

# 8ch C53-C60 DWDM Mux Demux + Monitor, 1310nm and Expansion Port

FMU Plug-in Module, LC/UPC

Data Center & Cloud Computing Infrastructure Solutions



## Overview

The DWDM passive Mux Demux modules deliver the benefits of a Dense Wave Division Multiplexer in a fully passive solution. They are designed for long-haul transmission where wavelengths are packed tightly together over the C-band range of wavelengths, up to 48 wavelengths in 100GHz grid(0.8nm) and 96 wavelengths in 50GHz grid(0.4nm). ITU G.694.1 standard and Telcordia GR1221, GR1209, CE, RoHS, FCC are compliant.

Our DWDM Mux Demux are modular, scalable and are perfectly suited to transport PDH, SDH / SONET, ETHERNET services over WWDM, CWDM and DWDM in optical metro edge and access networks.

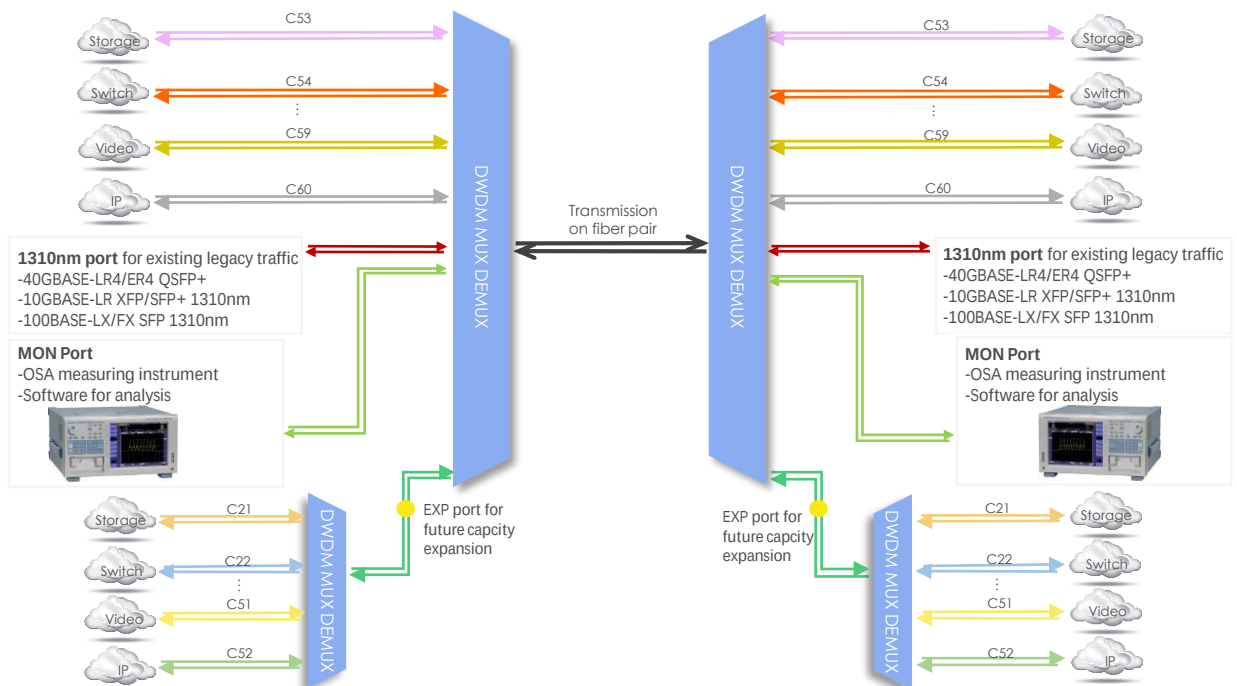
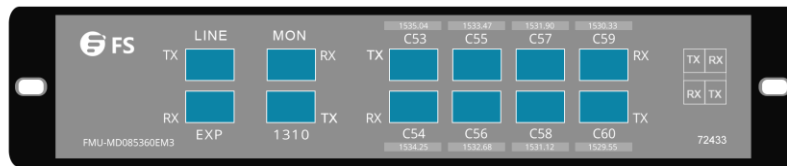
## Highlights

