CHAPTER 5

Turn Up Network

This chapter explains how to turn up and test a Cisco ONS 15454 dense wavelength division multiplexing (DWDM) network. For DWDM topology reference information and span loss tables, refer to Chapter 16, "DWDM Network Reference."

There are two main DWDM network types, metro core, where the channel power is equalized and dispersion compensation is applied, and metro access, where the channels are not equalized and dispersion compensation is not applied. Metro core networks often include multiple spans and amplifiers, thus making optical signal-to-noise ratio (OSNR) the limiting factor for channel performance. Metro access networks often include a few spans with very low span loss; therefore, the signal link budget is the limiting factor for performance. The DWDM network topologies supported are hubbed rings, multihubbed rings, meshed rings, linear configurations, and single-span links.

The DWDM node types supported are hub, terminal, optical add/drop multiplexing (OADM), reconfigurable optical add/drop multiplexing (ROADM) anti-amplified spontaneous emissions (ASE), and line amplifier. For DWDM and hybrid node turn up procedures, see Chapter 3, "Turn Up a Node."

Note Unless otherwise specified, "ONS 15454" refers to both ANSI and ETSI shelf assemblies.

Before You Begin

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. NTP-G51 Verify DWDM Node Turn Up, page 5-2—Complete this procedure before beginning network turn up.
2. NTP-G52 Verify Node-to-Node Connections, page 5-3—Complete this procedure next.
3. NTP-G53 Set Up Timing, page 5-4—Complete this procedure next.
4. NTP-G54 Provision and Verify a DWDM Network, page 5-7—Complete this procedure next.
5. NTP-G55 Verify the Optical Receive Power, page 5-13—Complete this procedure next.
6. NTP-G56 Verify the OSNR, page 5-14—Complete as needed.
7. NTP-G57 Create a Logical Network Map, page 5-15—Complete as needed.

NTP-G51 Verify DWDM Node Turn Up

Purpose	This procedure verifies that each ONS 15454 is ready for DWDM network turn up before adding nodes to a network.
Tools/Equipment	None
Prerequisite Procedures	Chapter 3, "Turn Up a Node"
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Log into an ONS 15454 on the network that you will test. See the "DLP-G46 Log into CTC" task on page 2-25. If you are already logged in, proceed to Step 2.

Step 2 Click the **Alarms** tab.

a. Verify that the alarm filter is not turned on. See the "DLP-G128 Disable Alarm Filtering" task on page 7-32 as necessary.

b. Verify that no unexplained alarms appear. If alarms appear, investigate and resolve them before continuing. Refer to the *Cisco ONS 15454 SONET and DWDM Troubleshooting Guide* for procedures.

Step 3 Verify that the software version and defaults shown in the node view status area match the software version and NE defaults shown in your site plan. If either is not correct, complete the following procedures as needed:

- If the software is not the correct version, install the correct version from the ONS 15454 software CD. Upgrade procedures are located in the release-specific software upgrade document. Follow the upgrade procedures appropriate to the software currently installed on the node. TCC2 cards can also be ordered with the latest software release.
- If the node defaults are not correct, import the network element defaults. Refer to the *Cisco ONS 15454 Network Element Defaults* publication for Software R4.7.

Step 4 Click the **Provisioning > General** tabs. Verify that all general node information settings match the settings of your site plan. If not, see the "NTP-G80 Change Node Management Information" procedure on page 9-8.

Step 5 Click the **Provisioning > Network** tabs. Ensure that the IP settings and other Cisco Transport Controller (CTC) network access information is correct. If not, see the "NTP-G81 Change CTC Network Access" procedure on page 9-10.

Step 6 Click the **Provisioning > Protection** tabs. Verify that all protection groups have been created according to your site plan. If not, see the "NTP-G83 Modify or Delete Card Protection Settings" procedure on page 9-20.

