Loop-WDM1800
Wavelength Division Multiplexing Multi-Service Platform

Features

- Full frontal access (ETSI) Shelf
- Two rack-mountable chassis types: 5U and 2U
- Dual controller modules, dual power modules for redundancy
- Support console (RS232/USB) and Ethernet (RJ45/SFP) for local and remote management
- Support Web, Telnet, SSH, and SNMP v1/v3 management
- Compatible with SNMP-based GUI network management systems and supported by Loop-iNET and Loop-iNMS
- Plug-in Module Types (hot-pluggable)
    - Transponder Modules
    - Muxponder Modules
    - Wavelength Division Multiplexing (Mux/Demux) Modules (with and without Optical Link Protection Function)
    - Amplifier Modules
    - Dispersion Compensation Modules (DCM)
    - Optical Time-Domain Reflectometer (OTDR) Modules



WDM1800-A (5U)



WDM1800-B (2U)

Item	WDM1800-A	WDM1800-B
Chassis	5U	2U
# of CPU Slots	2	2
# of Trib Card Slots	15	6
# of Power Slots	2	2
# of Fan Slot	1	1

Description

The Loop-WDM1800 Wavelength Division Multiplexing Multi-Service Platform is designed to deliver a number of client data services by multiplexing/demultiplexing several different wavelengths into/from an optical fiber. The WDM1800 platform provides up to 15 universal plug-in slots for mounting different modules, including Transponder, Muxponder, WDM Mux/Demux filters, amplifier modules, DCM and OTDR module. Compact, modular and cost –effective design of the WDM1800 platform makes it easier to select suitable modules for current needs and upgradable for future requirements. With two shelf sizes and universal pluggable slots, an initial network can be deployed with low first-in cost. Future in-service network expansion is as simple as adding and configuring new modules to realize cost-effective and pay-as-you-grow advantages.

In-service passive performance monitoring on each client data and modular redundancy, enabled when dual controller modules and dual power modules are installed in the chassis, make the WDM1800 an excellent fit for mission critical applications.

The WDM1800 supports local control and diagnostics by using a VT-100 terminal connected to the console port, and Ethernet and SFP ports for Web, Telnet, SSH, and SNMP v1/v3 management as well. Furthermore, optional Optical Supervisory Channel (OSC) can be accessed via Transponder and/or Muxponder module connection for remote management.

Ordering Information

To specify options, choose from the list below.
Note: RoHS compliant units are identified by the letter **G** appearing at the end of the ordering code.

Model	Description	Notes
Main Unit		
5U Chassis		
Loop-WDM1800-CHAa-**G**	WDM1800 5U Main Chassis, with 2 controller slots, 2 power module slots and 15 tributary module slots	
2U Chassis		
Loop-WDM1800-CHBa-**G**	WDM1800 2U Main Chassis, with 2 controller slots, 2 power module slots and 6 tributary module slots	
CPU Modules		
Loop-WDM1800-CCAa-**G**	WDM1800 Controller Module with console and Ethernet management interfaces.	
Plug-in Service Modules		
Single Slot Plug-in Module		
Loop-WDM1800-4TP10G3RMa-**G**	4-Port Transponder module with 10G Multi-rate Network Interface. Support 3R optical regeneration. Support multi-rate clients: • 10.3125Gbps (10GE LAN) • 10.1376G CPRI 8 • 9.8304G CPRI 7 • 6.144G CPRI 6/OBSAI • 3.072G CPRI 4 • 2.4576G CPRI 3 • 1.25G 1GE • 9.95328Gbps (STM64/OC192/10GE WIS or user defined pattern) without performance monitoring • 2.488320Gbps (STM16/OC48/2.5GE) without performance monitoring	Please order SFP optical modules from a separate SFP optical brochure.
Loop-WDM1800-4TP25G3RMa-**G**	4-Port Transponder module with 25G Multi-rate Network Interface. Support 3R optical regeneration. Support multi-rate client interfaces: 10GE (10.3125Gbps) or 25GE (25.78125Gbps)	Please order **SFP28** optical modules from a separate SFP optical brochure. Works at 25GE with DWDM filter only.
Loop-WDM1800-7MP10Ga-**G**	Muxponder module with 7 client ports and one 10G Network Interface: • Client Data Rates: - FE/1G/10G - STM1/4/16/64 (OC3/12/48/192) • Line Data Rate: OTU2	Please order SFP optical modules from a separate SFP optical brochure.

