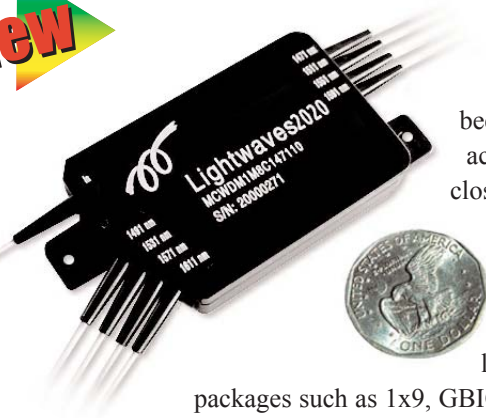


Compact CWDM product offers premium performance for metro to enterprise applications

New



The CWDM technology has been widely adopted by metro, access and other networks that are close to end users. The main features of CWDM include low cost, wide bandwidth capable of wider temperature range, and the use of un-cooled DFB lasers with low cost transceiver packages such as 1x9, GBIC, SFP etc.

Lightwaves2020 noticed this growing market trend and rapidly developed another innovative product for the industry. Utilizing our unique vertical and compact packaging technologies, we have developed a new high performance, low-cost, compact 4ch/8 ch CWDM Mux/Demux module.

1) Mechanism

The most popular platform for CWDM is thin film filter (TFF) technology, for the small channel counts and consequently low per channel cost. Like the multi-channel DWDM modules, a 4-ch or 8-ch CWDM Mux/Demux can be realized using discrete 3-port WDM devices.

However, Lightwaves2020 uses free space technology instead to realize the CWDM. Figure 1 shows the mechanism for the free space CWDM.

2) Performance Summary

The features of the above structures are:

1. Integrated structure saves materials
2. Shorter optical path with less loss components helps to achieve superior optical performance. The insertion loss for 8-ch is only around 1.0 dB (spec less than 1.5 dB), which gives the optical links potentially long reach and a lot of design flexibility.

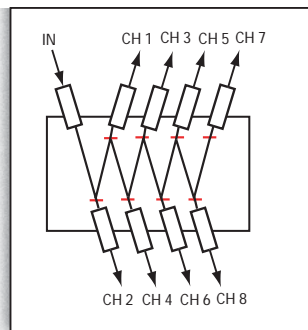


Figure 1. Functional diagram of free space CWDM



• Come visit us at the upcoming OFC/NFOEC 2005! We will participate in the exhibition and poster session. During the show, we will release three new products including the liquid crystal based polarization controller, the compact CWDM module and hot-pluggable EDFA. The booth # is 2085. At the poster session, we will demonstrate the recent progress of our liquid crystal based VOA on high power handling capability.

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3. Lightwaves2020's proprietary assembly fixtures guarantee the least thermal drift. The product is capable of very wide operating temperature range from - 40°C to + 85°C, enabling even outdoor applications for CATV networks.

Table 1 Typical thermal performance from - 40°C to 85°C

Channel #	λ_c (nm)	IL(±6.5nm)			Isolation at adjacent channel		
		-40	23	85	-40	23	85
T (°C)							
Channel 1	1471	0.73	0.76	1.07	34.1	34.4	35.7
Channel 2	1491	0.95	0.65	0.74	33.8	33.4	33.6
Channel 3	1511	0.93	0.82	1.21	34	34.2	34.3
Channel 4	1531	1.2	1	1.16	30.2	30.1	29.7
Channel 5	1551	1.06	0.83	0.79	34	33.2	33.3
Channel 6	1571	1.15	0.79	1.03	33.6	33.6	33.3
Channel 7	1591	1.24	0.93	1.16	33.6	33.7	33.5
Channel 8	1611	0.85	0.61	0.75	36.8	35.7	36

4. Compact size saves system space. The footprint of Lightwaves2020's 8-ch compact CWDM is only 58.4 x 31.8mm

3) Specifications

Table 2 lists the specification summary for 4-ch and 8-ch compact CWDM modules.