Step 7 Click the **Provisioning > Security** tabs. Verify that all users have been created and that their security levels match the settings indicated by your site plan. If not, see the "NTP-G88 Modify Users and Change Security" procedure on page 9-34.

Step 8 If Simple Network Management Protocol (SNMP) is provisioned on the node, click the **Provisioning > SNMP** tabs. Verify that all SNMP settings match the settings of your site plan. If not, see the "NTP-G89 Change SNMP Settings" procedure on page 9-42.

Step 9 Provision the network connections using the "NTP-G52 Verify Node-to-Node Connections" procedure on page 5-3.

Stop. You have completed this procedure.

NTP-G52 Verify Node-to-Node Connections

Purpose	This procedure verifies OSC terminations between nodes and checks span attenuation.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up, page 5-2
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Verify the network fiber connections. The east ports (LINE TX and LINE RX) of one node must connect to the west ports (LINE RX and LINE TX respectively) of the adjacent node. If fibers are missing or incorrectly connected, make the correct connections. See the "NTP-G34 Install Fiber-Optic Cables on DWDM Cards" procedure on page 3-35 for instructions.

Step 2 Complete the "DLP-G46 Log into CTC" task on page 2-25 at a network node.

Step 3 Click the **Provisioning > Comm Channels > OSC** tab. Verify that OSC terminations were created for the east and west OSC-CSM or OSCM cards and the port state is In-Service and Normal (IS-NR [ANSI])/Unlocked-enabled (ETSI). If so, continue with Step 5. If OSC terminations are not created, complete the "DLP-G75 Create OSC Terminations" task on page 3-61.

Step 4 Repeat Step 3 at each network node.

Step 5 Complete the "DLP-G155 Verify Optical Span Loss Using CTC" task on page 9-3.

Step 6 If the measured span loss is within the minimum and maximum expected span loss values, continue with the next step. If the measured span loss values are not within the minimum and maximum range, complete the "NTP-G115 Clean Fiber Connectors" procedure on page 11-32, then repeat Step 5. If necessary, complete the "DLP-G156 Measure Span Insertion Loss Using an OTDR" task on page 9-4 to provide a more accurate measurement.

Step 7 Repeat Step 5 at each network node.

Stop. You have completed this procedure.

NTP-G53 Set Up Timing

Purpose	This procedure provisions the ONS 15454 timing.
Tools/Equipment	None
Prerequisite Procedures	NTP-G51 Verify DWDM Node Turn Up, page 5-2
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task on page 2-25 at the node where you will set up timing. If you are already logged in, continue with Step 2.

Step 2 Complete the "DLP-G95 Set Up External or Line Timing" task on page 5-4 if an external building integrated timing supply (BITS) source is available. This is the common ONS 15454 timing setup procedure.

Step 3 If you cannot complete Step 2 (an external BITS source is not available), complete the "DLP-G96 Set Up Internal Timing" task on page 5-6. This task can only provide Stratum 3 timing.

Stop. **You have completed this procedure**.

DLP-G95 Set Up External or Line Timing

Purpose	This task defines the ONS 15454 timing source (external or line).
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view, click the **Provisioning > Timing** tabs.

Step 2 In the General Timing area, complete the following information:

- Timing Mode—Choose **External** if the ONS 15454 derives its timing from a BITS source wired to the backplane pins (ANSI) or a MIC-C/T/P FMEC (ETSI); choose **Line** if timing is derived from an OSC-CSM or OSCM card that is optically connected to the timing node. A third option, Mixed, allows you to set external and line timing references.

  Note Because Mixed timing might cause timing loops, Cisco does not recommend its use. Use this mode with care.

- SSM Message Set—For DWDM nodes, choose the Generation 2 synchronization status messaging (SSM) option. Generation 1 is used only by SONET or SDH ONS 15454s that are connected to equipment that does not support Generation 2.

