMD-16-C" refers to the NCS1K14-CCMD-16-C C-band optical line card.
- "CCMD-16-L" refers to the NCS1K14-CCMD-16-L optical line card.
- "1.2T" refers to the NCS1K4-1.2T-K9 line card.
- "2.4TX" refers to the NCS1K14-2.4T-X-K9 line card.
- "QXP-K9" refers to the NCS1K4-QXP-K9 line card.

2.4T, 2.4TA and 2.4TX Line Cards LED

The 2.4T, 2.4TA and 2.4TX line cards have nine LEDs to indicate the line port alarm status.

Note 2.4T line card LEDs apply to 2.4TA line card LEDs.

Figure 90: 2.4T Line Card LEDs

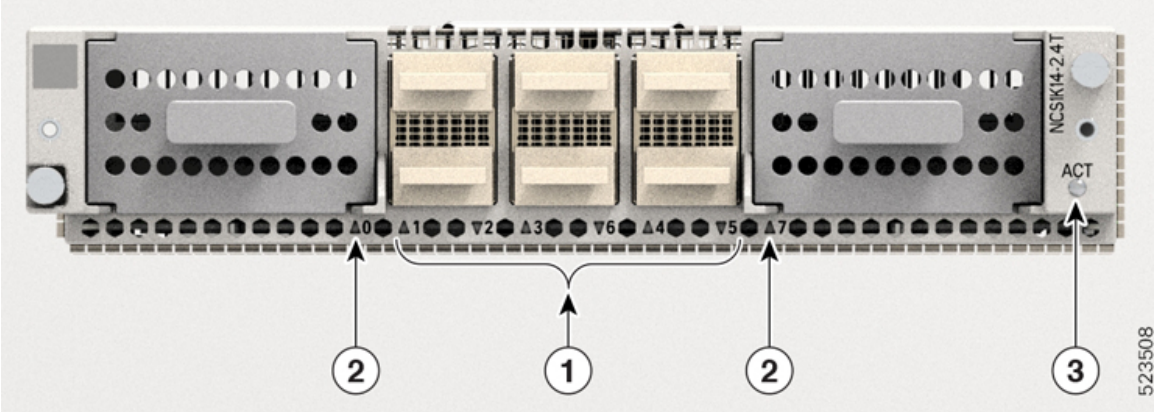
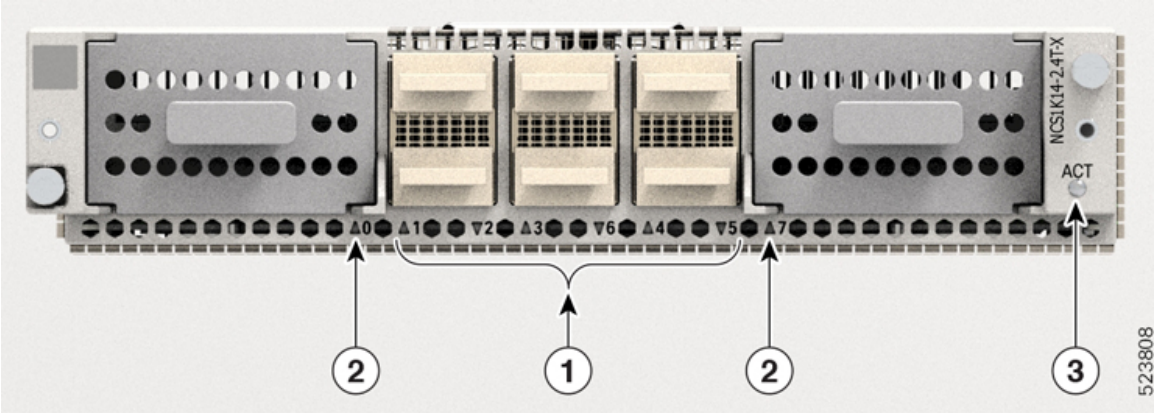


Figure 91: 2.4TX Line Card LEDs



Callout	LED
1	QSFP port (1–6) LEDs The card cage embeds the QSFP LEDs. The *triangles* appearing upwards and downwards indicate the status and position of the corresponding QSFP.
2	Trunk port (0 and 7) LEDs
3	ACT LED

Note The LED status applies to 2.4T, 2.4TA and 2.4TX line cards.

Table 52: Status of the Line Card LEDs

LED	Color	Status
ACT LED[1]	Amber (solid)	The line card is booting. This color appears as soon as the line card is inserted into the chassis.
	Flashing Red	The line card is in the booting phase.
	Green	The line card is up and operational (not associated to the traffic status).
QSFP and Trunk port LEDs (0…7)	Off	The port remains not provisioned or switched off.
	Green	The module is operational and has no alarm.
	Amber (solid)	Minor alarm (such as low Rx or Tx power) that could lead to a traffic-impacting situation.
	Amber (flashing)	Used for troubleshooting. Identifies the faulty port of an LC. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card. The port is configured in maintenance mode or the attention LED is enabled for this port. Use **hw-module location** to enable the attention LED for the port.
	Red	Major alarm that could lead to a traffic-impacting situation.

[1] ACT LED does not support Attention LED.

From R24.4.1, status of the trunk LEDs (0 and 7) are enhanced to reflect the conditions of the CIM8 pluggable.

Note Insert the CIM8 pluggable and verify that the LED begins blinking. If the LED fails to blink immediately after insertion, re-insert the pluggable until the blinking starts. Once the LED blinks, tighten both screws to secure the pluggable; this action stops the blinking and confirms the pluggable is correctly installed and ready for inventory detection.

Table 53: Status of the trunk LEDs based on CIM8 pluggable condition

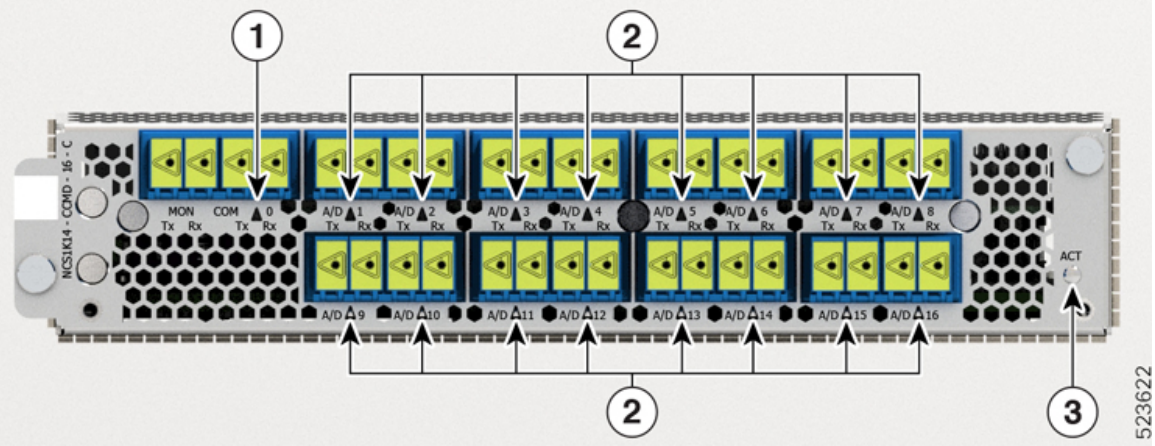
LED	Condition of the CIM8 pluggable	Color reported on CLI	Color on the port LED (physically)	Note
Trunk port LEDs (0 and 7)	Pluggable is inserted. Both captive screws in the pluggable are tightened. Datapath controllers for the pluggable are configured.	red/green	red/green	Based on the alarms that are raised, the LED reports red or green.
	Pluggable is inserted. Datapath controllers for the pluggable are configured. But, either one or both captive screws in the pluggable remain open.	red	red (flashing)	Raises Improper removal alarm.
	Datapath controllers for the pluggable are configured. But, the pluggable is removed.	red	red	Raises Improper removal alarm.
	Pluggable is inserted. Both captive screws in the pluggable are tightened. But, the datapath controllers for the pluggable are not configured.	red (flashing) to off	off	Raises no alarm.
	Pluggable is inserted. But, either one or both captive screws in the pluggable remain open. Datapath controllers for the pluggable are not configured.	off	red (flashing)	Raises no alarm.
	Pluggable is removed. Datapath controllers for the pluggable are not configured.	off	off	Raises no alarm.

CCMD-16-C and CCMD-16-L Line Card LED

The CCMD-16-C and CCMD-16-L optical line cards have 18 LEDs each to indicate the system status and the status of the optical ports.

The following information applies to both CCMD-16-C and CCMD-16-L cards.

Figure 92: CCMD-16-C Optical Cards LEDs



Callout	LED
1	COM
2	A/D-1…A/D-16
3	ACT

Table 54: Status of the CCMD-16-C and CCMD-16-L Optical Card LEDs

LED	Color	Status
ACT	Amber (solid)	The line card is booting. This color appears when you insert the line card into the chassis.
	Flashing Red	The line card is faulty.
	Green	The line card is up and operational—not associated to the traffic status.

LED	Color	Status
COM, A/D-1…A/D-16	Off	The port is not provisioned.
	Red	Major alarm that could lead to a traffic impacting situation.
	Green	The module is operational and has no alarm.
	Amber (solid)	Minor alarm (such as low Rx or Tx power) that could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of an LC. Use the **controller optics** command in the configuration mode to point to a faulty port in the LC. The port is configured in maintenance mode or the attention LED is enabled for this port. **Note** Attention LED is not supported on ACT LED.

1.2T and 1.2T Licensed Line Cards LEDs1.2T, 1.2TL, and 2-QDD-C Line Cards LEDs

The 1.2T and 1.2T licensed line cards have 14 LEDs and 2-QDD-C line cards have 12 LEDs to indicate the line port alarm status.

The LEDs information applies to 2-QDD-C, 1.2T, and 1.2T licensed cards.

