



Connection Verification

This chapter describes the tasks to verify connection between the OLT Line Card of NCS 1020 and NCS1K14-CCMD-16-C line card.

- [Power Data Reading, on page 1](#)
- [Connection Verification, on page 1](#)

Power Data Reading

Photodiodes (PDs) are optical power monitors available on all input and aggregated output ports to monitor power levels. Tone detection is enabled on some PD monitors.

Table 1: NCS1K-CCMD-16 Calibrated Port References

Port Calibrated	Port Label (Direction)	Minimum Power (dBm)	Maximum Power (dBm)	Dynamic Range (dBm)
LC input ports	(TX)	-50	30	80
LC output ports	(RX)	-50	30	80

Connection Verification

Connection verification checks the connection between the OLT line card and the CCMD-16 line cards to avoid miscabling during the node installation. The dedicated Connection Verification Tunable Laser (CV-TL) available at the OLT card generates a specific probe signal at a given frequency and power. This signal is detected by the CCMD-16 line card that is connected to the OLT line card.

- The same OLT-C line card
- The CCMD-16 line card that is connected to the OLT line card.
- A different unit (OLT-C line card or passive module) belonging to the same NE
- An optical interface (Router ports or Transponder) connected to the OLT-C line card

Connection verification uses a probe signal or adds a low frequency ON/OFF modulation tone transmitting a given tone pattern at 5 Hz (200 ms bit time). The tone pattern length ranges 4–32 bytes (including an

alignment byte) and it includes the Cable-IDs of the cables in the connection and in case also the optical frequency of the specific connection.

The Cable-ID is generated by the Optical Node Controller supervising the complete NE.

The connection verification process uses the out-of-band (OOB) and in-band (IB) WSS frequencies to reach the CCMD-16 line card.

CCMD-16 Connection Verification with OLT

The OLT line card generates the tone and connection verification is performed using the OOB channel with CV-TL tuned at 191.175 THz. To univocally identify the optical path under test, the CV-TL is modulated with a low-frequency pattern including the Cable ID of the connection.

For connection verification toward the CCMD-16 card, the CV-TL is routed to the PD inside the CCMD-16 card. The out-of-band (OOB) and the in-band (IB) connections are verified at two different PDs on the CCMD-16 line cards.

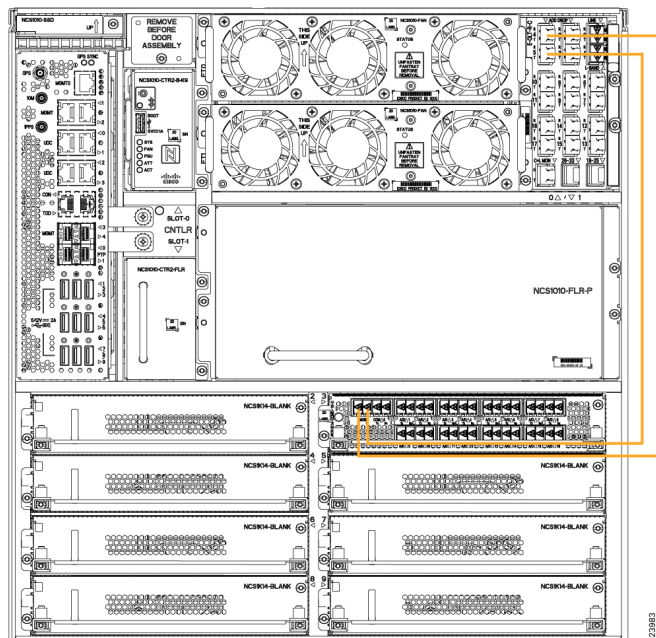
The PD monitors receiving a connection verification signal detect and buffer the Cable-ID pattern encoded in the tone to allow the connection verification process by the node controller.

Verify Connection for CCMD-16 Line Card

The connection verification procedure checks the connection between the OLT line card and CCMD-16 line cards to match the different instances regarding the OLT LC connectors.

The OLT-C line card and the NCS1K-CCMD-16 line card are connected as shown in the following image:

Figure 1: NCS 10120 and NCS1K-CCMD-16 Connection



The OLT-C line card performs connection verification between the OLT-C line card and the NCS1KCCMD-16 line card panels as described in [CCMD-16 Connection Verification with OLT](#), on page 2.

The identification/verification of the NCS1K-CCMD-16 line card is performed by checking the connection verification signal at the monitor present on the OOB loop and IB PD of the NCS1K-CCMD-16 line card respectively.

This task describes on how to verify the connection between the NCS 1010/ NCS 1020 OLT-C line card and NCS1K-CCMD-16 line card.

Start tone-pattern on OTS controller.

Before you begin

Configure the OTS controller in NCS 1020 to generate the tone for connection verification. See [Connection Verification on OTS Controller](#).

Procedure

Step 1 Configure the OTS controller to generate the tone for connection verification.