- Quality of RES—If your timing source supports the reserved S1 byte, set the timing quality here. (Most timing sources do not use RES.) Qualities are displayed in descending quality order as ranges. For example, ST3<RES<ST2 means the timing reference is higher than a Stratum 3 and lower than a Stratum 2. Refer to Chapter 18, "Security and Timing" for more information about SSM, including definitions of the SONET timing levels.
- Revertive—Select this check box if you want the ONS 15454 to revert to a primary reference source after the conditions that caused it to switch to a secondary timing reference are corrected.
- Revertive Time—If Revertive is checked, choose the amount of time the ONS 15454 will wait before reverting to its primary timing source. Five minutes is the default.

Step 3 In the BITS Facilities area, complete the following information:

Note The BITS Facilities section sets the parameters for your BITS-1 and BITS-2 timing references. Many of these settings are determined by the timing source manufacturer. If equipment is timed through BITS Out, you can set timing parameters to meet the requirements of the equipment.

- BITS In State—If Timing Mode is set to External or Mixed, set the BITS In State for BITS-1 and/or BITS-2 to **IS** (in service) depending whether one or both BITS input pin pairs on the backplane (ANSI) or FMEC (ETSI) are connected to the external timing source. If Timing Mode is set to Line, set the BITS In State to **OOS** (out of service).
- BITS Out State—If equipment is connected to the node's BITS output pins on the backplane (ANSI) or FMEC (ETSI) and you want to time the equipment from a node reference, set the BITS Out State for BITS-1 and/or BITS-2 to **IS**, depending on which BITS Out pins are used for the external equipment. If equipment is not attached to the BITS output pins, set the BITS Out State to **OOS**.

Step 4 If the BITS In State for BITS-1 and BITS-2 is set to OOS, continue with Step 5. If the BITS In State is set to IS for either BITS-1 or BITS-2, complete the following information:

- Coding—Set to the coding used by your BITS reference, either B8ZS (binary 8-zero substitution) or AMI (alternate mark inversion).
- Framing—Set to the framing used by your BITS reference, either ESF (Extended Super Frame) or SF (D4) (Super Frame).
- Sync Messaging—Check to enable SSM. SSM is not available if Framing is set to SF (D4).
- AIS Threshold—If SSM is disabled or SF (D4) is used, set the quality level where a node sends an alarm indication signal (AIS) from the BITS-1 Out and BITS-2 Out backplane (ANSI) or FMEC (ETSI) pins. An AIS is raised when the optical source for the BITS reference falls to or below the SSM quality level defined in this field.
- LBO—If you are timing an external device connected to the BITS Out pins, set the distance between the device and the ONS 15454. Options are: 0-133 ft. (default), 124-266 ft., 267-399 ft., 400-533 ft., and 534-655 ft. Line build out (LBO) relates to the BITS cable length.

Step 5 In the Reference Lists area, complete the following information:

Note Reference Lists defines up to three timing references for the node and up to six BITS Out references. BITS Out references define the timing references used by equipment that can be attached to the node's BITS Out pins on the backplane (ANSI) or FMEC (ETSI). If you attach equipment to BITS Out pins, you normally attach it to a node with Line mode because equipment near the external timing reference can be directly wired to the reference.

- NE Reference—Allows you to define three timing references (Ref 1, Ref 2, Ref 3). The node uses Reference 1 unless a failure occurs to that reference, in which case the node uses Reference 2. If Reference 2 fails, the node uses Reference 3, which is typically set to Internal Clock. Reference 3 is the Stratum 3 clock provided on the TCC2 card. The options displayed depend on the Timing Mode setting.
  - If the Timing Mode is set to External, your options are BITS-1, BITS-2, and Internal Clock.
  - If the Timing Mode is set to Line, your options are the node's working OSCM, OSC-CSM, or MXP cards and Internal Clock. Choose the cards/ports that are directly or indirectly connected to the node wired to the BITS source. Set Reference 1 to the card that is closest to the BITS source. For example, if Slot 5 is connected to the node wired to the BITS source, choose Slot 5 as Reference 1.
  - If the Timing Mode is set to Mixed, both BITS and OSC or MXP cards are available, allowing you to set a mixture of external BITS and OSC or MXP cards as timing references.
- BITS-1 Out/BITS-2 Out—Sets the timing references for equipment wired to the BITS Out backplane (ANSI) or FMEC (ETSI) pins. BITS-1 Out and BITS-2 Out are enabled when BITS-1 and BITS-2 facilities are put in service. If Timing Mode is set to external, choose the OSC or MXP card used to set the timing. If Timing Mode is set to Line, you can choose an OSC or MXP card or choose NE Reference to have the BITS-1 Out and/or BITS-2 Out follow the same timing references as the NE.

