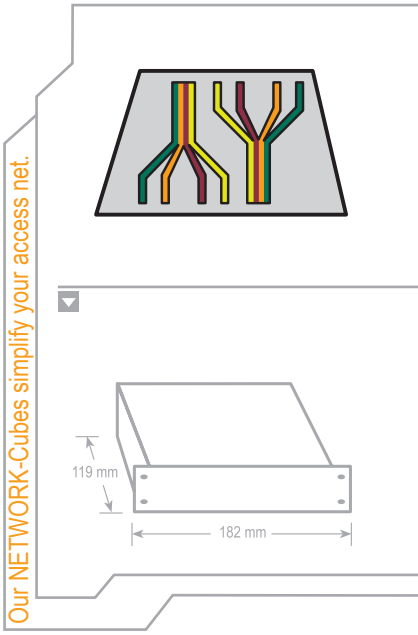
Cube Optics NETWORK-Cubes

The Cube Optics Coarse Wavelength Division Multiplexing NETWORK-Cubes are a flexible plug-and-play network solution that allows service providers and enterprise companies to cost effectively implement point to point or ring based WDM optical networks. Cube Optics WDM NETWORK-Cubes 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.



Overview

The WDM NETWORK-Cubes are based on the WDM-MODULAR-SHELL, which may hold up to 2 modules. A further high-density version is available, which is capable to hold up to 8 modules within 19“. The WDM-MODULAR-SHELL (height 1 HU) fits even the smallest rack systems while still leaving room for air circulation and is adaptable to all rack systems (ETSI, 19”, 23”). The modules feature a broad range of Wideband (SDH / SONET), Coarse Wavelength Division Multiplexing and Dense Wavelength Division Multiplexing configurations and give enough flexibility to implement a wide range of network node functions (Mux, Demux, OADMs) along any topology (point to point, mesh, ring), with the ideal scalability.

This solution is compliant with the ITU G.694.2, NEBS level 3 and Telcordia GR1221 standard, guarantying inter-operability and easy integration with any other compliant equipment. Cube Optics NETWORK-Cubes are based on the smallest footprint components available on the market, and provide the highest equipment density that can be found (depth only 12 cm).

Further more all functions as well available in splice trays or splice enclosures (-40 to 85 °C)

Features

- Types of modules offered:
  - > 1310 / 1550 wideband Mux & Demux for SDH / SONET / ATM
  - > Mux & Demux modules, up to 48 channels, cascadable
  - > Mux & Demux modules, 4 or 8 channels + Pass of SDH / ATM channel
  - > OADM modules, 1, 2 or 4 channels
- Further modules on demand
- Other functions, e.g. integrated taps, bandsplitter, WWDM, Multimode versions etc. on demand
- Your choice of adapter: SC, LC, E2000, MU etc.
- Private labeling and customization on demand
- For 19” or ETSI racks, adaptable to 23”
- For Central Office or Outside Plant
- As well as line cards for sub-rack mounts
- Also available as WDM splice enclosures or in splice trays for all brands
- Fully RoHS compliant

RoHS 2002/95/EC

V 4.0

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Benefits

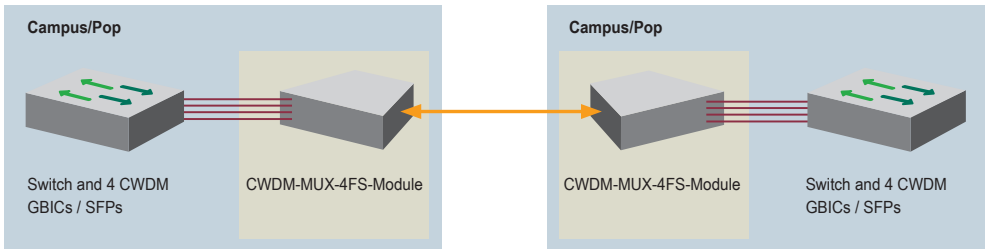
- Lowest cost solution on the market
- Smallest footprint solution on the market
- Easy to engineer, deploy , commission and support
- Highly flexible and scalable
- Tap function, (generally not supported by competitive solutions) allows non intrusive testing

