

iConverter CWDM/X **4 and 8 Channel Multiplexer/Demultiplexer**

Omnitron's *iConverter* CWDM/X Coarse Wave Division Multiplexing (CWDM) Multiplexer/Demultiplexer (MUX/DEMUX) modules support ITU-T G.694.2 wavelengths between 1270nm to 1610nm in 20nm increments. CWDM/X modules are protocol and rate transparent allowing different services up to 10Gbps to be transported across the same fiber link.

The passive *iConverter* CWDM/X modules are available in 4 and 8-Channel (wavelength) models, supporting a variety of wavelength combinations and port configurations.

The 4-Channel CWDM/X features an optional Expansion Port that can be used to cascade two MUX/DEMUX modules, doubling the channel capacity on the common fiber link. For example, two 4-Channel MUX/DEMUX modules can be cascaded to create an 8-Channel fiber common link.

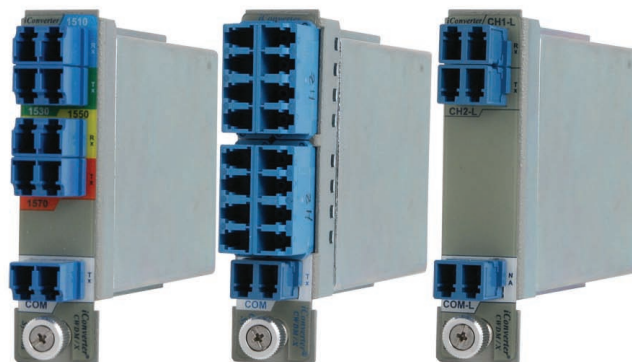
Two 8-Channel MUX/DEMUX modules can be cascaded to create a 16-Channel fiber common link using the CWDM/X Band-Splitter. The Band-Splitter module combines and separates the lower CWDM channels (1270nm to 1450nm) and the upper CWDM channels (1470nm to 1610nm).

The CWDM/X also features an optional 1310nm Pass Band Port that can be used to overlay up to 8 CWDM channels on an existing legacy 1310nm network such as SDH or SONET (which normally operates in the 1260nm to 1360nm wavelength spectrum). This feature allows the 8 CWDM channels in the range of 1470nm to 1610nm to be overlaid on the same fiber pair as the existing 1310nm network with no changes to the legacy equipment.

The small and compact size of the CWDM/X modules yields one of the highest port densities in the industry. A 2U high 19-module *iConverter* chassis populated with modules can yield up to 120 channels of capacity.

iConverter CWDM/X modules are passive devices that require no external power. They can also be installed in an *iConverter* powered chassis with a management module¹ and be managed using Omnitron's *NetOutlook*[®] network management software, third-party SNMP software, Telnet or a serial console port.

The modules can be installed in any *iConverter* chassis equipped with other *iConverter* media converters and transponders to provide a multi-service platform capable of delivering Ethernet, TDM, SONET and other services across a CWDM fiber common link.



KEY FEATURES

- 4 and 8 channels (wavelengths) multiplexer/demultiplexer modules
- Scalable to 8 or 16 channels using an optional Expansion Port or separate Band Splitter
- Enables existing 1310nm networks to carry up to an additional 8 channels with optional 1310nm Pass Band Port
- Protocol and rate transparent for applications up to 10Gbps
- Highly compact form factor with up to 120 ports in a 2U chassis
- Passive device that can be installed in a powered chassis for managed applications
- Can be managed via a management module in powered applications
- Management available with the addition of a management module to the chassis
- Minimal and uniform optical loss facilitates easy network planning
- Industry standard LC connectors
- Seamless integration with other *iConverter* media converters and chassis for multi-service platforms
- One (1) Year Warranty and Free 24/7 Technical Support

¹ For complete management functionality, use M2 series (NMM2, GX/TM2, 2GXM2, 10/100M2, 2FXM2) or higher series