Dual Slot Plug-in Module		
Loop-WDM1800-8TP10G3RMa-**G**	8-Port Transponder module with 10G Multi-rate Network Interface. Support 3R optical regeneration. Support multi-rate clients: • 10.3125Gbps (10GE LAN) • 10.1376G CPRI 8 • 9.8304G CPRI 7 • 6.144G CPRI 6/OBSAI • 3.072G CPRI 4 • 2.4576G CPRI 3 • 1.25G 1GE • 9.95328Gbps (STM64/OC192/10GE WIS or user defined pattern) without performance monitoring • 2.488320Gbps (STM16/OC48/2.5GE) without performance monitoring	Please order SFP optical modules from a separate SFP optical brochure.
Plug-in CWDM Mux/DeMux	**Match A cards in local chassis with B cards in remote chassis. with LC/PC connector**	
Single Slot CWDM Plug-in Module		
Loop-WDM1800-4CMDBAa-**G**	4-port (8-ch) Bi-directional wavelength Mux/DeMux type A, supports CWDM where channel #1 ~ #8 stands for different wavelength.	Channel wavelength List: #1~#4 : C27/29/31/33 1270/1290/1310/1330 #5~#8 : C55/57/59/61 1550/1570/1590/1610
Loop-WDM1800-4CMDBBa-**G**	4-port (8-ch) Bi-directional wavelength Mux/DeMux type B supports CWDM where channel #1 ~ #8 stands for different wavelength.	Channel wavelength List: #1~#4 : C55/57/59/61 1550/1570/1590/1610 #5~#8 : C27/29/31/33 1270/1290/1310/1330
Dual Slot CWDM Plug-in Module		
Loop-WDM1800-4CMDBASWa-**G***	4-port (8-ch) Bi-directional wavelength Mux/DeMux type A, supports CWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with built-in optical switch.	Channel wavelength List: #1~#4 : C27/29/31/33 1270/1290/1310/1330 #5~#8 : C55/57/59/61 1550/1570/1590/1610
Loop-WDM1800-4CMDBBSPa-**G***	4-port (8-ch) Bi-directional wavelength Mux/DeMux type B, supports CWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with optical splitter.	Channel wavelength List: #1~#4 : C55/57/59/61 1550/1570/1590/1610 #5~#8 : C27/29/31/33 1270/1290/1310/1330
Loop-WDM1800-8CMDBASWa-**G**	8-port (16-ch) Bi-directional wavelength Mux/DeMux type A, supports CWDM where channel #1 ~ #16 stands for different	Channel wavelength List: #1~#8 : C27/29/31/33/35/37/47/43

	wavelength. Supports Optical Link Protection (OLP) function with built-in optical switch.	1270, 1290, 1310, 1330, 1350, 1370, 1470. 1430. #9~#16 : C61/59/57/55/53/51/49/45 1610, 1590, 1570, 1550, 1530, 1510, 1490. 1450.
Loop-WDM1800-8CMDBBSPa-**G**	8-port (16-ch) Bi-directional wavelength Mux/DeMux type B, supports CWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with optical splitter.	Channel wavelength List: #1~#8 : C61/59/57/55/53/51/49/45 1610, 1590, 1570, 1550, 1530, 1510, 1490.1450. #9~#16 : C27/29/31/33/35/37/47/43 1270, 1290, 1310, 1330, 1350, 1370, 1470, 1430.

*Future option

Plug-in DWDM Mux/DeMux	**Match A cards in local chassis with B cards in remote chassis. with LC/PC connector**	
Single Slot DWDM Plug-in Module		
Loop-WDM1800-4DMDBAa-2Ea-**G**	4-port (8-ch) Bi-directional wavelength Mux/DeMux type A, supports DWDM where channel #1 ~ #8 stands for different wavelength. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#4 : D59/58/57/56 1530.33/1531.12/1531.90/1532.68 #5~#8 : D28/27/26/25 1554.94/1555.75/1556.55/1557.36
Loop-WDM1800-4DMDBBa-2Ea-**G**	4-port (8-ch) Bi-directional wavelength Mux/DeMux type B supports DWDM where channel #1 ~ #8 stands for different wavelength. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#4 : D28/27/26/25 1554.94/1555.75/1556.55/1557.36 #5~#8 : D59/58/57/56 1530.33/1531.12/1531.90/1532.68
Loop-WDM1800-4DMDUAa-**G***	4-port **Uni-directional** wavelength Mux/DeMux use in site A and B, supports DWDM where channel #1 ~ #4 stands for different wavelength.	Use 2 fibers for bidirectional transmission Channel wavelength List: Mux #1~#4 & DeMux #1~#4 : D28/27/26/25 1554.94/1555.75/1556.55/1557.36
Dual Slot DWDM Plug-in Module		
Loop-WDM1800-8DMDBAa-2Ea-**G***	8-port (16-ch) Bi-directional wavelength Mux/DeMux type A, supports DWDM where channel #1 ~ #16 stands for different wavelength. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#8 : D59/58/57/56/55/54/53/52 1530.33/1531.12/1531.90/1532.68/ 1533.47/1534.25/1535.04/1535.82 #9~#16 : D29/28/27/26/25/24/23/22 1554.13/1554.94/1555.75/1556.55/ 1557.36/1558.17/1558.98/1559.79
Loop-WDM1800-8DMDBBa-2Ea-**G***	8-port (16-ch) Bi-directional wavelength Mux/DeMux type B, supports DWDM where	Channel wavelength List:

	channel #1 ~ #16 stands for different wavelength. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	#1~#8 : D29/28/27/26/25/24/23/22 1554.13/1554.94/1555.75/1556.55/ 1557.36/1558.17/1558.98/1559.79 #9~#16 : D59/58/57/56/55/54/53/52 1530.33/1531.12/1531.90/1532.68/ 1533.47/1534.25/1535.04/1535.82
Loop-WDM1800-4DMDBASWa-2Ea-**G***	4-port (8-ch) Bi-directional wavelength Mux/DeMux type A, supports DWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with built-in optical switch. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#4 : D59/58/57/56 1530.33/1531.12/1531.90/1532.68 #5~#8 : D28/27/26/25 1554.94/1555.75/1556.55/1557.36
Loop-WDM1800-4DMDBBSPa-2Ea-**G***	4-port (8-ch) Bi-directional wavelength Mux/DeMux type B, supports DWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with optical splitter. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#4 : D28/27/26/25 1554.94/1555.75/1556.55/1557.36 #5~#8 : D59/58/57/56 1530.33/1531.12/1531.90/1532.68
Loop-WDM1800-8DMDBASWa-2Ea-**G**	8-port (16-ch) Bi-directional wavelength Mux/DeMux type A, supports DWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with built-in optical switch. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#8 : D59/58/57/56/55/54/53/52 1530.33/1531.12/1531.90/1532.68/ 1533.47/1534.25/1535.04/1535.82 #9~#16 : D29/28/27/26/25/24/23/22 1554.13/1554.94/1555.75/1556.55/ 1557.36/1558.17/1558.98/1559.79
Loop-WDM1800-8DMDBBSPa-2Ea-**G**	8-port (16-ch) Bi-directional wavelength Mux/DeMux type B, supports DWDM where channel #1 ~ #16 stands for different wavelength. Supports Optical Link Protection (OLP) function with optical splitter. Includes additional 2 ports for bi-directional booster/Pre-amp EDFA connection.	Channel wavelength List: #1~#8 : D29/28/27/26/25/24/23/22 1554.13/1554.94/1555.75/1556.55/ 1557.36/1558.17/1558.98/1559.79 #9~#16 : D59/58/57/56/55/54/53/52 1530.33/1531.12/1531.90/1532.68/ 1533.47/1534.25/1535.04/1535.82
Loop-WDM1800-8DMDUAa-**G***	8-port **Uni-directional** wavelength Mux/DeMux, using in site A and B, supports DWDM where channel #1 ~ #8 stands for different wavelength.	Use 2 fibers for bidirectional transmission Channel wavelength List: Mux #1~#8 & DeMux #1~#8 D59/58/57/56/55/54/53/52

		1530.33/1531.12/1531.90/1532.68/ 1533.47/1534.25/1535.04/1535.82

Plug-in of Optical Amplification, DCM only for DWDM and OTDR		**with LC/PC connector**
Loop-WDM1800-1BOEDFA-CBA20-**G**	1-ch EDFA amplifier as booster amplifier, support C-Band	EDFA card should be used along with all DWDM, transponder, muxponder and DWDM-OLP cards.
Loop-WDM1800-1PREDFA-CBA20-**G**	1-ch EDFA amplifier as pre-amplifier, support C-Band	EDFA card should be used along with all DWDM, transponder, muxponder and DWDM-OLP cards.
Loop-WDM1800-DCM-FBG-60K-**G**	Dispersion Compensation Module (DCM) with compensation length = 60Km. C-band supported.	
Loop-WDM1800-1OTDRa-**G**	Optical time-domain reflectometer (OTDR) module, with built-in 1x8 optical channel selector.	

Accessories

Model	Description	Notes
Power Module		
Loop-WDM1800-SDAa-**G** 	WDM1800 -48Vdc (-36 to -72Vdc, 300W) Power Module	• Works with WDM1800-CHAa • Order two for redundancy
Loop-WDM1800-SDBa-**G** 	WDM1800 -48Vdc (-36 to -72Vdc, 150W) Power Module	• Works with WDM1800-CHBa • Order two for redundancy • Can achieve redundancy with SABa
Loop-WDM1800-SABa-**G** 	WDM1800 100~240Vac Power Module	• Works with WDM1800-CHBa • Order two for redundancy • Can achieve redundancy with SDBa
Fan Tray		
Loop-WDM1800-FANAa-**G**	WDM1800 FAN Module for 5U chassis	One required for each WDM1800-CHAa. The tray holds ten cooling fans.
Loop-WDM1800-FANBa-**G**	WDM1800 FAN Module for 2U chassis	One required for each WDM1800-CHBa. The tray holds two cooling fans.
User's Manual		
Loop-WDM1800-UM	User's Manual (paper copy). Note: A CD version of the manual is already included as standard package.	
SFP Optical Modules		
Please place your order using the 5-digit alphanumeric codes listed in the separate SFP Optical Module Brochure. **NOTE:** Non-Loop SFP modules are not guaranteed to work with our equipment. It is strongly recommended to buy Loop logo SFP modules.		
Blank Panels(All blank panels are RoHS compliant)		
30.002553.A00-**G**	Blank Panel for Power Supply Slot (flat)	For WDM1800-CHAa only
30.002705.A00-**G**	Blank Panel for Power Supply Slot (flat)	For WDM1800-CHBa only
30.002552.A00-**G**	Blank Panel for Controller Slot and Tributary Slot(flat)	
Mounting Ear		
19"/23" ear mounts	A pair of 19"/23" ear mounts is supplied as part of standard package.	For other sizes, please contact your nearest Loop sales representative.