Compliance

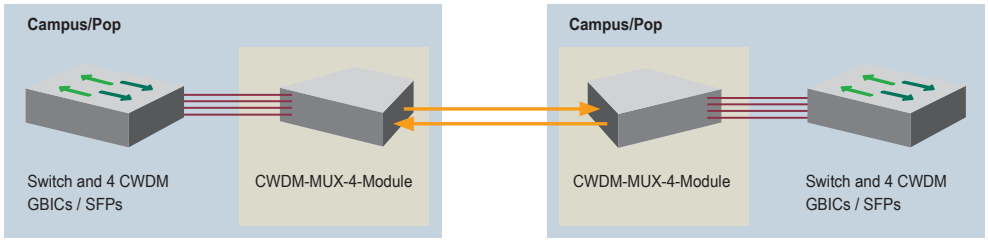
- ITU G.694.2
- Designed to meet NEBS level 3
- Telcordia GR1221 qualified components
- Proven interoperability with all routers, ethernet switches, GBICs & SFPs

Supported Network Topologies

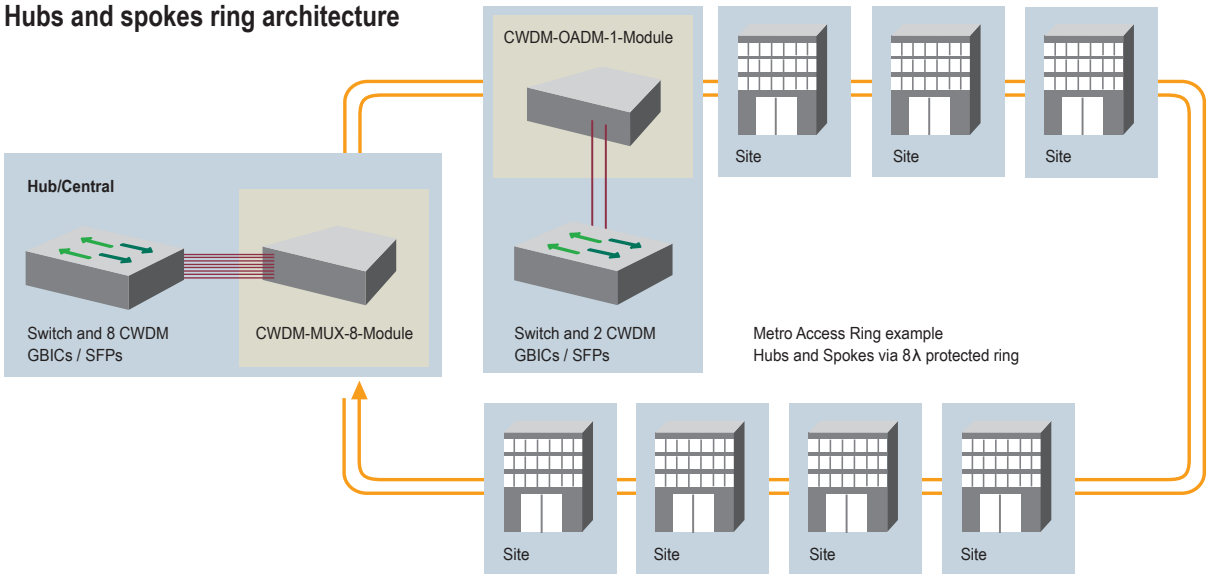
Single fiber point to point architecture



Dual fiber point to point architecture



Hubs and spokes ring architecture

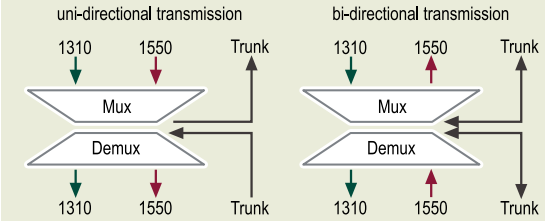


Module Types (further configurations on demand)

Optical Specification

■ **Bandsplitter-Modules** (for 1 slot of the WDM-Modular-Shell)

WWDM-HI-ISO Module / C-1659_Rev.C
Wideband splitter mux and demux for bi-directional or uni-directional data transmission over two fibers.
1310 WWDM band: 1260-1360 nm for "grey" 1310 nm transceivers.
1550 WWDM band 1460-1620 nm for "grey" 1550nm transceivers.

