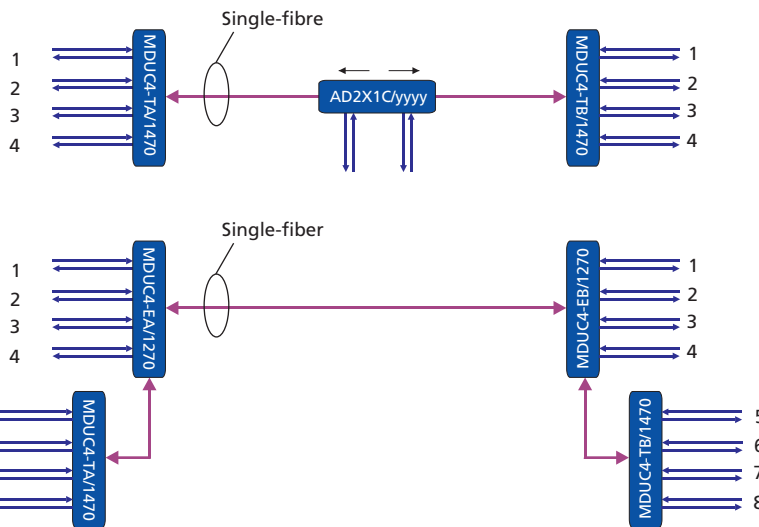


CWDM Single-fiber Networking

TM-Series
TM-3000/-301/-101/-102



The Transmode single-fiber configuration provides a higher degree of networking flexibility since each single-fiber within the fiber-pair can be used independently. This configuration is particularly effective when building bus and ring networks since the optical filters can be placed on either of the single-fibers to provide best transmission performance and/or to enable hitless future upgrades. One of the single-fibers can as an alternative be used for 10G connections using DWDM channels. The figure above shows an example where one single-fiber is used for a 4ch bus network, and the second single-fiber is used for an 8ch point-to-point connection.

A bi-directional connection on a single-fiber is created using two separate wavelengths, one for up-link and one for down-link. The following wavelength pairs are used to create a bi-directional connection;

Upper wavelength band: 1470/1490, 1510/1530, 1550/1570, 1590/1610nm
Lower wavelength band: 1270/1290, 1310/1330, 1350/1410, 1430/1450nm

The lower wavelength band does not use wavelengths 1370 and 1390nm. This is done to avoid the "water-peak" of standard G.652 fibres and thus open for using all 16 channels also on longer links. The intrinsic higher fiber attenuation in the lower wavelength band will however still limit the bridgeable distance and must be taken into account when designing the network.

Plug-in units

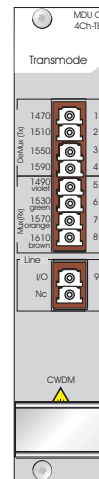
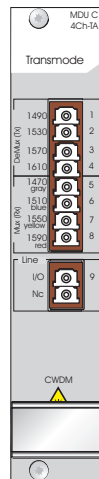
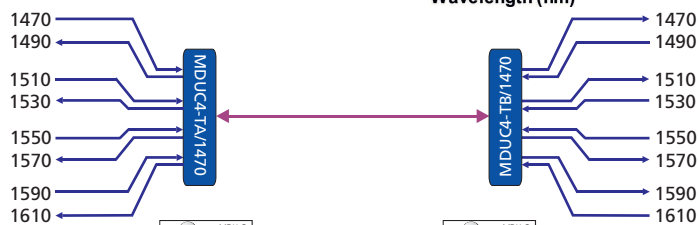
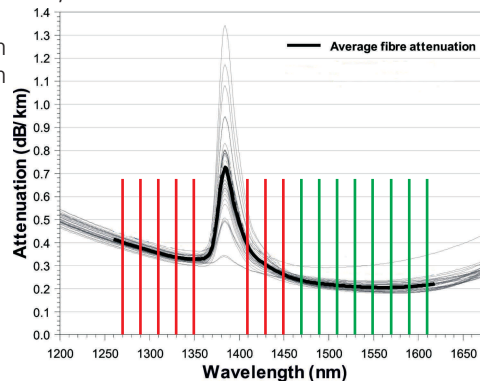
The upper wavelength band operates where the fiber attenuation is lowest and is thus the option for bus/ring networks where the optical losses from intermediate add/drop filters need to be taken into account. Optical Add/Drop filters are thus provided in the upper wavelength band only.

