



Configure the Node

This chapter describes the tasks related to node configuration in Cisco Optical Site Manager.

If Cisco Optical Site Manager is used to manage an XR device, any configuration changes made to the device using XR (CLI or NETCONF) will trigger a resynchronization of the device in Cisco Optical Site Manager. This means that Cisco Optical Site Manager will temporarily be out of sync with the device while it updates itself with the changes. Any alarms during this period will be reported on Cisco Optical Site Manager after the synchronization process is complete.



Note Removing any line card from the XR device will cause the configuration of the card to revert to the preconfigure state. This will result in the same behavior described above.

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Optical Degrees

From a topological point of view, all the units that are equipped in a node belong to a side. A side can be identified by a letter, or by the ports that are physically connected to the spans. A node can be connected to a maximum of 20 different spans. Each side identifies one of the spans to which the node is connected.

Manage Optical Degrees

Use this task to create, view, modify, or delete optical degrees in the node.

Before you begin

- [Log into Cisco Optical Site Manager](#)

Procedure

Step 1 Click **Optical Setup** in the left panel.

Step 2 Click the **Optical Configuration** tab and then click **Optical Degrees** to expand it.

Step 3 Perform these steps, as needed.

a) To create an optical degree, perform these steps:

1. Click the + button.

The **Create Optical Degree** dialog box appears.

2. Select the **Degree**, **Line In**, and **Line Out**, values from their respective drop-down lists.

3. (Optional) Enter a description in the **Description** field.

4. Click **Apply**.

b) To modify any one of the optical degree parameters described below degree, perform the following step as needed:

- To modify the span validation of an optical degree, select a value from the drop-down list in the **Span Validation** column and click **Apply**.

- Go to the related cell in the **Channel Spacing** column, select 50 or 100 from the drop-down list, and click **Apply**

- Go to the related cell in the **Spectrum Occupancy** column, enter a valid value, and click **Apply**.

c) To delete an optical degree, perform these steps:

1. Check the check box corresponding to the optical degree you want to delete.

2. Click the - button to delete the selected optical degree.

A confirmation message appears.

3. Click **Yes**.

The optical degree is deleted from the table.

Step 4 (Optional) Click the **Export to Excel** button to export the information to an Excel sheet.



Note You can only create a maximum of 20 optical degrees. The optical degree is created and added to the table that displays the following information.

- **Degree**—Specifies the optical span of the side.

- **Description**—Specifies the description as entered while creating the optical degree.
- **Line In**—Specifies line in settings.
- **Line Out**—Specifies line out settings.
- **Connected-to (IP/Degree)**—Specifies the IP address and the optical degree of the remote Cisco Optical Site Manager instance that is connected on the other side of the span.
- **Span Validation**—Specifies whether the span can be used by the GMPLS algorithm for channel routing and validation. Values are True or False.
- **Channel Grid**—Specifies the type of grid. Values are Flexible-Grid or Fixed-Grid.
- **Channel Spacing**—Specifies the minimum frequency spacing between two adjacent channels in the optical grid. Values are 100 or 50 GHz.
- **Spectrum Occupancy**—Specifies a percentage of the spectral density (the ratio of the C-band used by the carrier versus the total bandwidth). The valid range is 50% to 91%.
- **Domain Type**—Specifies the algorithm that is active on the span. By default, LOGO is displayed.

Internal Patch Cords

Virtual links can be created between network termination points using internal patchcords. These termination points include OSC ports, transponder or muxponder trunk ports, line ports, and passive device ports.

Manage Internal Patch Cords

Use this task to create, modify, view, or delete internal patch cords in the node.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

-
- Step 1** Click **Optical Setup** in the left panel.
 - Step 2** Click the **Optical Configuration** tab and then click **Internal Patch Cords** to expand it.
 - Step 3** Click the + button.
The **Create Internal Patch Cord** dialog box appears. It displays the **From** and **To** columns indicating the two termination points.
 - Step 4** Perform the following steps for the **From** and **To** columns:
 - a) Select the patch cord type from the **Type** drop-down lists. of the patch cord from the **From** and **To** drop-down lists.

Available options are *Chassis*, *Passive Chassis*, and *Passive Unit*.

The **UID** drop-down is displayed.
 - b) Select the unique ID of the device from the **UID** drop-down list
The **Port** drop-down is displayed.