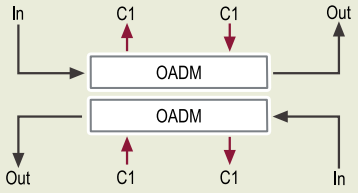


Insertion Loss (dB) [1]

	WWDM
Max:	< 1.2
Typ:	0.8

■ **CWDM-Modules** (for 1 slot of the WDM-Modular-Shell)

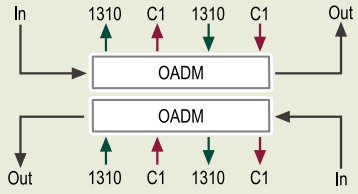
CWDM-OADM-1 Module / C-1660_Rev.B
One channel CWDM add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.



Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 1.0	< 1.0	< 0.9
Typ:	0.9	0.9	0.9

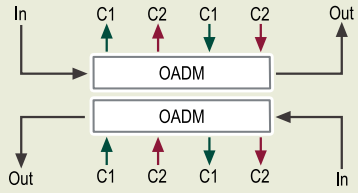
CWDM-OADM-1+1310 Module / C-1704_Rev.B
One channel CWDM add & drop multiplexer and additional 1310 band add & drop for EAST&WEST for bi-directional data transmission over two fibers.



Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 2.0	< 2.0	< 2.8
Typ:	1.2	1.2	1.6

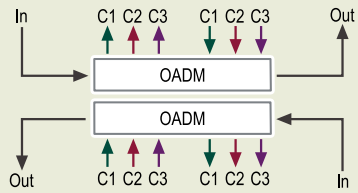
CWDM-OADM-2 Module / C-1709_Rev.B
Two channel CWDM add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.



Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 1.6	< 1.6	< 2.0
Typ:	1.2	1.2	1.6

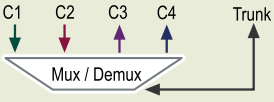
CWDM-OADM-3 Module / C-1710_Rev.A
Three channel CWDM add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.



Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 2.0	< 2.0	< 2.8
Typ:	1.5	1.5	2.0

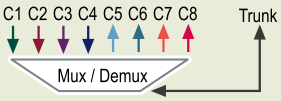
CWDM-MUX-2FS Module / C-1962_Rev.B
Bi-directional 4 channel CWDM multiplexer to transport 2 services bi-directional over one single fiber.
CWDM channels: 1510, 1530, 1550, 1570.



Insertion Loss (dB) [1]

	CWDM
Max:	< 2.4
Typ:	1.6

CWDM-MUX-4FS Module / C-1658_Rev.A
Bi-directional 8 channel CWDM multiplexer to transport 4 services bi-directional over one single fiber.
CWDM channels: 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610 nm.



Insertion Loss (dB) [1]

	CWDM
Max:	< 2.8
Typ:	1.9

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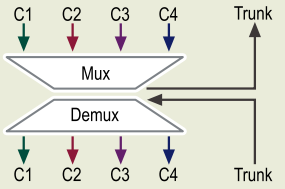
Module Types (further configurations on demand)

CWDM-MUX-4 Module / C-1643_Rev.A

CWDM 4 channel mux and demux for bi-directional data transmission over two fibers.
CWDM channels: 1510, 1530, 1550, 1570 nm.

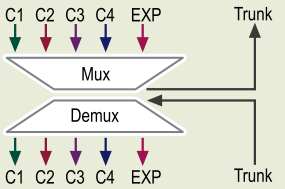


Insertion Loss (dB) [1]

	CWDM
Max:	< 2.4
Typ:	1.6

CWDM-MUX-4+EXP Module / C-1705_Rev.A

CWDM 4 channel mux and demux with EXP band ports for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1590, 1610 nm.
EXP/ Express band: 1504-1578 nm, for later upgrades or "grey" 1550 nm transceivers.

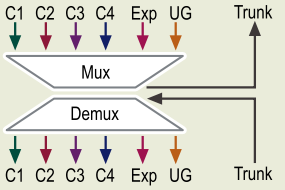


Insertion Loss (dB) [1]

	CWDM	Exp
Max:	< 2.5	< 2.5
Typ:	1.8	1.5

CWDM-MUX-4+1310 Module / C-1708_Rev.B

CWDM 4 channel mux and demux with 1310 band ports for bi-directional data transmission over two fibers.
CWDM channels: 1510, 1530, 1550, 1570 nm.
1310 / WWDM band: 1260-1360 nm for "grey" 1310 nm transceivers.