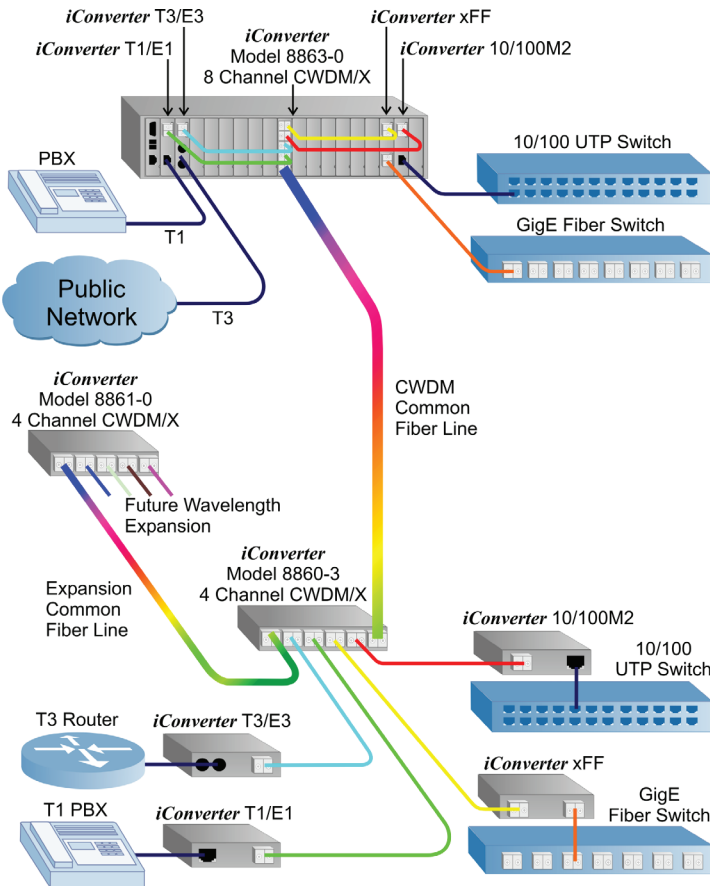
APPLICATIONS

Point to Point with Expansion Port

This example shows a multiple channel (wavelength) multiplexing/demultiplexing application. The *iConverter* 19-module chassis at the top of the illustration is providing a multi-service platform in which the traffic from external T1/E1, T3/E3 and 100Mbps Ethernet sources is converted from copper-to-fiber using *iConverter* copper-to-fiber converters. Each converter is equipped with the appropriate CWDM channel Small Form Pluggable (SFP) fiber transceivers. The traffic from a fiber port on the Gigabit Ethernet switch is converted from its standard 1310nm wavelength to the appropriate CWDM channel using an *iConverter* xFF fiber-to-fiber transponder.

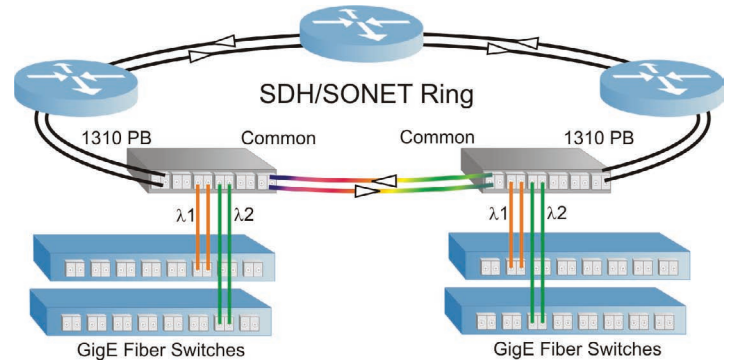
All four channels are connected to corresponding channels on a 8-Channel multiplexer, which are multiplexed over a fiber common link to the remote 4-Channel multiplexer. At the remote locations, the four channels are converted back to their original copper and fiber media using standalone converters.

The example also shows the addition of four extra channels using the Expansion Ports on the remote CWDM/X. The 8865-0 Band-Splitter (not shown) can also be used.



Point to Point CWDM with Pass Band on SONET Ring

This example shows two Gigabit point-to-point links connected over a segment of an existing SDH/SONET ring. Two 4-Channel *iConverter* CWDM/X modules with 1310 Pass Band (PB) ports are inserted into the SDH/SONET ring. The legacy 1310 SDH/SONET traffic continues to pass transparently through the CWDM/X devices unaffected. Two CWDM channels overlay the existing fiber link, creating two new point-to-point Gigabit Ethernet connections over the existing fiber, eliminating the need to install new fiber optic cabling.



