



Provisioning Optical Amplifier Cards

This chapter describes the optical amplifier cards used in Cisco NCS 2000 SVO and its related tasks.

Table 1: Feature History

Feature Name	Release Information	Feature Description
OPT-AMP-17-C and OPT-BST-E Cards	Cisco NCS 2000 Release 12.3	<p>The OPT-AMP-17-C card can be used as a preamplifier or as a booster amplifier, providing a total output power of 17 dBm. It integrates an optical service channel splitter and combiner to allow the OSC to be sent to and received from the OSCM card. It employs a single-stage amplifier design to optimize the noise figure and operates with a fixed gain of 17 dB.</p> <p>The OPT-BST-E card amplifies the outgoing composite DWDM signal to overcome the attenuation of the fiber network, providing a total output power of 20 dBm. It integrates an optical service channel splitter and combiner to allow the OSC to be sent to and received from the OSC-CSM card and/or the OSC derived from the control cards.</p>

Feature Name	Release Information	Feature Description
OPT-PRE and OPT-BST Cards	Cisco NCS 2000 Release 12.2	<p>The OPT-PRE card amplifies the incoming composite DWDM signal to allow sufficient optical power level to optical receivers on dropped wavelengths. It overcomes the insertion losses of the reconfigurable or fixed optical filters in the node.</p> <p>The OPT-BST card amplifies the outgoing composite DWDM signal to overcome the attenuation of the fiber network, providing a total output power of 17 dBm. It integrates an optical service channel splitter and combiner to allow the OSC to be sent to and received from the OSC-CSM card.</p> <p>Both the cards can be installed in NCS 2006 and NCS 2015 chassis.</p>

The following table lists the package support for the optical amplifier cards.

Card	SSON Package (12.xx-xxxx-xx.xx-S-SPA)	MSTP Package (12.xx-xxxx-xx.xx-L-SPA)
OPT-AMP-C	✓	✓
OPT-AMP-17C		✓
OPT-PRE		✓
OPT-BST		✓
OPT-BST-E		✓
OPT-EDFA-17	✓	✓
OPT-EDFA-24	✓	✓
OPT-EDFA-35	✓	
RAMAN-CTP	✓	✓
RAMAN-COP	✓	
RMN-CTP-CL	✓	
EDRA-1-xx	✓	
EDRA-2-xx	✓	

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OPT-AMP-C Card

In this chapter, "OPT-AMP-C" refers to the _15454-OPT-AMP-C card.

The OPT-AMP-C card is a 20-dB output power, C-band, DWDM EDFA amplifier or preamplifier. It contains midstage access loss for a Dispersion Compensation Unit (DCU). A Variable Optical Attenuator (VOA) is used to control gain tilt. The VOA can also be used to attenuate the signal of the DCU to a reference value. The amplifier module also includes the OSC add (TX direction) and drop (RX direction) optical filters.

The features of the card include:

- Fast transient suppression
- Nondistorting low-frequency transfer function
- Mid-stage access for DCU
- Constant pump current mode (test mode)
- Fixed output power mode
- Constant gain mode
- Amplified spontaneous emissions (ASE) compensation in Constant Gain and Constant Output Power modes
- Programmable tilt
- Full monitoring and alarm handling capability
- Gain range with gain tilt control of 12–24 dB

- Extended gain range (with uncontrolled tilt) of 24–35 dB
- Full monitoring and alarm handling with settable thresholds
- Optical Safety Remote Interlock (OSRI)—Shuts down optical output power or reduces the power to a safe level
- Automatic laser shutdown (ALS)—Safety mechanism used in case of fiber cut

You can install the OPT-AMP-C card in the following slots:

- Slots 2–7 in NCS 2006

For more information about the OPT-AMP-C card, see

http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/prod_data_sheet0900aecd8072b322.html. and [Card Features](#).

OPT-AMP-17-C Card

In this chapter, "OPT-AMP-17-C" refers to the _15454-OPT-AMP-17-C card.

The OPT-AMP-17-C is a 17-dB gain, C-band, DWDM EDFA amplifier or preamplifier with OSC add-and-drop capability. It supports 80 channels at 50-GHz channel spacing in the C-band (that is, the 1529 to 1562.5 nm wavelength range). When the system has an OPT-AMP-17-C card that is installed, an OSCM card and/or OSC derived from the controller card is needed to process the OSC.

The features of the card include:

- Fixed gain mode (no programmable tilt)
- Standard gain range of 14–20 dB at startup when configured as a preamplifier
- Standard gain range of 20–23 dB in transient mode when configured as a preamplifier
- Gain range of 14–23 dB (with no transient gain range) when configured as a booster amplifier
- True variable gain
- Fast transient suppression
- Nondistorting low-frequency transfer function
- Settable maximum output power
- Fixed output power mode
- Amplified spontaneous emissions (ASE) compensation in fixed gain mode
- Full monitoring and alarm handling with settable thresholds
- Optical Safety Remote Interlock (OSRI)—Shuts down optical output power or reduces the power to a safe level
- Automatic laser shutdown (ALS)—Safety mechanism used in case of fiber cut

You can install the OPT-AMP-17-C card in the following slots.

