Dual & Single Fiber CWDM OADM

Data Center & Cloud Computing Infrastructure Solutions

Overview

CWDM Optical Add/Drop multiplexer (OADM) is a passive optical device used in WDM networks for adding and dropping one/multiple CWDM channels into one or two fibers, while letting the rest of the wavelengths bypass to the needed destination. Through the use of CWDM technology, individual channels can be optically extracted from a fiber pair while allowing pass-through traffic to continue unobstructed through the bus or ring.

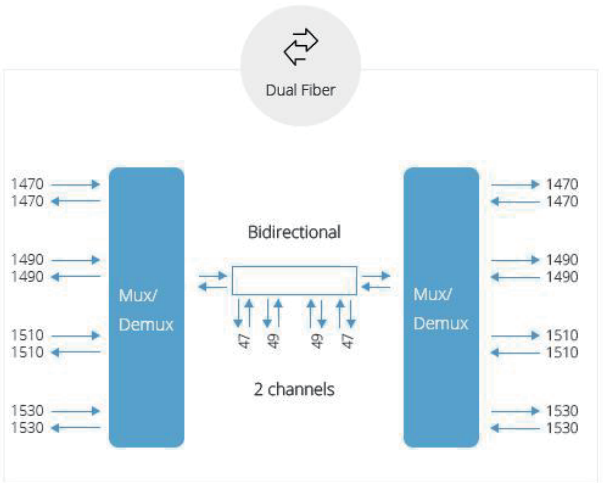
CWDM OADM modules are available in single-sided (East or West) and dual-sided (East and West) configurations. Each CWDM OADM uses wavelengths that fall within the ITU-T G.694.2 (2002) CWDM grid standard from 1270 nm to 1610 nm with 20 nm spacing. FS CWDM OADM is modular, scalable, and it is perfectly suited to 10/1G Ethernet, 16/8/4/2/1G FC, SDH/SONET, Video, CATV, FTTx applications.

Highlights

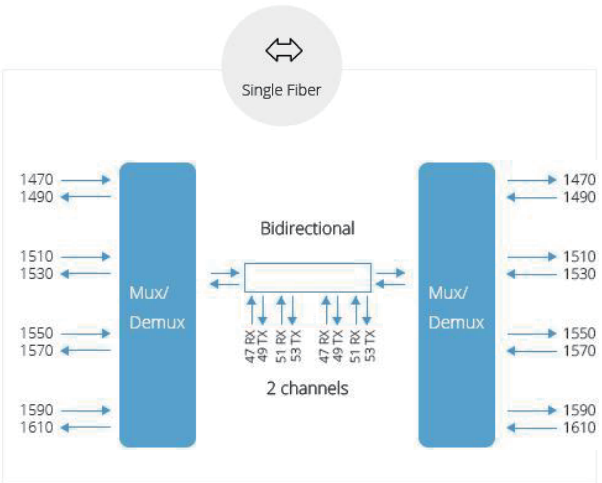
- Low insertion loss for C-band channels
- Add/drop 1-4 channels at remote sites
- Protocol transparent (support 1G, 10G etc.)
- Based on thin film optics with epoxy free optical path
- Fully compliant with CE, FCC, ISO, ITU-T G.694.2, RoHS, Telcordia GR1209 and GR1221
- Completely passive, no power or maintenance required
- Ideal for CWDM ring structures or daisy chain applications
- Various connectors are available - LC/SC/FC/ST, UPC/APC polish
- Optional monitor/1310nm/1550nm port for external functions

Line Type

Dual Fiber	Single Fiber
Dual fiber CWDM OADM adds and drops optical signals of same wavelengths into two fibers, while letting the rest of the wavelengths bypass to the needed destination. The CWDM transceiver connected to CWDM OADM should have the same wavelength as the client port.	In single fiber applications, CWDM OADM adds and drops optical signals of different wavelengths into a fiber in the opposite direction. It utilizes a single fiber for both adding and dropping, which reduces overall costs, and increases the capacity of the fiber.