Example:

```
RP/0/RP0/CPU0:ios(config)#controller ots 0/0/0/4
RP/0/RP0/CPU0:ios(config-Ots)#tone-rate 25
RP/0/RP0/CPU0:ios(config-Ots)#tone-frequency 191.175 ( OOB frequency )
RP/0/RP0/CPU0:ios(config-Ots)#tone-pattern abcd1234
RP/0/RP0/CPU0:ios(config-Ots)#commit
```

Step 2 Configure the OMS controller to detect the tone for connection verification.

Example:

```
RP/0/RP0/CPU0:ios(config)#controller oms 0/2/0/0
RP/0/RP0/CPU0:ios(config-Oms)#tone-rate 25
RP/0/RP0/CPU0:ios(config-Oms)#tone-pattern-expected aabbccdd
RP/0/RP0/CPU0:ios(config-Oms)#tone-detect-oob
RP/0/RP0/CPU0:ios(config-Oms)#commit
```

tone-detect-oob must be configured on the OMS x/x/x/0 for NCS1K-CCMD-16.

Step 3 Start the **tone-pattern** on the OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern controller ots 0/0/0/4 start
Tue May 10 11:37:51.597 UTC
Tone pattern started
```

When tone generation is in progress on the OTS interface, the tone generation on other OTS interfaces is not allowed until the current tone generation is stopped.

Step 4 Use the **tone-pattern-detect** command to start the detection of tone pattern.

Example:

The following is a sample on starting the tone pattern detection on the OMS controller.

```
RP/0/RP0/CPU0:ios#tone-pattern-detect controller oms 0/2/0/0 start
Tue May 10 11:38:03.775 UTC
Tone pattern detect started
```

Step 5 Use the **tone-info** command to check for successful connection verification.

Example:

The following is a sample to view the Tone Info for successful connection verification on the OMS controller.

```
RP/0/RP0/CPU0:ios#show controllers oms 0/2/0/0 tone-info
Fri Sep 22 06:04:03.787 UTC
Tone Info:
Tone Rate : 25 bits/second
Tone Pattern Expected(Hex value) : aabbccdd
Tone Pattern Received(Hex value) : aabbccdd
Tone Detected OOB : Enabled
Detection State: Success
```

The following is a sample to view the Tone Info for failed connection verification on the OMS controller.

```
RP/0/RP0/CPU0:ios#show controllers oms 0/2/0/0 tone-info
Fri Sep 22 11:10:22.425 UTC
Tone Info:
Tone Frequency : 191.1750000 THz
Tone Rate : 25 bits/second
Tone Pattern Expected(Hex value) : aabbccdd
Tone Pattern Received(Hex value) : 12b36bd3e1
Tone Detected OOB : Enabled
Detection State: Failed
```

Step 6 After successful connection verification, stop **tone-pattern-detect** on the OMS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern-detect controller oms 0/2/0/0 stop
Fri Sep 22 06:23:15.165 UTC
Tone pattern detect stopped
```

Step 7 Stop the tone-pattern generation on the OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern controller ots 0/0/0/4 stop
Wed Sep 22 06:25:25.187 UTC
Tone pattern stopped
```

Connection Verification on OTS Controller

This task describes how to check OTS interface connectivity on OLT nodes.

Procedure

Step 1 Start tone-pattern on OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern controller ots 0/0/0/4 start
Wed May 25 11:59:51.040 UTC
Tone pattern started
```

Step 2 Start tone-pattern-detect on OTS controller on one side.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern-detect controller ots 0/0/0/4 start
Wed May 25 12:00:03.271 UTC
Tone pattern detect started
```

Step 3 Configure the OTS controller to generate the tone for connection verification.

Example:

```
RP/0/RP0/CPU0:ios(config)#controller ots 0/0/0/4
RP/0/RP0/CPU0:ios(config-Ots)#tone-rate 25
RP/0/RP0/CPU0:ios(config-Ots)#tone-frequency 191.175 ( OOB frequency )
RP/0/RP0/CPU0:ios(config-Ots)#tone-pattern abcd1234
RP/0/RP0/CPU0:ios(config-Ots)#tone-detect-oob
RP/0/RP0/CPU0:ios(config-Ots)#tone-pattern-expected abcd1234
RP/0/RP0/CPU0:ios(config-Ots)#commit
```

Step 4 Check for successful connection verification on the Line 2 OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#show controllers ots 0/0/0/4 tone-info
Wed May 25 12:00:11.393 UTC
Tone Info:
Tone Frequency : 191.1750000 THz
Tone Rate : 20 bits/second
Tone Pattern(Hex value) : abcd1234
Tone Pattern Expected(Hex value) : abcd1234
Tone Pattern Received(Hex value) : abcd1234
Tone Detected OOB : Enabled
Detection State: Success
```

Step 5 Stop the tone-pattern-detect on the OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern-detect controller ots 0/0/0/4 stop
Wed May 25 12:00:56.540 UTC
Tone pattern detect stoped
```

Step 6 Stop the tone-pattern generation on the OTS controller.

Example:

```
RP/0/RP0/CPU0:ios#tone-pattern controller ots 0/0/0/4 stop
Wed May 25 12:01:04.226 UTC
Tone pattern stoped
```
