

Cisco NCS 1014 Passive Devices

The Cisco NCS 1014 chassis supports the passive devices:

- NCS1K-MD-32x-CE Mux/Demux Passive Patch Panels, on page 1
- MD-32E-CE and MD-32O-CE LED, on page 5

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

Table 1: Feature History

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

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

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

Characteristics of MD-32x-CE

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

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

Front panel of the MD-32x-CE

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

Figure 1: MD-32x-CE interfaces

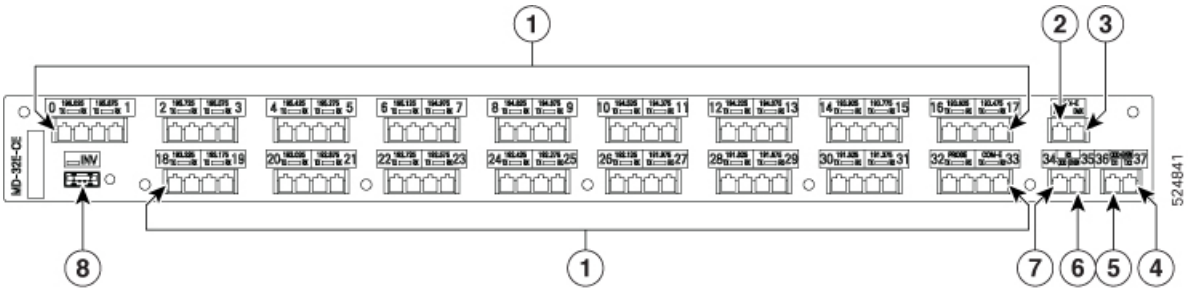


Table 2: Port Label Descriptions

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

Callout	Port label	Connector type	Description
3	MON-x-DEMUX	LC	Monitors the aggregrated signal coming into the patch panel to demultiplex the signal. Its operating frequency is the same as MON-x-MUX port.
4	ODD+EVEN-TX2	LC	Transmits the ODD and EVEN optical channels
5	ODD+EVEN TX1	LC	Transmits the ODD and EVEN optical channels
6	RX-EVEN	LC	Receives the EVEN optical channels
7	RX-ODD	LC	Receives the ODD optical channels
8	INV	USB Type A receptacle connector	Establishes USB communication channel with the optical line system

Communication with the NCS 1001 and NCS 1014 optical line system

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

The USB communication channel helps to:

- retrieve the inventory data and the insertion loss of the optical paths.
- retrieve the optical power levels monitored by the patch panels' photodiodes.
- activate an LED on request or other type of displays or electrical actuators.
- upgrade the patch panels firmware.

Interoperability with EDFA2 line card

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

Channel wavelength allocation

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

Table 3: C-Band channel wavelength allocation

Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
0	196.025	1529.36	196.100	1528.77
1	195.875	1530.53	195.950	1529.94

Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
2	195.725	1531.70	195.800	1531.12
3	195.575	1532.88	195.650	1532.29
4	195.425	1534.05	195.500	1533.47
5	195.275	1535.23	195.350	1534.64
6	195.125	1536.41	195.200	1535.82
7	194.975	1537.59	195.050	1537.00
8	194.825	1538.78	194.900	1538.19
9	194.675	1539.96	194.750	1539.37
10	194.525	1541.15	194.600	1540.56
11	194.375	1542.34	194.450	1541.75
12	194.225	1543.53	194.300	1542.94
13	194.075	1544.72	194.150	1544.13
14	193.925	1545.92	194.000	1545.32
15	193.775	1547.12	193.850	1546.52
16	193.625	1548.31	193.700	1547.72
17	193.475	1549.52	193.550	1548.91
18	193.325	1550.72	193.400	1550.12
19	193.175	1551.92	193.250	1551.32
20	193.025	1553.13	193.100	1552.52
21	192.875	1554.34	192.950	1553.73
22	192.725	1555.55	192.800	1554.94
23	192.575	1556.76	192.650	1556.15
24	192.425	1557.97	192.500	1557.36
25	192.275	1559.19	192.350	1558.58
26	192.125	1560.40	192.200	1559.79
27	191.975	1561.62	192.050	1561.01
28	191.825	1562.84	191.900	1562.23

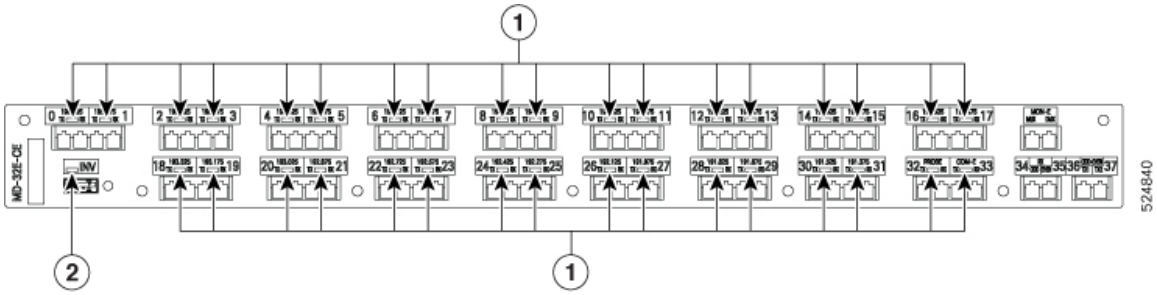
Channel Label	NCS1K-MD-32E-CE		NCS1K-MD-32O-CE	
	Frequency (THz)	Wavelength (nm)	Frequency (THz)	Wavelength (nm)
29	191.675	1564.07	191.750	1563.45
30	191.525	1565.29	191.600	1564.68
31	191.375	1566.52	191.450	1565.90

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

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

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

Figure 2: MD32x-CE Optical Port LEDs



Callout	LED
1	INV
2	CH-0…CH-31

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

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