- c) Select **Bidirectional** or **Mpo** check box for the **From** column.
If you want to make the patch cord bidirectional, select the **Bi-directional** check box.
- d) Select the slot from the **Slot** type drop-down list for the **To** column.
If the selected UID in the previous step is a *Passive Unit*, the **Slot** field is not displayed.
- e) Click the **Add** button to add the selected Internal Patch Cord options to the **Adding** list.
- f) (Optional) the **Reset** button to remove all the added Internal Patch Cords from the **Adding** list.

Step 5 Click **Apply**.

The internal patch cord is created and added to the table that displays the following information:

- **From**—Specifies the location from where the connection originates.
- **To**—Specifies the location where the connection terminates.
- **Type**—Specifies the type of internal patch cord. Possible values are Transport and Add-Drop.

Step 6 (Optional) Select the check boxes corresponding to the internal patch cords you want to delete and click the - button.

Step 7 (Optional) Click the **Export to Excel** button to export the information to an Excel sheet.



Tip You can view the internal patch cords and detailed information about cards and ports from the Map and Detailed views.

Fiber Attributes

The Fiber Attributes tab lists the attributes of the fibers that are connected to the optical side.

Manage Fiber Attributes

Use this task to create, view, modify, or delete fiber attributes of a span.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

Step 1 Click **Optical Setup** in the left panel.

Step 2 Click the **Optical Configuration** tab and then click **Fiber Attributes** to expand it.
A list of already added opticaldegrees is displayed.

Step 3 Perform these steps, as needed.

a) To create a fiber attribute, perform these steps:

1. Click the + button corresponding to a row you want to create a fiber attribute.

The **Fiber Attributes** section is displayed.

2. Click the **Fiber Attributes** section to display it.
3. Enter the fiber ID in the **Fiber ID** field.
4. Select the **Fiber Direction**, **Fiber ID**, **Fiber Type**, **Length**, **PMD**, **Attenuator In**, and **Attenuator Out** from their respective scroll-lists.
5. Click **Apply**.

The fiber attribute is created and added to the table that displays the following information.

- **Fiber Direction**—Specifies the TX or RX direction.
 - **Fiber ID**—Specifies the fiber number in the duct.
 - **Fiber Type**—Specifies the type of fiber deployed.
 - **Length**—Specifies the length of the optical span in kms or miles.
 - **PMD**—Specifies the polarization mode dispersion (PMD) fiber coefficient in ps/sqrt (km).
 - **Attenuator In**—Specifies the input attenuation in dB between the node output port (typically LINE-TX port) and the input of the fiber span. The span may include patchcords, attenuators, and patch panels.
 - **Attenuator Out**—Specifies the output attenuation in dB between the node input port (typically LINE-RX port) and the output of the fiber span. The span may include patchcords, attenuators, and patch panels.
- b) To modify the Fiber Type, Length, PMD, Attenuator In, Attenuator Out, or PMD values on an optical degree, perform these steps:
1. Hover over the related cell for which you want to edit the value.
 2. Select a value from the drop-down list.
 3. Click **Apply**.
A confirmation message appears.
 4. Click **Yes**.
- c) To delete a fiber attribute, perform these steps:
1. Select the check box corresponding to the fiber attribute you want to delete.
 2. Click the - button to delete the selected fiber attribute.
A confirmation message appears.
 3. Click **Yes**.
The fiber attribute is deleted from the table.

Step 4 (Optional) Click the **Export to Excel** button to export the information to an Excel sheet.

Automatic Power Control

The Automatic Power Control (APC) feature performs the following functions:

- Maintains constant per-channel power increases optical network resilience, even when changes to the number of channels occur.
- Compensates for the degradation of optical networks caused by aging effects.
- Simplifies installation and upgrades of DWDM optical networks by automatically calculating amplifier setpoints.

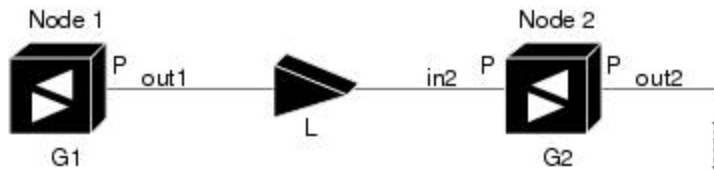
The amplifier software uses a control gain loop to keep channel power constant regardless of the number of channels. It monitors input power changes and adjusts output power proportionately. The shelf controller software emulates the control output power loop to compensate for fiber degradation.

For proper functioning, the control card needs to know the channel distribution via a signaling protocol, and the expected per-channel power which you can set. It compares actual amplifier output power with expected power and adjusts setpoints if needed.