Parameter	Unit	4-ch Mux/Demux	8-ch Mux/Demux
Channel Passband @ 0.5dB	nm	$\geq \pm 6.5$	$\geq \pm 6.5$
Insertion Loss	dB	≤ 1.0	≤ 1.5
Isolation Input-Demux (adjacent channels)	dB	N/A	≥ 30
Isolation Input-Demux (non-adjacent channels)	dB	N/A	≥ 50
Directivity	dB	≥ 50	≥ 55
Optical Return Loss	dB	≥ 45	≥ 45
PDL	dB	≤ 0.1	≤ 0.1
PMD	ps	≤ 0.1	≤ 0.1

4) Applications

Compact CWDM products are used in a wide range of applications.

1. Metro access networks
2. CATV end nodes
3. Storage networks
4. Enterprise network and more...

Bi-directional high isolation 1310/1550 nm WDM plays key role at system upgrade



Lightwaves2020's TFF based 1310/1550 WDM is superior in the performance. Compared to the performances from its peers, the product has the following advantages:

1. Wider bandwidth for 1550 nm band. It covers the whole 8 CWDM channels from 1464 nm to 1618 nm.
2. Higher isolation on both pass channel and reflect channel. The product provides a symmetric high isolation of 45 dB and enables the bi-directional communication with single device.

Lightwaves2020's high isolation 1310/1550 WDM is ideal for system upgrade.

Application 1. Add CWDM/DWDM channels in the legacy 1310 nm PDH & SDH/SONET transmission systems

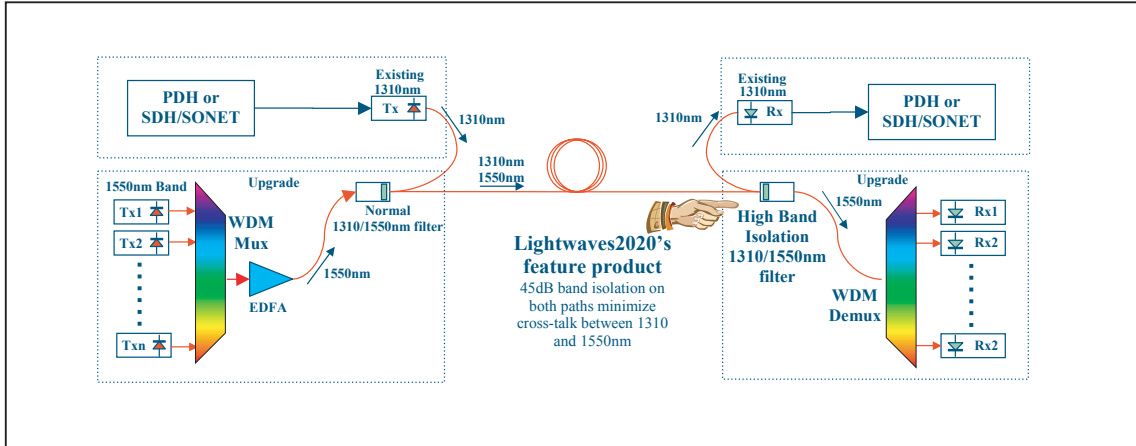


Figure 1 Legacy PDH, SDH/SONET capacity upgrade

Lightwaves2020's high isolation 1310/1550 WDM completely cleanup the residue signal at both paths and with simple structure and maintain the good signal quality on all channels.

Application 2. Complete the FTTP triplex services with CATV fiber distribution network upgrade