Power Cord (All power cords are RoHS compliant)		
Loop-ACC-PC-USA-**G**	AC power cord for Taiwan/America	
Loop-ACC-PC-EU-**G**	AC power cord for Europe	
Loop-ACC-PC-UK-**G**	AC power cord for UK	
Loop-ACC-PC-AUS-**G**	AC power cord for Australia	
Loop-ACC-PC-CH-**G**	AC power cord for China	

Power Adaptor		
Loop-ACC-AC**x**-DC48-320W-**G**	320 Watts, AC (88~264VAC or 124~370VDC to DC (+48Vdc, 6.7A) adaptor Working temperature: -30~+70°C	

■ Where **x** is used for selecting AC power plug type:

x =	Description	Notes
A	adaptor power plug type for USA and Taiwan	
E	adaptor power plug type for Europe	
U	adaptor power plug type for UK	

Product Specifications

CCAa Controller

Connector 2 RJ45 for twisted pair 10/100/1000BaseT, 1 SFP GbE Slot for optical

Alarm Relay Max. Current: 1A for 24VDC, 0.625A for 48VDC
Critical, major, minor, info alarms, IRIG time code*

Management

Console	DB9, RS232, Micro USB Connector
Ethernet	10/100/1000Base T, SNMPv1/v3, Telnet/SSH/Web
System Configuration Parameters	Active Configuration, Stored Configuration, and Default Configuration (Stored in Non-volatile Memory)

Performance Monitoring

Alarm Queue	To record alarms by type, location, date and time
Front Panel	Controller LED indicators (Power, ACTIVE, ALARM)

Mini Switch L2 Function This mini L2 switch 4 ports (2 RJ45, 1 SFP , CPU access) can be used to add DCN network and switch on a SFP with Lambda for Out-band management.

Physical/Electrical

	CHBa(2U)	CHAa(5U)
Chassis	CHBa(2U)	CHAa(5U)
Dimensions	W442 x H88 x D224.7mm	W442 x H220 x D224.7mm
Power	Single/Dual DC: -48 Vdc (-36 to -72 Vdc), 150 Watts max. Single/Dual AC: 100 to 240 Vac, 50/60 Hz	Single/Dual DC: -48 Vdc (-36 to -72 Vdc), 150 Watts max
Operating Temperature	-5 ~ +55°C for industrial grade SFP	-5 ~ +55°C for commercial grade SFP
Net Weight	7.5 Kg (16.53 lbs)	15 Kg (33.07 lbs)
Humidity	0-80% RH (non-condensing)	0-95% RH (non-condensing)

Mounting Desk-top stackable, 19” /23” rack mountable

Total Power Consumption Varies depending on the number and types of modules used. Please refer to the table below for the power consumption of each module

Module	Power Consumption (Watt)
Controller (CCAa)	3.45
4-port 10G Transponder (without SFP modules)	8.1
8-port 10G Transponder (without SFP modules)	14.1
SFP (10G SFP+, no link)	0.75
SFP (10G SFP+, linked up)	1.28
4-port 25G Transponder (without SFP modules)	9.1
25G SFP (SFP28, no link)	1
25G SFP (SFP28, linked up)	1.6
4-port CWDM Mux/DeMux Type A	2.1

Module	Power Consumption (Watt)
4-port CWDM Mux/DeMux Type B	2.1
8-port CWDM Mux/DeMux Type A with OLP	3.1
8-port CWDM Mux/DeMux Type B with OLP	3.1
4-port DWDM Mux/DeMux Type A	2.1
4-port DWDM Mux/DeMux Type B	2.1
8-port DWDM Mux/DeMux Type A with OLP	3.1
8-port DWDM Mux/DeMux Type B with OLP	3.1
DCM	1.8
OTDR (working)	6.8
OTDR (in measurement)	10.4
EDFA-BA	3.5
EDFA-PA	3.9
Muxponder	9.5
DC power (SDAa)	1
AC power (SABa)	1
DC power (SDBa)	1
FANA Off	0.5
FANB Off	0.5
Fan*10 working in FANA module	25
FANB Unprotected Fan tray	6.5
FANB Protected Fan tray	4

Transponder (TP)

Number of client/network ports	8-TP: 8 4-TP: 4
Port for remote management	8-TP: port 8 4-TP: port 4
Data Rate	1.25G ~ 10G
CPRI	Options 3 (2.4576 Gbps), 7 (9.8304 Gbps), 8 (10.1376 Gbps)
OBSAI	3.072 Gbps, 6.144 Gbps
Ethernet	1G/10G
SDH/SONET	STM-16/OC-48, STM-64/OC-192 w/o performance monitoring
Type	SFP+
3R Regeneration	Re-Amplification, Re-Shaping, and Re-timing
Performance Monitoring	CV, ES, BES, SES, UAS on Client and Network Ports
SyncE and 1588v2	Transparent transport
Maximum round-trip latency	2.5 μs
Transmitter power range Transmitter wavelength range Receiver wavelength range Receiver dynamic range	Vary depending on the SFP+ module used. Please refer to the separate SFP Optical Module Brochure for details.
Operating Temperature	-5 ~ +55°C

25G Transponder (TP)

Number of client/network ports	4
Port for remote management	Port 4
Data Rate	Ethernet 10G or 25G (with/without FEC)
Type	SFP+ for 10G, SFP28 for 25G
3R Regeneration	Re-Amplification, Re-Shaping, and Re-timing
Performance Monitoring	Monitor packet FCS error
SyncE and 1588v2	Transparent transport
Maximum round-trip latency	2.5 μs
Transmitter power range Transmitter wavelength range Receiver wavelength range Receiver dynamic range	Vary depending on the SFP+/SFP28 module used. Please refer to the separate SFP Optical Module Brochure for details.
Operating Temperature	-5 ~ +55°C

Muxponder (MP)

Number of client ports	Up to 7
Number of Network port	One network port
Data Rate	1.25G ~ 10G
Ethernet	1G/10G
SDH/SONET	STM-1/4/16/64, OC-3/12/48/192
Transmitter power range Transmitter wavelength range Receiver wavelength range Receiver dynamic range	Vary depending on the SFP+ module used. Please refer the separate SFP Optical Module Brochure for details.
Operating Temperature	-5 ~ +55°C

