



# Cisco NCS 1014 Advanced Multihaul Optical Platform - An Overview

This chapter provides an overview for Cisco NCS 1014 Advanced Multihaul Optical Platform.

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## Cisco NCS 1014 chassis and line cards

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

### Modules supported in NCS 1014

NCS 1014 chassis have these modules.

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

### Line cards and modules supported in NCS 1014

NCS 1014 chassis support these line cards and modules.

**Table 1: Line cards and modules supported**

From Release	PID	Description
7.11.1	<a href="#">NCS1K14-2.4T-K9</a>	2.4T DWDM Transponder Card

From Release	PID	Description
7.11.1	<a href="#">NCS1K14-CCMD-16-C/L</a>	16-port Colorless Mux/Demux Optical Line Card
7.11.1	<a href="#">NCS1K4-1.2T-K9</a>	1.2T DWDM Transponder Card
24.1.1	NCS1K14-2.4T-X-K9	2.4T-X DWDM Transponder/Muxponder Card
24.1.1	<a href="#">NCS1K4-QXP-K9</a>	3.2T QXP Transponder Card
25.1.1	<a href="#">NCS1K14-EDFA2</a>	NCS 1014 EDFA terminal with equalization
25.1.1	<a href="#">NCS1K-MD-32O-CE and NCS1K-MD-32E-CE</a>	NCS 1000 32 channel Odd Mux/Demux-150GHz-C-band Enhanced  NCS 1000 32 channel Even Mux/Demux-150GHz-C-band Enhanced

## 1.2T card

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

## NCS1K4-2-QDD-C-K9 C-Band line card

From, 25.2.1, the NCS 1014 supports the NCS1K4-2-QDD-C-K9 (2-QDD-C) C-Band line card, which offers high-performance optical networking capabilities with configurable client and trunk ports.

### Overview

- The card features eight client ports (QSFP28 and QSFP-DD) and two DWDM dual sub-channel module trunk ports.
- Supported optics for 400GE client ports include FR4 and AOC.
- Trunk ports support line rates of 200, 300, and 400 Gbps with fine control over modulation format, baud rate, and forward error correction (FEC).
- The trunk ports are software-configurable, and the card supports both module and slice configurations.

### Features of the 2-QDD-C line card

The features of the 2-QDD-C line card are:

- **Client Ports:** Supports up to eight 100GE or two 400GE client ports.

- **Trunk Line Rate:** Configurable between 200G and 400G in 100G increments.
- **Client-to-Trunk Mapping:** Based on the type of configuration and the line rate.
- **Modulation Format:** Supports QPSK, 8 QAM, 16 QAM, and hybrid modulation formats. Hybrid modulation formats can be configured with 1/128 bits/symbol granularity.
- **Forward Error Correction (FEC):** Soft Decision FEC 27% and Soft Decision FEC 15%.
- **Baud Rate:** Configurable between 28 Gbd/s and 72 Gbd/s.
- **Frequency Range:** Covers 191.25 to 196.1 THz with a default value of 193.1 THz.

## 2.4T line card

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

## CCMD-16 line card

The CCMD-16 optical line card has:

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

This table shows two variants of the optical line card:

**Table 2: Optical line card variants**

Linecard	Details
<b>NCS1K14-CCMD-16-C</b>	The NCS1K14-CCMD-16-C line card is a C-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels. It supports any signal distribution between 191250 and 196200 GHz, for example, the 64 channels grid with 75-GHz spacing.
<b>NCS1K14-CCMD-16-L</b>	The NCS1K14-CCMD-16-L line card is an L-band, 16-port Colorless Direct attach optical line card with EDFA. It can host up to 16 channels. It supports any signal distribution between 186025 and 191000 GHz, for example, the 64 channels grid with 75-GHz spacing.

## 2.4TX line card

**Table 3: Feature History**

Feature Name	Release Information	Feature Description
NCS1K14-2.4T-X-K9 Line Card	Cisco IOS XR Release 24.1.1	<p>The new <b>NCS1K14-2.4T-X-K9 line card</b> is a single-slot Transponder and Muxponder card that delivers up to 1.2T C-band traffic at each trunk port. It has six QDD client ports that support 400GE and 4x100GE traffic on each port. This card provides two trunk ports that support 1.2T traffic on each port. The <b>mxponder-slice</b> and <b>mxponder</b> keywords in the <b>hw-module</b> command enable this card to operate in the following modes.</p> <ul style="list-style-type: none"> <li>• <b>Muxponder Slice Mode:</b> The card virtually splits into two slices in this mode. It is possible to configure both trunks to carry different data rates. The supported trunk rates are 400G, 500G, 600G, 800G, 1000G, and 1200G.</li> <li>• <b>Muxponder Mode:</b> The card acts as one unit in this mode, configuring both trunks to the same data rate. The supported trunk rates are 600G and 1000G. Additionally, the capacity of a specific shared client port is consumed by two trunk ports.</li> </ul>

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

This card operates in two card modes:

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



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

For more information about the 2.4TX card, see [datasheet](#).

