



Hardware Installation Guide for Cisco NCS 1010 and Cisco NCS 1000 Passive Modules

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Americas Headquarters

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

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CHAPTER 1

Cisco NCS 1010 Overview

This chapter provides an overview for Cisco NCS 1010.

Table 1: Feature History

Feature Name	Release Information	Description
LC Ports on OLT and ILA Line Cards	Cisco IOS XR Release 7.10.1	The new OLT and ILA line cards introduce LC ports on their faceplates. These LC ports enable you to directly connect the breakout or multiplexer/demultiplexer modules for degree interconnect or Add/Drop options. The following are the new PIDs introduced for the OLT and ILA line cards: <ul style="list-style-type: none">• NCS1K-E-OLT-C• NCS1K-E-OLT-L• NCS1K-E-OLT-R-C• NCS1K-E-ILA-R-C• NCS1K-E-ILA-2R-C

- [Cisco NCS 1010 Overview, on page 2](#)
- [OLT-C Line Card, on page 4](#)
- [OLT-R-C Line Card, on page 5](#)
- [OLT-L Line Card, on page 7](#)
- [ILA-C Line Card, on page 9](#)
- [ILA-R-C Line Card, on page 11](#)
- [ILA-2R-C, on page 12](#)
- [ILA-L Line Card, on page 13](#)
- [E-OLT-C Line Card, on page 15](#)
- [E-OLT-R-C Line Card, on page 18](#)
- [E-OLT-L Line Card, on page 20](#)
- [E-ILA-R-C Line Card, on page 23](#)
- [E-ILA-2R-C Line Card, on page 26](#)
- [E-ILA-R-C-2 Line Card, on page 28](#)
- [External Interface Timing Unit, on page 31](#)

- [Supported Modules, on page 32](#)
- [Supported Controller Cards, on page 32](#)
- [Cisco NCS 1010 LEDs, on page 33](#)

Cisco NCS 1010 Overview

Cisco NCS 1010 is a next-generation optical line system optimized for ZR/ZR+ WDM router interfaces. Its salient features are:

- Provides point-to-point connectivity between routers with WDM interfaces.
- Multiplexes the signals received from multiple routers over a single fiber.
- With one MPO port, it can be scaled to 8 Degree but if needed node can be scaled to higher than 8 degree, using more EXP MPO ports.
- Caters to C-band WDM transmission to maximize capacity, and can be enhanced to C+L combined band in the future.

Cisco NCS 1010 is a 3RU chassis that has an in-built External Interface Timing Unit (EITU) and the following field-replaceable modules.

- Controller
- Two power supply units
- Two fan trays
- Fan filter
- Line card

There are five different variants of the line card:

- [OLT-C Line Card, on page 4](#)—C-band Optical Line Terminal without Raman
- [OLT-R-C Line Card, on page 5](#)—C-band Optical Line Terminal with Raman
- [ILA-C Line Card, on page 9](#)—C-band In-Line Amplifier without Raman
- [ILA-R-C Line Card, on page 11](#)—C-band In-Line Amplifier with one side Raman
- [ILA-2R-C, on page 12](#)—C-band In-Line Amplifier with both sides Raman

From Release 7.9.1, the following line cards are introduced to perform amplification and add/drop function for the L-band traffic.

- [OLT-L Line Card, on page 7](#)—L-band Optical Line Terminal without Raman
- [ILA-L Line Card, on page 13](#)—L-band In-Line Amplifier without Raman

From Release 7.10.1, the following line cards are introduced with LC ports on their faceplates to enable direct connection for degree interconnect or Add/Drop options.

- [E-OLT-C Line Card, on page 15](#)—C-band Optical Line Terminal without Raman, Enhanced
- [E-OLT-R-C Line Card, on page 18](#)—C-band Optical Line Terminal with Raman, Enhanced

- [E-OLT-L Line Card, on page 20](#)—L-band Optical Line Terminal without Raman, Enhanced
- [E-ILA-R-C Line Card, on page 23](#)—C-band In-Line Amplifier with East-facing Raman, Enhanced
- [E-ILA-2R-C Line Card, on page 26](#)—C-band In-Line Amplifier with both sides Raman, Enhanced

From Release 7.11.1, the following line card is introduced to amplify the C-band traffic on the west-side.

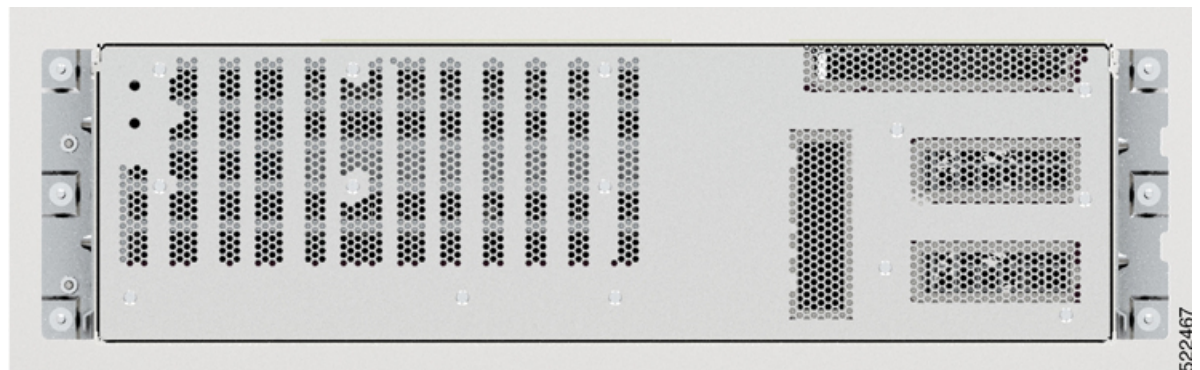
- [E-ILA-R-C-2 Line Card, on page 28](#)—C-band In Line Amplifier with West-facing Raman, Enhanced

For more information about the Cisco NCS 1010 chassis, see [Cisco NCS 1010 Data Sheet](#).

Figure 1: Cisco NCS 1010 Front View

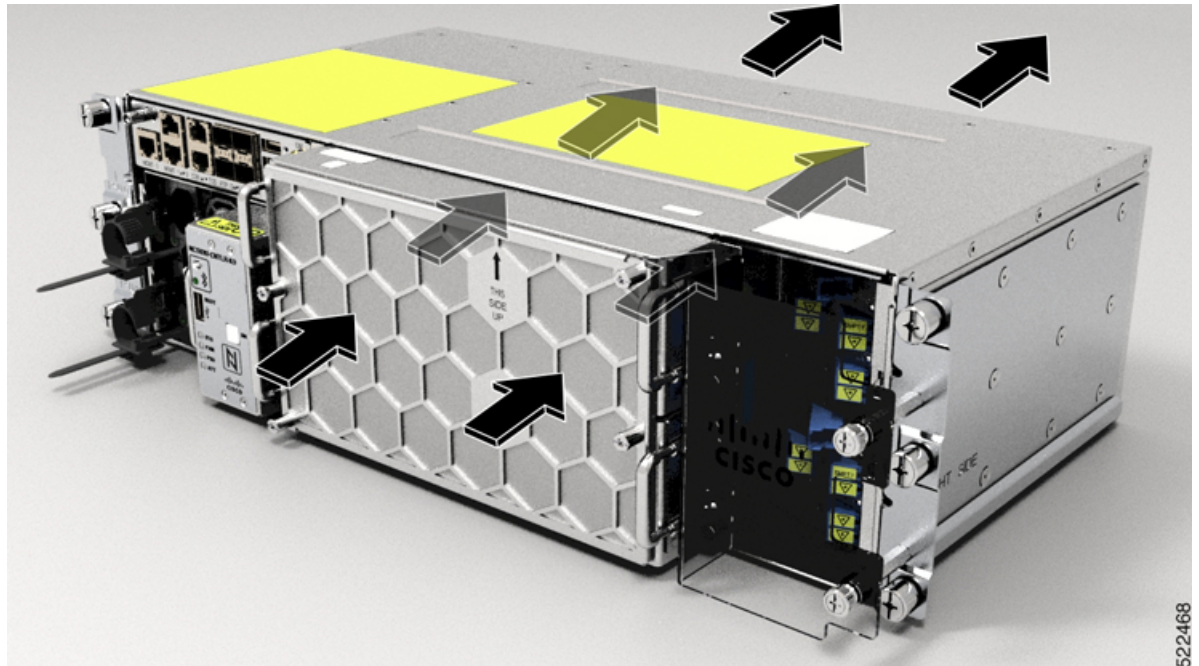


Figure 2: Cisco NCS 1010 Rear View



The airflow on Cisco NCS 1010 is front to back. Cool air enters the chassis through the fan trays and exhausts through the rear end of the chassis.

Figure 3: Airflow in Cisco NCS 1010

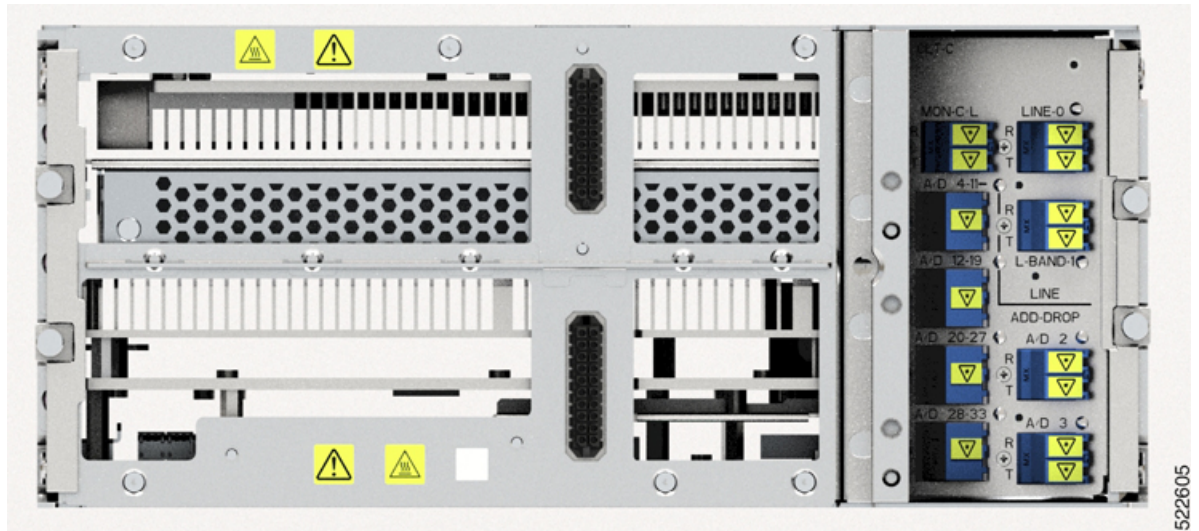


OLT-C Line Card

The C-band Optical Line Terminal without Raman (OLT-C) line card includes the following features:

- 25-dBm line preamplifier True Variable Gain (TVG) Erbium-Doped Fiber Amplifier (EDFA) with two switchable gain ranges
- Dedicated amplification of the odd and even add channels through an embedded Fixed Gain (FG) EDFA
- 23-dBm line boost-amplifier TVG EDFA single gain range
- Dedicated EDFA for noise loading
- Embedded Optical Time Domain Reflectometer (OTDR) for line RX and TX monitoring
- 37 ports Optical Channel Monitoring (OCM)
- Dedicated Tunable Laser (TL) enabling Connection Verification (CV) and patch cord discovery features
- Up to 30 EXP ports
- Embedded Optical Service Channel at Fast Ethernet (FE)
- Multiplexing and demultiplexing of odd and even channels
- C+L combiner for multiplexing and demultiplexing L-band channels
- 2x2 switch to reverse transmit direction of Optical Service Channel (OSC)-C
- Fiber reflectors to support fiber end detection by OTDR

Figure 4: Front View of OLT-C Line Card



For details of the OLT-C line card ports, see [Figure 39: Front View of the OLT-C Line Card Faceplate](#), on page 37.

Figure 5: Perspective View of OLT-C Line Card



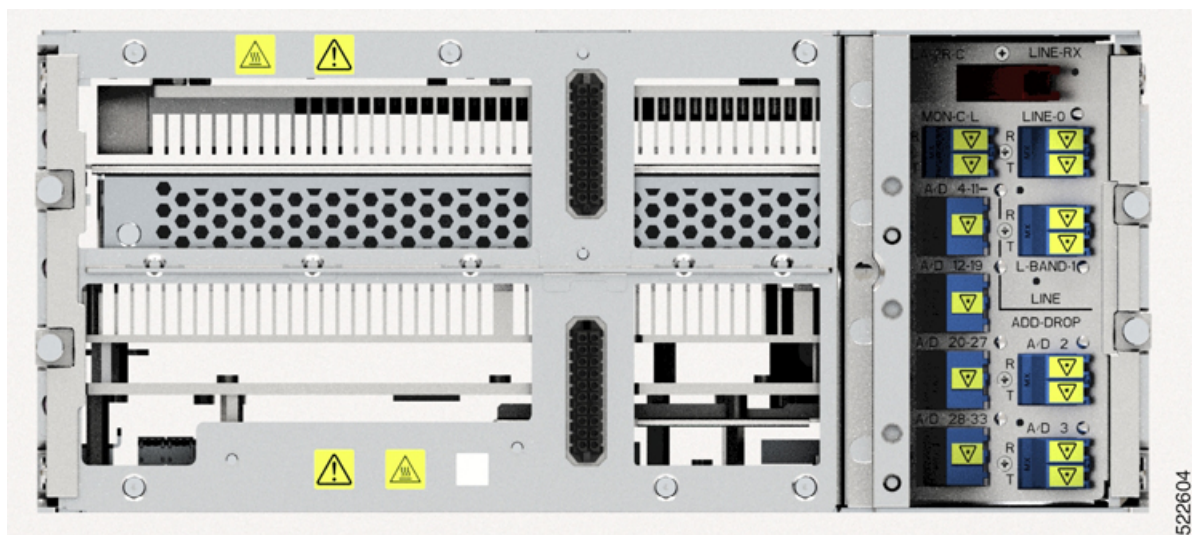
OLT-R-C Line Card

The C-band Optical Line Terminal with Raman (OLT-R-C) line card includes the features of the OLT-C line card along with the Raman amplifier.

The following are the features of the Raman amplifier:

- Five different pump wavelengths for supporting C+L Raman amplification
- Embedded Distributed Feedback (DFB) laser at 1568.77 nm (class 1M) to be used for optical safety (link continuity)
- Full monitoring of pumps, DFB laser and signal power
- Raman pump back-reflection detector
- Meets class 1M Laser safety.
- Additional Photodiode (PD) to monitor remnant pump power at the far end

Figure 6: Front View of OLT-R-C Line Card



For details of the OLT-R-C line card ports, see [Figure 40: Front View of the OLT-R-C Line Card Faceplate, on page 38](#).

Figure 7: Perspective View of OLT-R-C Line Card



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OLT-L Line Card

Table 2: Feature History

Feature Name	Release Information	Description
NCS1K-OLT-L Line Card	Cisco IOS XR Release 7.9.1	The new NCS1K-OLT-L line card for the NCS 1010 optical line system performs the add/drop function for the L-band traffic. The OLT-L card acts as expansion equipment for the OLT-C units and connects to the L-band expansion port in the OLT-C unit. By supporting L-band traffic, the OLT-L line card improves fiber utilization by enabling the existing OLT-C node to send both C-band and L-band traffic.

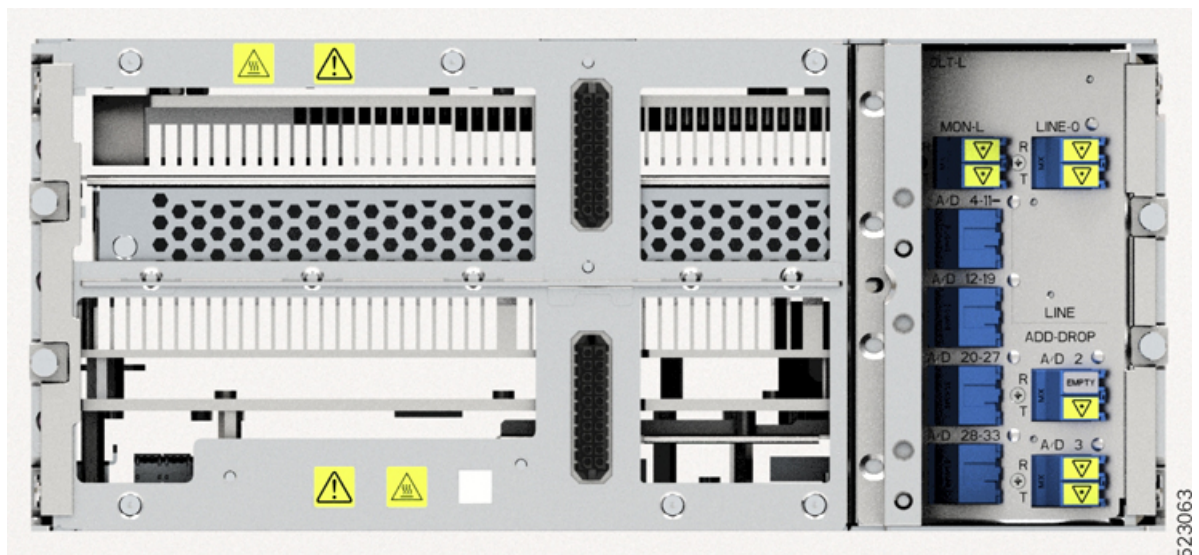
The OLT-L line card connects to the L-band expansion ports in the OLT-C unit to add, drop, and route the L-band traffic in the existing fiber. This card cannot be deployed as a standalone unit. It can be used as an expansion equipment for both variants of the OLT-C unit. This card enhances the fiber capacity of the existing OLT-C nodes to send both C- and L-band traffic. Supporting L-band traffic, this unit expands the C-band only nodes to C+L-band nodes.

The L-band Optical Line Terminal (OLT-L) line card includes the following features:

- 25-dBm line preamplifier True Variable Gain (TVG) Erbium-Doped Fiber Amplifier (EDFA) with two switchable gain ranges
- Dedicated amplification of the odd and even add channels through an embedded Fixed Gain (FG) EDFA
- 24.5-dBm line boost-amplifier TVG EDFA single gain range

- 15-dBm ADD-side boost-amplifier TVG EDFA with single gain range of 16 dB
- Dedicated EDFA for noise loading
- 37 ports Optical Channel Monitoring (OCM)
- Dedicated Tunable Laser (TL) enabling Connection Verification (CV) and patch cord discovery features
- Up to 30 EXP ports
- Embedded Optical Service Channel at Fast Ethernet (FE) at 184.45 THz (1625.33 nm)
- Multiplexing and demultiplexing of odd and even channels
- 2x2 switch to reverse send direction of Optical Service Channel OSC-L.

Figure 8: Front View of OLT-L Line Card



For details of the OLT-L line card ports, see [Figure 41: Front View of the OLT-L Line Card Faceplate](#), on [page 39](#).

Figure 9: Perspective View of OLT-L Line Card

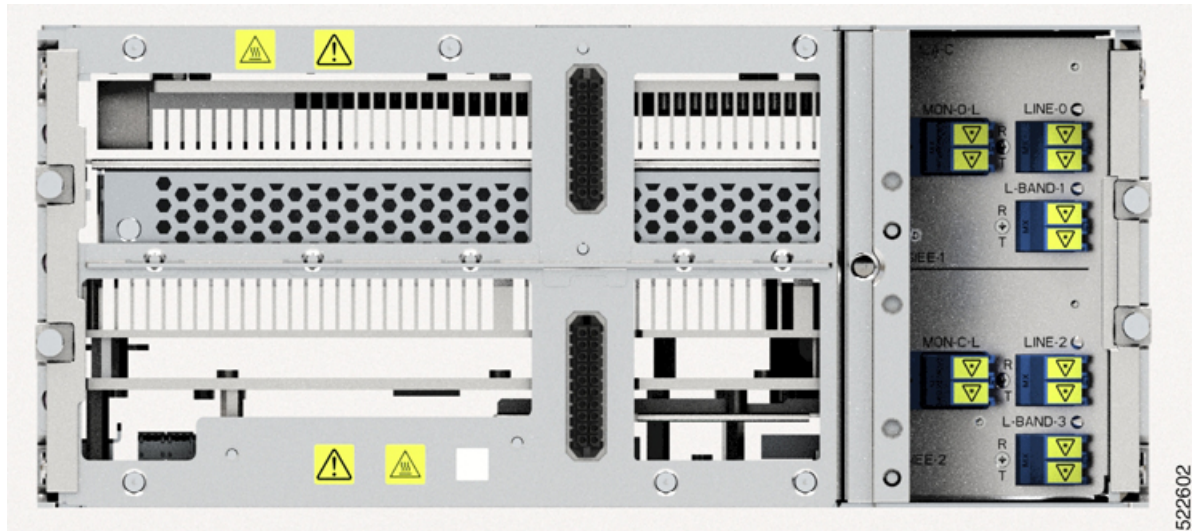


ILA-C Line Card

The C-band In Line Amplifier without Raman (ILA-C) line card includes the following features:

- Two independent TVG EDFA block, covering full operative gain ranging 8–36 dB
- Each EDFA block can provide up to 23dBm output power
- Dynamic Gain Equalization (DGE) embedded capability to compensate for line tilt and ripple
- Embedded OTDR for line 1/2-RX/TX monitoring
- Four-ports OCM for channels monitoring
- Embedded Optical Service Channel at Fast Ethernet (FE)
- C+L combiner for multiplexing/demultiplexing L-band channels
- Dedicated ports for amplifiers output monitoring
- 2x2 switch to reverse transmit direction of OSC-C for both directions
- Fiber reflectors to support fiber end detection by OTDR

Figure 10: Front View of ILA-C Line Card



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For details of the ILA-C line card ports, see [Figure 42: Front View of the ILA-C Line Card Faceplate, on page 40](#)

Figure 11: Perspective View of ILA-C Line Card

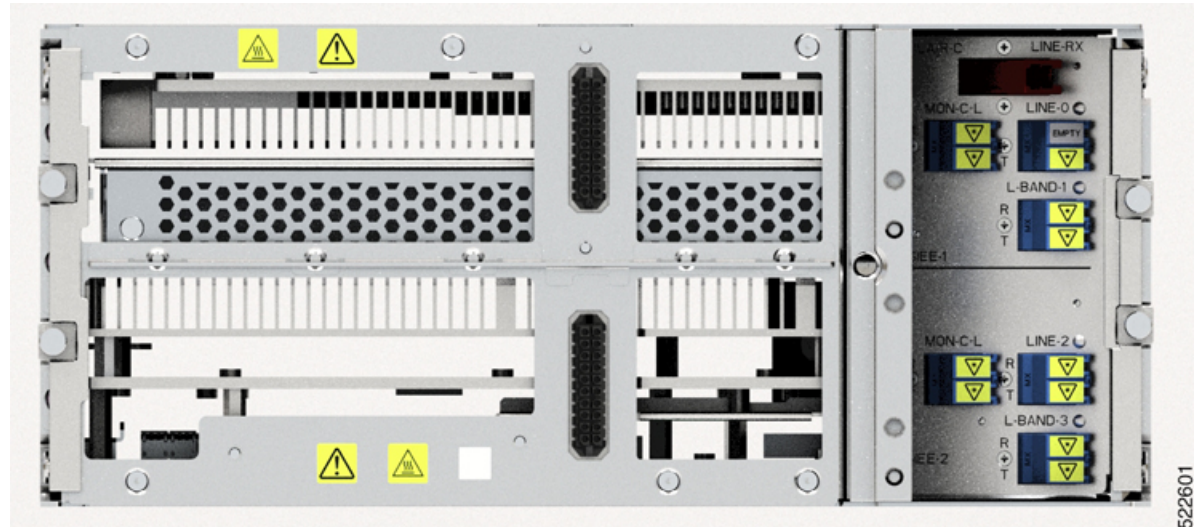


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ILA-R-C Line Card

The C-band In Line Amplifier with Raman (ILA-R-C) line card includes the features of ILA-C and Raman amplifier.

Figure 12: Front View of ILA-R-C Line Card



For details of the ILA-R-C line card ports, see [Figure 43: Front View of the ILA-R-C Line Card Faceplate](#), on page 41.

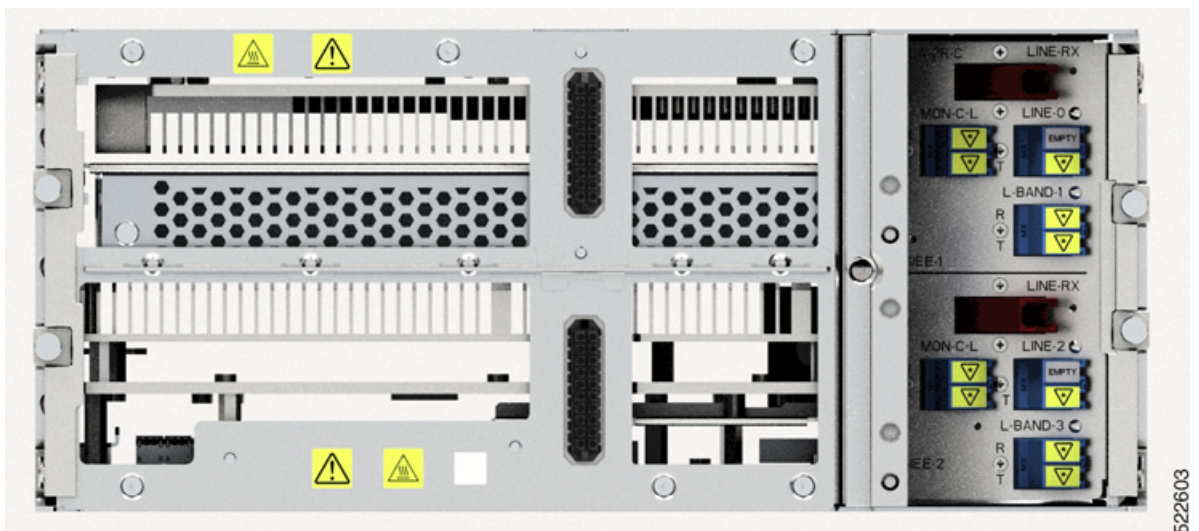
Figure 13: Perspective View of ILA-R-C Line Card



ILA-2R-C

The C-band In-Line Amplifier with two Raman (ILA-2R-C) line card includes the features of the ILA-C and Raman amplifier.

Figure 14: Front View of ILA-2R-C Line Card



For details of the ILA-2R-C line card ports, see [Figure 44: Front View of the ILA-2R-C Line Card Faceplate, on page 42](#).

Figure 15: Perspective View of ILA-2R-C Line Card



ILA-L Line Card

Table 3: Feature History

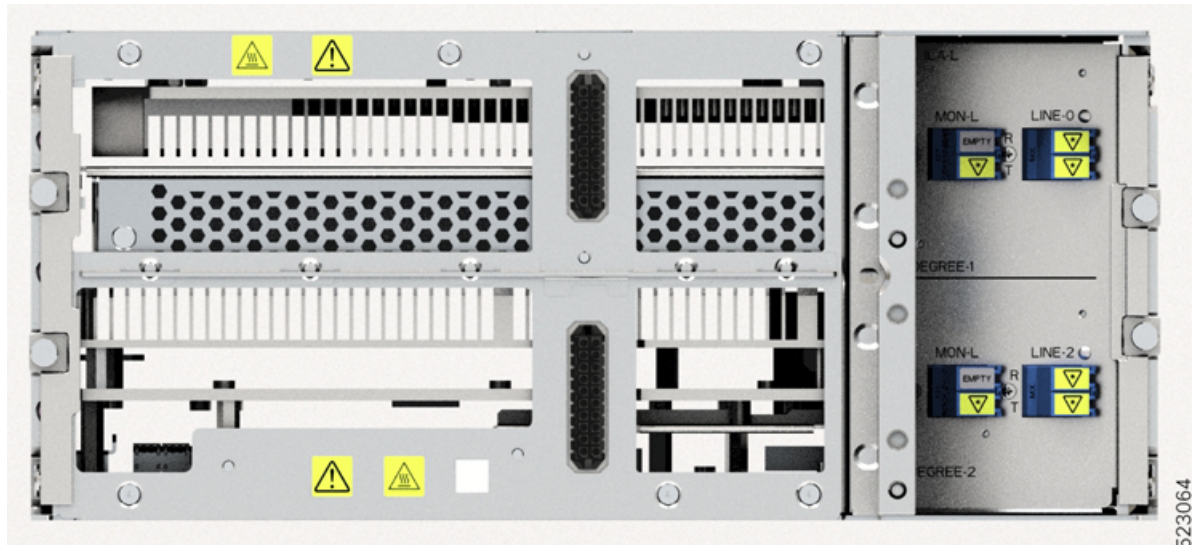
Feature Name	Release Information	Description
NCS1K-ILA-L Line Card	Cisco IOS XR Release 7.9.1	The new NCS1K-ILA-L line card for the NCS 1010 optical line system amplifies L-band traffic. The ILA-L card acts as expansion equipment for the ILA-C units and connects to the L-band expansion port in the ILA-C unit. The ILA-L enables sending the low-loss L-Band through the existing ILA-C node to enhance the fiber capacity and effectively upgrade the C-band only node to a C+L band node.

The ILA-L must always be connected to the L-band expansion ports in the ILA-C unit to amplify the L-band traffic that is traveling together with the C-band traffic in the fiber. The ILA-L unit cannot be deployed as standalone. It can always be used as an expansion equipment for all variants of the ILA-C unit, with or without Raman amplification in one or both direction. The Raman module in the ILA-C unit provides amplification for both C- and L-band signals in long-distance transmission.

The L-band In Line Amplifier (ILA-L) line card includes the following features:

- Two independent TVG EDFA block, covering full operative gain ranging 10.8–32.8 dB
- Each EDFA block can provide up to 24.5-dBm total output power
- Dynamic Gain Equalization (DGE) embedded capability to compensate for line tilt and ripple
- Four-ports OCM for channels monitoring
- Embedded Optical Service Channel at Fast Ethernet (FE)
- Dedicated ports for amplifiers output monitoring
- 2x2 switch to reverse transmit direction of OSC-L for both directions

Figure 16: Front View of ILA-L Line Card



For details of the ILA-L line card ports, see [Figure 48: Front View of the ILA-L Line Card Faceplate](#), on page 46

Figure 17: Perspective View of ILA-L Line Card



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E-OLT-C Line Card

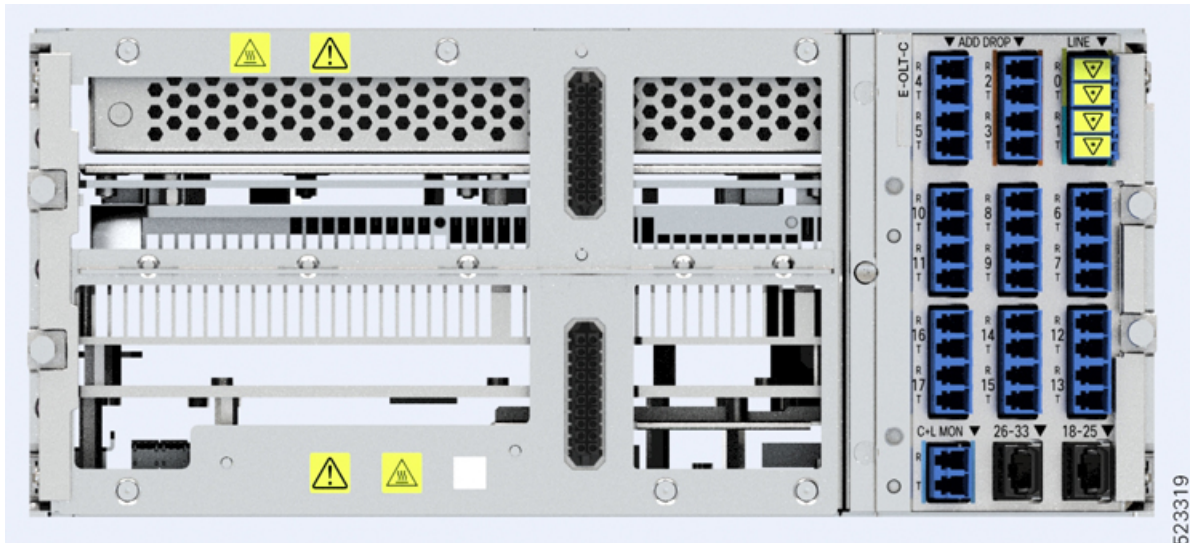
The C-band Optical Line Terminal without Raman, Enhanced (E-OLT-C) line card includes the following features:

- 25-dBm line preamplifier True Variable Gain (TVG) Erbium-Doped Fiber Amplifier (EDFA) with two switchable gain ranges
- Dedicated amplification of the odd and even add channels through an embedded Fixed Gain (FG) EDFA
- 23-dBm line boost-amplifier TVG EDFA single gain range
- Dedicated EDFA for noise loading
- Embedded Optical Time Domain Reflectometer (OTDR) for line RX and TX monitoring
- 37 ports Optical Channel Monitoring (OCM)
- Dedicated Tunable Laser (TL) enabling Connection Verification (CV) and patch cord discovery features
- Up to 30 EXP ports
- Embedded Optical Service Channel at Fast Ethernet (FE)
- Multiplexing and demultiplexing of odd and even channels
- C+L combiner for multiplexing and demultiplexing L-band channels
- 2x2 switch to reverse transmit direction of Optical Service Channel (OSC)-C

- Fiber reflectors to support fiber end detection by OTDR

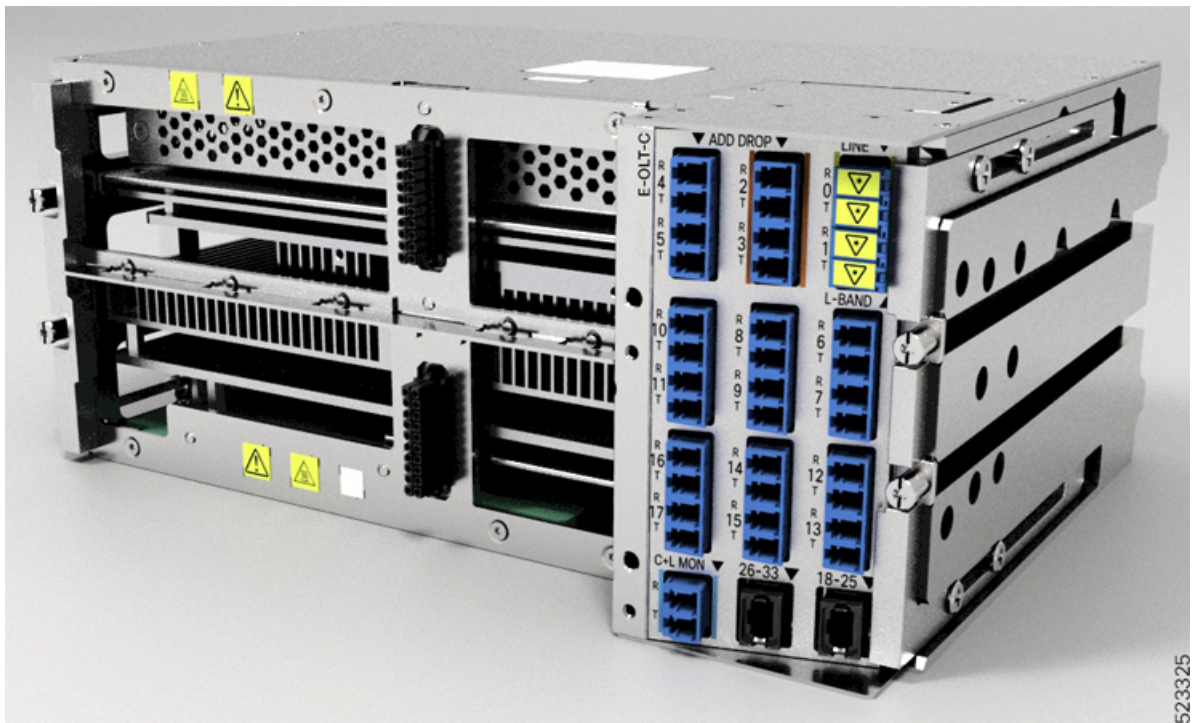
Figure 18: E-OLT-C Line Card

Figure 19: Front View of E-OLT-C Line Card



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Figure 20: Perspective View of E-OLT-C Line Card



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E-OLT-R-C Line Card

The C-band Optical Line Terminal with Raman, Enhanced (E-OLT-R-C) line card includes the features of the OLT-C line card along with the Raman amplifier.

The following are the features of the Raman amplifier:

- Five different pump wavelengths for supporting C+L Raman amplification
- Embedded Distributed Feedback (DFB) laser at 1568.77 nm (class 1M) to be used for optical safety (link continuity)
- Full monitoring of pumps, DFB laser and signal power
- Raman pump back-reflection detector
- Meets class 1M Laser safety.
- Additional Photodiode (PD) to monitor remnant pump power at the far end

Figure 21: E-OLT-R-C Line Card

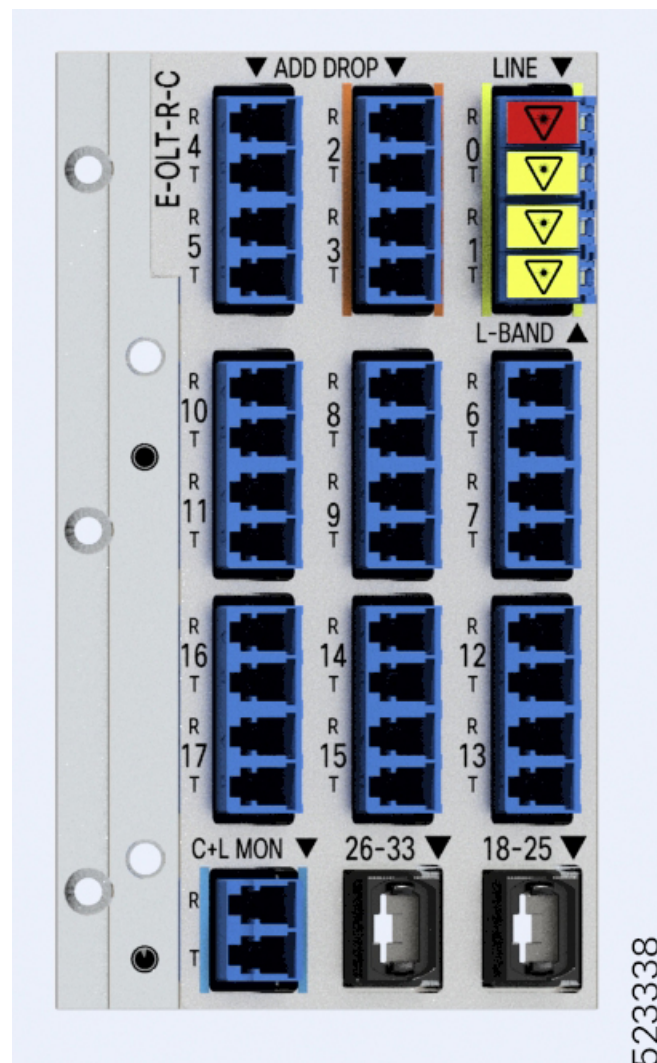
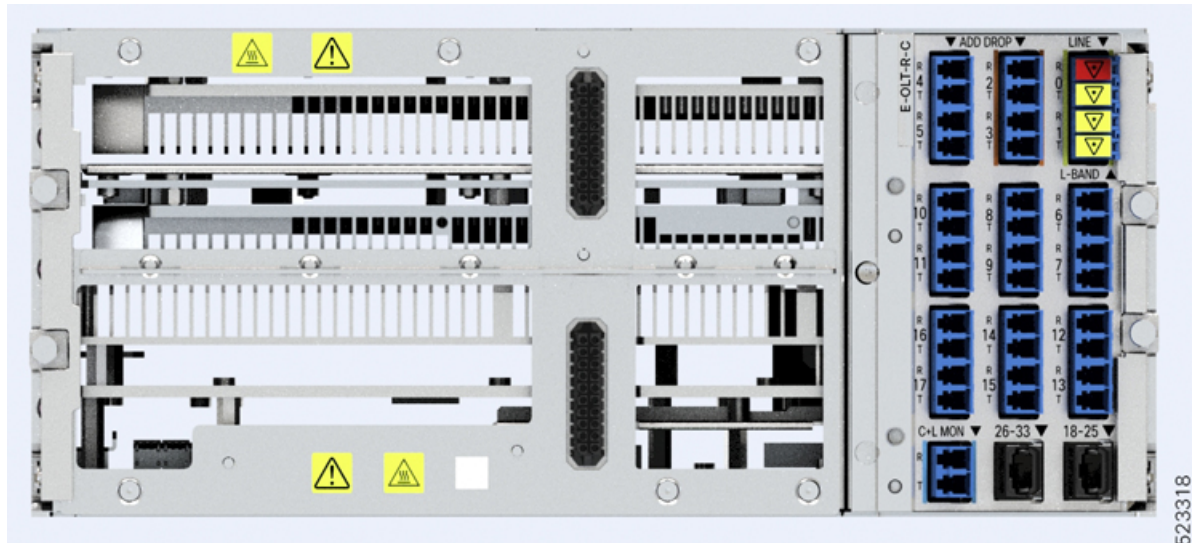
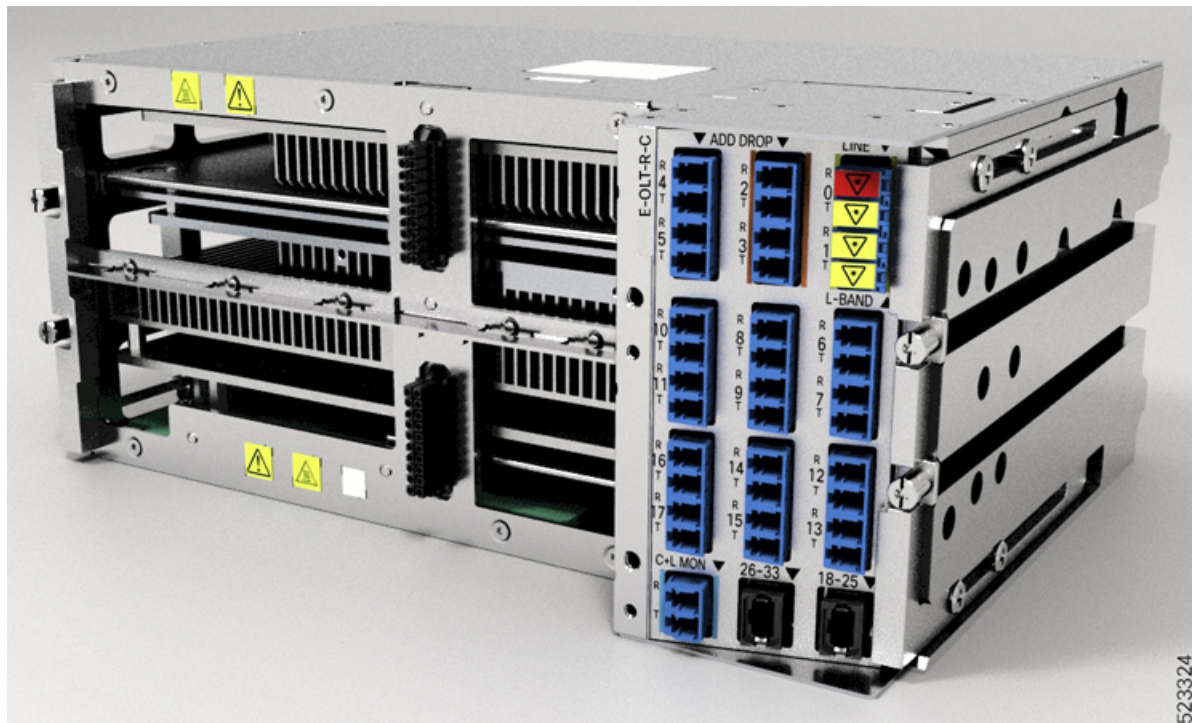


Figure 22: Front View of E-OLT-R-C Line Card



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Figure 23: Perspective View of E-OLT-R-C Line Card



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E-OLT-L Line Card

The L-band Optical Line Terminal, Enhanced (E-OLT-L) line card includes the following features:

- 25-dBm line preamplifier True Variable Gain (TVG) Erbium-Doped Fiber Amplifier (EDFA) with two switchable gain ranges
- Dedicated amplification of the odd and even add channels through an embedded Fixed Gain (FG) EDFA
- 24.5-dBm line boost-amplifier TVG EDFA single gain range
- 15-dBm ADD-side boost-amplifier TVG EDFA with single gain range of 16 dB
- Dedicated EDFA for noise loading
- 37 ports Optical Channel Monitoring (OCM)
- Dedicated Tunable Laser (TL) enabling Connection Verification (CV) and patch cord discovery features
- Up to 30 EXP ports
- Embedded Optical Service Channel at Fast Ethernet (FE) at 184.45 THz (1625.33 nm)
- Multiplexing and demultiplexing of odd and even channels
- 2x2 switch to reverse send direction of Optical Service Channel OSC-L.

