



## Turn Up a DWDM Node

This chapter explains how to provision a single Cisco ONS 15454 dense wavelength division multiplexing (DWDM) node and turn it up for service, including node name, date and time, timing references, network attributes such as IP address and default router, users and user security, and DWDM parameters.



### Note

The procedures and tasks in this chapter apply to DWDM (Software Release 4.5) nodes only.



### Note

To provision an ONS 15454 for DWDM, you must have a DWDM network planning application, such as Cisco MetroPlanner. Cisco MetroPlanner designs the entire network based on your traffic flow and physical topology. The design includes an ONS 15454 shelf plan listing the DWDM cards that need to be installed for each node in the DWDM network. MetroPlanner provides a configuration file that you can import into the node to set its power and attenuation levels automatically. For information about Cisco MetroPlanner, contact your Cisco account representative.

## Before You Begin

Complete the following procedures and tasks before you begin DWDM node turn up:

- In [Chapter 1, “Install the Shelf and Backplane Cable,”](#) complete all procedures.
- In [Chapter 2, “Install Cards and Fiber-Optic Cable,”](#) complete the “[DLP-A36 Install the TCC+/TCC2 Cards](#)” task on page 2-7.
- In [Chapter 3, “Connect the PC and Log into the GUI,”](#) complete all procedures.
- In [Chapter 4, “Turn Up Node,”](#) complete all procedures.

This section lists the procedures (NTPs) that you need to complete to turn up a DWDM node. Turn to a procedure for applicable tasks (DLPs).

1. [NTP-A221 Verify TCC2 Installation, page 5-2](#)—Complete this procedure first.
2. Using your DWDM shelf layout plan, complete the following procedures:
  - [NTP-A242 Install the DWDM Cards, page 2-23](#)
  - [NTP-A243 Install the DWDM Dispersion Compensating Cards, page 2-25](#), as needed
  - [NTP-A244 Install Fiber-Optic Cables on DWDM Cards, page 2-42](#)
3. [NTP-A222 Provision the DWDM Node, page 5-3](#)—Complete this procedure last.

# NTP-A221 Verify TCC2 Installation

<b>Purpose</b>	This procedure verifies that the ONS 15454 node has TCC2 cards installed and is ready for DWDM provisioning.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">Chapter 1, “Install the Shelf and Backplane Cable”</a> <a href="#">Chapter 2, “Install Cards and Fiber-Optic Cable”</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Retrieve or higher

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- Step 1** Verify that two TCC2 cards are installed in Slots 7 and 11.
- Step 2** Verify that the green ACT (active) LED is illuminated on one TCC2 and the amber STBY (standby) LED is illuminated on the second TCC2.




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**Note** If the TCC2s are not installed, or their LEDs are not illuminated as described, do not proceed. Repeat the [“DLP-A36 Install the TCC+/TCC2 Cards” task on page 2-7](#), or refer to the *Cisco ONS 15454 Troubleshooting Guide* to resolve installation problems before proceeding to the next procedure.

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- Step 3** Verify that the software release shown on the LCD matches the software release indicated in your site plan. If the release does not match, perform one of the following procedures:
- Perform a software upgrade using a Cisco ONS 15454 software CD. Refer to the *Cisco ONS 15454 Software Upgrade Guide* for instructions.
  - Replace the TCC+/TCC2 cards with cards containing the correct release. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for replacement procedures.

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

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# NTP-A222 Provision the DWDM Node

<b>Purpose</b>	This procedure sets the network and system settings and provisions the node power levels.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	You must use Cisco MetroPlanner or other DWDM network calculation tool to prepare a configuration file for your network. <a href="#">NTP-A221 Verify TCC2 Installation, page 5-2</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** Complete the [“DLP-A60 Log into CTC” task on page 3-26](#) at the DWDM node you want to provision.
- Step 2** Click the **Connections** tab, then click the **Calculate Connections** button.
- Step 3** Verify that every connection matches the connections specified by your DWDM design plan. If a connection is not correct:
- a. Delete the connection. See the [“DLP-A405 Delete a DWDM Connection” task on page 5-11](#).
  - b. Uninstall the fibers from the incorrect slot/card/port.
  - c. Connect the fiber to the correct slot/card/port.
- Step 4** Perform one of the following tasks:
- If you have a Cisco MetroPlanner configuration file, complete the [“DLP-A400 Import a Cisco MetroPlanner Configuration File” task on page 5-4](#).
  - If you need to provision the node manually, complete one of the following tasks as appropriate:
    - [DLP-A401 Provision DWDM Hub Node Settings, page 5-4](#).
    - [DLP-A402 Provision DWDM Terminal Node Settings, page 5-6](#).
    - [DLP-A403 Provision DWDM OADM Node Settings, page 5-7](#).
    - [DLP-A404 Provision DWDM Line Node Settings, page 5-10](#).
  - d. Create a new connection. See the [“DLP-A406 Create a DWDM Connection” task on page 5-11](#).
- Step 5** Click the **Services** tab. Click **Launch ANS**. Automatic Node Setup (ANS) adjusts the values of the variable optical attenuators (VOAs) to equalize the per-channel power at the amplifier level.
- Step 6** Complete the [“DLP-A407 Verify OSCM and OSC-CSM Transmit Power” task on page 5-12](#).
- Stop. You have completed this procedure.**
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## DLP-A400 Import a Cisco MetroPlanner Configuration File

