



OpenConfig Support for NCS1K14-2.4T-K9 and NCS1K14-2.4T-A-K9 cards

The NCS1K14-2.4T-K9 card is a single slot line card. The card is equipped with six QSFPDD and two CIM-8 ports. This chapter briefs the detail configurations, client and trunk optics, supported OpenConfig models for the NCS1K14-2.4T-K9 card.

Starting with Release 26.1.1, the NCS1K14-2.4T-A-K9 card supports OpenConfig.

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Overview

The NCS1K14-2.4T-K9 and NCS1K14-2.4T-A-K9 cards is a single slot line card. The card is equipped with six QSFPDD and two CIM-8 ports. You can configure six QSFPDD ports as client and two CIM-8 as trunk.

The NCS1K14-2.4T-K9 and NCS1K14-2.4T-A-K9 cards support both transponder (TXP) and muxponder(MXP) configuration and they can coexist on the same line card.

Supported Operational modes, Optics, and OpenConfig Models

The NCS1K14-2.4T-K9 and NCS1K14-2.4T-A-K9 cards support these Operational modes, client and trunk optics, and OpenConfig models:

Operational Modes

This table provides information for Operational modes, config in SliceMode, Slice 0 Client, and Slice 1 Client:

Operational modes	Config in SliceMode	Slice 0 Client	Slice 1 Client
400G	4X100GE	1	4

Operational modes	Config in SliceMode	Slice 0 Client	Slice 1 Client
600G	400GE+2x100GE	1,2	4,5
800G	2x400GE	1,2	4,5
1000G	2x400GE+2x100GE	1,2,3	4,5,6

Client Optics

The following table provides information about PIDs, and related interface, transmit power, transmit wavelength, fiber type, fiber connector, and distance support:

PID	Interface	Transmit power	Transmit wavelength	Fiber type	Fiber connector	Distance support	Description
QDD-400G-FR4-S	400GE	-7.0 to +6.0 dbm per wavelength	1310 nm	Duplex SMF	Duplex LC connector	2km	Only be used as 400GE non-breakout mode
QDD-400G-DR4-S	400GBASE-DR4	-10.1 to +4.0 dbm per wavelength	1310 nm	MPO-12 parallel SMF	12-fiber MPO	500m	Can be used as 4x100GE breakout mode
QDD-400G-AOCxM	400GBASE-AOC	-10.1 to +4.0 dbm per wavelength	850 nm	MMF	AOC	1, 2, 3, 5, 7, 10, 15, 20, 25, and 30 meters	Only be used as 400GE non-breakout mode
QDD-4X100G-LR-S	10Base-LR	-8.2 to +0.5 per wavelength	1310nm	G.652 micron SMF	12-fiber MPO	10km	Can be used in 4x100GE breakout mode as well as 400GE non-breakout mode.

Trunk Optics



Note The transceiver name appears in the new format "Optics *rack/slot/instance/port*" from release 7.11.1.

The following table provides information for PIDs, its related payloads, trunk ports, and inventory details:

PID	Payload	Trunk Port Number	Inventory Details
CIM8-C-K9	400G, 600G, 800G, and 1000G	0, and 7	NAME: "Optics0/1/0/0", DESCR: "Cisco CIM8 C K9 Pluggable Optics Module" PID: CIM8-C-K9, VID: VES1, SN: ACA273401DG

OpenConfig Models

The NCS1K14-2.4T-K9 and NCS1K14-2.4T-A-K9 cards support these OpenConfig models:

Table 1: Supported OC Models

Model	Feature
openconfig-platform.yang	Inventory and LCMODE
openconfig-platform-transceiver.yang	Pluggable Inventory and Operational Data
openconfig-terminal-device.yang	Logical and Optical Channels – Datapath and OperData
openconfig-interface.yang	Optical Interface Enable/Disable (shut/no-shut)
openconfig-system.yang (augmented with openconfig-alarms)	Alarms
openconfig/gnoi/os.proto	Software Upgrade
Openconfig/gnoi/diag.proto	PRBS Testing

Extended Terminal Device Configuration for Baud Rate

The following table provides standard operational-modes for configuring the baud rate:

Table 2: Standard Operational Modes

Mode	FEC	Baud-Rate	Description
4201	SD_15	138.000000	SoftDecision_FEC15:Baud_138.00000000
4202	SD_15	139.000000	SoftDecision_FEC15:Baud_139.00000000
4203	SD_15	140.000000	SoftDecision_FEC15:Baud_140.00000000
4204	SD_15	141.000000	SoftDecision_FEC15:Baud_141.00000000
4205	SD_15	142.000000	SoftDecision_FEC15:Baud_142.00000000
4206	SD_15	100.000000	SoftDecision_FEC15:Baud_100.00000000
4207	SD_15	80.000000	SoftDecision_FEC15:Baud_80.00000000