Figure 24: E-OLT-L Line Card

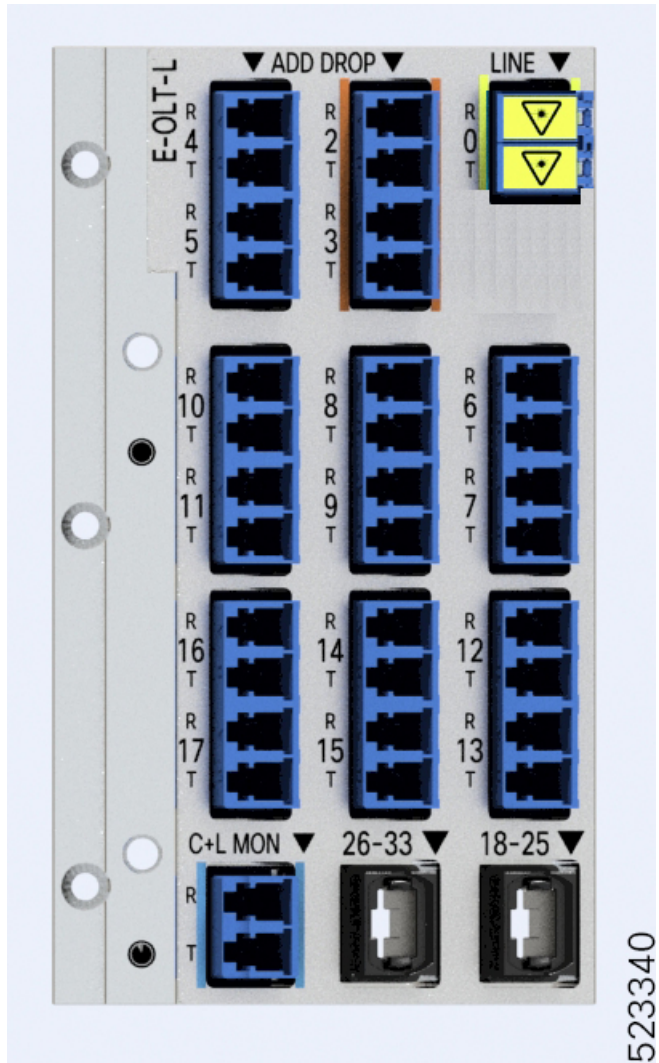


Figure 25: Front View of E-OLT-L Line Card

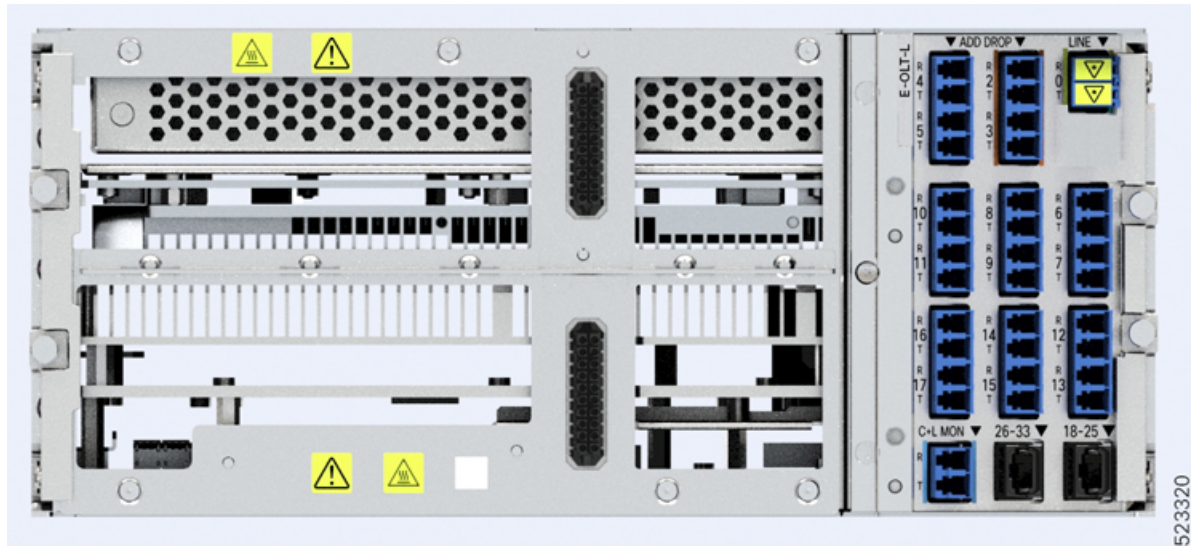
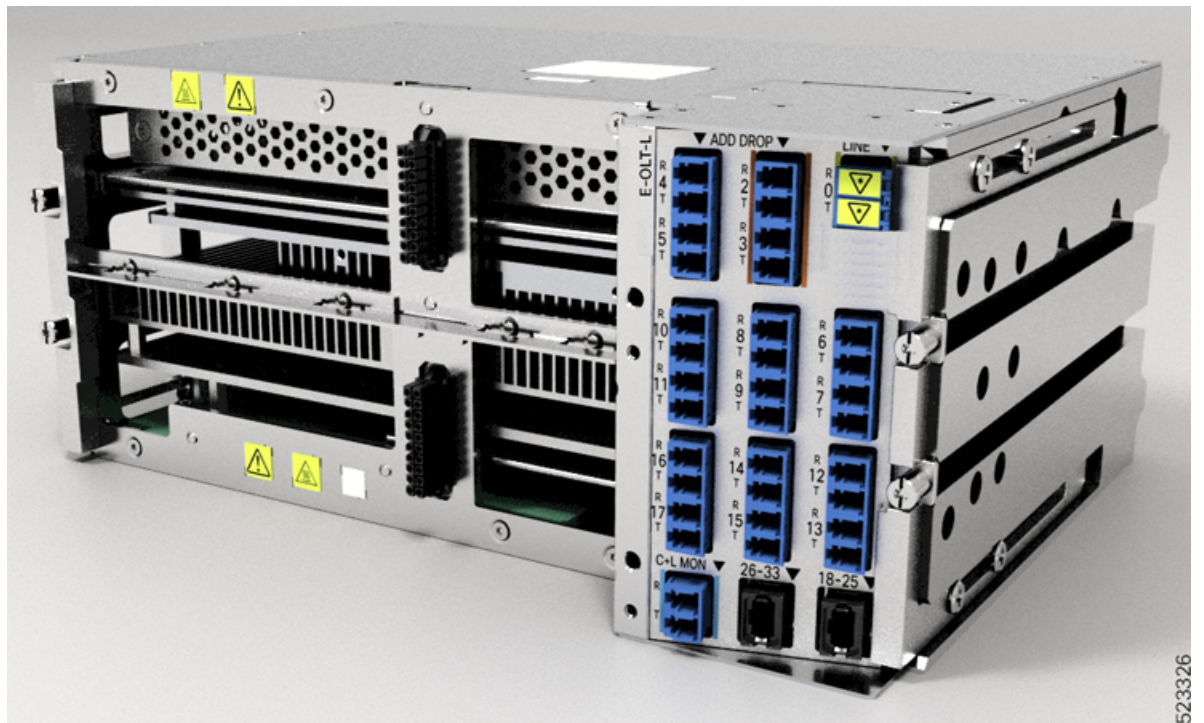


Figure 26: Perspective View of E-OLT-L Line Card



E-ILA-R-C Line Card

The C-band In Line Amplifier with Raman, Enhanced (E-ILA-R-C) line card includes the features of E-ILA-C and Raman amplifier.

Figure 27: E-ILA-R-C Line Card

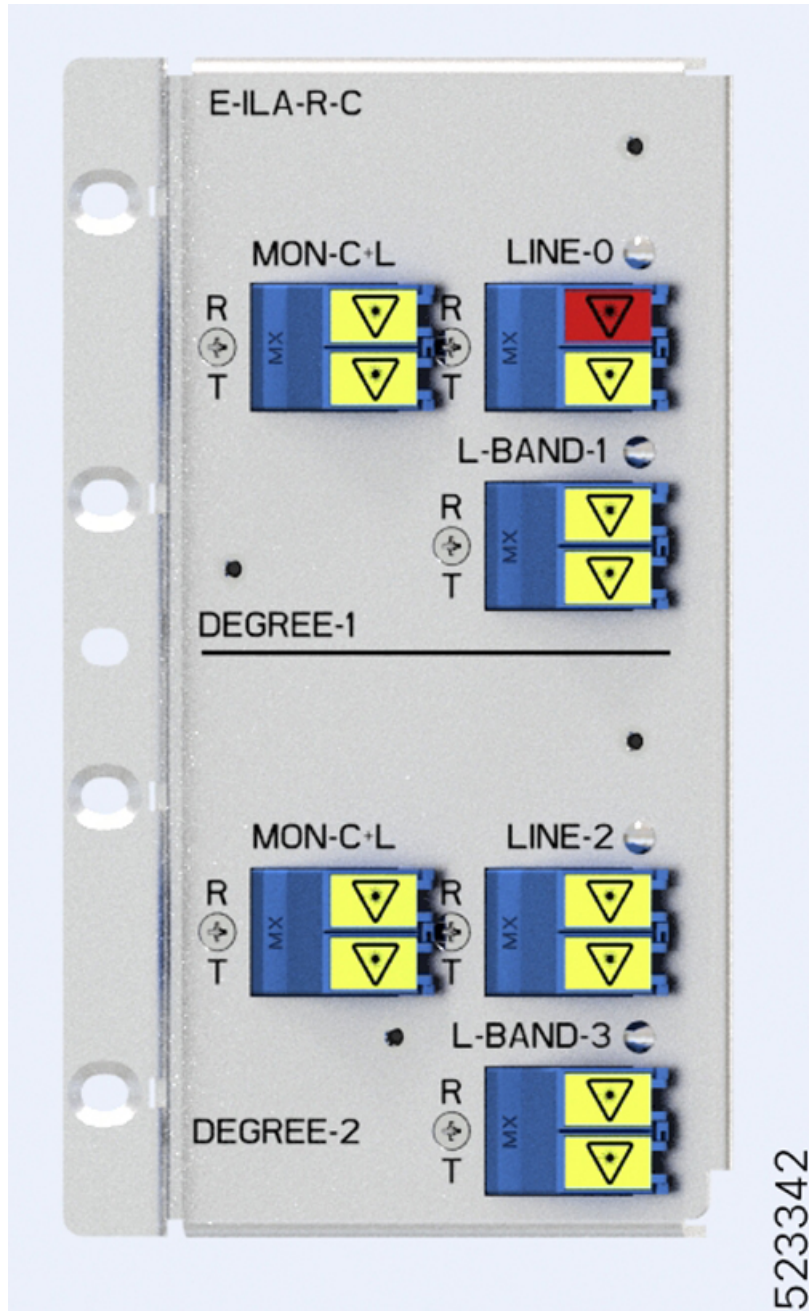
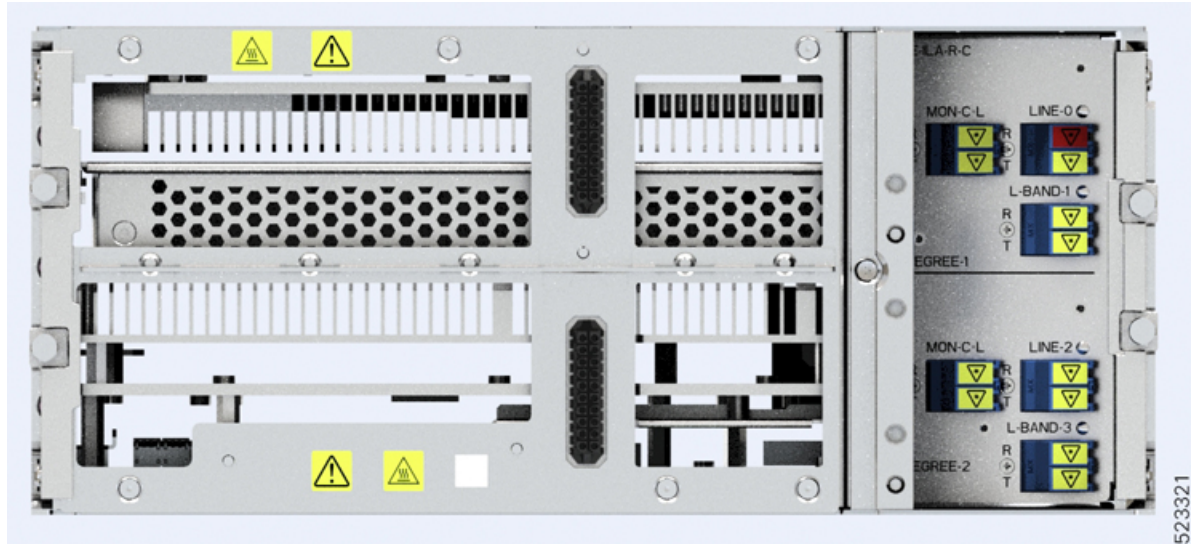


Figure 28: Front View of E-ILA-R-C Line Card



For details of the E-ILA-R-C line card ports, see [Figure 45: Front View of the E-ILA-R-C Line Card Faceplate](#), on page 43.

Figure 29: Perspective View of E-ILA-R-C Line Card



E-ILA-2R-C Line Card

The C-band In-Line Amplifier with two Raman, Enhanced (E-ILA-2R-C) line card includes the features of the E-ILA-C and Raman amplifier.

Figure 30: E-ILA-2R-C Line Card

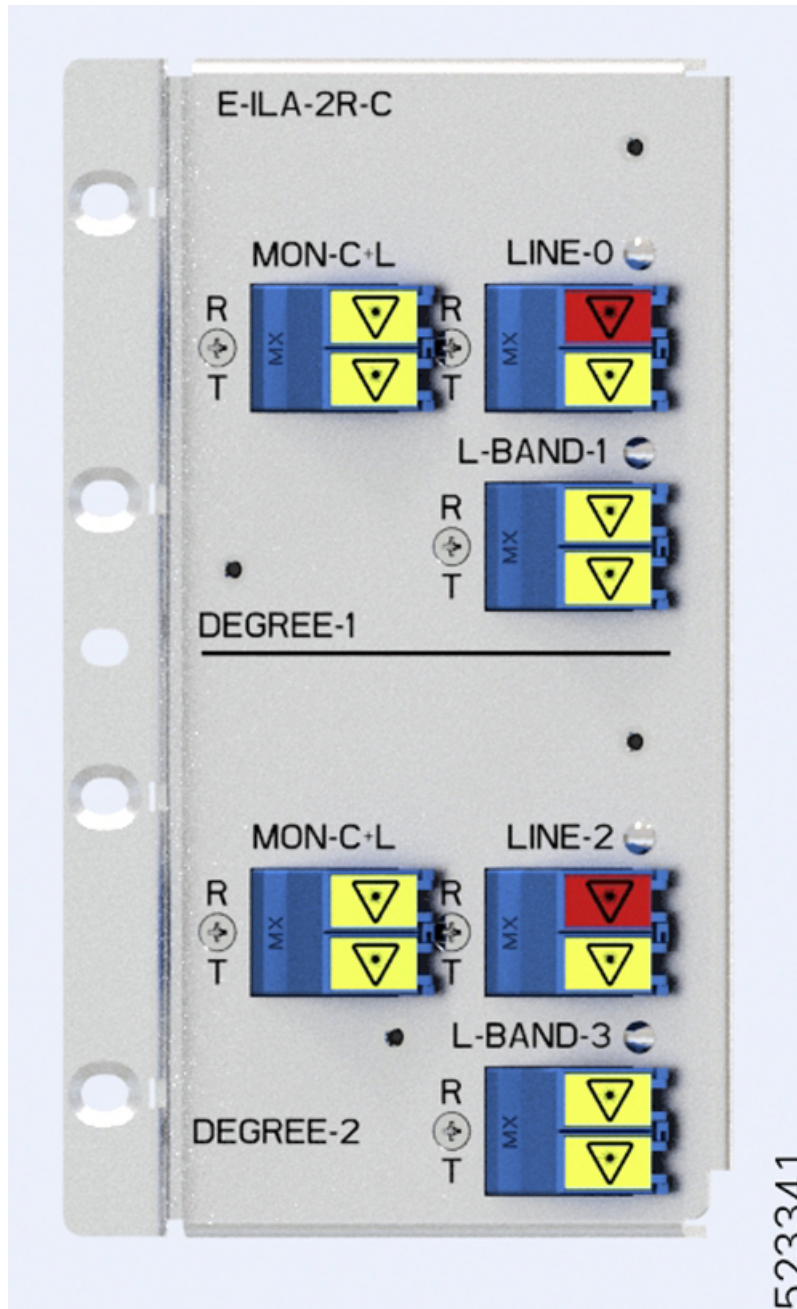
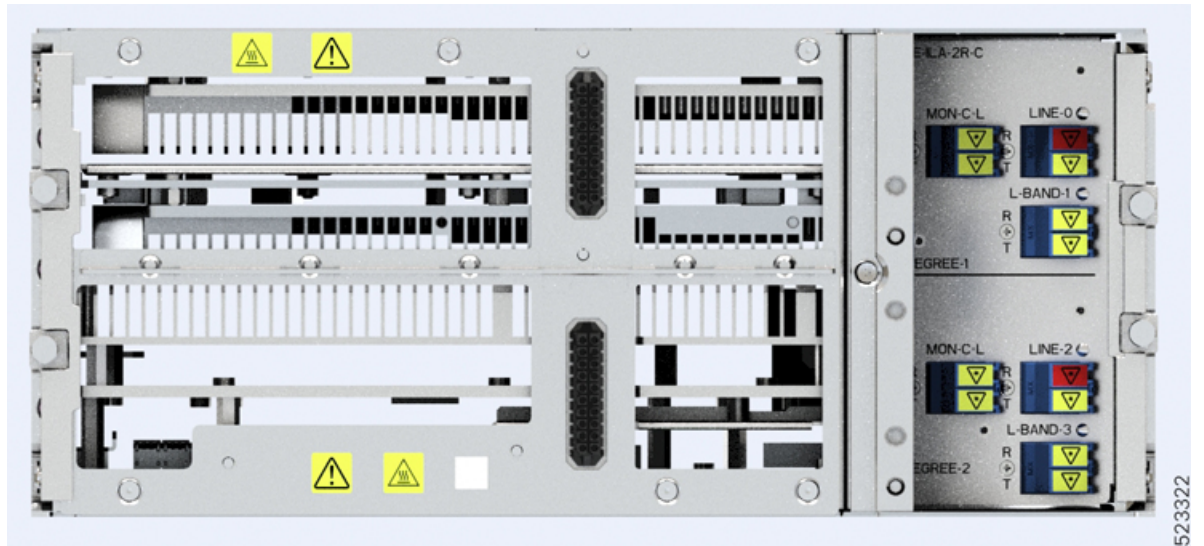


Figure 31: Front View of E-ILA-2R-C Line Card



For details of the E-ILA-R-C line card ports, see [Figure 46: Front View of the E-ILA-2R-C Line Card Faceplate](#), on page 44.

Figure 32: Perspective View of E-ILA-2R-C Line Card



E-ILA-R-C-2 Line Card

Table 4: Feature History

Feature Name	Release Information	Description
NCS1K-E-ILA-R-C-2 Line Card	Cisco IOS XR Release 7.11.1	NCS1K-E-ILA-R-C-2 line card is a new addition to the NCS 1010 ILA line cards family. With an inbuilt West-facing Raman amplifier, it amplifies the C-band and C+L-band traffic received from the west direction.

The C-band In Line Amplifier with West-facing Raman, Enhanced (E-ILA-R-C-2) line card includes the features of ILA-C and Raman amplifier.

Figure 33: E-ILA-R-C-2 Line Card

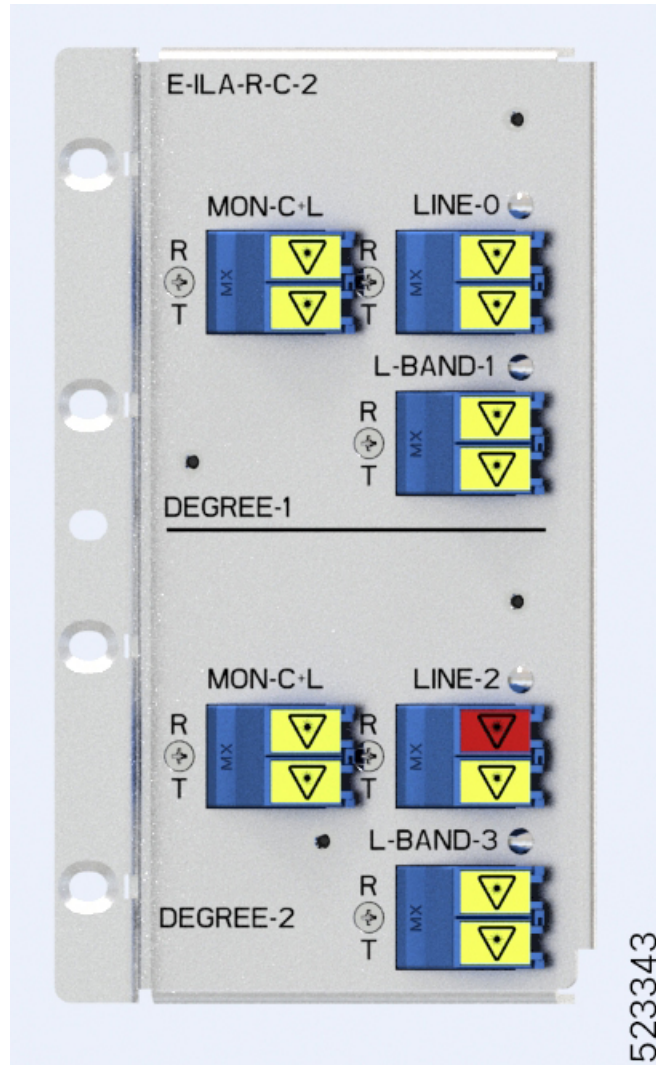
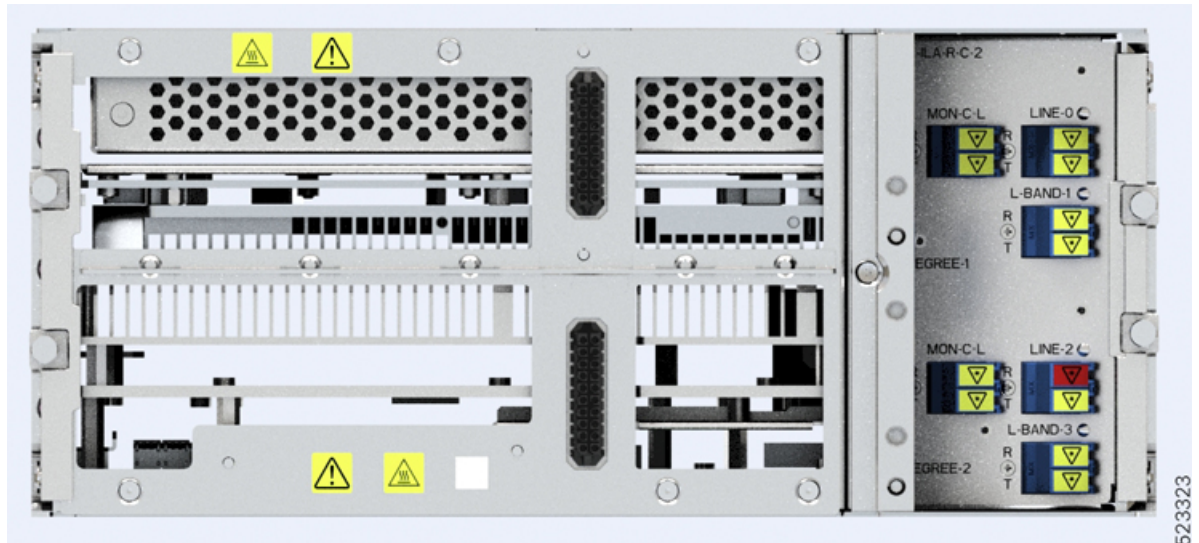


Figure 34: Front View of E-ILA-R-C-2 Line Card



For details of the E-ILA-R-C line card ports, see [Figure 47: Front View of the E-ILA-R-C-2 Line Card Faceplate](#), on page 45.

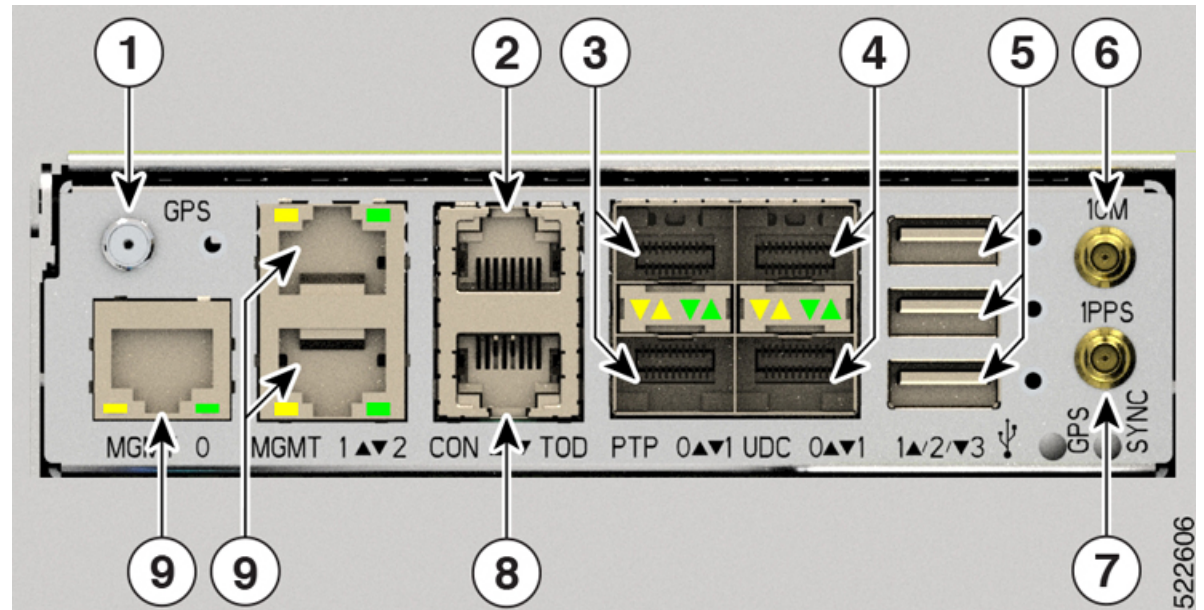
Figure 35: Perspective View of E-ILA-R-C-2 Line Card



External Interface Timing Unit

The External Interface Timing Unit (EITU) manages the control plane interfaces and includes all user external interfaces (timing and management). It is connected to the controller with a redundant 10G Ethernet bus.

Figure 36: Front View of EITU



The following is the list of the available user interfaces:

1	Coaxial connector for GPS antenna RF input (with +5V antenna power, if necessary) (1x)
2	Console/Universal Asynchronous Receiver/Transmitter (UART) Interface (1x)
3	SFP for 1GE optical PTP port (1588 and SyncE) (2x)
4	SFP for 1GE optical User Data Channels (UDC) (2x)
5	<p>USB 2.0 type A, 1.8A max at 5V/12V (with Cisco NCS 1000 Breakout Patch Panel support) (3x)</p> <p>Note The USB ports in the EITU do not support USB drives; they only support passive optical devices from Cisco, such as breakout modules and mux/demux patch panels. If you want to install the operating system or copy files to and from the system, use the USB 3.0 ports labeled "Boot" on the controller cards.</p>

6	Coaxial connector for 10MHz sync signal (bidirectional) (1x)
7	Coaxial connector for 1PPS sync signal (bidirectional) (1x)
8	RJ45 for 1588 TOD (1x)
9	10/100/1000 RJ-45 Ethernet management ports and Interconnection Link (ILINK) (3x)

Supported Modules

Cisco NCS 1010 supports the following passive modules.

- Cisco NCS 1000 Breakout Patch Panel

The breakout panel supports the following passive optical modules:

- NCS1K-BRK-8
- NCS1K-BRK-16
- NCS1K-BRK-24

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

For more information on the passive modules, see [Cisco NCS 1000 Breakout Patch Panel and Modules Overview](#), on page 107 and [Cisco NCS 1000 32-Channel Mux/Demux Patch Panel Overview](#), on page 155.

Supported Controller Cards

Table 5: Feature History

Feature Name	Release Information	Description
NCS1K10-CNTRLR-B-K9 Controller Card	Cisco IOS XR Release 7.10.1	The new NCS1010-CTLR-B-K9 controller card for the NCS 1010 optical line system supports a default baud rate of 9600 bps on the RS232 console port. It runs on BIOS version 4.40 and later.

The Cisco NCS 1010 supports the following controller cards:

- **NCS1K10-CNTRLR-K9**

The NCS1K10-CNTRLR-K9 controller card supports a default of 115200 bps baud rate on the RS232 console port. For details of the NCS1K10-CNTRLR-K9 controller card, see [Figure 37: Front View of the NCS1010-CNTRLR-K9 Controller](#), on page 33

- **NCS1K10-CTLR-B-K9**

The NCS1K10-CNTLR-B-K9 controller card supports a default of 9600 bps baud rate on the RS232 console port. For details of the NCS1K10-CNTLR-B-K9 controller card, see [Figure 38: Front View of the NCS1010-CTRL-B-K9 Controller](#), on page 34

Cisco NCS 1010 LEDs

Cisco NCS 1010 includes multiple LEDs to determine the overall state of the system and to verify the status of specific connections, ports, and system components.

Controller LEDs

The controller (NCS1010-CNTLR-K9 and NCS1010-CTRL-B-K9) units have five LEDs to indicate the system status and the status of the components.

Figure 37: Front View of the NCS1010-CNTLR-K9 Controller

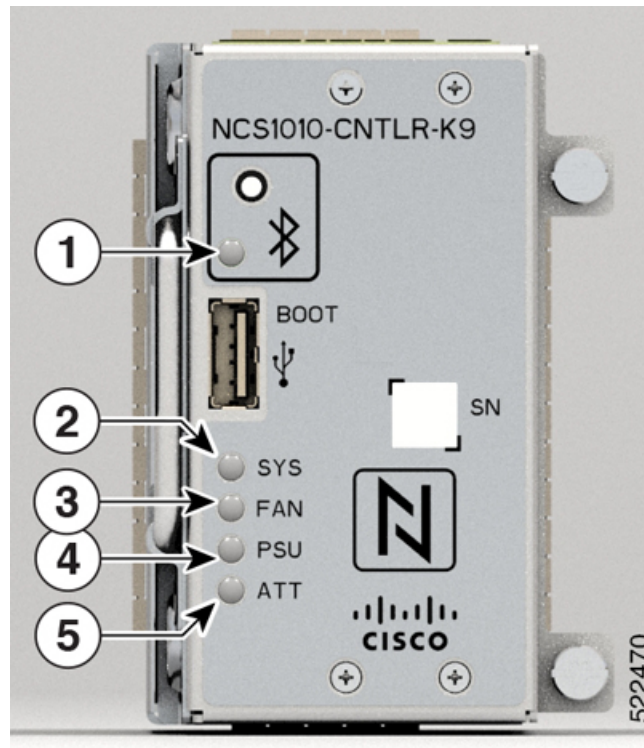
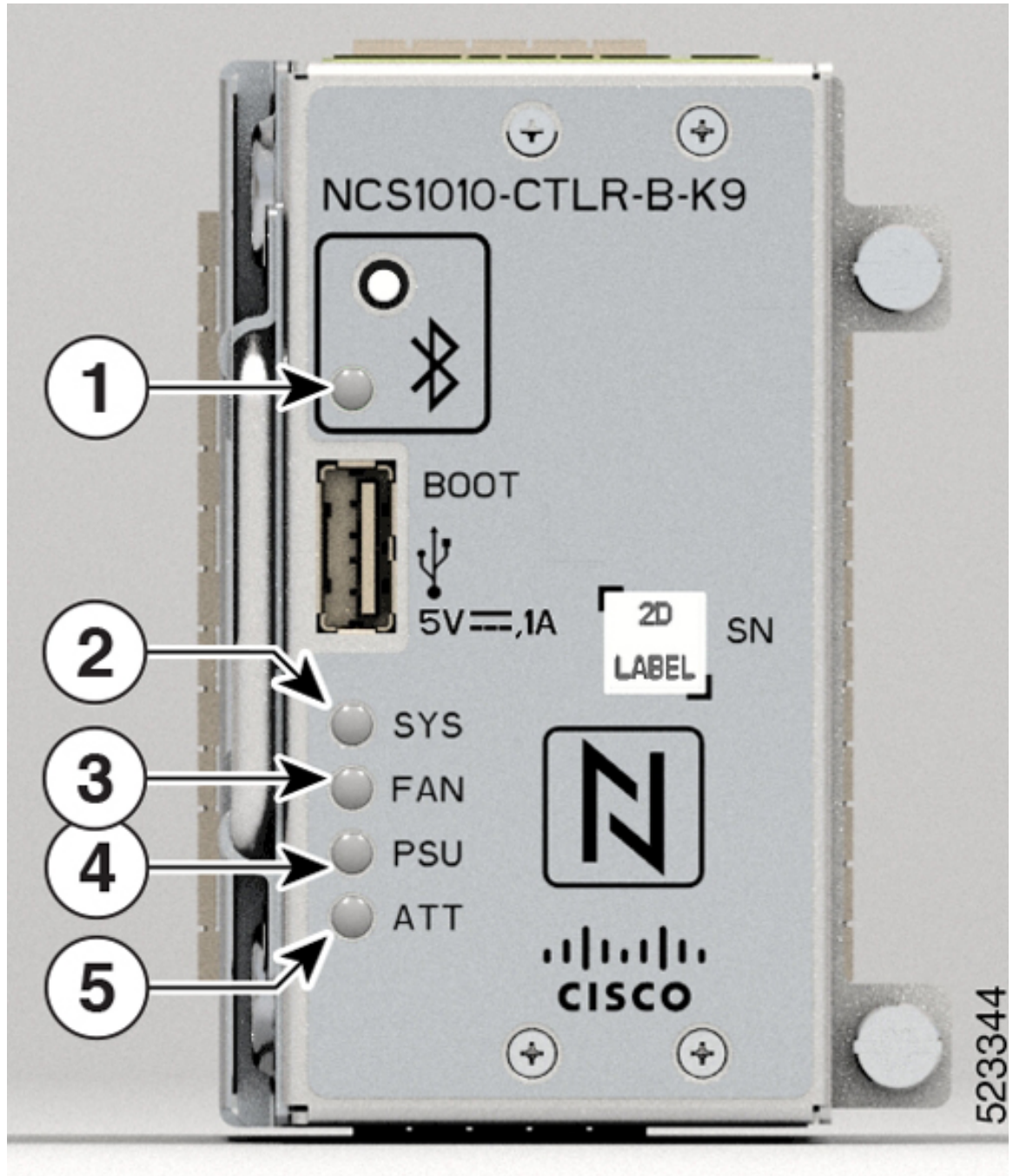


Figure 38: Front View of the NCS1010-CTRL-B-K9 Controller



1	Bluetooth Low Energy (BLE) Status LED
2	System Status LED
3	Fan Status LED
4	Power Supply Status LED

5	Attention LED
---	---------------

Table 6: Status of the Controller LEDs

LED	Default Status of LED (At the time of Power On and when the System is not Up)	Color	Status
BLE LED	Off	Off	Not supported.
System LED (during controller boot up)	Red	Red	Indicates that the controller unit is powering ON.
		Red (flashing slowly)	Indicates BIOS loading.
		Yellow (flashing slowly)	Indicates operating system loading.
		Red (flashing fast)	Indicates secure boot failure. Replace the controller.
		Yellow (flashing fast)	Indicates that the controller unit is not seated properly. Remove and replace the controller properly.
System LED (controller is operational)	Red	Red	Indicates a major or critical alarm.
		Yellow	Indicates a minor alarm.
		Green	The module is operational and has no active alarms.
Fan LED	Red	Green	Indicates all fans present in the chassis are in working condition.
		Red	Indicates either a fan is missing from its slot or is faulty.

LED	Default Status of LED (At the time of Power On and when the System is not Up)	Color	Status
PSU LED	Red	Green	Indicates all PSUs' present in the chassis are in working condition.
		Red	Indicates either a PSU is missing from its slot or is faulty, or there is no input power.
Attention LED	Off	Blue	Used to identify a specific chassis in a rack or room. This is used for troubleshooting purposes such as replacing the fiber and field-replaceable units. It can be controlled through the software CLI. Use the following command to activate this LED, manually: hw-module attention-led location 0/RP0/CPU0

Line Card LEDs

The OLT line cards (OLT-C, OLT-R-C, OLT-L) have two LEDs to indicate the line port alarm status, two LEDs indicating the add/drop port alarm status, and four LEDs indicating the MPO connector ports alarm status. The MPO port LEDs represent multiple ports.

Figure 39: Front View of the OLT-C Line Card Faceplate

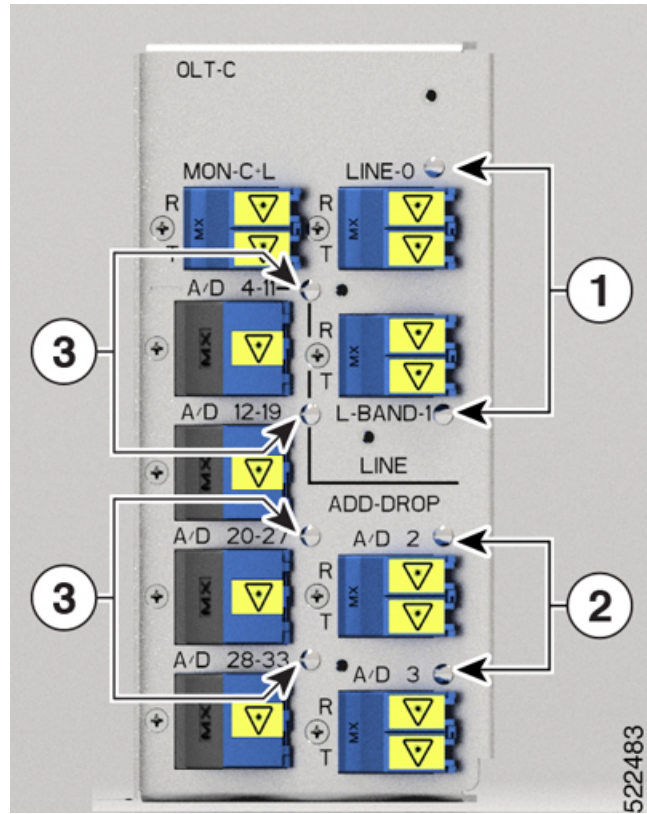
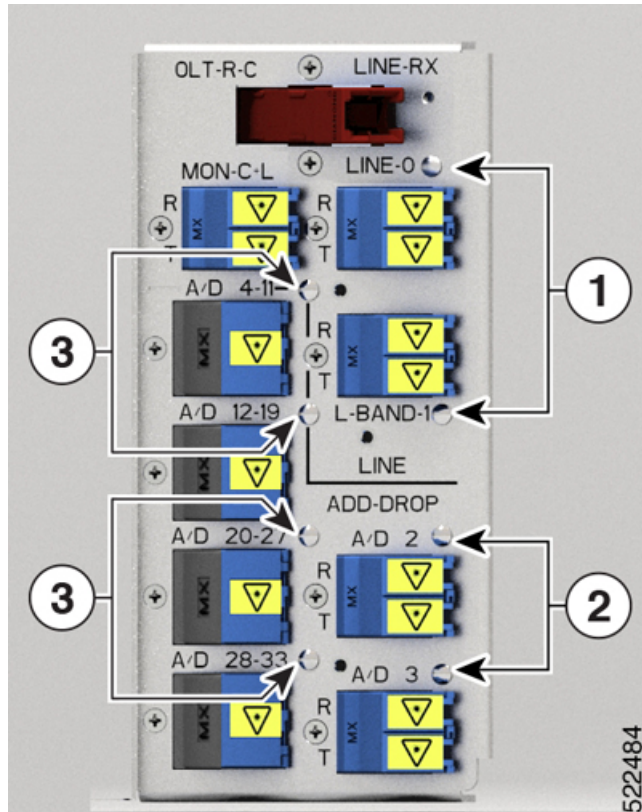
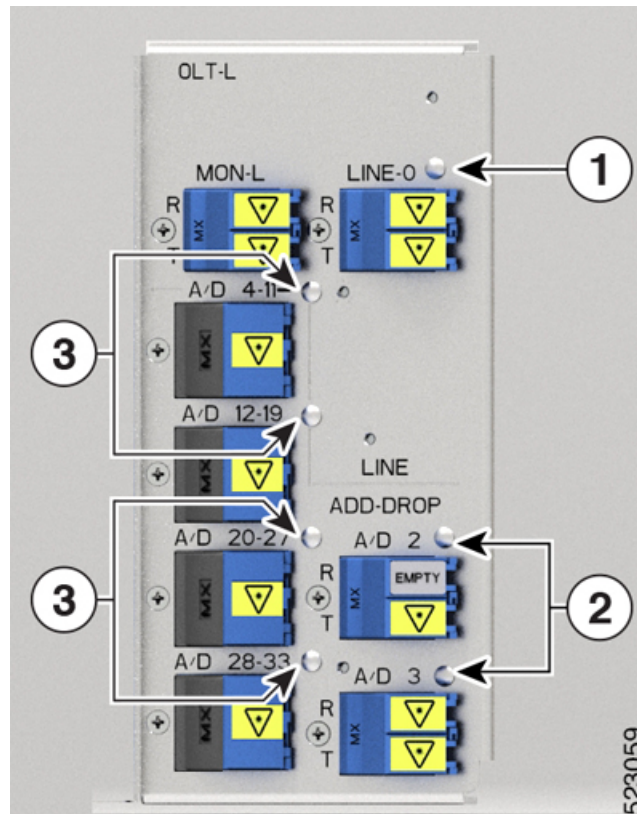


Figure 40: Front View of the OLT-R-C Line Card Faceplate



The OLT-L line card has only one LED to indicate the line port alarm status, two LEDs indicating the add/drop port alarm status, and four LEDs indicating the MPO connector ports alarm status. The MPO port LEDs represent multiple ports.

Figure 41: Front View of the OLT-L Line Card Faceplate



1	Line port LEDs
2	Add/Drop port LEDs
3	MPO connector LEDs

The ILA line cards (ILA-C, ILA-R-C, ILA-2R-C, ILA-R-C, ILA-2R-C, ILA-R-C-2) have four LEDs to indicate the line port alarm status.