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

**Table 4: NCS1K14-2.4T-X-K9 interfaces and data rates**

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

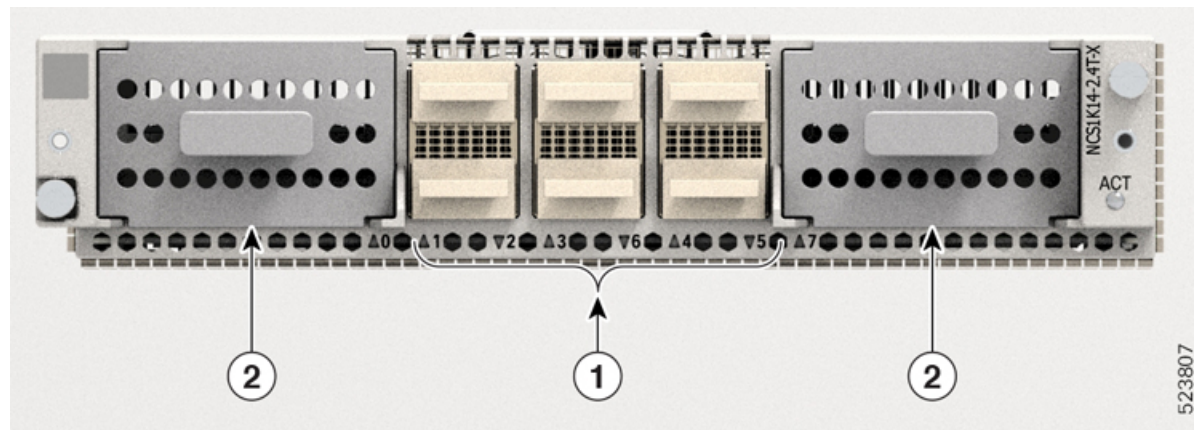
Interfaces	Form factor	Ports	Data rates
Trunk	Coherent Interface Module 8 (CIM8)	0, 7	up to 1.2T in each port



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

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

**Figure 1: 2.4TX line card front view**



**Table 5: 2.4TX line card interfaces**

Callout	Interface
1	Client port
2	Trunk port

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

Figure 2: 2.4TX card client and trunk mapping

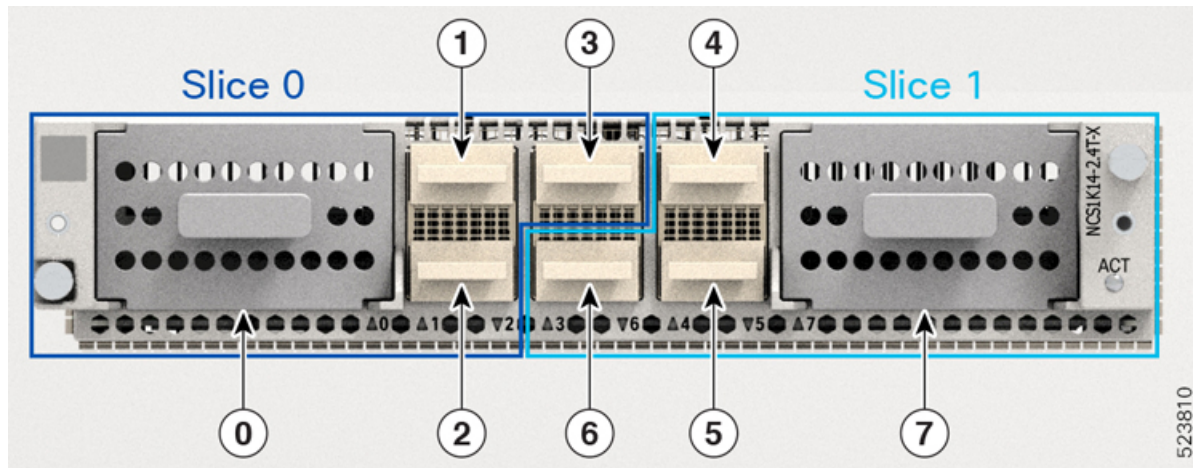


Table 6: Client-to-Trunk port mapping

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



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

## QXP-K9 line card

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

## Document Objective

The Cisco NCS 1014 Configuration Guide describes how to configure various card modes for the line cards that are supported in the Cisco NCS 1014 chassis.

## Document Organization

This document is organized into the following chapters:

Chapter	Description
<a href="#">Configuring the Card Mode</a>	Describes different card mode configurations and supported data rates for the 1.2T, 2.4T and 2.4T-X line cards.
<a href="#">Configuring Controllers</a>	Describes the procedure to configure three controllers types in the line card; optics controller, the ethernet controller, and the coherent DSP controller.
<a href="#">Performance Monitoring</a>	Describes the configuration and retrieval of PM counters for the optics, Ethernet, coherent DSP, OCH, and OMS controller types in flex-bin, 30-second, 15-minute, or 24-hour intervals.
<a href="#">Pseudo Random Binary Sequence</a>	Describes how to configure Pseudo Random Binary Sequence (PRBS) on coherent DSP, ODU, or Ethernet controller and PRBS performance monitoring parameters.
<a href="#">Implementing Host Services and Applications</a>	Describes how to configure HTTP client application and overview of TCP functionality.