Figure 93: 1.2T Line Card LEDs

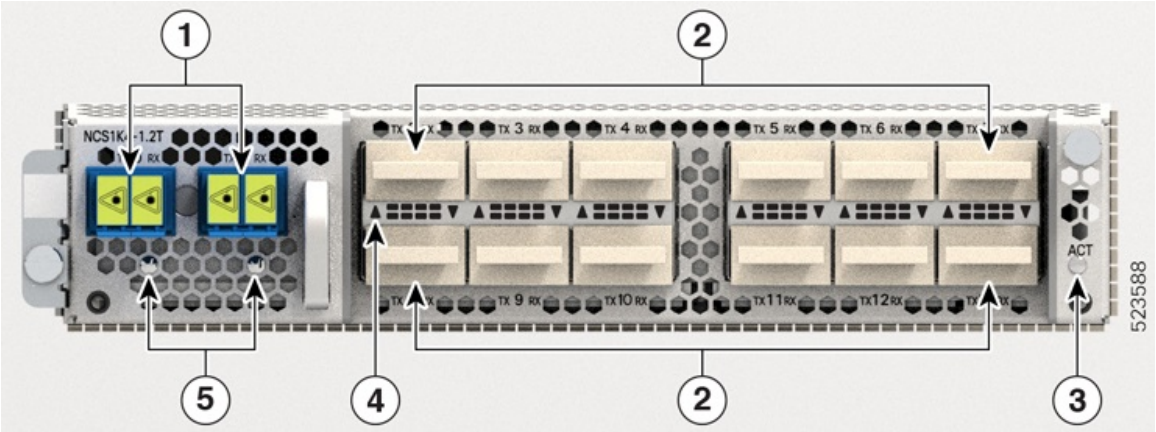
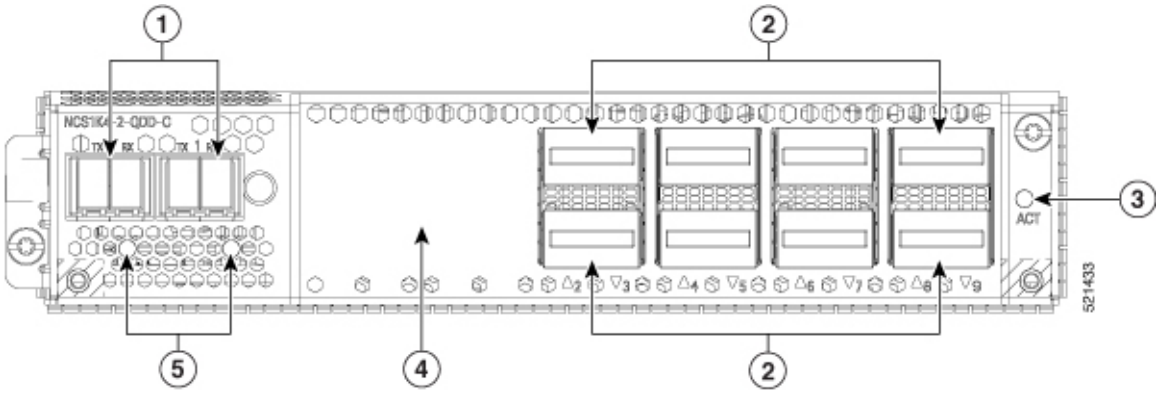


Figure 94: 2-QDD-C Line Card LEDs



1	Trunk ports (0 and 1)
2	• 1.2T and 1.2TL line card 12 QSFP ports (2 to 13). Each QSFP port has Attention LED. • 2-QDD-C line card 8 QSFP ports (2 to 9). Each QSFP port has Attention LED.
3	ACT LED
4	QSFP port LEDs The LEDs for the QSFPs are embedded in the card cage. The *triangles* shown upwards or downwards (in 2-QDD-C, 1.2T and 1.2TL line cards) indicate the status of the corresponding QSFP.
5	Trunk port LEDs

Table 55: Status of the Line Card LEDs

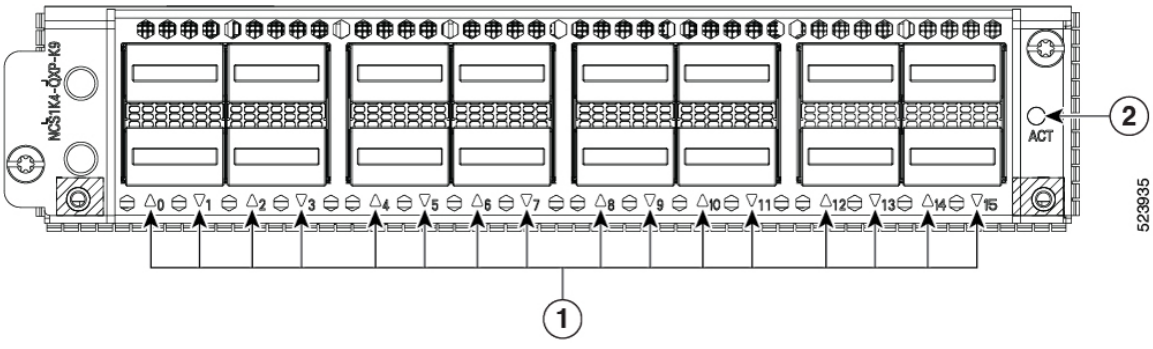
LED	Color	Status
Attention LED	Yellow Flashing	Used by the field engineers to identify a specific port in the line card. This is used for troubleshooting purposes. • Use the **hw-module location** *location***attention-led all-ports** command to turn on this LED on all the ports of the line card. • Use the **hw-module location** *location***attention-led** *port-number* command to turn on this LED on a specific port of the line card. • Use the **show controllers optics** *rack/slot/instance/port* **| in LED** command to display the LED status of ports.

LED	Color	Status
ACT LED	Amber (solid)	The line card is booting. This colour appears as soon as the line card is inserted in to the chassis.
	Flashing Red	The line card is in the booting phase.
	Green	The line card is up and operational (not associated to the traffic status).
QSFP and Trunk port LEDs	Off	The port has not been provisioned.
	Red	Major alarm that could lead to a traffic-impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of a line card. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card. The port is configured in maintenance mode or the attention LED is enabled for this port. **Note** Attention LED is not supported on ACT LED.

QXP Line Card LED

The front view of the QXP-K9 line card is as below.

Figure 95: Front View of the QXP-K9 Line Card



1	16 QSFP-DD ports (0 to 15)
2	ACT LED

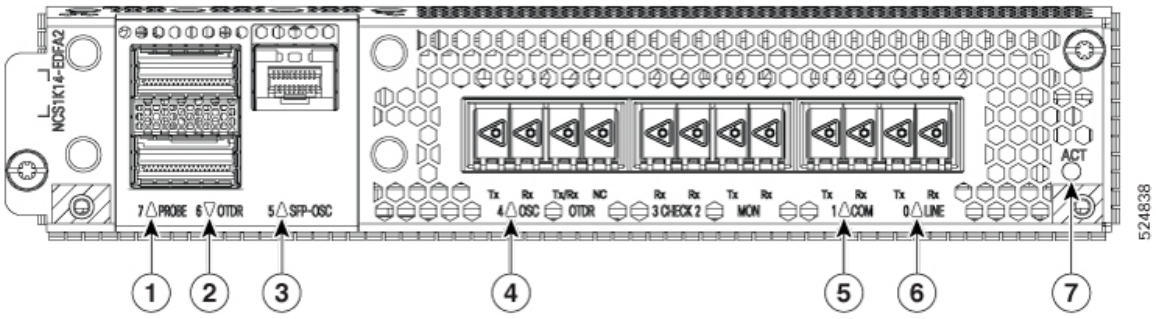
Table 56: Status of the QXP-K9 Line Card LEDs

LED	Color	Status
ACT LED	Flashing Red	The line card is booting. This color appears as soon as the line card is inserted in to the chassis.
	Amber (solid)	Indicates that the line card is in the booting phase.
	Green	Indicates that the line card is up and operational (not associated to the traffic status).
QSFP-DD port LEDs	Off	This indicates that the port has not been provisioned.
	Red	Indicates a major alarm, which could be a traffic impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of a line card. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card.

EDFA2 Line Card LED

The EDFA2 line card has seven LEDs to indicate the QSFP-DD and LC port alarm status.

Figure 96: EDFA2 LEDs



Callout	LED
1	PROBE 7
2	OTDR 6
3	SFPP-OSC 5
4	OSC 4

Callout	LED
5	COM 1
6	LINE 0
7	ACT

Table 57: Status of the Line Card LEDs

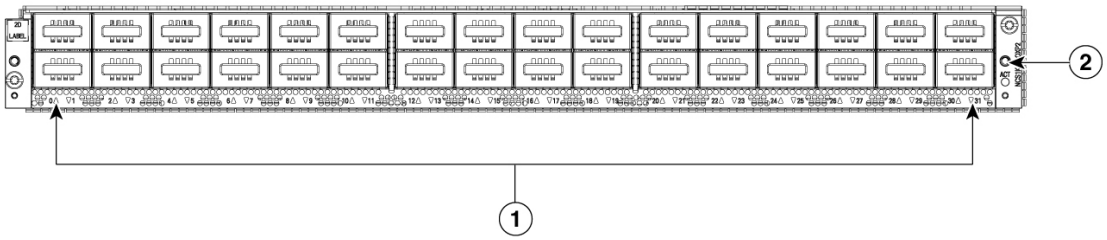
LED	Color	Status
ACT LED[2]	Amber (solid)	The line card is booting. This color appears as soon as the line card is inserted into the chassis.
	Flashing Red	The line card is in the booting phase.
	Green	The line card is up and operational (not associated to the traffic status).
PROBE 7 SFP-OSC 5 OSC 4 COM 1 LINE 0	Off	The port remains not provisioned or switched off.
	Green	The module is operational and has no alarm.
	Amber (solid)	Minor alarm (such as low Rx or Tx power) that could lead to a traffic-impacting situation.
	Amber (flashing)	Used for troubleshooting. Identifies the faulty port of an LC. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card. The port is configured in maintenance mode or the attention LED is enabled for this port. Use **hw-module location** to enable the attention LED for the port.
	Red	Major alarm that could lead to a traffic-impacting situation.
OTDR 6 port	Red	The module is not present.
	Yellow	OTDR scan is in progress.
	Green	The module is present.

[2] ACT LED does not support Attention LED.

OXP2-K9 line card LED

The OXP2-K9 optical line card has 32 LEDs each to indicate the status of the optical ports and 1 ACT LED to indicate the system status.

Figure 97: OXP2-K9 line card LEDs



1	32 OSPF ports (0 to 31)
2	ACT LED

Table 58: Status of the OXP2-K9 line card LEDs

LED	Color	Status
ACT LED	Flashing Red	The line card is booting. This color appears as soon as the line card is inserted in to the chassis.
	Amber (solid)	Indicates that the line card is in the booting phase.
	Green	Indicates that the line card is up and operational (not associated to the traffic status).
OSFP port LEDs	Off	This indicates that the port has not been provisioned.
	Red	Indicates a major alarm, which could be a traffic impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of a line card. Use the **hw-module location 0/0/NXR0 attention-led port** command to configure the attention LED.

Controller LEDs

The controllers have six LEDs to indicate the system status and the status of the components.