Mode	FEC	Baud-Rate	Description
4208	SD_15	88.000000	SoftDecision_FEC15:Baud_88.00000000
4209	SD_15	98.000000	SoftDecision_FEC15:Baud_98.00000000
4210	SD_15	108.000000	SoftDecision_FEC15:Baud_108.00000000
4211	SD_15	118.000000	SoftDecision_FEC15:Baud_118.00000000
4212	SD_15	128.000000	SoftDecision_FEC15:Baud_128.00000000
4213	SD_15	110.000000	SoftDecision_FEC15:Baud_110.00000000
4214	SD_15	111.000000	SoftDecision_FEC15:Baud_111.00000000
4215	SD_15	112.000000	SoftDecision_FEC15:Baud_112.00000000
4216	SD_15	113.000000	SoftDecision_FEC15:Baud_113.00000000
4217	SD_15	114.000000	SoftDecision_FEC15:Baud_114.00000000
4218	SD_15	115.000000	SoftDecision_FEC15:Baud_115.00000000

You can use the **extended terminal-device baud rate** to set a new baud rate value compared to the value provided in the **Standard Operational Mode** table.



Note The Optical Channel name appears in the new format "OpticalChannel *rack/slot/instance/port*" from release 7.11.1.

Sample Configuration

```

-----
Edit config baud-rate
-----
<edit-config>
  <target>
    <candidate/>
  </target>
  <config>
    <components xmlns="http://openconfig.net/yang/platform">
      <component>

        <name>OpticalChannel0/0/0/0</name>
        <optical-channel xmlns="http://openconfig.net/yang/terminal-device">
          <extended
xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-openconfig-terminal-device-ext">
            <config>
              <baud-rate>15.1234567</baud-rate>
            </config>
          </extended>
        </optical-channel>
      </component>
    </components>
  </config>
</edit-config>

```



Note If both the operating mode and extended baud rate exist, the line card employs the extended baud rate value.

Extended Transceiver Model

The extended transceiver model provides you with the Forward Error Correction (FEC) information for individual physical-channels.

Sample Configuration:

```
"Optics0/1/0/8": {
  "openconfig-platform-transceiver:transceiver": {
    "physical-channels": {
      "channel": {
        "1": {
          "state": {
            "index": 1,
            "input-power": {
              "avg": 1.64,
              "instant": 1.6,
              "interval": 10000000000,
              "max": 1.72,
              "max-time": 1649788692425519767,
              "min": 1.59,
              "min-time": 1649788694425593293
            },
            "laser-bias-current": {
              "avg": 800,
              "instant": 800,
              "interval": 100000000000,
              "max": 800,
              "max-time": 1649788690426089532,
              "min": 800,
              "min-time": 1649788690426089532
            },
            "output-frequency": 228849200,
            "output-power": {
              "avg": 1.62,
              "instant": 1.61,
              "interval": 100000000000,
              "max": 1.62,
              "max-time": 1649788690426089532,
              "min": 1.62,
              "min-time": 1649788690426089532
            }
          },
          "extended": {
            "state": {
              "index": 1
            },
            "fec-mode": "openconfig-platform-types:FEC_ENABLED",
            "fec-uncorrectable-words": 0,
            "fec-corrected-words": 0
          }
        }
      }
    }
  }
}
```

```

    }
  }

```

Client Configuration Details

The following table explains the different commands that are used for 100G and 400GE client ports.

Table 3: Configuration Details for 100G and 400GE Client Ports

Client Port	Logical Channel	Trunk ODU	Coherent DSP	Optical Channel
100G	<pre> "index":101, "rate-class": "openconfig-transport-types: TRIB_RATE_100G", "description": "Client Logical Channel", "admin-state":"ENABLED", "loopback-mode":"NONE", "trib-protocol": "openconfig-transport-types: PROT_100G_MLG", "logical-channel-type": "openconfig-transport-types: PROT_ETHERNET" </pre>	<pre> index": 111, "config": { "index": 111, "rate-class": "openconfig-transport-types: TRIB_RATE_100G", "admin-state": "ENABLED", "description": "Trunk-side-ODU", "trib-protocol": "openconfig-transport-types: PROT_ODUFLEX_CBR", "logical-channel-type": "openconfig-transport-types: PROT_OTN" </pre>	<pre> "index": 212, "config": { "index": 212, "admin-state": "ENABLED", "loopback-mode":"NONE", "description": "Coherent DSP", "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "logical-channel-type": "openconfig-transport-types: PROT_OTN" </pre>	<pre> "name": "OpticalChannel0/1/0/0", "openconfig-terminal-device: optical-channel": { "config": { "frequency": "193100000", "target-output-power": -700,"operational-mode": 4178, "line-port": "Optics0/1/0/0" </pre>

Client Port	Logical Channel	Trunk ODU	Coherent DSP	Optical Channel
400GE	<pre>"index": 101, "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "description": "Client Logical Channel", "admin-state": "ENABLED", "loopback-mode": "NONE", "trib-protocol": "openconfig-transport-types: PROT_400GE", "logical-channel-type": "openconfig-transport-types: PROT_ETHERNET"</pre>	<pre>"index": 211, "config": { "index": 211, "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "admin-state": "ENABLED", "description": "Trunk-side-ODU", "trib-protocol": "openconfig-transport-types: PROT_ODUFLEX_CBR", "logical-channel-type": "openconfig-transport-types: PROT_OTN"</pre>	<pre>"index":212, "config": { "index": 212, "admin-state": "ENABLED", "loopback-mode":"NONE", "description":"Coherent DSP", "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "logical-channel-type": "openconfig-transport-types: PROT_OTN"</pre>	<pre>"name": "OpticalChannel0/1/0/0", "openconfig-terminal-device: optical-channel": { "config": { "frequency": "193100000", "target-output-power": -700, "line-port": "Optics0/1/0/0"</pre>



Note Trunk payload rate determines the Trib rate.