APC at the Shelf Controller Layer

Amplifiers are managed through software to monitor changes in the input power. Changes in the network characteristics have an impact on the amplifier input power. Changes in the input power are compensated for by only modifying the original calculated gain, because input power changes imply changes in the span loss. As a consequence, the gain to span loss established at the amplifier start-up is no longer satisfied, as shown in the following figure.

Figure 1: Using Amplifier Gain Adjustment to Compensate for System Degradation



In the preceding figure, Node 1 and Node 2 are equipped with booster amplifiers and preamplifiers. The input power received at the preamplifier on Node 2 (P_{in2}) depends on the total power launched by the booster amplifier on Node 1, $P_{out1}(n)$ (where n is the number of channels), and the effect of the span attenuation (L). The power into Node 2 is given by the following formula:

$$P_{in2} = L P_{out1}(n)$$

The phase gain of the preamplifier on Node 2 (G_{Pre-2}) is set during provisioning to compensate for the span loss so that the Node 2 preamplifier output power ($P_{out-Pre-2}$) is equal to the original transmitted power, as represented in the following formula:

$$P_{out-Pre-2} = L \times G_{Pre-2} \times P_{out1}(n)$$

In cases of system degradation, the power received at Node 2 decreases due to the change of span insertion loss (from L to L'). As a consequence of the preamplifier gain control working mode, the Node 2 preamplifier output power ($P_{out-Pre-2}$) also decreases. The goal of APC at the shelf controller layer is simply to detect if an amplifier output change is needed because of changes in the number of channels or to other factors. If

factors other than the "changes in the number of channels" factor occur, APC provisions a new gain at the Node 2 preamplifier (GPre-2') to compensate for the new span loss, as shown in the formula:

$$G_{\text{Pre-2}'} = G_{\text{Pre-2}} (L / L') = G_{\text{Pre-2}} + [\text{Pout-Pre-2} - \text{Exp}(\text{Pout-Pre-2})]$$

Generalizing on the preceding relationship, APC is able to compensate for system degradation by adjusting working amplifier gain or variable optical attenuation (VOA) and to eliminate the difference between the power value read by the photodiodes and the expected power value. The expected power values are calculated using:

- Provisioned per channel power value
- Channel distribution (the number of express, add, and drop channels in the node)
- ASE estimation

Channel distribution is determined by the sum of the provisioned and failed channels. Information about provisioned wavelengths is sent to APC on the applicable nodes during the circuit creation. Information about failed channels is collected through a signaling protocol that monitors alarms on ports in the applicable nodes and distributes that information to all the other nodes in the network.

ASE calculations purify the noise from the power level that is reported from the photodiode. Each amplifier can compensate for its own noise, but cascaded amplifiers cannot compensate for ASE generated by preceding nodes. The ASE effect increases when the number of channels decreases; therefore, a correction factor must be calculated in each amplifier of the ring to compensate for ASE build-up.

APC is a network-level feature that is distributed among different nodes. An APC domain is a set of nodes that are regulated by the same instance of APC at the network level. An APC domain optically identifies a network portion that can be independently regulated. Every domain is terminated by two node sides residing on a terminal node, ROADM node, hub node, line termination meshed node, or an XC termination meshed node. An optical network can be divided into several different domains, with the following characteristics:

- Every domain is terminated by two node sides. The node sides terminating domains are:
 - Terminal node (any type)
 - ROADM node
 - Hub node
 - Cross-connect (XC) termination mesh node
 - Line termination mesh node
- APC domains are shown in the GUI.

Inside a domain, the APC algorithm designates a primary node that is responsible for starting APC hourly or every time a new circuit is provisioned or removed. Every time the primary node signals APC to start, gain and VOA setpoints are evaluated on all nodes in the network. If corrections are needed in different nodes, they are always performed sequentially following the optical paths starting from the primary node.

APC corrects the power level only if the variation exceeds the hysteresis thresholds of ± 0.5 dB. Any power level fluctuation within the threshold range is skipped because it is considered negligible. Because APC is designed to follow slow time events, it skips corrections greater than 3 dB. This is the typical total aging margin that is provisioned during the network design phase. After you provision the first channel or the amplifiers are turned up for the first time, APC does not apply the 3-dB rule. In this case, APC corrects all the power differences to turn up the node.

To avoid large power fluctuations, APC adjusts power levels incrementally. The maximum power correction is ± 0.5 dB. This is applied to each iteration until the optimal power level is reached. For example, a gain deviation of 2 dB is corrected in four steps. Each of the four steps requires a complete APC check on every node in the APC domain. APC can correct up to a maximum of 3 dB on an hourly basis. If degradation occurs over a longer time period, APC compensates for it by using all margins that you provision during installation.