Figure 98: CNTLR LEDs

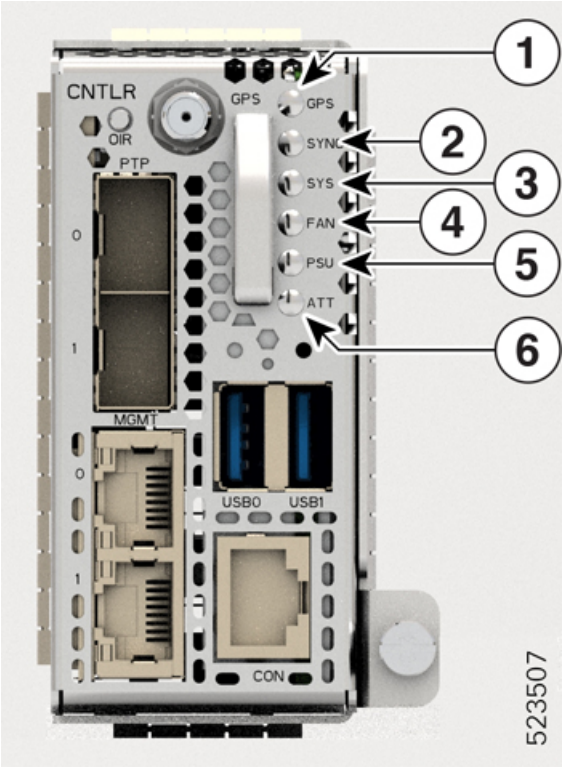
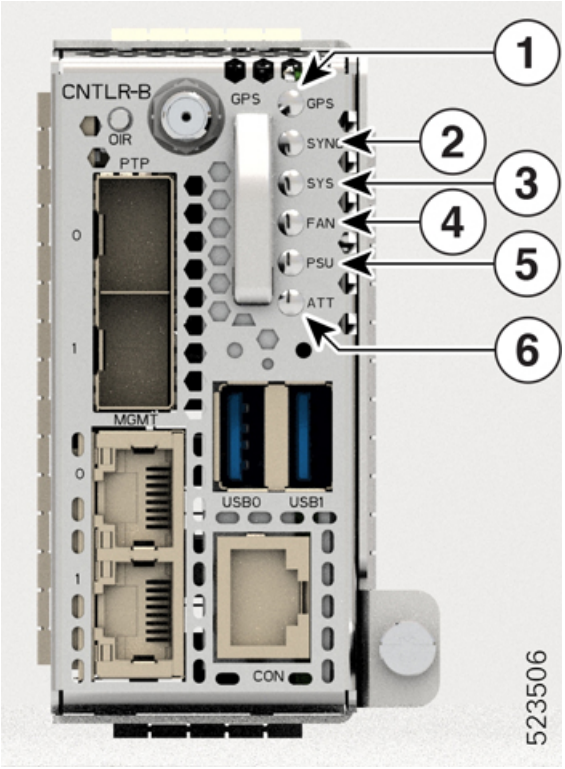


Figure 99: CNTLR-B LEDs



Callout	LED	Callout	LED
1	GPS LED	4	Fan Unit Status (FAN) LED
2	Synchronous Ethernet (SYNC) LED	5	Power Supply Unit Status (PSU) LED
3	System Status (SYS) LED	6	Attention (ATT) LED

Table 59: Status of the Controller LEDs

LED	Color	Status
GPS	Green	GPS phase locked.
	Yellow	GPS enabled.
	Off	GPS not enabled.
	Red	GPS is in use.

LED	Color	Status
SYNC	Green	Time core becomes synchronized to an external source including IEEE1588.
	Flashing green	System is in Synchronous Ethernet mode.
	Amber	Acquiring state or Holdover: Time core is in acquiring state or holdover mode.
	Off	Time core clock synchronization has become disabled or is in a free-running state.
SYS (during controller boot up)	Red	The controller unit is powering on.
	Red (flashing slowly)	BIOS loading.
	Amber (flashing slowly)	OS loading.
	Red (flashing fast)	Secure boot failure. Replace the controller unit.
	Amber (flashing fast)	XR loading.
SYS (controller is operational)	Red	Major or critical alarm is present.
	Amber	Minor alarm is present.
	Green	The module is operational and has no active alarms.
PSU	Green	All PSUs present in the chassis are in working condition.
	Red	Either a PSU is missing from its slot or is faulty.
FAN	Green	All fans present in the chassis are in working condition.
	Red	Either a fan is missing from its slot or is faulty.

LED	Color	Status
ATT	Blue (flashing)	Applicable during online insertion and removal (OIR) procedures. The system is cooling down.
	Blue	Used to identify a specific chassis in a rack or room. Use this LED for troubleshooting purposes. Run the **hw-module attention led location** command to turn on this LED.

Power Supply Unit (PSU) LED

The NCS1K4-AC-PSU-2 and NCS1K4-DC-PSU-2 units have one LED each to indicate their status.

Figure 100: Front View of 2.5-kW AC PSU

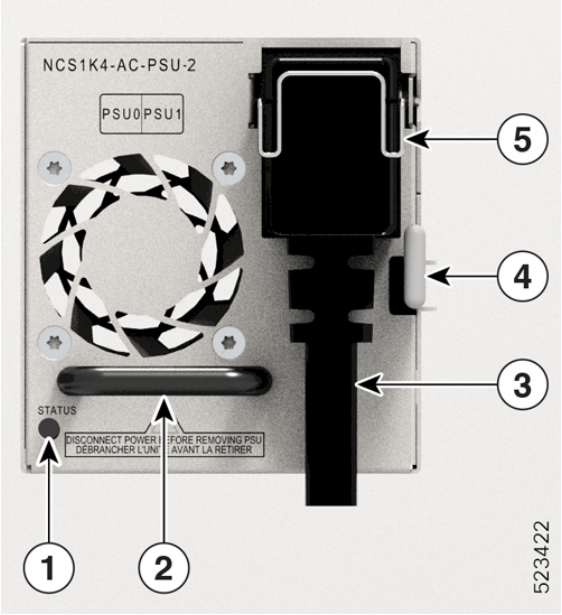
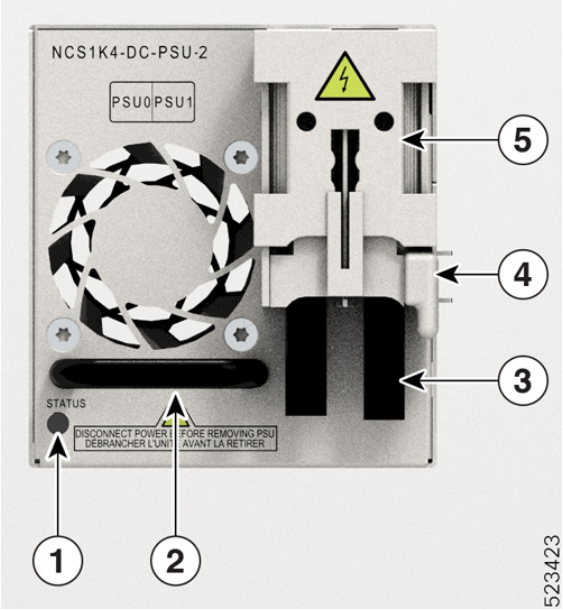


Figure 101: Front View of 2.5-kW DC PSU



1	PSU Unit (STATUS) LED	4	Locking latch
2	PSU Handle	5	Protective cover
3	6 AWG 180-degree exit cables		

Table 60: Status of the 2.5-kW PSU LED

Color	Status
Amber	There exists no input to the PSU, provided the other PSU is working.

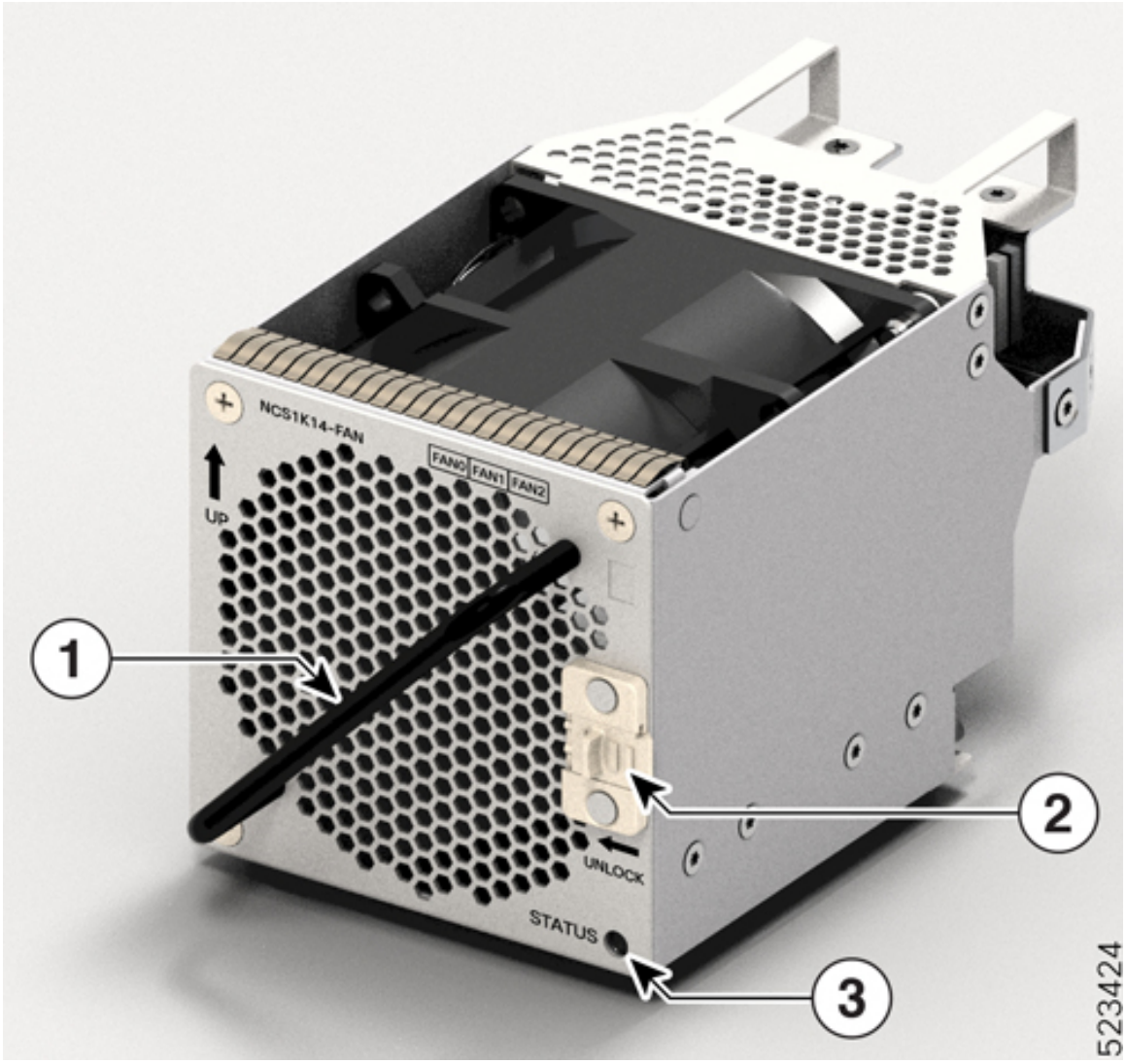
Color	Status
Off	Both PSUs do not have input.
Green	The input to the PSU is valid.

For 2-kW PSU LEDs, see Power Supply Unit LED

Fan Module LED

Each fan module has one LED to indicate its status.

Figure 102: Front View of the Fan Module



1	Cross-handle

2	Spring-loaded Lever
3	Fan Module (STATUS) LED

Table 61: Status of the Fan Module LED

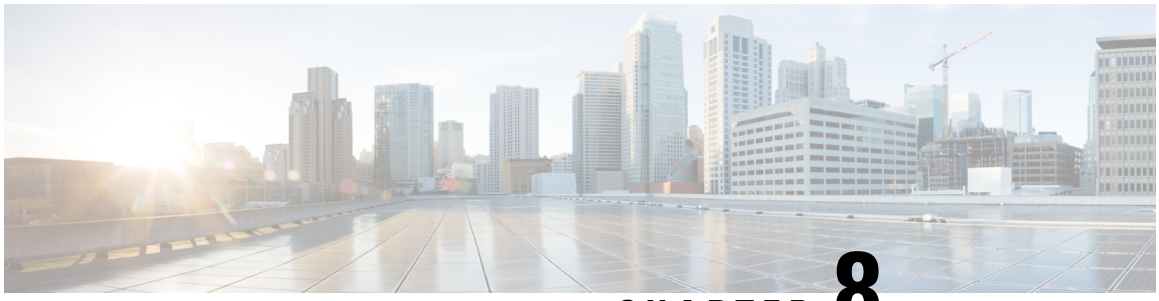
LED	Color	Status
STATUS	Red	Fault found in the fan module. This status occurs for the following reasons: • Fan speed is out of range. • Or the inserted fan module does not power on. • Or the fan module is not present.
	Green	Fan module is working fine.