- Slots 2–7 in NCS 2006

- Slots 2–16 in NCS 2015

For more information about the OPT-AMP-17-C card, see https://www.cisco.com/c/en/us/products/collateral/optical-networking/ons-15454-series-multiservice-provisioning-platforms/prod_data_sheet0900aecd8072b322.html and [Card Features](#).

OPT-PRE Card

In this chapter, "OPT-PRE" refers to the _15454-OPT-PRE card.

The OPT-PRE is a C-band, DWDM, two-stage erbium-doped fiber amplifier (EDFA) with midamplifier loss (MAL). This card can be connected to a dispersion compensating unit (DCU). The OPT-PRE is equipped with a built-in Variable Optical Attenuator (VOA) that controls the gain tilt and attenuates the signal of the DCU to a reference value. The card is designed to support up to 80 channels at 50-GHz channel spacing.

The features of the card include:

- Fixed gain mode with programmable tilt
- True variable gain
- Fast transient suppression
- Nondistorting low-frequency transfer
- Settable maximum output power
- Fixed output power mode
- MAL for fiber-based DCU
- Amplified spontaneous emissions (ASE) compensation in fixed gain mode
- Full monitoring and alarm handling with settable thresholds
- An optical output port for external monitoring



Note The optical splitter has a ratio of 1:99, resulting in about 20-dB lower power at the MON port than at the COM TX port.

You can install the OPT-PRE card in the following slots.

- Slots 2 and 3 in NCS 2002
- Slots 2–7 in NCS 2006
- Slots 2–16 in NCS 2015

For more information about the OPT-PRE card, see https://www.cisco.com/c/en/us/products/collateral/optical-networking/ons-15454-series-multiservice-provisioning-platforms/prod_data_sheet0900aecd8072b322.html and [Card Features](#).

OPT-BST and OPT-BST-E Cards

In this chapter, "OPT-BST" refers to the _15454-OPT-BST card and "OPT-BST-E" refers to the _15454-OPT-BST-E card.

The OPT-BST is designed to support up to 80 channels at 50-GHz channel spacing. The OPT-BST-E amplifier card is a gain-enhanced version of the OPT-BST card. It is designed to support up to 80 channels at 50-GHz channel spacing. The cards are C-band, DWDM EDFA with optical service channel (OSC) add-and-drop capability.

The features of the cards include:

- Fixed gain mode (with programmable tilt)
- Gain range of 5–20 dB in constant gain mode and output power mode
- The standard gain range with tilt control is 8–23dB. The extended gain range without tilt control is 23–26 dB.
- True variable gain
- Built-in VOA to control gain tilt
- Fast transient suppression
- Nondistorting low-frequency transfer function
- Settable maximum output power
- Fixed output power mode
- ASE compensation in fixed gain mode
- Full monitoring and alarm handling with settable thresholds
- Optical Safety Remote Interlock (OSRI)—Shuts down optical output power or reduces the power to a safe level
- Automatic laser shutdown (ALS)—Safety mechanism used in case of fiber cut



Note Each optical splitter has a ratio of 1:99. The result is that MON TX and MON RX port power is about 20 dB lower than COM TX and COM RX port power.

You can install the cards in the following slots:

- Slots 2–7 in NCS 2006
- Slots 2–16 in NCS 2015

For more information about the cards, see https://www.cisco.com/c/en/us/products/collateral/optical-networking/ons-15454-series-multiservice-provisioning-platforms/prod_data_sheet0900aecd8072b322.html.

OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 Cards

In this chapter, "OPT-EDFA-17" refers to the _15454-OPT-EDFA-17 card. "OPT-EDFA-24" refers to the _15454-OPT-EDFA-24 card. "OPT-EDFA-35" refers to the NCS2K-OPT-EDFA-35 card.

The OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 cards are C-band DWDM EDFA amplifiers and preamplifiers. The cards are true variable gain amplifiers, offering an optimal equalization of the transmitted optical channels over a wide gain range. They support 96 channels at 50-GHz channel spacing in the C-band (that is, 1528.77 to 1566.72-nm wavelength range). The OPT-EDFA-17 and OPT-EDFA-24 cards deliver 20-dBm output powers and the OPT-EDFA-35 card delivers +23-dBm output power. These cards do not contain mid-stage access loss for a Dispersion Compensation Unit (DCU). The cards provide a noise-figure optimized version of the EDFA amplifiers to cope with new modulation formats like PM-DQPSK, which do not need dispersion compensation. To control gain tilt, a VOA is used. The amplifier module also includes the OSC add (TX direction) and drop (RX direction) optical filters.

The OPT-EDFA-17, and OPT-EDFA-24 cards share the same hardware platform and firmware architecture, but they differ in their operative optical gain range, which is 17 and 24 dB respectively.

The OPT-EDFA-35 card includes two identical amplification sections to serve two fiber directions simultaneously. Each section has a switchable gain range that allows its usage over a wide gain range. The OPT-EDFA-35 card is bidirectional. The card acts on both pairs of fibers entering and exiting from the node.