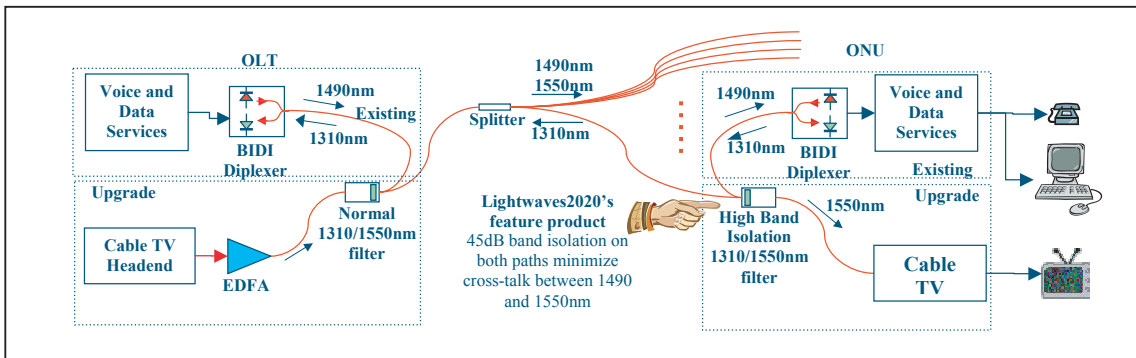


Figure 2 Adding 1550 nm cable TV signal to complete FTTP triplex services

Both the data signal carried at 1490 nm and the CATV analog signal transmit on the same direction. Lightwaves2020's high isolation 1310/1550 WDM completely separates these two channels at the receiver and maintains the bi-directional communication.



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Application 3 Upgrade early stage FTTP Duplex network

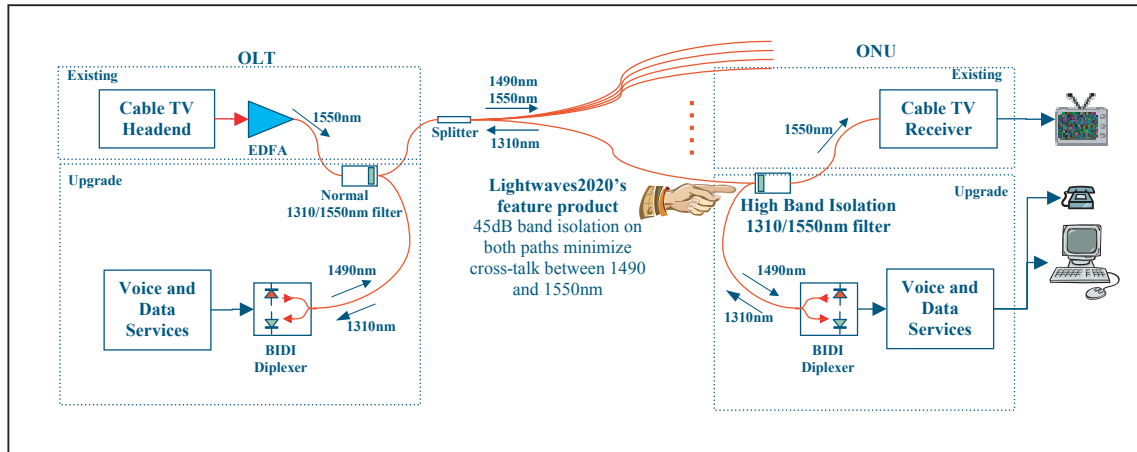


Figure 3 Adding 1310/1490 nm duplex to complete FTTP triplex services

Similar to the Figure 2, the product also helps to complete the FTTP triplex service by adding the duplex signal to existing CATV networks.



NEWSWIRE

- Lightwaves2020 proudly announces another new patent has been granted recently, adding to our growing number of patents. The patent is regarding our innovation on **"Temperature Compensation for Liquid Crystal Cell Optical Device"**. The patent number is 6,801,183 B2
- Lightwaves2020 adds new sales power! We would like to give a warm welcome to our new sales representative, **SJ Associates Inc.** The rep firm will use their extensive experience in the fiber optic industry to help us promote business in the Northeast including ME, VT, NH, MA, RI, and CT. Please contact them via email: tfaherty@sjassoc.com, phone: 508-485-2700, fax: 508-485-2702
- Our MOPM (power monitor) product line now offers a new low cost product! Due to recent successful cost reducing innovations, Lightwaves2020 is able to offer a state-of-art, high performance product at a competitively reduced price! Contact the sales department at sales@lightwaves2020.com to get more information and start enjoying the discounts today!