Wavelengths for Add/Drop are the same



Wavelengths for Add/Drop are different

Technical Data

Parameter	Dual Fiber				
Transmission Direction	West and East			West or East	
Number of Channels	1ch	2ch	4ch	1ch	2ch
Operating Wavelength	1260~1620nm				
Channel Spacing	20nm				
Channel Passband	±6.5nm				
Insertion Loss (Add/Drop)	≤ 0.8dB	≤ 1.2dB	≤ 1.9dB	≤ 0.8dB	≤ 1.2dB
Insertion Loss (Pass-through)	≤ 1.1dB	≤ 1.6dB	≤ 2.3dB	≤ 0.8dB	≤ 1.2dB
Insertion Loss (+ 1% Mon)	≤ +0.3dB			≤ +0.3dB	
Insertion Loss (+ 1310nm port)	≤ +0.6dB			≤ +0.3dB	
Insertion Loss (+ 1550nm port)	≤ +0.6dB			≤ +0.3dB	
Adjacent Channel Isolation	≥ 30dB				
Non-adjacent Channel Isolation	≥ 35dB				
Output Channel Isolation	≥ 20dB			≥ 12dB	
Technology	TFF				
Passband Ripple	≤ 0.30dB				
Polarization Dependent Loss	≤ 0.30dB				
Return Loss	≥ 45dB				
Directivity	≥ 50dB				
Polarization Mode Dispersion	≤ 0.20ps				
Power Handling	≤ 300mW				
Operating Temperature	-40 ~ 85° C				
Storage Temperature	-40 ~ 85° C				
Fiber Type	G657 A1				

Notes:

1. Specified without connectors. Add an additional 0.2dB loss per connector.

2. If any Mon/1310nm/1550nm port is added, passband insertion loss will increase about 0.3dB (West or East) / 0.6dB (West and East). .

Parameter	Single Fiber				
Transmission Direction	West and East			West or East	
Number of Channels	1ch	2ch	4ch	1ch	2ch
Operating Wavelength	1260~1620nm				
Channel Spacing	20nm				
Channel Passband	±6.5nm				
Insertion Loss (Add/Drop)	≤ 1.2dB	≤ 1.9dB	≤ 2.7dB	≤ 1.2dB	≤ 1.9dB
Insertion Loss (Pass-through)	≤ 1.6dB	≤ 2.3dB	≤ 4.0dB	≤ 1.2dB	≤ 1.9dB
Insertion Loss (+ 1% Mon)	≤ +0.6dB			≤ +0.3dB	
Insertion Loss (+ 1310nm port)	≤ +0.6dB			≤ +0.3dB	
Insertion Loss (+ 1550nm port)	≤ +0.6dB			≤ +0.3dB	
Adjacent Channel Isolation	≥ 30dB				
Non-adjacent Channel Isolation	≥ 35dB				
Output Channel Isolation	≥ 20dB			≥ 12dB	
Technology	TFF				
Passband Ripple	≤ 0.30dB				
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Return Loss	≥ 45dB				
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Notes:

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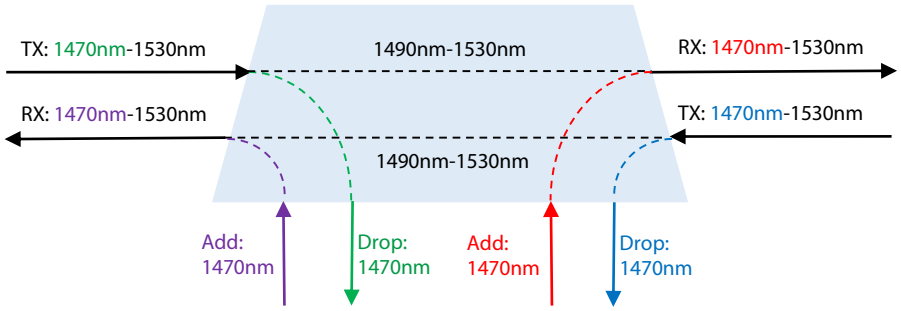
Transmission Direction

For adding/dropping CWDM channels across sites, we categorize our CWDM OADM in two groups: single-sided (East or West) and dual-sided (East and West).