The OPT-EDFA-35 card has two possible gain ranges: gain range 1 from 12–24, gain range 2 from 20–35. The card also has extended gain range up to 40 dB without tilt control.

The OPT-EDFA-35 card is managed in a similar way as the OPT-EDFA-17 and OPT-EDFA-24 cards. For each EDFA unit inside the OPT-EDFA-35 card, the following settings are allowed:

- Configuration of PRE or BST role
- Configuration of Constant Gain working mode
- Configuration of Gain Range

The main functionalities of the OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 cards are:

- (OPT-EDFA-17 and OPT-EDFA-24) Amplification of the input signal at the COM-RX port toward the LINE-TX port through a true-variable gain EDFA block.

(OPT-EDFA-35) Two EDFA amplifier units embedded into the card, amplification of the input signal at the LINE-1-RX port toward the LINE-2-TX port through a true-variable gain EDFA-2 block, and amplification of the input signal at the LINE-2-RX port toward the LINE-1-TX port through a true-variable gain EDFA-1 block.
- Multiplexing the OSC to the LINE-TX port
- Demultiplexing the OSC from the LINE-RX port
- Monitoring of the LINE input or output signal with 1% TAP splitters

The features of the OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 cards are:

- Embedded Gain Flattening Filter
- Constant pump current mode (test mode)
- Constant output power mode

- Constant gain mode
- Nondistorting low-frequency transfer function
- ASE compensation in Constant Gain and Constant Output Power modes
- Fast transient suppression
- Programmable tilt
- Full monitoring and alarm handling capability
- Gain range with gain tilt control of 5–17 dB (for OPT-EDFA-17 card) , 12 to 24 dB and 20 to 35 dB (for OPT-EDFA-35 card), and 12–24 dB (for OPT-EDFA-24 card).
- Extended gain range (with uncontrolled tilt) of 17–20 dB (for OPT-EDFA-17 card) , (for OPT-EDFA-35 card) of upto 27dB (for Gain Range1) and 40dB (for Gain Range2), and 24–27 dB (for OPT-EDFA-24 card).
- Optical Safety Remote Interlock (OSRI)
- Automatic Laser Shutdown (ALS)

You can install the OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 cards in the following slots:

- Slots 2–7 in NCS 2006
- Slots 2–16 in NCS 2015

For more information about the OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 cards, see the [data sheet](#).

Power Monitoring of OPT-EDFA-17, OPT-EDFA-24, and OPT-EDFA-35 Cards

Physical photodiodes PD1 through PD6 monitor the power for the OPT-EDFA-17 and OPT-EDFA-24 cards.

Table 2: Port Calibration of OPT-EDFA-17 and OPT-EDFA-24 Cards

Photodiode	Calibrated to Port
PD1	COM-RX
PD2	LINE-TX
PD3	LINE-TX
PD4	OSC-RX
PD5	LINE-RX
PD6	LINE-RX

Physical photodiodes PD1 through PD8 monitor the power for the OPT-EDFA-35 card.

Table 3: Port Calibration of OPT-EDFA-35 Card

Photodiode	Calibrated to Port
PD1	LINE-2-RX
PD2	LINE-1-TX
PD3	LINE-1-RX
PD4	LINE-2-TX
PD5	OSC-2-RX
PD6	OSC-2-TX
PD7	OSC-1-TX
PD8	OSC-1-RX

Installing the Amplifier Card

Use this task to install the amplifier cards on the chassis.

Procedure

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- Step 1** Remove a DWDM card from its packaging, then remove the protective caps from the backplane connectors. (Safety caps are typically yellow.)
- Step 2** Align the amplifier card so the markings on the card and the chassis are on the same side.
- Step 3** Open the latches or ejectors of the first card that you will install.
- Step 4** Use the latches or ejectors to firmly slide the card horizontally along the guide rails until the card plugs into the receptacle at the back of the slot. (slot 2 to 7 in the NCS 2006 shelf or slot 2 to 16 in the NCS 2015 shelf.)
- Note** The card slides vertically in NCS 2015 shelf.
The card slides horizontally in NCS 2006.
- Step 5** Verify that the card is inserted correctly, and close the latches or ejectors on the card.
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RAMAN-CTP and RAMAN-COP Cards

In this chapter, "RAMAN-CTP" refers to the 15454-M-RAMAN-CTP card and "RAMAN-COP" refers to the 15454-M-RAMAN-COP card.

The single-slot RAMAN-CTP and RAMAN-COP cards support counter and co-propagating Raman amplification on long unregenerated spans.

The cards manage up to 96 ITU-T 50 GHz spaced channels over the C-band of the optical spectrum (wavelengths from 1528.77 to 1566.72 nm). The counter-propagating RAMAN-CTP card is the primary unit.

The co-propagating RAMAN-COP card is the secondary unit and can be used only when the counter-propagating unit is present. The OSC pluggable used with the cards is ONS-SC-OSC-18.0=.

The RAMAN-CTP card can be calibrated either manually or automatically from the **Maintenance** tab in the SVO web interface. When the RAMAN-COP card is used, the RAMAN-CTP card can be calibrated only using the manual option.