PART II

Cisco NCS 1000 32-Channel Mux/Demux Enhanced Patch Panel Hardware Installation

- Cisco NCS 1014 Passive Devices, on page 157
- Prepare to Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 163
- Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 165
- Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 179



CHAPTER 8

Cisco NCS 1014 Passive Devices

The Cisco NCS 1014 chassis supports the passive devices:

- NCS1K-MD-32x-CE Mux/Demux Passive Patch Panels, on page 157
- MD-32E-CE and MD-32O-CE LED, on page 161

NCS1K-MD-32x-CE Mux/Demux Passive Patch Panels

Table 62: Feature History

Feature Name	Release Information	Feature Description
NCS1K-MD-32x-CE patch panel	Cisco IOS XR Release 25.1.1	The MD-32x-CE patch panels are passive AAWG modules with 32 channels each. They support 150-GHz channel spacing, with a 75-GHz shift between ODD and EVEN panels. Combined, they offer 64 channels with 75-GHz spacing. Each panel supports wide optical pass-band and acts as an add/drop unit for 32 channels at 140 GBd. The supported panels are: • NCS1K-MD-32E-CE • NCS1K-MD-320-CE

Note NCS1K-MD-32x-CE is referred as MD-32x-CE patch panel.

The MD-32x-CE patch panels are a pair of passive Athermal Arrayed Waveguide Grating (AAWG) based modules. Each mux/demux panel has 32 channels and works as an add/drop unit for the NCS 1001 and NCS 1014 optical line systems. Each mux/demux panel allows the multiplexing and demultiplexing of 32 channels with 150-GHz spacing. 75-GHz frequency shift exists between the ODD and EVEN panels. When both panels are used on the same optical line systems (NCS 1001 or NCS 1014), the combined capacity becomes 64 channels with 75-GHz spacing. Each mux/demux panel provides a wide optical pass-band support. When used as a standalone, each panel acts as an add/drop unit for 32 channels at 140 GBd.

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.	
Frenquency 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.	

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 103: MD-32x-CE interfaces

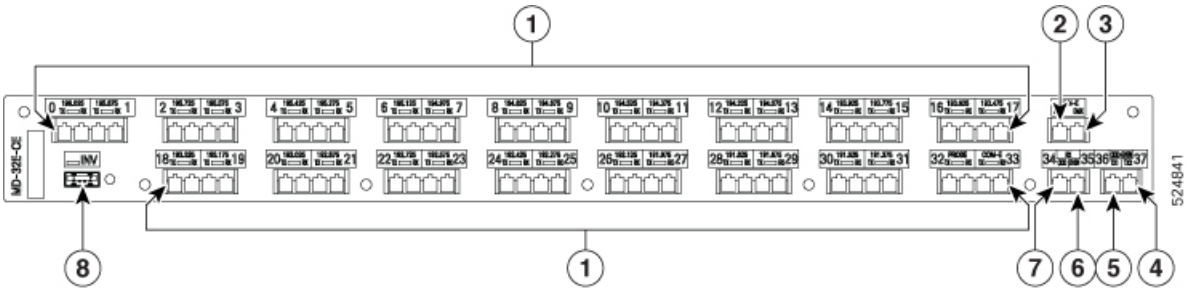


Table 63: Port Label Descriptions

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)].

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

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 dedicted 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.
- retrieve the optical power levels monitored by the patch panels' photodiodes.
- activate an LED on request or other type of displays or electrical actuators.
- upgrade the patch panels firmware.

Interoperability with EDFA2 line card

NCS1014 node containing an EDFA2 line card and one or more MD-32x-CE patch panels aggregate signals from 2.4T or 2.4TX transponders.

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 64: 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

Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
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
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

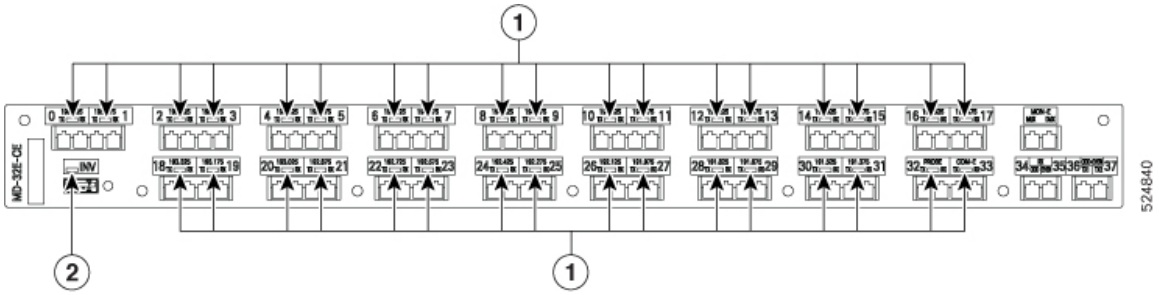
Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
29	191.675	1564.07	191.750	1563.45
30	191.525	1565.29	191.600	1564.68
31	191.375	1566.52	191.450	1565.90

MD-32E-CE and MD-32O-CE LED

The MD-32E-CE and MD-32O-CE patch panels have 35 LEDs each to indicate the system status and the status of the optical ports.

The LED information applies to both MD-32E-CE and MD-32O-CE patch panels.

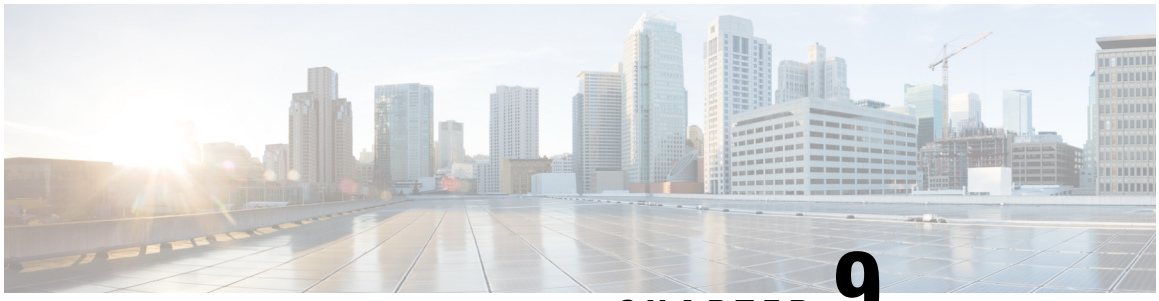
Figure 104: MD32x-CE Optical Port LEDs



Callout	LED
1	INV
2	CH-0…CH-31

Port LED	Color	Status
CH-0…CH-31	Red	• Major and critical alarms such as RX-LOS-P, which could be traffic-impacting. These alarms are raised when there is a loss of signal (LOS) or when the OTS power reading is below the Fail-Low threshold. • Active signal is not present in the fiber.
	Green (flashing)	Patch panel is operational and has no alarm. **Note** The led flashes green from port CH-0 to CH-31 when the INV port is connected to the NCS 1014 controller USB 2.0 port.

Port LED	Color	Status
INV	Off	Patch panel is not connected to the NCS 1014 controller USB 2.0 port.
	Blue	Active status and attention state of the inventory USB that is connected to the host NCS 1014 controller USB 2.0 port.



CHAPTER 9

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

This chapter explains how to prepare for the installation of the Cisco NCS 1000 32-Channel Mux/Demux Patch Panels.

- NCS1K-MD-32E-CE
- NCS1K-MD-32O-CE

Note The tasks in this chapter also apply to the **N1K-MD-32E-C=** patch panel in the Cisco NCS 1000 Series Mux/Demux Patch Panels, unless otherwise specified.

Note In this chapter, "patch panel" refers to the "Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced".

- Package Contents, on page 163
- Unpack and Verify NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 164

Package Contents

You can order Cisco NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced along with the components.

The package contains the following:

- Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced. The patch panel comes preinstalled with the ground lug and toothed lock washer.
- Accessory kit—Includes all the hardware necessary for the patch panel installation on the 19", 23" and ETSI rack. The following list provides the contents of the accessory kits.
  - Double hole ground lug (1)
  - Tie wrap with UL94V-0 flammability rate (3)
  - 16 x 160mm (W x L) Velcro strips (4)

- Optical fiber network saddle (5)
- M6 x 12mm long Philips pan head screws (ETSI Rack compatible) (4)
- ETSI brackets (2)
- 23-inch mounting brackets (2)

Unpack and Verify NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced

This procedure describes the steps for unpacking and verifying both the components.

Procedure

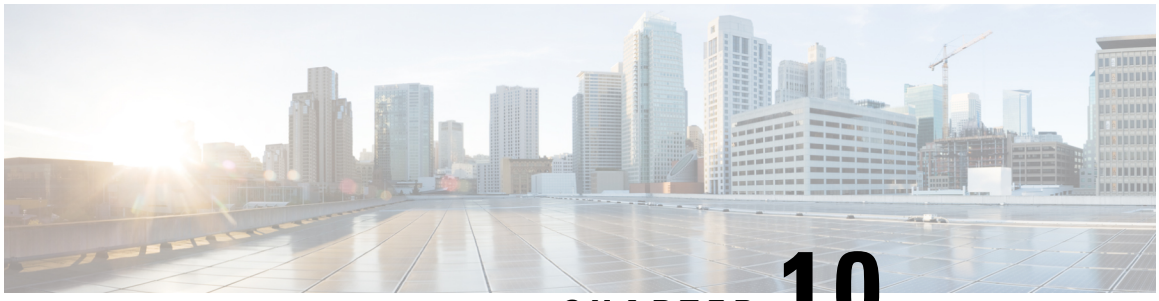
Step 1 When you receive Cisco NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced at the installation site, open the top of the box. The Cisco Systems logo is on the side of the box.

Step 2 Unpack and inspect the module. The package includes these components:

For more information on the package contents, see Package Contents, on page 163.

Step 3 To remove the patch panel, grasp the side of the patch panel and lift the panel out of the box.

Step 4 If there is any damage, call your Cisco sales engineer for a replacement.



CHAPTER 10

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

This chapter contains tasks to install Cisco NCS 1000 32-Channel Mux/Demux Patch Panels.

- NCS1K-MD-32E-CE
- NCS1K-MD-32O-CE

Note The tasks in this chapter also apply to the **N1K-MD-32E-C=** patch panel in the Cisco NCS 1000 Series Mux/Demux Patch Panels, unless otherwise specified.

Note In this chapter, "patch panel" refers to the "Cisco NCS 1000 32-Channel Mux/Demux Patch Panel".