APC can be manually disabled. In addition, APC automatically disables itself when:

- A Hardware Fail (HF) alarm is raised by any card in any of the domain nodes.
- A Mismatch Equipment Alarm (MEA) is raised by any card in any of the domain nodes.
- An Improper Removal (IMPROPRMVL) alarm is raised by any card in any of the domain nodes.
- Gain Degrade (GAIN-HDEG), Power Degrade (OPWR-HDEG), and Power Fail (PWR-FAIL) alarms are raised by the output port of any amplifier card in any of the domain nodes.
- A VOA degrade or fail alarm is raised by any of the cards in any of the domain nodes.
- The signaling protocol detects that one of the APC instances in any of the domain nodes is no longer reachable.

APC raises the following minor, non-service-affecting alarms:

- APC Out of Range—APC cannot assign a new setpoint for a parameter that is allocated to a port because the new setpoint exceeds the parameter range.
- APC Correction Skipped—APC skipped a correction to one parameter allocated to a port because the difference between the expected and current values exceeds the ± 3 -dB security range.

APC at the Amplifier Card Level

In constant gain mode, the amplifier power out control loop performs the following input and output power calculations, where G represents the gain and t represents time.

- $P_{out}(t) = G * P_{in}(t)$ (mW)
- $P_{out}(t) = G + P_{in}(t)$ (dB)

In a power-equalized optical system, the input power scales with the number of channels, and the amplifier software adjusts for power fluctuations caused by changes in the incoming signal's channel count.

The amplifier software detects input power changes at two instances, t_1 and t_2 , as traffic fluctuations occur. In the formula, 'm' and 'n' denote distinct channel numbers, and P_{in}/ch signifies the input power per channel.

- $P_{in}(t_1) = nP_{in}/ch$
- $P_{in}(t_2) = mP_{in}/ch$

The output power is quickly adjusted in response to input power changes, maintaining constant power for each channel, even during upgrades or fiber cuts, with a reaction time in milliseconds.

The power and mode for each channel are determined by Automatic Node Setup (ANS) on a per-degree basis during provisioning.

Forcing Power Correction

A wrong use of maintenance procedures can lead the system to raise the APC Correction Skipped alarm. The APC Correction Skipped alarm strongly limits network management (for example, a new circuit cannot be converted into In-Service (IS) state).

The **Force Power Correction** button in the **APC** section helps the user to restore normal conditions by clearing the APC Correction Skipped alarm. The use of the **Force Power Correction** button must be supervised by Cisco TAC to prevent any traffic loss.

Enable APC

Use this task to enable APC.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
 - Step 2** Click the **Optical Configuration** tab and then click **APC** to expand it.
A list of degrees is displayed.
 - Step 3** Select the check box corresponding to the degree you want to enable APC and click the **Edit** button.
 - Step 4** Select **automatic-enabled** from the **Admin Status** drop-down list.
Only degrees with Admin Status as force-disabled can be enabled.
 - Step 5** Click **Apply**.
 - Step 6** Verify that the **Service Status** field changes to enabled.
-

Disable APC

Use this task to disable APC.



Caution When APC is disabled, aging compensation is not applied and circuits cannot be activated. Disable APC only to perform specific troubleshooting or node provisioning tasks. When the tasks are completed, enable and run APC. Leaving APC disabled can cause traffic loss.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **Optical Configuration** tab and then click **APC** to expand it.
A list of degrees is displayed.
- Step 3** Select the check box corresponding to the degree you want to enable APC and click the **Edit** button.
- Step 4** Select **force-disabled** from the **Admin Status** drop-down list.
Only degrees with Admin Status as automatic-enabled can be disabled.
- Step 5** Click **Apply**.
- Step 6** Verify that the **Service Status** field changes to force-disabled.
-

Span Loss Measurement

Span loss measurements (in dB) check the span loss and are useful whenever changes to the network occur.

The span loss operational parameters are:

- **Measured By**—Displays whether the span loss is measured by the channel or Optical Service Channel (OSC). If a channel is not configured, the span loss is measured by the OSC. An EDFA measures the span loss based on circuits.
- **Measured Span Loss**—Displays the measured span loss.
- **Measured Span Loss Accuracy**—Displays the accuracy of the span loss measurement. For example, if the measured span loss is 20 dB and the displayed accuracy value is 2.5, the actual span loss could either be 19 or 21 dB.
- **Measured Time**—Displays the time and date when the last span loss measured value is changed.

If there is a new network with Cisco Optical Site Manager, the operational parameters list of span loss has two rows. The first row displays the OSC-measured span loss details. After the channel is configured, the second row is added, which displays the channel-measured span loss details. After the channel is configured, only the channel-measured span loss details are updated.