The figure shows the two MDU's that operate in the upper wavelength band. Note the direction of the wavelengths:

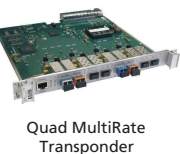
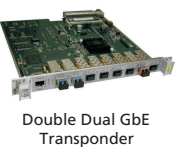
MDUC4-TA/1470 Transmits 1470, 1510, 1550, 1590nm
MDUC4-TB/1470 Transmits 1490, 1530, 1570, 1610nm.

Note that the product codes are identical, apart from the "TA" and "TB" index. These indexes indicates the direction of the wavelengths. A "TA" - unit shall always be connected to a "TB" - unit.

Both MDU units are half-sized units and can be mounted in passive slots in the TM-3000, TM-301 or TM-101/-102 chassis.



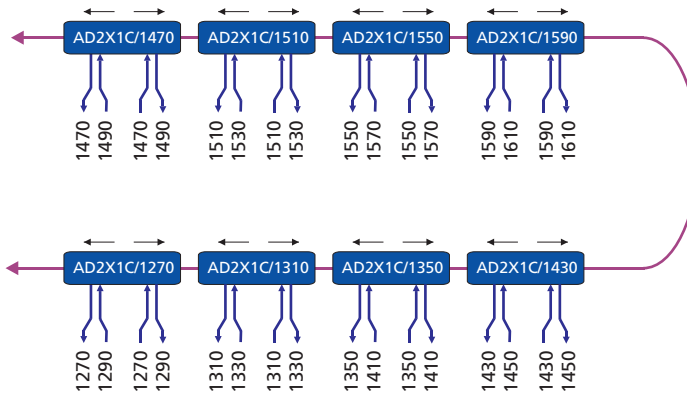
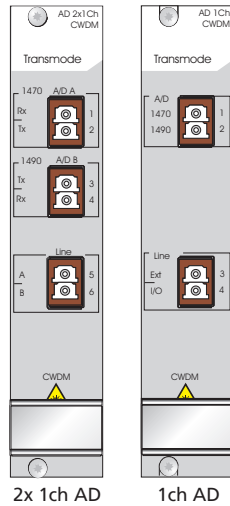
The single-fiber CWDM filter units can be mounted stand-alone in the TM-101/-102 chassis or in the larger TM-301 or TM-3000 chassis where it can be combined with other CWDM or DWDM Traffic Units. See separate Data Sheets for more information about these products



1ch Add/Drop units are provided in both upper and lower wavelength band; One unit type has a single 1ch AD-filter and another has two 1ch AD-filters connected back-to-back as shown in the figure.

The 2x 1chAD-filters provide a more compact solution for bus networks where an add/drop in both east and west direction is needed.

All AD-filters are half-sized units.

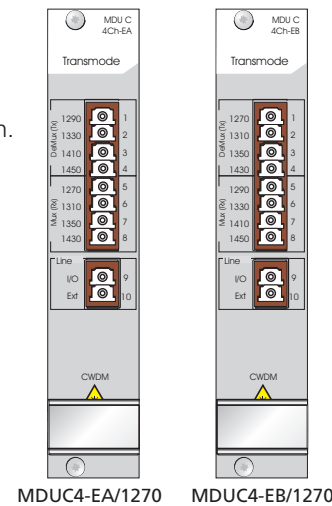
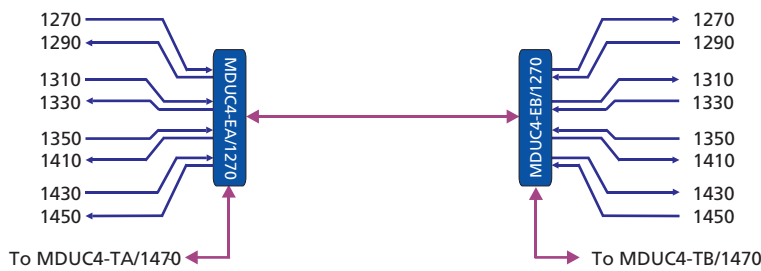