The features of the RAMAN-CTP and RAMAN-COP cards include:

- Raman section: 1000-mW total pump power for four pumps and two wavelengths.
- Embedded distributed feedback (DFB) laser at 1568.77 nm to be used for optical safety and link continuity (in RAMAN-CTP card only).
- Photodiodes to enable monitoring of Raman pump power.
- Photodiodes to enable monitoring of the DFB laser and signal power (in RAMAN-CTP card only).
- Automatic laser shutdown (ALS) for optical laser safety.
- Hardware output signals for loss of signal (LOS) monitoring at input photodiodes.
- Raman pump back reflection detector to check for excessive back reflection.

When the node has either RAMAN-CTP or RAMAN-COP card, you can install the card in the following slots.

- Slots 2–7 in NCS 2006
- Slots 2–16 in NCS 2015

When the node has both RAMAN-CTP or RAMAN-COP cards, you can install the cards in the following slots.

- If the RAMAN-CTP card is installed in an even slot, the RAMAN-COP card must be installed in the next odd slot.
- If the RAMAN-COP is installed in an even slot, the RAMAN-CTP card must be installed in the next odd slot.

RAMAN-CTP and RAMAN-COP Cards Power Monitoring

Physical photodiodes P1 through P10 monitor the power for the RAMAN-CTP card.

Table 4: RAMAN-CTP Port Calibration

Photodiode	Type Name	Calibrated to Port
P1	DFB in-fiber Output Power	LINE-TX
P2	DWDM RX Input Power	LINE-RX
P3	Pump 1 in-fiber Output Power	LINE-RX
P4	Pump 2 in-fiber Output Power	LINE-RX
P5	Total Pump in-fiber Output Power	LINE-RX

Photodiode	Type Name	Calibrated to Port
P6	Back-Reflected Pump Power	LINE-RX
P7	DWDM TX Input Power	COM-RX
P8	Total Co-Pump in-fiber Output Power	LINE-TX
P9	DFB Input Power	LINE-RX
P10	ASE Input Power	LINE-RX

Physical photodiodes P3 through P6 monitor the power for the RAMAN-COP card.

Table 5: RAMAN-CTP Port Calibration

Photodiode	Type Name	Calibrated to Port
P3	Pump 1 in-fiber Output Power	RAMAN-TX
P4	Pump 2 in-fiber Output Power	RAMAN-TX
P5	Total Pump in-fiber Output Power	RAMAN-TX
P6	Back-Reflected Pump Power	RAMAN-TX

For more information about the RAMAN-CTP and RAMAN-COP cards, see the [data sheet](#).

RMN-CTP-CL Card

Table 6: Feature History

Feature Name	Release Information	Feature Description
RMN-CTP-CL Card	Cisco NCS 2000 Release 12.3	The RMN-CTP-CL card is a RAMAN amplifier card that provides optical amplification of the wavelengths by counter-propagating Raman pumping. The card operates for both C and L bands of the optical spectrum. The card occupies one slot in NCS 2006 and NCS 2015 chassis.

In this chapter, "RMN-CTP-CL" refers to the NCS2K-RMN-CTP-CL card.

The RMN-CTP-CL card provides optical amplification of the wavelengths by counter-propagating Raman pumping. The card operates for both C and L bands of the optical spectrum.

The RMN-CTP-CL card can be installed in any service slot in the Cisco NCS 2006 and NCS 2015 chassis. The RMN-CTP-CL card works on a node that is installed with the flex package.

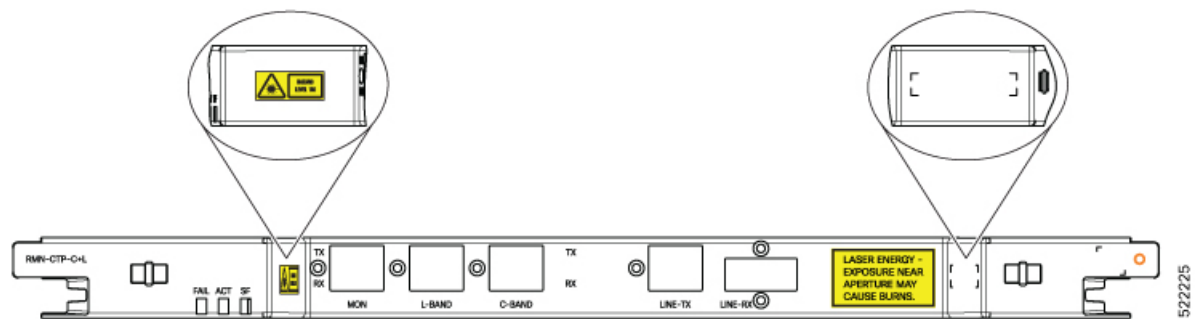
Key Features

The RMN-CTP-CL card provides the following key features:

- 1.2W total power with five Raman pump wavelengths to support Raman amplification over the C-band and L-band wavelength range.
- Multiplexer and demultiplexer section to combine and split the C-band and L-band wavelength range.
- Embedded laser at 1568.77 nm used for optical safety and link continuity.
- Photodiodes to enable monitoring of Raman pump power, embedded laser, and signal power.
- Raman pump back reflection detector to check for excessive back reflection.
- Automatic laser shutdown (ALS) for optical laser safety.
- Automated turn up of the card with automatic tuning of the pump wavelengths to ensure optimal amplification performance.