View or Modify Span Loss Parameters

Use this task to view or modify span loss parameters.



Note If a channel or OSC is not configured, span loss measurement is not reported and the operational parameters list is empty.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **Optical Configuration** tab and then click **Span Loss** to expand it.
- Step 3** Click the + button corresponding to a degree in the list and then click **Span Loss Measured Data** to expand it.
- Step 4** Select a row and click the **Measure Span Loss** button.
A message appears. Click **OK**.
- Step 5** Click the Retrieve button to view the updated **Measured Span Loss**, **Measured Accuracy**, and **Measured time** values.
- Step 6** Enter the values for **Min. Exp. Span Loss** or **Max. Exp. Span Loss** in dB. The range is from 0 to 99.
- Step 7** Click **Apply**.
A confirmation message appears.
- Step 8** Click **Yes**.
The span loss range is extended including the Accuracy value. A Span Loss Out of Range condition is raised when the measured span loss is higher than the extended range.
- Step 9** (Optional) Click the **Export to Excel** button to export the information to an Excel sheet.
-

The **Span Loss Measured Data** section displays the following information:

- **Degree**—Displays the side for which span loss information appears.
- **Measured By**—Displays whether the measurement was executed with or without channels. Values are OSC or CHANNEL.
- **Min Exp. Span Loss (dB)**—Displays the minimum expected span loss (in dB) for the incoming span.
- **Max Exp. Span Loss (dB)**—Displays the maximum executed span loss (in dB) for the incoming span.
- **Measured Span Loss (dB)**—Displays the measured span loss value.
- **Measured Accuracy (dB)**—Displays the resolution or accuracy of the span loss measurement. The resolution is +/-1.5 dB if the measured span loss is 0–25 dB. The resolution is +/-2.5 dB if the measured span loss is 25–38 dB.
- **Measured Time**—Displays the time and date when the last span loss measured value is changed.

Optical Cross-connect Management

Optical cross-connect (OXC) circuits are used to connect two optical nodes on a specified C-band wavelength. These circuits are created using data models and are bidirectional in nature. The connection is established through the ports present on the wavelength selective switches, multiplexers, demultiplexers, and add/drop cards.

In an OXC circuit, the wavelength from a source interface port enters to a DWDM system and then exits from the DWDM system to the destination interface port.

The administrative states are:

- IS/Unlocked
- IS, AINS/Unlocked, AutomaticInService
- OOS, DSBLD/Locked, disabled

View Optical Cross-connect Circuits

Use this task to view the details of the optical cross-connects that are created for a node using data models.



Note The optical cross-connects are read-only and cannot be modified.

Before you begin

[Log into Cisco Optical Site Manager](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
 - Step 2** Click the **Optical Cross Connections** tab.
 - Step 3** To delete an optical cross-connect, select the check box corresponding to the OXC you want to delete and click the - button.
 - Step 4** (Optional) Click the **Export to Excel** button to export the information to an Excel sheet.
 - Step 5** (Optional) Click the **Download OXC as XML** button to download the details of the optical cross-connects as a XML file.
 - Step 6** (Optional) Click the **Sync from device** button to synchronize the optical cross-connect information with the associated NCS 1000 device.
-

The **Optical Cross Connections** tab displays the following details for each cross-connect.

- **Connection Label**—Displays the name of the cross-connect.
- **Type**—Displays the type of cross-connect. It is bidirectional.
- **Admin Status**—Displays the admin state on the circuit.
- **Service Status**—Displays the status of the service.
- **Central Frequency (THz)**—Displays the spectral position of the circuit.
- **Allocation Width (GHz)**—Displays the bandwidth occupied by the service. The range is 25 to 300GHz.
- **Signal Width (GHz)**—Displays the carrier bandwidth.



Note The payload bandwidth is lesser than the allocation bandwidth.

- **Path 1 End-points**—Displays the source and destination interfaces of the path.
- **Path 2 End-points**—Displays the source and destination interfaces of the path.

To view Path 1 or Path 2, click the + icon to expand the cross-connect. Click the down arrow on the right to view the internal details of Path 1 or Path 2. The details are:

- **Interface Name**—Displays the interface name.
- **Optical Power**—Displays the value of the optical power.
- **Power Failure Low**—Displays the threshold for power failure.
- **Optical PSD Setpoint (dBm/GHz)**—Displays the configured optical power spectral density setpoint. This setpoint is independent of the width of the circuit.
- **Current PSD Setpoint**—Displays the current optical power spectral density setpoint. This setpoint is independent of the width of the circuit.
- **Optical Power Setpoint**—Displays optical power setpoint. This setpoint is scaled to the width of the circuit and matches the value of the optical power parameter.