Figure 42: Front View of the ILA-C Line Card Faceplate

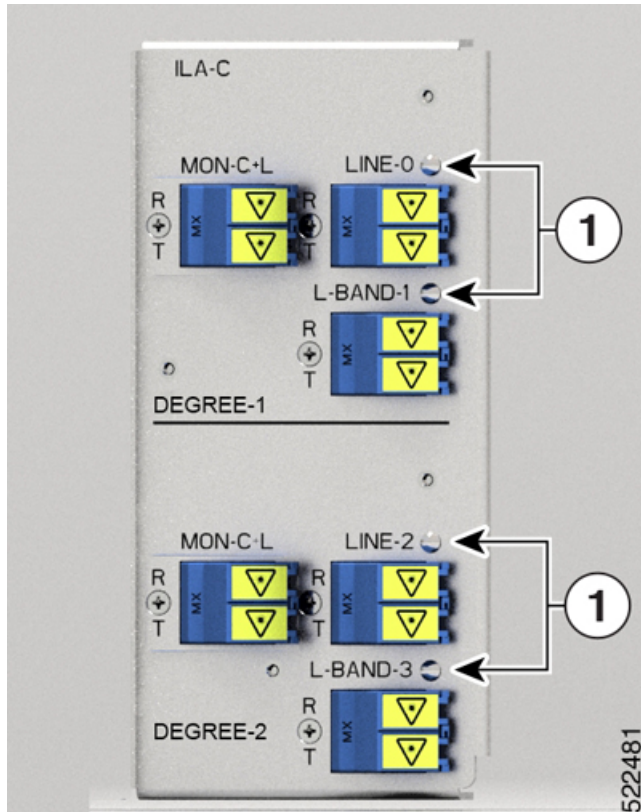


Figure 43: Front View of the ILA-R-C Line Card Faceplate

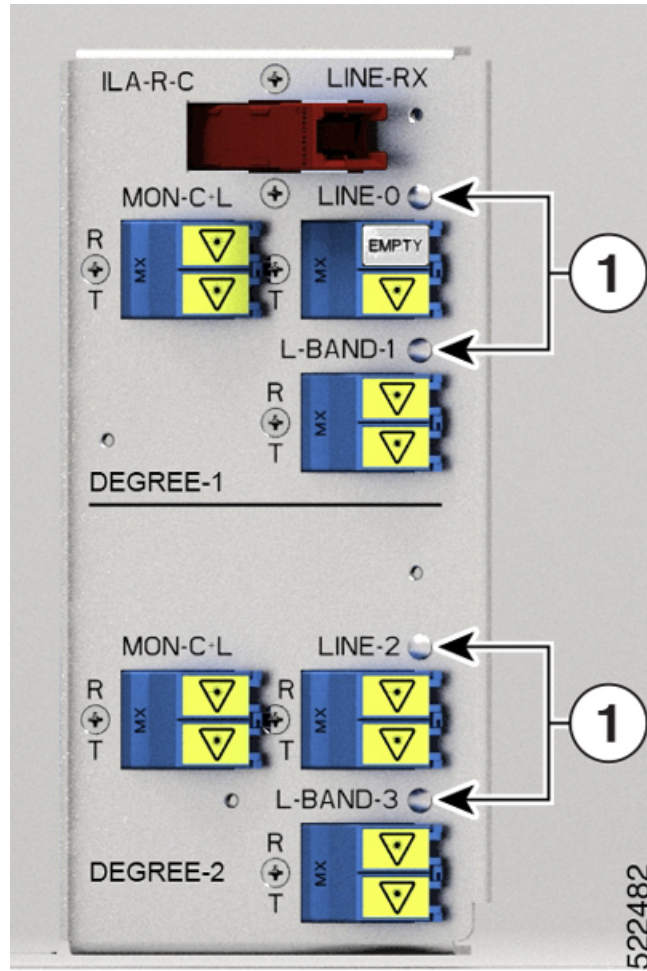


Figure 44: Front View of the ILA-2R-C Line Card Faceplate

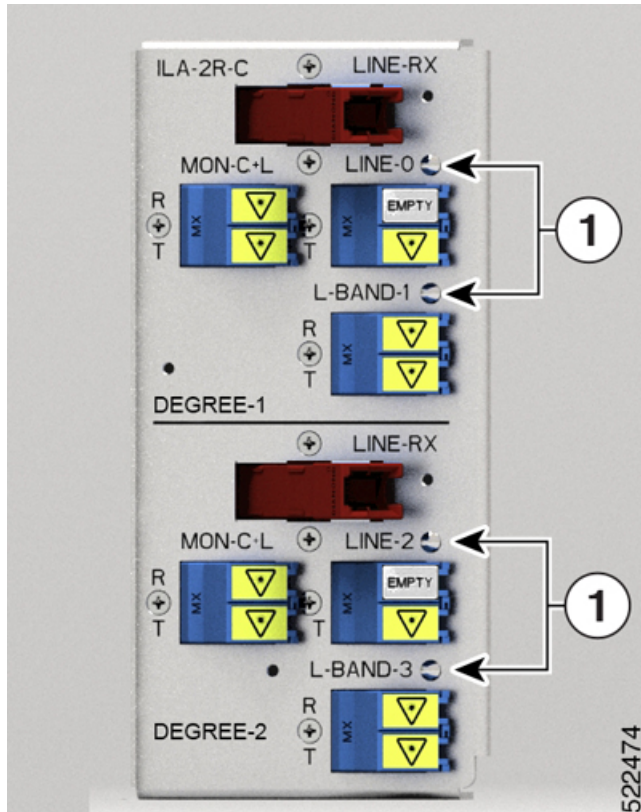


Figure 45: Front View of the E-ILA-R-C Line Card Faceplate

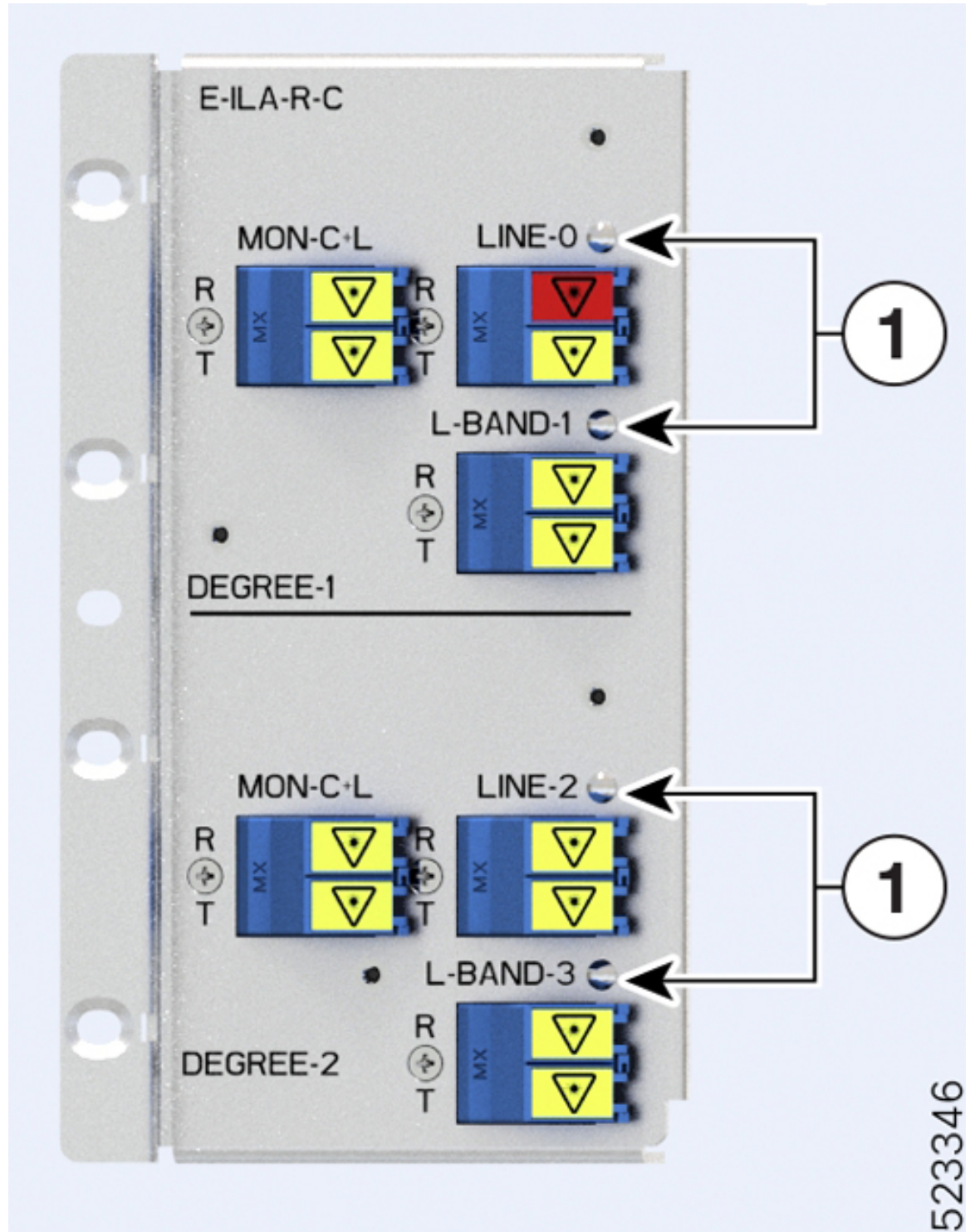


Figure 46: Front View of the E-ILA-2R-C Line Card Faceplate

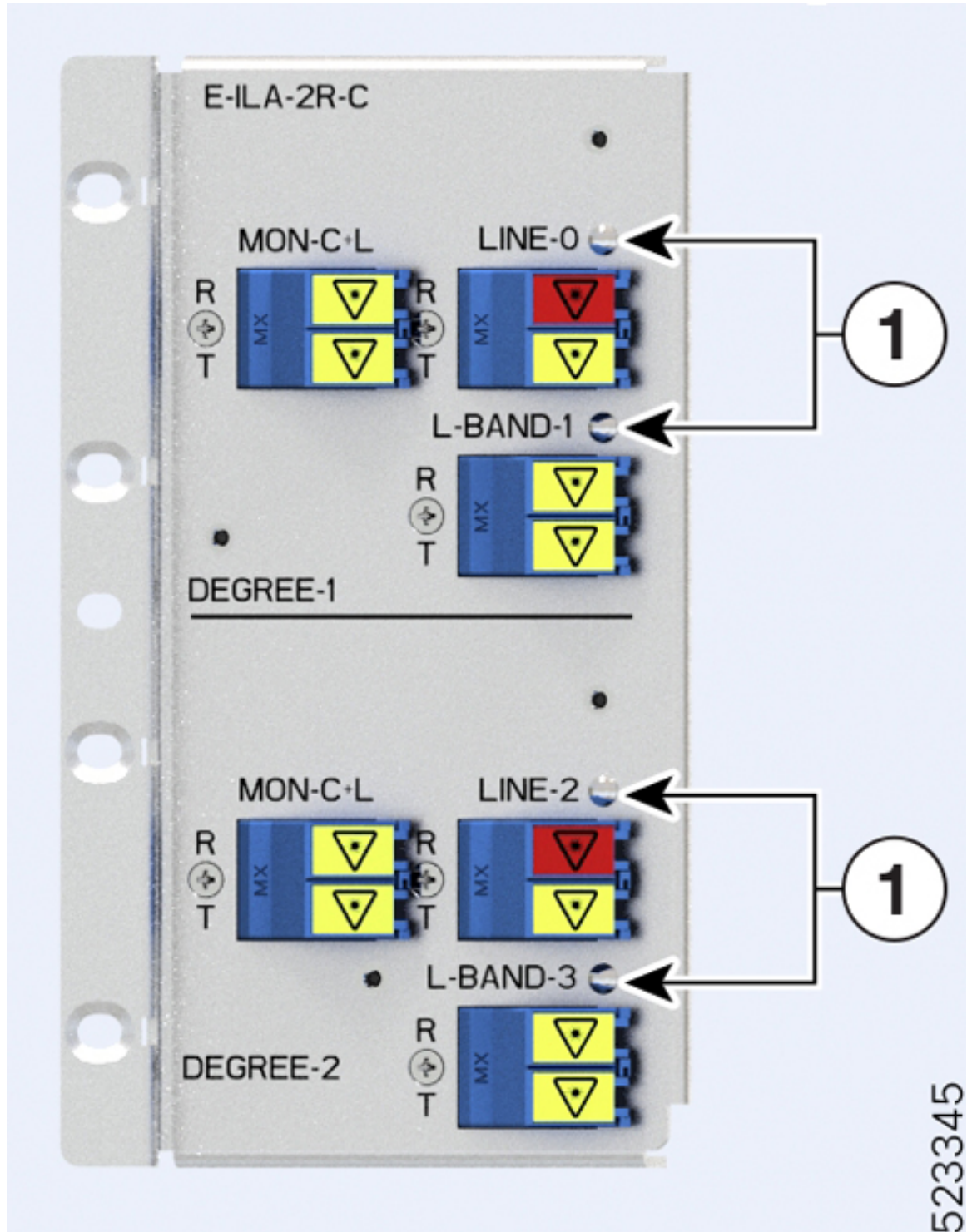
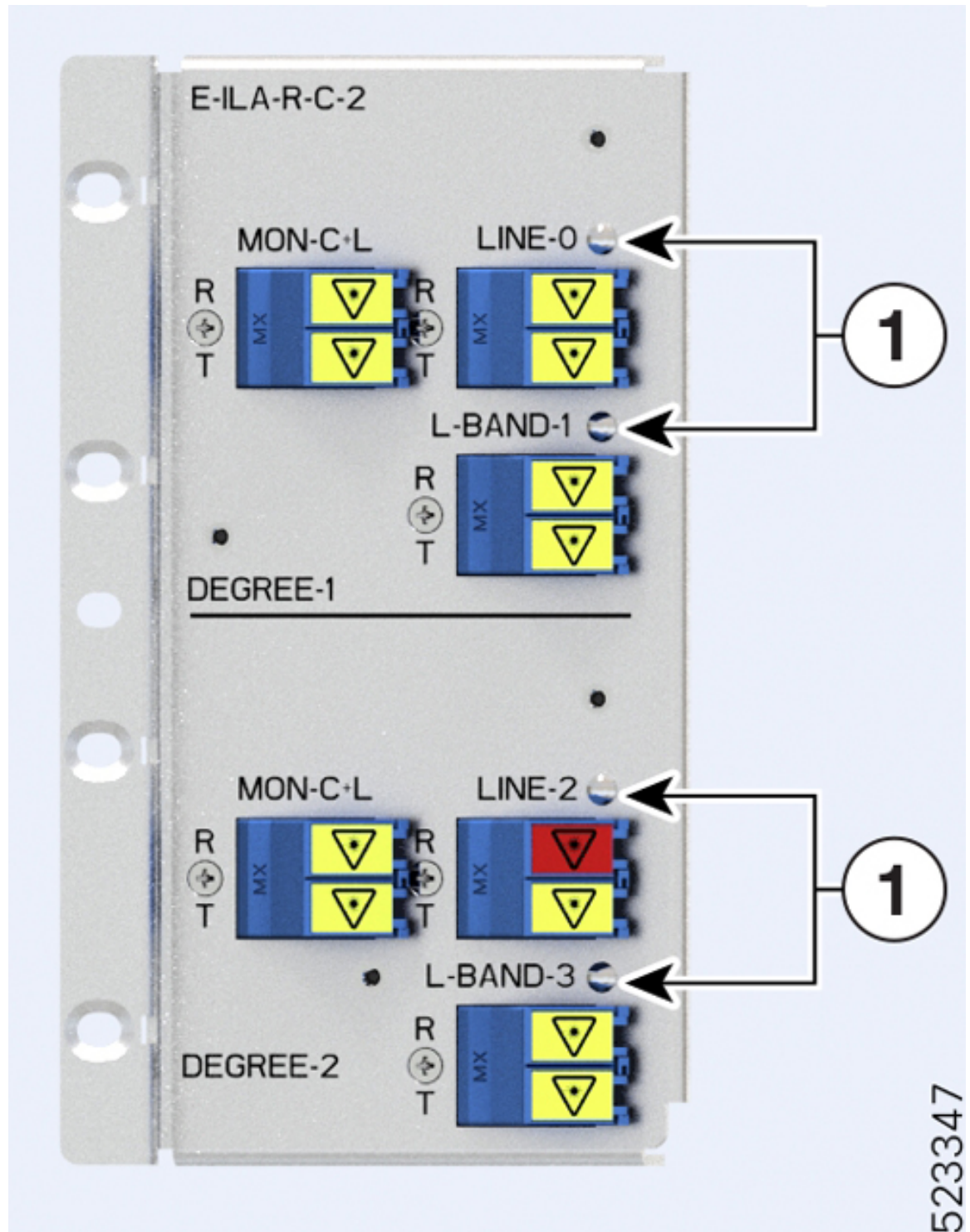
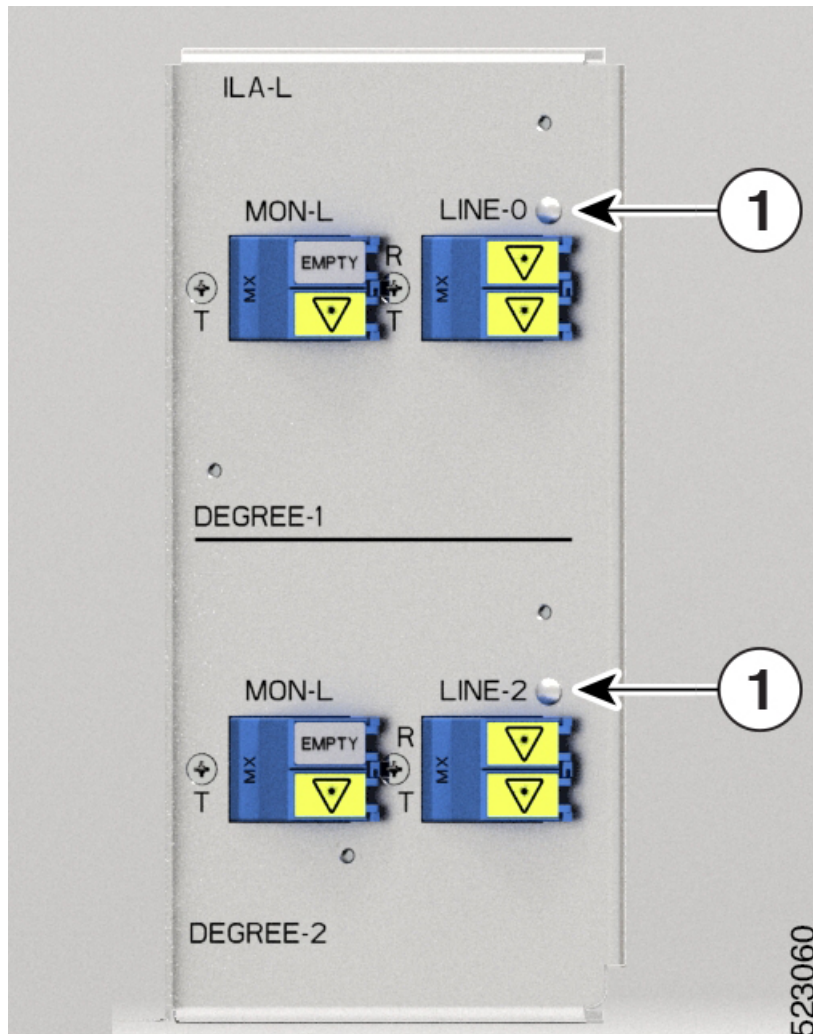


Figure 47: Front View of the E-ILA-R-C-2 Line Card Faceplate



The ILA-L line card has two LEDs to indicate the line port alarm status.

Figure 48: Front View of the ILA-L Line Card Faceplate



1	Line port LEDs
---	----------------

Table 7: Status of the Line Card LEDs

LED	Color	Status
Line card LED	Red	Indicates major and critical alarms, which could be a traffic impacting situation.
	Orange	Indicates a minor alarm.
	Green	Indicates that the module is operational and has no alarm.

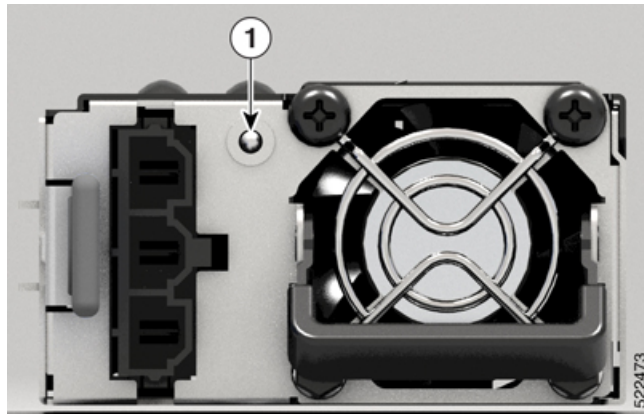
PSU LED

The PSU has one LED to indicate its status.

Figure 49: Front View of AC PSU



Figure 50: Front View of DC PSU



1	LED
---	-----

The following table has details of the PSU LED:

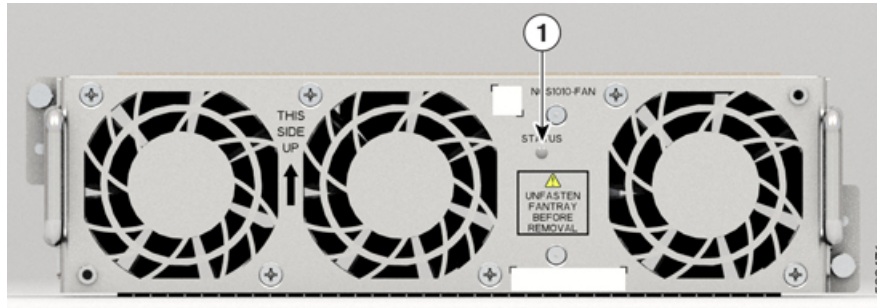
Table 8: Status of the PSU LED

LED	color	Status
PSU LED	Amber	Indicates that there is no input to the PSU, provided the other PSU is working.
	Off	Both PSUs do not have input.
	Green	Indicates that the input to the PSU is valid.

Fan Tray LED

The fan tray has one LED to indicate its status.

Figure 51: Front View of the Fan Tray



1	Fan tray LED
---	--------------

The following table has details of the fan tray LED:

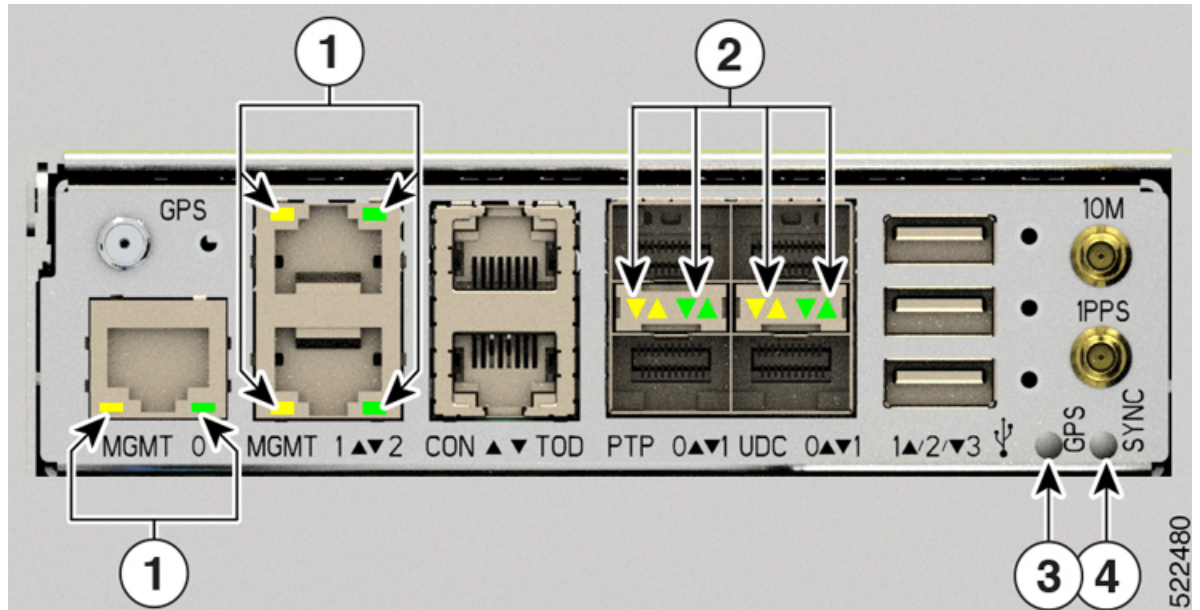
Table 9: Status of the Fan Tray LED

LED	Color	Status
Fan LED	Amber	Indicates that the fan speed is out of expected range such as fan is not rotating. Also, indicates that the fan speed is not readable.
	Red	Indicates a fault in the fan tray.
	Green	Indicates that the fan tray is working fine.

EITU LEDs

The EITU has 12 LEDs indicating the status of its ports.

Figure 52: Front View of the EITU



1	Ethernet Copper Ports LEDs
2	Ethernet Optical SFP Ports LEDs
3	GPS LED
4	SYNC LED

Table 10: Status of the EITU LEDs

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

LED	Color	Status
Sync LED	Green	Time core is 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 is disabled or in free-running state.
Ethernet Copper Ports (MGMT 0/1/2) LEDs	Green	The link is ON.
	Yellow	Link is up but without traffic.
	Flashing yellow	Link is up but with traffic.
Ethernet Optical SFP Ports (PTP0/1, UDC 0/1) LEDs	Green	Indicates the presence of duplex or traffic collision.
	Yellow	LINK is up but without traffic.
	Flashing yellow	LINK is up but with traffic.



CHAPTER 2

Safety Guidelines and Warnings

Before you perform any task 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 - Cisco Network Convergence System 1010*.

- [Standard Warning Statements](#), on page 51
- [General Safety Guidelines for Personal Safety and Equipment Protection](#), on page 54
- [Safety Precaution for Module Installation and Removal](#), on page 54
- [Safety with Electricity](#), on page 54
- [Power Connection Guidelines](#), on page 55
- [Safety Precaution for Energy Hazard](#), on page 55
- [Safety Precaution for Laser Radiation](#), on page 56
- [Prevent Electrostatic Discharge Damage](#), on page 57
- [NEBS Regulatory Compliance Statements](#), on page 57

Standard Warning Statements



Warning 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 provided at the end of each warning statement to locate its translation in the translated safety warnings for this device. Statement 1071

SAVE THESE INSTRUCTIONS





Warning When installing the product, use the provided or designated connection cables, power cables, AC adapters, and batteries. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" or "CSA" shown on the cord), not regulated with the subject law by showing "PSE" on the cord, for any other electrical devices than products designated by Cisco. Statement 371



Warning 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.

〈製品仕様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、バッテリーなどの部品は、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。

Statement 407



Warning Read the installation instructions before using, installing, or connecting the system to the power source. Statement 1004



Warning 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 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. Statement 1029



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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073



Warning To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes. Statement 1074



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089

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. Statement 1089



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091



Note For more information on all the applicable statements and their translations, see *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010*.

General Safety Guidelines for Personal Safety and Equipment Protection

- 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.
- To reduce risk of electric shock and fire, take care when connecting units to the supply circuit so that wiring is not overloaded.
- Two persons 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.
- To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of 104F or 40C.
- The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before installation or servicing. Failure to stabilize the rack can cause bodily injury.
- To reduce the risk of bodily injury, the chassis should be mounted on a rack that is permanently affixed to the building.

Safety Precaution for Module Installation and Removal

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



Warning Invisible laser radiations present. Statement 1016



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

Safety with Electricity



Warning To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning**

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.

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**

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. Statement 1024

**Warning**

Use copper conductors only. Statement 1025

**Warning**

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

Safety Precaution for Energy Hazard

**Warning**

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

Cisco NCS 1010 can be configured for a DC power source. Do not touch terminals with body parts or conductive objects while they are energized.

Safety Precaution for Laser Radiation

Cisco NCS 1010 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 53: Class 1M Laser Product Label



Figure 54: Class 1M Laser Product Label



Warning

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

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

3618295

Statement 291



Warning

Invisible laser radiations present. Statement 1016



Warning

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

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.

NEBS Regulatory Compliance Statements

The NEBS-GR-1089-CORE regulatory compliance statements and requirements are discussed in this section.



Warning

The intra-building port(s) (Management Ethernet Ports) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends. Statement 7003



Warning

The intra-building port(s) (Management Ethernet Ports) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly must not be metalically connected to interfaces that connect to the OSP or its wiring for more than 6 meters (approximately 20 feet). These interfaces are designed for use as intra-building interfaces only (Type 2, 4, or 4a ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metalically to an OSP wiring system. Statement 7005



Warning 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. Statement 7011

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.

Products that have AC power ports that are intended for deployments where an external Surge Protective Device (SPD) is utilized at the AC power service equipment (see definition in National Electric Code). Statement 7012

This product is designed for a Common Bonding Network (CBN) installation. Statement 7013

This product can be installed in network telecommunication facilities or locations where the National Electric Code applies. Statement 8015 and 8016

The DC return connection to this system should remain isolated from the system frame and chassis (DC-I). Statement 7016



Note These equipments are designed to boot up in less than 30 minutes based on their neighbouring devices that are fully up and running.



CHAPTER 3

Prepare to Install Cisco NCS 1010

This chapter explains how to prepare for the Cisco NCS 1010 installation.

- [Package Contents, on page 59](#)
- [Unpack and Verify Cisco NCS 1010, on page 60](#)

Package Contents

You can order Cisco NCS 1010 as assembled chassis (NCS1010-SYS) or as empty chassis (NCS1010-SA) along with the components. See [PIDs, on page 183](#) for all PIDs of the NCS 1010 components.

The shipped package contains the following:

- Cisco NCS chassis.
- Accessory kit (NCS1010-ACC-KIT)—Includes all the hardware necessary for the chassis installation on the 19" rack. You can order the accessory kits for ETSI (NCS1010-ETSI-KIT) and 23" ANSI (NCS1010-23-KIT) racks as required. The following table describes the contents of the accessory kits.

Table 11: Accessory Kit Contents

Accessory Kit	Contents
NCS1010-ACC-KIT	<p>This kit has the following items for chassis installation on a 19" rack:</p> <ul style="list-style-type: none">• Double hole ground lug (1x)• M5 Pan head screws (2x)• 12–24 Pan head screws (8x)• External tooth washers (2x)• Standoffs (2x)• Left slide rail (1x)• Right slide rail (1x)• Protection cover (1x)

Accessory Kit	Contents
NCS1010-23-KIT	This kit has the following items for chassis installation on an ANSI 23" rack: <ul style="list-style-type: none"> • 23" rack to 19" rack adapter • 12–24 Screws (14x)
NCS1010-ETSI-KIT	This kit has the following items for chassis installation on an ETSI rack: <ul style="list-style-type: none"> • ETSI rack to 19" rack adapter • M6 screws (8x) • Ground adapter

- Field replaceable modules such as PSUs, controller, fan trays, air filter, and line card (the variant of line card that you have ordered).
- AC and DC power cables that you have ordered. See [Supported Cables, on page 187](#).

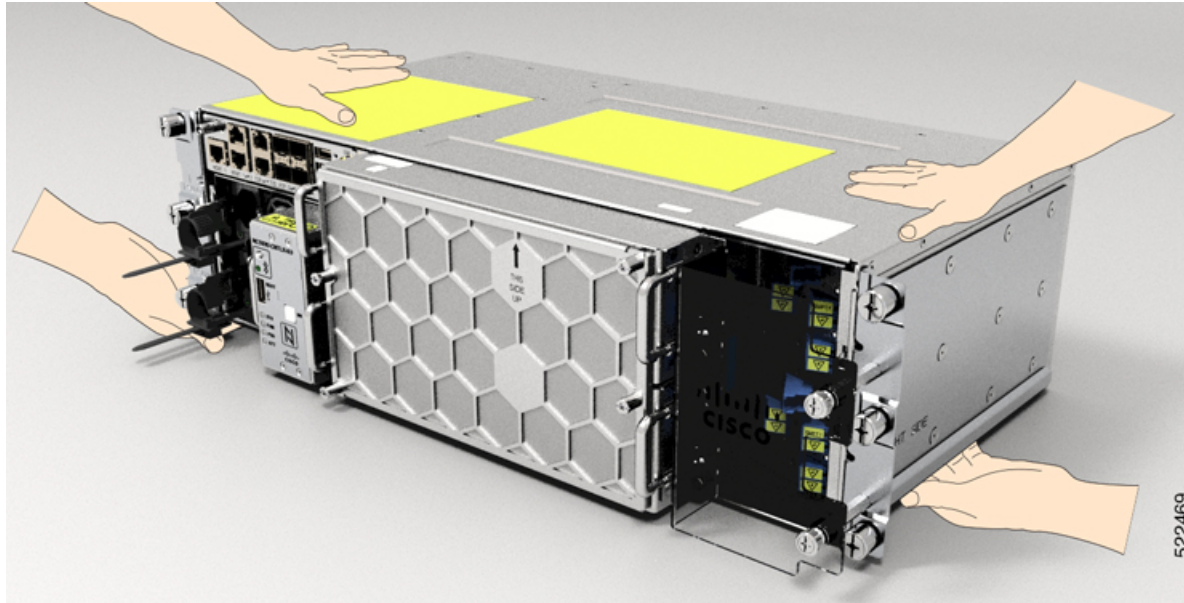
Unpack and Verify Cisco NCS 1010

Use this task to unpack and check if all the chassis modules that are required for installation have been shipped.

Procedure

-
- Step 1** When you receive Cisco NCS 1010 equipment at the installation site, open the top of the box.
- Step 2** Remove the accessory kits and foam inserts in the box. The box contains Cisco NCS 1010 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.

Figure 55: Lifting Cisco NCS 1010



A fully loaded chassis can weigh as much as 19 kg (42 lb).

- 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:

- Cisco NCS 1010 is not damaged. Check for a scratch, bend, discoloration, or deformation on the Cisco NCS 1010 chassis.
- The modules that are shipped with the chassis or separately are not damaged.

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



CHAPTER 4

Install Cisco NCS 1010

This chapter contains tasks to install Cisco NCS 1010.

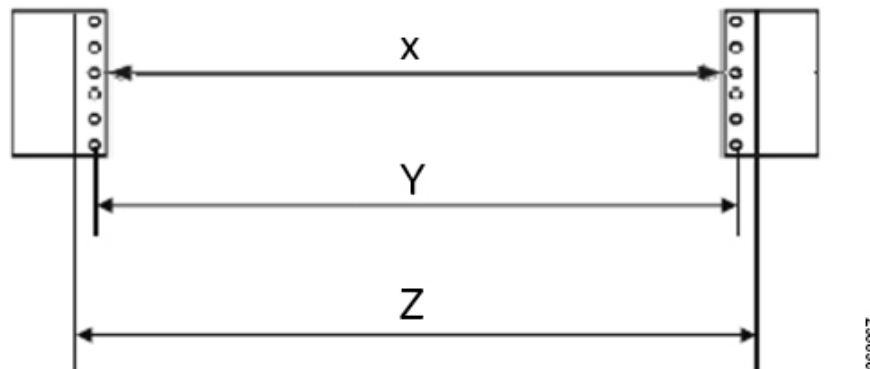
- [Rack Compatibility, on page 63](#)
- [Install Slide Rail into the Rack, on page 64](#)
- [General Power and Grounding Requirements, on page 68](#)
- [Equipment Installation to Power Warnings, on page 72](#)
- [Rack-Mount Warnings, on page 74](#)
- [Install Cisco NCS 1010 on an EIA/ANSI/ETSI Rack, on page 74](#)

Rack Compatibility

The NCS1010 chassis can be installed in a standard EIA (19"), ANSI (23"), or ETSI 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 56: 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")

Install Slide Rail into the Rack

The length of the slide rail fits only in the front posts of the four-post rack. Therefore, the same slide rails can be used for both two-post and four-post racks.

- [Install Slide Rail into an EIA 19" Rack, on page 64](#)
- [Install Slide Rail into an ANSI 23" Rack, on page 65](#)
- [Install Slide Rail into an ETSI Rack, on page 66](#)

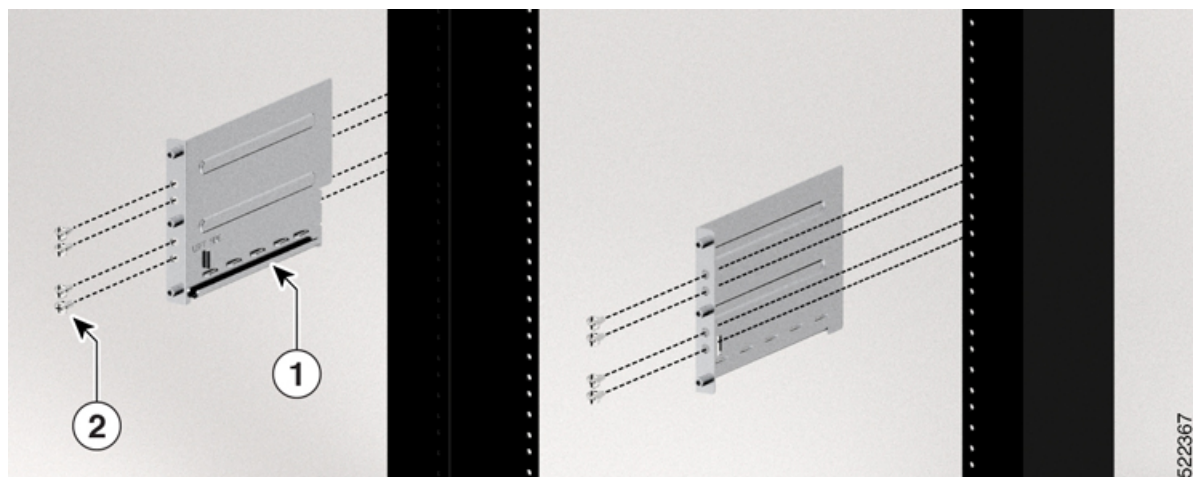
Install Slide Rail into an EIA 19" Rack

Use the following task to install the slide rail into two-post or four-post EIA rack.

Procedure

- Step 1** Identify the left side and right side slide rail.
- Step 2** On the left side front post of the rack, place the left side slide rail.
- Step 3** Insert all the four screws into the slide rail, one by one.

Figure 57: Slide Rail Integration - EIA Rack



1	Slide rail
---	------------

2	8x 12–24 Pan head screws
---	--------------------------

- Step 4** Tighten the screws to a torque value of 4.65 N-m (41 lbs-in).
- Step 5** Similarly, fix the right side slide rail on the right side front post.

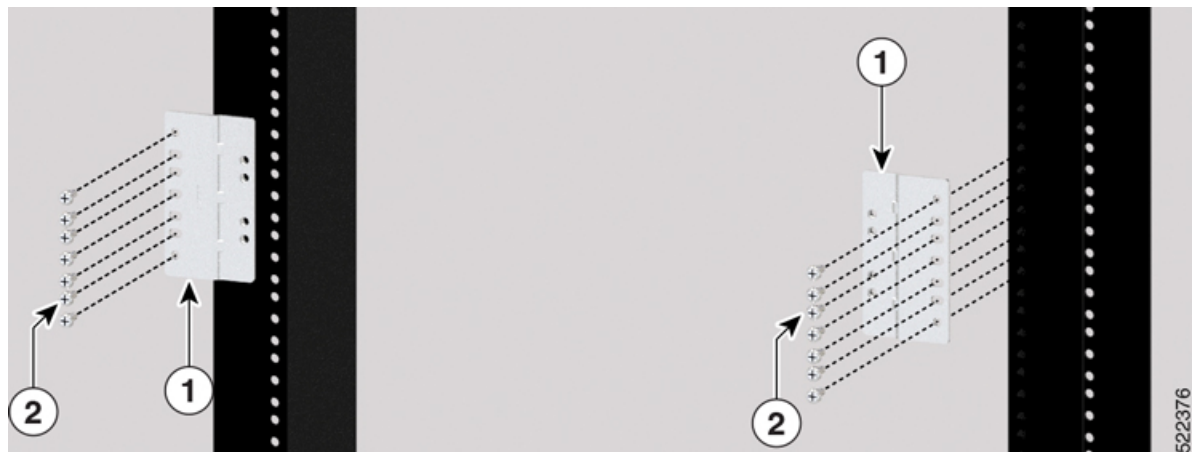
Install Slide Rail into an ANSI 23" Rack

Use the following task to install the slide rail into a two-post or four-post ANSI rack.

Procedure

- Step 1** Identify the left side and right side slide rails.
- The slide rail is fitted on to an ANSI rack using a 23" rack to 19" rack adapter.
- Step 2** Identify the left side and right side adapters.
- Step 3** Fix the adapters on both the left side and right side posts using the 12–24 screws that are available in the accessory kit (NCS1010-23-KIT).

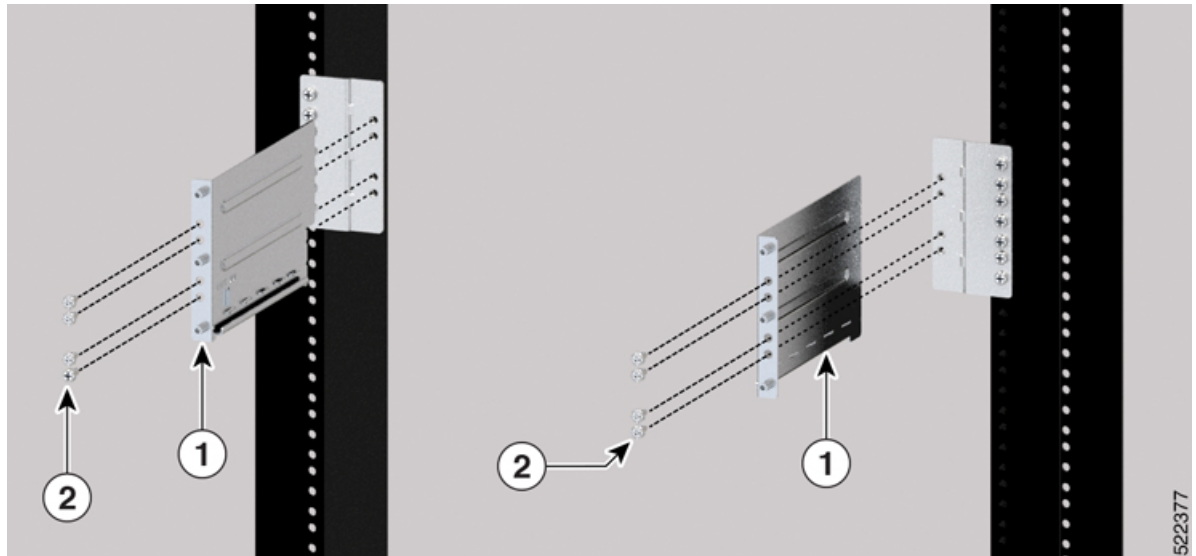
Figure 58: Fixing 23" Adapter



1	23" rack to 19" rack adapter
2	12–24 screws (14x)

- Step 4** On the left side adapter, place the left side slide rail and insert the 12–24 pan head screws.

Figure 59: Slide Rail Integration



1	Slide rail
2	12–24 Pan head screws (8x)

Step 5 Tighten the screws to a torque value of 4.65 N-m (41 lbs-in).

Step 6 Similarly, fix the right side slide rail on the right side post.

Install Slide Rail into an ETSI Rack

Use the following task to install the slide rail into a two-post or four-post ETSI rack.

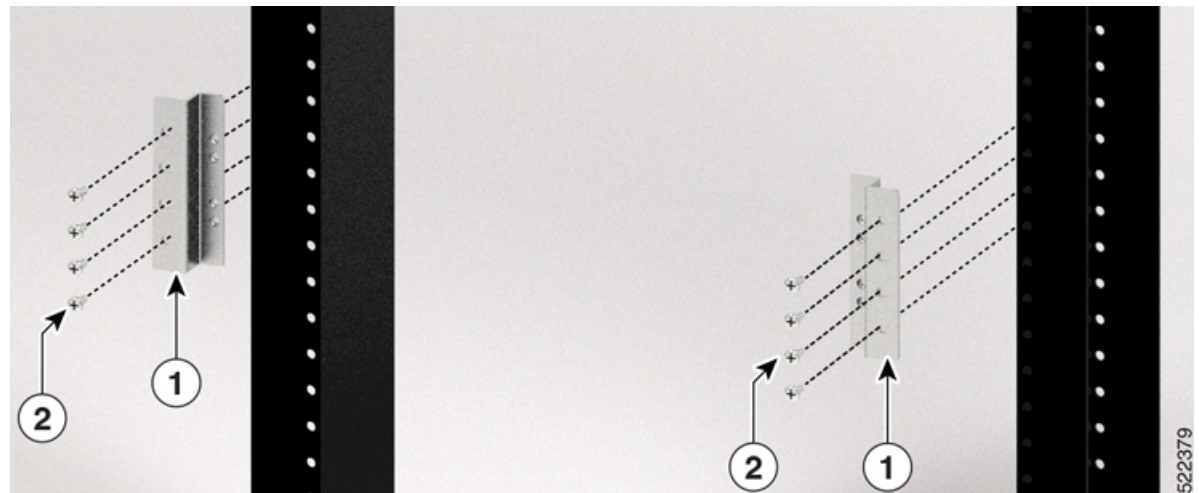
Procedure

Step 1 Identify the left side and right side slide rail.

The slide rail is fitted on to an ETSI rack using an ETSI to 19" adapter. The same adapter can be used for both left and right sides.

Step 2 Fix the adapters on both the left side and right side posts using the M6 four screws available in the accessory kit (NCS1010-ETSI-KIT).

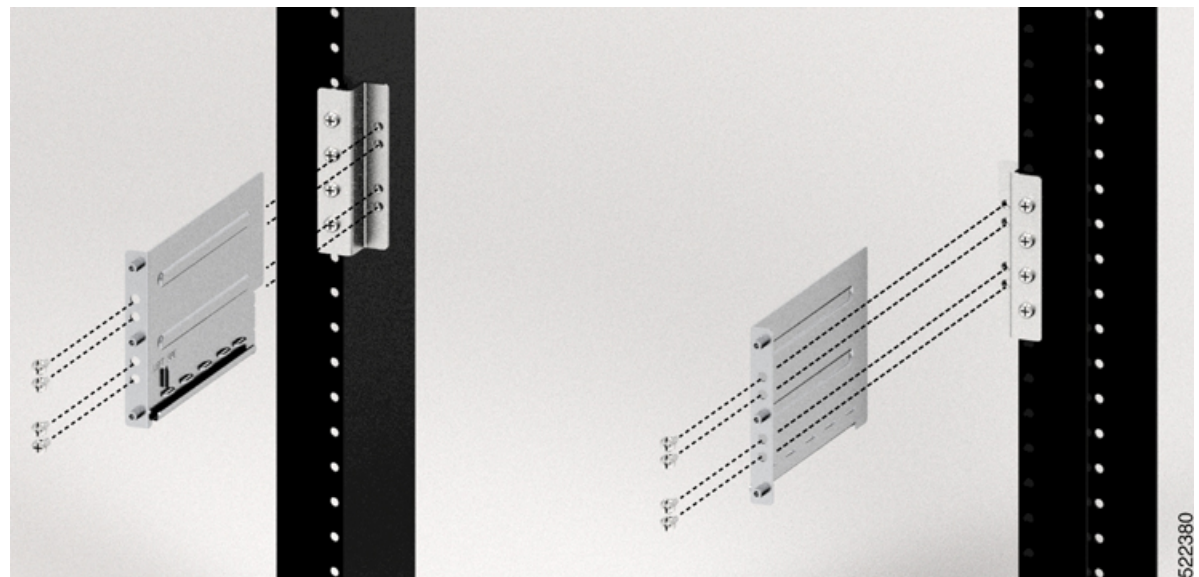
Figure 60: Fixing 19" to ETSI Adapter



1	ETSI rack to 19" rack adapter
2	M6 screws (8x)

Step 3 On the left side adapter, place the left side slide rail and insert the 12–24 pan head screws (4x).