Note All MXP card client ports are available for timing regardless of the card's termination mode. MXP trunk ports can be a timing reference when G.709 is set to OFF and the Termination Mode is set to LINE.

Step 6 Click **Apply**.

Note Refer to the *Cisco ONS 15454 SONET and DWDM Troubleshooting Guide* for timing-related alarms.

Step 7 Return to your originating procedure (NTP).

DLP-G96 Set Up Internal Timing

Purpose	This task sets up internal timing (Stratum 3) for an ONS 15454.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25
Required/As Needed	As needed (use only if a BITS source is not available)
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution Internal timing is Stratum 3 and not intended for permanent use. All ONS 15454s should be timed to a Stratum 2 or better primary reference source.

Step 1 In node view, click the **Provisioning > Timing** tabs.

Step 2 In the General Timing area, enter the following:

- Timing Mode—Set to **External**.
- SSM Message Set—Set to **Generation 1**.
- Quality of RES—Does not apply to internal timing.
- Revertive—Does not apply to internal timing.
- Revertive Time—Does not apply to internal timing.

Step 3 In the BITS Facilities area, change the BITS In State and BITS Out State to **OOS**. Disregard the other BITS Facilities settings; they are not relevant to internal timing.

Step 4 In the Reference Lists area, enter the following information:

- NE Reference
  - Ref 1—Set to **Internal Clock**.
  - Ref 2—Set to **Internal Clock**.
  - Ref 3—Set to **Internal Clock**.
- BITS-1 Out/BITS-2 Out—Set to **None**.

Step 5 Click **Apply**.

Step 6 Return to your originating procedure (NTP).

NTP-G54 Provision and Verify a DWDM Network

Purpose	This procedure verifies the performance of all cable connections and cards in a network topology. You can also use this procedure to troubleshoot any problems with DWDM network setup.
Tools/Equipment	Test set or protocol analyzer
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task on page 2-25 to log into an ONS 15454 on the network.

Step 2 Click the **Alarms** tab:

a. Verify that the alarm filter is not turned on. See the "DLP-G128 Disable Alarm Filtering" task on page 7-32 as necessary.

b. Verify that no unexplained conditions appear on the network. If unexplained conditions appear, resolve them before continuing. Refer to the *Cisco ONS 15454 SONET and DWDM Troubleshooting Guide*.

c. Complete the "DLP-G114 Export CTC Data" task on page 7-4 to export alarm and condition information.

Step 3 Review the MetroPlanner file and determine the first channel (ITU wavelength) to be provisioned. Use the transponder, muxponder, or line card that corresponds to the selected wavelength.

Note Provision and measure only one channel.

Step 4 As needed, complete the "DLP-G97 Provision a Proxy Tunnel" task on page 5-10.

Step 5 As needed, complete the "DLP-G98 Provision a Firewall Tunnel" task on page 5-11.

Step 6 As needed, complete the "DLP-G99 Create a Provisionable Patchcord" task on page 5-12.