Wavelength-Division Multiplexing (WDM) filter modules

Loop Telecom supports:
CWDM passive technology to multiplex 8 or 16 wavelengths (or Lambda λ) in the same fiber with a spacing of 20nm and working channel passband +/- 6.5nm with a maximum distance of 70km according to the type of fiber.
DWDM passive technology to multiplex 8 or 16 lambda of C-Band per filter with channel spacing at 100GHz or 0,8nm.
Only the DWDM optical transmission can be amplified by EDFA modules and Raman external chassis.
The distance reach by the solution depends on:

- The TX power (dBm) of SFP/+ and its RX sensitivity (dBm), or its optical Budget (TXout – RXSensitivity) (dB)
- The fiber loss per km depending of fiber type (G.652/G655/G656), number of splices and connectors of the line
- The insertion loss of MuxDemux filters,
- The eventual Amplification with EDFA and Raman,
- The eventual insertion loss of DCM necessary to use for 10G and 25G transmission.

CWDM and DWDM filters without OLP

Parameter	4CMDBAa or 4CMDBBa	4DMDBAa-2Ea or 4DMDBBa-2Ea
Number of Client Ports	4	4
Insertion Loss per module	≤ 2.2 dB	≤ 1.9 dB
Insertion Loss of link	≤ 4.4 dB	≤ 3.8 dB

Parameter	8DMDBAa-2Ea* or 8DMDBBa-2Ea*
Number of Client Ports	8
Insertion Loss per module	≤ 3.1 dB
Insertion Loss of link	≤ 6.2 dB

CWDM filters with OLP

Parameter	4CMDBASWa*	4CMDBBSPa*	8CMDBASWa	8CMDBBSPa
Number of Client Ports	4	4	8	8
Insertion Loss of module	≤ 3.8 dB	≤ 5.2 dB	≤ 5.1 dB	≤ 6.5 dB
Insertion Loss of link	≤ 9.0 dB	≤ 9.0 dB	≤ 11.6 dB	≤ 11.6 dB

DWDM filters with OLP

Parameter	4DMDBASWa-2Ea*	4DMDBBSPa-2Ea*	8DMDBASWa-2Ea	8DMDBBSPa-2Ea
Number of Client Ports	4	4	8	8
Insertion Loss of module	≤ 3.5 dB	≤ 4.9 dB	≤ 4.7 dB	≤ 6.1 dB
Insertion Loss of link	≤ 8.4 dB	≤ 8.4 dB	≤ 10.8 dB	≤ 10.8 dB

CWDM & DWDM filters common specifications

Directivity	≥ 50 dB	≥ 50 dB	≥ 50 dB	≥ 50 dB
Polarization Dependent Loss	≤ 0.2 dB	≤ 0.2 dB	≤ 0.2 dB	≤ 0.2 dB
Optical Return Loss	≥ 45 dB	≥ 45 dB	≥ 45 dB	≥ 45 dB
Isolation (Adjacent Group)	≥ 30 dB	≥ 30 dB	≥ 30 dB	≥ 30 dB
Isolation (Non-Adjacent Group)	≥ 40 dB	≥ 40 dB	≥ 40 dB	≥ 40 dB
Optical Transmission Power	≤ 500 mW	≤ 500 mW	≤ 500 mW	≤ 500 mW
Optical Connector Type	LC	LC	LC	LC
Operating Temperature	-5 ~ +55°C	-5 ~ +55°C	-5 ~ +55°C	-5 ~ +55°C

Erbium-Doped Fiber Amplifier (EDFA)

Booster Amplifier

Parameter	Symbol	Min	Typ	Max	Unit
Wavelength	λc	1529	1550	1561	nm
Saturated output power (1)	Po	-	-	20	dBm
Input power	Pi	-10	-	+6	dBm
Gain	G	17	-	20	dB
Multi-wavelength gain flatness	GF	-	-	1.5	dB
Noise Figure (2)	NF	-	4.5	-	dB
Output power stability	ΔPo	-	±0.05	±0.1	dB
Return loss	RL	-	-	-45	dB
Polarization dependent gain	PDG	-	-	0.3	dB
Polarization mode dispersion	PMD	-	-	0.5	ps
Operating Temperature	-	-5	-	55	°C

(1): Two output ports are available
(2): Test at 0dBm input

Pre Amplifier

Parameter	Symbol	Min	Typ	Max	Unit
Wavelength	λc	1529	1550	1561	nm
Saturated output power (1)	Po	-	-	20	dBm
Input power	Pi	-35	-	-5	dBm
Gain	G	-	24	-	dB
Multi-wavelength gain flatness	GF	-	-	1.5	dB
Noise Figure (2)	NF	-	4.5	-	dB
Output power stability	ΔPo	-	±0.05	±0.1	dB
Return loss	RL	-	-	-45	dB
Polarization dependent gain	PDG	-	-	0.3	dB
Polarization mode dispersion	PMD	-	-	0.5	ps
Operating Temperature	-	-5	-	55	°C

(1): Two output ports are available
(2): Test at 0dBm input

Dispersion Compensation Module (DCM)

