



# OpenConfig Support for NCS1K14-2.4T-K9 Card

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.

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## Overview

The NCS1K14-2.4T-K9 card 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 card supports 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 card supports the following Operational modes, client and trunk optics, and OpenConfig models:

### Operational Modes

The following 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
600G	400GE+2x100GE	1,2	4,5
800G	2x400GE	1,2	4,5

Operational modes	Config in SliceMode	Slice 0 Client	Slice 1 Client
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, it's 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 card supports the following 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": 1000000000,
              "max": 1.72,
              "max-time": 1649788692425519767,
              "min": 1.59,
              "min-time": 1649788694425593293
            },
            "laser-bias-current": {
              "avg": 800,
              "instant": 800,
              "interval": 1000000000,
              "max": 800,
              "max-time": 1649788690426089532,
              "min": 800,
              "min-time": 1649788690426089532
            },
            "output-frequency": 228849200,
            "output-power": {
              "avg": 1.62,
              "instant": 1.61,
              "interval": 1000000000,
              "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"
      }
    }
  ]
}
}
```