Import the Cisco Optical Network Planner Configuration File

If you have a configuration file NETCONF file (.xml) exported from Cisco Optical Network Planner, you can import it to Cisco Optical Site Manager. The file includes parameters for the node, shelf, card type, port (including the wavelength of the card), pluggable port module (PPM), OTN, and FEC parameters.

Only the values present in XML format appear in the configuration file parameters. If the values are not in XML format, a column appears blank. The XML file values are independently reported and do not affect any configuration changes that you apply.

Use this task to import the Cisco Optical Network Planner NETCONF file (.xml) into Cisco Optical Site Manager.

Before you begin

Before importing the NETCONF file (.xml), ensure that:

1. The NETCONF file (.xml) contains the following parameters available on Cisco Optical Site Manager:
 - device name
 - uid
 - rack id
 - chassis/passive unit id
2. You are logged in to Cisco Optical Site Manager. For details, see [Log into Cisco Optical Site Manager](#).

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **Node Setup** tab.
- Step 3** Click **Select Files**, navigate to the location where the NETCONF file (.xml) is present and select it. A confirmation message appears.
- Step 4** Click **Yes**.
- Step 5** Click **Upload**.
A confirmation message appears after the upload is complete.
- Step 6** To export the XML file, click the **Download Node Configuration as XML** button.

Configure Amplifier Parameters

Use this task to configure the optical amplifier parameters.

For more details about the supported cards, see [Supported Cards and Passive Devices, on page 23](#)

Before you begin

- [Log into Cisco Optical Site Manager](#)
- [Open the Card View](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **ANS Parameters** tab and then click **Amplifier** to expand it.
- Step 3** Modify any of the settings described in the following table.

Table 1: Amplifier Parameters for Amplifier Cards

Parameter	Description	Options
Working Mode	Shows the working mode.	<ul style="list-style-type: none"> • Channel Power • Total Power • Optimized • Fixed Gain • Start and Hold

Parameter	Description	Options
Tilt Setpoint (dB)	Target output tilt requested by the user.	—
PSD Setpoint (dBm/GHz)	Power Spectral Density. Target output power requested by the user for each circuit.	—
Gain Setpoint (dB)	Target amplifier gain requested by the user.	—
Gain Range	Sets the gain range of the amplifier.	<ul style="list-style-type: none"> • Gain Range 1 • Gain Range 2 • No Gain Range

Step 4 Click **Apply** to save the changes.

The **Amplifier** section displays the following details:

Table 2: Amplifier Parameters for Amplifier Cards

Parameter	Description	Displayed Values
Port	(Display only) Displays the port number, port type, and direction (TX or RX).	—
Total Output Power (dBm)	(Display only) Shows the current power level for each port.	—
Output Power Setpoint (dBm)	Shows the output power setpoint.	—
Working Mode	Shows the working mode.	<ul style="list-style-type: none"> • Channel Power • Total Power • Optimized • Fixed Gain • Start and Hold
Role	Role of the amplifier.	<ul style="list-style-type: none"> • Preamplifier • Booster
Actual Gain (dB)	Actual gain setpoint.	—
Target Gain (dB)	Target gain setpoint.	—

Parameter	Description	Displayed Values
Tilt Setpoint (dB)	Target output tilt requested by the user.	—
PSD Setpoint (dBm/GHz)	Power Spectral Density. Target output power requested by the user for each circuit.	—
PSD Optimized (dBm/GHz)	Optimized PSD	—
Gain Setpoint (dB)	Target amplifier gain requested by the user.	—
Gain Range	Sets the gain range of the amplifier.	<ul style="list-style-type: none"> • Gain Range 1 • Gain Range 2 • No Gain Range
Power Degrad Threshold (High) (dBm/GHz)	Shows the current value of the optical power degrade high threshold.	—
Power Degrad Threshold (Low) (dBm/GHz)	Shows the current value of the optical power degrade low threshold.	—
Status	Shows the current status of the amplifier.	—
Gain Degrad High (dB)	<p>(Display only) Shows the current value of the gain degrade high threshold configured in the card. This threshold applies only when the amplifier is active and in constant gain mode.</p> <p>Gain Degrad High refers to the Gain value of the port and is automatically calculated by the control card when the amplifier is turned up.</p>	—

Parameter	Description	Displayed Values
Gain Degrade Low (dB)	<p>(Display only) Shows the current value of the gain degrade low threshold configured in the card. This threshold applies only when the amplifier is active and in constant gain mode.</p> <p>Gain Degrade Low refers to the Gain value of the port and is automatically calculated by the control card when the amplifier is turned up.</p>	—

Provision Interface Parameters

Use this task to change the optical interface parameters.