Figure 61: Slide Rail Integration - ETSI Rack



Step 4 Tighten the screws to a torque value of 4.65 N-m (41 lbs-in).

Step 5 Similarly, fasten the right side slide rail on the right side adapter.

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 2N 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 Ground lug connection is mandatory for the AC chassis version too.

- 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 *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010* before attempting to install the chassis.

Ground Connection Warnings

Take note of the following ground connection warnings:



Warning The appliance must be connected to a grounded outlet.

Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

Apparatet må tilkoples jordet stikkontakt.

Apparaten skall anslutas till jordat uttag. Statement 414



Warning To reduce risk of electric shock and fire, you must incorporate a readily accessible two-poled disconnect device in the fixed wiring. Statement 1022



Warning To reduce risk of fire, use copper conductors only. Statement 1025



Warning To reduce the risk of electric shock, refer to national and local codes for proper installation and grounding of antennas. Statement 1052

Ground Cisco NCS 1010

In the installation of the chassis, the ground lug must be connected first.

This task provides the grounding details for the Cisco NCS 1010 chassis. In the installation of the chassis, connect the ground lug first.



Warning High touch/leakage current—Permanently connected protective earth ground is essential before connecting to the system power supply. Statement 342



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



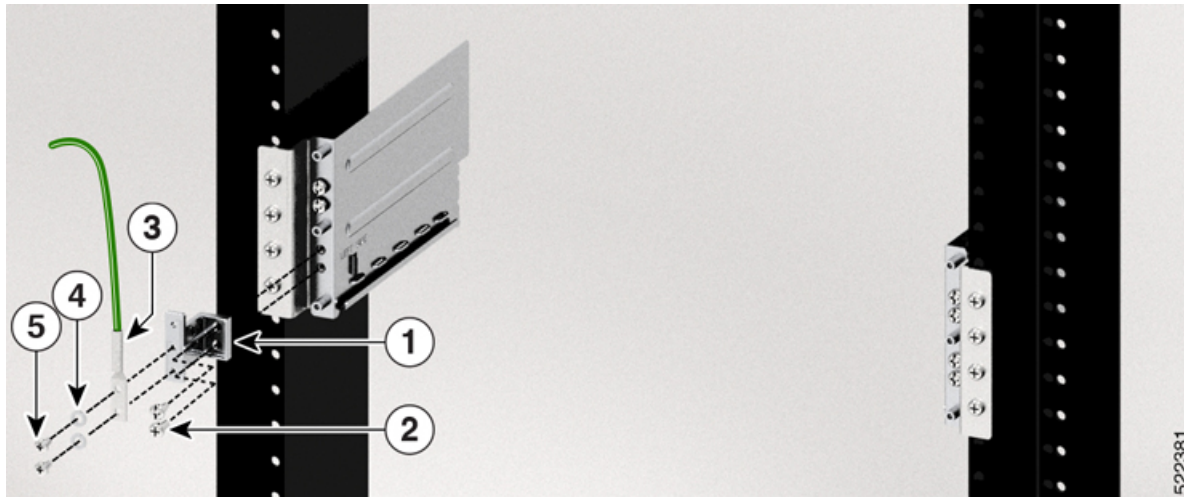
Note The ground lug must be attached before energizing the chassis.

Procedure

- Step 1** Connect the ground lug in one of the following ways as per your requirement:
- a. To connect the ground lug in the front side:
 - Fix the upper two screws of the left slide rail.
 - Align the ground adapter (provided with ETSI accessory kit (NCS1010-ETSI-KIT)), with the lower two screw holes of the slide rail.
 - Fix the lower screws using a screw driver to a torque value of 4.65 N-m (41 lbs-in). These screws hold both the ground adapter and the slide rail.
 - Place the ground lug on the ground adapter and insert the two screws with the washers.

- Tighten the screws by using a screw driver to a torque value of 3.1 N-m (27.4 lbs-in).

Figure 62: Fixing Ground Lug on the Ground Adapter - ETSI Rack

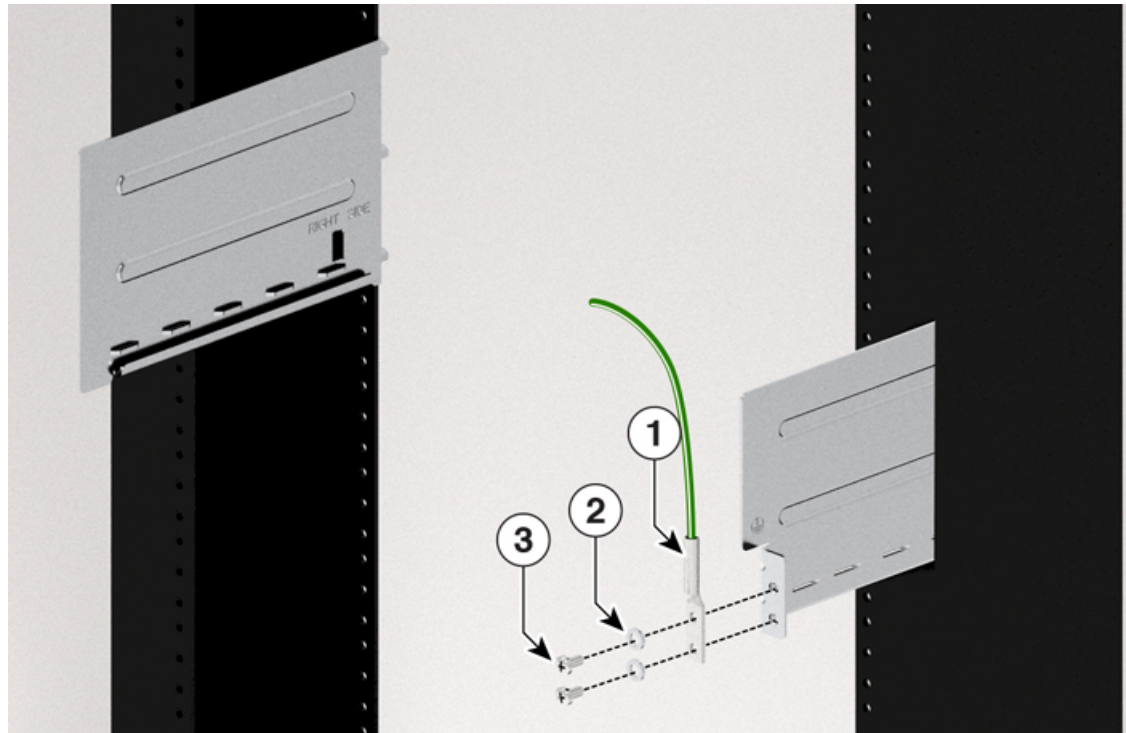


1	Ground adapter
2	12–24 Pan head screws
3	Ground lug
4	Washers (2x)
5	M5X10mmL Screws (2x)

Note You can use the preceding option 'a' only for the ETSI rack.

- b.** To connect the ground lug in the front side:
- Place the lug on the provision at the rear side of the left slide rail.
 - Fix the M5X10mmL screws with the washers, by using a screw driver to a torque value of 3.1 N-m (27.4 lbs-in).

Figure 63: Fixing Ground Lug in the Rear Side of the Slide Rail



1	Ground lug
2	Washers (2x)
3	M5X10mmL screws (2x)

- c. To fix the ground lug at the rear side of the chassis:
- Place the lug on that provision at the rear left side of the chassis. You can see a grounding symbol next to the provision for the ground lug.
 - Fix the M5X10mmL screws with the washers by using a screw driver to a torque value of 3.1 N-m (27.4 lbs-in).

Figure 64: Fixing Ground Lug in the Rear Side of the Chassis



1	Ground lug
2	Washers (2x)
3	M5X10mmL Screws (2x)

Note When you use the options 'a' and 'b', the ground lug remains attached to the slide rails. This allows you to remove the chassis without needing to remove the ground lug.

Note If the ETSI rack does not have rear access, front ground lug (option 'a') must be attached before mounting the NCS1010 chassis on the slide rails. In all other cases, you can use the two rear ground lug options (option s 'b' and 'c') that can be assembled after the chassis is mounted on slide rails.

- Step 2** Verify that the office ground cable is connected to the top of the rack and the office ground, according to local site practice.
- Step 3** Remove any paint and other nonconductive coatings from the surfaces between the shelf ground and bay frame ground point. Clean the mating surfaces and apply appropriate antioxidant compound to the bare conductors.
- Step 4** Attach one end of the shelf ground cable (#6 AWG cable) to the ground point using the lug.
- Step 5** Attach the other end of the shelf ground cable to the bay frame using a lug connector according to the equipment rack frame specifications.

Equipment Installation to Power Warnings

Take note of the following power safety warnings:



Warning To reduce the risk of electric shock, secure the modules with the provided screws. Statement 347.



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



Warning 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 40A for DC. Statement 1005.



Warning This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area. Statement 1017.



Warning To reduce risk of electric shock and fire, take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018.



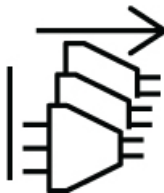
Warning To reduce risk of electric shock and fire, you must incorporate a readily accessible two-poled disconnect device in the fixed wiring. Statement 1022



Warning To reduce risk of fire, use copper conductors only. Statement 1025



Warning This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit. Statement 1028



Warning 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. Statement 1029



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



Warning To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

Rack-Mount Warnings

Take note of the following rack-mount safety warnings.



Warning Two 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. Statement 164



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

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

Statement 1006



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



Warning To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of 40 degree Celsius. Statement 1047

Install Cisco NCS 1010 on an EIA/ANSI/ETSI Rack

Use this task to mount the Cisco NCS 1010 chassis on an EIA/ANSI/ETSI rack.

**Caution**

- You must support the chassis with your hand during installation and replacement in a rack post.
- The slide rails are used only for positioning the chassis. To prevent accidental fall of the chassis, ensure that you fix the chassis in the slide rail using the captive screws.

Before you begin

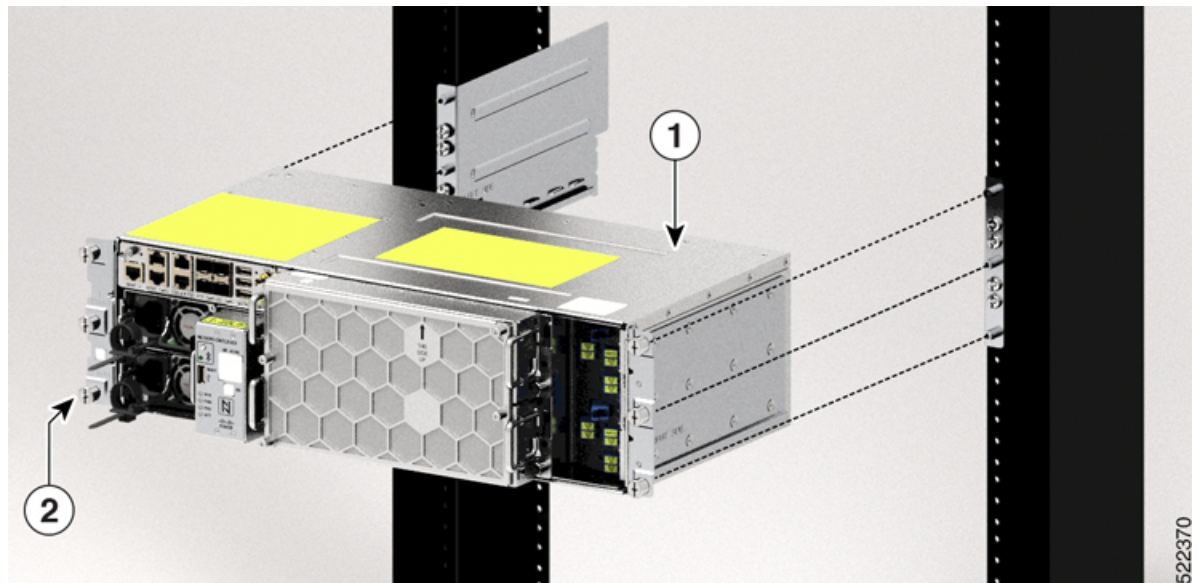
Ensure that the rack is compatible. See [Rack Compatibility](#), on page 63.

Procedure

Step 1 [Install Slide Rail into the Rack](#), on page 64.

Step 2 Insert the chassis onto the slide rails assembled on the rack.

Figure 65: Mounting the Chassis on the Rack



1	Cisco NCS 1010 chassis
2	Captive screws

Step 3 After the chassis is completely inserted, tighten the captive screws into the standoffs available on each side of the slide rail, using a number-2 Phillips screwdriver to a torque value of 1.5 N-m (13.3 lbs-in).



CHAPTER 5

Install Cisco NCS 1010 Modules

This chapter describes the tasks to install Cisco NCS 1010 modules.



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: 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.

522406

- [Install PSU, on page 77](#)
- [Install Controller, on page 82](#)
- [Install Line Card, on page 83](#)
- [Install Fan Tray, on page 85](#)
- [Install Fan Filter, on page 87](#)
- [Install Protection Cover, on page 88](#)

Install PSU

Use this task to install PSU into the Cisco NCS 1010 chassis. You can install two AC PSUs or two DC PSUs in a chassis.

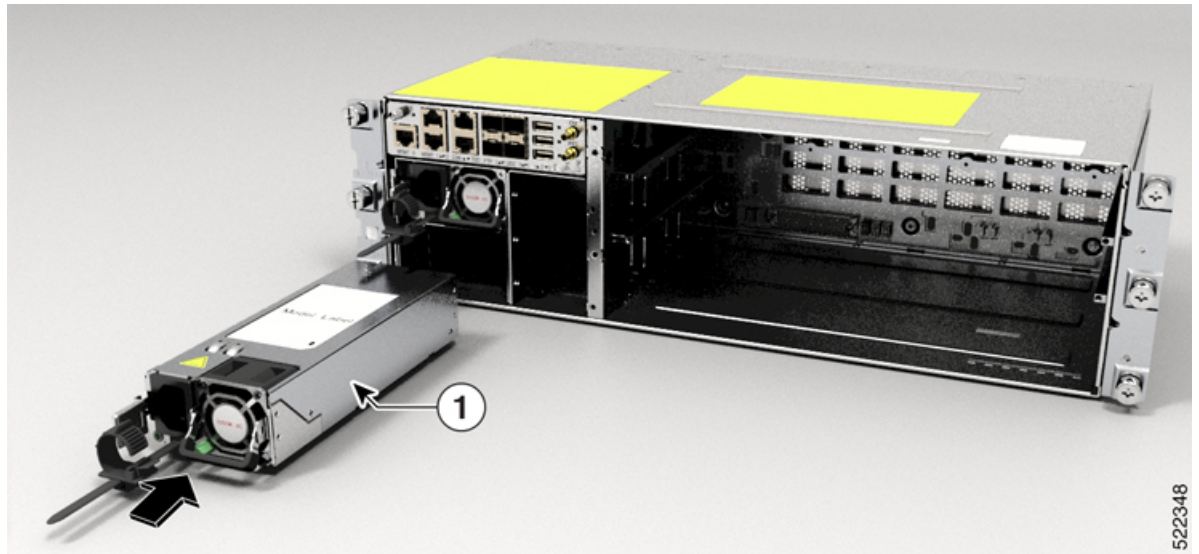
Procedure

- Step 1** Orient the PSU correctly before inserting.

Step 2 Using the handle, slide the PSU into the slot (support the PSU at the bottom with your hand) and push it in until you hear a click sound; direction of insertion is shown in the following figure. The click sound indicates that the unit has been latched. .

Note The locking latch must be pressed and released only for removing the PSU.

Figure 66: Installing the PSU



1

PSU unit

Connect AC Power to Cisco NCS 1010



Caution

Cisco NCS 1010 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 67: Rating Label for AC Power

RATINGS AND STATEMENTS FOR AC MAINS POWERED SYSTEM	
PRODUCT RATING(輸入):100-120 Vac; 12A MAX(2X);50/60 Hz 200-240 Vac; 7A MAX(2X);50/60 Hz	CHARACTÉRISTIQUES DU PRODUIT(輸入):100-120 Vac; 12A MAX(2X);50/60 Hz 200-240 Vac; 7A MAX(2X);50/60 Hz
 READ USER MANUAL	 LIRE MANUEL D'UTILISATION
 SHOCK HAZARD	 RISQUE D'ÉLECTROCUTION
 CAUTION - THIS UNIT HAS MORE THAN ONE POWER CONNECTION. TURN OFF POWER SOURCE CIRCUIT BREAKERS AND REMOVE ALL CONNECTIONS TO DE-ENERGIZE SYSTEM	 AVERTISSEMENT - CETTE UNITÉ COMPORTE PLUSIEUR RACCORDS D'ALIMENTATION. DÉACTIVEZ L'INTERRUPTEUR D'ALIMENTATION ET DÉBRANCHEZ LE SYSTÈME DE TOUTES LES PRISES POUR LE METTRE HORS TENSION
WARNING - HIGH LEAKAGE CURRENT. EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY	AVERTISSEMENT - COURANT DE FUITE ÉLEVÉ. MISE À LA TERRE ESSENTIELLE AVANT DE BRANCHER L'APPAREIL

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

- Input: 100-120Vac, 12A, 50-60HzDC
Outputs: +12V, 67A Max. +12Vsb, 3A Max. Total output power 800W.
- Input: 200-240Vac, 7A, 50-60HzDC
Outputs: +12V, 87.5A Max. +12Vsb, 3A Max. Total output power 1050W.

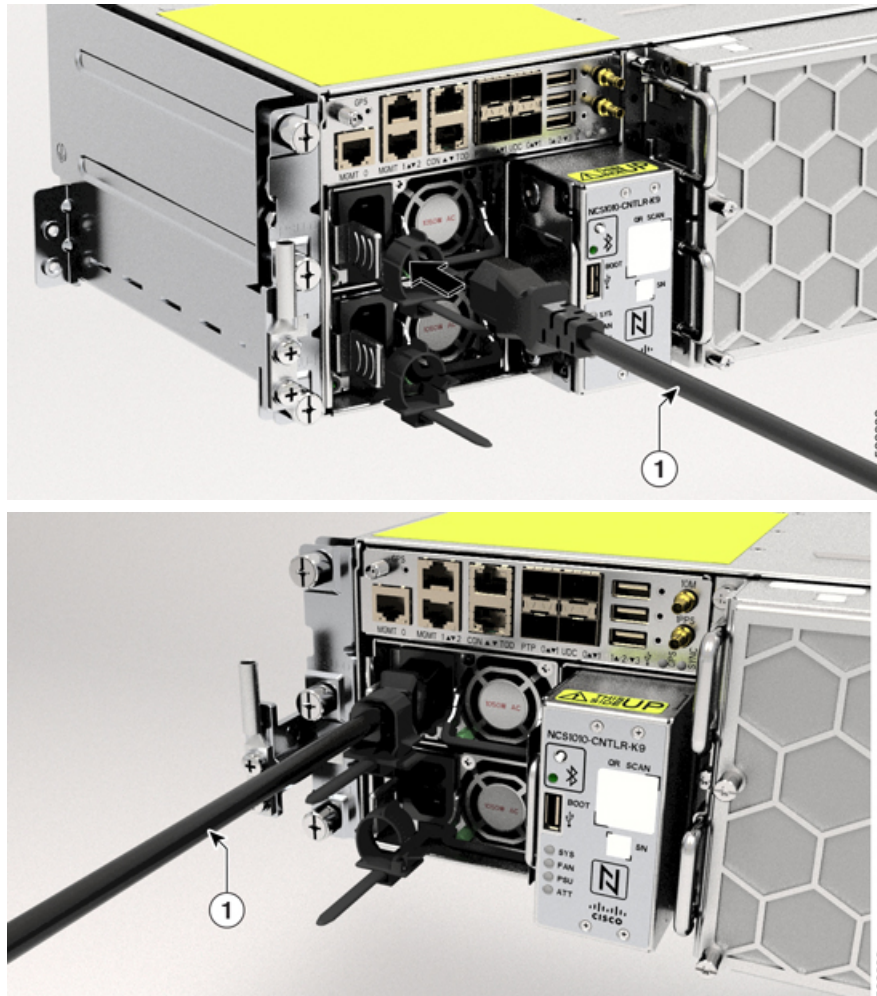


Note A dual pole breaker is needed for the installation. The rating of the dual pole breaker for each feed is 16A for input voltage 200–240 Vac, and 20A for input voltage 100–127 Vac.

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. See [Power Cable Specifications](#), on page 187 for the supported AC power cables.

Figure 68: Connecting AC Power Cable



1

AC power cable

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

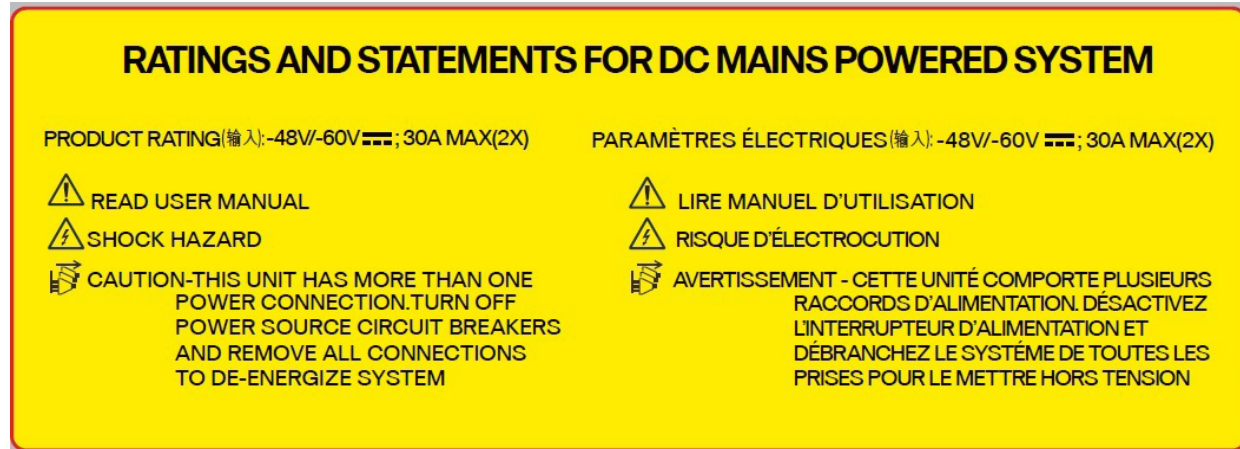
Connect DC Power to Cisco NCS 1010



Caution

Cisco NCS 1010 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 DC Power



DC power ratings:

- Input: 48-60Vdc, 30A.
- DC output: +12V, 87.5A Max. +12Vsb, 3A Max. Total output power must not exceed 1050W.

Before you begin

1. In the installation of the chassis, the ground lug must be connected first.
2. The ground lug must be attached before energizing the chassis.

Procedure

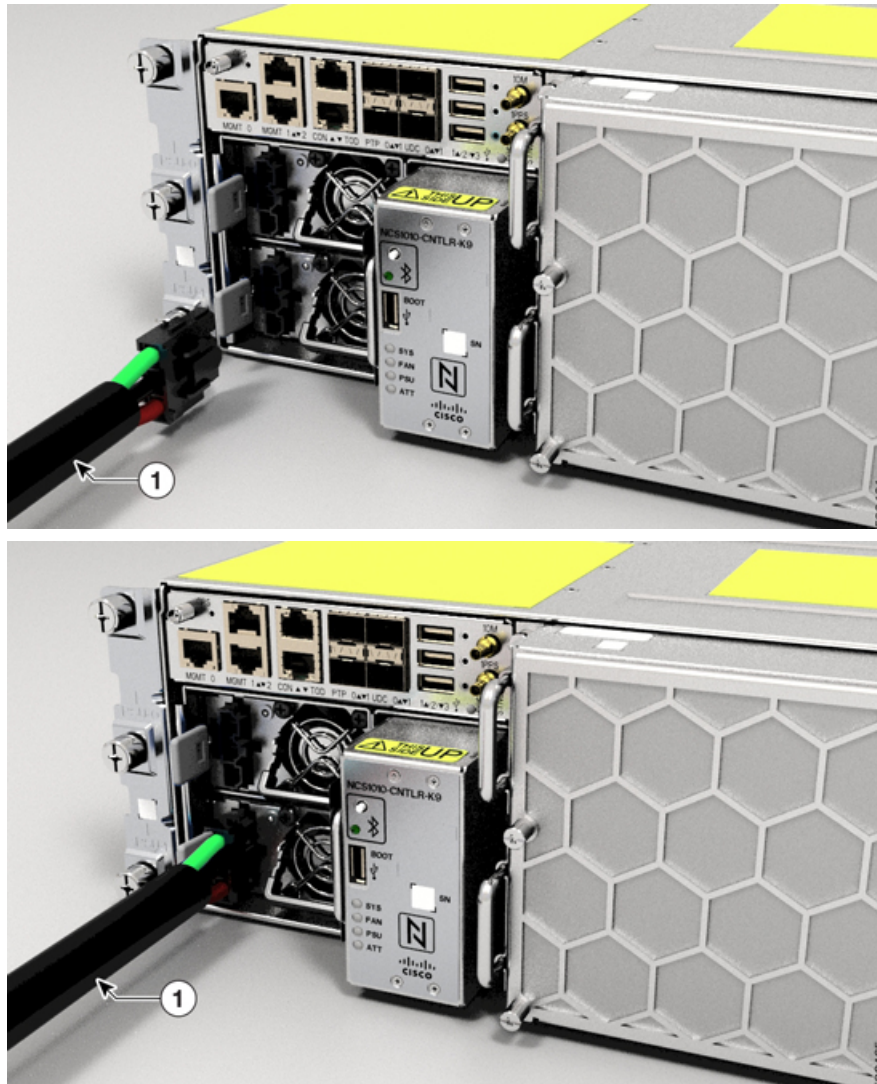
-
- Step 1** Verify that the correct fuse panel is installed in the top mounting space.
- Step 2** Measure and cut the cables as required to reach Cisco NCS 1010 from the fuse panel.
- Step 3** Connect the office battery and return cables according to the fuse panel engineering specifications.
- Step 4** Attach the DC power cable to the cable connector in the DC power module.

Use the CAB-48DC-40A-8AWG or NCS1010-DC-CBL-ET= cable. We recommend using NCS1010-DC-CBL-ET= with the ETSI 300-mm cabinet to remain compliant with the 300-mm footprint. See [Power Cable Specifications, on page 187](#).

Note Ensure to ground the green colored cable.

The green-colored cable is provided as an optional connection to the GND terminal on the fuse panel that has a dedicated GND terminal.

Figure 70: Connecting DC Power



1

DC power cable

Install Controller

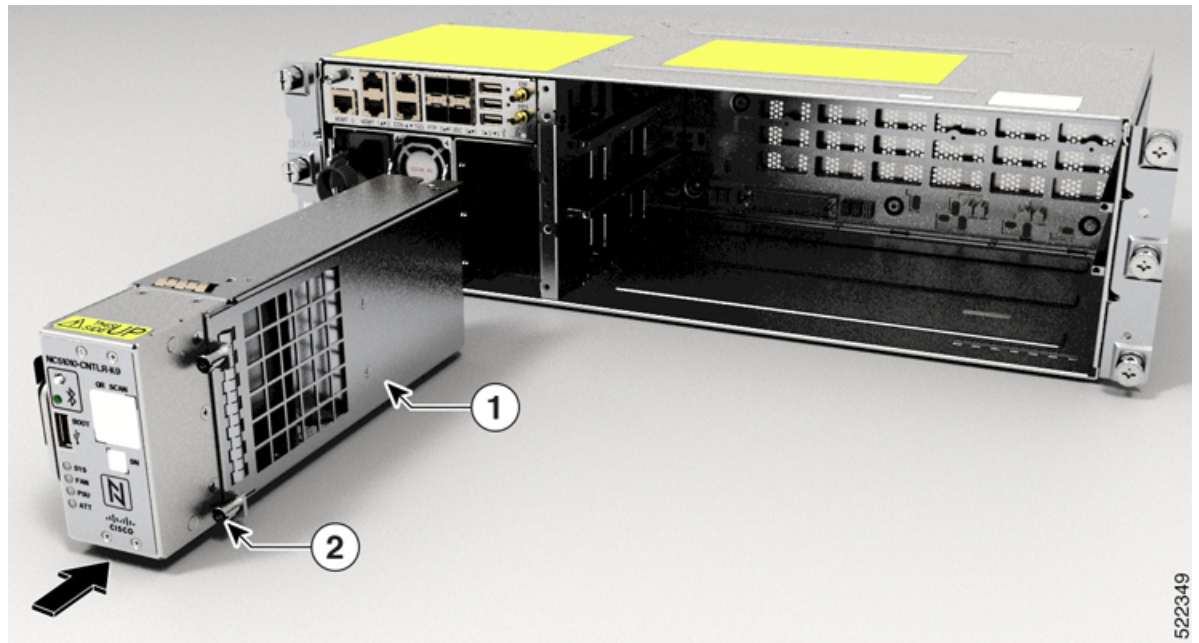
Use this task to install controller into the Cisco NCS 1010 chassis.

Procedure

- Step 1** Orient the controller appropriately before inserting. Check for the *This Side Up* label.

Step 2 Hold the upper and lower surface of the controller with hands and insert the controller into the slot.

Figure 71: Installing the Controller



1	Controller
2	Captive Screw

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

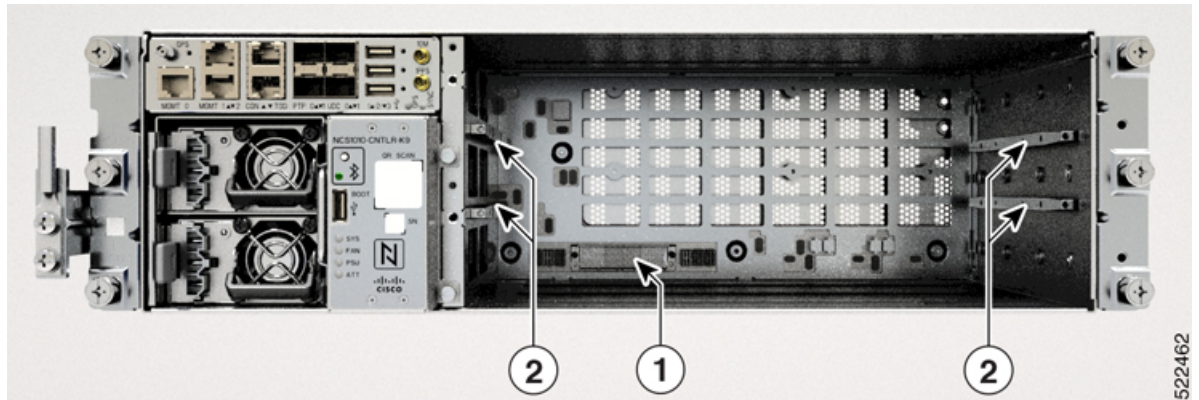
Install Line Card

Use this task to install the line card into the Cisco NCS 1010 chassis.

Procedure

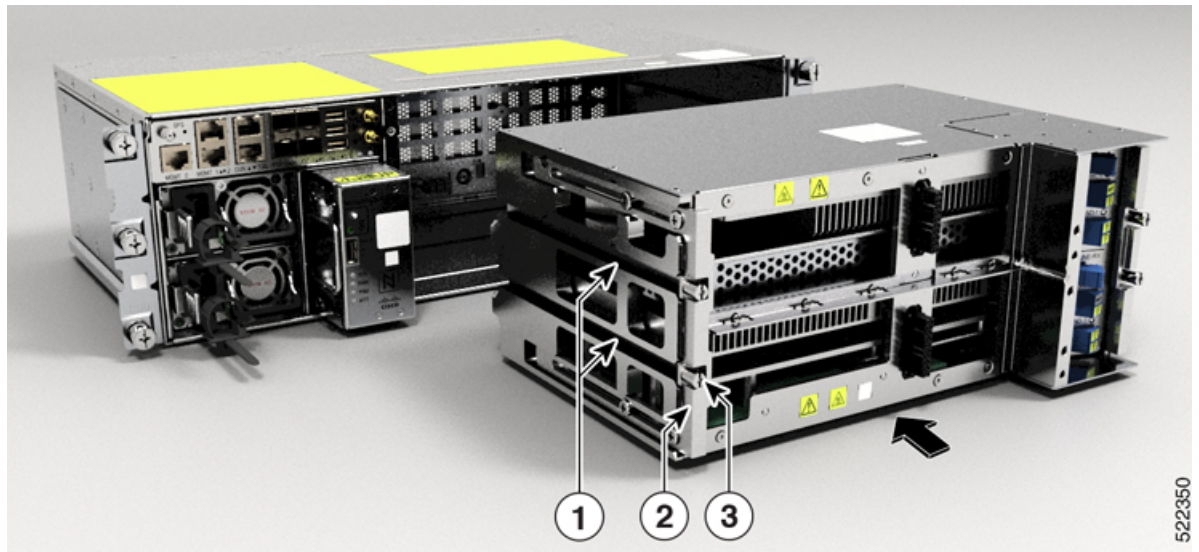
- Step 1** Orient the line card.
- Step 2** Align the grooves in both sides of the line card with the slide guides available inside the chassis.

Figure 72: Cisco NCS 1010 Chassis



1	Backplane connector
2	Slide Guides

Figure 73: Inserting the Line Card



1	Grooves
2	Handle
3	Captive Screws (Two captive screws on each side of the line card)

Step 3 Insert the line card into the chassis.

Caution Use the handle only to push and pull out the line card from the chassis. Do not use the handle to carry the line card. To prevent any accidental drop, support the top and bottom of the line card with your hand while you remove or insert it.

- Step 4** Tighten the captive screws available in the left and right side handles of the line card, using a screw driver with a torque value of 1.5 N-m (13.3 lbs-in).
-

Install Fan Tray

Use this task to install the fan trays into the chassis. The chassis can accommodate two fan trays.

Procedure

- Step 1** Orient the fan tray using the guide pin available in the fan tray, before inserting. Check for the *This Side Up* label.

Figure 74: Front View of the Fan Tray

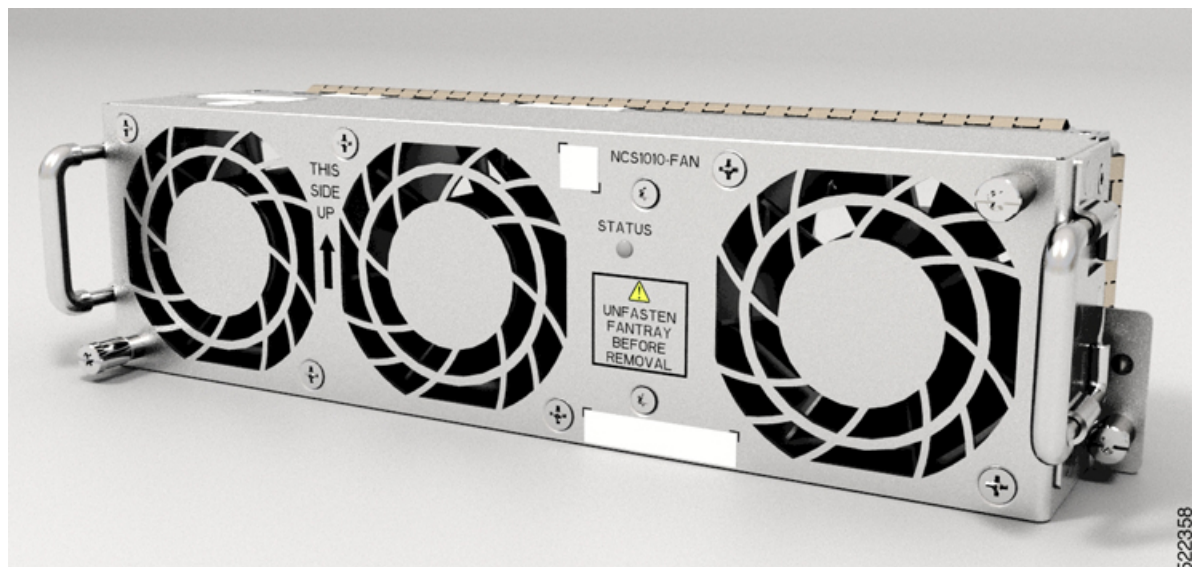
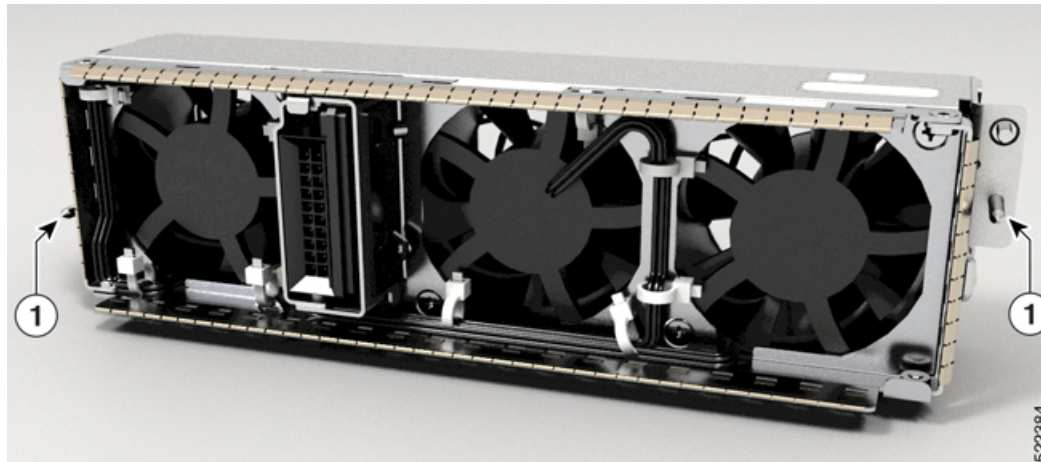


Figure 75: Rear View of the Fan Tray



1	Guide pin
---	-----------

Step 2 Holding the handles with both hands, insert the fan tray into the slot on the front side of the chassis.

Figure 76: Inserting a Fan Tray



1	Fan tray
2	Captive screw

Step 3 Using the screw driver, tighten the captive screws at the corners of the fan tray, to a torque value 0.65 N-m (5.75 lbs-in).

The left captive screw goes into the chassis and the right captive screw goes into the line card.

Step 4 Repeat the preceding steps to insert and fix the second fan tray.

Install Fan Filter

Use this task to assemble the fan filter on the Cisco NCS 1010 chassis.

Procedure

Step 1 Align the four captive screws in the fan filter with the respective standoffs in the fan trays. Check for the *This Side Up* label.

Figure 77: Installing the Fan Filter



1	Fan filter
2	Captive screw

Step 2 Tighten the captive screws using the screwdriver to a torque value of 0.65 N·m (5.75 lbs-in).

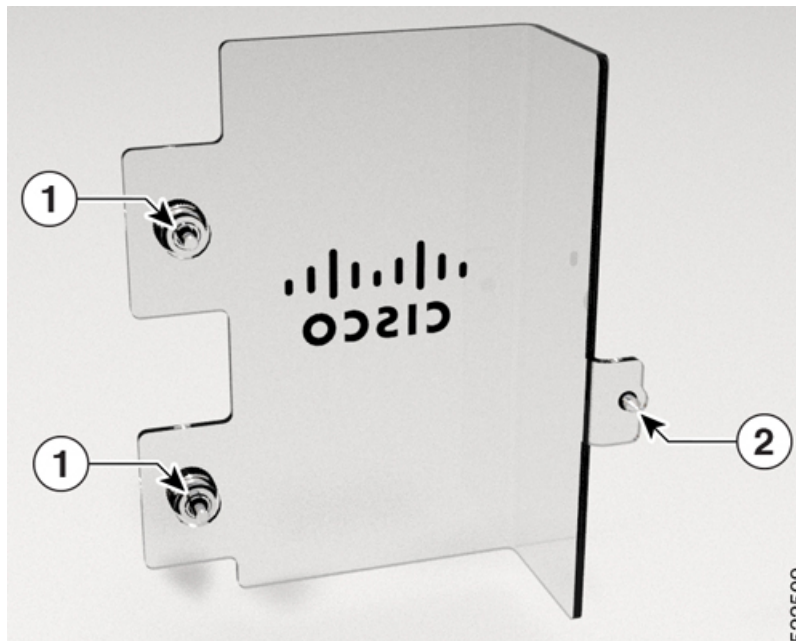
Install Protection Cover

Use this task to install the transparent plastic protection cover to enclose the faceplate of the line card, after the fibers are connected on the faceplate of the line card.

Procedure

- Step 1** Align the guide pin available at the back side of the cover with the hole in the line card.

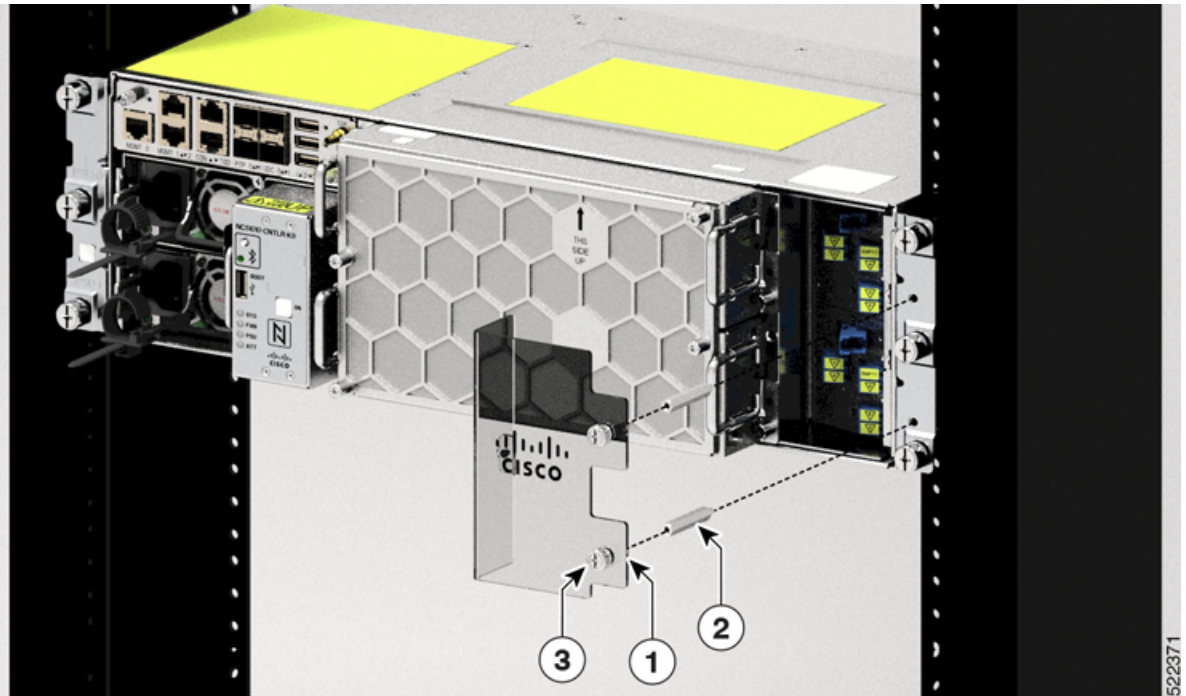
Figure 78: Rear View of the Protection Cover



1	Captive screws
2	Guide pin

- Step 2** Align the standoffs with the holes available in the chassis mounting brackets, and fasten the standoffs into the holes.

Figure 79:



1	Protection cover
2	Standoffs
3	Captive screws

- Step 3** Tighten the captive screws available in the protection cover, such that the screws get fixed into the standoffs. Remove the protection cover to access the line card faceplate and reinstall after the fibers are connected.



CHAPTER 6

Remove and Replace Cisco NCS 1010 Modules

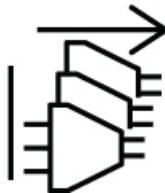
This chapter describes the tasks to remove and replace Cisco NCS 1010 modules.



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 This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit. Statement 1028.



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



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089.

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. Statement 1089



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091



Note The maximum operating altitude for OIR is 1800 m.



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.