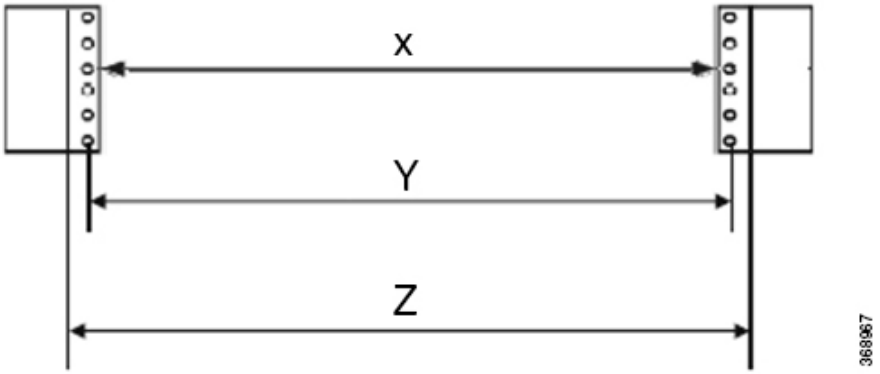
- Rack Compatibility, on page 165
- Ground Description, on page 166
- Rack Mount Warnings, on page 168
- Attach the Mounting Brackets, on page 168
- Install NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced, on page 171
- Install and Route Fiber-Optic and USB Cables, on page 173
- Cleaning and Maintaining Fiber-Optic Connectors, on page 175

Rack Compatibility

The mux/demux panels can be installed in a standard ANSI/EIA (19"), ANSI (23"), or ETSI (21") rack.

- The rack can be two post type or four post type rack.
- The 19" and 23" racks must be compliant with "EIA Universal" holes.
- The ETSI rack must be compliant with "ETSI Universal" holes.

Figure 105: Rack Specification



Rack Type	Rack Front Opening X	Rack Mounting Hole Center-Center Y	Mounting Flange Dimension Z
ANSI 19" racks	450.8mm (17.75")	465mm (18.312")	482.6mm (19")
ANSI 23" racks	552.45mm (21.75")	566.7mm (22.312")	584.2mm (23")
ETSI 21" racks	500.0mm(19.68")	515.0mm(20.276")	533.4mm(21")

Ground Description

The NCS 1000 32-channel mux/demux patch panels have two grounding options on the left and right rear side. You can choose from the two grounding options to ground the patch panels. The rear side of the patch panels, adapter brackets, the straight adapter brackets, and the Z-shaped adapter brackets are unpainted and treated with conductive finishing.

Note Use the grounding lug and wire size according to your local regulations.

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.

Ground NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced

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

This task describes the steps to ground the patch panel.

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 patch panel ground and bay frame ground point. Clean the mating surfaces and apply appropriate antioxidant compound to the bare conductors.

Step 3 Identify the ground stamp on the patch panel to attach the ground lug.

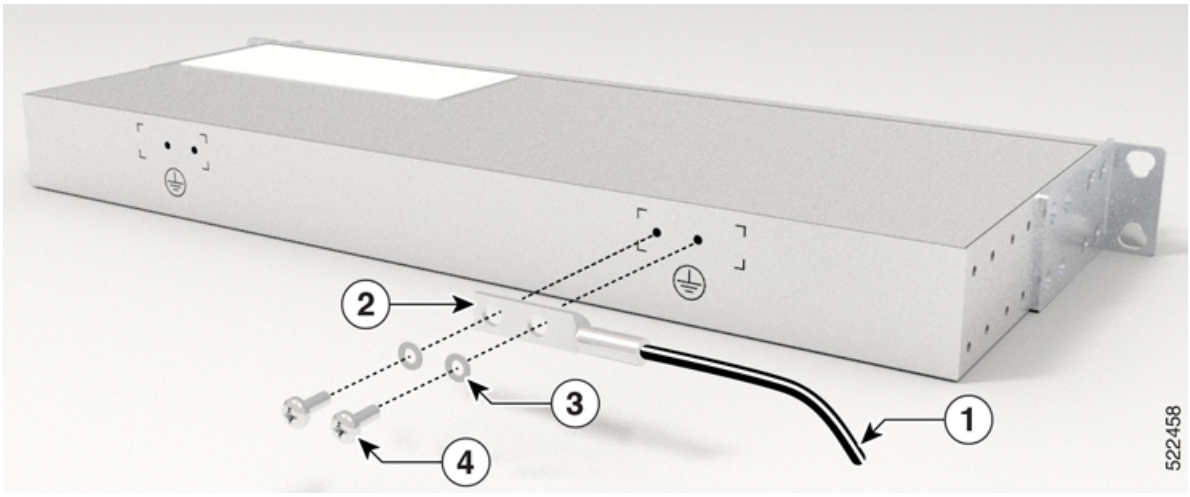
Step 4 Crimp the ground cable to the dual-hole ground lug.

Note
Use a ground lug and cable size according to your local regulations.

Step 5 Align the dual-hole ground lug to the patch panel and attach the lug to the patch panel using a M4x10mm long pan head screw.

Note
Use only M4x10mm pan head screws to avoid any damage to the patch panel.

Figure 106: Grounding the Patch Panel



1	Ground Lug Cable
2	Ground Lug
3	Lock Washers

4	M4x10mm long Pan Head Phillips Screws

Step 6 Tighten the M4x10mm pan head screw to torque value of 1.3 N-m (11.5 lbs-in).

Step 7 Terminate the other end of the ground cable either at the office ground point or the rack ground point.

What to do next

- Install NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced, on page 171

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.

Attach the Mounting Brackets

This task explains how to attach the mounting brackets to the ANSI or ETSI standard equipment rack.

Note The patch panels come preinstalled with the 19-inch mounting brackets.

Before you begin

Ensure you completed the following tasks:

- Unpack and Verify NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 164
- Check for rack compatibility. See Rack Compatibility.

SUMMARY STEPS

1. To attach the mounting bracket for each standard equipment rack, perform one of the following actions:
2. Align the mounting bracket screw holes against the patch panel screw holes.
3. Insert the screws and tighten them.
4. Repeat steps 2 through 3 to attach the mounting bracket on the opposite side.

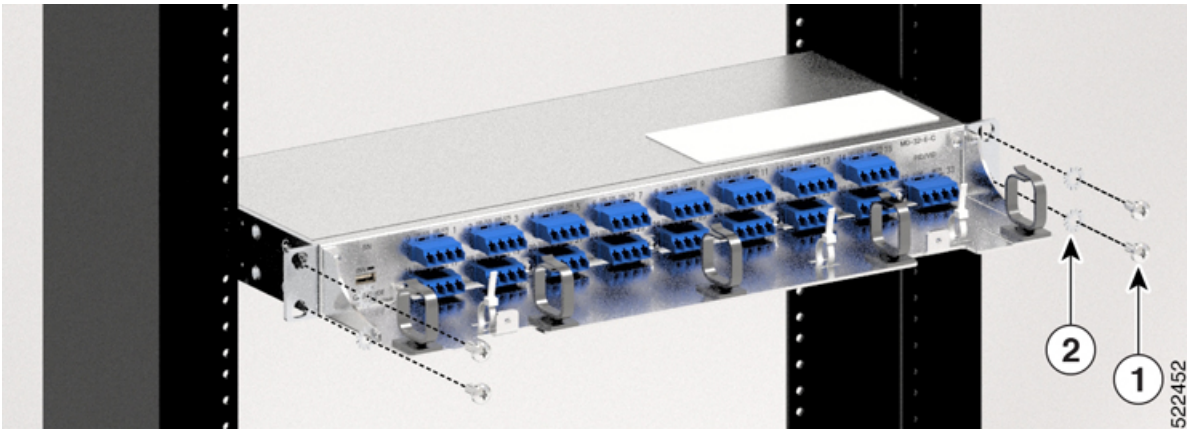
DETAILED STEPS

Procedure

Step 1 To attach the mounting bracket for each standard equipment rack, perform one of the following actions:

- For a 19 inch (482.6 mm) ANSI or IEC configuration, align the screw holes of the patch panel against the rack.

Figure 107: Installing the Adapter Bracket on a 19-inch Rack

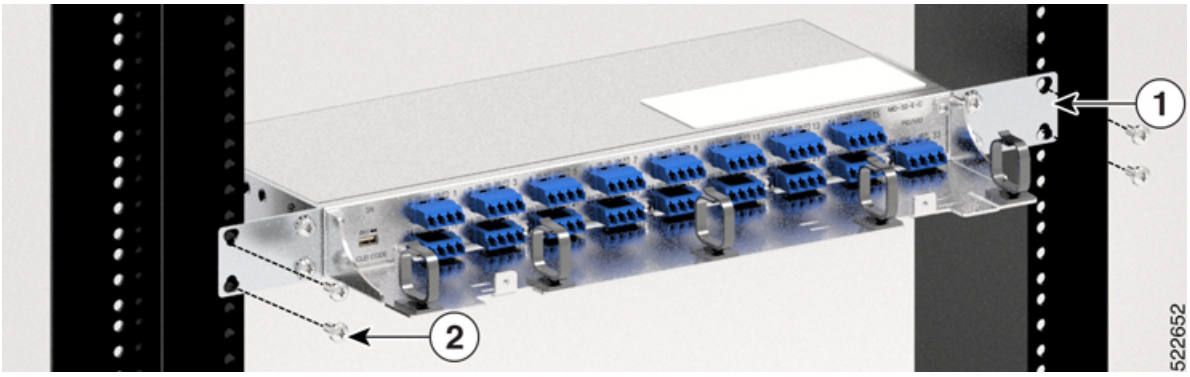


Note
The cable ties shown in the image are optional. Use the cable ties to route the USB 3.0 cable to right side of the patch panel to the NCS 1010 EITU.

1	12-24x 0.5-Inch Phillips Pan Head Screws	2	#12 Lock Washers

- For a 23 inch (584.2 mm) ANSI configuration, remove the preinstalled brackets and place the 23-inch mounting bracket against one side of the patch panel.

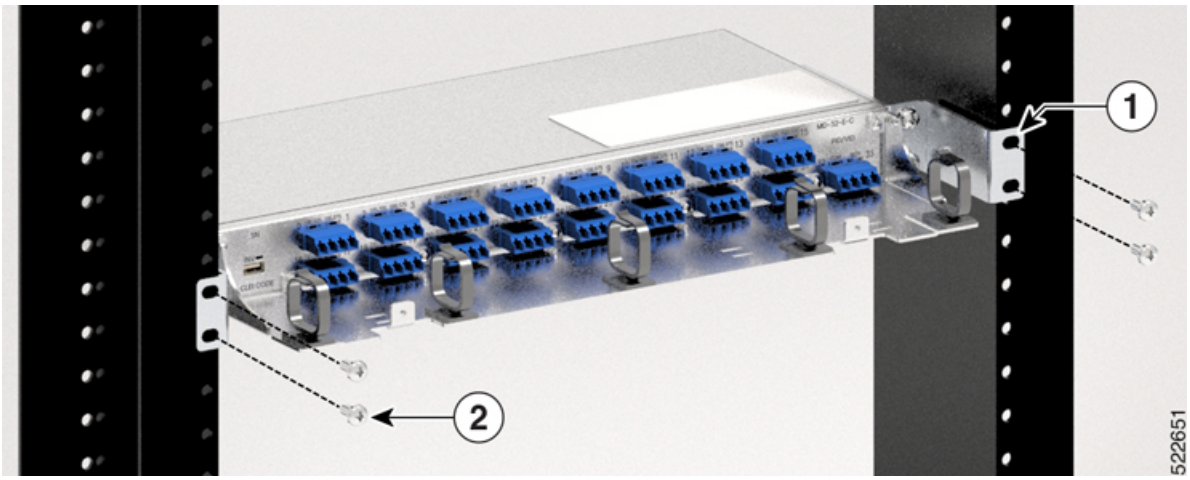
Figure 108: Installing the Mounting Bracket on a 23-inch Rack



1	23-Inch Mounting Bracket	2	12-24x 0.5-Inch Phillips Pan Head Screws

- For an ETSI configuration, remove the preinstalled brackets and place the Z-shaped bracket against one side of the patch panel.