Faceplate Diagram

Figure 1: Faceplate Diagram of RMN-CTP-CL Card



Connector Assignment

The RMN-CTP-CL card uses LC connectors for all the ports except the LINE-RX port.

Table 7: Connector Assignment

Optical Connector Label	Optical Connector Type	Port Name
LINE	LC - UPC	LINE-TX
	E2000 – PS - PC	LINE-RX
C-BAND	LC - UPC	C-BAND-TX
	LC - UPC	C-BAND-RX
L-BAND	LC - UPC	L-BAND-TX
	LC - UPC	L-BAND-RX

Optical Connector Label	Optical Connector Type	Port Name
MON	LC - UPC	MON-TX
	LC - UPC	MON-RX

For more information about the RMN-CTP-CL card, such as the block diagram and card specifications, see the data sheet.

EDRA-1-xx and EDRA-2-xx Cards

In this chapter, "EDRA-1-xx" refers to the NCS2K-EDRA1-26C and NCS2K-EDRA1-35C cards.

"EDRA-2-xx" refers to the NCS2K-EDRA2-26C and NCS2K-EDRA2-35C cards.

The double-slot EDRA-1-xx and EDRA-2-xx cards combine standard erbium-doped fiber amplifiers and a Raman amplifier to enable amplification on long unregenerated spans.

The cards manage up to 96 ITU-T 50 GHz spaced channels over the C-band of the optical spectrum (wavelengths from 1528.77 to 1566.72 nm). You can install the EDRA-1-xx and EDRA-2-xx cards in the lowest slots to allow high output power. The power output is limited to 21 dBm when the cards are inserted in any other slot. The OSC pluggable used with the cards is ONS-SC-OSC-18.0=.

The cards can be used in point-to-point, ring, multi-ring, or mesh topologies and are supported on flexible nodes in line amplifier node configurations.

Apart from these node configurations having only EDRA cards as amplifiers, the system also supports hybrid configurations with OPT-EDFA-17, OPT-EDFA-24, RAMAN-CTP, and RAMAN-COP cards. These cards support span loss and gain values that are not supported in EDRA cards.

- For gain less than 15 dB, OPT-EDFA-17 or OPT-EDFA-24 must be used.
- For gain greater than 35 dB, RAMAN-CTP, RAMAN-COP, OPT-EDFA-17 or OPT-EDFA-24 must be used.

You can install the EDRA-1-xx and EDRA-2-xx cards in the following slots.

- Slots 2–6 in NCS 2006
- Slots 2–15 in NCS 2015

EDRA-1-xx and EDRA-2-xx Cards Power Monitoring

The following table lists the physical photodiodes that monitor the power for the EDRA-1-xx and EDRA-2-xx cards.

Table 8: EDRA-1-xx and EDRA-2-xx Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
PD1	Remnant Pump Input power	LINE-TX
PD2	OSC Add Input Power	OSC-RX

Photodiode	CTC Type Name	Calibrated to Port
PD3	EDFA1 Input Power	LINE-RX
PD4	EDFA1 Output Power	COM-TX
PD5	EDFA2 Input Power	COM-RX
PD6	EDFA2/LINE-TX Output Power	LINE-TX
PD7	OSC Drop Output Power	LINE-TX
PD11	Pump λ 1 in-fibre Output Power	LINE-RX
PD12	Pump λ 2 in-fibre Output Power	LINE-RX
PD13	Pump λ 3 in-fibre Output Power	LINE-RX
PD14	Pump λ 4 in-fibre Output Power	LINE-RX
PD15	Total Pump in-fibre Output Power	LINE-RX
PD16	Back-Reflected Pump Power	LINE-RX
PD17	OTDR2-L Input Power	OTDR2-L-RX

Provision Amplifier Parameters

Use this task to provision the optical amplifier parameters for OPT-AMP-C, OPT-AMP-17-C, OPT-PRE, OPT-BST, OPT-BST-E, OPT-EDFA-17, OPT-EDFA-24, OPT-EDFA-35, EDRA1-xx, and EDRA2-xx cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Provisioning > Amplifier** tabs.

Step 2 Modify any of the settings described in the following table.

Table 9: Amplifier Parameters for Amplifier Cards

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

Parameter	Description	Options
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.	—
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 Degrade Threshold (High) (dBm/GHz)	Shows the current value of the optical power degrade high threshold.	—
Power Degrade Threshold (Low) (dBm/GHz)	Shows the current value of the optical power degrade low threshold.	—
Status	Shows the current status of the amplifier.	—

Parameter	Description	Options
Gain Degrade High (dB)	(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. Gain Degrade High refers to the Gain value of the port and is automatically calculated by the control card when the amplifier is turned up.	—
Gain Degrade Low (dB)	(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. 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.	—

Step 3 Click **Apply** to save the changes.

