Provisioning Optical Add/Drop Cards

This chapter describes optical add/drop cards used in Cisco ONS 15454 dense wavelength division multiplexing (DWDM) networks. For card safety and compliance information, refer to the Regulatory Compliance and Safety Information for Cisco ONS Products document.

Note The cards described in this chapter are supported on the Cisco ONS 15454, Cisco ONS 15454 M6, Cisco ONS 15454 M2 platforms, unless noted otherwise.

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

Chapter topics include:

- Safety Labels, on page 1
- Card Overview, on page 1
- AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards, on page 4
- AD-1B-xx.x and AD-4B-xx.x Cards, on page 7

Safety Labels

For information about safety labels, see the section, Class 1M Laser Product Cards .

Card Overview

The card overview section contains card overview, software compatibility, and channel allocation information for optical add/drop cards.

Optical add/drop cards are divided into two groups:

- Band optical add/drop multiplexer (OADM) cards
- Channel OADM cards

Band OADM cards add and drop one or four bands of adjacent channels. The cards in this chapter, including the 4-Band OADM (AD-4B-xx.x) and the 1-Band OADM (AD-1B-xx.x) are utilized only in the C band.

Channel OADM cards add and drop one, two, or four adjacent channels; they include the 4-Channel OADM (AD-4C-xx.x), the 2-Channel OADM (AD-2C-xx.x), and the 1-Channel OADM (AD-1C-xx.x).

Card Compatibility

The following table lists the CTC software compatibility for each optical add/drop card.

Table 1: Software Release Compatibility for Optical Add/Drop Cards

Card Name	R4.5 - R9.1	R9.2 - R9.8	R10.0 /R10.1/R10.3	R10.5	R10.5.2 7	R10.6 01 12
AD-1C-xx.x	15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, , 15454-M6, , 15454 -DWDM M	2M 15454-M2 6M 15454-M6 15454 -DWDM
AD-2C-xx.x	15454 -DWDM	15454-M2, 15454-M6, 15454-DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, , 15454-M6, , 15454 -DWDM	2M 15454-M2 6M 15454-M6 15454 -DWDM
AD-4C-xx.x	15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, 15454-M6, 15454 -DWDM	15454-M2, , 15454-M6, , 15454 -DWDM M	2M 15454-M2 6M 15454-M6 15454 -DWDM
AD-1B-xx.x	15454 -DWDM	15454 -DWDM	15454 -DWDM	15454 -DWDM	15454 -DWDM M	15454 -DWDM
AD-4B-xx.x	15454 -DWDM	15454 -DWDM	15454 -DWDM	15454 -DWDM	15454 -DWDM M	15454 -DWDM

DWDM Card Channel Allocation Plan

ONS 15454 DWDM channel OADM and band OADM cards are designed for use with specific channels in the C band. In most cases, the channels for these cards are either numbered (for example, 1 to 32) or delimited (odd or even). Client interfaces must comply with these channel assignments to be compatible with the ONS 15454 system.

Table 9-2 lists the channel IDs and wavelengths assigned to the C-band DWDM channels.

Note In some cases, a card uses only some or all of the channels listed in a band. Also, some cards use channels on the 100-GHz ITU-T grid while others use channels on the 50-GHz ITU-T grid.

Table 2: DWDM Channel Allocation Plan (C Band)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134
23	194.90	1538.186	64	192.85	1554.537
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards

AD-1C-xx.x Card

The AD-1C-xx.x card has reached end of support.

The 1-Channel OADM (AD-1C-xx.x) card passively adds or drops one of the 32 channels utilized within the 100-GHz-spacing of the DWDM card system. Thirty-two versions of this card—each designed only for use with one wavelength—are used in the ONS 15454 DWDM system. Each wavelength version of the card has a different part number.

The features of the AD-1C-xx.x card are listed in the section, "“Features of AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards” section on page 9-4".

For more information about the AD-1C-xx.x card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a5572.html.

AD-2C-xx.x Card

The AD-2C-xx.x card has reached end of support.

The 2-Channel OADM (AD-2C-xx.x) card passively adds or drops two adjacent 100-GHz channels within the same band. Sixteen versions of this card—each designed for use with one pair of wavelengths—are used in the ONS 15454 DWDM system. The card bidirectionally adds and drops in two different sections on the same card to manage signal flow in both directions. Each version of the card has a different part number.

The features of the AD-2C-xx.x card are listed in the section, ""Features of AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards" section on page 9-4".

For more information about the AD-2C-xx.x card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a5572.html.

AD-4C-xx.x Card

The AD-4C-xx.x card has reached end of support.

The 4-Channel OADM (AD-4C-xx.x) card passively adds or drops all four 100-GHz-spaced channels within the same band. Eight versions of this card—each designed for use with one band of wavelengths—are used in the ONS 15454 DWDM system. The card bidirectionally adds and drops in two different sections on the same card to manage signal flow in both directions. There are eight versions of this card with eight part numbers.

The features of the AD-2C-xx.x card are listed in the section, ""Features of AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards" section on page 9-4".

For more information about the AD-4C-xx.x card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a5572.html.

Features of AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards

The AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x cards have the following features:

- Passive cascaded optical interferential filters perform the channel add and drop functions.
- Software-controlled variable optical attenuators (VOA) regulate the optical power of the inserted channel.
- Software-controlled VOA regulate the insertion loss of the express optical path.
- VOA settings and functions, photodiode detection, and alarm thresholds, are internally controlled.
- Virtual photodiodes (firmware calculations of port optical power) at the common DWDM output and input ports are monitored within the software.

Power Monitoring

Physical photodiodes P1 through P4 and virtual photodiodes V1 and V2 monitor the power for the AD-1C-xx.x card. The returned power level values are calibrated to the ports as shown in the following table.