- Multiplexing of 8 channels on fiber pair
- Low insertion loss
- Low-profile modular design, fits in FMU 2-slot 1U chassis
- LC/UPC connectors
- 1% monitor port for Tx and Rx, ensures easy troubleshooting without downtime
- 1310nm port allows the overlaid on an existing legacy 1310nm network such as 1000Base SFP LX, 10G SFP+ LR, 40G QSFP+ LR4 and 100G CFP LR4
- Expansion port for future capacity expansion
- Compliant to ITU G.694.1, 100GHz ITU grid, 0.8 nm spacing
- High quality thin film filter technology
- Passive, no electricity needed (MTBF ca. 500 years)

## General Specification

| Front View | Function |
|------------|----------|
|------------|----------|

72433



Technical Data

| Parameter                      | Value                           |
|--------------------------------|---------------------------------|
| ITU Channel                    | 8 channels C53-C60 (DWDM ports) |
| Operating Wavelength           | 1529.55-1535.04nm               |
| Channel Spacing                | 100GHz (0.8nm)                  |
| Channel Passband               | ±0.11nm                         |
| Center Wavelength Accuracy     | ±0.05nm                         |
| Insertion Loss                 | ≤ 3.3dB                         |
| Insertion Loss (1% Mon)        | ≤ 25.2dB                        |
| Insertion Loss (1310 port)     | ≤ 1.3dB                         |
| Insertion Loss (Exp port)      | ≤ 3.3dB                         |
| Adjacent Channel Isolation     | ≥ 30dB                          |
| Non-adjacent Channel Isolation | ≥ 40dB                          |
| Filter Technology              | TFF (Thin Film Filter)          |
| Passband Ripple                | ≤ 0.5dB                         |
| Return Loss                    | ≥ 45dB                          |
| Directivity                    | ≥ 45dB                          |
| Polarization Dependent Loss    | ≤ 0.3dB                         |
| Polarization Mode Dispersion   | ≤ 0.1ps                         |
| Power Handling                 | ≤ 500mW                         |
| Operating Temperature          | -40°C~ +85°C                    |
| Storage Temperature            | -40°C~ +85°C                    |

Notes:

- 1. Specified with connectors and adapters.

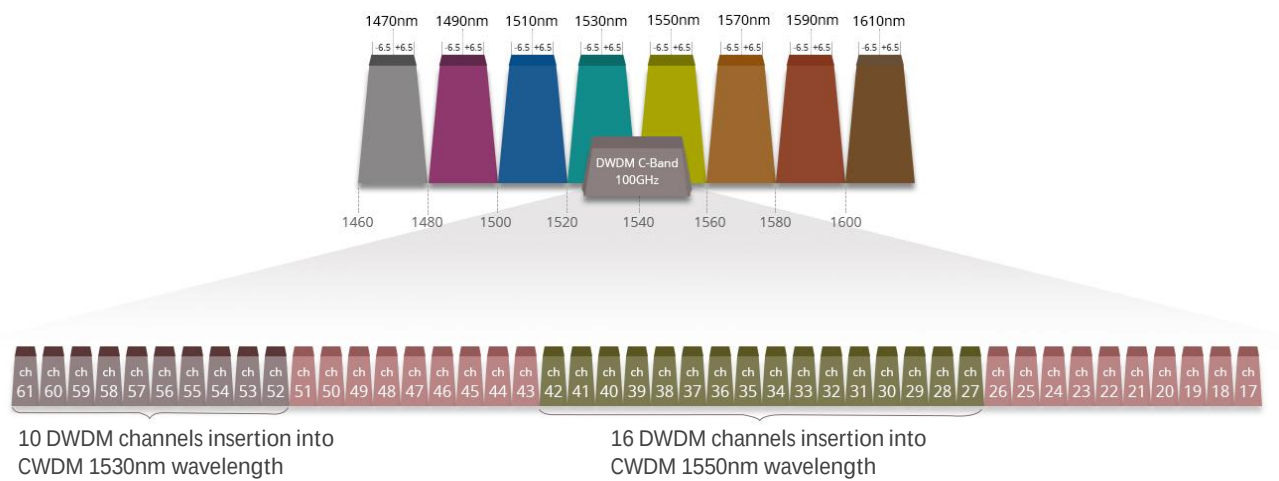
## Hybrid CWDM/DWDM System

DWDM wavelengths are within the wavelength range of CWDM, which have much smaller channel spacing, so CWDM wavelengths near DWDM can be used to transmit the DWDM wavelengths. A hybrid C/DWDM system is built to expand the existing CWDM system, keeping initial startup costs low.