If CWDM OADM adds/drops the wavelengths in one side on fiber network, it is the East or West module; On the contrary, it is the East and West module.

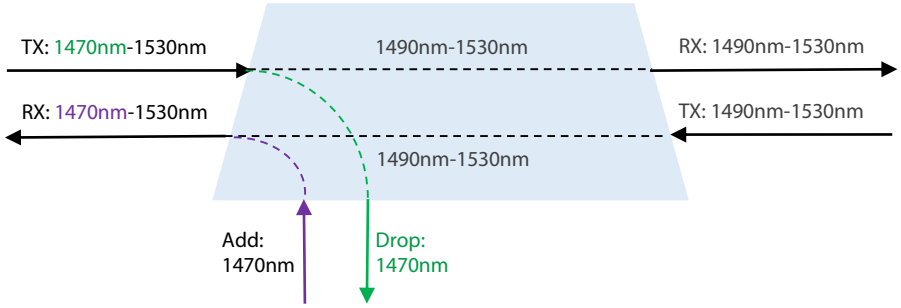
East and West

The dual-sided OADM removes one channel from the network in one direction and sends it to a local interface in one direction. It also allows a second local port to add the same channel back onto the network fiber in the opposite direction.



East or West

The single-sided OADM removes one channel from the network in one direction and sends it to a local interface. The remaining channels are passed straight through to other nodes along the network.



Special Service

Monitor Port

It is used to monitor or test the power signal, usually at a 1% ratio, 2%, 3%, 5%, etc, also available. By connecting with measurement or monitoring equipment, such as power meters, spectrum analyzer, or FMT AIU/OPD card, the signal can be inspected without interrupting the existing network.

1310nm and 1550nm Ports

The 1310nm and 1550nm are actually WDM wavelengths. Many optical transceivers, especially the CWDM and DWDM SFP/SFP+ transceiver, support long-haul transmission over these two wavelengths. By connecting with the same wavelength optical transceivers, these two ports can be used to add 1310nm or 1550nm wavelengths into existing WDM networks.

PS:
If 1310nm port is added, the following CWDM wavelengths can't be added: 1270nm, 1290nm, 1310nm, 1330nm, 1350nm and 1370nm;
If 1550nm port is added, the following CWDM wavelengths can't be added: 1510nm, 1530nm, 1550nm, 1570nm, 1590nm and 161nm.

Monitor port
Ensure easy troubleshooting without downtime, 1% ratio as default, 2%, 3%, 5%, etc, also available.

OR

1310nm port
Allow existing legacy 1310nm traffic to be added such as 1000Base SFP LX, 10G SFP+ LR

OR

1550nm port
Allow existing legacy 1550nm traffic to be added such as 1000Base SFP ZX and 10G SFP+ ZR

Type of Special Port	Pass Band Wavelength Range	Reflection Band Wavelength Range	Wavelength that can't be Used
1310nm port	T1260~1360nm	R1380~1620nm	1270nm,1290nm,1310nm, 1330nm,1350nm,1370nm
1550nm port	T1520~1620nm	R1260~1500nm	1510nm,1530nm,1550nm, 1570nm,1590nm,1610nm

Housing & Enclosure

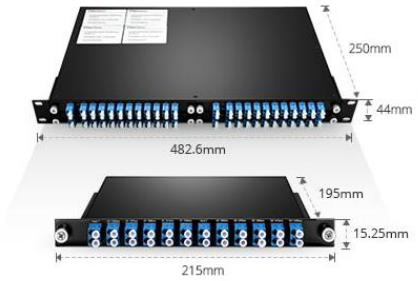
FS.COM provides 4 different package options for 1ch/2ch/4ch dual fiber CWDM OADM, including FMU&FUD plug-in module, ABS pigtailed module and 1U 19" rack mount, as well as the matched chassis.