522406

- [Remove and Replace Controller, on page 92](#)
- [Remove and Replace PSU, on page 93](#)
- [Remove and Replace Fan Filter, on page 95](#)
- [Remove and Replace Fan Tray, on page 96](#)
- [Remove and Replace Line Card, on page 97](#)
- [Wipe Data in Disk Using Secure Erase, on page 99](#)
- [Upgrade an NCS 1010 EDFA only Network to a Raman Network, on page 101](#)

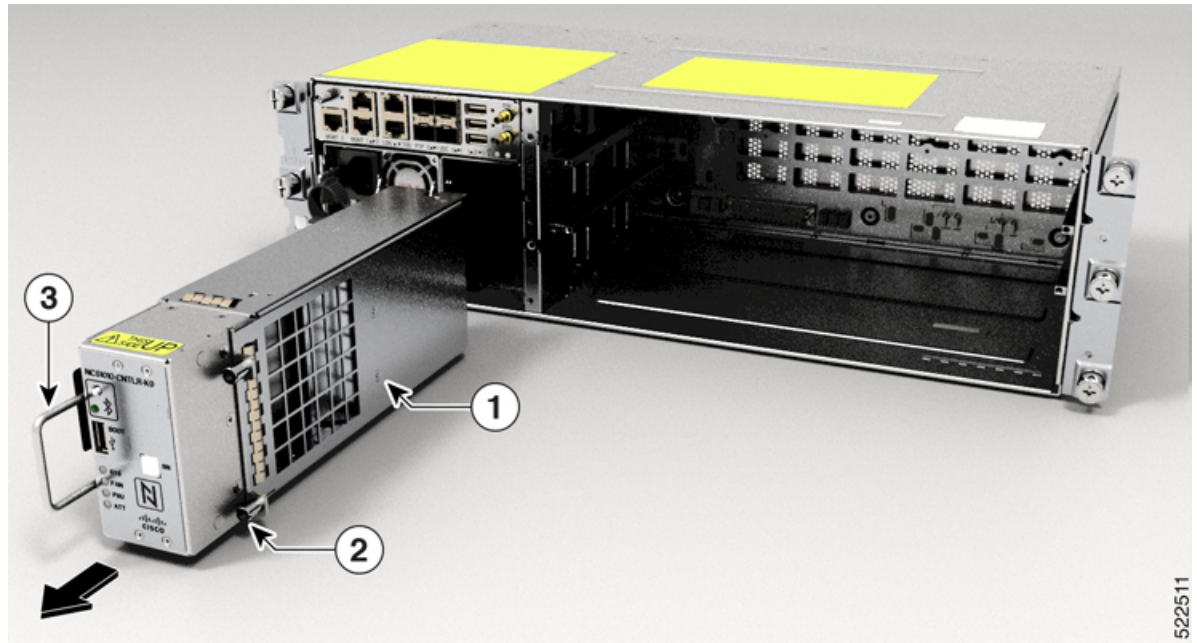
Remove and Replace Controller

Use this task to remove and replace the controller in the Cisco NCS 1010 chassis.

Procedure

-
- Step 1** Using a screwdriver, unfasten the two captive screws on the controller.
- Step 2** Pull out the handle from the controller
- Step 3** Holding the handle with one hand and supporting the controller with the other, gently remove the controller from the slot.

Figure 80: Removing the Controller



522511

1	Controller
2	Captive screws
3	Handle

What to do next

To replace the controller, see [Install Controller, on page 82](#).

Remove and Replace PSU

Use this task to remove and replace a PSU in the Cisco NCS 1010 chassis.

Before you begin

Remove the connections to the PSU:

- Disconnect power from the breaker before disconnecting power from the PSU.
- Remove the cable from the retainer and the PSU, in case of an AC PSU installation.
- Disengage the latch available in the DC Cable connector from the DC PSU to remove the cable.

Procedure

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

Figure 81: Locking Latch of AC Power Supply

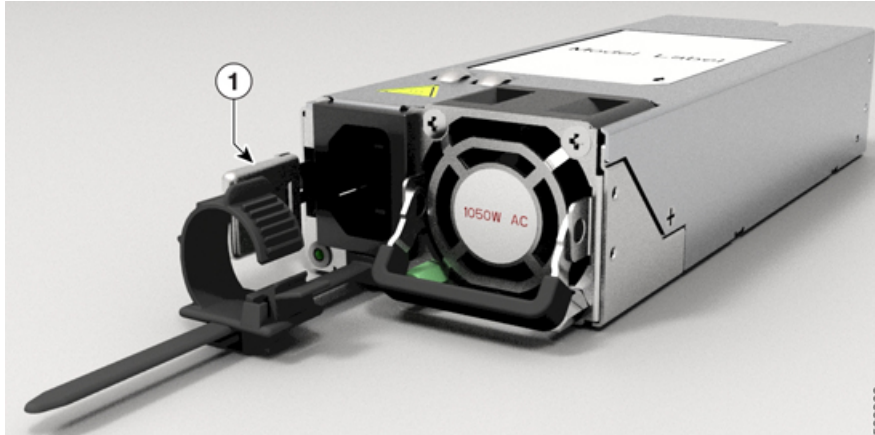
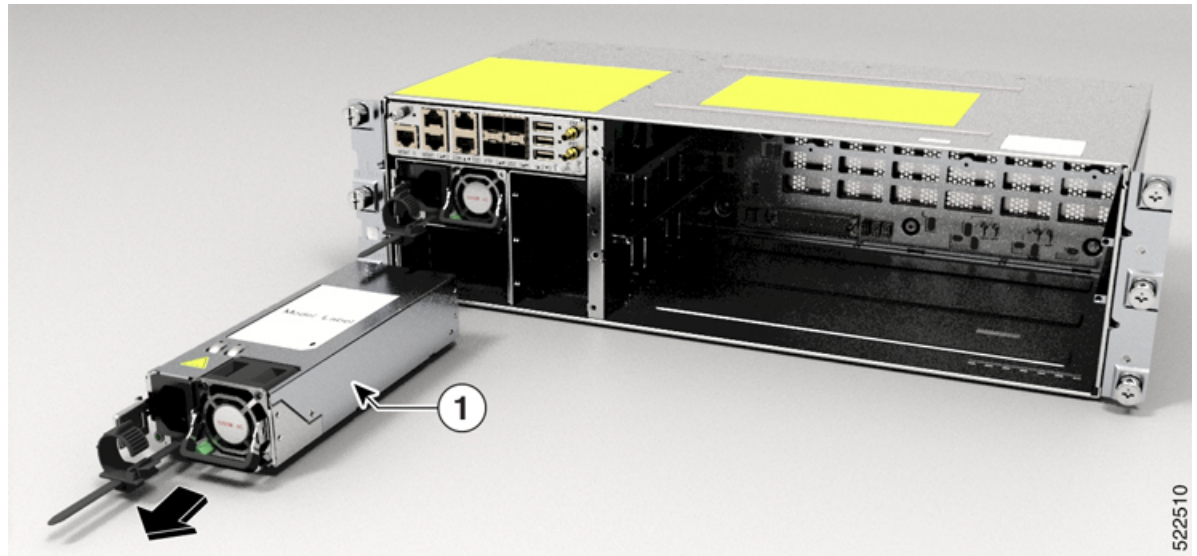


Figure 82: Locking Latch of DC Power Supply



1	Latch
---	-------

Figure 83: Removing the PSU



Step 2 Supporting the PSU with the one hand, gently pull out the PSU from the slot.

What to do next

To replace the PSU, see [Install PSU, on page 77](#).

Remove and Replace Fan Filter

The fan filter removes dust from the fan that is drawn into the chassis by the fan trays. If the fan filters are damaged, dirty, or clogged with dust, they must be replaced with a new fan filter. Failure to replace a compromised fan filter can result in insufficient fan circulation through the chassis and temperature-related environmental alarms.

Use this task to remove and replace the fan filter.



Note First inspection of the fan filter must be performed six months after the first installation of the fan filter. Air filters must be inspected every three months after the initial six-month inspection and replaced if found to be dirty. Cleaned fan filters cannot be reused. Replace with a new fan filter. We recommend having spare fan filters in stock.

Procedure

Step 1 Loosen the four captive screws in the fan filter from the standoffs in the fan trays.

Figure 84: Removing the Fan Filter



1	Fan filter
2	Captive Screw

Step 2 Gently remove the fan filter from the fan tray.

What to do next

To replace the fan filter, see [Install Fan Filter, on page 87](#).

Remove and Replace Fan Tray

Use this task to remove and replace a fan tray in the Cisco NCS 1010 chassis.



Caution Online Insertion and Removal (OIR) duration for the fan tray unit at 30 degree Celsius ambient temperature, is five minutes.

Only one fan tray should be removed at a time. Removing both fan trays simultaneously leads to overheating and may result in an unexpected system shutdown.

Before you begin

[Remove and Replace Fan Filter.](#)

Procedure

- Step 1** Loosen the captive screws (one on the left side and other on the right side) using a screwdriver.
- Step 2** Using the handle pull the fan tray out of the chassis.

Figure 85: Removing the Fan Tray



1	Fan
2	Captive Screw

- Step 3** Repeat [Step 1](#) and [Step 2](#) to remove the second fan tray.

What to do next

To replace the fan tray, see [Install Fan Tray, on page 85](#).

Remove and Replace Line Card

Use this task to remove and replace the line card in the Cisco NCS 1010 chassis.

Before you begin

- [Remove and Replace Fan Filter](#).
- [Remove and Replace Fan Tray](#).

- Remove the protection cover by loosening the captive screws fastened into the standoffs, and remove the standoffs.

**Caution**

- **Perform the removal and replacement procedure for the line card only when the ambient temperature is below 30 degree Celsius and complete it within five minutes to prevent overheating of the chassis components.**
- **Ensure that you perform the removal and replacement of the fan filter, fan trays, protection cover, and line card within the five minutes of time limit.**
- **As the fan trays draw power through the line card, you must complete the line card replacement before installing the fan trays on top of it.**

Procedure**Step 1**

Loosen the captive screws available in the line card handles.

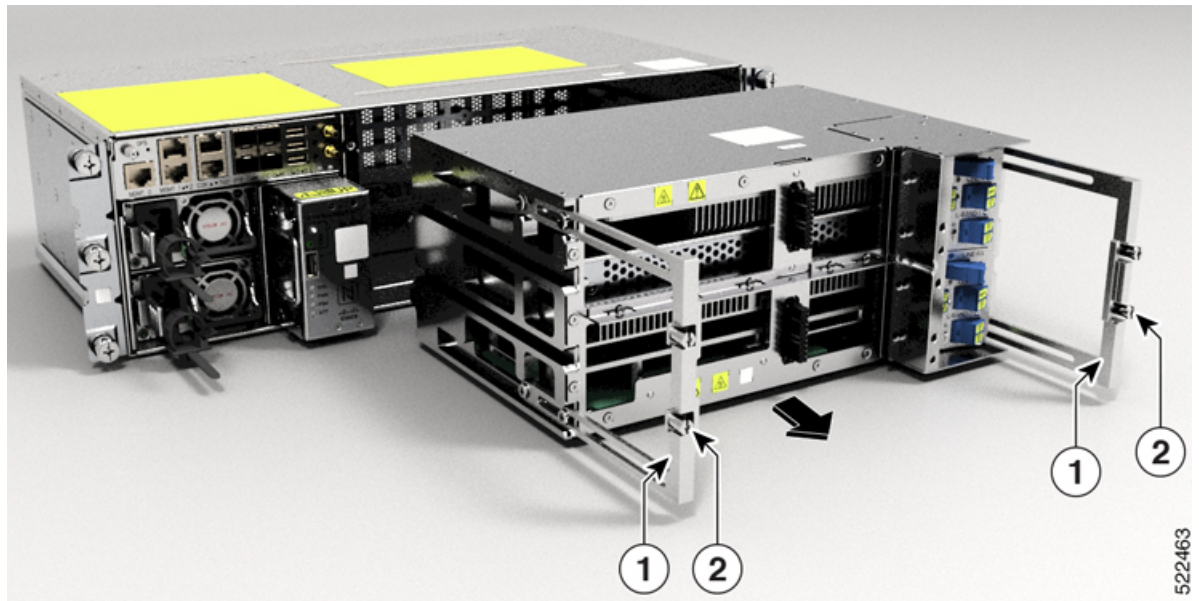
Step 2

Pull the handles out of the line card, and gently remove the card from the chassis.

Caution

Use the handles only to push and pull out the line card from the chassis. Do not use the handles to carry the line card. To prevent any accidental drop, support the top and bottom of the line card with your hand while you remove or insert it.

Figure 86: Removing the Line Card



1

Handle

2	Captive Screws
---	----------------

What to do next

To replace the line card, see [Install Line Card, on page 83](#).

Wipe Data in Disk Using Secure Erase

When NCS 1010 becomes faulty, contact TAC to open a Return Material Authorization (RMA) request. Before opening an RMA request, you can securely erase data on NCS 1010 disks using the Secure Erase feature.



Warning Use this procedure only during RMA.

Before you begin

- The NCS 1010 unit that is planned for RMA must be taken out of the data center and the network. You must access NCS 1010 only using the console port.
- You must perform the RP cold reload for the successful CPU disk wipe.
- You must perform the chassis cold reload for the successful Chassis disk wipe.

Procedure

Step 1 When NCS 1010 boots during RP cold reload or chassis cold reload, the following message appears.

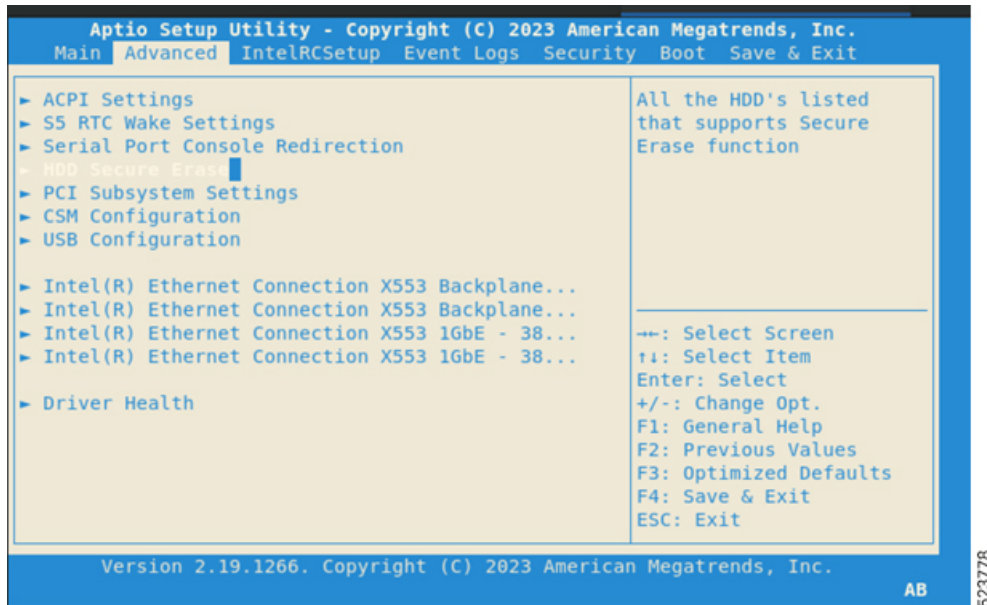
```
Version 2.19.1266. Copyright (C) 2022 American Megatrends, Inc.  
BIOS Date: 06/22/2022 08:29:52 Ver: 0ACHI0420  
Press <DEL> or <ESC> to enter setup.  
Press DEL or ESC key to enter BIOS.
```

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.

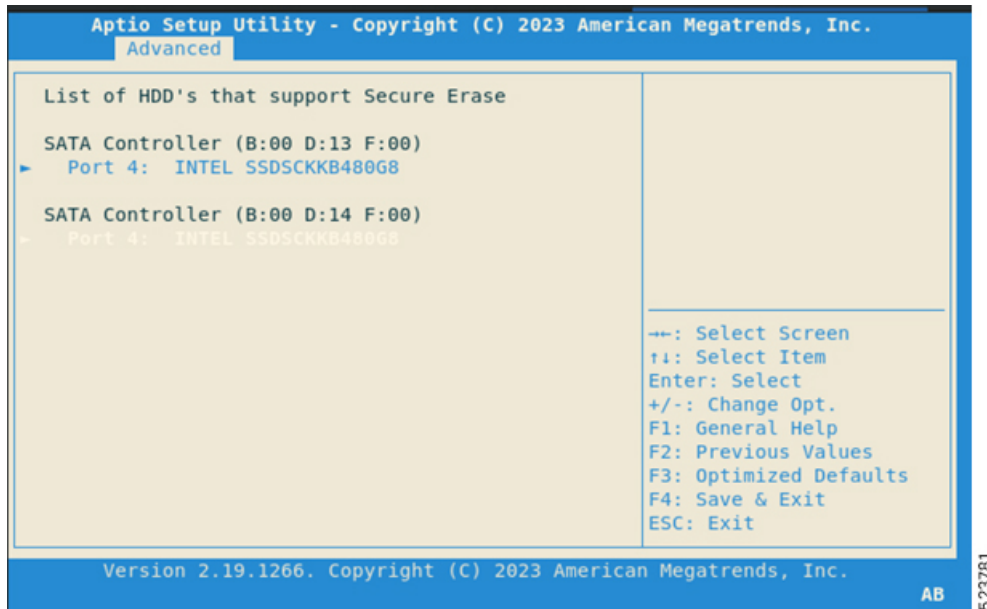


Step 4 Select the SSD using the arrow keys.

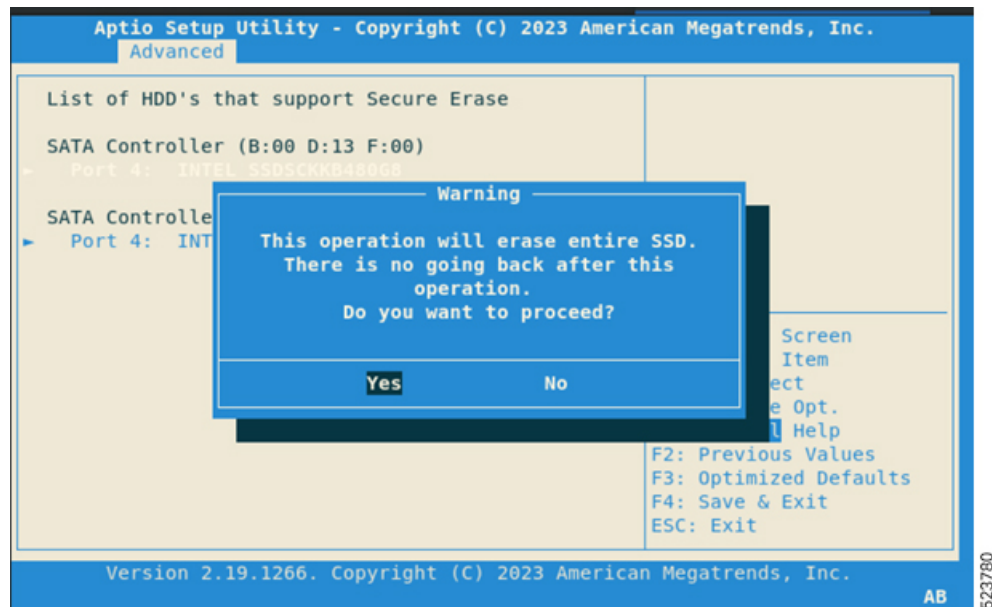
- a) Select the SSD under D: 13 for RP cold reload.



- b) Select the SSD under D: 14 for chassis cold reload.



Step 5 Click **Yes** on the **Warning** message box to erase the selected SSD data.



Upgrade an NCS 1010 EDFA only Network to a Raman Network

The following topics describe how to upgrade an NCS 1010 EDFA only network to a Raman network.

Prerequisites

- Maintain the same physical connections as the EDFA only NCS 1010 nodes.
- You need E2000-LC patch cords for the NCS 1010 Raman ports on the NCS 1010 MPO faceplate. Make sure you have E2000-LC patch cords for each MPO faceplate Raman port. For LC faceplate OLTs, use LC-LC patch cords.
- Raman amplification is sensitive to reflection and loss. Make sure you have the necessary cleaners and fiber scope for any troubleshooting.

Copy Configuration

On each existing EDFA device on the network, perform the following steps:

1. Use the **show running-config** command to get the controller configuration.
2. Copy the configuration to a file on your local system and save the file.



Note This configurations include all the cross-connect configuration on OLTs. Copying these configurations to the Raman module ensures that you do not need to recreate the cross-connect configuration on the Raman node.

Replace the Hardware

You have the following two options to replace the hardware.

- Replace the whole chassis with a Raman OLT or ILA chassis.
- Replace the OLT or ILA line card with a corresponding Raman line card.

Replace all OLT and ILA nodes with corresponding Raman nodes.

1: Replace the Entire NCS 1010 Chassis

For instructions to assemble the NCS 1010 chassis, see [Install Cisco NCS 1010 Modules](#).

1. Remove the existing fiber connections from the NCS 1010 chassis.
2. Loosen the screws of the NCS 1010 chassis in the rack or adapter brackets.
3. Support the top and bottom of the NCS 1010 chassis with your hand to extract the chassis.
4. Install the Raman ILA or OLT module by following the instructions at [Install Cisco NCS 1010](#).
5. Make the fiber connections maintaining the previous connections.

2: Replace the Line Card Only

Prerequisites:

- Remove the fan filter by following the instructions at [Remove and Replace Fan Filter](#)

- Remove the fan tray by following the instructions at [Remove and Replace Fan Tray](#)
 - Remove the protection cover by loosening the captive screws fastened into the standoffs, and remove the standoffs.
1. Remove the existing fiber connections from the NCS 1010 chassis.
 2. Remove the OLT or ILA line card by following the instructions at [Remove and Replace Line Card](#) , on [page 97](#).
 3. Install the Raman line card. For steps to install the line card, see [Install Line Card](#), on [page 83](#).
 4. Make the fiber connections maintaining the previous connections.

Apply Configuration to Raman Nodes

Boot up the new nodes. For instructions to boot, see [Boot NCS 1010](#).

Apply the configurations copied in [Copy Configuration](#), on [page 102](#) to the newly installed Raman nodes.

Initial Setup of Raman Nodes

Initiate Raman tuning and gain estimation so that Automatic Power Control gets the necessary setpoints. Link tuner runs automatically when it detects changes in the network and during network bring-up.

For more information on Raman Tuning, Gain Estimation, Link Tuner, and APC, see the following links:

- [Raman Tuning](#)
- [Gain Estimation](#)
- [Link Tuner](#)
- [Automatic Power Control](#)

Use the following commands to initiate these operations.

- **olc start-raman-tuning controller ots** *Rack/Slot/Instance/Port*
- **olc start-gain-estimation controller ots** *Rack/Slot/Instance/Port*



Note Raman tuning blocks gain estimation from executing while tuning is in progress. Wait until Raman tuning status changes to **Tuned** before initiating gain estimation.

The circuits on the new Raman nodes should be up if the configurations were copied and port connections were mapped accurately between the EDFA implementation and Raman implementation.



PART II

Cisco NCS 1000 Breakout Patch Panel Hardware Installation

- [Cisco NCS 1000 Breakout Patch Panel and Modules Overview](#) , on page 107
- [Safety Guidelines for Breakout Patch Panel and Modules](#), on page 115
- [Prepare to Install Cisco NCS 1000 Breakout Patch Panel and Modules](#), on page 119
- [Install Cisco NCS 1000 Breakout Patch Panel and Modules](#), on page 123
- [Remove and Replace Cisco NCS 1000 Breakout Patch Panel and Modules](#), on page 149



CHAPTER 7

Cisco NCS 1000 Breakout Patch Panel and Modules Overview

This chapter provides an overview for Cisco NCS 1000 Breakout Patch Panel and Cisco NCS 1000 Breakout Modules.



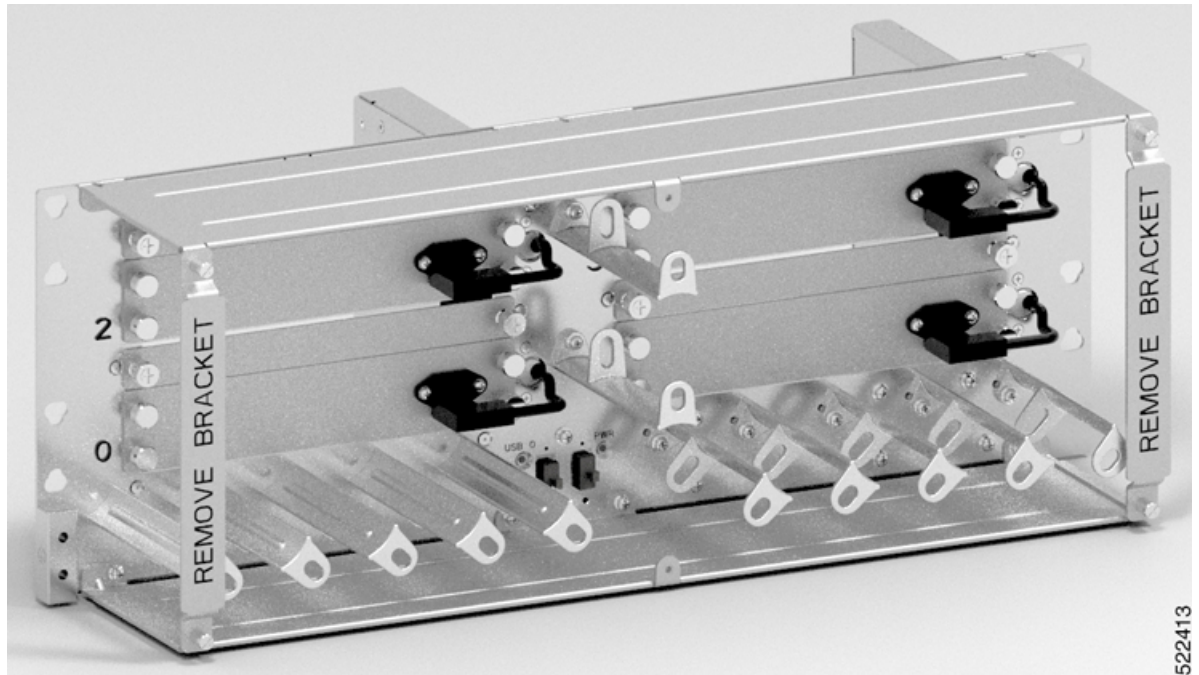
Note In this chapter, "breakout panel" refers to the "Cisco NCS 1000 Breakout Patch Panel". "breakout modules" refer to the "Cisco NCS 1000 Breakout Modules".

- [Cisco NCS 1000 Breakout Patch Panel, on page 107](#)
- [Cisco NCS 1000 Breakout Modules, on page 108](#)

Cisco NCS 1000 Breakout Patch Panel

Cisco NCS 1000 Breakout Patch Panel is colorless breakout-modular patch panel. It is powered by the NCS 1010 chassis using a single USB 2.0 cable from the NCS 1010 EITU. The breakout panel contains four USB 2.0 connections that power the breakout modules. It allows connections between the OLT-C and OLT-R-C line cards that are installed in the NCS 1010 chassis and the four breakout modules using MPO cables. The breakout panel supports up to 72 colorless mux/demux channels and 8-directional interconnections. The breakout panel is 4 RU high and has adjustable fiber guides for fiber routing. The empty slots are covered with dummy covers. The panel is shipped with USB 2.0 connectors that are connected to the corresponding dummy covers. The plastic transparent cover can be installed in front of the panel for fiber protection. The panel is designed to fit a 19-inch rack. The panel can also be installed on ETSI and 23-inch rack using adapter brackets.

Figure 87: NCS1K-BRK-SA



Cisco NCS 1000 Breakout Modules

The breakout modules are a set of three optical breakout units. The modules can be connected to the A/D 4–11, A/D 12–19, A/D 20–27 and A/D 28–33 MPO connector ports of the OLT-C and OLT-R-C line cards to provide ROADM node internal connections and for local channels add/drop.

A USB 2.0 connection from the NCS 1010 chassis powers up the breakout panels. The modules monitor signals, check connection verification, and retrieve the inventory data.

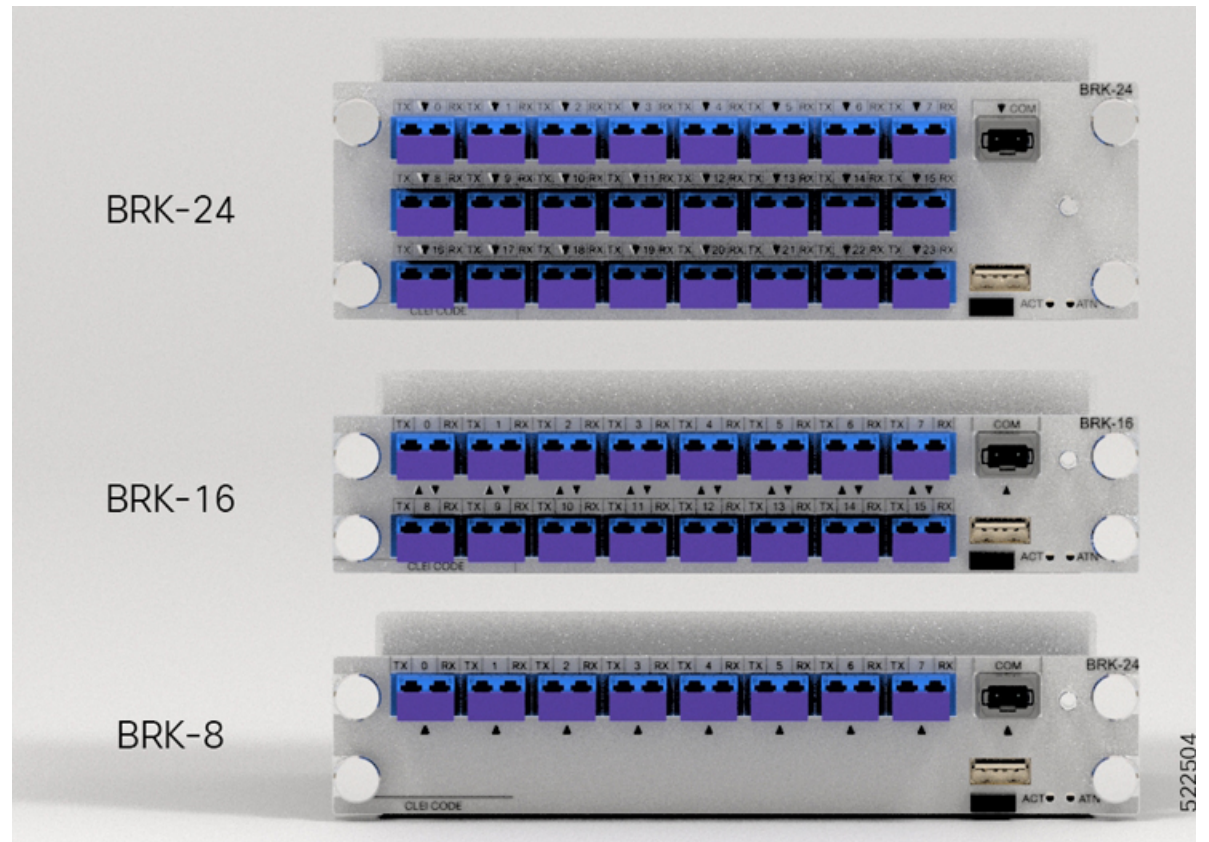
The modules have two operational modes:

- Low-power mode—Retrieves only inventory data.
- High-power mode—Full monitoring and checks features are available.

The three breakout modules can be used in C-band.

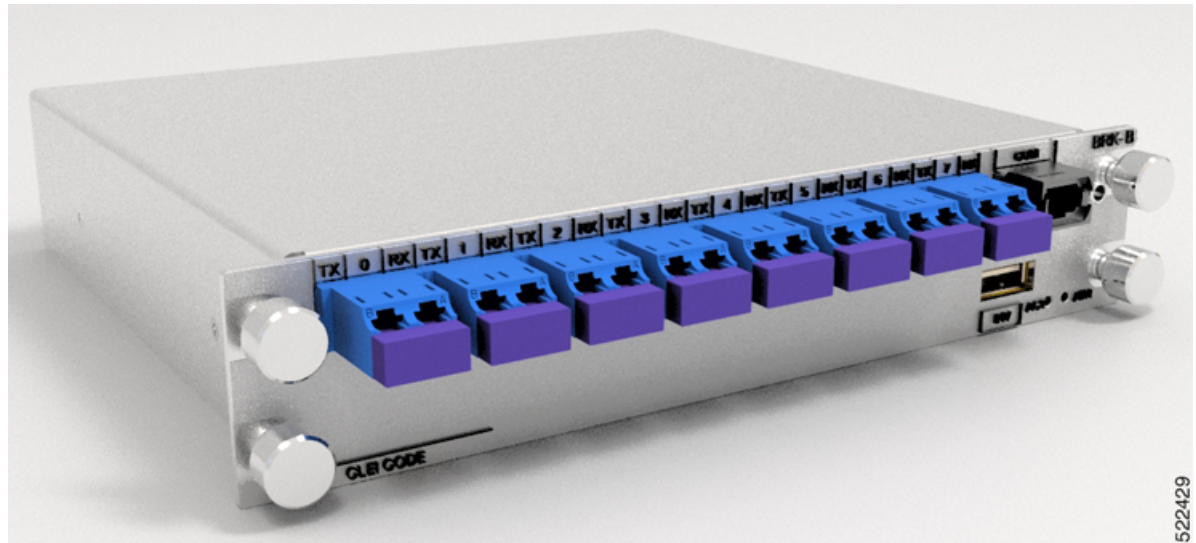
Breakout Modules Faceplate

Figure 88: Breakout Modules Faceplate



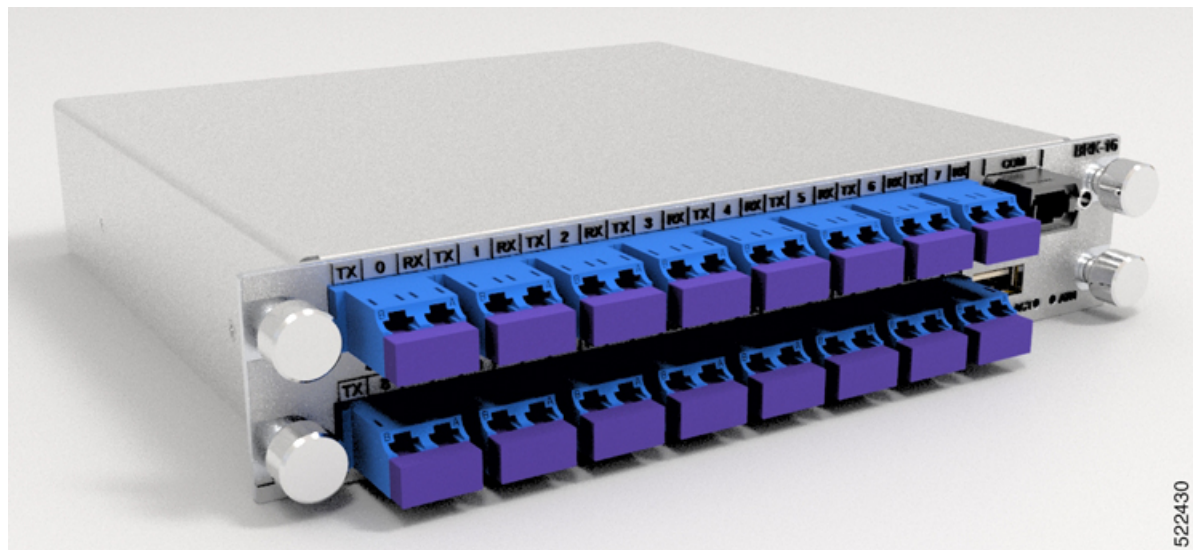
The breakout panel supports the following breakout modules:

- **NCS1K-BRK-8**

Figure 89: 8-port Breakout Module

The NCS1K-BRK-8 module provides the breakout of 16 fibers from an MPO-24 connector to 8 duplex line card connectors. It essentially performs an optical connection adaptation of MPO-to-LC connectors for the ADD/DROP signals of the MPO ports of OLT line cards. For each port (MPO and LC), power monitors with tone detection capability are available. A filtered optical loopback (191.175 THz) from one MPO input port (fiber-1) to all MPO output ports is available for connection verification.

- **NCS1K-BRK-16**

Figure 90: 16-port Breakout Module

The NCS1K-BRK-16 module provides the breakout of 16 fibers from an MPO-24 connector to 16 duplex LC connectors. The signals on each fiber from the MPO input ports are split over two LC output ports by a 1x2 optical splitter. The signals from the two adjacent input LC ports are combined into a single MPO output port through a 1x2 optical coupler. For each port (MPO and LC), power monitors with tone

detection capability are available. A filtered optical loopback (191.175 THz) from one MPO input port (fiber-1) to all MPO output ports is available for connection verification.

- **NCS1K-BRK-24**

Figure 91: 24-port Breakout Module



The NCS1K-BRK-24 module provides the breakout of 16 fibers from an MPO-24 connector to 24 duplex LC connectors. The signals on each fiber from the MPO input ports are split over three LC output ports by a 1x3 optical splitter. The signals from the three adjacent input LC ports are combined into a single MPO fiber output port through a 1x3 optical coupler. For each port (MPO and LC), power monitors with tone detection capability are available. A filtered optical loopback (191.175 THz) from one MPO input port (fiber-1) to all MPO output ports is available for connection verification.

For more information on the port details of the breakout modules, see [Cisco NCS 1010 datasheet](#).

Breakout Modules Port Label Descriptions

NCS1K-BRK-8 Port Label Description

NCS1K-BRK-8 is equipped with 1x MPO-24 connector (with only 16 fibers connected) and with 8x LC-duplex connectors.

Table 12: NCS1K-BRK-8 Port Label Description

Port	Connector Type	Connector Label	Operating Frequency Range [THz, (nm)]	Note
COM-TX/RXi, (i=1–8)	MPO/MPT	COM	197.2–185.9 (1520–1612)	—

Port	Connector Type	Connector Label	Operating Frequency Range [THz, (nm)]	Note
DIR-i-TX/RX (i=1–8)	LC	TX-i-RX	197.2–191.275 (1520–1567.34) 191.0–185.9 (1569.6–1612)	Signals from 191.275 to 191 THz are filtered out from/to the DIR-i-TX/RX ports.

NCS1K-BRK-16 Port Label Description

NCS1K-BRK-16 is equipped with 1x MPO-24 connector (with only 16 fibers connected) and with 16x LC-duplex connectors.

Table 13: NCS1K-BRK-16 Port Label Description

Port	Connector Type	Connector Label	Operating Frequency Range [THz, (nm)]	Note
COM-TX/RXi, (i=1–8)	MPO/MPT	COM	197.2–185.9 (1520–1612)	—
CH-i-TX/RX (i=1–16)	LC	TX-i-RX	197.2–191.275 (1520–1567.34) 191.0–185.9 (1569.6–1612)	Signals from 191.275 to 191 THz are filtered out from/to the CH-i-TX/RX ports.

NCS1K-BRK-24 Port Label Description

NCS1K-BRK-24 is equipped with 1x MPO-24 connector (with only 16 fibers connected) and with 24x LC-duplex connectors.

Table 14: NCS1K-BRK-24 Port Label Description

Port	Connector Type	Connector Label	Operating Frequency Range [THz, (nm)]	Note
COM-TX/RXi, (i=1–8)	MPO/MPT	COM	197.2–185.9 (1520–1612)	—
CH-i-TX/RX (i=1–24)	LC	TX-i-RX	197.2–191.275 (1520–1567.34) 191.0–185.9 (1569.6–1612)	Signals from 191.275 to 191 THz are filtered out from/to the CH-i-TX/RX ports.

Breakout Module LEDs

Table 15: Feature History

Feature Name	Release Information	Feature Description
Port Status for Breakout Modules	Cisco IOS XR Release 7.9.1	<p>The LEDs for optical ports (COM, TX-i-RX) in the breakout modules will now indicate port status in these colors:</p> <ul style="list-style-type: none"> • Red—Presence of major and critical alarms that could be traffic-impacting • Amber—Presence of minor alarm when tone generation or tone detection is initiated. Tone detection uses a specific probe signal to verify the connection between OLT line cards and the breakout modules. • Green—Normal operations with no system alarms.

The breakout module LEDs indicate the system status and the status of the optical ports.

Three color LEDs (green, amber, and red) are present near each optical port (COM, DIR-i, and CH-i) to indicate the port status. The optical ports vary depending on the breakout module.

Table 16: Status of the Optical Port LEDs

Port LED	Color	Status
COM, DIR-i, or CH-i	Red	Indicates 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.
	Amber	Indicates minor alarms that are raised when initiating tone generation and tone detection for connection verification.
	Green	Indicates that the patch panel is operational and has no alarm.
ACT	Green	Indicates the active status for the USB connection.
ATN	Green	Indicates the attention condition for the USB connection.



CHAPTER 8

Safety Guidelines for Breakout Patch Panel and Modules

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 - Cisco Network Convergence System 1010*.

- [Standard Warning Statements, on page 115](#)
- [Safety Information, on page 117](#)
- [Laser Radiation Emission Restrictions, on page 117](#)
- [Laser Safety During Operation, on page 117](#)
- [Electrical Safety, on page 118](#)

Standard Warning Statements



Warning

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 provided at the end of each warning statement to locate its translation in the translated safety warnings for this device. Statement 1071

SAVE THESE INSTRUCTIONS





Warning When installing the product, use the provided or designated connection cables, power cables, AC adapters, and batteries. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" or "CSA" shown on the cord), not regulated with the subject law by showing "PSE" on the cord, for any other electrical devices than products designated by Cisco. Statement 371



Warning 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.

〈製品仕様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、バッテリーなどの部品は、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。

Statement 407



Warning Read the installation instructions before using, installing, or connecting the system to the power source. Statement 1004



Warning 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. Statement 1029



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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073



Warning To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes. Statement 1074



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089

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. Statement 1089



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091



Note For more information on all the applicable statements and their translations, see *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010*.

Safety Information

Before you install, operate, or service, you must read the *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010* document for important safety information and warning translations.

The units are compliant with the GR 1089, UL60950 /CSA 22.2 No. 60950-00, and IEC 60950 standards.

Laser Radiation Emission Restrictions

The Class 1M Laser safety and warning label affixed to the passive optical modules indicate that the product should never be used or installed in an optical network with emissions higher than Class 1M.



Warning Class 1M laser radiation when open. Do not view directly with optical instruments. Statement 281

Laser Safety During Operation

Cisco NCS 1010 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 92: Class 1M Laser Product Label



Figure 93: Class 1M Laser Product Label

**Warning**

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

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

3848295

Statement 291

**Warning**

Invisible laser radiations present.Statement 1016

**Warning**

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

Electrical Safety

The passive optical modules are optically and electrically passive and require no electrical connections. No electrostatic discharge (ESD) or other electrical safety considerations apply.



CHAPTER 9

Prepare to Install Cisco NCS 1000 Breakout Patch Panel and Modules

This chapter explains how to prepare for Cisco NCS 1000 Breakout Patch Panel and Cisco NCS 1000 Breakout Modules installation.



Note In this chapter, "breakout panel" refers to the "Cisco NCS 1000 Breakout Patch Panel". "breakout modules" refer to the "Cisco NCS 1000 Breakout Modules".

- [Package Contents, on page 119](#)
- [Unpack and Verify Cisco NCS 1000 Breakout Patch Panel and Breakout Modules, on page 120](#)

Package Contents

You can order the breakout panel and breakout modules separately. The breakout panel package contains the 19-inch rack accessory kit as part of the default kit. If necessary, you can order the ETSI and ANSI 23" accessory kits separately. The breakout panel and breakout modules are shipped separately. See [PIDs, on page 183](#) for all PIDs of the breakout panel and breakout modules components.

The shipped breakout panel package contains the following:

- Cisco NCS 1000 Breakout Patch Panel.
- Accessory kit (NCS1K-BRK-KIT)—Includes all the hardware necessary for the breakout patch panel installation on the ANSI 19" Rack. You can order the accessory kits for ETSI (NCS1K-ETSI-KIT) and ANSI 23" (NCS1K-23-KIT) racks as required. The following table describes the contents of the accessory kits.

Table 17: Accessory Kit Contents

Accessory Kit	Contents
NCS1K-BRK-KIT	This kit has the following items for patch panel installation on a 19" rack: <ul style="list-style-type: none"> • Plastic faceplate (1) • 12–24 x 0.50-inch length Pan head screws (8) • Double hole ground lug (1) • Lock washers for M5 screws (2) • M5 x 10mm length Pan head screws (2) • 6-inch Velcro strips for fiber management (15)
NCS1K-ETSI-KIT	This kit has the following items for patch panel installation on an ETSI 21" rack: <ul style="list-style-type: none"> • M6 x 20mm length Pan head screws (12) • Z-shaped adapter brackets (2)
NCS1K-23-KIT	This kit has the following items for patch panel installation on an ANSI 23" rack: <ul style="list-style-type: none"> • 12–24 x 0.5-inch length Pan head screws (12) • Right adapter bracket (1) • Left adapter bracket (1)

The breakout module package includes the following:

- Breakout modules
- Production test report form. The form has the part number and serial number of the manufacturer, Cisco product part number, date, and device description.