Sample Configurations

Configuring 400 TXP (Client and Slice)

```
{
  "openconfig-terminal-device:terminal-device": {
    "logical-channels": {
      "channel": [
        {
          "index": 101,
          "config": {
            "index": 101,
            "rate-class": "openconfig-transport-types:TRIB_RATE_400G",
            "admin-state": "ENABLED",
            "description": "Client Logical Channel",
            "trib-protocol": "openconfig-transport-types:PROT_400GE",
            "logical-channel-type": "openconfig-transport-types:PROT_ETHERNET"
          },
          "ingress": {
            "config": {
              "transceiver": "Optics0/1/0/1"
            }
          }
        }
      ]
    }
  }
}
```

```

    },
    "logical-channel-assignments": {
      "assignment": [
        {
          "index": 1,
          "config": {
            "index": 1,
            "allocation": "400",
            "assignment-type": "LOGICAL_CHANNEL",
            "description": "logical to logical assignemnt",
            "logical-channel": 111
          }
        }
      ]
    },
    {
      "index": 111,
      "config": {
        "index": 111,
        "rate-class": "openconfig-transport-types:TRIB_RATE_400G",
        "admin-state": "ENABLED",
        "description": "Trunk-side-ODU",
        "trib-protocol": "openconfig-transport-types:PROT_ODUFLEX_CBR",
        "logical-channel-type": "openconfig-transport-types:PROT_OTN"
      }
    },
    "logical-channel-assignments": {
      "assignment": [
        {
          "index": 1,
          "config": {
            "index": 1,
            "allocation": "400",
            "assignment-type": "LOGICAL_CHANNEL",
            "description": "logical to Logical",
            "logical-channel": 30000
          }
        }
      ]
    },
    {
      "index": 201,
      "config": {
        "index": 201,
        "rate-class": "openconfig-transport-types:TRIB_RATE_400G",
        "admin-state": "ENABLED",
        "description": "Client Logical Channel",
        "trib-protocol": "openconfig-transport-types:PROT_400GE",
        "logical-channel-type": "openconfig-transport-types:PROT_ETHERNET"
      }
    },
    "ingress": {
      "config": {
        "transceiver": "Optics0/1/0/2"
      }
    },
    "logical-channel-assignments": {
      "assignment": [
        {
          "index": 1,
          "config": {
            "index": 1,
            "allocation": "400",

```

```

        "assignment-type": "LOGICAL_CHANNEL",
        "description": "logical to logical assignemnt",
        "logical-channel": 211
      }
    ]
  },
  {
    "index": 211,
    "config": {
      "index": 211,
      "rate-class": "openconfig-transport-types:TRIB_RATE_400G",
      "admin-state": "ENABLED",
      "description": "Trunk-side-ODU",
      "trib-protocol": "openconfig-transport-types:PROT_ODUFLEX_CBR",
      "logical-channel-type": "openconfig-transport-types:PROT_OTN"
    },
    "logical-channel-assignments": {
      "assignment": [
        {
          "index": 1,
          "config": {
            "index": 1,
            "allocation": "400",
            "assignment-type": "LOGICAL_CHANNEL",
            "description": "logical to Logical",
            "logical-channel": 30000
          }
        }
      ]
    }
  },
  {
    "index": 30000,
    "config": {
      "index": 30000,
      "admin-state": "ENABLED",
      "description": "Coherent DSP",
      "logical-channel-type": "openconfig-transport-types:PROT_OTN"
    },
    "logical-channel-assignments": {
      "assignment": [
        {
          "index": 1,
          "config": {
            "index": 1,
            "allocation": "800",
            "assignment-type": "OPTICAL_CHANNEL",
            "description": "logical to optical",

            "optical-channel": "OpticalChannel0/1/0/0"
          }
        }
      ]
    }
  }
],
"openconfig-platform:components": {
  "component": [
    {

```

```

    "name": "OpticalChannel0/1/0/0",
    "openconfig-terminal-device:optical-channel": {
      "config": {
        "line-port": "Optics0/1/0/0"
      }
    }
  ],
  "openconfig-interfaces:interfaces": {
    "interface": [
      {
        "name": "Optics0/1/0/0",
        "config": {
          "name": "Optics0/1/0/0",
          "type": "iana-if-type:opticalChannel",
          "description": "T0",
          "enabled": "true"
        }
      }
    ]
  }
}

```