Table 3: AD-1C-xx.x Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1	ADD	DROP RX
P2	DROP	DROP TX
P3	IN EXP	EXP RX
P4	OUT EXP	EXP TX
V1	IN COM	COM RX
V2	OUT COM	COM TX

Physical photodiodes P1 through P10 and virtual photodiodes V1 and V2 monitor the power for the AD-2C-xx.x card. The returned power level values are calibrated to the ports as shown in the following table.

Table 4: AD-2C-xx.x Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1–P2	ADD	COM TX
P3–P4	DROP	DROP TX
P5	IN EXP	EXP RX
P6	OUT EXP	EXP TX
V1	IN COM	COM RX
V2	OUT COM	COM TX

Physical photodiodes P1 through P10 and virtual photodiodes V1 and V2 monitor the power for the AD-4C-xx.x card. The returned power level values are calibrated to the ports as shown in the following table.

Table 5: AD-4C-xx.x Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1–P4	ADD	COM TX
P5–P8	DROP	DROP TX
P9	IN EXP	EXP RX
P10	OUT EXP	EXP TX
V1	IN COM	COM RX
V2	OUT COM	COM TX

For information on the associated TL1 AIDs for the optical power monitoring points, refer the “CTC Port Numbers and TL1 Aids” section in Cisco ONS SONET TL1 Command Guide.

Related Procedures for AD-1C-xx.x, AD-2C-xx.x, and AD-4C-xx.x Cards

- NTP-G30 Installing the DWDM Cards
- NTP-G37 Running Automatic Node Setup
- NTP-G59 Creating, Deleting, and Managing Optical Channel Network Connections
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G74 Monitor DWDM Card Performance
- NTP-G106 Resetting Cards Using CTC
- NTP-G107 Remove Permanently or Remove and Replace DWDM Cards
- NTP-G119 Powering Down the Node

AD-1B-xx.x and AD-4B-xx.x Cards

AD-1B-xx.x Card

The AD-1B-xx.x card has reached end of support.

(Cisco ONS 15454 only)

The 1-Band OADM (AD-1B-xx.x) card passively adds or drops a single band of four adjacent 100-GHz-spaced channels. Eight versions of this card with eight different part numbers—each version designed for use with one band of wavelengths—are used in the ONS 15454 DWDM system. The card bidirectionally adds and drops in two different sections on the same card to manage signal flow in both directions. This card can be used when there is asymmetric adding and dropping on each side (east or west) of the node; a band can be added or dropped on one side but not on the other.

The features of the AD-1B-xx.x card are listed in the section, ""Features of AD-1B-xx.x and AD-4B-xx.x Cards" section on page 9-7".

For more information about the AD-1B-xx.x card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a5572.html.

AD-4B-xx.x Card

The AD-4B-xx.x card has reached end of support.

(Cisco ONS 15454 only)

The 4-Band OADM (AD-4B-xx.x) card passively adds or drops four bands of four adjacent 100-GHz-spaced channels. Two versions of this card with different part numbers—each version designed for use with one set of bands—are used in the ONS 15454 DWDM system. The card bidirectionally adds and drops in two different sections on the same card to manage signal flow in both directions. This card can be used when there is asymmetric adding and dropping on each side (east or west) of the node; a band can be added or dropped on one side but not on the other.

The features of the AD-4B-xx.x card are listed in the section, ""Features of AD-1B-xx.x and AD-4B-xx.x Cards" section on page 9-7".

For more information about the AD-4B-xx.x card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a5572.html.

Features of AD-1B-xx.x and AD-4B-xx.x Cards

The AD-1B-xx.x and AD-4B-xx.x cards have the following features:

- Software-controlled VOAs regulate the optical power flowing in the OADM paths.
- Output power of the dropped band is set by changing the attenuation of the VOA drop.
- The VOA express is used to regulate the insertion loss of the express path.
- VOA settings and functions, photodiode detection, and alarm thresholds are internally controlled.
- Software-monitored virtual photodiodes (firmware calculation of port optical power) at the common DWDM output and input ports.

Note The AD-4B-xx.x card has only one virtual photodiode at the common DWDM output port.

Power Monitoring

Physical photodiodes P1 through P4 and virtual photodiodes V1 and V2 monitor the power for the AD-1B-xx.x card. The returned power level values are calibrated to the ports as shown in the following table.

Table 6: AD-1B-xx.x Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1	ADD	BAND RX
P2	DROP	BAND TX
P3	IN EXP	EXP RX
P4	OUT EXP	EXP TX
V1	IN COM	COM RX
V2	OUT COM	COM TX

Physical photodiodes P1 through P11 and virtual photodiode V1 monitor the power for the AD-4B-xx.x card. The returned power level values are calibrated to the ports as shown in the following table.

Table 7: AD-4B-xx.x Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1–P4	ADD	COM TX
P5–P8	DROP	DROP TX

Photodiode	CTC Type Name	Calibrated to Port
P9	IN EXP	EXP RX
P10	OUT EXP	EXP TX
P11	IN COM	COM RX
V1	OUT COM	COM TX

For information on the associated TL1 AIDs for the optical power monitoring points, refer the “CTC Port Numbers and TL1 Aids” section in Cisco ONS SONET TL1 Command Guide.

Related Procedures for AD-1B-xx.x and AD-4B-xx.x Cards

- NTP-G30 Installing the DWDM Cards
- NTP-G37 Running Automatic Node Setup
- NTP-G59 Creating, Deleting, and Managing Optical Channel Network Connections
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G74 Monitor DWDM Card Performance
- NTP-G106 Resetting Cards Using CTC
- NTP-G107 Remove Permanently or Remove and Replace DWDM Cards
- NTP-G119 Powering Down the Node