Step 7 If TXP and MXP cards are installed, provision them according to the MetroPlanner file or according to your site plan. For cards with tunable optical wavelengths, choose the ITU wavelength according to your site plan. For provisioning information, see the following:

- NTP-G96 Modify Line Settings and PM Parameter Thresholds for TXP_MR_10G and TXP_MR_10E Cards, page 10-32
- NTP-G97 Modify Line Settings and PM Parameter Thresholds for MXP_2.5G_10G and MXP_2.5G_10E Cards, page 10-43
- NTP-G98 Modify Line Settings and PM Parameter Thresholds for TXP_MR_2.5G and TXPP_MR_2.5G Cards, page 10-55
- NTP-G99 Modify Line Settings and PM Parameter Thresholds for MXP_MR_2.5G and MXPP_MR_2.5G Cards, page 10-65

Step 8 Create the optical channels according to your site plan. Complete the "DLP-G105 Provision DWDM Optical Channel Network Connections" task on page 6-9.

Note The amplifiers automatically calculate the optical output power to maintain a constant power level on each channel every time a channel is created on the DWDM network. Automatic power control (APC) also starts every 60 minutes. If the span length changes, APC modifies amplifier gains and express variable optical attenuation (VOA). For more information about APC, see the "15.2 Automatic Power Control" section on page 15-14.

Step 9 If OPT-PRE amplifiers are being turned up for the first time:

a. In node view, double-click the OPT-PRE card to open card view.

b. Click the **Provisioning > Opt. Ampli. Line > Parameters** tabs.

c. Verify that the Signal Output Power value for Port 2 is equal to or higher than provisioned set point shown in the Channel Power Ref field. The Total Output Power field includes the ASE noise component.

d. Click the **Maintenance > ALS** tabs and verify that the ALS Mode column displays Auto Restart. Auto Restart is the default Automatic Laser Shutdown (ALS) mode.

e. For each OPT-PRE amplifier that is turned up for the first time on your network, repeat Steps a through d.

Step 10 If OPT-BST amplifiers are being turned up for the first time:

a. In node view, double-click the OPT-BST card to open card view.

b. Click the **Provisioning > Opt. Ampli. Line > Parameters** tabs.

c. Verify that the Signal Output Power field for Port 6 is equal to or higher than the provisioned set point shown in the Channel Power Ref field. The Total Output Power field includes the ASE noise component.

d. Verify that the Working Mode field is the one specified by Cisco MetroPlanner, either control power or control gain. The MetroPlanner parameter is dwdm.rx/tx.amp.WkgModeW/E (rx for OPT-PRE cards; tx for OPT-BST cards). You can view the parameter on the node view Provisioning > WDM-ANS tab.

e. Click the **Maintenance > ALS** tabs and verify that the ALS Mode column displays Auto Restart. Auto Restart is the default ALS mode.

f. For each OPT-BST amplifier that is turned up for the first time on your network, repeat Steps a through e.

Step 11 If OADM nodes have a new circuit running traffic for the first time, check the power values:

Note This step checks the Pin AD Stage (dwdm.[rx/tx].amp.WkgModeW/E) value and the Pout AD Stage (dwdm.rx.power.InAdE/W) value that characterize every OADM node. The ANS function uses these values to make the VOA adjustments.

- If the circuit is terminated inside the node, go to node view and click the **Provisioning > WDM-ANS > Provisioning** tabs. In the Selector area, click **West Pin** field and then **Pin AD Stage**. Verify that the value matches the value for the first OADM card in your circuit heading west to east shown in the COM RX port, ±2 dB. If the values are outside of the error margins, contact Cisco qualified personnel to create another MetroPlanner file or refer to the next level of support.
- If the circuit passes through the node, go to node view and click the **Provisioning > WDM-ANS > Provisioning** tabs. Click **West Pin** field and then **Pin AD Stage**. Verify that the value matches the value for the first OADM card in your circuit heading west to east shown in the COM RX port, ±2 dB. Click **East Pin** and **Pout AD Stage**. Verify the value matches the value for the first OADM card in your circuit heading west to east shown in the COM TX port, ±1 dB. If the values are outside of the error margins, contact Cisco qualified personnel to create another MetroPlanner file or refer to the next level of support.
- If the circuit starts from the node, go to node view and click the **Provisioning > WDM-ANS > Provisioning** tabs. Click **East Pin** field and then **Pin AD Stage**. Verify the value matches the value for the first OADM card in your circuit heading west to east shown in the COM TX port, ±1 dB. If the values are outside of the error margins, contact Cisco qualified personnel to create another MetroPlanner file or refer to the next level of support.