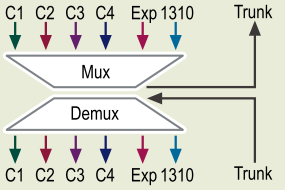


Insertion Loss (dB) [1]

	CWDM	WWDM
Max:	< 2.5	< 1.6
Typ:	1.8	1.5

CWDM-MUX-4+EXP+1310 Module / C-1706_Rev.A

CWDM 4 channel mux and demux with 1310 band and EXP band ports for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1590, 1610 nm.
EXP / Express channel: 1504-1578 nm, for later upgrades or "grey" 1550 nm transceivers.
1310 / WWDM band: 1260-1360 nm for "grey" 1310 nm transceivers.

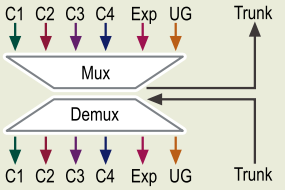


Insertion Loss (dB) [1]

	CWDM	Exp	WWDM
Max:	< 2.5	< 2.5	< 1.6
Typ:	1.7	1.4	1.2

CWDM-MUX-4+EXP+UG Module / C-1707_Rev.A

CWDM 4 channel mux and demux with UG band and EXP band ports for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1590, 1610 nm.
EXP / Express channel: 1504-1578 nm, for later upgrades or "grey" 1550 nm transceivers.
UG / Upgrade band: 1260-1438 nm, for later upgrades or "grey" 1310 nm transceivers.

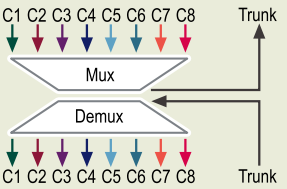


Insertion Loss (dB) [1]

	CWDM	Exp	WWDM
Max:	< 2.5	< 2.5	< 1.6
Typ:	1.7	1.4	1.2

CWDM-MUX-8 Module / C-1640_Rev.A

CWDM 8 channel mux and demux for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610 nm.

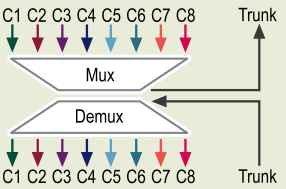


Insertion Loss (dB) [1]

	CWDM
Max:	< 2.8
Typ:	2.2

CWDM-MUX-8 Module / C-1939_Rev.A

CWDM 8 channel mux and demux for bi-directional data transmission over two fibers.
CWDM channels: 1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410 nm.



Insertion Loss (dB) [1]

	CWDM
Max:	< 2.8
Typ:	2.2

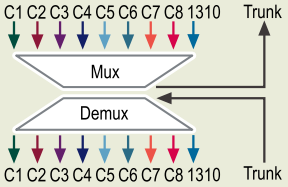
Optical Specification

[1] Insertion loss over channel bandwidth, valid over full operating temperature range and all states of polarization with optical connectors. The typical connector loss is 0.4 dB for a pair of connectors.

Module Types (further configurations on demand)

CWDM-MUX-8+1310 Module / C-1651_Rev.B

CWDM 8 channel mux and demux with 1310 band ports for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610 nm.
1310 / WWDM band: 1260-1360 nm for “grey” 1310 nm transceivers.

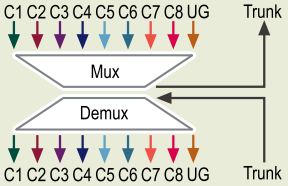


Insertion Loss (dB) [1]

	CWDM	WWDM
Max:	< 3.6	< 1.2
Typ:	1.7	0.7

CWDM-MUX-8+UG Module / C-1678_Rev.C

CWDM 8 channel mux and demux with UG band ports for bi-directional data transmission over two fibers.
CWDM channels: 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610 nm.
UG / Upgrade band: 1260-1438 nm, for later upgrades or “grey” 1310 nm transceivers.