Provision Raman Amplifier Parameters

Use this task to provision the optical Raman amplifier parameters for the RAMAN-CTP, RAMAN-COP, RMN-CTP-CL, EDRA1-xx, and EDRA2-xx cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Provisioning > Raman Amplifier** tabs.

Step 2 Modify any of the settings described in the following table.

Table 10: Raman Amplifier Parameters for Amplifier Cards

Parameter	Description	Options
Port	(Display only) Displays the port number, port type, and direction (TX or RX).	—
Name		
Gain Setpoint (dB)	Target amplifier gain requested by the user.	—
Tilt Setpoint (dB)	Target output tilt requested by the user.	—
Actual Gain (dB)	(Display only) Displays the actual amplifier gain.	—
Actual Tilt (dB)	(Display only) Displays the actual amplifier tilt	—
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 3 Click **Apply** to save the changes.

Step 4 Expand the RAMAN port to view the pump power details.

Table 11: 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).
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 5 Click **Apply** to save the changes.

Provision Interface Parameters

Use this task to change the optical interface parameters of OPT-AMP-C, OPT-AMP-17-C, OPT-PRE, OPT-BST, OPT-BST-E, OPT-EDFA-17, OPT-EDFA-24, OPT-EDFA-35, RAMAN-CTP, RMN-CTP-CL, EDRA1-xx, and EDRA2-xx cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Provisioning** > **Interface** tabs.

Step 2 Modify the settings described in the following table. The provisionable parameters are listed in the Options column in the table.

Table 12: 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
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 (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 3 Click **Apply** to save the changes.

Manage Raman Interface Parameters

Use this task to manage the Raman interface parameters of RAMAN-CTP, RAMAN-COP, RMN-CTP-CL, EDRA1-xx, and EDRA2-xx cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Provisioning > Raman Interface** tabs.

Step 2 View the settings described in the following table. Only the Admin State parameter can be modified.

Table 13: 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
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 3 Click **Apply** to save the changes.

Provision Thresholds for TCA alarms

Use this task to change the thresholds for TCA alarms raised on cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Provisioning > Optics Thresholds** tabs.

Step 2 Choose the type of threshold that you want to change, 15 Min or 1 Day.

Step 3 Modify the settings described in the following table. The provisionable parameters are listed in the Options column in the table.

Table 14: Threshold Options

Parameter	Description	Options
Interface Name	(Display only) Displays the port number, port type, and direction (RX or TX)	All the TX and RX ports
PM Type	Type of interface	<ul style="list-style-type: none"> • oscPowerPMTh • opticalPowerPMTh

Parameter	Description	Options
Low	Sets the low power warning level.	Numeric. The default is -50 dBm. Double-click the parameter, enter a value, and press Enter.
High	Sets the high power warning level.	Numeric. The default is 30 dBm. Double-click the parameter, enter a value, and press Enter.

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

Provision Optical Safety

Use this task to provision the optical safety parameters for cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Maintenance > Optical Safety** tabs.

Step 2 Modify required settings described in the following table:

Table 15: Optical Safety Parameters for Cards

Parameter	Description	Options
Interface	(Display only) Displays the port name, port type, and direction.	—
Supported Safety	(Display only) Displays the supported safety mechanism.	<ul style="list-style-type: none"> • ALS for line cards and control cards. • ALS-OSRI for amplifier cards.

Parameter	Description	Options
ALS Mode	Automatic laser shutdown mode. The ALS mode is disabled for RX ALS interfaces.	From the drop-down list, choose one of the following: <ul style="list-style-type: none"> • ALS-Disabled—Deactivates ALS. • Automatic Restart—(Default) ALS is active. The power is automatically shut down when needed, and it automatically tries to restart using a probe pulse until the cause of the failure is repaired. • Manual Restart
OSRI	Optical safety remote interlock. The default value is OSRI-OFF. When set to OSRI-ON, the TX output power is shut down. Note OSRI configuration is not supported on the transponder and muxponder cards.	From the drop-down list, choose one of the following: <ul style="list-style-type: none"> • OSRI-OFF • OSRI-ON
ALS Status	(Display only) ALS status of the device.	<ul style="list-style-type: none"> • Working • Shutdown
Recovery Pulse Interval	Displays the interval between two optical power pulses.	60 to 300 seconds.
Recovery Pulse Duration	Displays the duration of the optical power pulse that begins when an amplifier restarts.	2 to 100 seconds
Manual Restart	Triggers manual restart action for the ALS interface. However, manual restart does not happen if Mode is set to Automatic Restart or Disabled.	—

Step 3 Click **Apply** to save the changes.

Clear the Raman Laser Shutdown Condition

The Raman Laser Shutdown (RLS) condition is raised during the Raman link turn-up phase on the RAMAN-TX port of the RAMAN-CTP and RAMAN-COP cards when excessive back reflection is detected. When the RLS condition is raised, the Raman pump laser inside the card is automatically shut down and the optical link turn-up procedure is terminated. The RLS condition must be cleared before proceeding with further provisioning.