<b>Purpose</b>	This task imports a Cisco MetroPlanner configuration file into the node to configure the node automatically.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	A Cisco MetroPlanner network configuration file must be located on an available local or network drive. <a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** In node view, click the **Provisioning > WDS-ANS > NE Update** tabs.
- Step 2** Click the **Import** button.
- Step 3** In the Import Defaults From File dialog box, enter the path to the configuration file, or click **Browse** and navigate to the configuration file using the Open dialog box.
- Step 4** Click **OK**.
- Step 5** Click the **Apply** button.
- Step 6** Return to your originating procedure (NTP).
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## DLP-A401 Provision DWDM Hub Node Settings

<b>Purpose</b>	This task provisions the network types, system types, network power levels, and channel power levels for a DWDM hub node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** In node view, click the **Provisioning > WDS-ANS > Provisioning** tabs.
- Step 2** Complete the fields shown in [Table 5-1](#). In the table, the West Side of the node is the one equipped with cards that receive from the west and transmit to the east. The East Side of the node is the one equipped with cards that receive from the east and transmit to the west.

**Table 5-1 DWDM Hub Node Settings**

Parameter	Description	Default Value	Options
Network type	Defines the DWDM network type	Metro-Core	Metro-Core—Channels are equalized Metro-Access—Channels are not equalized to minimize the number of amplifiers in the ring
West Side			
System Type	Defines the west-side DWDM fiber type, number of channels, and control mode. <a href="#">Table 5-2</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pdrop	Sets the west-side expected power level on the client interface.	-14 dBm	-50 dBm to 30 dBm
Pexpress	Sets the west-side expected per-channel power on the pass-through interface.	-12 dBm	-50 dBm to 30 dBm
Pout-mux Stage	Sets the per-channel power out at the multiplexing stage.	-18 dBm	-50 dBm to 30 dBm
East Side			
System Type	Defines the east-side DWDM fiber type, number of channels, and control mode. <a href="#">Table 5-2</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pdrop	Sets the east-side expected power level on the client interface.	-14 dBm	-50 dBm to 30 dBm
Pexpress	Sets the east-side expected per-channel power on the pass-through interface.	-12 dBm	-50 dBm to 30 dBm
Pout-mux Stage	Sets the per-channel power out at the multiplexing stage.	-18 dBm	-50 dBm to 30 dBm

[Table 5-2](#) shows the system types that can be assigned to the node.

**Table 5-2 DWDM System Types**

System Type	Per-Channel Power	Control Mode
SMF-28 32 Ch Control Gain	2 dBm	Control gain
SMF-28 32 Ch Control Power	2 dBm	Control power
SMF-28 8 Ch Control Power	8 dBm	Control power
SMF-28 16 Ch Control Power	5 dBm	Control power

- Step 3** Click **Apply**.
- Step 4** Return to your originating procedure.

## DLP-A402 Provision DWDM Terminal Node Settings

<b>Purpose</b>	This task provisions the network types, system types, network power levels, and channel power levels for a DWDM terminal node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

- Step 1** In node view, click the **Provisioning > WDS-ANS > Provisioning** tabs.
- Step 2** Complete the fields shown in [Table 5-3](#). In the table, the West Side of the node is the one equipped with cards that receive from the west and transmit to the east. The East Side of the node is the one equipped with cards that receive from the east and transmit to the west. The fields that you provision depend on the terminal node type. You will provision West parameters on an East terminal node, and East parameters on a West terminal node.