The TM-series Platform entails both CWDM and DWDM solutions in single-fibre or fibre-pair configurations. All in the same card cage, one the same fibre and under the same node and network management system.

To enable up to 8 bidirectional channels on a single-fibre, a MDU-pair for the lower wavelength band can be used. The index "E" indicates that they have an extension port that can be connected to the MDU's in the upper wavelength band and thus giving a 4+4 channel system on a single-fibre.

MDUC4-EA/1270 Transmits 1270, 1310, 1350, 1430nm
MDUC4-EB/1270 Transmits 1290, 1330, 1410, 1450nm

The MDUC4-EA/1270 can be combined with a MDUC4-TA/1470 and the MDUC4-EB/1270 can be combined with a MDUC4-TB/1470 to form a 8ch connection. All MDU's are half-sized units.



6-port Ethernet Demarcation Unit



9xGbE/10G Muxponder



10G Tunable Transponder



Double 10GbE DWDM Transponder



ROADM



Embedded Node Manager (ENM)



Transmode Network Manager (TNM)

Technical Data

Add/Drop losses when only using high wavelength units

	MDUC4-TB/1470	AD1C/yyyy	AD2x1C/yyyy
MDUC4-TA/1470	2.5dB	3.6dB	2.7dB
AD1C/yyyy	3.6dB	4.2dB	3.3dB
AD2x1C/yyyy	2.7dB	3.3dB	2.1dB

Add/Drop losses when only using both high and low wavelength units

	MDUC4-TB/1470	AD1C/yyyy	AD2x1C/yyyy	MDUC4-EB/1270
MDUC4-TA/1470	7.7dB	6.2dB	5.3dB	-
AD1C/yyyy	6.2dB	4.2dB	3.3dB	-
AD2x1C/yyyy	5.3dB	3.3dB	2.1dB	4.0dB
MDUC4-EA/1270	-	-	4.0dB	5.6dB

Add/Drop losses when only using low wavelength units

	MDUC4-EB/1470
MDUC4-EA/1470	5.6dB

Misc Data

	MDUC4-TA/1470 MDUC4-TB/1470	MDUC4-EA/1270 MDUC4-EB/1270	AD1C/yyyy	AD2x1C/yyyy
Express loss	-	-	1.3dB	1.4dB
Extension port loss	-	2.6dB	-	-
Connector type	MU	MU	MU	MU
Input fiber type	SM	SM	SM	SM
Wavelengths (nm)	1471/1491 1511/1531 1551/1571 1591/1611 (G.694.2)	1271/1291 1311/1331 1351/1411 1431/1451 (G.694.2)	1471/1491 1511/1531 1551/1571 1591/1611 (G.694.2)	1471/1491 1511/1531 1551/1571 1591/1611 (G.694.2)

The two upper tables shows the end-to-end losses between different units. When designing links using the wavelength in the lower band, ensure to use the correct fibre attenuation values.

As can be seen in the tables, the wavelengths in the lower band have less attenuation through the MDU's compared to the wavelengths in the high band. This is to compensate for the higher fiber attenuation and thus give an overall lower loss.

The fiber attenuation in the low wavelength band will be the limiting factor and will vary between different fibers. As a consequence, some of the 16 wavelengths cannot be used.

The specifications and information within this document are subject to change without further notice. All statements, information and recommendations are believed to be accurate but are presented without warranty of any kind.