Step 12 Check the received power range:

a. Display the first TXP, MXP, or line card in card view. Complete the "DLP-G136 Clear Selected PM Counts" task on page 8-6.

b. Click the **Performance > Optics PM** tab.

c. Record the values shown in the RX Optical Pwr field.

d. Click the **Provisioning > Optics Thresholds** tabs.

e. Compare the value recorded in Step c with the values listed in the RX Power High and RX Power Low columns. Verify that the received power on the transponder, muxponder, or line card is within the allowed receiving range according to optical card sensitivity specifications. See the Chapter 14, "Card Reference," for information about card specifications.

Step 13 Perform a short-term bit error rate (BER) test:

a. Complete the "DLP-G136 Clear Selected PM Counts" task on page 8-6 for the transponder, muxponder, or line card.

b. Click the **Payload PM** tab, or, if OTN is provisioned, click the **OTN PM** tab.

c. Perform a short-term BER test using a test set or protocol analyzer.

Note To see an accurate performance monitoring count, the BER test results must be consistent with the transmitted bit rate for at least 10 minutes.

Note For information about using a test set or protocol analyzer, refer to the test set or protocol analyzer user guide.

Step 14 Repeat Steps 3 through 13 for each channel in your site plan.

Step 15 If a node fails any test, repeat the test after verifying correct setup and configuration. If the test fails again, refer to the next level of support.

After all tests are successfully completed and no alarms exist in the network, the network is ready for service.

Stop. You have completed this procedure.

DLP-G97 Provision a Proxy Tunnel

Purpose	This task sets up a proxy tunnel to communicate with a non-ONS far-end node. Proxy tunnels are only necessary when the proxy server is enabled and a foreign GCC termination exists, or if static routes exist so that the GCC network is used to access remote networks or devices. You can provision a maximum of 12 proxy server tunnels.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25 DLP-G76 Provision GCC Terminations, page 3-62
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Note If the proxy server is disabled, you cannot set up a proxy tunnel.

Step 1 Click the **Provisioning > Network > Proxy** subtabs.

Step 2 Click **Create**.

Step 3 In the Create Tunnel dialog box, complete the following:

- Source Address—Type the IP address of the source node (32 bit length) or source subnet (any other length).
- Length—Choose the length of the source subnet mask.
- Destination Address—Type the IP address of the destination node (32 bit length) or destination subnet (any other length).
- Length—Choose the length of the destination subnet mask.

Step 4 Click **OK**.

Step 5 Continue with your originating procedure (NTP).

DLP-G98 Provision a Firewall Tunnel

Purpose	This task provisions destinations that will not be blocked by the firewall. Firewall tunnels are only necessary when the proxy server is enabled and a foreign GCC termination exists, or if static routes exist so that the GCC network is used to access remote networks or devices. You can provision a maximum of 12 firewall tunnels.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25 DLP-G76 Provision GCC Terminations, page 3-62
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Note If the proxy server is configured as proxy-only or is disabled, you cannot set up a firewall tunnel.

Step 1 Click the **Provisioning > Network > Firewall** subtabs.

Step 2 Click **Create**.

Step 3 In the Create Tunnel dialog box, complete the following:

- Source Address—Type the IP address of the source node (32 bit length) or source subnet (any other length).
- Length—Choose the length of the source subnet mask.
- Destination Address—Type the IP address of the destination node (32 bit length) or destination subnet (any other length).
- Length—Choose the length of the destination subnet mask.