**Table 5-3 DWDM Terminal Node Settings**

Parameter	Description	Default Value	Options
Network type	Defines the DWDM network type.	Metro-Core	Metro-Core—Channels are equalized. Metro-Access—Channels are not equalized to minimize the number of amplifiers in the ring.
West Side			
System Type	Defines the west-side DWDM system type (fiber type, number of channels, control mode). <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pdrop	Sets the west-side expected power level on the client interface.	-14 dBm/	-50 dBm to 30 dBm
Pout-mux Stage	Sets the west-side per-channel power out at the multiplexing stage.	-18 dBm/	-50 dBm to 30 dBm
East Side			

**Table 5-3 DWDM Terminal Node Settings (continued)**

Parameter	Description	Default Value	Options
System Type	Defines the east-side DWDM system type (fiber type, number of channels, control mode). <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pdrop	Sets the east-side expected power level on the client interface.	-14 dBm	-50 dBm to 30 dBm
Pout-mux Stage	Sets the east-side per-channel power out at the multiplexing stage.	-18 dBm	-50 dBm to 30 dBm

**Step 3** Click **Apply**.

**Step 4** Return to your originating procedure.

## DLP-A403 Provision DWDM OADM Node Settings

<b>Purpose</b>	This task provisions the network types, system types, network power levels, and channel power levels for a DWDM add/drop multiplexing node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

**Step 1** In node view, click the **Provisioning > WDS-ANS > Provisioning** tabs.

**Step 2** Complete the fields shown in [Table 5-4](#). In the table, the West Side of the node is the one equipped with cards that receive from the west and transmit to the east. The East Side of the node is the one equipped with cards that receive from the east and transmit to the west.

**Table 5-4 DWDM OADM Node Settings**

Parameter	Description	Default Value	Options
Network type	Defines the DWDM network type.	Metro-Core	Metro-Core—Channels are equalized. Metro-Access—Channels are not equalized to minimize the number of amplifiers in the ring.
West Side			

**Table 5-4 DWDM OADM Node Settings (continued)**

Parameter	Description	Default Value	Options
System Type	Defines the west-side DWDM system type. <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pout-oadm Stage	Sets the west-side per-channel power out at the OADM stage.	+2 dBm	-50 dBm to 30 dBm
Pin-oadm Stage	Sets the west-side per-channel input power at the OADM stage.	-14 dBm	-50 dBm to 30 dBm
Pout Band [nn.n]	Sets the west-side per-band power for a specific drop band, where <i>nn.n</i> is the channel ID. Up to 8 bands might appear, 30.3, 34.2, 38.1, 42.1, 46.1, 50.1, 54.1, and 58.1, depending on the optical filter cards that are installed in the node.	-14 dBm	-50 dBm to 30 dBm
East Side			
System Type	Defines the east-side DWDM system type. <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
Pout-oadm Stage	Sets the east-side per-channel power out from the OADM stage.	+2 dBm	-50 dBm to 30 dBm
Pin-oadm Stage	Sets the east-side per-channel input power from the OADM stage.	-14 dBm	-50 dBm to 30 dBm
Pout Band [nn.n]	Sets the east-side per-band power for a specific drop band, where <i>nn.n</i> is the channel ID. Up to 8 bands might appear, 30.3, 34.2, 38.1, 42.1, 46.1, 50.1, 54.1, and 58.1, depending on the optical filter cards that are installed in the node.	-14 dBm	-50 dBm to 30 dBm

[Table 5-5 on page 5-8](#) shows the OADM channels.

**Table 5-5 OADM Channels**

Channel No.	Channel ID	Frequency (GHz)	Wavelength (nm)
1	30.3	195.9	1530.33
2	31.2	195.8	1531.12
3	31.9	195.7	1531.90
4	32.6	195.6	1532.68
5	34.2	195.4	1534.25



**Table 5-5 OADM Channels (continued)**

Channel No.	Channel ID	Frequency (GHz)	Wavelength (nm)
6	35.0	195.3	1535.04
7	35.8	195.2	1535.82
8	36.6	195.1	1536.61
9	38.1	194.9	1538.19
10	38.9	194.8	1538.98
11	39.7	194.7	1539.77
12	40.5	194.6	1540.56
13	42.1	194.4	1542.14
14	42.9	194.3	1542.94
15	43.7	194.2	1543.73
16	44.5	194.1	1544.53
17	46.1	193.9	1546.12
18	46.9	193.8	1546.92
19	47.7	193.7	1547.72
20	48.5	193.6	1548.51
21	50.1	193.4	1550.12
22	50.9	193.3	1550.92
23	51.7	193.2	1551.72
24	52.5	193.1	1552.52
25	54.1	192.9	1554.13
26	54.9	192.8	1544.94
27	55.7	192.7	1555.75
28	56.5	192.6	1556.55
29	58.1	192.4	1558.17
30	58.9	192.3	1558.98
31	59.7	192.2	1559.79
32	60.6	192.1	1560.61

**Step 3** Click **Apply**.

**Step 4** Return to your originating procedure.

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## DLP-A404 Provision DWDM Line Node Settings

<b>Purpose</b>	This task provisions the network and system types for DWDM line node.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

**Step 1** In node view, click the **Provisioning > WDS-ANS > Provisioning** tabs.

**Step 2** Complete the fields shown in [Table 5-6](#). In the table, the West Side of the node is the one equipped with cards that receive from the west and transmit to the east. The East Side of the node is the one equipped with cards that receive from the east and transmit to the west.