Unpack and Verify Cisco NCS 1000 Breakout Patch Panel and Breakout Modules

The breakout panel and the breakout modules are shipped in separate packages. This task describes the steps for unpacking and verifying both the components.

Procedure

-
- Step 1** When you receive the breakout panel and breakout modules at the installation site, open the top of the box.
- Step 2** Unpack and inspect the breakout panel and breakout modules.

For more information on the package contents, see [Package Contents, on page 119](#).

- Step 3** To remove the breakout panel or breakout modules, grasp the side of the breakout panel or module and lift the panel or module 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 Breakout Patch Panel and Modules

This chapter contains tasks to install Cisco NCS 1000 Breakout Patch Panel and Cisco NCS 1000 Breakout Modules.



Note In this chapter, "breakout panel" refers to the "Cisco NCS 1000 Breakout Patch Panel". "breakout modules" refer to the "Cisco NCS 1000 Breakout Modules".

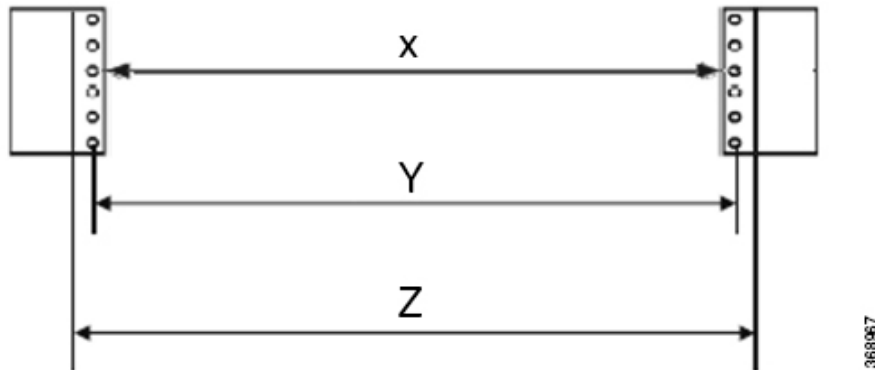
- [Rack Compatibility, on page 123](#)
- [Ground Description, on page 124](#)
- [Rack Mount Warnings, on page 127](#)
- [Install Breakout Panel Adapter Brackets, on page 128](#)
- [Install the NCS 1000 Breakout Patch Panel, on page 129](#)
- [Install the NCS 1000 Breakout Modules, on page 131](#)
- [Breakout Panel Cable Management, on page 139](#)
- [Install Breakout Panel Plastic Cover, on page 145](#)
- [Fiber-Optic Connector Cleaning and Maintenance, on page 146](#)

Rack Compatibility

The Cisco NCS 1000 Breakout Patch Panel 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 94: 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 unpainted surface between the adapter bracket, optical modules, and patch panels, ensure proper grounding of the breakout patch panels. The adapter bracket, the straight adapter brackets, and the Z-shaped adapter brackets are unpainted and treated with conductive finishing.

Ground Connection Warnings

Take note of the following ground connection warnings:



Warning The appliance must be connected to a grounded outlet.

Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

Apparatet må tilkoples jordet stikkontakt.

Apparaten skall anslutas till jordat uttag. Statement 414.



Warning To reduce risk of electric shock and fire, you must incorporate a readily accessible two-poled disconnect device in the fixed wiring. Statement 1022.



Warning To reduce risk of fire, use copper conductors only. Statement 1025.



Warning To reduce the risk of electric shock, refer to national and local codes for proper installation and grounding of antennas. Statement 1052.

Ground the Breakout Panel



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

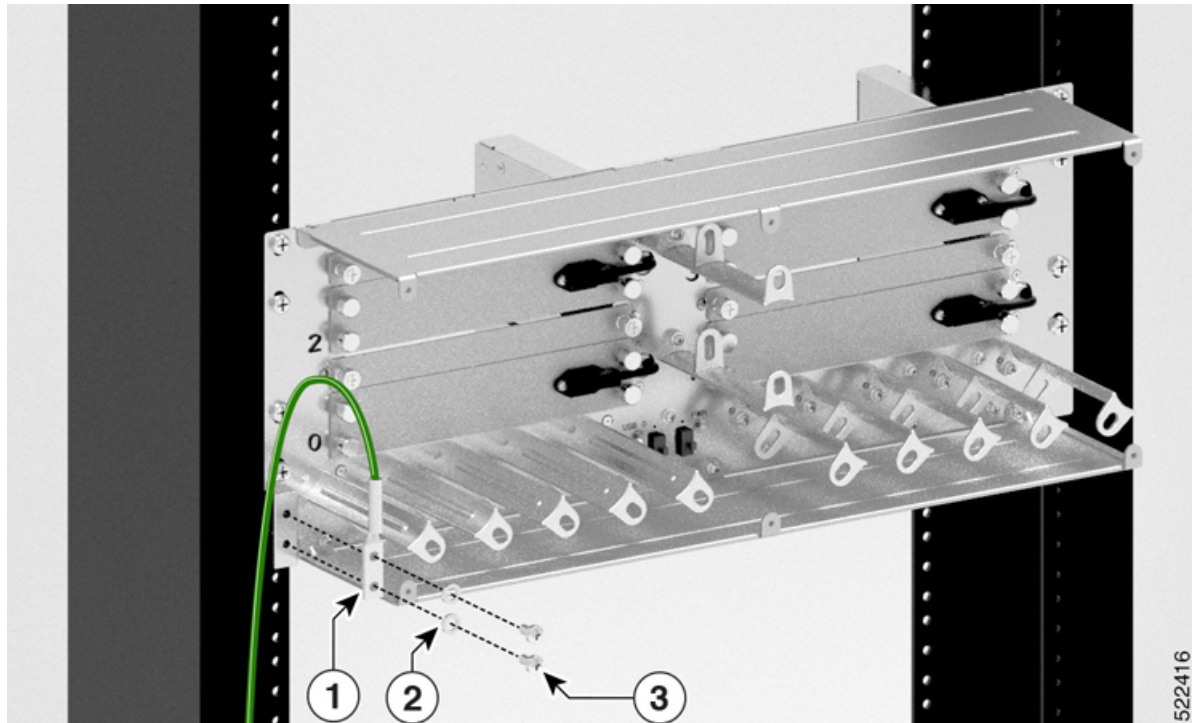
This task describes the steps to ground the breakout panel.

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 breakout 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 breakout panel to attach the ground lug.
 - Step 4** Crimp a #6 AWG ground cable to the dual-hole ground lug.
 - Step 5** Align the dual-hole ground lug to the breakout panel.

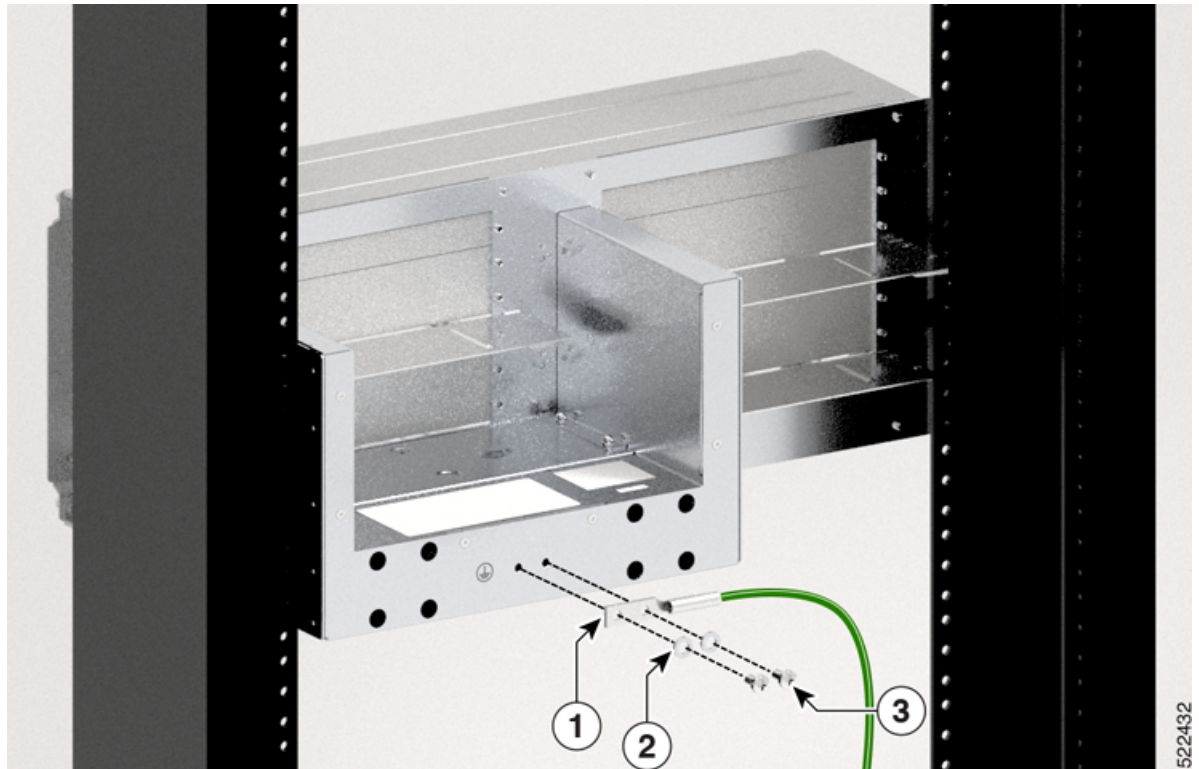
The ground points are present on the front and rear side of the breakout panel, as shown in the following figure.

Figure 95: Front Side Grounding Option



522416

Figure 96: Rear Side Grounding Option



522432

1	Double-hole Ground Lug
2	Lock Washers
3	M5 Pan Head Phillips Screws

Step 6 Tighten the M5 pan head screw to torque value of 3.1 N-m (27.4 lbs-in).

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

Rack Mount Warnings

Take note of the following rack-mount safety warnings.



Warning Two 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. Statement 164.



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

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

Statement 1006



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



Warning To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of 40° C. Statement 1047.

Install Breakout Panel Adapter Brackets

This task explains how to install the adapter brackets to the ANSI or ETSI standard equipment rack.



Note The breakout panel does not need adapter brackets to fit into an ANSI 19-inch rack.

Before you begin

Ensure you completed the following tasks:

- [Unpack and Verify Cisco NCS 1000 Breakout Patch Panel and Breakout Modules, on page 120.](#)
- [Rack Compatibility](#)

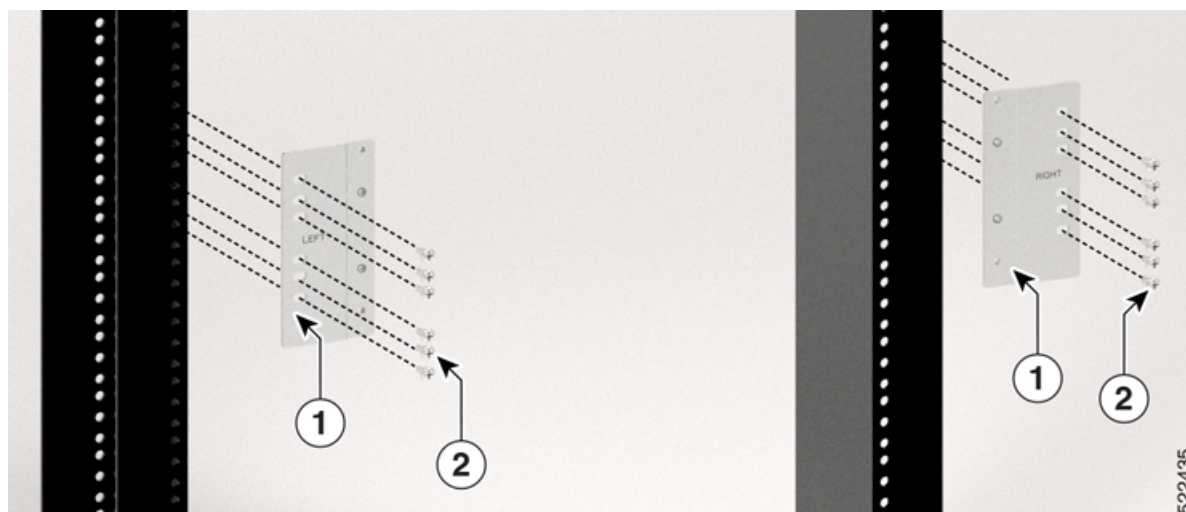
Procedure

Step 1 To mount the adapter brackets to the standard equipment rack, perform one of the following actions:

- For a 23 inch (584.2 mm) ANSI configuration, perform the following steps.

- Note** Use the "NCS1K-23-KIT" accessory kit for installing the breakout panel on the 23-inch rack. For more information, see [Package Contents, on page 119.](#)
- Align the screw holes of the left bracket against the screw holes of the left rack.
 - Place the screws to hold the left bracket on the left rack.
 - Align the screw holes of the right bracket against the screw holes of the right rack.

Figure 97: Installing the Adapter Brackets on the 23-inch Rack



1	Left and Right Adapter Brackets
---	---------------------------------

2	12-24 Pan Head Screws
---	-----------------------

d. Place the screws to hold the right bracket on the right rack.

- For an ETSI configuration, align the screw holes of the Z-shaped adapter brackets against the rack screw holes.

Note Use the "NCS1K-ETSI-KIT" accessory kit for installing the breakout panel on the ETSI rack. For more information, see [Package Contents, on page 119](#).

Figure 98: Installing the Adapter Brackets on an ETSI Rack



1	Adapter Bracket
2	M6 x 20mm Length Screws

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

What to do next

- [Install the NCS 1000 Breakout Patch Panel, on page 129](#)

Install the NCS 1000 Breakout Patch Panel

This task explains how to install the breakout panel into the ETSI and 23-rack adapter brackets.

Before you begin

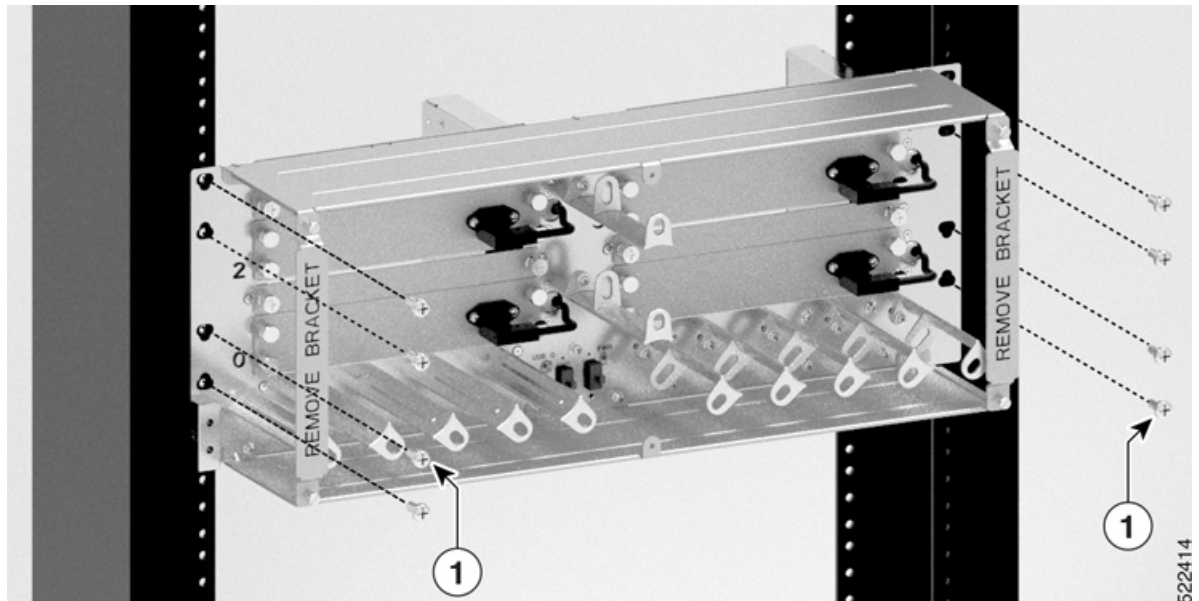
- [Install Breakout Panel Adapter Brackets, on page 128](#)

Procedure

Step 1 Hold the bottom side of the breakout panel and align the breakout panel to the rack.

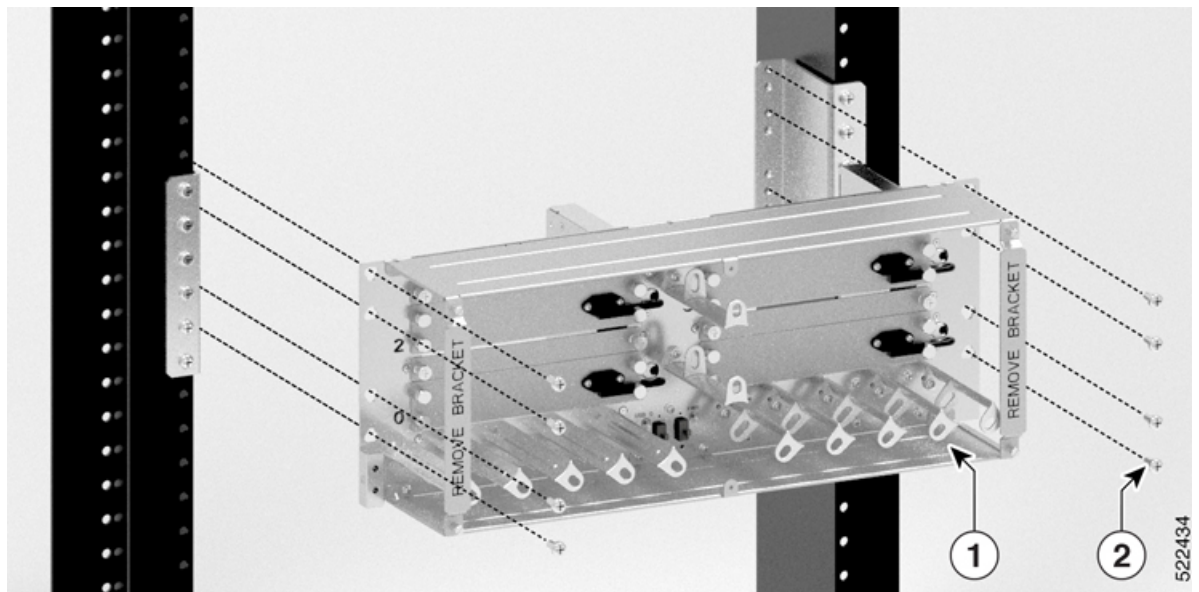
Warning Using the top or bottom covers to lift the breakout panel may damage the equipment.

Figure 99: Installing the Breakout Panel on a 19-inch Rack



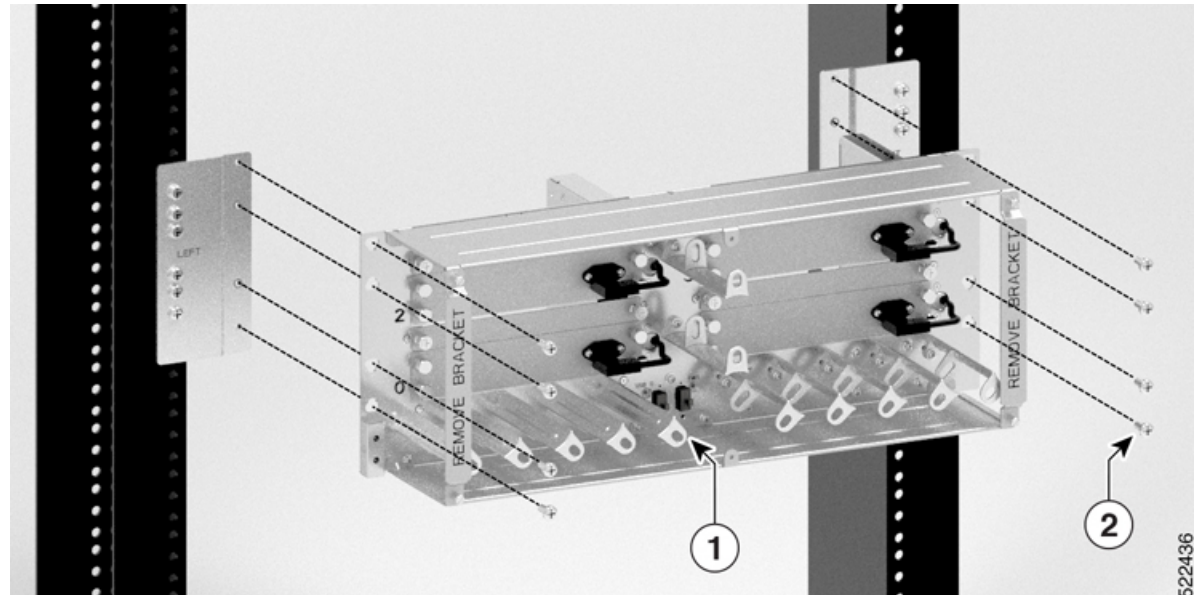
1	12–24 x 0.5" Length Pan Head Screws
---	-------------------------------------

Figure 100: Installing Breakout Panel on an ETSI Rack



1	NCS1K-BRK-SA
2	12–24 x 0.5" Length Pan Head Screws

Figure 101: Installing Breakout Panel on a 23-inch Rack



1	NCS1K-BRK-SA
2	12–24 x 0.5" Length Pan Head Screws

Step 2 Tighten the 12–24 pan-head screws to a torque value of 4.65 N-m (41 lbs-in).

What to do next

- [Install the NCS 1000 Breakout Modules, on page 131](#)

Install the NCS 1000 Breakout Modules

This task explains how to install the following breakout modules into the breakout panel.

- NCS1K-BRK-8
- NCS1K-BRK-16
- NCS1K-BRK-24

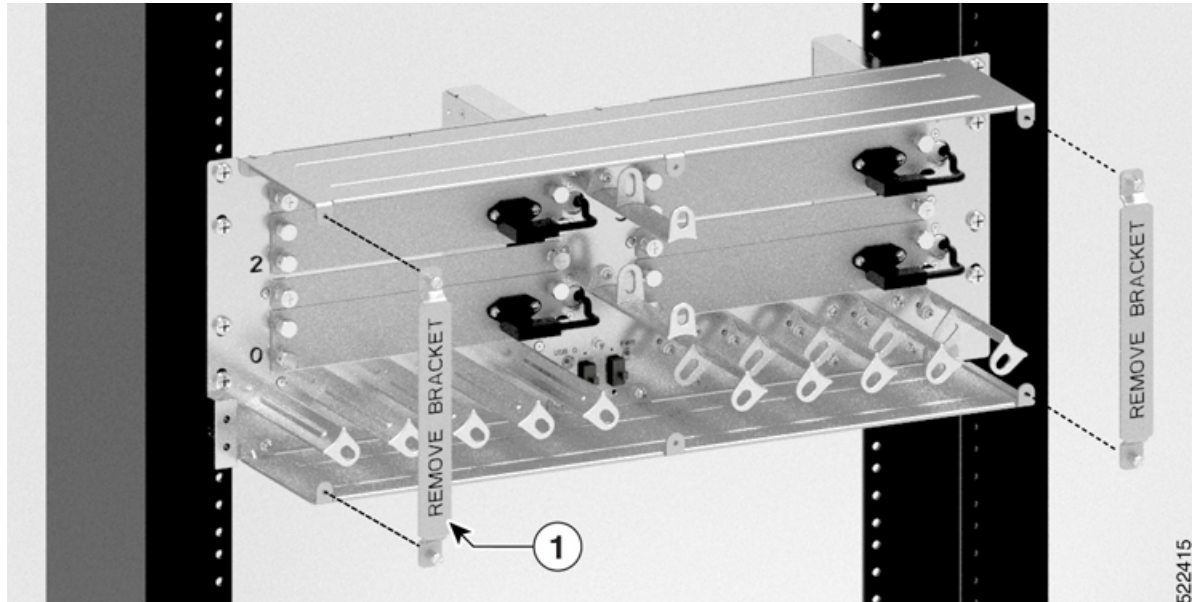
Before you begin

- [Install the NCS 1000 Breakout Patch Panel](#)

Procedure

- Step 1** Loosen the captive screws to remove the front brackets in the breakout panel.

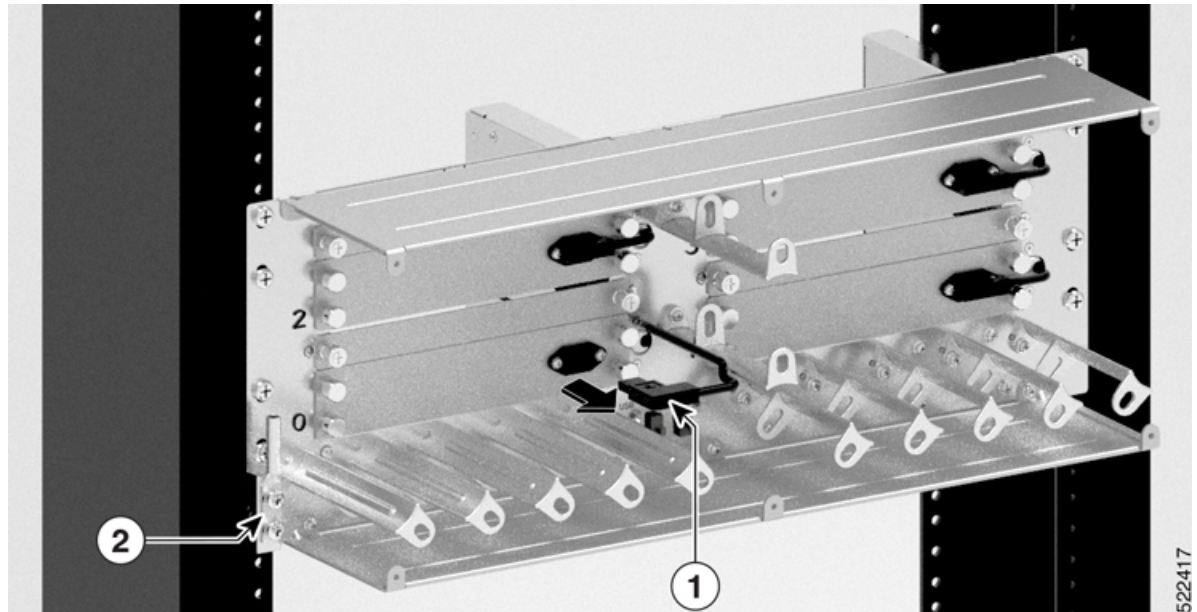
Figure 102: Removing Front Brackets from Breakout Panel



1	Front Brackets
---	----------------

- Step 2** Establish grounding for the breakout panel. For more information, see [Ground the Breakout Panel, on page 125](#).
- Step 3** Remove the USB 2.0 connection from the USB dummy cover.

Figure 103: Removing USB 2.0 Connection

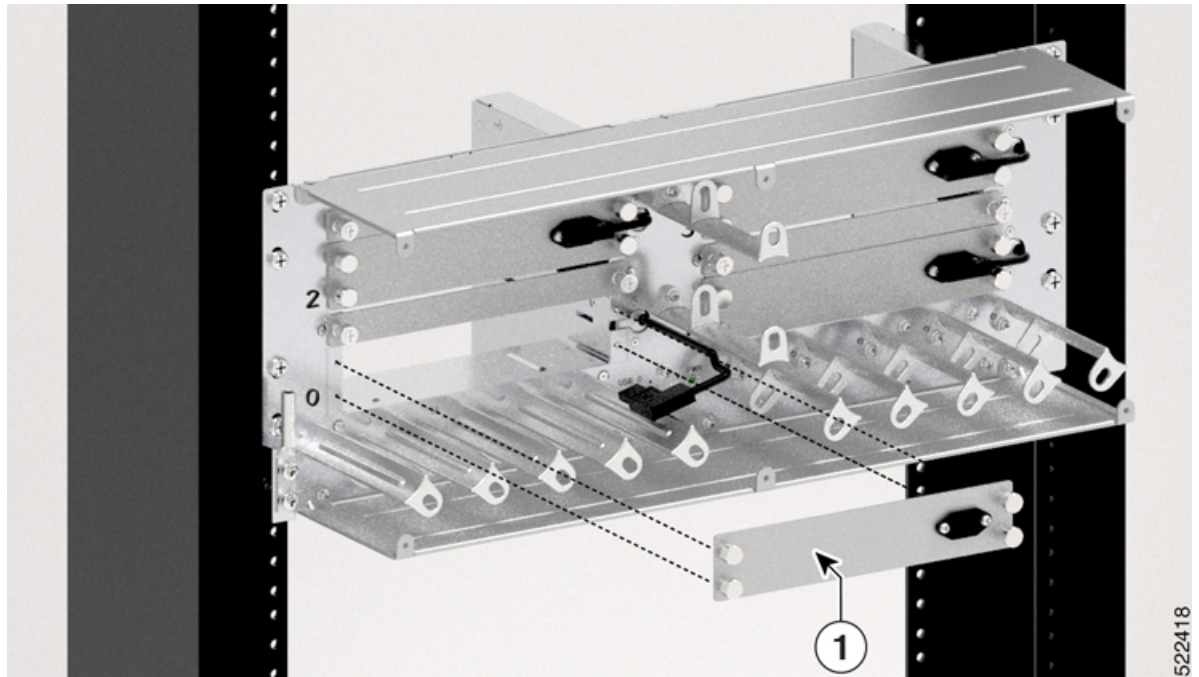


1	USB 2.0 Cable
2	Ground Lug

Step 4 Loosen the captive screws to remove the dummy cover from the breakout panel. For installing the 24-port breakout module, you need to also remove the smaller dummy cover above the USB dummy cover. See [Figure 105: Removing Dummy Cover for 24-Port Module, on page 134](#).

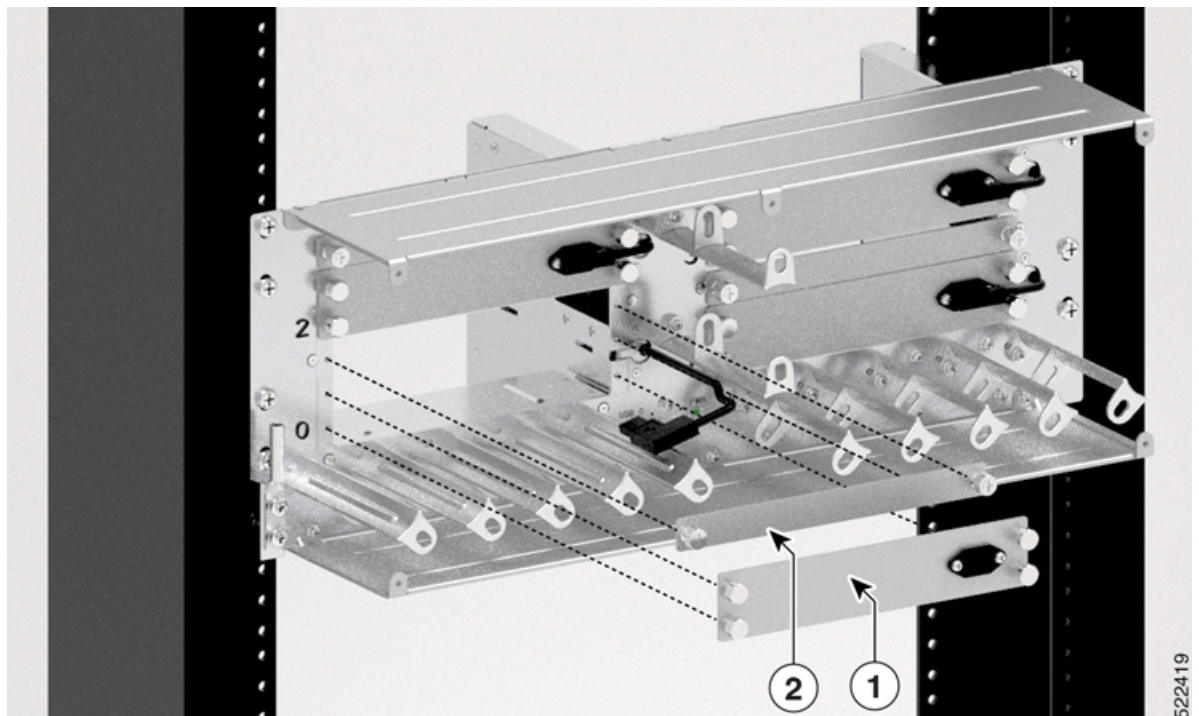
Note A line marking is provided on the faceplate of the breakout panel where 8/16-port breakout modules can be installed.

Figure 104: Removing USB Dummy Cover for 8/16-Port Module



1	USB Dummy Cover
---	-----------------

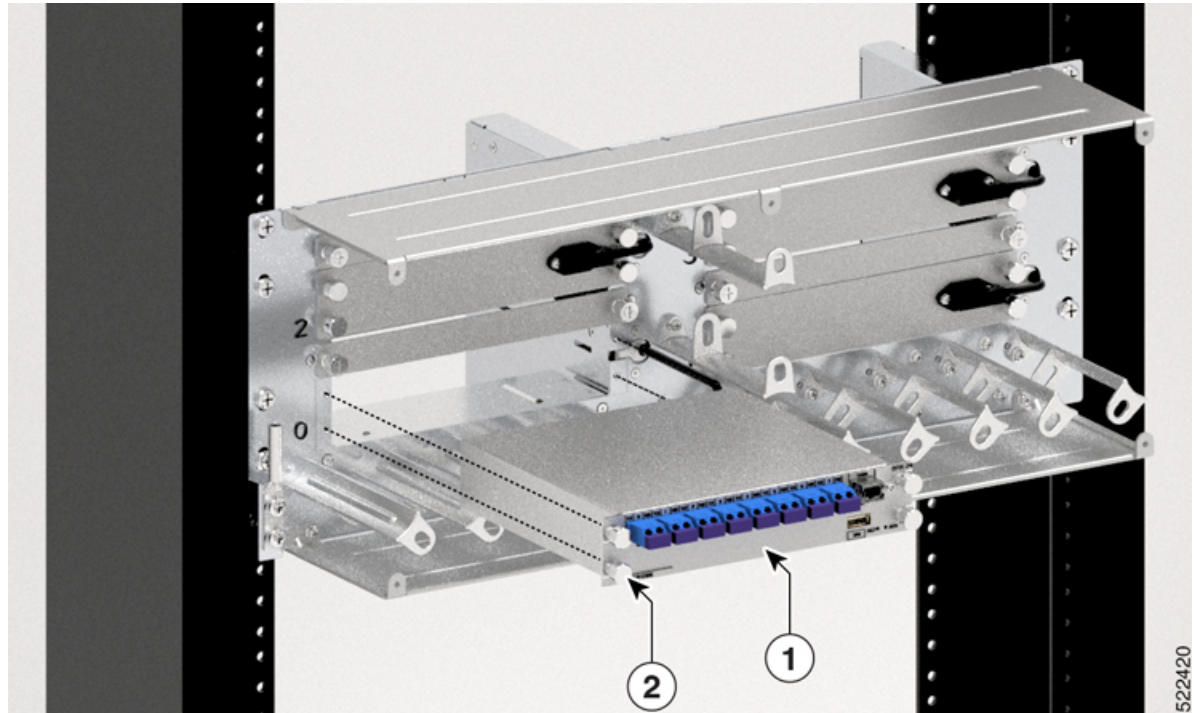
Figure 105: Removing Dummy Cover for 24-Port Module



1	USB Dummy Cover
2	Dummy Cover

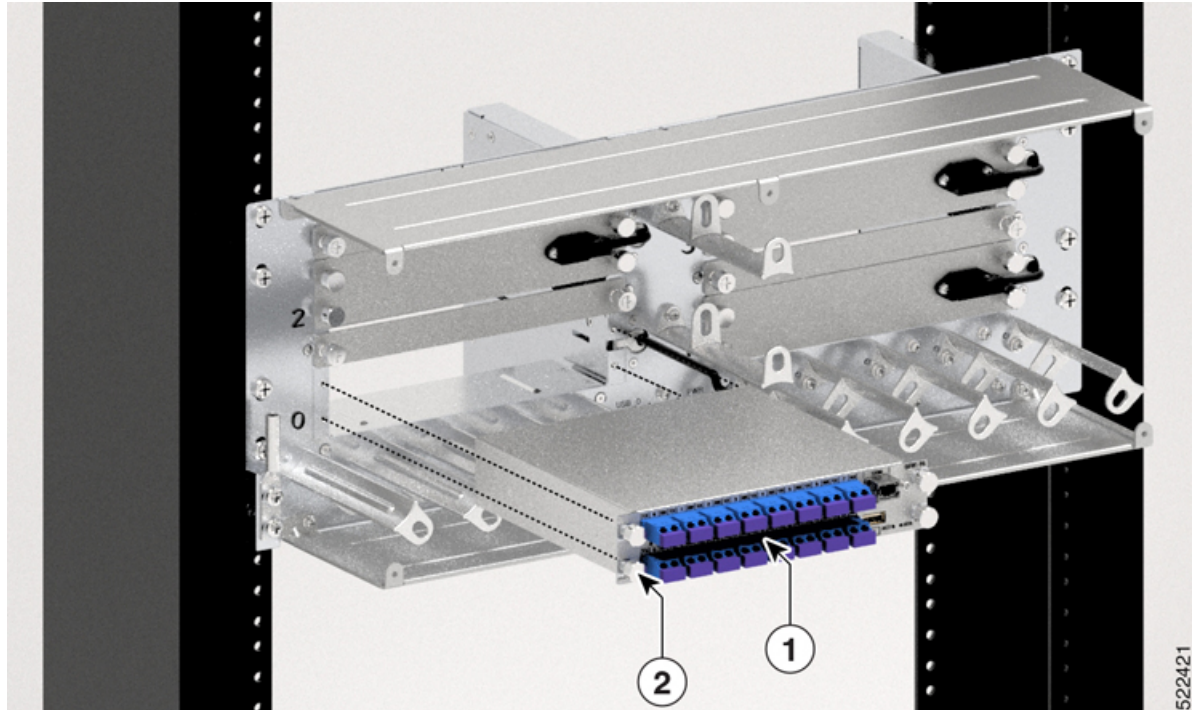
Step 5 Insert the breakout module into the empty slot.

Figure 106: Inserting 8-Port Breakout Module into the Breakout Panel



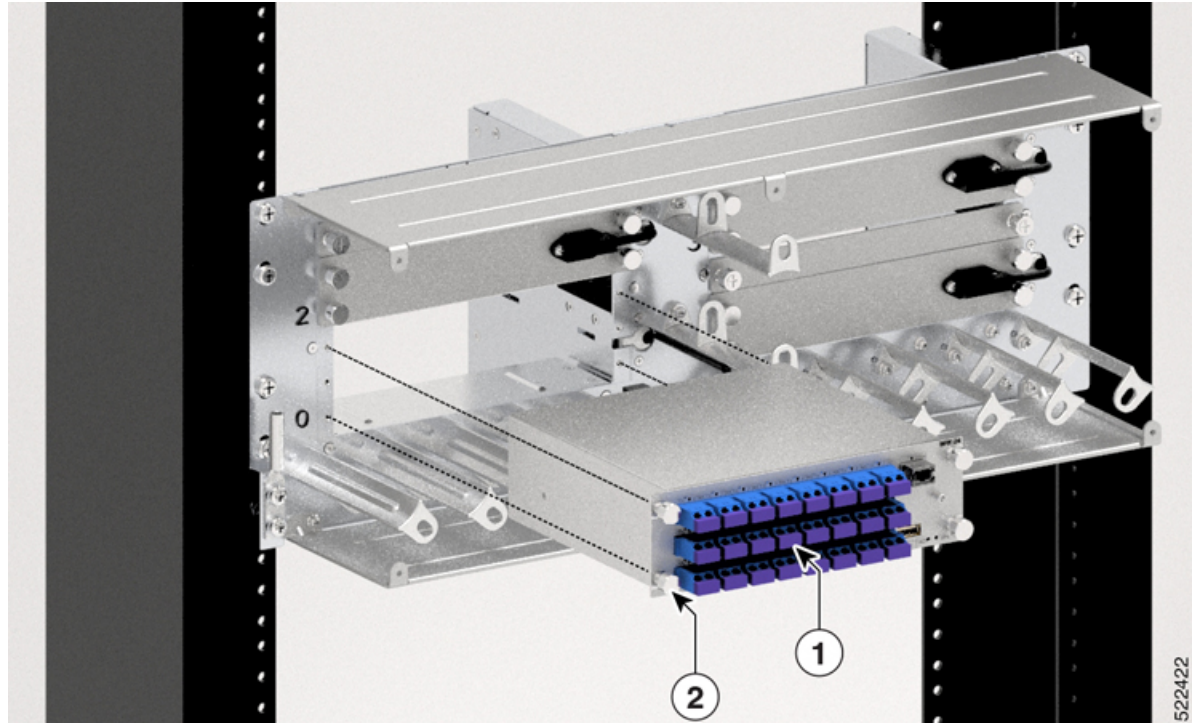
1	8-Port Breakout Module (NCS1K-BRK-8)
2	Captive Screws

Figure 107: Inserting 16-Port Breakout Module into the Breakout Panel



1	16-Port Breakout Module (NCS1K-BRK-16)
1	Captive screws

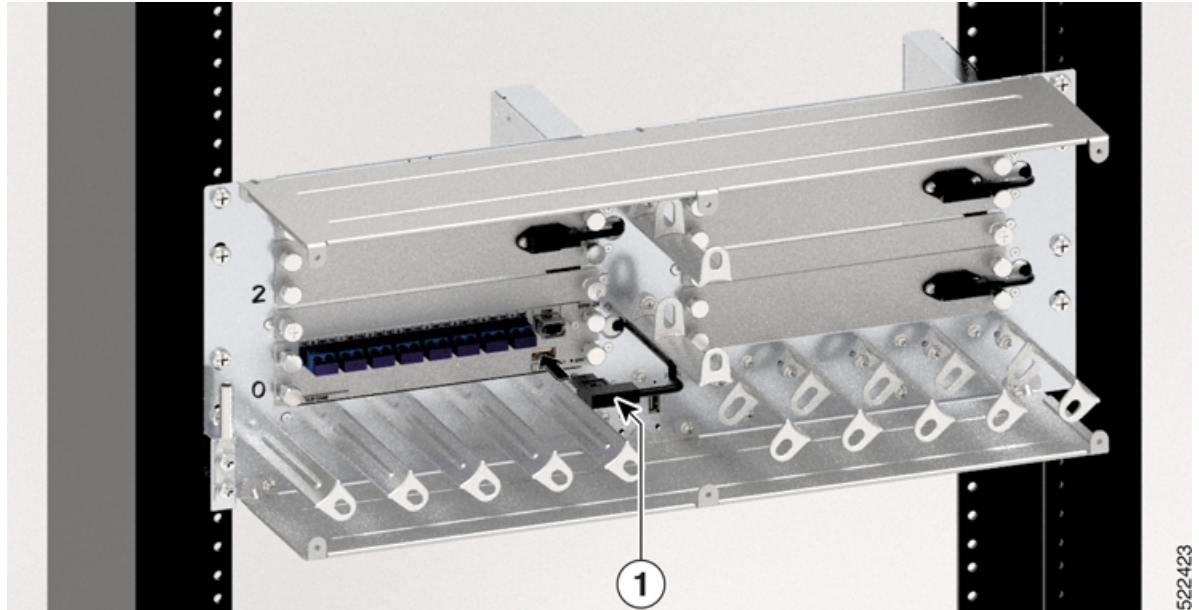
Figure 108: Inserting 24-Port Breakout Module into the Breakout Panel



1	24-Port Breakout Module (NCS1K-BRK-24)
1	Captive Screws

- Step 6** Tighten the captive screws of the breakout module to a torque value of 0.65 N-m (5.75 lbs-in).
- Step 7** Connect the associated USB 2.0 connector to the breakout module.