SPECIFICATIONS

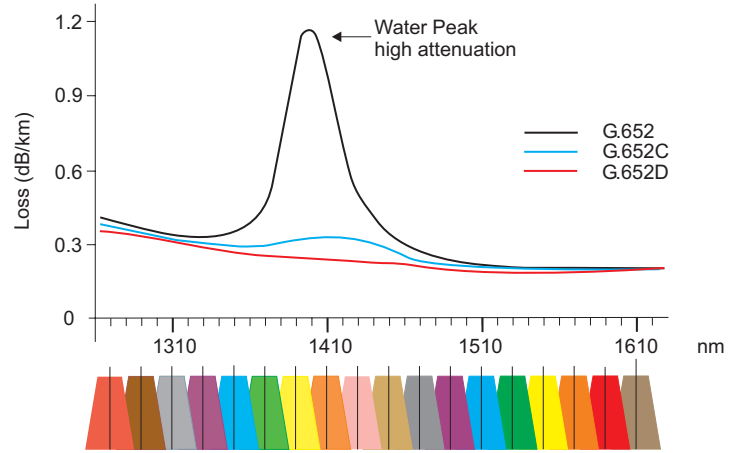
Model Type	CWDM/X MUX/DEMUX
Channels	4 or 8 Channel
Options	Optional 1310 Pass Band port Optional Expansion port
Common Link	Fiber Pair
Connectors	LC (UPC)
Dimensions	W: 0.85" x D: 4.5" x H:2.8
Weight	12 oz.
Compliances	UL, CE, FCC Class A
Power Requirements	Not powered for non-managed applications 0.025A max @ 3.3VDC for managed applications
Temperature	Standard: 0 to 70° C Storage: -40 to 80° C
Humidity	5 to 95% (non-condensing)
Altitude	-100m to 4,000m
MTBF (hrs)	> 1,000,000 hrs

CWDM OVERVIEW

CWDM technology provides the flexibility to increase capacity of existing fiber infrastructure by enabling multiple channels (wavelengths) over the same fiber cabling. Each channel carries data independently from each other, allowing network designers to transport different data rates and protocols (T1, T3, Ethernet, Serial, etc) for different customers or applications.

The wavelengths used with CWDM implementations are defined by the International Telecommunications Union, reference ITU-T G.694.2, listing eighteen wavelengths from 1270nm to 1610nm with 20nm wavelength spacing.²

ITU-T G.652 single-mode fiber optic cable is not optimized for CWDM applications due to the high attenuation in the 1360nm to 1460nm band, centered around 1383nm (the water peak). The 1390 and 1410 wavelengths are not used on the standard models of *iConverter* CWDM/X MUX/DEMUX modules because of the higher attenuation.



² Note: The ITU standard specifies the exact center wavelength as 1271nm, 1291nm, 1311nm, etc. However, for clarity (and to comply with general industry conventions) the text in this data sheet refers to these wavelengths as 1270nm, 1290nm, 1310nm, etc.

ORDERING INFORMATION

Model Type	Model Number	Channel Port ITU Center Wavelength (nm)	# of Chassis Slots Required	1310 Pass Band Port ³	Expansion Port	Insertion Loss	Adjacent Channel Port Isolation	Non-Adjacent Channel Port Isolation	Return Loss (filtered channel)
CWDM/X 4-Channel MUX/DeMUX	8860-0	1471, 1491, 1591, 1611	1	No	No	< 1.9dB	> 30dB	> 40dB	> 45dB
	8860-1	1471, 1491, 1591, 1611	1	Yes	No	< 2.0dB	> 30dB	> 40dB	> 45dB
	8860-2	1471, 1491, 1591, 1611	1	Yes	Yes ⁴	< 2.0dB	> 30dB	> 40dB	> 45dB
	8860-3	1471, 1491, 1591, 1611	1	No	Yes ⁴	< 2.0dB	> 30dB	> 40dB	> 45dB
	8861-0	1511, 1531, 1551, 1571	1	No	No	< 1.9dB	> 30dB	> 40dB	> 45dB
	8861-1	1511, 1531, 1551, 1571	1	Yes	No	< 2.0dB	> 30dB	> 40dB	> 45dB
CWDM/X 8-channel MUX/DeMUX	8862-0	1271, 1291, 1311, 1331, 1351, 1371, 1431, 1451	1	No	No	< 2.7dB	> 30dB	> 40dB	> 45dB
	8863-0	1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611	1	No	No	< 2.7dB	> 30dB	> 40dB	> 45dB
	8863-1	1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611	2	Yes	No	< 2.7dB	> 30dB	> 40dB	> 45dB
CWDM/X Single Band Splitter	8865-0	Lower Band (1271 - 1451) + Upper Band (1471 - 1611)	1	No	No	< 0.8dB	> 30dB	N/A	> 45dB
CWDM/X Dual Band Splitter	8865-2	Lower Band (1271 - 1451) + Upper Band (1471 - 1611)	1	No	No	< 0.8dB	> 30dB	N/A	> 45dB

³ 1310 Pass Band port supports 1310 +/- 50nm. Use with any legacy 1310 device.

⁴ Expansion port support 1511nm to 1571nm. Use with 8861-0 or with any legacy 1550 device.