**Table 5-6 DWDM Line Node Settings**

Parameter	Description	Options
Network type	Defines the DWDM network type.	Metro-Core—Channels are equalized. Metro-Access—Channels are not equalized to minimize the number of amplifiers in the ring.
West Side		
System Type	Defines the west-side DWDM system type. <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power
East Side		
System Type	Defines the east-side DWDM system type. <a href="#">Table 5-2 on page 5-5</a> shows the per-channel power and control mode for each system type.	SMF-28 32 Ch Control Gain SMF-28 32 Ch Control Power SMF-28 8 Ch Control Power SMF-28 16 Ch Control Power

**Step 3** Click **Apply**.

**Step 4** Return to your originating procedure.

## DLP-A405 Delete a DWDM Connection

<b>Purpose</b>	This task deletes a DWDM connection.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** In node view, click the **Provisioning > WDS-ANS > Connection** tabs.
- Step 2** Click the connection you want to delete.
- Step 3** Click **Delete**.
- Step 4** Return to your originating procedure.
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## DLP-A406 Create a DWDM Connection

<b>Purpose</b>	This task creates a DWDM connection.
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** In node view, click the **Provisioning > WDS-ANS > Connections** tabs.
- Step 2** Click the **Create** button.
- Step 3** In the Create Optical Link dialog box, choose the From and To slots and ports from the drop-down menus.
- Step 4** If the connection is unidirectional, uncheck the bidirectional check box.
- Step 5** Click **OK**.
- Step 6** Return to your originating procedure (NTP).
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## DLP-A407 Verify OSCM and OSC-CSM Transmit Power

<b>Purpose</b>	This task verifies the transmit power of the ONS 15454 Optical Service Channel Module (OSCM) and the Optical Service Channel + Combiner Separator Module (OSC-CSM).
<b>Tools/Equipment</b>	None
<b>Prerequisite Procedures</b>	<a href="#">DLP-A60 Log into CTC, page 3-26</a>
<b>Required/As Needed</b>	Required
<b>Onsite/Remote</b>	Onsite or remote
<b>Security Level</b>	Superuser

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- Step 1** In the node view shelf graphic, double-click the OSCM or OSC-CSM card in Slot 8.
- Step 2** Click the **Maintenance** tab.
- Step 3** From the ALS Command drop-down menu, choose **Manual Start**.
- Step 4** Click the **Provisioning > Optical Line** tabs.
- Step 5** For the TX (transmit) port entry, verify that the value in the Power column falls within the following ranges:
- For OSCM cards installed on nodes set to Control Gain, the power should be  $-5\text{dBm}$ .
  - For OSC-CSM card installed on nodes set to Control Gain, the power should be a minimum of  $-6\text{ dBm}$  on OADM nodes.
  - For OSC-CSM cards installed on nodes configured as a passive or active OADM nodes, the power level depends on the Pout OADM Stage power level on the WDM-ANS > Provisioning tab:
    - If the Pout OADM Stage value is less than  $-6.5\text{ dBm} \pm 0.5\text{ dBm}$ , the OSC-CSM power should be equal to that power.
    - If the Pout OADM Stage value is greater than  $-6.5\text{ dBm} \pm 0.5\text{ dBm}$ , the OSC-CSM power should be  $-6.5\text{ dBm} \pm 0.5\text{ dBm}$ .
- Step 6** If the OSCM or OSC-CSM power levels are not within the ranges specified in [Step 5](#), complete the following steps:
- a. Click the **Maintenance > ALS** tabs. Verify that the ALS Command is set to OSRI off.
  - b. In the ALS Command area, choose **Manual Restart** and click **Apply**.
  - c. Clean the optical connections. See the “[NTP-A112 Clean Fiber Connectors](#)” procedure on [page 17-21](#).
  - d. Verify the optical connections inside the unit (need to verify this procedure).
  - e. Relaunch ANS
- Step 7** Return to your originating procedure (NTP).
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