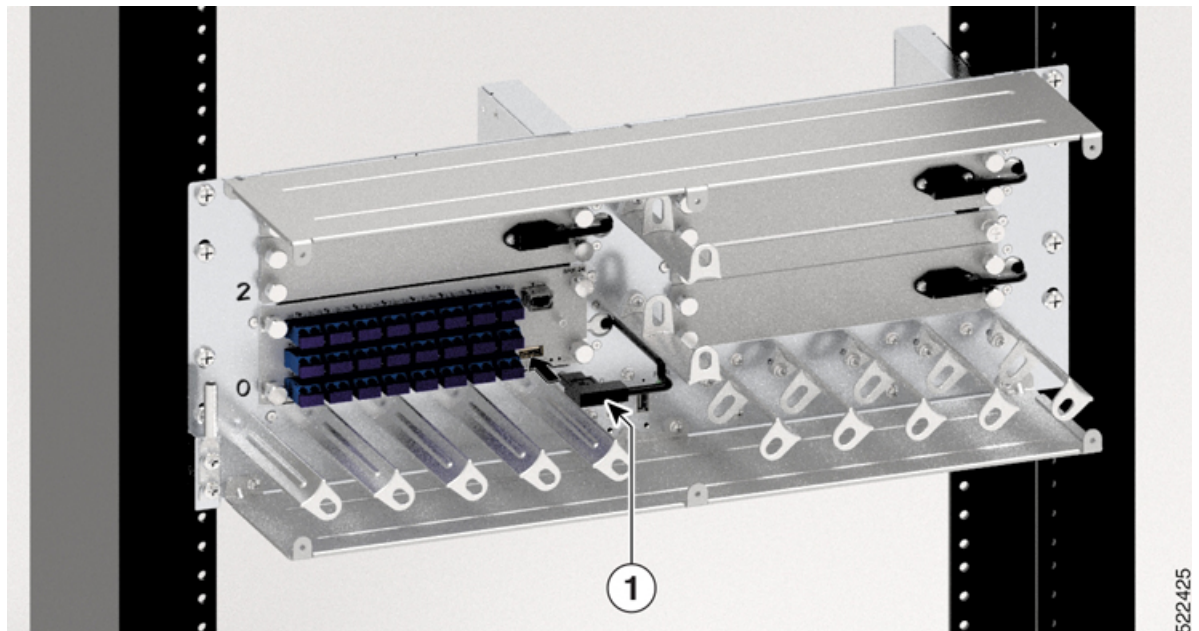
Figure 109: Connecting USB 2.0 Connector for 8-Port Breakout Module



522423

1	USB 2.0 Connector
---	-------------------

Figure 110: Connecting USB 2.0 Connector for 24-Port Breakout Module



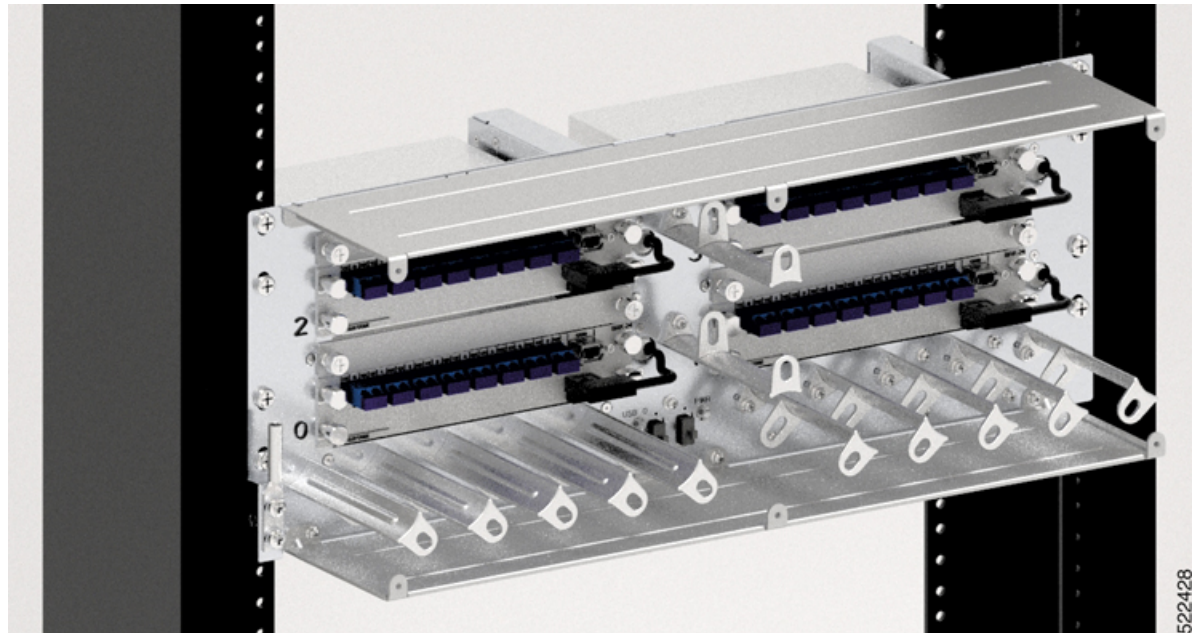
522425

1	USB 2.0 Connector
---	-------------------

Step 8 Repeat steps [Step 3, on page 132](#) through [Step 7, on page 137](#) to install the rest of the breakout modules.

The following image displays the complete installation of the breakout modules into the breakout panels.

Figure 111: Breakout Panel with Breakout Modules Installed



Breakout Panel Cable Management

The breakout panel accommodates high-density cable connections from the breakout modules. The LC, MPO, and USB cables exit the breakout panel through the right-, left-, or both sides. The USB 2.0 cable connection must exit from the lower left side of the breakout panel and connect to the USB 0 port of the NCS 1010 EITU. The MPO cables must exit on the right side of the breakout panel to the MPO ports of the NCS 1010 OLT-C and OLT-R-C line cards. The LC cables can exit through the left-, right-, or both sides of the breakout panel. The following image shows the different orientations of the fibre guides:

Figure 112: Fiber Guides



To exit the cables on both sides of the breakout panel, perform the following steps:

- Tilt the bottom fiber guides inwards toward the USB 0 port on the faceplate.
- Fix the protrusions of the fiber guides on the faceplate guide holes.
- Tighten the captive screws.
- Route the cables on both sides out of the breakout panel.

To exit the cables on the right side of the breakout panel, perform the following steps:

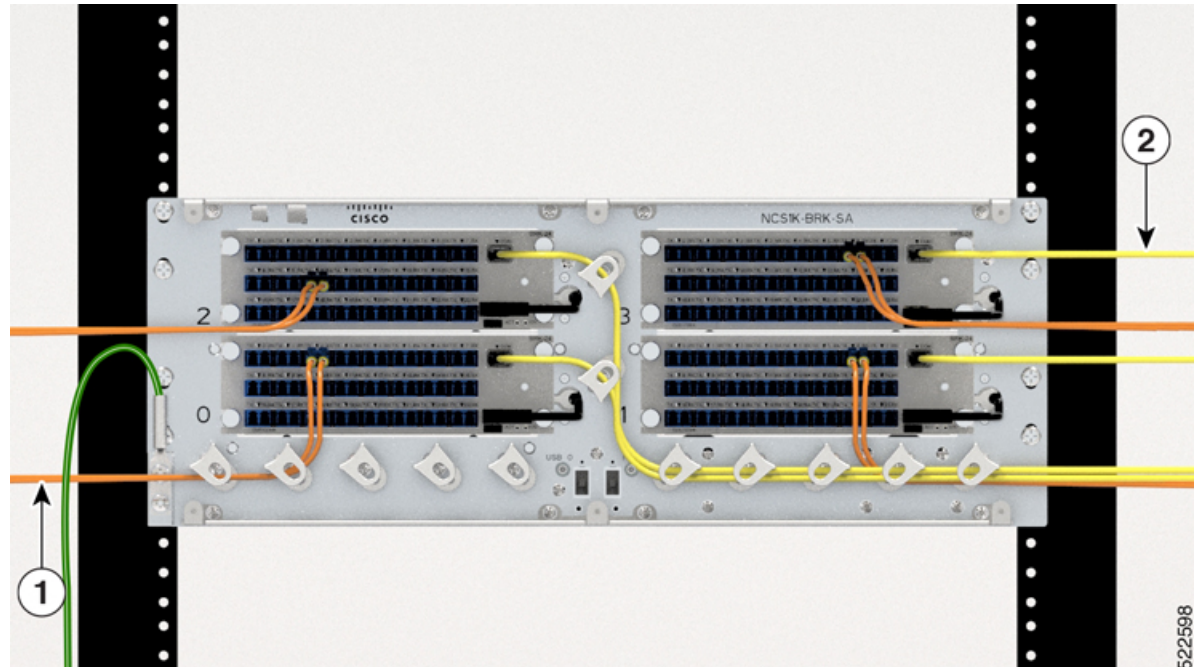
- Tilt the bottom fiber guides to the left side facing downwards.
- Tilt the top fiber guide to the right side facing upwards and tilt the middle fiber guide in the opposite direction.
- Fix the protrusions of the fiber guides on the faceplate guide holes.
- Tighten the captive screws.
- Route the cables to the right side of the breakout panel.

To exit the cables on the left side of the breakout panel, perform the following steps:

- Tilt the bottom fiber guides to the right side facing downwards.

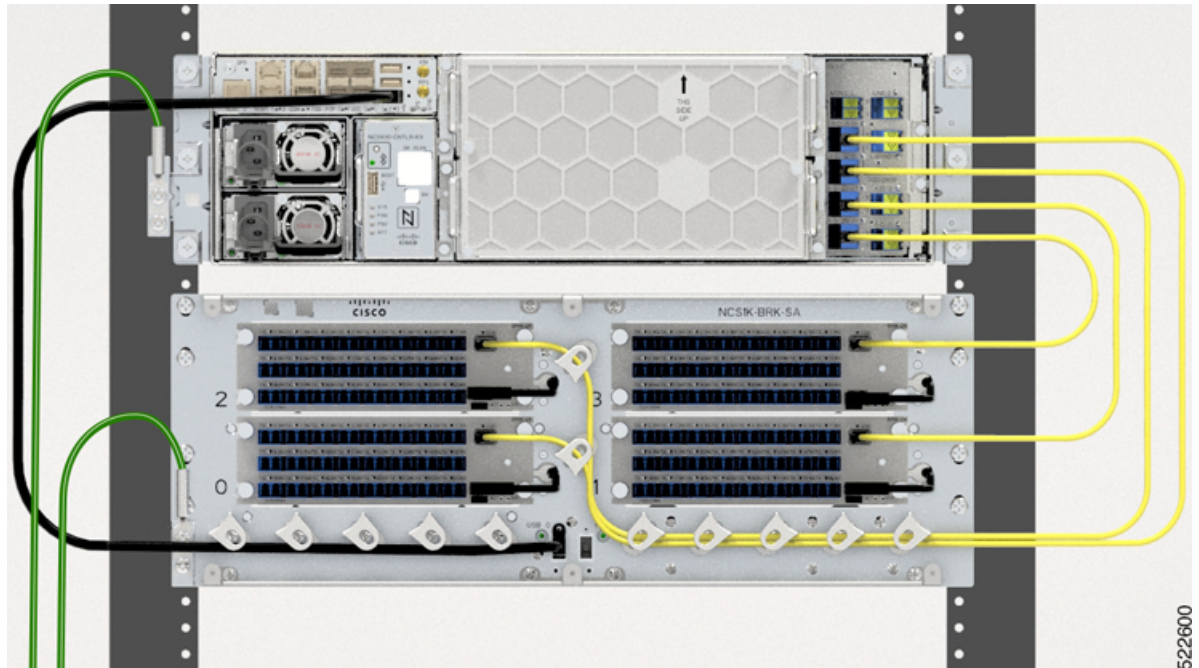
- Tilt the top fiber guide to the left side facing upwards and tilt the middle fiber guide to the opposite direction.
- Fix the protrusions of the fiber guides on the faceplate guide holes.
- Tighten the captive screws.
- Route the cables to the right side of the breakout panel.

Figure 113: Routing of MPO and LC Cables



1	LC Cable
2	MPO Cable

Figure 114: Routing of MPO and USB 3.0 Cables



Install and Route Fiber-Optic Cables



Warning

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



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 breakout module, which makes regular cleaning imperative. For cleaning instructions, see [Fiber-Optic Connector Cleaning and Maintenance](#).



Note

The breakout modules feature LC/MPO bulkhead adapters. Always use fiber-optic cables equipped with the corresponding (LC/MPO) connector type. Using any other type of connector results in damage to the connector or adapter, or both.

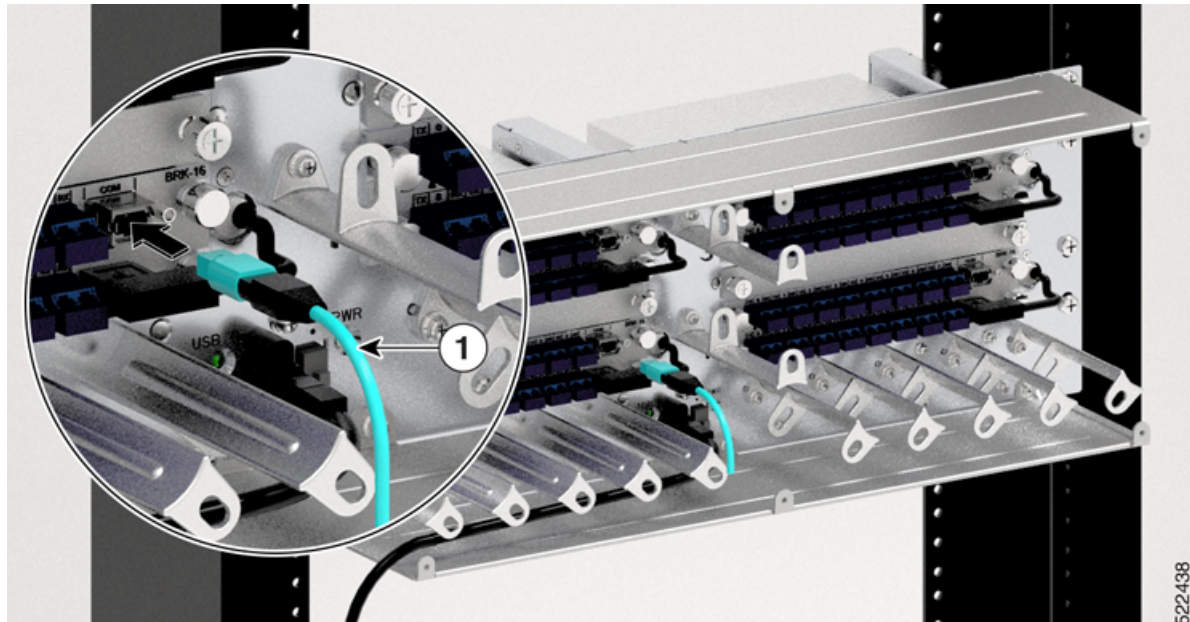
This procedure explains how to install and route fiber-optic cables from the OLT-C or OLT-R-C line card to the breakout module.

Procedure

Step 1 For an MPO cable installation, do the following:

- a) Remove the dust cap from the MPO adapter on the breakout module.
- b) Place the MPO cable connector in front of the corresponding COM port of the breakout modules.
- c) Align the keyed ridge of the MPO cable connector with the slot in the receiving adapter.

Figure 115: Aligning MPO Fiber Cable Connector



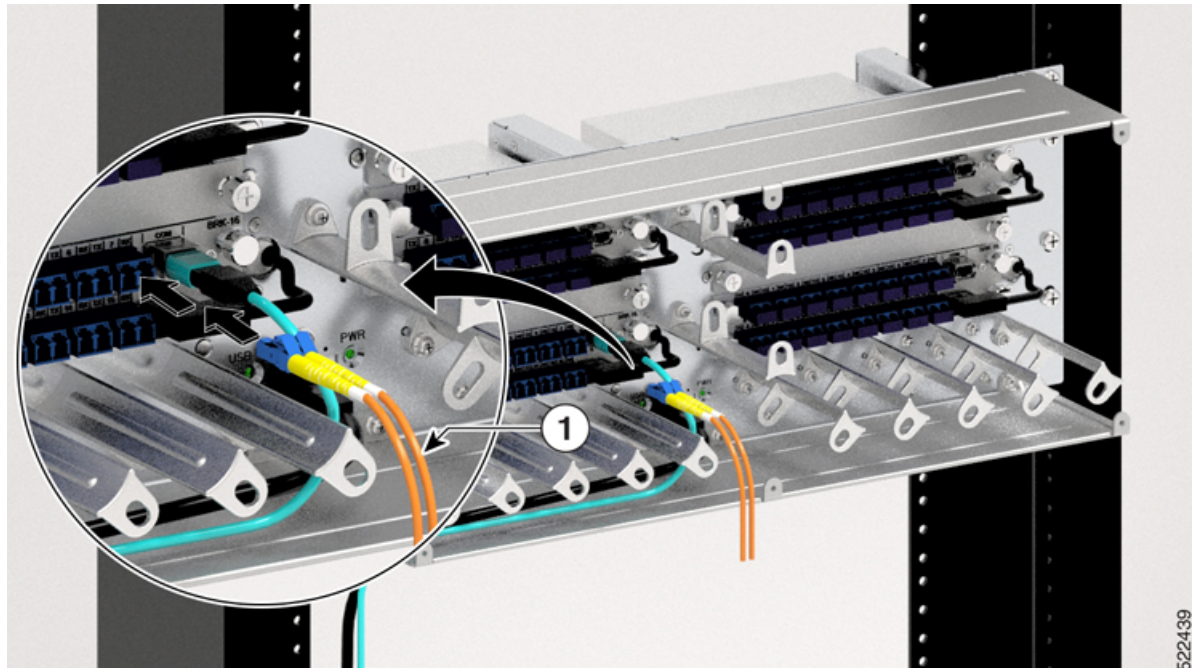
1	<p>MPO Fiber Cable</p> <ul style="list-style-type: none"> • 15454-24MPO-MPO-2 • 15454-24MPO-MPO-4 • 15454-24MPO-MPO-6 • 15454-24MPO-MPO-8
---	---

- 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 right side to the MPO ports A/D 4–11, A/D 12–19, A/D 20–27 and A/D 28–33 in the OLT-C or OLT-R-C line cards in the NCS 1010 shelf. See [Breakout Panel Cable Management, on page 139](#).
- f) Place the other end of the MPO cable connector in front of the corresponding ADD/DROP port of the line cards.
- g) Align the keyed ridge of the MPO cable connector with the slot in the receiving adapter.
- h) Gently push the cable connector into the adapter until you hear a click, which indicates that the latching system is engaged.

Step 2 For an LC cable installation, do the following:

- a) Remove the dust cap from the LC adapter on the breakout modules.
- b) Place the LC cable connector in front of the corresponding LC bulkhead adapter of the breakout modules.
- c) Align the keyed ridge of the cable connector with the slot in the receiving adapter.

Figure 116: Aligning LC Cable Connector



1	LC Cable
---	----------

- 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 side of the breakout panel. See [Breakout Panel Cable Management, on page 139](#).
- f) Place the other end of the LC cable connector in front of the corresponding unit.
- g) Align the keyed ridge of the LC cable connector with the slot in the receiving adapter.
- h) Gently push the cable connector into the adapter until you hear a click, which indicates that the latching system is engaged.

Install and Route the USB Cable

This task explains how to install and route the USB 3.0 cable into the NCS 1010 chassis.

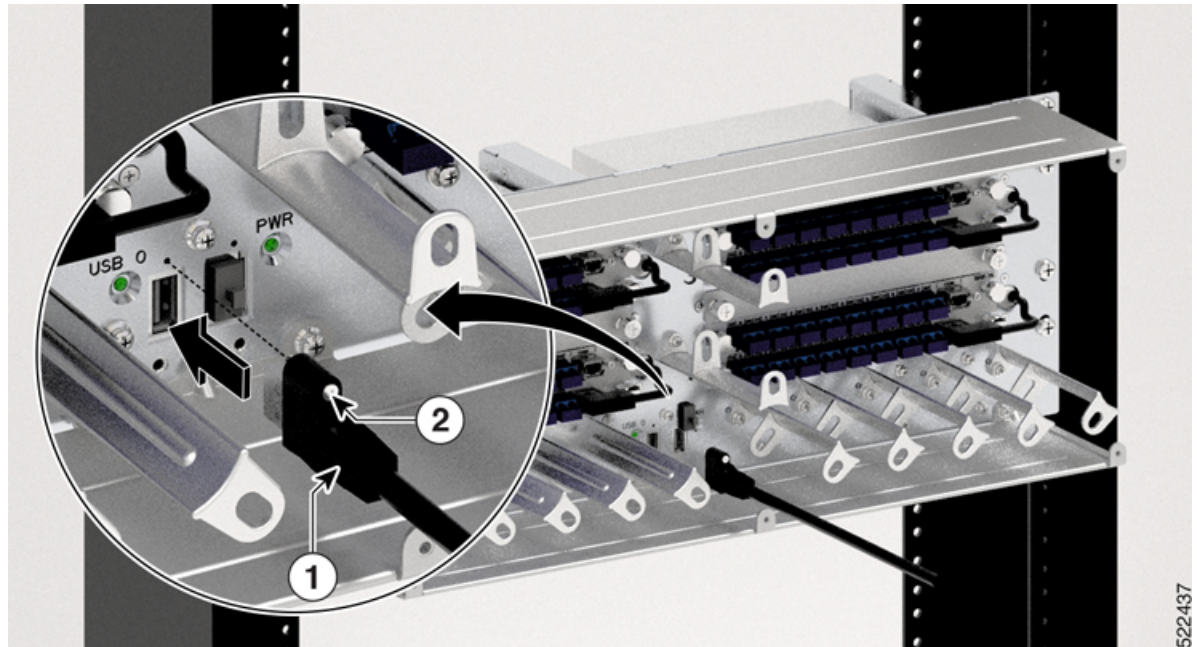
Procedure

Step 1 Remove the dust cap from USB 0 port in the breakout panel.

Caution Do not remove the dust cap from the PWR port. The PWR port will be supported in a future release. Avoid connecting the USB cable to the PWR port.

Step 2 Align the USB 3.0 cable connector to the inventory USB Type A receptacle (USB 0 port) present on the breakout panel.

Figure 117: USB 3.0 Cable Connection



1	USB 3.0 <ul style="list-style-type: none"> • NCS1010-USB-3M= • NCS1010-USB-1M=
2	USB 3.0 Cable Screw

- Step 3** Gently push the USB 3.0 cable connector in the USB Type A receptacle (USB 0 port) on the breakout panel.
- Step 4** Tighten the captive screw to a torque value of 0.15 N-m (1.32 lbs-in) to secure the USB 3.0 cable in the receptacle.
- Step 5** Route the other side of the USB 3.0 cable through the left side of the breakout panel.
- Step 6** Connect the other side of the USB 3.0 cable to the USB 0 port on the NCS 1010 EITU.

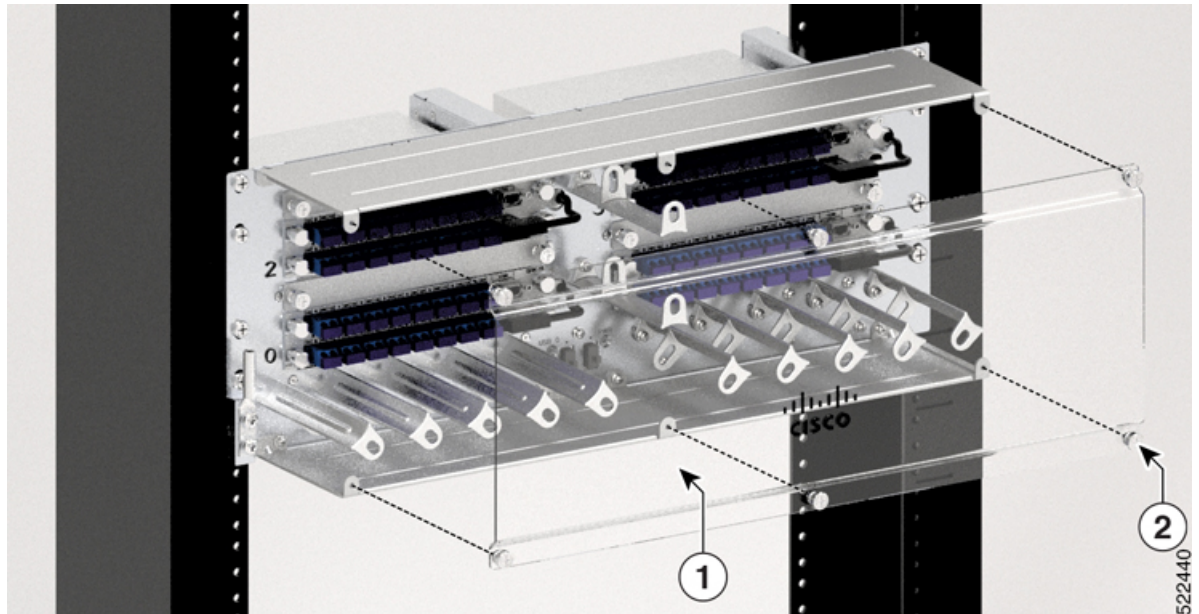
Install Breakout Panel Plastic Cover

This task describes the steps to install the transparent plastic cover on the breakout panel.

Procedure

- Step 1** Install the plastic cover to the breakout panel using six captive screws.

Figure 118: Installing the Plastic Cover on Breakout Panel



1	Plastic Cover
2	Captive Screws

Step 2 Using a screwdriver, tighten the captive screws to a torque value of 0.65 N-m (5.6 lbs-in).

Fiber-Optic Connector Cleaning and Maintenance

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 mating bulkhead adapter on the front panel of the patch panel and the optical modules are clean before the connection is made.



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

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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040.

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 mating bulkhead adapter on the front panel.

The LC/MPO bulkhead adapters on the optical modules are less likely to get dirty if they are capped when not in use. Because the procedure for a thorough cleaning of these adapters is complicated, we recommend that you use a commercially available cleaning kit and closely follow the instructions included with the kit.

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 patch panel/optical modules.

When cleaning a paired cable connector (bulkhead mating adapter), always clean the mating adapter first.

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 multi-fiber cable assemblies, use specific cleaning tools or materials designed for the assembly type.

Clean the Bulkhead Mating Adapters

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

Procedure

-
- Step 1** Read the manufacturer (cleaning cartridge) instructions to insert the cartridge cleaning tip into the 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.

Clean Fiber-Optic Cable Connectors

This task describes the steps to clean the fiber-optic cables 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).



CHAPTER 11

Remove and Replace Cisco NCS 1000 Breakout Patch Panel and Modules

This chapter describes the tasks to replace Cisco NCS 1000 Breakout Patch Panel and Cisco NCS 1000 Breakout Modules.



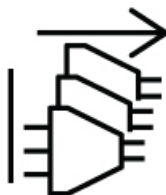
Note In this chapter, "breakout panel" refers to the "Cisco NCS 1000 Breakout Patch Panel". "breakout modules" refer to the "Cisco NCS 1000 Breakout Modules".



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 This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit. Statement 1028.



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



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073.



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089.

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. Statement 1089.



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090.



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091.



Note The maximum operating altitude for OIR is 1800 m.

⚠ 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 Breakout Panel Plastic Cover, on page 150](#)
- [Remove and Replace NCS 1000 Breakout Module, on page 151](#)
- [Remove and Replace Cisco NCS 1000 Breakout Patch Panel, on page 151](#)

Remove and Replace Breakout Panel Plastic Cover

This task describes the steps for removing the plastic cover from the breakout panel.

Procedure

-
- Step 1** Loosen the six captive screws in the plastic cover.
- Step 2** Pull the plastic cover away from the breakout panel to remove the plastic cover.
-

What to do next

- [Install Breakout Panel Plastic Cover, on page 145](#)

Remove and Replace NCS 1000 Breakout Module

This task describes the steps for removing a breakout module in the rack.

Before you begin

Uninstall the Plastic Cover. See [Remove and Replace Breakout Panel Plastic Cover, on page 150](#).

Procedure

-
- Step 1** Remove the LC cables from the LC adapter ports in the breakout module.
- Note** Keep the LC cables in a safe place to protect the cables from damage and dust.
- Step 2** Remove the MPO cables from the MPO adapter port (COM).
- Note** Keep the MPO cables in a safe place to protect the cables from damage and dust.
- Step 3** Disconnect the inventory USB 2.0 cable in the USB receptacle (INV) for the breakout module to replace.
- Step 4** Loosen the captive screws of the breakout module.
- Step 5** Extract the breakout module from the breakout panel.
-

What to do next

- [Install the NCS 1000 Breakout Modules, on page 131](#)

Remove and Replace Cisco NCS 1000 Breakout Patch Panel

This task describes the steps for removing the breakout panel in the rack.

Before you begin

- Remove the USB 3.0 cable connector plug.
- Uninstall Breakout Modules. See [Remove and Replace NCS 1000 Breakout Module, on page 151](#).

Procedure

-
- Step 1** Loosen the screws of the breakout panel in the ETSI and 23-inch adapter brackets.
- Note** For the 19-inch rack, you can loosen the breakout panel screws from the ANSI 19-inch rack.

Step 2 Support the top and bottom of the breakout panel with your hand to extract the breakout panel.

What to do next

- [Install the NCS 1000 Breakout Patch Panel, on page 129](#)



PART **III**

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

- [Cisco NCS 1000 32-Channel Mux/Demux Patch Panel Overview, on page 155](#)
- [Safety Guidelines for Mux/Demux Patch Panel, on page 159](#)
- [Prepare to Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel, on page 163](#)
- [Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel, on page 165](#)
- [Remove and Replace NCS 1000 32-Channel Mux/Demux Patch Panel, on page 179](#)



CHAPTER 12

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

This chapter provides an overview for Cisco NCS 1000 32-Channel Mux/Demux Patch Panel.



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

- [Cisco NCS 1000 32-Channel Mux/Demux Patch Panels Overview, on page 155](#)
- [Port Label Descriptions, on page 156](#)
- [Channel Wavelength Allocation, on page 157](#)

Cisco NCS 1000 32-Channel Mux/Demux Patch Panels Overview

The Cisco NCS 1000 32-Channel Mux/Demux patch panels are a pair of passive Athermal Arrayed Waveguide Grating (AAWG) based modules (PIDs NCS1K-MD-32O-C and NCS1K-MD-32E-C). Each mux/demux panel has 32 channels and works as an add/drop unit for the OLT-C and OLT-R-C line cards. 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 OLT (OLT-C and OLT-R-C) line cards, 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.

The NCS1K-MD-32O/E-C panel operates in C-band.

The Cisco NCS 1000 Mux/Demux patch panels are fully passive. The units are powered with a USB 2.0 connection in the NCS 1010 chassis. The panels are capable of monitoring channel power, verifying connection, detecting tone, and reporting the inventory data.

Mux/Demux Patch Panel LEDs

Table 18: Feature History

Feature Name	Release Information	Feature Description
Port Status for Mux/Demux Patch Panel	Cisco IOS XR Release 7.9.1	<p>In the mux/demux panel, the optical ports (COM, CH-0...CH-31) LEDs will now indicate port status in the following three colors:</p> <ul style="list-style-type: none"> • Red—Presence of traffic-impacting major and critical alarms. • Amber—Presence of minor alarm when performing tone generation or tone detection for connection verification. Tone detection verifies the connection between OLT line cards and the mux/demux panels using a specific probe signal. • Green—Patch panel is operating fine and no alarm is raised.

The Mux/Demux Patch Panel unit has 34 LEDs to indicate the system status and the status of the optical ports.

Three color LEDs (green, amber, and red) are present near each optical port (COM and CH-i) to indicate the port status.

Table 19: Status of the Optical Port LEDs

Port LED	Color	Status
COM, CH-0...CH-31	Red	Indicates 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.
	Amber	Indicates minor alarms that are raised when initiating tone generation and tone detection for connection verification.
	Green	Indicates that the patch panel is operational and has no alarm.
INV	Green	Indicates the active status and attention state of the inventory USB that is connected to the OLT line card.

Port Label Descriptions

Each mux/demux patch panel is equipped with 34-port LC-duplex connectors.

Table 20: Mux/Demux Patch Panels Port Labels

Port Labels	Connector Type	Connector Label	Operating Frequency Range [THz (nm)]	Note
COM-RX COM-TX	LC	COM TX RX	196.175–191.15 (1528.2–1568.4)	—
MON-RX MON-TX	LC	MON TX RX	196.175–191.15 (1528.2–1568.4)	Both are output ports. Replica of COM-RX/TX signals ~20dB attenuated.
CH-i TX/RX [i=0–31]	LC	<ch_number> <frequency> TX RX	For more information on ODD and EVEN channels, see Channel Wavelength Allocation, on page 157	—
INV	USB Type A receptacle connector	INV	—	USB inventory port

Channel Wavelength Allocation

The following table describes the C-band channel wavelength plan for the odd and even patch panels.

Table 21: C-Band Channel Wavelength Plan

Channel Label	NCS1K-MD-320-C		NCS1K-MD-32E-C	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
0	196.100	1528.77	196.025	1529.36
1	195.950	1529.94	195.875	1530.53
2	195.800	1531.12	195.725	1531.70
3	195.650	1532.29	195.575	1532.88
4	195.500	1533.47	195.425	1534.05
5	195.350	1534.64	195.275	1535.23
6	195.200	1535.82	195.125	1536.41
7	195.050	1537.00	194.975	1537.59

Channel Label	NCS1K-MD-320-C		NCS1K-MD-32E-C	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
8	194.900	1538.19	194.825	1538.78
9	194.750	1539.37	194.675	1539.96
10	194.600	1540.56	194.525	1541.15
11	194.450	1541.75	194.375	1542.34
12	194.300	1542.94	194.225	1543.53
13	194.150	1544.13	194.075	1544.72
14	194.000	1545.32	193.925	1545.92
15	193.850	1546.52	193.775	1547.12
16	193.700	1547.72	193.625	1548.31
17	193.550	1548.91	193.475	1549.52
18	193.400	1550.12	193.325	1550.72
19	193.250	1551.32	193.175	1551.92
20	193.100	1552.52	193.025	1553.13
21	192.950	1553.73	192.875	1554.34
22	192.800	1554.94	192.725	1555.55
23	192.650	1556.15	192.575	1556.76
24	192.500	1557.36	192.425	1557.97
25	192.350	1558.58	192.275	1559.19
26	192.200	1559.79	192.125	1560.40
27	192.050	1561.01	191.975	1561.62
28	191.900	1562.23	191.825	1562.84
29	191.750	1563.45	191.675	1564.07
30	191.600	1564.68	191.525	1565.29
31	191.450	1565.90	191.375	1566.52



CHAPTER 13

Safety Guidelines for Mux/Demux Patch Panel

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 - Cisco Network Convergence System 1010*.

- [Standard Warning Statements, on page 159](#)
- [Safety Information, on page 161](#)
- [Laser Radiation Emission Restrictions, on page 161](#)
- [Laser Safety During Operation, on page 161](#)
- [Electrical Safety, on page 162](#)

Standard Warning Statements



Warning

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 provided at the end of each warning statement to locate its translation in the translated safety warnings for this device. Statement 1071

SAVE THESE INSTRUCTIONS





Warning When installing the product, use the provided or designated connection cables, power cables, AC adapters, and batteries. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" or "CSA" shown on the cord), not regulated with the subject law by showing "PSE" on the cord, for any other electrical devices than products designated by Cisco. Statement 371



Warning 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.

〈製品仕様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、バッテリーなどの部品は、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。

Statement 407



Warning Read the installation instructions before using, installing, or connecting the system to the power source. Statement 1004



Warning 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. Statement 1029



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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073



Warning To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes. Statement 1074



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089

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. Statement 1089



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091



Note For more information on all the applicable statements and their translations, see *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010*.

Safety Information

Before you install, operate, or service, you must read the *Regulatory Compliance and Safety Information - Cisco Network Convergence System 1010* document for important safety information and warning translations.

The units are compliant with the GR 1089, UL60950 /CSA 22.2 No. 60950-00, and IEC 60950 standards.

Laser Radiation Emission Restrictions

The Class 1M Laser safety and warning label affixed to the passive optical modules indicate that the product should never be used or installed in an optical network with emissions higher than Class 1M.



Warning Class 1M laser radiation when open. Do not view directly with optical instruments. Statement 281

Laser Safety During Operation

Cisco NCS 1010 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 119: Class 1M Laser Product Label



Figure 120: Class 1M Laser Product Label

**Warning**

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

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

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Statement 291

**Warning**

Invisible laser radiations present. Statement 1016

**Warning**

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

Electrical Safety

The passive optical modules are optically and electrically passive and require no electrical connections. No electrostatic discharge (ESD) or other electrical safety considerations apply.



CHAPTER 14

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

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



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

- [Package Contents, on page 163](#)
- [Unpack and Verify NCS 1000 32-Channel Mux/Demux Patch Panel, on page 164](#)

Package Contents

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

The package contains the following:

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

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 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 15

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

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



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

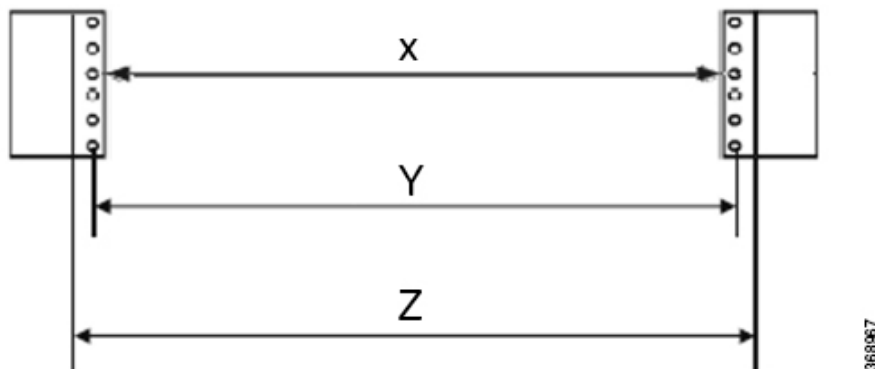
- [Rack Compatibility, on page 165](#)
- [Ground Description, on page 166](#)
- [Rack Mount Warnings, on page 168](#)
- [Attach the Mounting Brackets, on page 169](#)
- [Install NCS 1000 32-Channel Mux/Demux Patch Panels, on page 171](#)
- [Install and Route Fiber-Optic and USB Cables, on page 174](#)
- [Cleaning and Maintaining Fiber-Optic Connectors, on page 176](#)

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 121: Rack Specification



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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. The grounding lug has provisions for connecting a minimum ground cable of 14 AWG.

Ground Connection Warnings

Take note of the following ground connection warnings:



Warning

The appliance must be connected to a grounded outlet.

Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

Apparatet må tilkoples jordet stikkontakt.

Apparaten skall anslutas till jordat uttag. Statement 414.



Warning To reduce risk of electric shock and fire, you must incorporate a readily accessible two-poled disconnect device in the fixed wiring. Statement 1022.



Warning To reduce risk of fire, use copper conductors only. Statement 1025.



Warning To reduce the risk of electric shock, refer to national and local codes for proper installation and grounding of antennas. Statement 1052.

Ground NCS 1000 32-Channel Mux/Demux Patch Panels



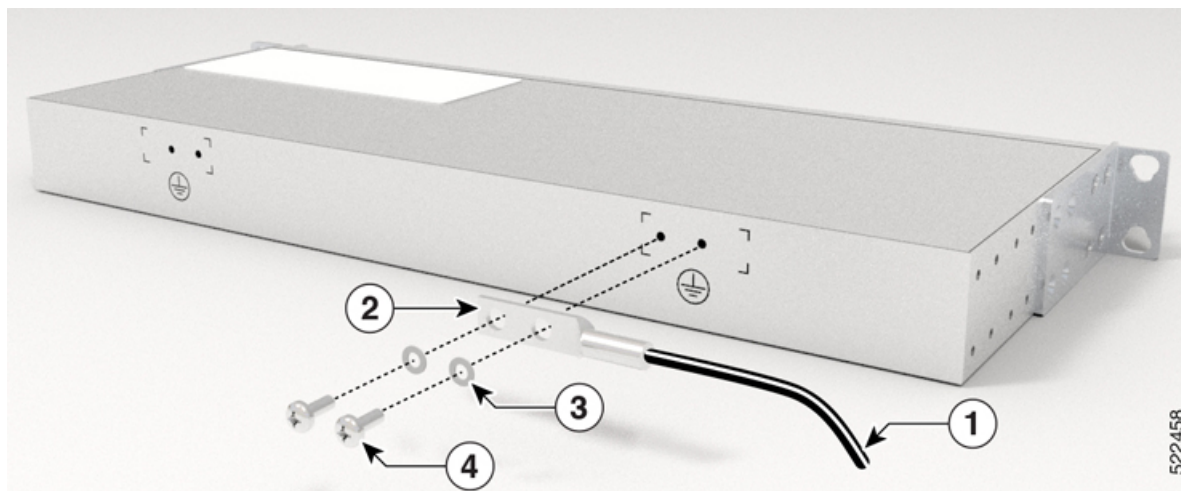
Caution When terminating the frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick connect connectors, or other friction-fit connectors.

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 a #14 AWG ground cable to the dual-hole ground lug.
 - Step 5** Align the dual-hole ground lug to the patch panel.

Figure 122: Grounding the Patch Panel



1	Ground Lug Cable
2	Ground Lug
3	Lock Washers
4	6-32 UNC-2A or M4 Pan Head Phillips Screws

Step 6 Tighten the M4 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, on page 171](#)

Rack Mount Warnings

Take note of the following rack-mount safety warnings.



Warning Two 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. Statement 164.

**Warning**

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

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

Statement 1006

**Warning**

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

**Warning**

To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of 40 degree C. Statement 1047.

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, on page 164](#)
- Check for rack compatibility. See [Rack Compatibility](#).

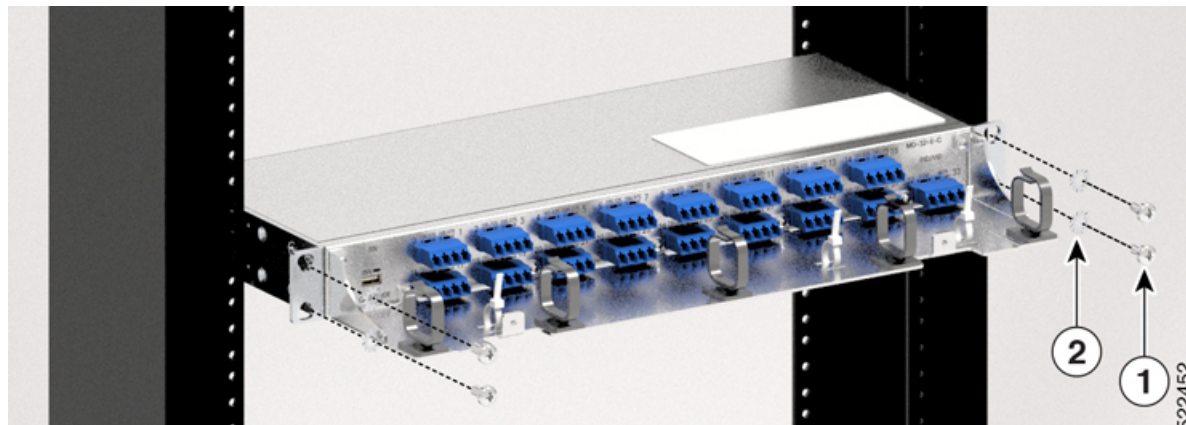
Procedure

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 123: Installing the Adapter Bracket on a 19-inch Rack

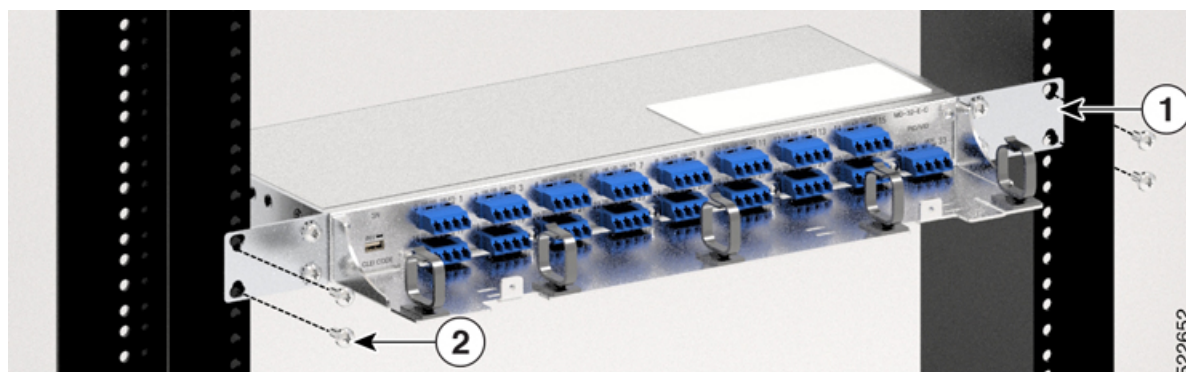


Note The cable ties shown in the image are optional. Use the cable ties to route the USB 3.0 cable to right side of the patch panel to the NCS 1010 EITU.

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.

