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

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
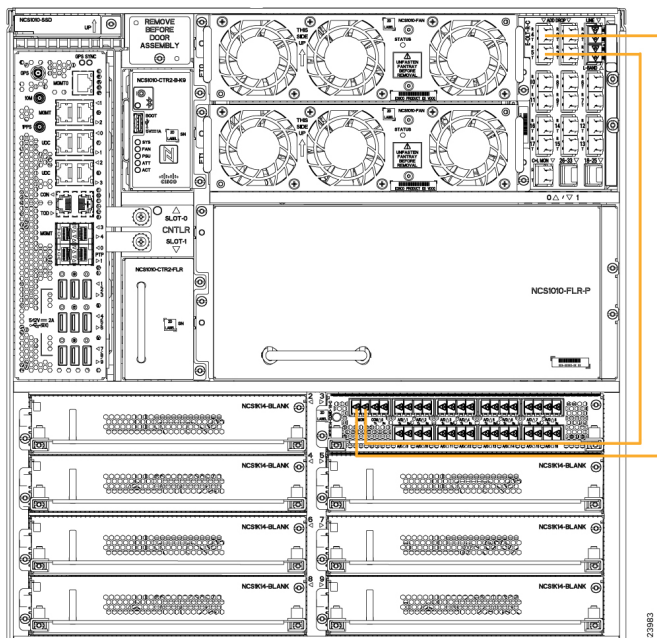
The OLT-C line card performs connection verification between the OLT-C line card and the NCS1KCCMD-16 line card panels as described in .

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.

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.

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 stopped
```