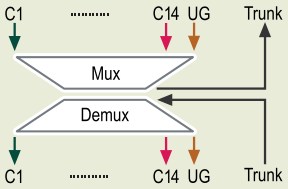


Insertion Loss (dB) [1]

	CWDM	UG
Max:	< 3.6	< 1.2
Typ:	2.5	1.2

CWDM-MUX-14+UG Module / C-2458_Rev.B

CWDM 14 channel mux and demux with UG band ports for bi-directional data transmission over two fibers.
CWDM channels: 1271 to 1371 nm; 1431 to 1511 nm; 1571 to 1611 nm.
UG / Upgrade band: 1525.0 - 1561.5 nm for later upgrades.



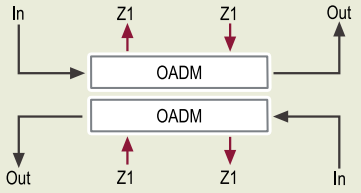
Insertion Loss (dB) [1]

	CWDM	UG
Max:	< 4.5	< 2.0
Typ:	2.8	1.0

■ **DWDM-Modules** (fixed 1HU / 19” rack-mountable) – all these units are also available as 200 GHz-Units

DWDM-OADM-1 Unit / C-1943_Rev.A

One channel DWDM (100GHz grid) add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.

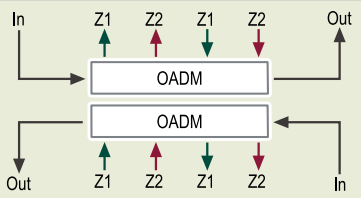


Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 1.4	< 1.4	< 1.0
Typ:	1.3	1.3	1.0

DWDM-OADM-2 Unit / C-1853_Rev.A

Two channel DWDM (100GHz grid) add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.

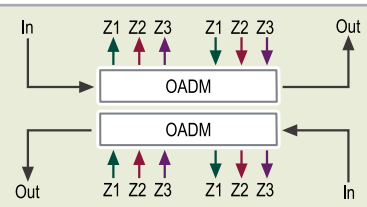


Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 1.7	< 1.7	< 1.6
Typ:	1.5	1.5	1.5

DWDM-OADM-3 Unit / C-1944_Rev.A

Three channel DWDM (100GHz grid) add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.

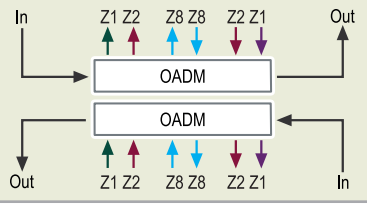


Insertion Loss (dB) [1]

	Add	Drop	Pass
Max:	< 2.0	< 2.0	< 2.2
Typ:	1.7	1.7	1.8

DWDM-OADM-8 Unit / C-2427_Rev.A

Eight channel DWDM (100GHz grid) add & drop multiplexer for EAST&WEST for bi-directional data transmission over two fibers.



Insertion Loss (dB) [1]

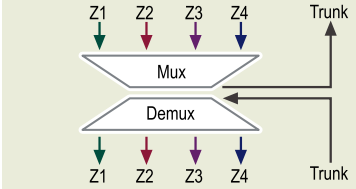
	Add	Drop	Pass
Max:	< 4.2	< 4.2	< 2.0
Typ:	3.5	3.5	1.7

Optical Specification

Module Types (further configurations on demand)

DWDM-MUX-4 Unit / C-1755_Rev.C

DWDM 4 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers.
DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

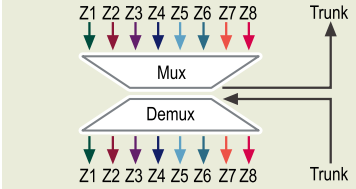


Insertion Loss (dB) [1]

	DWDM
Max:	< 2.2
Typ:	1.3

DWDM-MUX-8 Unit / C-2469_Rev.A

DWDM 8 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

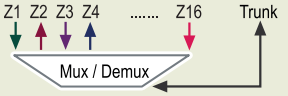


Insertion Loss (dB) [1]

	DWDM
Max:	< 3.4
Typ:	2.2

DWDM-MUX-8FS Unit / C-2513_Rev.B

DWDM 16 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

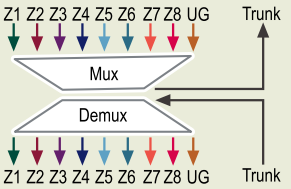


Insertion Loss (dB) [1]