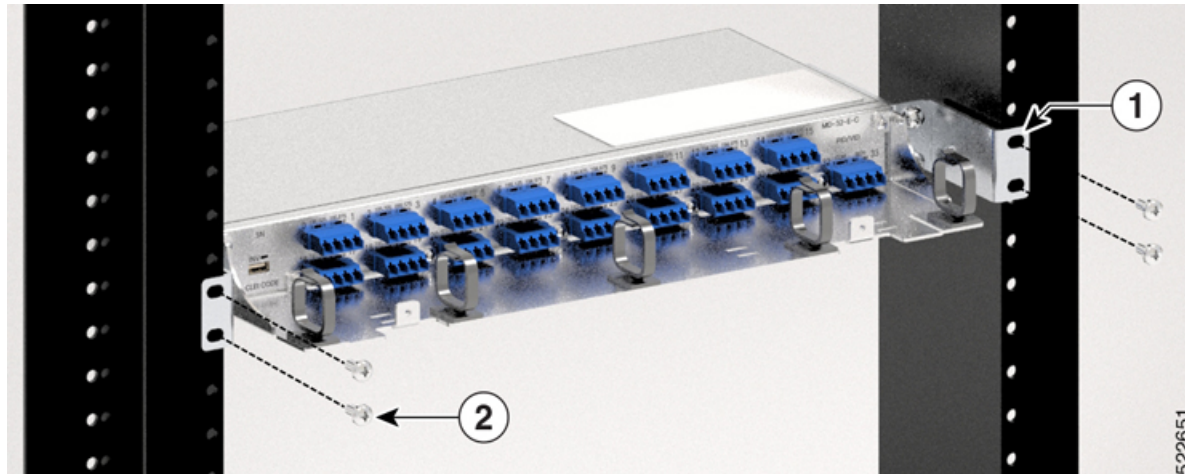
Figure 124: Installing the Mounting Bracket on a 23-inch Rack



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 125: 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, on page 171](#)

Install NCS 1000 32-Channel Mux/Demux Patch Panels

The patch panel is a new NCS 1000 32-Channel Mux/Demux 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. For more information on the port assignments of the module, see [Cisco NCS 1010 Datasheet](#).



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 169](#).

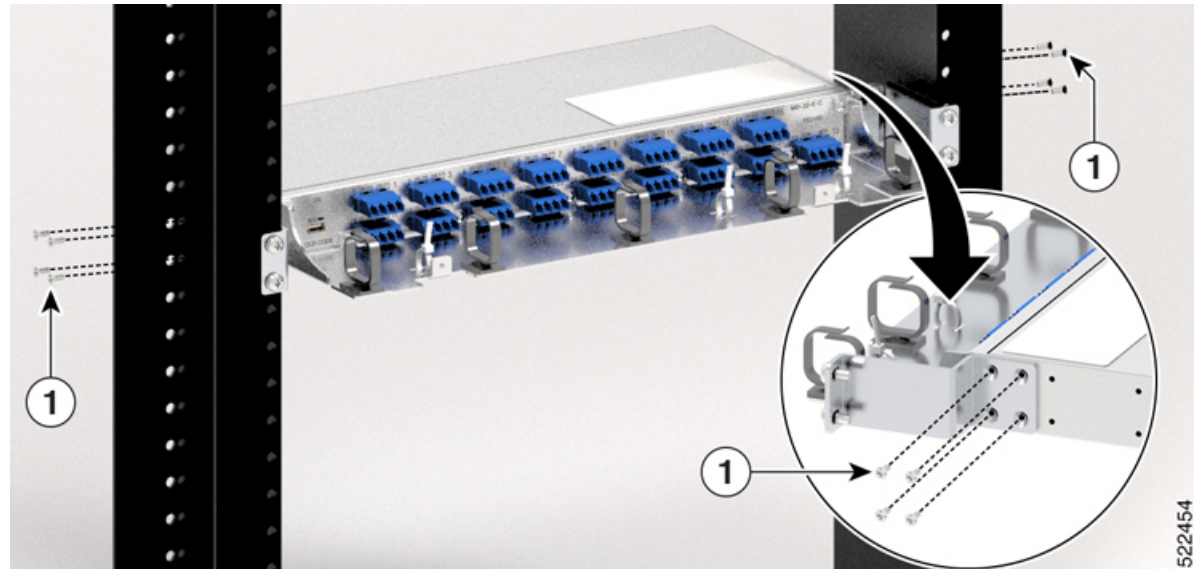
Note The patch panels can be mounted on 19 inch (482.6 mm), 23 inch (584.2 mm) EIA standard racks, on a 19 inch (482.6 mm) IEC rack, or on a 600 x 600 mm or 600 x 300 mm ETSI racks.

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.

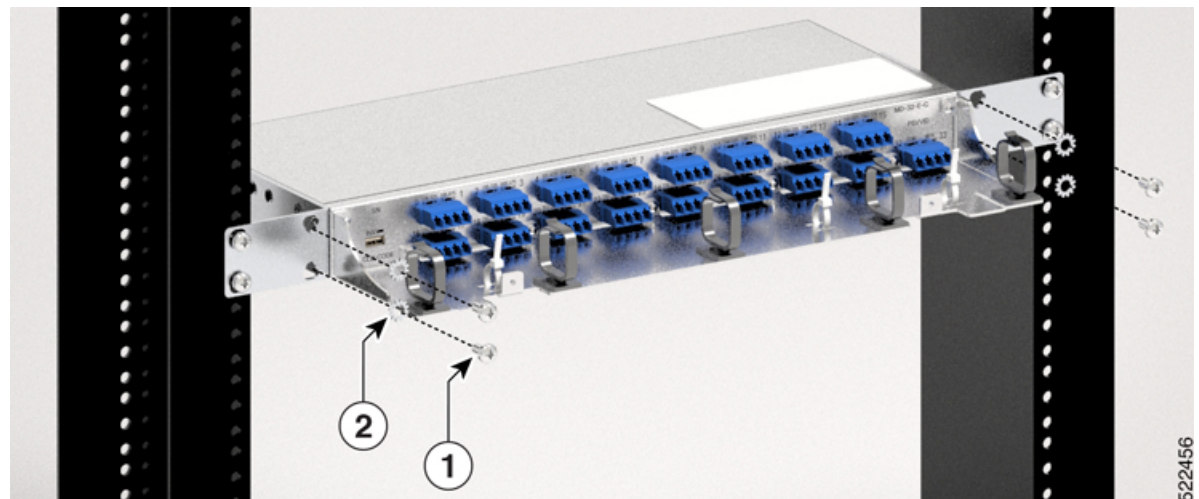
Step 2 Secure the unit to the rack using the mounting screws.

Figure 126: Mounting the Patch Panel on the ETSI Rack



1	M4 Phillips Flat Screw
---	------------------------

Figure 127: 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, 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 [Port Label Descriptions, on page 156](#). The LC-LC patch cords are used to connect the patch panel to the NCS 1010 chassis.



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



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 176](#).



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.

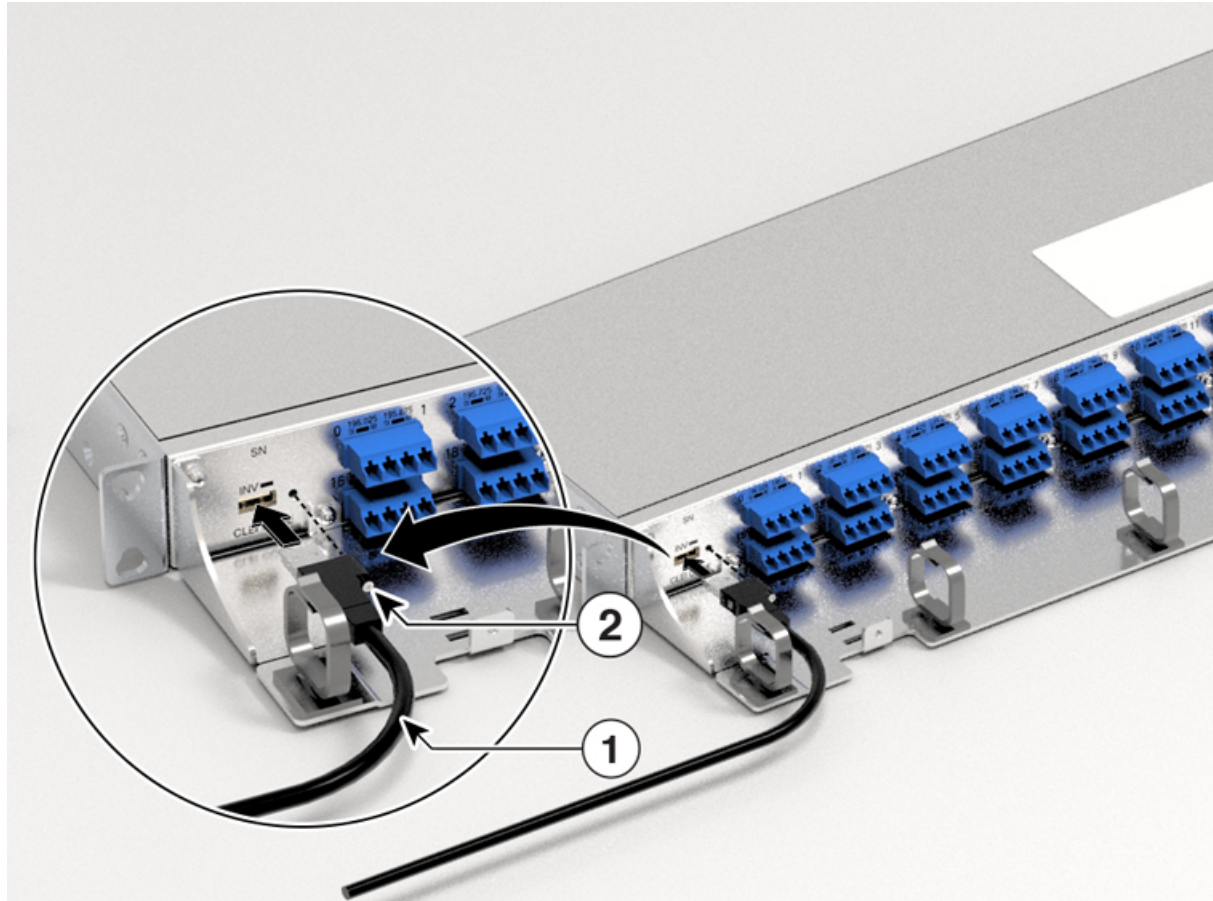
Procedure

- Step 1** To connect the fibers as appropriate, perform the following:
- Remove the LC adapter cap from the LC-LC adapter of the patch panel.
 - Place the LC/UPC cable connector in front of the corresponding bulkhead adapter on the front panel of the patch panel.
 - Align the keyed ridge of the cable connector with the slot in the receiving adapter.
 - Gently push the cable connector into the adapter until you hear a click, which indicates that the latching system is engaged.
 - Route the cables through the left or right fiber holder clip.
 - (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.
 - 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 128: 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 Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



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.

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 16

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

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



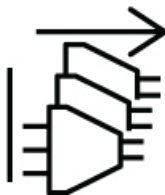
Note In this chapter, "patch panel" refers to the "Cisco NCS 1000 32-Channel Mux/Demux Patch Panel".



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 This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit. Statement 1028.



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



Warning There are no serviceable parts inside. To avoid risk of electric shock, do not open. Statement 1073.



Warning An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment. Statement 1089.

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. Statement 1089.



Warning Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person. Statement 1090.



Warning Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person. Statement 1091.



Note The maximum operating altitude for OIR is 1800 m.

⚠ 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 NCS 1000 32-Channel Mux/Demux Patch Panel, on page 180](#)

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

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, on page 171](#)



APPENDIX A

PIDs

This chapter describes the list of PIDs for Cisco NCS 1010 and its modules.

- [PIDs, on page 183](#)

PIDs

The following table lists the PIDs of Cisco NCS 1010 and its modules:

Table 22: PIDs for Cisco NCS 1010 and Its Modules

Product ID	Product Description
NCS1010-CNTLR-K9=	NCS 1010 Controller, 112500bps default console baud rate
NCS1010-CTLR-B-K9=	NCS 1010 Controller, 9600bps console baud-rate
NCS1010-SA	NCS 1010 Shelf Assembly
NCS1010-SYS	NCS 1010 Assemble to Order
NCS1010-FAN	NCS 1010 Shelf Fan Assembly
NCS1010-DC-PSU	NCS 1010 DC Power Supply Unit
NCS1010-AC-PSU	NCS 1010 AC Power Supply Unit
NCS1010-FTF	NCS 1010 Fan Tray Filter
NCS1010-ACC-KIT	NCS 1010 Accessory Kit for 19-inch racks
NCS1010-23-KIT	NCS 1010 Accessory Kit add-on for 23inch racks
NCS1010-ETSI-KIT	NCS 1010 Accessory Kit add-on for ETSI racks
NCS1K-OLT-C	C-band Optical Line Terminal without Raman
NCS1K-OLT-R-C	C-band Optical Line Terminal with Raman
NCS1K-ILA-C	C-band In-Line Amplifier without Raman

Product ID	Product Description
NCS1K-ILA-R-C	C-band In-Line Amplifier with one side Raman
NCS1K-ILA-2R-C	C-band In-Line Amplifier with both sides Raman
NCS1K-OLT-L=	L-band Optical Line Terminal without Raman
NCS1K-ILA-L=	L-band In-Line Amplifier without Raman
NCS1K-E-OLT-C=	C-band Optical Line Terminal without Raman, enhanced
NCS1K-E-OLT-R-C=	C-band Optical Line Terminal with Raman, enhanced
NCS1K-E-ILA-R-C=	C-band In-Line Amplifier with one side Raman, enhanced
NCS1K-E-ILA-2R-C=	C-band In-Line Amplifier with both sides Raman, enhanced
NCS1K-E-ILA-R-C-2=	C-band In-Line Amplifier with west-facing Raman, enhanced
NCS1K-BRK-SA	NCS 1000 breakout patch panel
NCS1K-BRK-8	8 ports colorless channels breakout module
NCS1K-BRK-16	16 ports colorless channels breakout module
NCS1K-BRK-24	24 ports colorless channels breakout module
NCS1K-MD-32O-C	32-channels spaced at 150 GHz on the Odd ITU grid
NCS1K-MD32E-C	32-channels spaced at 150 GHz on the Even ITU grid



APPENDIX **B**

System Environmental Specifications

This chapter describes the environmental specifications for Cisco NCS 1010.

- [System Environmental Specifications, on page 185](#)

System Environmental Specifications

The Cisco NCS 1010 has the following environmental specifications:

Table 23: Environmental Specifications for Cisco NCS 1010

Environmental Conditions	Operating Duration	Operating Temperature	Operating Altitude
Operating at high or low temperature	Short term ¹	-5–55° Celsius	1800 m
Normal Operation	Long term (365 days)	5–40° Celsius	1800 m
Fan failure ²	Short term	5–40° Celsius	1800 m

¹ As per NEBS GR-63-CORE, short term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in one year (This refers to a total of 360 hours in any given year, but not more than 15 occurrences during that one year)

² A fan failure means that one of the fans on both fan trays stopped working (5 out of 6 fans are working). Replace a failed fan tray as per the replacement procedure within the OIR time limits.



APPENDIX **C**

Power Cable Specifications

This chapter describes the power cables that are supported by the Cisco NCS 1010 AC and DC PSUs.

- [Supported Cables, on page 187](#)

Supported Cables

Each power supply has a separate power cable. Standard power cables or jumper power cables are available for connection to the appliance. The jumper power cables, for use in racks, are available as an optional alternative to the standard power cables.



Note Only the approved power cables or jumper power cables that are provided with the appliance are supported.

The following power cords are supported.

AC Power Cables

- Argentina

[Figure 129: CAB-250V-10A-AR \(Argentina\)](#) AC power cable, 250 V, 10 A, CAB-250V-10A-AR

- Australia

[Figure 130: CAB-9K10A-AU \(Australia\)](#) AC power cable, 250 V, 10 A, 3112 plug, CAB-9K10A-AU

- Brazil

[Figure 131: CAB-250V-10A-BR \(Brazil\)](#) AC power cable, 250 V, 10 A, CAB-250V-10A-BR

- China

[Figure 132: CAB-250V-10A-CN \(China\)](#) AC power cable, 250 V, 10 A, CAB-250V-10A-CN

- Europe

[Figure 133: CAB-9K10A-EU \(Europe\)](#) AC Power cable, 250 V, 10 A; CEE 7/7 Plug, CAB-9K10A-EU

- Europe and North America

[Figure 146: NCS1010-DC-CBL-ET= \(Europe\)](#) AC power cable, 10 A; C13 to C14, recessed receptacle, CAB-C13-C14-AC

- Israel

[Figure 134: CAB-250V-10A-IS \(Israel\)](#) AC Power cable, 250 V, 10 A, CAB-250V-10A-IS

- Italy

[Figure 135: CAB-9K10A-IT \(Italy\)](#) AC power cable, 250 V, 10 A, CEI 23-16/VII plug, CAB-9K10A-IT

- India

[Figure 136: CAB-250V-10A-ID \(India\)](#) AC power cable, 250 V, 10 A, CAB-250V-10A-ID

- Japan PSE Mark

[Figure 137: CAB-C13-C14-2M-JP \(Japan\)](#) AC Power cable, C13 to C14, CAB-C13-C14-2M-JP

- North America

[Figure: CAB-C13-C14-AC](#) AC power cable, 125 V, 13 A, NEMA 5–15 plug, CAB-9K12A-NA

- North America

[Figure 142: CAB-AC-L620-C13 \(North America\)](#) AC power cable, NEMA L6-20 to C13 connectors – If rated for greater than 12.5 A, it is compliant with North America, CAB-AC-L620-C13

- Switzerland

[Figure 139: CAB-9K10A-SW \(Switzerland\)](#) AC power cable, 250 V, 10 A, MP232 plug, CAB-9K10A-SW

- Taiwan

[Figure 140: CAB-ACTW \(Taiwan\)](#) AC power cable, 250 V, 10 A, CAB-ACTW

- United Kingdom

[Figure 141: CAB-9K10A-UK \(United Kingdom\)](#) AC power cable, 250 V, 10 A (13-A fuse), BS1363 plug, CAB-9K10A-UK

- Europe, North America, United Kingdom, Australia, New Zealand, Morocco, and Korea

[Figure 144: CAB-C13-CBN](#) AC cabinet jumper power cable, 250, 10 A, C13 to C14, Compliant with Europe and North America at 200-240V, CAB-C13-CBN

- Europe, North America, United Kingdom, Australia, New Zealand, Morocco, Korea, China, and Russia

[Figure 145: CAB-C13-C14-2M](#) AC cabinet jumper power cable, 250, 10 A, C13 to C14, Compliant with Europe and North America at 200-240V, CAB-C13-C14-2M

DC Power Cables

- Europe

[Figure 146: NCS1010-DC-CBL-ET= \(Europe\)](#) CABASY, WIRES, DC POWER, 10AWG, 930W / NCS 1010 DC Cable - ETSI compliant, NCS1010-DC-CBL-ET=

- Worldwide

[Figure 147: CAB-48DC-40A-8AWG \(Worldwide\)](#) DC power cable, –48 VDC, 40 A, 8 AWG, Three-socket Mini-Fit connector to three-wire, CAB-48DC-40A-8AWG, and CAB-48DC-40A-10AWG



Note We recommend using NCS1010-DC-CBL-ET= with the ETSI 300-mm cabinet to remain compliant with the 300-mm footprint.

The following figures depict the power cables:

Figure 129: CAB-250V-10A-AR (Argentina)

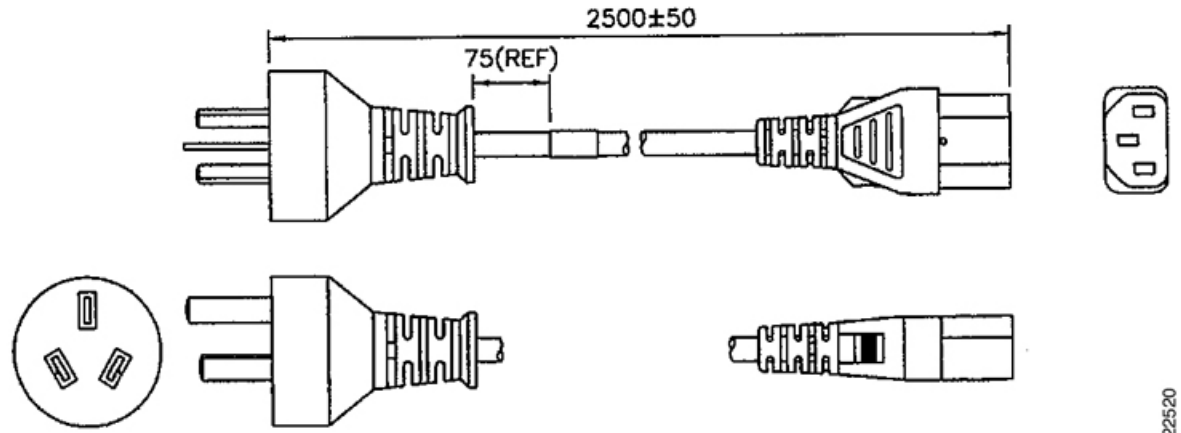


Figure 130: CAB-9K10A-AU (Australia)

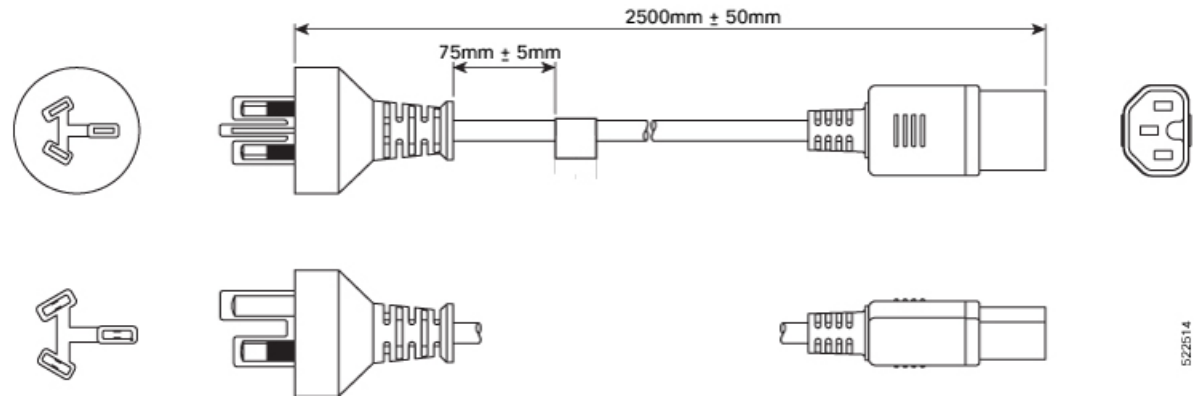


Figure 131: CAB-250V-10A-BR (Brazil)

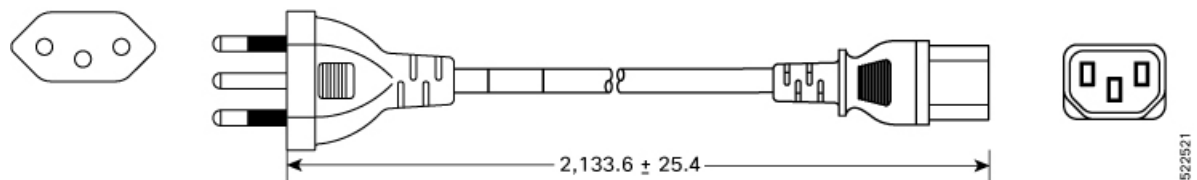


Figure 132: CAB-250V-10A-CN (China)

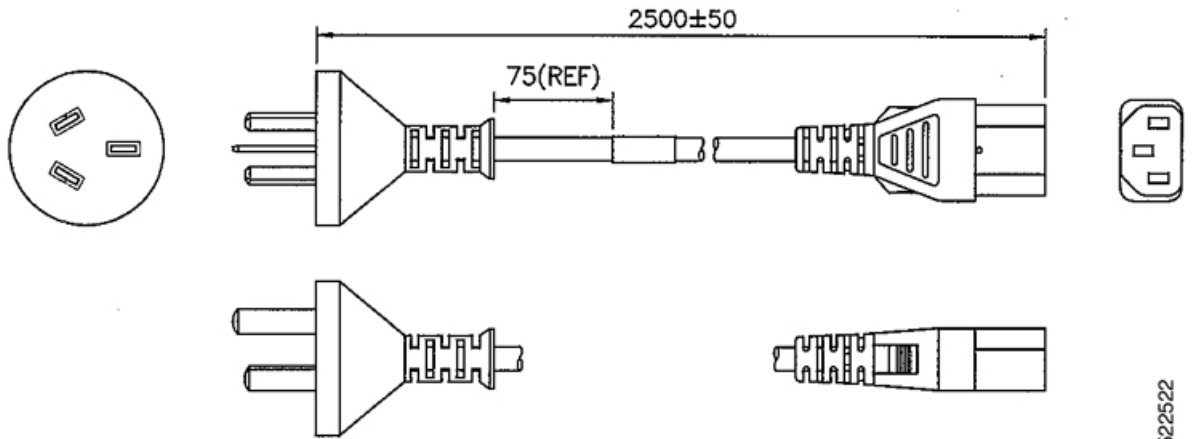


Figure 133: CAB-9K10A-EU (Europe)

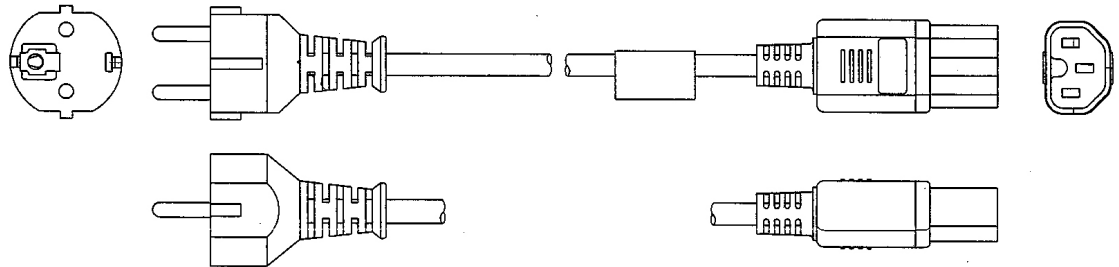


Figure 134: CAB-250V-10A-IS (Israel)

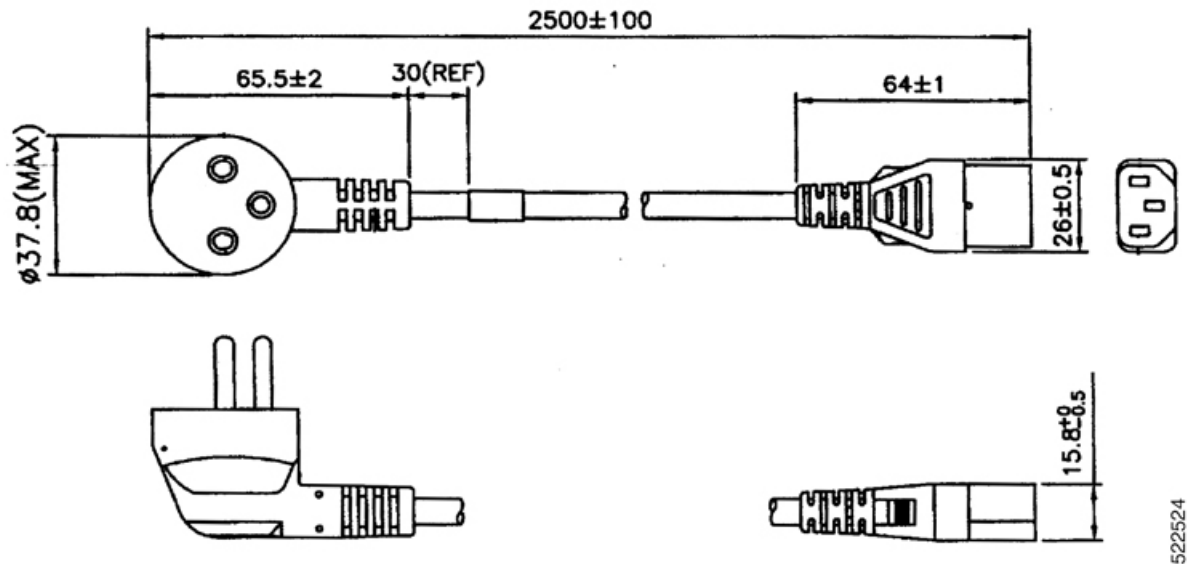
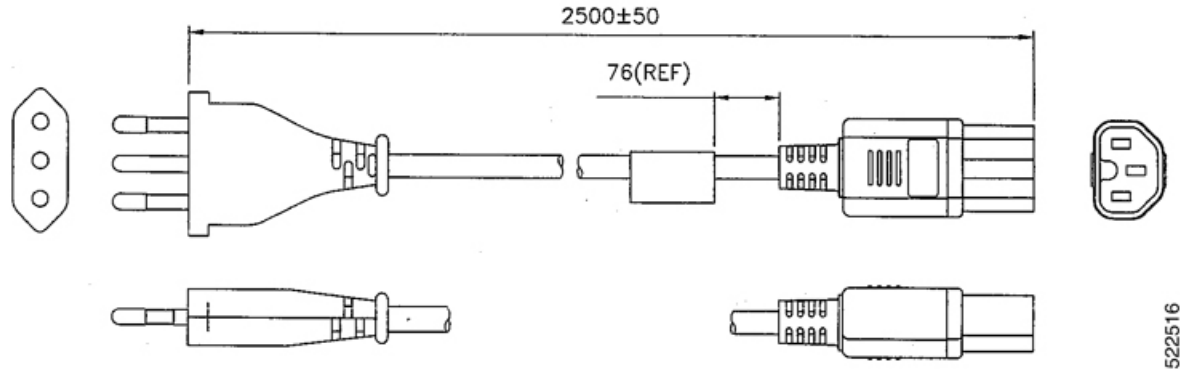
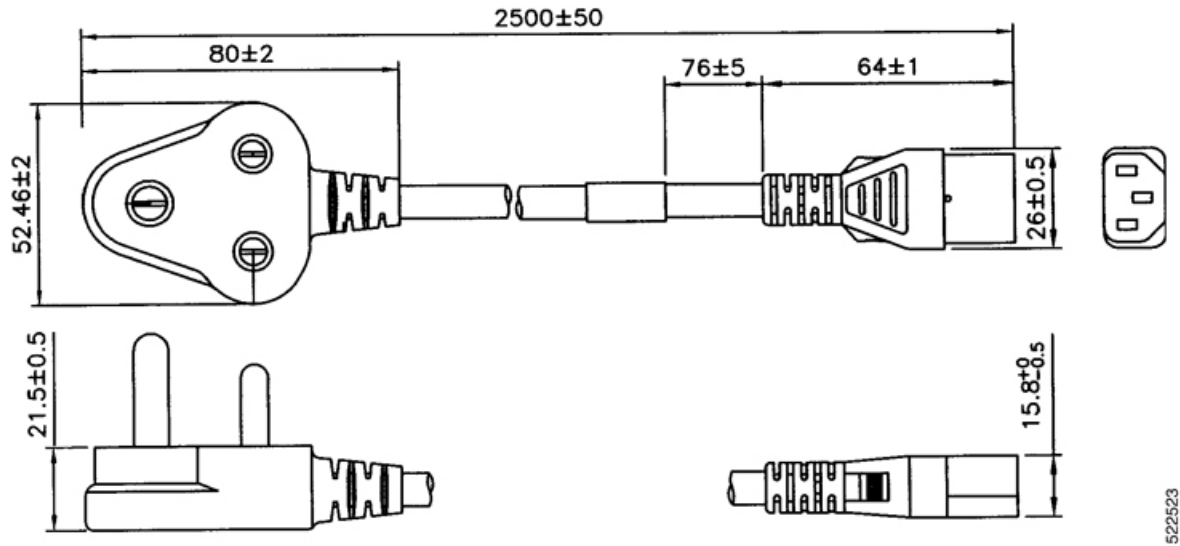


Figure 135: CAB-9K10A-IT (Italy)



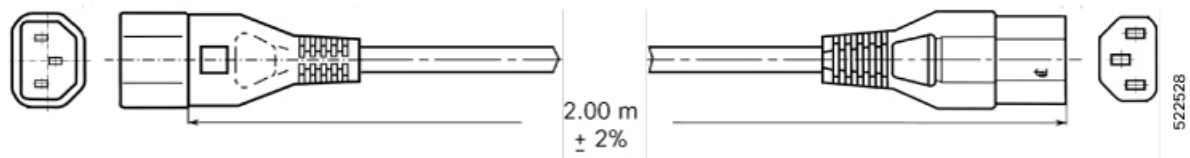
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Figure 136: CAB-250V-10A-ID (India)



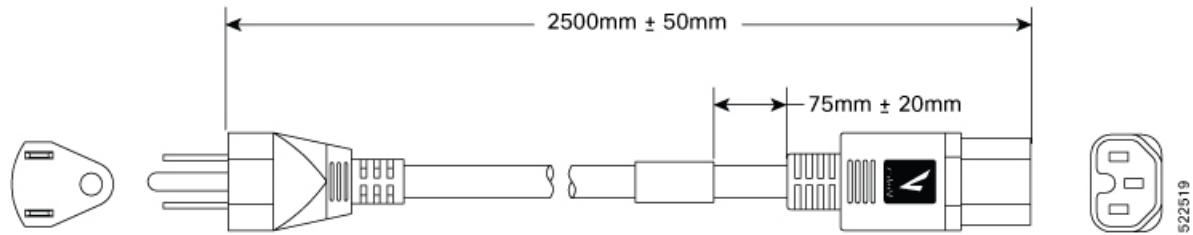
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Figure 137: CAB-C13-C14-2M-JP (Japan)



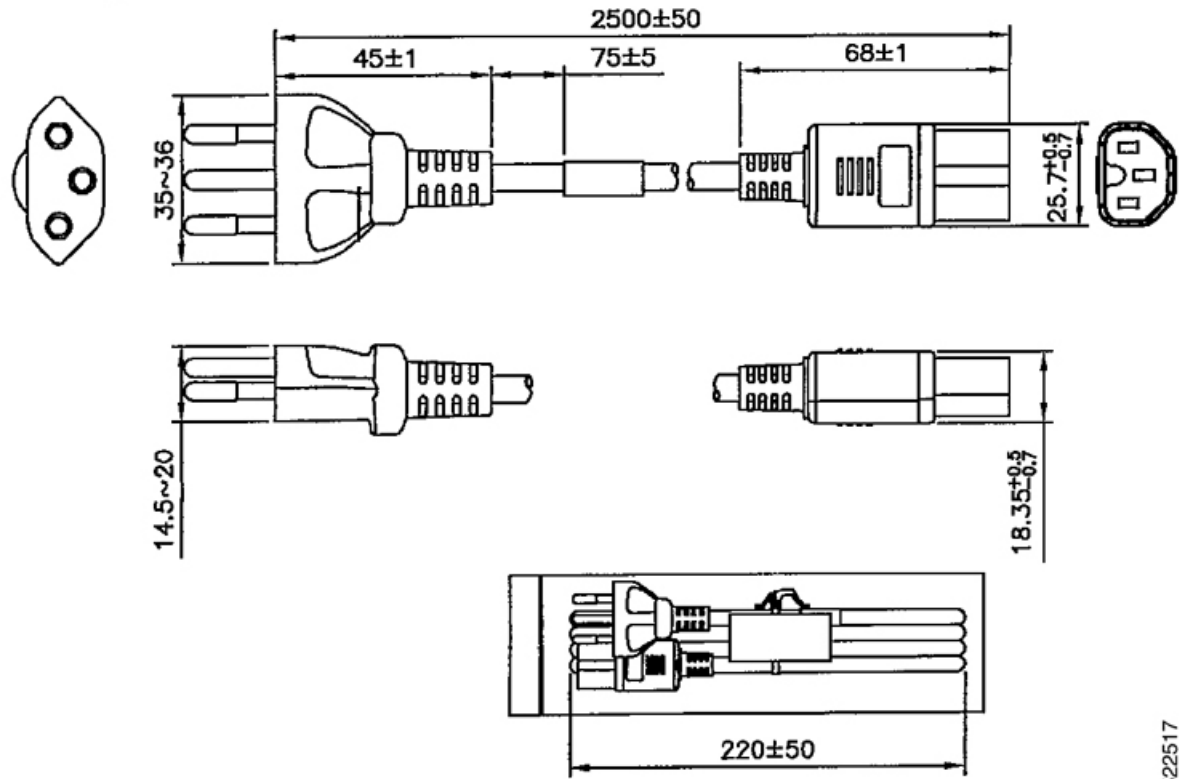
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Figure 138: CAB-9K12A-NA (North America)



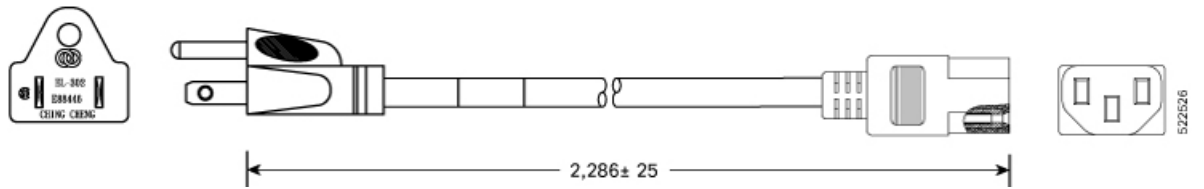
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Figure 139: CAB-9K10A-SW (Switzerland)



522517

Figure 140: CAB-ACTW (Taiwan)



522526

Figure 141: CAB-9K10A-UK (United Kingdom)

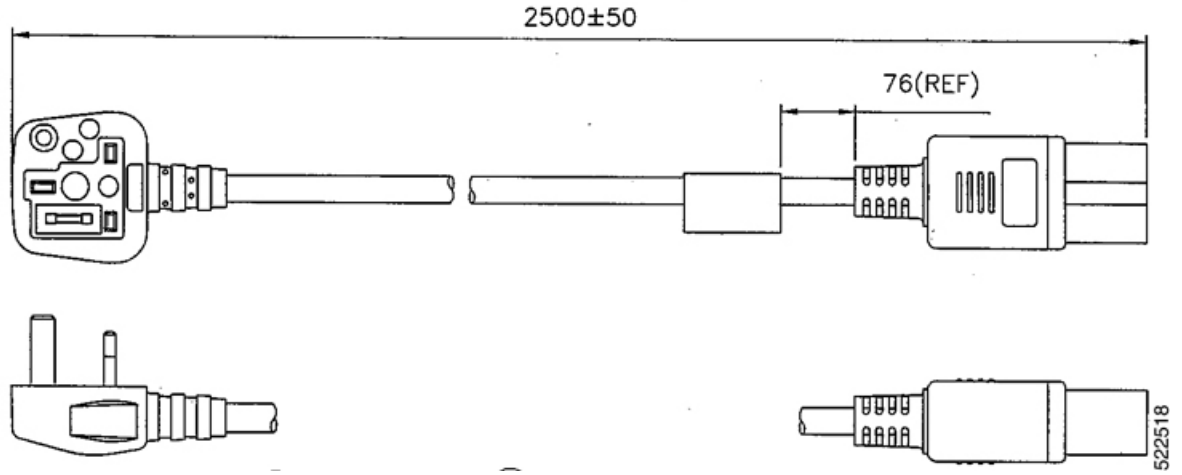


Figure 142: CAB-AC-L620-C13 (North America)

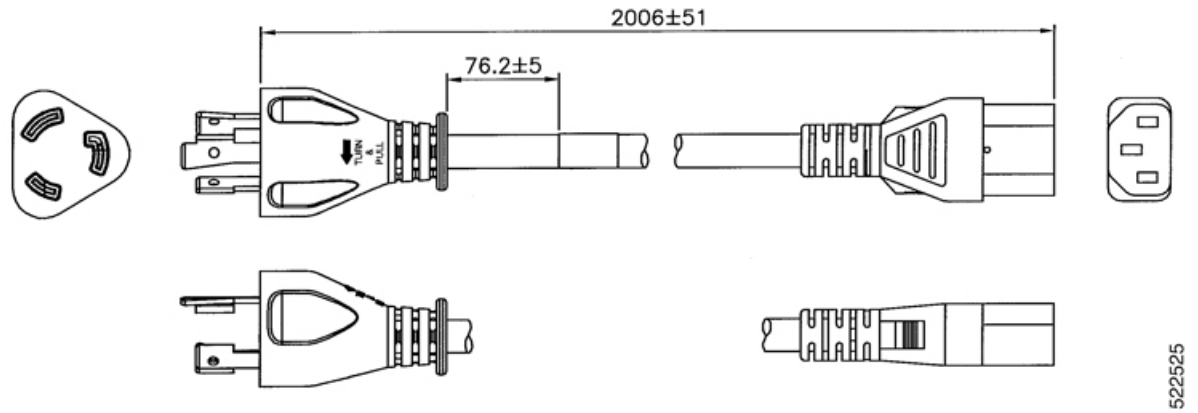


Figure 143: CAB-C13-C14-AC (Europe and North America)

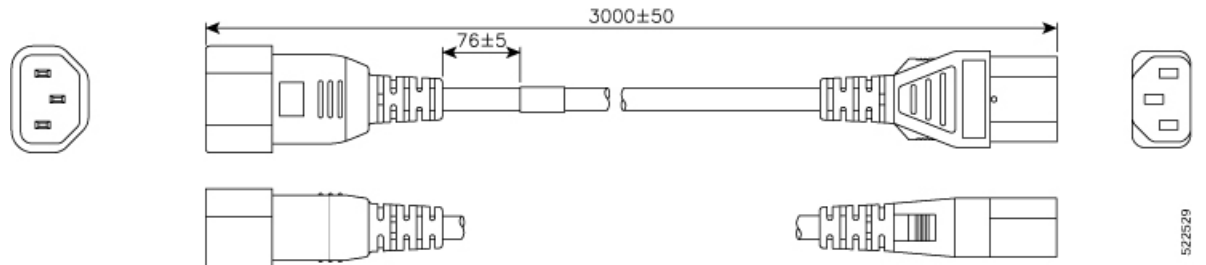


Figure 144: CAB-C13-CBN

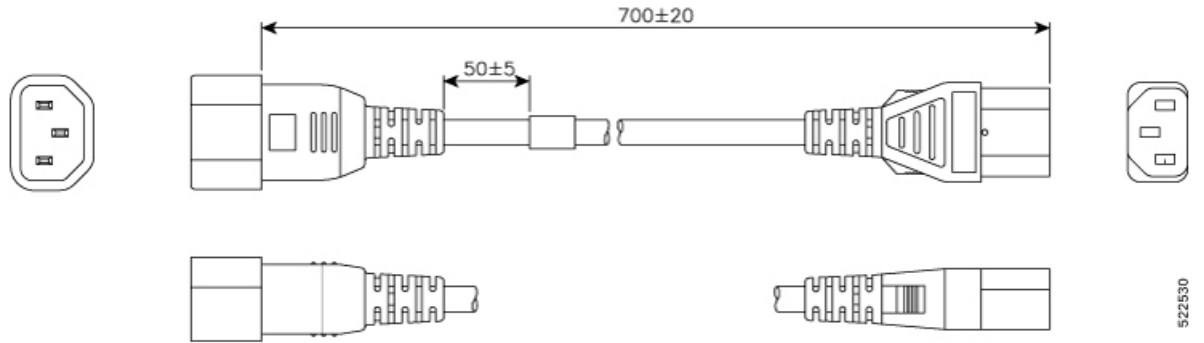


Figure 145: CAB-C13-C14-2M

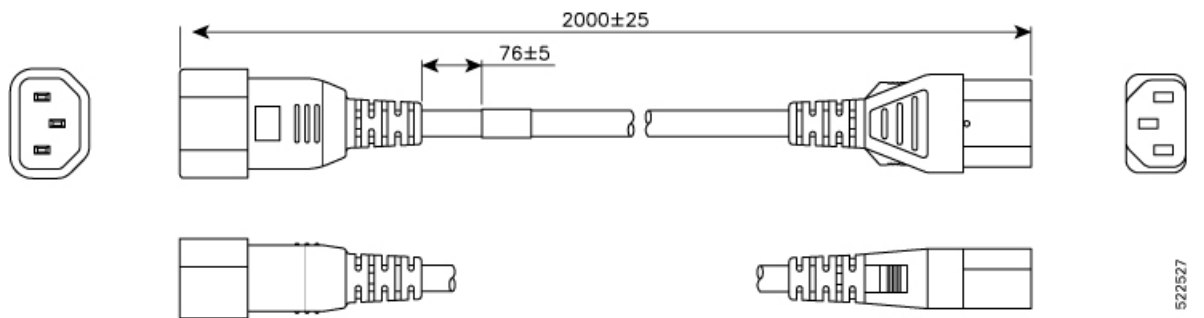


Figure 146: NCS1010-DC-CBL-ET= (Europe)

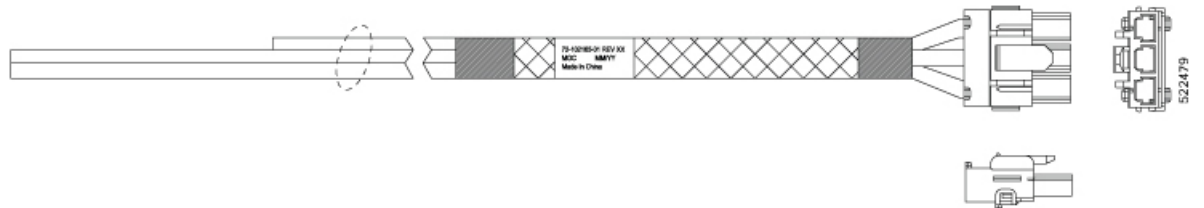


Figure 147: CAB-48DC-40A-8AWG (Worldwide)