Parameter	Value
Wavelength range	C-band
Operating bandwidth	>30GHz
Channel spacing	100GHz
Compensation length	60Km
Insertion loss	< 3.5dB
Dispersion slope	SMF G.652
Operating Temperature	-5 ~ +55°C

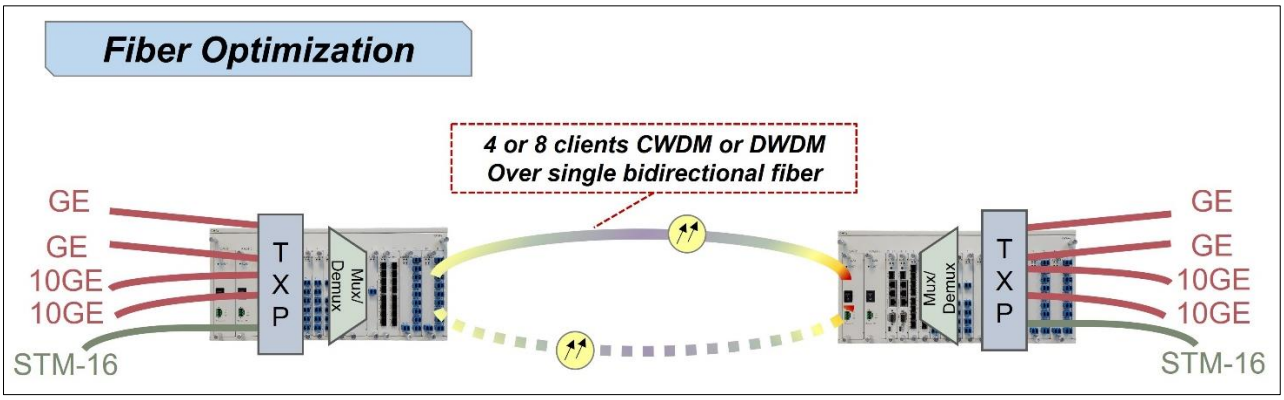
Optical Time-Domain Reflectometer (OTDR) for CWDM links

Parameter	Value
Dynamic Range (SNR =1)	36 dB
Wavelength	1625 ± 20 nm
Optical fiber	9/125 μm Single-mode fiber
Connector	LC/PC
Event dead zone	≦ 3m
Attenuation dead zone	≦ 15m
Ranging accuracy	± (1m + 5 x 10-5 x distance + sampling spacing)
Switching time (1 x 8 switch)	≦ 8ms
Operating Temperature	-5 ~ +55°C