	DWDM
Max:	< 4.0
Typ:	2.4

DWDM-MUX-8+UG Unit / C-2468_Rev.A

DWDM 8 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

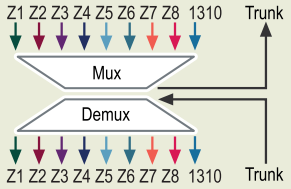


Insertion Loss (dB) [1]

	DWDM	UG
Max:	< 3.2	< 0.7
Typ:	2.9	0.8

DWDM-MUX-8+1310 Unit / C-2401_Rev.A

DWDM 16 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

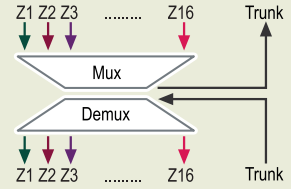


Insertion Loss (dB) [1]

	DWDM	WWDM
Max:	< 4.1	< 1.2
Typ:	2.7	0.9

DWDM-MUX-16 Unit / C-2402_Rev.A

DWDM 16 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.

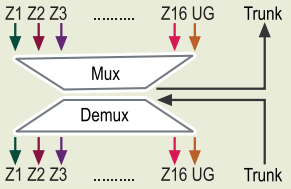


Insertion Loss (dB) [1]

	DWDM
Max:	< 4.0
Typ:	2.5

DWDM-MUX-16+UG Unit / C-2403_Rev.B

DWDM 16 channel (100GHz grid) mux and demux with UG band ports for bi-directional data transmission over two fibers.
DWDM channels: ITU 100GHz grid channel 21-36.
UG / Upgrade band: supporting channel 43-59.



Insertion Loss (dB) [1]

	DWDM	UG
Max:	< 4.5	< 1.0
Typ:	2.8	0.9

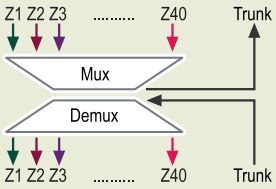
Optical Specification

[1] Insertion loss over channel bandwidth, valid over full operating temperature range and all states of polarization with optical connectors. The typical connector loss is 0.4 dB for a pair of connectors.

Module Types (further configurations on demand)

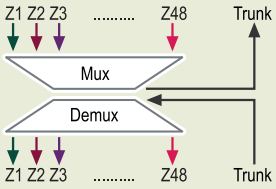
DWDM-MUX-40 Unit / C-2477_Rev.B

DWDM 40 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers, based on athermal AWG technology with wideband passbands. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.



DWDM-MUX-48 Unit / C-2533_Rev.B

DWDM 48 channel (100GHz grid) mux and demux for bi-directional data transmission over two fibers, based on athermal AWG technology with wideband passbands. DWDM channels: to be selected by customer out of the 100 GHz ITU grid.



Optical Specification

Insertion Loss (dB) [1]

	DWDM
Max:	< 5.0
Typ:	4.4

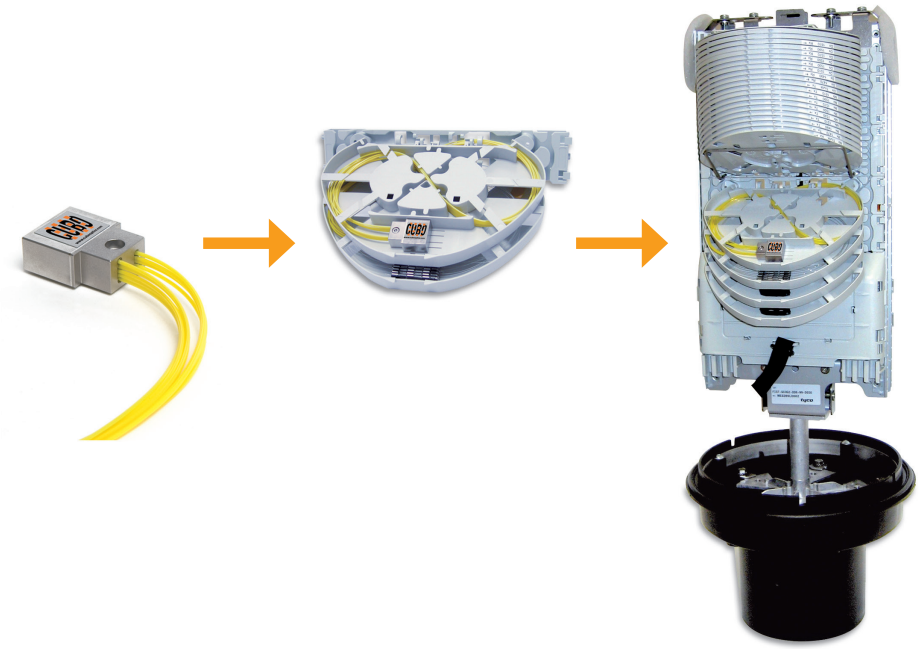
Insertion Loss (dB) [1]