For more details about the supported cards, see [Supported Cards and Passive Devices, on page 23](#)

Before you begin

- [Log into Cisco Optical Site Manager](#)
- [Open the Card View](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **ANS Parameters** tab and then click **Interface** to expand it.
- Step 3** Modify the settings described in the following table. The provisionable parameters are listed in the *Options* column in the table.

Table 3: Interface Options

Parameter	Description	Options
Port	(Display only) Displays the port number, port type, and direction (RX or TX)	All the RX and TX ports

Parameter	Description	Options
Admin State	Sets the administrative state of the port.	From the drop-down list, choose one of the following: <ul style="list-style-type: none"> • Unlocked / IS • Locked, disabled/OOS, DSBLD • Locked, maintenance/OOS, MT • Unlocked, automaticInService/IS, AINS
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State.	<ul style="list-style-type: none"> • IS-NR/ Unlocked-enabled • OOS-AU,AINS/ Unlocked-disabled, automaticInService • OOS-MA,DSBLD/ Locked-enabled,disabled • OOS-MA,MT/ Locked-enabled,maintenance
Optical Power (dBm)	(Display only) Displays the optical power for each port.	—
OSC Power (dBm)	(Display only) Displays the service-channel power level for each port.	—
Optical PSD Setpoint (dBm/GHz)	Target output Power Spectral Density requested by the user.	-50 to 10
Attenuator Value (dB)	Sets the attenuator value.	—
Optical Power Threshold Low (dBm)	Fail low threshold used to detect the LOS alarm on the port.	—
OSC Power Threshold Low (dBm)	(Display only) Displays the OSC power level for each port.	—

Parameter	Description	Options
Current Power Degrade High (dBm)	(Display only) Shows the current value of the optical power degrade high threshold configured in the card. Power Degrade High refers to the Signal Output Power value of the port and is automatically calculated by the control card.	—
Current Power Degrade Low (dBm)	(Display only) Shows the current value of the optical power degrade low threshold configured in the card. Power Degrade Low refers to the Signal Output Power value of the port and is automatically calculated by the control card.	—
Current Power Failure Low (dBm)	(Display only) Shows the optical power failure low threshold for the port.	—

Step 4 Click **Apply** to save the changes.

Provision Raman Amplifier Parameters

Use this task to provision the optical Raman amplifier parameters.

For more details about the supported cards, see [Supported Cards and Passive Devices, on page 23](#)

Before you begin

- [Log into Cisco Optical Site Manager](#)
- [Open the Card View](#)

Procedure

- Step 1** Click **Optical Setup** in the left panel.
- Step 2** Click the **ANS Parameters** tab and then click **Raman Amplifier** to expand it.
- Step 3** Modify any of the settings described in the following table.

Table 4: Raman Amplifier Parameters for Amplifier Cards

Parameter	Description	Options
Port	(Display only) Displays the port number, port type, and direction (TX or RX).	—
Status	Displays the Status of the port.	
Gain Setpoint (dB)	Target amplifier gain requested by the user.	—
Actual Gain (dB)	(Display only) Displays the actual amplifier gain.	—
Pumping Scheme	(Display only) Displays the pumping scheme that the card uses.	<ul style="list-style-type: none"> • Counter-Propagating for the RAMAN-CTP, RMN-CTP-CL, EDRA-1-xx, and EDRA-2-xx cards. • Co-Propagating for the RAMAN-COP card.
Calibration Type	Calibration type that the card uses. The RAMAN-COP card supports only manual calibration. The RAMAN-CTP card supports both automatic and manual calibration. The RMN-CTP-CL card supports only automatic calibration. If a node has both RAMAN-CTP and RAMAN-COP cards, the RAMAN-CTP card supports only manual calibration.	<ul style="list-style-type: none"> • Automatic • Manual • No-Calibration
Unsaturated Gain Setpoint (dBm)	Unsaturated target amplifier gain. This field is editable only for the RAMAN-COP card.	0–50

Step 4 Click **Apply** to save the changes.
The RAMAN port section is displayed.

Step 5 Expand the RAMAN port to view the pump power details.

Table 5: RAMAN Pump Power Parameters

Parameter	Description
Pump ID	(Display only) Identifier of the Raman Pump (2 pumps with RAMAN-CTP and 4 pumps with EDRA).