Use this task to clear the RLS condition for RAMAN-CTP and RAMAN-COP cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

- Step 1** Click the **Maintenance > Safety** tabs.
- Step 2** Click **Manual Safety Restart** to clear the RLS condition.
A confirmation dialog box appears and is service-affecting.
- Step 3** Click **Yes** to proceed.
-

Provision FPD Upgrade

Whenever the firmware version on the card is earlier than the FPGA firmware version, an alarm "FPD-UPG-REQUIRED" is raised on the card in the **Alarms** tab.

You can view the running firmware version and the NCS 2000 FPGA firmware version under the **Maintenance > FPD upgrade** tabs.

Use this task to upgrade the RMN-CTP-CL card with the latest firmware released as part of the NCS 2000 software release.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

- Step 1** Click the **Maintenance > FPD Upgrade** tabs.
- Step 2** Click **FPD upgrade** to perform firmware upgrade for the card.

After the firmware upgrade is completed successfully, the "FPD-UPG-REQUIRED" alarm gets cleared in **Alarms** tab and you can view the updated running firmware version in the **FPD Upgrade** table.

View Insertion Loss Parameters

Use this task to view the insertion loss parameters of cards.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Click the **Maintenance > Insertion Loss** tabs to view the insertion loss parameters.

The Insertion Loss tab displays the following information:

- **Insertion Loss Path**—Displays the insertion loss path.
- **IL Value (dB)**—Displays the insertion loss value.

Note When the card is removed, the last retrieved Insertion Loss values are displayed in the SVO web UI. When the card is replaced, the Insertion Loss values are updated in the SVO web UI.

Perform Manual Calibration

Use this task to perform manual calibration for the RAMAN-CTP and RAMAN-COP cards.

The RAMAN-COP card supports only manual calibration. The RAMAN-CTP card supports both automatic and manual calibration. However, if a node has both RAMAN-CTP and RAMAN-COP cards, the RAMAN-CTP card supports only manual calibration.

For complete information on the specific setup that is required for manual calibration, see [DLP-G690 Configure the Raman Pump Using Manual Day-0 Installation](#).

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Maintenance > Manual Calibration** tabs.

All the values in this pane are read-only and reflects the status of last manual calibration.

Table 16: Parameters of Manual Calibration

Parameter	Description
Port	Displays the port number, port type, and direction (TX or RX).
Time Stamp	Displays the date and time of calibration.
Pump 1 Low Power (dBm)	Displays the measured incoming power with only pump 1 on at low power level.
Pump 2 Low Power (dBm)	Displays the measured incoming power with only pump 2 on at low power level.
Pump 1 High Power (dBm)	Displays the measured incoming power with only pump 1 on at high power level.
Pump 2 High Power (dBm)	Displays the measured incoming power with only pump 2 on at high power level.
Target Gain (dB)	Displays the target spectrum gain.
Obtained Gain (dB)	Displays the obtained spectrum gain.
Target Tilt (dB)	Displays the target spectrum tilt.
Obtained Tilt (dB)	Displays the obtained spectrum tilt.
Result	<p>Displays the result of manual Raman calibration. The possible values of Result are as follows:</p> <ul style="list-style-type: none"> • No Target Gain—Raman target gain is not configured. • Not Enough Gain—Raman gain obtained from calibration is too low. • Lower Than Target Gain—Raman gain obtained from calibration is below the target but is acceptable. • Target Gain Reached—Raman target gain is reached. • User Override—User has overridden the calibration result and uses the configured setpoint of Raman pumps manually.

Parameter	Description
Status	<p>Displays the status of manual Raman calibration. The possible values of Status are as follows:</p> <ul style="list-style-type: none"> • Not Calibrated—Raman calibration was not run. • In Progress—Raman calibration is being run by the user. • Completed—Raman calibration is completed. • Using pumps-power-setpoint—Raman pumps are regulated according to the user configuration.

Step 2 Click **Run Calibration**.

A confirmation message appears.

Step 3 Click **Yes**.

Step 4 Click **Run Pump Test** for each individual pump.

The pump test cannot be run if active circuits are present in the node. When you run the pump test, the Status column in the Manual Calibration tab changes to "In Progress."

Step 5 Enter the optimum power value of individual pump in the Power Value (dBm) field.

Step 6 Click **Calibrate Pump** to start the manual calibration.

The calibration progress appears in the **Calibration Result** area. The calibration result can be a success, failure, or lower than target gain.

- If the calibration result is success, the obtained target gain value is applied to the node.
- If the calibration result is a failure, the old target gain value is restored.
- If the calibration result is lower than the target gain, it implies that the obtained gain is + or -2 dB from the target gain. The gain is degraded. However, the calibration is still accepted and the obtained target gain value is applied to the node.

Perform Automatic Calibration

Use this task to perform automatic calibration for the RAMAN-CTP, RMN-CTP-CL, EDRA1-xx, and EDRA2-xx cards.

The automatic calibration automatically runs on the cards upon fiber restoration, power cycle, and so on.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Step 1 Click the **Maintenance > Automatic Calibration** tabs.

All the values in this pane are read-only and reflects the status of last automatic calibration.

Note Only the Port, Timestamp, Result, Status, Max Gain, and Progress parameters are applicable for the RMN-CTP-CL card.