| CWDM Channels (Bandwidth) | DWDM Channels (Center Wavelength) |
|---------------------------|-----------------------------------|
|---------------------------|-----------------------------------|

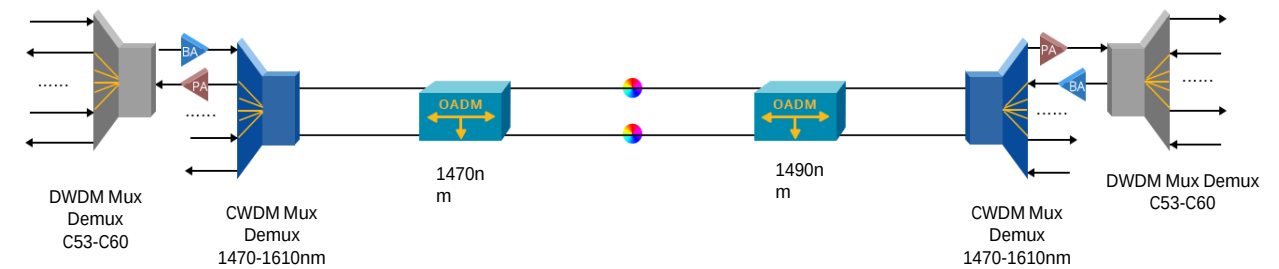
|                 |                               |
|-----------------|-------------------------------|
| 1530nm (±6.5nm) | C52-C61 (1528.77 - 1535.82nm) |
|-----------------|-------------------------------|

|                 |                               |
|-----------------|-------------------------------|
| 1550nm (±6.5nm) | C27-C42 (1543.73 - 1555.75nm) |
|-----------------|-------------------------------|



## Solution Design

To meet customers' applications, connect 8ch C53-C60 DWDM Mux Demux to 1530nm channel of 8ch CWDM Mux Demux to achieve the hybrid. Boost amplifier is deployed to amplify the output of single channel, which optimize the residual and signal quality of the link.



High Quality DWDM Transceivers to Build a Passive DWDM System

FS.COM offers DWDM transceiver modules in SFP, SFP+ and XFP formats. Every optics is tested in real switches and full compatible with Cisco, Juniper, Arista, Brocade, Dell, Extreme, etc.

Transmission distances range from 20-120km for Gigabit speeds, and 40-120km for 10 Gigabit speeds, without the use of optical amplifiers.



ITU Channel Guiding

|                           |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ITU Channel<br>(xx or yy) | 21      | 22      | 23      | 24      | 25      | 26      | 27      | 28      | 29      | 30      | 31      | 32      | 33      | 34      | 35      | 36      | 37      | 38      | 39      | 40      |
| Wavelength<br>(nm)        | 1560.61 | 1559.79 | 1558.98 | 1558.17 | 1557.36 | 1556.55 | 1555.75 | 1554.94 | 1554.13 | 1553.33 | 1552.52 | 1551.72 | 1550.92 | 1550.12 | 1549.32 | 1548.51 | 1547.72 | 1546.92 | 1546.12 | 1545.32 |

|                           |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ITU Channel<br>(xx or yy) | 41      | 42      | 43      | 44      | 45      | 46      | 47      | 48      | 49      | 50      | 51      | 52      | 53      | 54      | 55      | 56      | 57      | 58      | 59      | 60      |
| Wavelength<br>(nm)        | 1544.53 | 1543.73 | 1542.94 | 1542.14 | 1541.35 | 1540.56 | 1539.77 | 1538.98 | 1538.19 | 1537.40 | 1536.61 | 1535.82 | 1535.04 | 1534.25 | 1533.47 | 1532.68 | 1531.90 | 1531.12 | 1530.33 | 1529.55 |