	DWDM
Max:	< 5.0
Typ:	4.6

Splice Enclosures

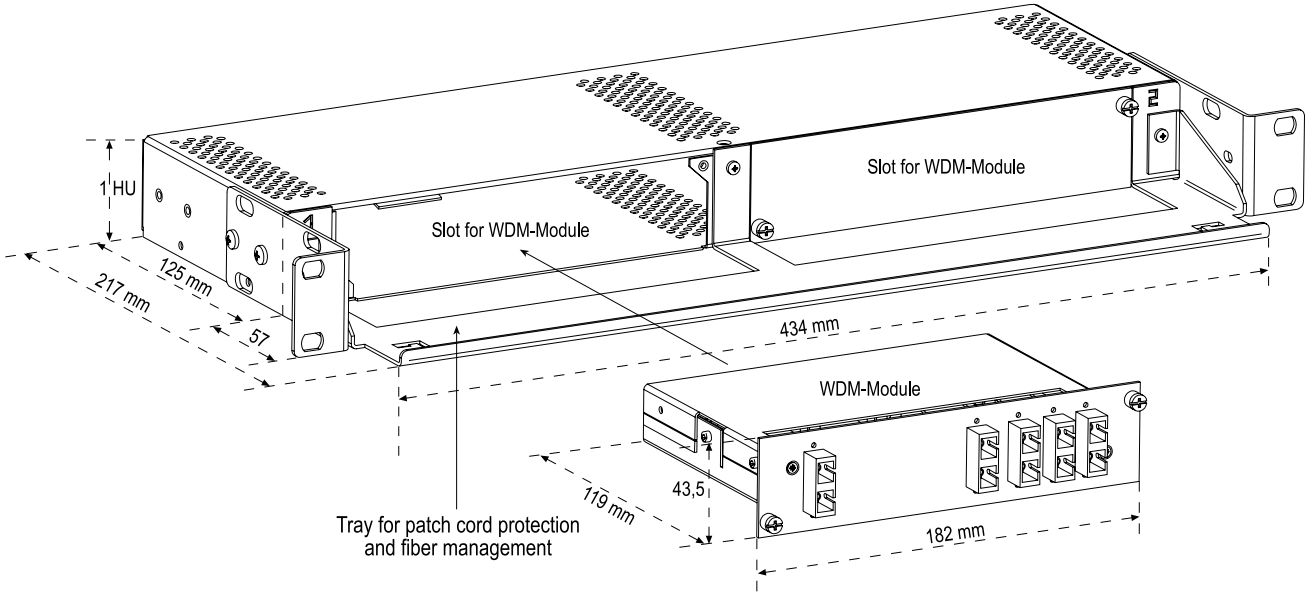
All above shown multiplexing configurations are as well available for splice enclosures. We provide either the fully assembled enclosure ready for installation on the trays with muxes to be integrated on site in your enclosure. This is available for almost all enclosure brands on the market.

- Miniature WDM qualified for damp heat, temperature cycles, shock and vibration in accordance with Telcordia GR1221 uncontrolled environment standard and the GR1209 moisture cycling standard
- Multiplies capacity of point-to-point links within existing hand hole, pole pod or curb-side cabinet nodes
- Splice trays delivered ready for mounting and splicing
- Integrates WDM into a variety of major brands of infrastructure equipment such as Tyco (for example the FIST-SOSA2 splice tray as shown in the diagram), Multilink and others
- Fully RoHS compliant RoHS 2002/95/EC



Mechanical Specifications

The WDM-MODULAR-SHELL (1HU) may hold up to 2 modules. It may be mounted (forward or backward) into 19" or ETSI racks (adaptable to 23"). The reduced depth of only 12.5 cm and the punctured chasis guarantee sufficient air circulation even in the smallest racks.



Notes

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