Table 17: Parameters of Automatic Calibration

Parameter	Description
Port	Displays the port number, port type, and direction (TX or RX).
Timestamp	Displays the date and time of calibration.
Calibration Gain (dB)	Displays the Raman gain that is obtained with calibration of total pump power.
Calibration Total Pumps (mW)	Displays the reference power level used throughout calibration. The default value is 700 mW. If Raman gain is too low, the power value is automatically increased to 850 mW.
Target Gain (dB)	Displays the target spectrum gain.
Obtained Gain (dB)	Displays the obtained spectrum gain.
Target Tilt (dB)	Displays the target spectrum tilt.
Obtained Tilt (dB)	Displays the obtained spectrum tilt.
Raman Noise Floor (dBm)	Displays the optical power measured at the LINE-RX port when Raman pumps are at calibration total pumps power level and incoming signal is not received from the neighboring node. It is noise generated by the Raman amplification process.
Incoming Power Pumps Off (dBm)	Displays the power level of probe signal with Raman pumps off.
Incoming Power Pumps On (dBm)	Displays the power level of probe signal with Raman pumps on (combined with Raman noise floor).

Parameter	Description
Power Source	<p>Displays the type of power source that is used for calibration. The possible values of Power Source are as follows:</p> <ul style="list-style-type: none"> • Broadband Optical Power—Raman automatic calibration used broadband optical power, typically, Amplified Spontaneous Emission (ASE) generated by an optical amplifier. • Active Optical Services—Raman automatic calibration used active services. • Active Optical Services (Unbalanced)—Raman automatic calibration used active services; however, they do not properly cover the whole C-Band spectrum.
Result	<p>Displays the result of automatic Raman calibration. The possible values of Result are as follows:</p> <ul style="list-style-type: none"> • No Target Gain—Raman target gain is not configured. • Not Enough Gain—Raman gain obtained from calibration is too low. • Lower Than Target Gain (Need Accept)—Raman gain obtained from calibration is below the target but might be acceptable. The user must accept the Raman gain. • Lower Than Target Gain (Accepted)—Raman gain obtained from calibration is below the target and the user has accepted the Raman gain. • Target Gain Reached—Raman target gain is reached. • User Override—User has overridden the calibration result and uses configured setpoint of Raman pumps manually.

Parameter	Description
Status	<p>Displays the status of automatic Raman calibration. The possible values of Status are as follows:</p> <ul style="list-style-type: none"> • Not Scheduled—Raman automatic calibration is not scheduled. • Invalid—Raman automatic calibration reports invalid data. • Pending—Raman automatic calibration is scheduled and pending. • Running On User Request—Raman automatic calibration is running on user request. • Running—Raman automatic calibration is automatically running. • Failed—Raman automatic calibration has failed. • Aborted—Raman automatic calibration has been terminated and will be re-scheduled soon. • Completed—Raman automatic calibration is completed.
Max Gain	<p>(Only for RMN-CTP-CL card) Displays the maximum obtainable Raman gain value on the specific fibre span. The value is a result of the initial probing during the Raman Calibration procedure and indicates the quality of fibre for Raman amplification. The higher the max gain value, the better. The lower max gain value (10 dB or lower) indicates that the fibre is not suitable for Raman amplification.</p>
Progress	<p>(Only for RMN-CTP-CL card) Displays the current stage of the calibration. This parameter can have values such as "Probing Transmission Fibre", "Evaluating Max Gain", and "Calculating Pumps Power for Target Gain".</p>

Step 2 Click **Run Calibration** to start the automatic calibration.

A confirmation message appears.

Step 3 Click **Yes**.

When you start the automatic calibration, the Status column in the Automatic Calibration tab changes to "Running on User Request."

The calibration result can be success, failure, or lower than target gain.

- If the calibration result is success, the obtained target gain value is applied to the node.
- If the calibration result is failure, the old target gain value is restored.

- If the calibration result is lower than target gain, it implies that the obtained gain is + or –2 dB from the target gain. The gain is degraded. The RAMAN-GAIN-NOT-REACHED alarm is raised on the node to inform the user of a lower target gain. The user can accept this lower target gain by clicking the **Accept Degraded Gain** button. This clears the RAMAN-GAIN-NOT-REACHED alarm and the lower target gain value is applied to the node.

Step 4 (Optional) (Not applicable for RMN-CTP-CL card) Click **Get All Calibration Reports** to display the last 10 calibration reports with the timestamp and result in a table.

Step 5 (Optional) Click **Get Last Calibration Error** to identify the reason for the last calibration failure.

The automatic calibration typically completes without user intervention. However, the automatic calibration fails upon certain conditions such as loss of communication between two nodes and OSC failure. You can identify the reason for the last calibration failure by clicking the **Get Last Calibration Error** button. The reason is displayed only when the Status column in the Automatic Calibration tab is Failure.

Collect Failure Logs

Use this task to collect the failure log information for the cards. This task can be used to debug the cards before RMA.

Before you begin

- [Log into the SVO Web Interface](#)
- [Open the Card View](#)

Procedure

Right-click the card and choose **OBFL** to collect the On Board Failure Logs (OBFL).

The failure log information is displayed in the **Maintenance > OBFL Status** tabs.