Step 4 Click **OK**.

Step 5 Continue with your originating procedure (NTP).

DLP-G99 Create a Provisionable Patchcord

Purpose	This task creates a provisionable patchcord, also called a virtual link. They appear as dashed lines in CTC network view. For the specific situations in which a patchcord is necessary, see the "19.3 Provisionable Patchcords" section on page 19-19.
Tools/Equipment	OC-N, transponder/muxponder, optical add/drop multiplexer, and multiplexer/demultiplexer cards
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25 NTP-G94 Provision Pluggable Port Modules, page 10-29 for transponder and muxponder cards
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning and higher

Note An optical port requires two patchcords when the remote end is Y-cable protected or is an add/drop multiplexer or multiplexer/demultiplexer port.

Step 1 In node view, click the **Provisioning > Comm Channels > Provisionable Patchcords** tabs. If you are in network view, click the **Provisioning > Provisionable Patchcords** tabs.

Step 2 Click **Create**. The Provisionable Patchcord dialog box appears.

Step 3 In the Origination Node area, complete the following:

- **a.** If you are in node view, the Origination Node defaults to the current node. If you are in network view, click the desired origination node from the drop-down list.
- **b.** Type a patchcord identifier (0 through 32767) in the TX/RX ID field.
- **c.** Click the desired origination slot/port from the list of available slots/ports.

Step 4 In the Termination Node area, complete the following:

- **a.** Click the desired termination node from the drop-down list. If the remote node has not previously been discovered by CTC but is accessible by CTC, type the name of the remote node.
- **b.** Type a patchcord identifier (0 through 32767) in the TX/RX ID field. The origination and termination IDs must be different if the patchcord is set up between two cards on the same node.
- **c.** Click the desired termination slot/port from the list of available slots/ports. The origination port and the termination port must be different.

Step 5 If you need to provision transmit and receive separately for multiplexer/demultiplexer cards, check the **Separate Tx/Rx** check box. If not, continue with Step 6. The origination and termination TX ports are already provisioned. Complete the following to provision the RX ports:

- **a.** In the Origination Node area, type a patchcord identifier (0 through 32767) in the RX ID field. The origination Tx and Rx and termination Tx and Rx IDs must be different.
- **b.** Click the desired origination slot/port from the list of available slots/ports.
- **c.** In the Termination Node area, type a patchcord identifier (0 through 32767) in the RX ID field. The origination Tx and Rx and termination Tx and Rx IDs must be different.
- **d.** Click the desired termination slot/port from the list of available slots/ports.

Step 6 Click **OK**.

Step 7 If you provisioned a patchcord on a port in a 1+1 protection group, a dialog box appears to ask if you would like to provision the peer patchcord. Click **Yes**. Repeat Steps 3 through 6.

Step 8 Return to your originating procedure (NTP).

NTP-G55 Verify the Optical Receive Power

Purpose	This procedure verifies the optical receive power.
Tools/Equipment	Optical power meter
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task on page 2-25 at an ONS 15454 on the network.

Step 2 Using an optical power meter, check the receive optical power on both ends of the span:

a. Identify a transmit port on an AD-xC-xx.x, 32DMX-O, 32DMX, or 4MD card in the node that you want to test and connect it to the optical power meter.

b. Read the values displayed on the optical power meter. These values must be consistent with the data provided by the MetroPlanner installation file, +/– 1 dB. To view MetroPlanner values, click the **Provisioning > WDM-ANS > Provisioning** tabs. For 32DMX-O and 32DMX cards, the values are listed in the Channel x Drop Power field (dwdm.rx.power.DropChxW/E) where x = 1 to 32. For OADM cards, the fields are listed in the Band [x] Drop (dwdm.rx.power.DropBxW/E) field where x = 1 to 8.

Note For information about using an optical power meter, refer to the optical power meter user guide.