Figure 109: Installing the Mounting Bracket on an ETSI Rack



1	ETSI Bracket	2	M6 x 12mm Phillips Pan Head Screws

Step 2 Align the mounting bracket screw holes against the patch panel screw holes.

Step 3 Insert the screws and tighten them.

Step 4 Repeat steps 2 through 3 to attach the mounting bracket on the opposite side.

What to do next

- Install NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced, on page 171

Install NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced

The patch panel is a NCS 1000 32-Channel Mux/Demux - Enhanced that can be installed either above or below the DWDM generating equipment according to the local site practice.

The patch panel is 1 rack unit (RU) high. Each package includes one set of the following brackets:

- 19 inch (482.6 mm) or 23 inch (584.2 mm) reversible (two-way) mounting brackets that can be rotated to fit either rack size. These reversible brackets are used for EIA and IEC standard racks.
- ETSI brackets that are used for ETSI standard racks.

Note The unit is shipped with the mounting brackets in the 19 inch (482.6 mm) position.

The patch panel is passive and requires no power cabling or connections. All connectors are on the front panel and are equipped with LC/MPO bulkhead adapters and with a USB Type A receptacle connector for Inventory purpose. Fiber-optic cables equipped with the corresponding (LC/MPO) connector type are used. The module ports are labeled on the front panel.

Caution Use only the fastening hardware provided with the patch panel to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the patch panel in a frame with a nonconductive coating (such as paint, lacquer, or enamel) use either the thread-forming screws that are provided with the shipping kit or remove the coating from the threads to ensure electrical continuity.

This task describes the steps to install the patch panels.

Before you begin

Ensure the rack is compatible. See the Rack Compatibility, on page 165 section.

Procedure

Step 1 Set the mounting brackets to the rack you are using. See Attach the Mounting Brackets, on page 168.

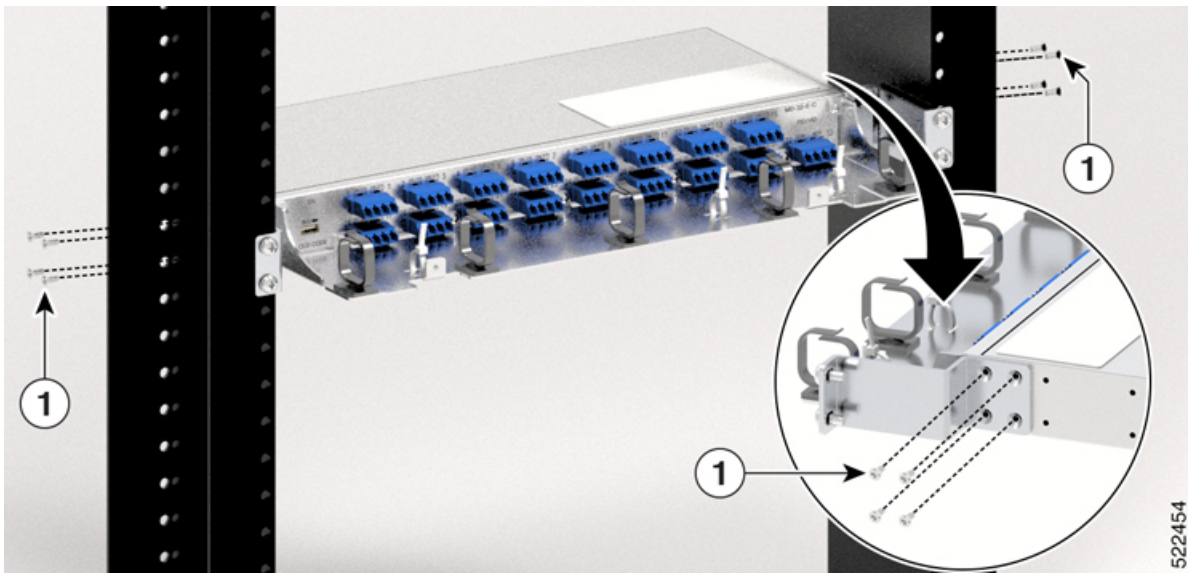
Note
The patch panels can be mounted on 19 inch (482.6 mm), 23 inch (584.2 mm) EIA standard racks, on a 19 inch (482.6 mm) IEC rack, or on a 600 x 600 mm or 600 x 300 mm ETSI racks.

A single patch panel is 17.21 inches (437.1 mm) wide and occupies 1 RU in a rack.

The patch panel mounting brackets can be mounted such that the patch panels project either 2.25, 5, 6, or 6.5 inches from the front of the EIA standard racks fixing plane, or 40 mm from the front of the IEC or ETSI standard racks fixing plane.

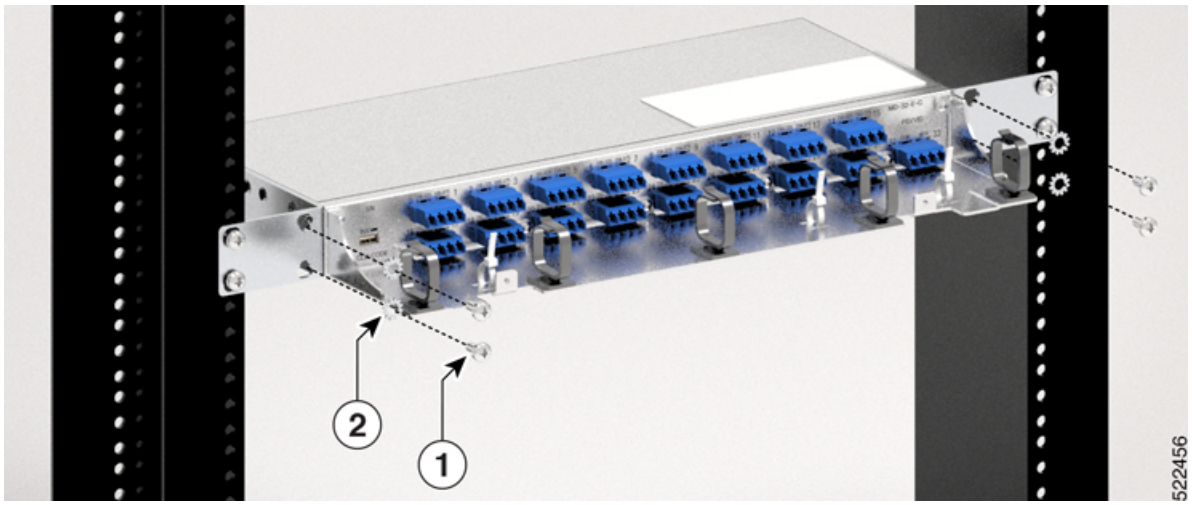
Step 2 Secure the unit to the rack using the mounting screws.

Figure 110: Mounting the Patch Panel on the ETSI Rack



1	M4 Phillips Flat Screw

Figure 111: Mounting the Patch Panel on the 23-Inch Rack



1	12-24x0.5" Phillips Pan Head Screw	2	#12 Lock Washer

Step 3 Using a screwdriver, tighten the screws to a torque of 4.65 N-m (41 lbs-in).

Step 4 Establish grounding for the patch panel. The ground position is present on the rear side of the patch panel. For more information, see Ground NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced, on page 167.

Note
When the patch panel is installed in the ETSI 600x300 cabinet, only the lateral ground position must be used.

Install and Route Fiber-Optic and USB Cables

All connectors are on the front of the patch panel and are equipped with LC bulkhead adapters and with a USB Type A receptacle connector for inventory purpose. For port label description, see NCS1K-MD-32x-CE Mux/Demux Passive Patch Panels, on page 157. The LC-LC patch cords are used to connect the patch panel to the NCS 1010 chassis.

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.

Note Always clean all fiber connectors thoroughly before making the connection with the mating adapter. Very small particles can permanently damage the end of the mating fiber inside the patch panel, which makes regular cleaning imperative. For cleaning instructions see Clean Fiber-Optic Cable Connectors, on page 175.

Caution The patch panel has LC bulkhead adapters for optical connections. Always use fiber-optic cables equipped with the corresponding LC connector type. Using any other type of connector results in damage to the connector or adapter, or both.

This task describes the steps to install and route the fiber-optic and USB cables from the patch panel.

Procedure

Step 1 To connect the fibers as appropriate, perform the following:

a) Remove the LC adapter cap from the LC-LC adapter of the patch panel.
b) Place the LC/UPC cable connector in front of the corresponding bulkhead adapter on the front panel of the patch panel.
c) Align the keyed ridge of the cable connector with the slot in the receiving adapter.
d) Gently push the cable connector into the adapter until you hear a click, which indicates that the latching system is engaged.
e) Route the cables through the left or right fiber holder clip.
f) (Optional) Secure the fibers further by placing them into one or more adhesive clips. The adhesive clips can be placed on the fiber management plate as per the actual installation conditions.

g) Place the extra fiber length of the two LC-LC patch cords used to connect the patch panel with its plugged patch panel.

Step 2 To secure the fibers, bundle the fibers using one of the four Velcro strips that is provided.