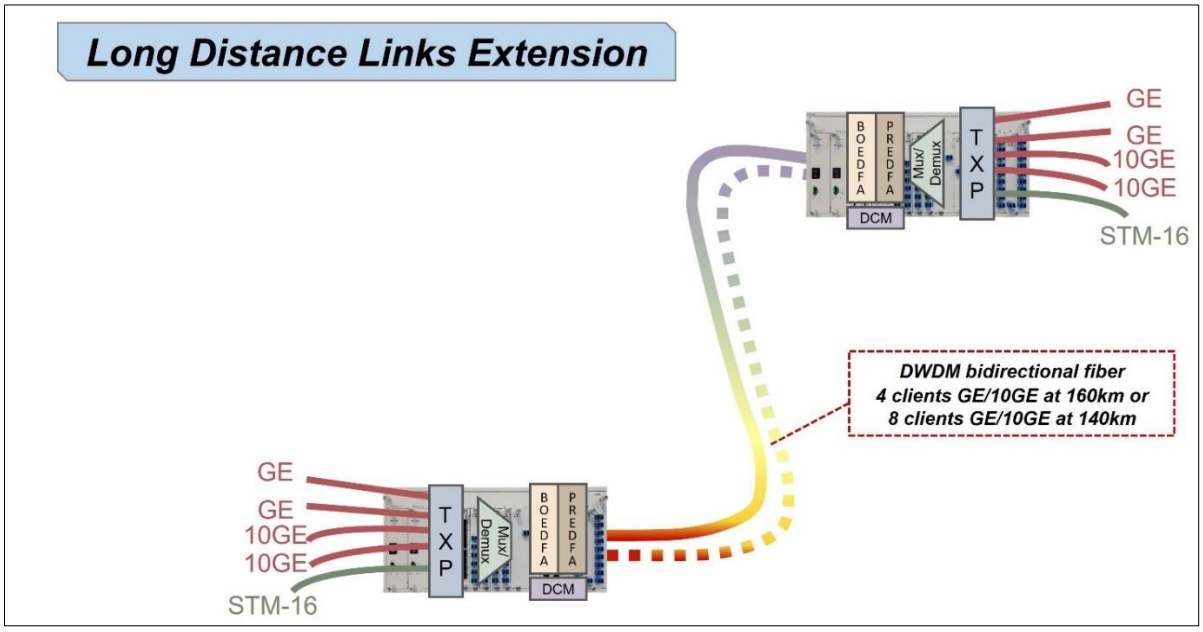
Certification

FCC Part 15 Class A, ICES-003, EN55032, EN55035, BS EN55032, BS EN55035, EN IEC62368-1, BS EN IEC62368-1

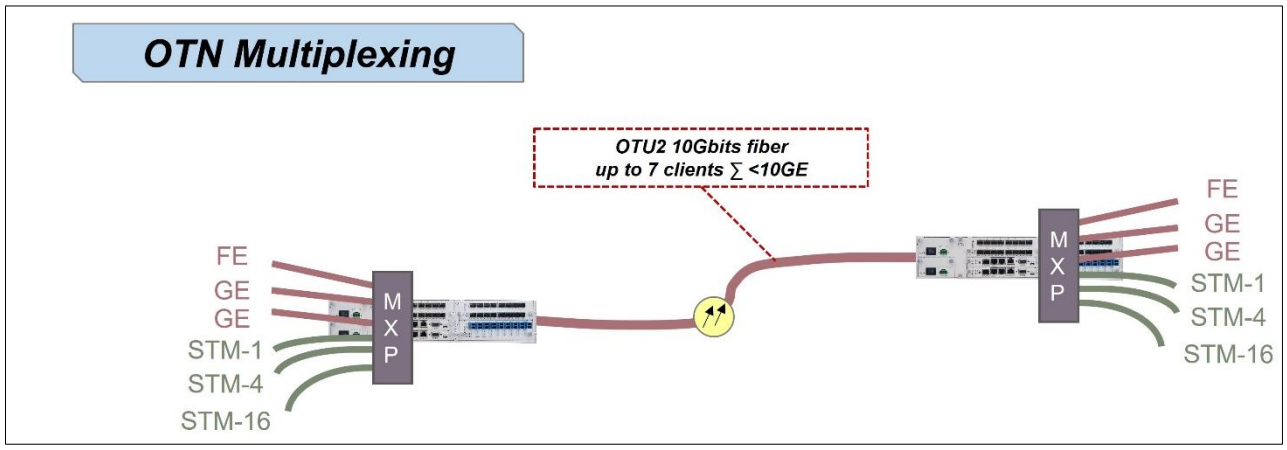
Application Illustrations



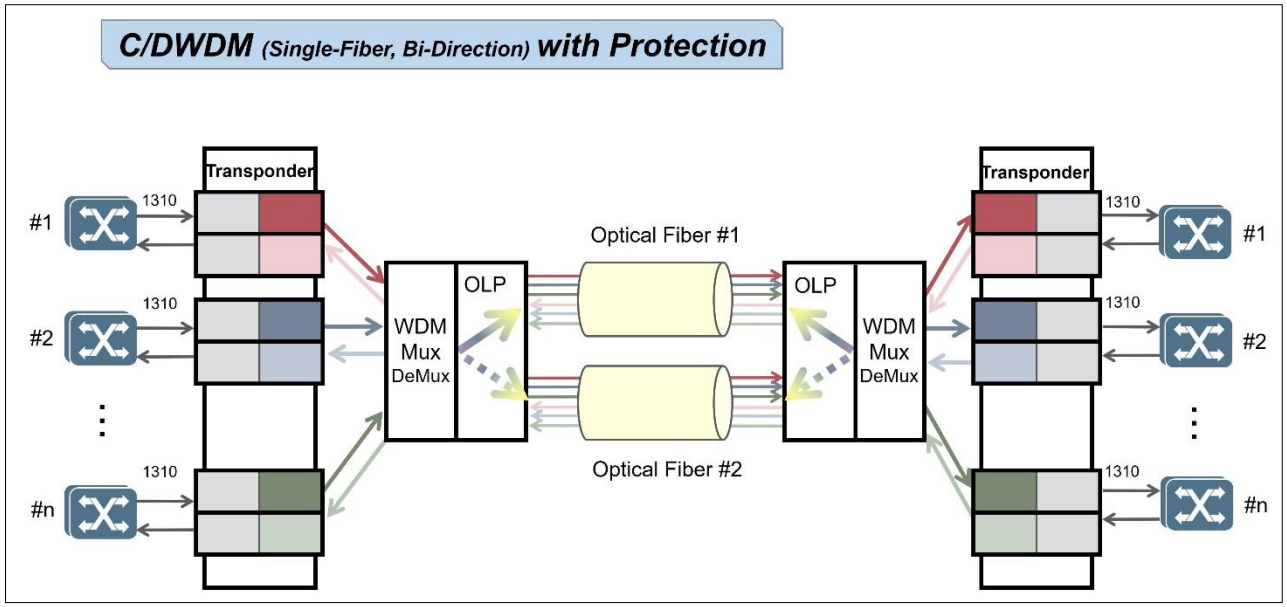
- CWDM/DWDM filters multiplex Lambda at one end of the fiber, and demultiplex it at the other end. The Lambda can be issued from an active terminal with colored SFP or by the Transponder.
- The Transponder converts the standard optical wavelength to a colored wavelength or Lambda.
- Such configuration can optimize the length of fiber to 60km without amplification.



- Because of high level of optical signal dispersion generated by high speed signal, to increase the distance of 10GE, the signal has to be transmitted over narrow band DWDM by using DWDM SFP/SFP+ and DWDM filter.
- This DWDM signal can be amplified by an EDFA-Booster.
- To achieve longer distance extension, an EDFA-Preamplifier is added to the end of the line before DWDM DEMUX.
- For long-haul, it is necessary to add a Dispersion Compensation Module (DCM) at level of Booster and Preamplifier along the line.