Step 3 If the optical power is too low (indicated by an alarm or APC out of range or skipped condition), check the fiber connections as appropriate to your node configuration:

- Check the fiber connections between the OPT-BST amplifier or the OSC-CSM card and the OPT-PRE amplifier or the next OADM card.
- Check the fiber connections between the OADM cards and if needed clean the connectors. See the "NTP-G115 Clean Fiber Connectors" procedure on page 11-32.

Step 4 If the power coming from the AD-xC-xx.x card is higher than required, put an external optical attenuator before the client interface input in order to meet the power requirement.

Step 5 If the power coming from the 32DMX-O card is higher or lower than required, you can regulate the VOA in CTC.

- From the 32DMX-O or 32DMX card view, choose the **Provisioning > Optical Chn > Parameters** tabs. The VOA columns including the VOA power and attenuation reference points can be manually set according to your site plan.

- Changing the VOA power and attenuation calibration values adjusts the power and attenuation reference settings.

Stop. You have completed this procedure.

NTP-G56 Verify the OSNR

Purpose	This procedure verifies the OSNR. The OSNR is the ratio between the signal power level and the noise power level.
Tools/Equipment	Optical spectrum analyzer
Prerequisite Procedures	DLP-G46 Log into CTC, page 2-25
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task on page 2-25 at an ONS 15454 on the network.

Step 2 Using an optical spectrum analyzer, check the received OSNR for each transmitted channel on both ends of the span:

a. Identify the last OSC-CSM, OPT-PRE, or OPT-BST MON port before the channel is dropped. If OPT-PRE cards are installed with an OPT-BST or OSC-CSM card, use the OPT-PRE MON port.

b. Determine the OSNR values based on the optical spectrum retrieved. These values must be consistent with the OSNR values provided by the MetroPlanner installation file, +/– 1 dB. The MetroPlanner OSNR values are only valid for the receive locations of a dropped channel. Therefore, OSNR values of an OADM express channel cannot be compared to the MetroPlanner values.

Note For OSNR values for each card class, refer to Chapter 14, "Card Reference."

Step 3 If the OSNR is too low, check the following, depending on your node configuration:

Note The purpose of this step is not to improve the signal-to-noise ratio (SNR), but to match the per-channel power level within the receive (RX) port power range.

- Check the fiber connections between the OPT-BST amplifier or the OSC-CSM and the OPT-PRE amplifier and if needed, clean the connectors. See the "NTP-G115 Clean Fiber Connectors" procedure on page 11-32.
- On the near-end OPT-BST amplifier, check the equalization of the added channels at the monitor output.
- On the OPT-PRE amplifier, check the output power on both COM TX and DC TX ports.
- On the far-end OPT-PRE amplifier, check the amplifier gain tilt at the monitor output.

Stop. You have completed this procedure.

NTP-G57 Create a Logical Network Map

Purpose	This procedure allows a superuser to create a consistent network view for all nodes on the network.
Tools	None
Prerequisite Procedures	This procedure assumes that network turn up is complete.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Step 1 Complete the "DLP-G46 Log into CTC" task on page 2-25 at a node on the network where you want to create the network map. If you are already logged in, continue with Step 2.

Step 2 From the View menu, choose **Go to Network View**.

Step 3 Change the position of the nodes in the network view according to your site plan.

- **a.** Click a node to select it, then press the **Ctrl** key while you drag and drop a node icon to a new location.
- **b.** Repeat Step a for each node you need to position.

Step 4 On the network view map, right-click and choose **Save Node Position**.

Step 5 Click **Yes in the Save Node Position dialog box.**

CTC opens a progress bar and saves the new node positions.

Note Retrieve, Provisioning, and Maintenance users can move nodes on the network map, but only Superusers can save new network map configurations. To restore the view to a previously saved version of the network map, right-click on the network view map and choose Reset Node Position.

Stop. You have completed this procedure.