DWDM OADM Optional Housing

FMU 2-slot 1U Rack

FMU Plug-in module

FUD 4-slot 1U Rack



FUD Plug-in module

1U 19" Rack Mount

ABS Pigtailed module

0.9mm/2.0mm/3.0mm cable diameter can be customized.

Ordering Information

Mux Demux & OADM		
DWDM MUX DEMUX	FMU-D402160M3	40 Channels 100GHz C21-C60, with 1310nm and Monitor Port, 3.5dB Typical IL, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount #35887
	M6200-D2160M	40 Channels 100GHz C21-C60 Dual Fiber DWDM Mux and Demux with Monitor Port, Pluggable Module, LC/UPC, Integrated with M6200 Series Managed Chassis #120424
	FMU-D162136EM3	16 Channels 100GHz C21-C36, with Monitor, Expansion and 1310nm Port, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount #72430
	FMU-MD085360EM3	CWDM/DWDM Hybrid Solution, 8 Channels 100GHz C53-C60, with Monitor, Expansion and 1310nm Port, LC/UPC, Dual Fiber DWDM Mux Demux, FMU Plug-in Module #72433
CWDM MUX DEMUX	FMU-C182761M	18 Channels 1270-1610nm, with Monitor Port, LC/UPC, Dual Fiber CWDM Mux Demux, 1U Rack Mount #33489
	FMU-MC084761EM	8 Channels 1470-1610nm, with Monitor and Expansion Port, LC/UPC, Dual Fiber, Low Insertion Loss CWDM Mux Demux, FMU Plug-in Module #78163
LWDM MUX DEMUX	ABS-L042930A	4 Channels 1295.56-1309.14nm, Single Fiber LAN-WDM Mux Demux, Side-A, ABS Pigtailed Module, LC/UPC #97782
	ABS-C062737A	6 Channels 1271-1371nm, Single Fiber CWDM Mux Demux, Side-A, ABS Pigtailed Module, LC/UPC #97784
OADM	DOADM-DF	Customized Dual Fiber & Single Fiber DWDM OADM #70427
	COADM-DF	Customized Dual Fiber & Single Fiber CWDM OADM #70425
Chassis	FMU-1UFMX-N	FMU 2-Slot 1U 19" Rack Chassis Unloaded, holds up to 2 Units FMU Plug-in Module #30408
	FUD-1UFMX-N	FUD 4-Slot 1U 19" Rack Chassis Unloaded, holds up to 4 Units FUD Plug-in Module #106578
TRANSPONDERS & MUXPONDERS		
8x 200G	M6800-TSP16	16x 100G QSFP28 to 8x 200G CFP2 OTN Managed Transport Platform#111053
100G/200G	M6500-TMXP5	2x 100G QSFP28/4x 40G QSFP+ to 1x 200G CFP2 Transponder/Muxponder#111049
10G	M6200-OEO10G	5 Channels WDM Transponder (Converter), 10 SFP/SFP+ Slots#107365
Chassis	M6500-CH2U	2U Managed Chassis Unloaded Platform, Supports 2x 200G Transponder/Muxponder #96454
	M6500-CH5U	5U Managed Chassis Unloaded Platform, Supports 6x 200G Transponder/Muxponder #111050
	M6200-CH2U	2U Managed Chassis Unloaded Platform, Supports 7x Mux/DEMUX/EDFA/OEO/OLP/DCM Cards #107371
	M6200-CH5U	5U Managed Chassis Unloaded Platform, Supports 15x MUX/DEMUX/EDFA/OEO/OLP/DCM Cards #111052