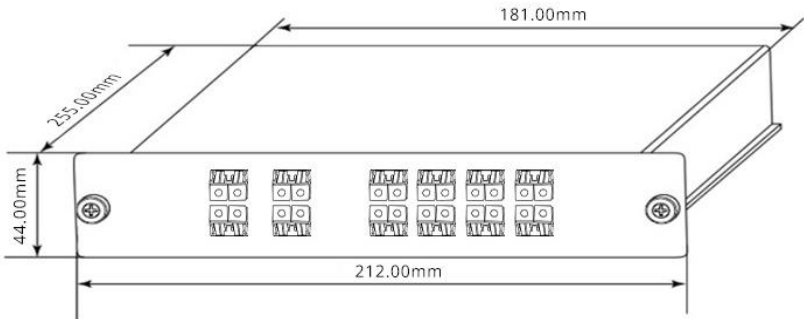
Layout and Dimensions

- Width: 212.00mm (8.35")

- Height: 44.00mm (1.73")

- Depth: 255.00mm (10.04")
- The color of the module is black

- All fonts and lables are printed in black



Ordering Information

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

OPEN LINE SYSTEM

|                         |                              |                                                                                             |
|-------------------------|------------------------------|---------------------------------------------------------------------------------------------|
| Amplifiers              | <a href="#">M6200-25PA</a>   | 25dB Gain DWDM EDFA Pre-Amplifier, 16dBm Output#107367                                      |
|                         | <a href="#">M6200-20BA</a>   | 20dBm Output DWDM EDFA Booster Amplifier, 16dB Gain#107366                                  |
| Dispersion Compensation | <a href="#">M6200-DCM40</a>  | 40KM DCF-based Passive Dispersion Compensation Module#107370                                |
|                         | <a href="#">M6200-DCM80</a>  | 80KM DCF-based Passive Dispersion Compensation Module#119071                                |
| Line Protection         | <a href="#">M6200-OLP2</a>   | 1+1 Optical Line Protection Switch (OLP)#107368                                             |
| Red/Blue Filter         | <a href="#">M6200-RB</a>     | 1x2 Single Fiber DWDM Red/Blue Filter#107369                                                |
| VOA Units               | <a href="#">M6200-SFPVOA</a> | SFP Variable Optical Attenuator Module#107373                                               |
|                         | <a href="#">AT-M-LCU</a>     | Fixed Fiber Optic Attenuators #70009                                                        |
| Chassis                 | <a href="#">M6200-CH2U</a>   | 2U Managed Chassis Unloaded Platform, Supports 7x Mux/DEMUX/EDFA/OEO/OLP/DCM Cards #107371  |
|                         | <a href="#">M6200-CH5U</a>   | 5U Managed Chassis Unloaded Platform, Supports 15x MUX/DEMUX/EDFA/OEO/OLP/DCM Cards #111052 |

WDM TRANSCEIVERS

|                |                                  |                                                                                              |
|----------------|----------------------------------|----------------------------------------------------------------------------------------------|
| 100G/200G CFP2 | <a href="#">M-CFP2-DCO</a>       | C14 1566.31nm 100G/200G Tunable CFP2-DCO Coherent Transceiver, up to 1000km #120128          |
|                | <a href="#">DWDM-SFP25G-10</a>   | 25G DWDM SFP28 100GHz 1563.86nm 10km DOM LC SMF Optical Transceiver Module #87000            |
| 25G SFP28      | <a href="#">CWDM-SFP25G-40S</a>  | 25G 1270nm CWDM SFP28 40km DOM LC SMF Optical Transceiver Module #100112                     |
|                | <a href="#">CWDM-SFP25G-10SP</a> | 25G 1270nm CWDM SFP28 10km DOM LC SMF Optical Transceiver Module #76003                      |
|                | <a href="#">LWDM-SFP25G-40</a>   | 25G LWDM SFP28 1286.66nm 40km DOM LC SMF Optical Transceiver Module #93786                   |
|                | <a href="#">DWDM-SFP16G-40</a>   | Customized 16G DWDM SFP+ C20-C61 100GHz 40km DDM LC SMF Transceiver Module#73084             |
| 16G/8G FC      | <a href="#">DWDM-SFP16GH-40</a>  | Customized 16G DWDM SFP+ 50GHz 40km DDM LC SMF Transceiver Module #73085                     |
|                | <a href="#">CWDM-SFP16G-40</a>   | Customized 16G Fiber Channel CWDM SFP+ 1470-1610nm 40km DDM LC SMF Transceiver Module #80765 |