Step 3

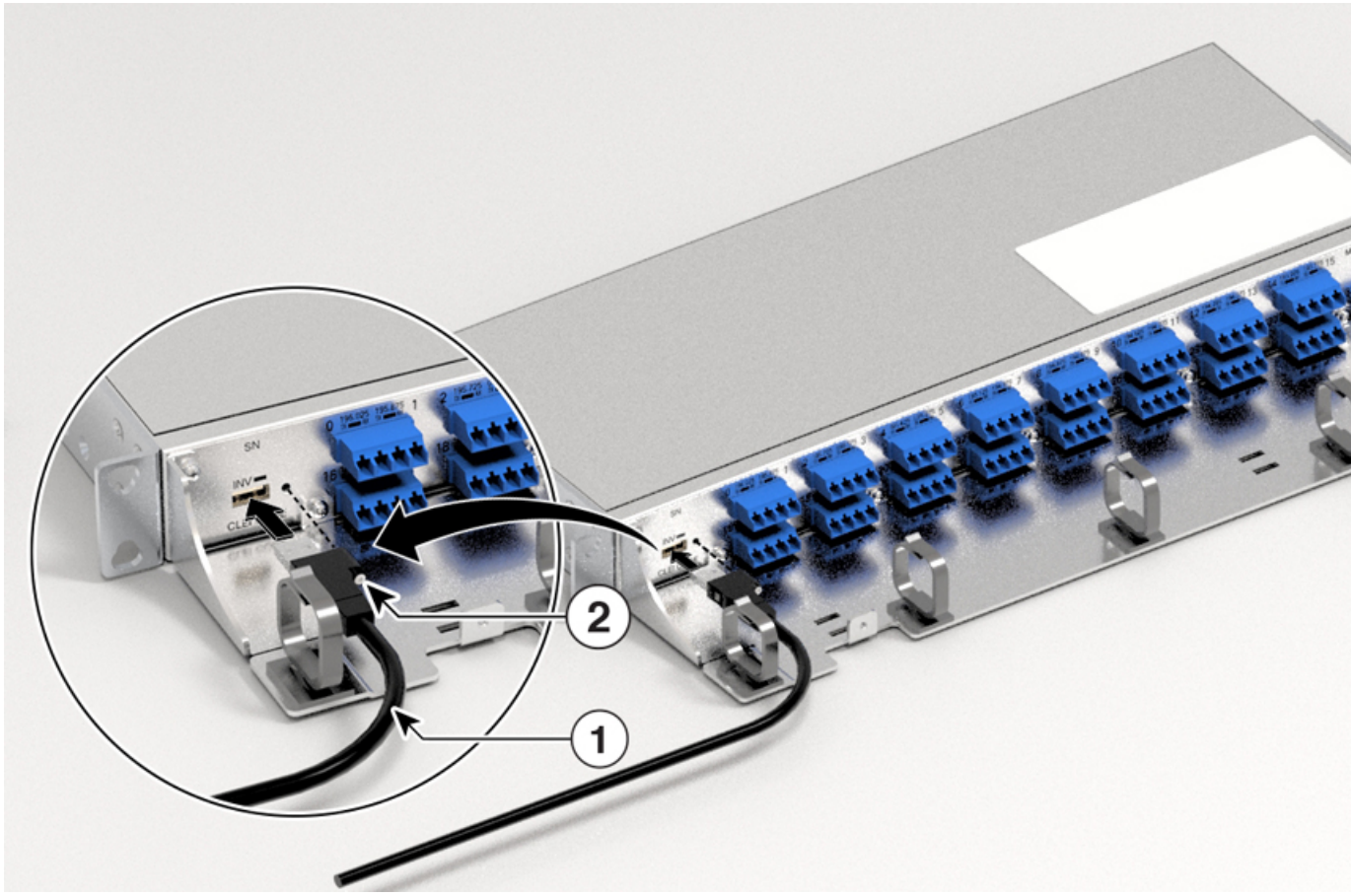
Note

This step is not applicable for the **N1K-MD-32E-C=** patch panel, you can skip this step.

To connect and secure the inventory USB Type A plug connector to the inventory USB Type A receptacle connector, perform the following:

a) Route the inventory USB cable through the left fiber holder clip from NCS 1010 EITU.
b) Connect the USB Type A plug connector to the USB Type A receptacle connector.
c) Tighten the captive screw on top of the USB connector to secure the USB plug.

Figure 112: Connecting USB Cable



1	USB 3.0 Cable
2	USB 3.0 Cable Screw

d) (Optional) Secure the USB cable with a tie-wrap at one of the three available locations on the patch panel.

Note

Perform Step d if you are routing the USB cable to the right side of the patch panel to the NCS 1010 EITU.

Cleaning and Maintaining Fiber-Optic Connectors

Connector cleaning is required to maintain the performance of fiber-optic circuits. It is important that both the LC/UPC connector at the end of the fiber-optic cable and the optical mating adapter on the front panel of the device are clean before the connection is made.



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.

The following warning applies to disposal of chemicals and other materials used to clean connectors and adapters:



Warning **Statement 9001—**Product Disposal

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



Note Before installing the fiber-optic cable, always perform the cleaning procedure for cable connectors described in the following section. Whenever possible, inspect each connector before connecting it to the optical mating adapter on the front panel.



Note The LC optical mating adapter on the faceplate of the device is less likely to get dirty if it is capped when not in use. On some devices, the optical mating adapter has a shutter. The shutter automatically closes when the LC/UPC connector is disconnected. This prevents entry of dirt.

The procedure for a thorough cleaning of these adapters is complicated. Use a commercially available cleaning kit and closely follow the instructions included with the kit.

Clean Fiber-Optic Cable Connectors

This task describes the steps to clean the fiber-optic cable connectors.

The tools required to clean fiber connectors are:

- Inspection microscope
- Type A fiber-optic connector cleaner (CLETOP reel)

- Optical swab
- Optical receiver cleaning stick

Procedure

Step 1 Using an inspection microscope, inspect each fiber connector for dirt, cracks, or scratches.

Step 2 Replace any damaged fiber connectors.

Note
Replace all dust caps whenever the equipment is unused for 30 minutes or more.

Note
Do not reuse optical swabs. Keep unused swabs away from work surfaces.

Step 3 Clean the fiber connectors with CLETOP reel:

a. Remove the dust cap from the fiber connector.

b. Press the lever down to open the shutter door. Each time you press the lever, you expose a clean wiping surface.

c. Insert the connector into the CLETOP cleaning cassette slot, rotate one-quarter turn, and gently swipe downwards.

d. Use an inspection microscope to inspect each fiber connector for dirt, cracks, or scratches. If the connector is not clean, repeat the above substeps.

e. Insert the fiber connector into the applicable adapter or attach a dust cap to the fiber connector.

Note
If you must replace a dust cap on a connector, first verify that the dust cap is clean. To clean the dust cap, wipe the outside of the cap using a dry lint-free wipe and the inside it using a CLETOP stick swab (14100400).

Customer-supplied Cleaning Materials

The Type A fiber optic connector cleaners (for example, CLETOP reel) are recommended to clean the cable connectors, but are not supplied with the device.

If properly maintained (only used with clean, defect-free fiber connectors and capped when not in use), the mating adapter would not require cleaning. However, if you suspect the adapter is dirty, clean it by using the CLETOP stick swab.



Note For multifiber cable assemblies, use specific cleaning tools or materials designed for the assembly type.

Cleaning the Optical Mating Adapter

This task describes the steps to clean the optical mating adapters.

SUMMARY STEPS

1. Read the cartridge cleaning instructions (provided by the manufacturer) to insert the cartridge cleaning tip into the optical mating adapter.
2. Slide the lever on the cartridge to swipe the mating surface.

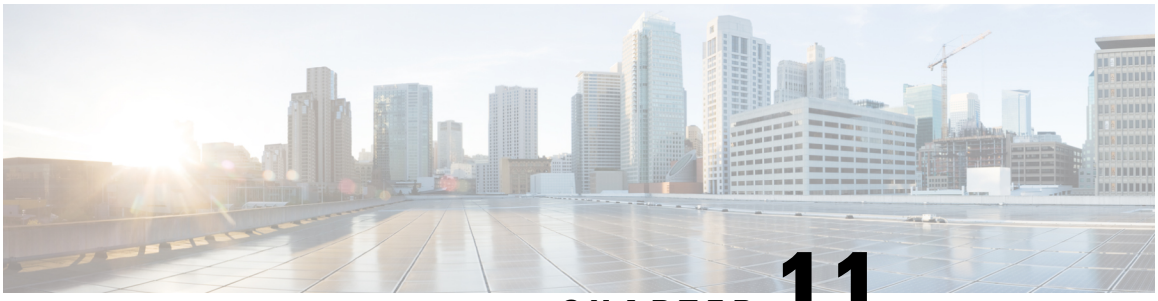
DETAILED STEPS

Procedure

Step 1 Read the cartridge cleaning instructions (provided by the manufacturer) to insert the cartridge cleaning tip into the optical mating adapter.

Step 2 Slide the lever on the cartridge to swipe the mating surface.

Note
Always keep unused adapter ports and fiber connectors capped with a clean dust cap. The optical mating adapters that have shutter need not be capped.



CHAPTER 11

Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced

This chapter describes the tasks to remove and replace the Cisco NCS 1000 32-Channel Mux/Demux Patch Panels.

- NCS1K-MD-32E-CE
- NCS1K-MD-32O-CE

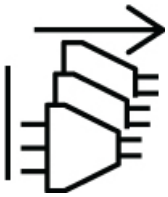
Note This chapter also applies to the **N1K-MD-32E-C=** patch panel in the Cisco NCS 1000 Series Mux/Demux Patch Panels, unless otherwise specified.

Note In this chapter, "patch panel" refers to the "Cisco NCS 1000 32-Channel Mux/Demux Patch Panel".

Caution Always populate the modular slots in the Cisco NCS 1010 chassis with respective modules (line card, controller, PSU, and fan trays). Perform the replacement or upgrade of the modules (Online Insertion or Removal (OIR)) only when the ambient temperature is below 30 degree Celsius. Complete the OIR of modules within five minutes to prevent overheating of the components.

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 1091—**Installation by an Instructed Person or Skilled 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 person or skilled person.

Note The maximum operating altitude for OIR is 1800 m.

• Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced, on page 180

Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel - Enhanced

This task describes the steps for removing the patch panel from the rack.

Procedure

Step 1 Gently disconnect the fiber-optic connectors in the LC-LC adapters.

Step 2 Disconnect the inventory USB cable releasing it in the USB cable and in the USB receptacle.

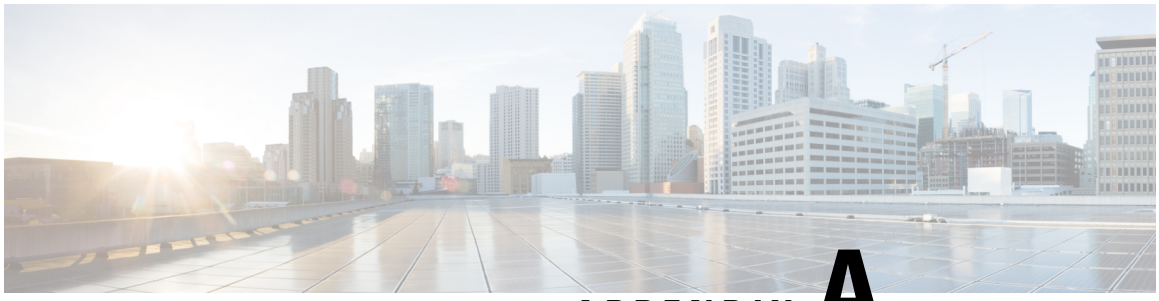
Step 3 Clear the front of the patch panel from any cable or fiber.

Step 4 Disconnect the ground lug.

Step 5 Loosen the mounting screws and remove the patch panel from the rack.

What to do next

- Install NCS 1000 32-Channel Mux/Demux Patch Panels - Enhanced, on page 171



APPENDIX A

Product IDs

This chapter describes the list of Product IDs (PIDs) for Cisco NCS 1014 and its modules.