Parameter	Description
Pump Power Setpoint (mW)	(Only for RAMAN-CTP and RAMAN-COP cards) Provisioned value of pump power setpoint. This value is effective only for manual calibration of RAMAN-CTP and RAMAN-COP cards and if the calibration is not performed. The value of this parameter must also be provided for automatic calibration of the RAMAN-CTP card even if the value is not effective.
Pump Power Target (mW)	(Display only) Target power set by the internal control algorithm. The result of calibration can be both automatic and manual.
Pump Power (mW)	(Display only) Actual power value of the individual pump.

Step 6 Click **Apply** to save the changes.

Manage Raman Interface Parameters

Use this task to manage the Raman interface parameters.

For more details about the supported cards, see [Supported Cards and Passive Devices](#), on page 23

Before you begin

- [Log into Cisco Optical Site Manager](#)
- [Open the Card View](#)

Procedure

Step 1 Click **Optical Setup** in the left panel.

Step 2 Click the **ANS Parameters** tab and then click **Raman Interface** to expand it.

Step 3 View the settings described in the following table. Only the Admin State parameter can be modified.

Table 6: Interface Options

Parameter	Description	Options
Port	(Display only) Displays the port number, port type, and direction (RX or TX)	All the RX and TX ports

Parameter	Description	Options
Admin State	Sets the administrative state of the port.	From the drop-down list, choose one of the following: <ul style="list-style-type: none"> • Unlocked (ETSI)/ IS (ANSI) • Locked, disabled (ETSI)/OOS, DSBLD (ANSI) • Locked, maintenance (ETSI)/OOS, MT (ANSI) • Unlocked, automaticInService (ETSI)/ IS, AINS (ANSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State.	<ul style="list-style-type: none"> • IS-NR/ Unlocked-enabled • OOS-AU,AINS/ Unlocked-disabled, automaticInService • OOS-MA,DSBLD/ Locked-enabled,disabled • OOS-MA,MT/ Locked-enabled,maintenance
Optical Power (mW)	(Display only) Displays the optical power for each port.	—
Current Optical Power Setpoint (mW)	(Display only) Shows the current value of the optical power setpoint that must be reached.	—
Current Power Degrade High (mW)	(Display only) Shows that the current value of the optical power degrade high threshold. Power Degrade High refers to the Signal Output Power value of the port and is automatically calculated by the control card.	—

Parameter	Description	Options
Current Power Degrade Low (mW)	(Display only) Shows that the current value of the optical power degrade high threshold configured in the card. Power Degrade Low refers to the Signal Output Power value of the port and is automatically calculated by the control card.	—
Current Power Failure Low (mW)	(Display only) Shows the optical power failure low threshold for the port.	—

Step 4 Click **Apply** to save the changes.

Connection Verification

Connection verification validates card connectivity and detects incorrect cabling between NCS1K-E-OLT-C and NCS1K14-CCMD-16-C cards. This feature also measures power levels and verifies the optical cables and patchcords in a node for the following:

- Connectivity: Checks whether the cable is connected.
- Insertion Loss: Checks whether the cable loss is within expected value.

A connectivity check signal is generated and transmitted into the DMUX input port of a card by a dedicated laser source. This signal is detected by an embedded photo diode to complete the connection verification.



Note The connection verification feature is only compatible with OLT-E and CCMD-16 cards.

Supported Cards and Passive Devices

The following table lists the cards and passive devices that support connection verification:

Table 7: Supported Devices and Cards for Connection Verification

Card Type	PIDs
Transponder and Muxponder Cards	<ul style="list-style-type: none"> • NCS1K14-2.4T-K9 • NCS1K14-2.4T-K9
Active Add/Drop Modules	NCS1K-CNTRL-B-K9

Card Type	PIDs
Optical Add/Drop and Amplifier Modules	<ul style="list-style-type: none"> • NCS1K-CNTRL-K9 • NCS1K-ILA-R-C • NCS1K-ILA-2R-C • NCS1K-OLT-R-C • NCS1K-E-OLT-C • NCS1K-E-OLT-R-C • NCS1K-E-ILA-C • NCS1K-E-ILA-R-C • NCS1K-E-ILA-R-C-2 • NCS1K14-CNTRL-K9 • NCS1K14-CTRL-B-K9
Controller Modules	<ul style="list-style-type: none"> • NCS1K-ILA-C • NCS1K-OLT-C • NCS1K14-CCMD-16-C



Note The passive devices require loopback caps on unused ports. The connection verification version of the passive devices is shipped with loopback caps.