OPEN LINE SYSTEM		
Amplifiers	M6200-25PA	25dB Gain DWDM EDFA Pre-Amplifier, 16dBm Output#107367
	M6200-20BA	20dBm Output DWDM EDFA Booster Amplifer, 16dB Gain#107366
Dispersion Compensation	M6200-DCM40	40KM DCF-based Passive Dispersion Compensation Module#107370
	M6200-DCM80	80KM DCF-based Passive Dispersion Compensation Module#119071
Line Protection	M6200-OLP2	1+1 Optical Line Protection Switch (OLP)#107368
Red/Blue Filter	M6200-RB	1x2 Single Fiber DWDM Red/Blue Filter#107369
VOA Units	M6200-SFPVOA	SFP Variable Optical Attenuator Module#107373
	AT-M-LCU	Fixed Fiber Optic Attenuators #70009
Chassis	M6200-CH2U	2U Managed Chassis Unloaded Platform, Supports 7x Mux/DEMUX/EDFA/OEO/OLP/DCM Cards #107371
	M6200-CH5U	5U Managed Chassis Unloaded Platform, Supports 15x MUX/DEMUX/EDFA/OEO/OLP/DCM Cards #111052
WDM TRANSCEIVERS		
100G/200G CFP2	M-CFP2-DCO	C14 1566.31nm 100G/200G Tunable CFP2-DCO Coherent Transceiver, up to 1000km #120128
25G SFP28	DWDM-SFP25G-10	25G DWDM SFP28 100GHz 1563.86nm 10km DOM LC SMF Optical Transceiver Module #87000
	CWDM-SFP25G-40S	25G 1270nm CWDM SFP28 40km DOM LC SMF Optical Transceiver Module #100112
	CWDM-SFP25G-10SP	25G 1270nm CWDM SFP28 10km DOM LC SMF Optical Transceiver Module #76003
	LWDM-SFP25G-40	25G LWDM SFP28 1286.66nm 40km DOM LC SMF Optical Transceiver Module #93786
16G/8G FC	DWDM-SFP16G-40	Customized 16G DWDM SFP+ C20-C61 100GHz 40km DDM LC SMF Transceiver Module#73084
	DWDM-SFP16GH-40	Customized 16G DWDM SFP+ 50GHz 40km DDM LC SMF Transceiver Module #73085
	CWDM-SFP16G-40	Customized 16G Fiber Channel CWDM SFP+ 1470-1610nm 40km DDM LC SMF Transceiver Module #80765

10G SFP+	DWDM-SFP10G-80	10G DWDM SFP+ 1559.79nm 80km DOM LC SMF Transceiver Module, Commercial Temperature#31237, Industrial Temperature#113562
	DWDM-SFP10G-40	10G DWDM SFP+ 1560.61nm 40km DOM LC SMF Transceiver Module, Commercial Temperature#38731, Industrial Temperature#113511
	DWDM-SFP10G-C	10G DWDM C-band Tunable SFP+ 50GHz 80km DOM LC SMF Transceiver Module #69267
	CWDM-SFP10G-80L	10G CWDM SFP+ 1470nm 80km DOM LC SMF Transceiver Module #19367
	CWDM-SFP10G-40S	10G CWDM SFP+ 1270nm 40km DOM LC SMF Transceiver Module, Commercial Temperature#22168, Industrial Temperature#112392
1G SFP	DWDM-SFP1G-EZX	1000BASE-DWDM SFP 100GHz 1563.86nm 100km DOM LC SMF Transceiver Module #54150
	DWDM-SFP1G-ZX	1000BASE-DWDM SFP 1563.86nm 80km DOM LC SMF Transceiver Module #47697
	CWDM-SFP1G-EZX	1000BASE-CWDM SFP 1270nm 120km DOM LC SMF Transceiver Module #102776
	CWDM-SFP1G-ZX	1000BASE-CWDM SFP 1270nm 80km DOM LC SMF Transceiver Module #33234

*Standard products are listed above. Customized specifications are available upon request.

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