- NCS 1014 Chassis and Modules PIDs, on page 183
- Optical Patch Cord PIDs, on page 187

NCS 1014 Chassis and Modules PIDs

The following table lists the PIDs of the Cisco NCS 1014 chassis and its modules:

Table 65: Shelf and Accessory Options

Product ID	Product Description
NCS1014	NCS 1014 Chassis with Timing Support
NCS1K14-SYS	NCS 1014 Assemble to Order
NCS1K14-SYS-P	NCS 1014 ATO Chassis, RTU enabled
NCS1014-2=	NCS 1014 Chassis
NCS1K14-SA-D=	Network Convergence System 1014 Shelf Assembly Divider
NCS1K14-BLANK-2=	NCS 1014 Dual width Blank for NCS 1014-2 chassis
NCS1K14-S-KIT	NCS 1014 accessory kit for 19-inch racks that are up to 40-inch in depth
NCS1K14-ACC-KIT	NCS 1014 Accessory Kit

Table 66: Bundle Options

Product ID	Product Description
NCS1K14-MOLS-SK	NCS 1014 MOLS Bundle of Line Card and pluggables

Table 67: SSD Option

Product ID	Product Description
NCS1K14-SSD	NCS 1014 SSD

Table 68: Controller Options

Product ID	Product Description
NCS1K14-CNTLR-K9	NCS 1014 Controller, 115200 bps Baud Rate
NCS1K14-CNTLR-B-K9	NCS 1014 Controller, 9600 bps Baud Rate

Table 69: Fan Options

Product ID	Product Description
NCS1K14-FAN	NCS 1014 Fan Module
NCS1K14-FAN-P	Network Convergence System 1014 Programmable fan
NCS1K14-FAN-2	Network Convergence System 1014 Programmable fan

Table 70: Power Supply Options

Product ID	Product Description
NCS1K4-AC-PSU	NCS 1004 AC Power Supply Unit, 2.1 kW
NCS1K4-DC-PSU	NCS 1004 DC Power Supply Unit, 2.1 kW
NCS1K4-AC-PSU-2	NCS 1004 AC Power Supply Unit, 2.5 kW
NCS1K4-DC-PSU-2	NCS 1004 DC Power Supply Unit, 2.5 kW
NCS1K14-AC-PSU-3	NCS 1014 AC Power Supply Unit 3.2KW

Table 71: Line Card Options

Product ID	Product Description
NCS1K14-2.4T-K9=	Network Convergence System 1014 2.4T Line Card
NCS1K14-CCMD-16-C=	NCS 1000 16-port Colorless Direct attach LC with EDFA, C-band
NCS1K14-CCMD-16-L=	NCS 1000 16-port Colorless Direct attach LC with EDFA, L-band
NCS1K4-1.2T-K9=	NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card
NCS1K14-2.4T-X-K9=	NCS 1014 2.4T Line Card Cross Connect Mode
NCS1K4-1.2T-L-K9=	NCS1K4 12x QSFP28 2 Trunk C-Band DWDM card - Licensed

Product ID	Product Description
NCS1K14-EDFA2=	NCS 1014 EDFA terminal with equalization
NCS1K4-2-QDD-C-K9=	Network Convergence System 1004 2x QSFP-DD C-Band Line Card
NCS1K14-OXP2-K9=	NCS 1014 OSFP 12.8T Line card
NCS1K14-OXP2-L-K9=	NCS 1014 OSFP 12.8T Line card, Licensed

Table 72: Passive Device Option

Product ID	Product Description
NCS1K-MD-32O-CE=	NCS 1000 32chs Odd Mux/Demux-150GHz-C-band Enhanced
NCS1K-MD-32E-CE=	NCS 1000 32chs Even Mux/Demux-150GHz-C-band Enhanced

Table 73: Line Card Filler/Blank Option

Product ID	Product Description
NCS1K14-BLANK=	NCS 1014 Blank Card
NCS1K14-BLANK-2=	NCS 1014 Dual width Blank for NCS 1014-2 chassis

Table 74: 2.4T and 2.4TX Pluggable Options

Product ID	Product Description
Trunk Pluggables	
CIM8-C-K9=	Coherent Interface Module 8, C-Band
CIM8-L-K9=	Coherent Interface Module 8, L-Band
Client Pluggables	
QDD-400G-FR4-S	400GBase-FR4, 2 km over duplex SMF, 1270, 1290, 1310, 1330 nm
QDD-400G-AOCxM	400G QDD Active optical cable pluggable optics module
QDD-400G-DR4-S	400GBase-DR4, 500 m over SMF, 1310 nm
QDD-4X100G-LR-S	4x100GBase-LR1, 10 km over SMF, 1310 nm

Table 75: 1.2T Pluggable Options

Product ID	Product Description
1.2T Client Pluggables	
QDD-400G-LR4-S	400GBASE-LR4, 10km over duplex SMF, 1270, 1290, 1310, 1330

Product ID	Product Description
ONS-QSFP28-LR4	100G Base LR4, OTU4, 10 km over SMF, 1295.56, 1300.05, 1304.58, 1309.14 nm
QSFP-100G-AOC-1M	100G QDD Active optical cable pluggable optics module, 1 m
QSFP-100G-AOC-3M	100G QDD Active optical cable pluggable optics module, 3 m
QSFP-100G-AOC-10M	100G QDD Active optical cable pluggable optics module, 10 m
QSFP-100G-CU1M	100GBase-CR4 Passive copper cable, 1 m
QSFP-100G-CU2M	100GBase-CR4 Passive copper cable, 2 m
QSFP-100G-CU3M	100GBase-CR4 Passive copper cable, 3 m
QSFP-100G-CU5M	100GBase-CR4 Passive copper cable, 5 m
QSFP-100G-CWDM4-S	100GBase CWDM4, 2 km over SMF, 1271, 1291, 1311, 1331 nm
QSFP-100G-DR-S	100GBase-DR, 500 m over SMF, 1310 nm
QSFP-100G-ER4L-S	100GBase, 25-40 km over SMF, 1295, 1300, 1304, 1309 nm
QSFP-100G-FR-S	100GBase-FR, 2km over SMF, 1310 nm
QSFP-100G-LR4-S	100GBase-LR4, 10 km over SMF, 1295, 1300, 1304, 1309 nm
QSFP-100G-LR-S	100GBase-LR, 10 km over SMF, 1310 nm
QSFP-100G-SM-SR	100G CWDM4 Lite, 2 km over SMF, 1271, 1291, 1311, 1331 nm
QSFP-100G-SR4-S	100GBase-SR4, 100 m over OM4 MMF, 850 nm
QSFP-40/100-SRBD	100G and 40GBase-SR, BiDi, 100 m over OM4 MM, 855, 908 nm

Table 76: QXP Pluggable Options

Product ID	Product Description
Trunk Pluggables	
DP04QSDD-HK9	QSFP-DD 400G ZR+ - High Tx Power - OTN, 1550 nm
DP04QSDD-LK9	QSFP-DD 400G ZR+ - High Tx Power - OTN - 100G BW, 1550 nm
DP04QSDD-HE0	QSFP-DD 400G ZR+ - High Tx Power, 1550 nm
DP04QSDD-HE0-A1	QSFP-DD 400G ZR+ - High Tx Power, 1550 nm
QDD-400G-ZR-S	QSFP-DD transceiver module, coherent DCO, 400G-ZR
QDD-400G-ZRP-S	QSFP-DD transceiver module, coherent DCO, 400G-ZR+,
QXP Client Pluggables	

Product ID	Product Description
QDD-400G-FR4-S	400GBase-FR4, 2 km over duplex SMF, 1270, 1290, 1310, 1330 nm
QDD-400G-DR4-S	400GBase-DR4, 500 m over SMF, 1310 nm
QDD-400-AOCxM	400G QDD Active optical cable pluggable optics module
QDD-4x100G-LR-S	4x100GBase-LR1, 10 km over SMF, 1310 nm
QDD-400G-LR4-S	400GBASE-LR4, 10km over duplex SMF, 1270, 1290, 1310, 1330

Table 77: EDFA2 Pluggable Options

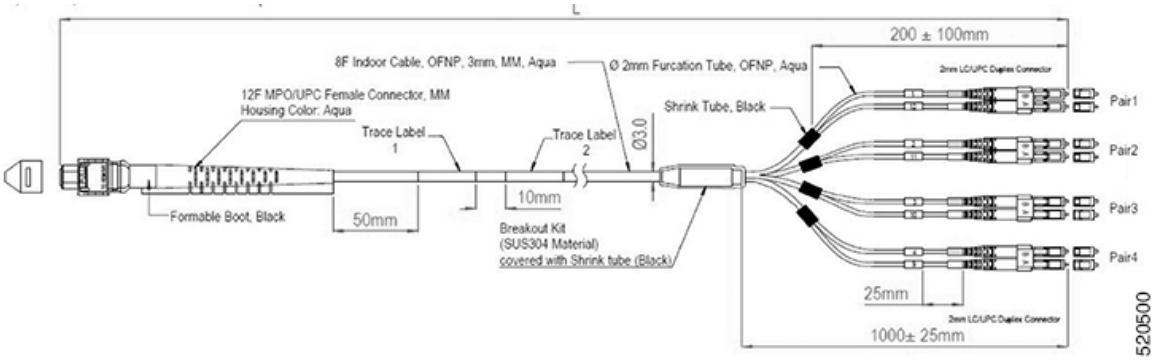
Product ID	Product Description
ONS-QSFP-OTDR	OTDR pluggable
DP01QSDD-ZT5-A1	100GBPS COHERENT QSFP-DD, 100GbitEthernet, 191.27-196.25 THz tuneable frequency, 30GHz bandwidth.
ONS-SC-PTP-1510	1GbitEthernet or 100MbitFastEthernet, 1GHz bandwidth (max), 1510 nm
DP04QSDD-E26-A1	400G ZR Coherent QSFP-DD DCO probe, 120km over amplified SMF, tuneable C-band frequency
GLC-TE	1000BASE-T standard, PTP/UDC electrical, Extended temperature range (EXT): -5°C to 85°C (23 to 185°F)

Optical Patch Cord PIDs

This section lists the PIDs of the optical patch cords that are supported in the Cisco NCS 1014 line cards.

Breakout Cable

Figure 113: Breakout Cable



Note Use the breakout cable only for ETSI racks to maintain a 600-mm footprint. Ensure a minimum gap of 50 mm below the chassis for routing the cables.

The following table lists the PIDs and specifications of the breakout cables that are supported for the QSFP-100G-SR4-S pluggable in the 1.2T line card:

Table 78: PIDs and Specifications of the Breakout Cables

PID	MPN	Overall Length (m)
ONS-4X10-MMCBL-5=	BCJ7F3FM005CSO008	05 ± 0.30
ONS-4X10-MMCBL-10=	BCJ7F3FM010CSO008	10 ± 0.30
ONS-4X10-MMCBL-20=	BCJ7F3FM020CSO008	20 ± 0.60

Cable with Formable Boot and Standard Boot

Figure 114: Cable with Formable Boot and Standard Boot



You must use the formable boot on the side of the line card only.

The following table lists the PIDs and specifications of the cable with formable boot and standard boot that support the QDD-400G-DR4-S pluggable in the 2.4T line card:

Table 79: PIDs and Specifications of Cables with Formable Boot and Standard Boot

PID	MPN	Overall Length (m)
-ONS-FMPO-SM-5=	MDD3F 3GM005CSO001	05±0.30
-ONS-FMPO-SM-10=	MDD3F 3GM010CSO001	10±0.30
-ONS-FMPO-SM-20=	MDD3F 3GM020CSO001	20±0.60
-ONS-FMPO-SM-30=	MDD3F 3GM030CSO001	30±0.90
-ONS-FMPO-SM-40=	MDD3F 3GM040CSO001	40±1.20
-ONS-FMPO-SM-50=	MDD3F 3GM050CSO001	50±1.50
-ONS-FMPO-SM-60=	MDD3F 3GM060CSO001	60±1.50

PID	MPN	Overall Length (m)
-ONS-FMPO-SM-70=	MDD3F 3GM070CSO001	70±1.50
-ONS-FMPO-SM-80=	MDD3F 3GM080CSO001	80±1.50
-ONS-FMPO-SM-90=	MDD3F 3GM090CSO001	90±1.50
-ONS-FMPO-SM-100=	MDD3F 3GM100CSO001	100±1.50

Product IDs