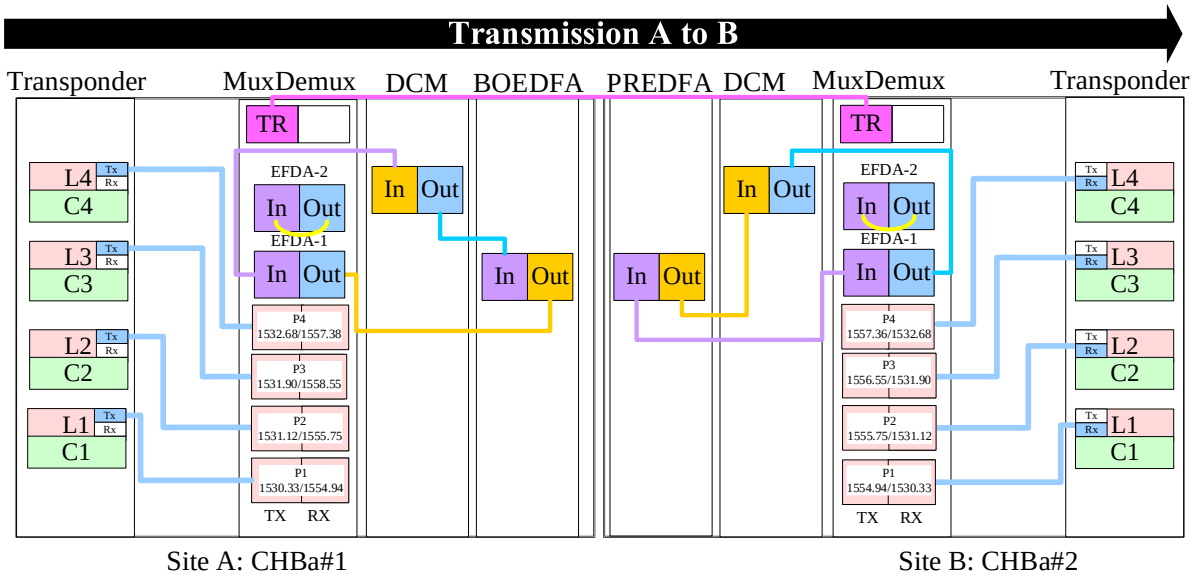
- The Optical Transport Network (OTN) is a Layer 2 multiplexing to enable the transport of optical packet based and SDH/SONET traffic.
- The MuxPonder can multiplex up to 7 network connections (FE, GE, STM1/4/16 or OC3/12/48) over a single fiber interface with a rate of 10 Gigabit as OTU2 interface.
- This solution makes it easy to deploy low rate to high rate packet and legacy data over a simple fiber of a leased 10G fiber.

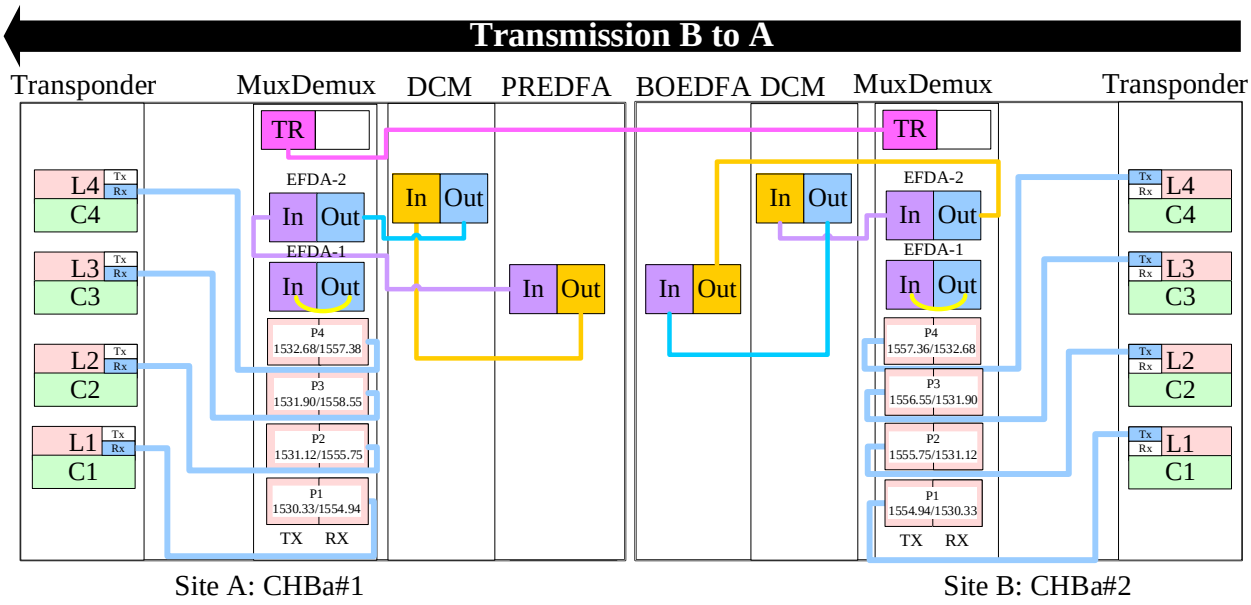


- The transmission of 4 or 8 channel CWDM/DWDM is done by 4 or 8 Lambdas over 2 unidirectional fibers, or with 8 or 16 Lambdas over a single bidirectional fiber as shown above.
- Today Loop Telecom proposes only the solution of CWDM/DWDM transmission over a single bidirectional fiber.

Schematics of WDM1800 connection with EDFA BOOSTER, PREAMPLIFIER and DCM

Bidirectional transmission (from Site A to Site B and from Site B to Site A) on single fiber over 140km for 4 x 10GE





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