PL-2000M 200G Muxponder/Transponder

200G over a single wavelength coherent transport solution

Features Overview

- User-configurable muxponder and transponder operation modes
- Supported clients: 10GbE, 40GbE, 100GbE, 8G/16G/32G Fibre Channel, 12G-SDI, STM-64/OC-192, SONET/SDH, OTU2/OTU2e/OTU3/OTU4 OTN
- 200G uplink aggregation using any mix, for example: up to 20x10GbE (multi-rate) clients, 2x100GbE clients, 1x100GbE + 10x10GbE clients, 4x40GbE + 4x10GbE clients
- Forward error correction (FEC)
- 200G pluggable CFP2 coherent (ACO) tunable DWDM line interface
- Operation modes:
  - 16QAM 200G metro ~650km
  - DP-QPSK 100G long haul ~4000km
- Layer-1 GCM-AES-256 encryption
- Diffie-Hellman key exchange
- Line and service performance monitoring
- Optional integrated EDFA, mux/demux and optical switch
- Facility protection using an optional integrated optical switch
- Remote management with in-band GCC or out-of-band OSC
- Dual AC or DC pluggable power supply and pluggable fan unit
- Supports standard MSA pluggable SFP+, SFP28, QSFP+, QSFP28 and CFP2
- 1U footprint with low power consumption

Data Center Interconnect and Metro Applications

The PL-2000M is an advanced 200G multi-protocol multi-rate solution for building high capacity optical transport networks. This 1U platform with flexible architecture enables the same device to be used in multiple applications and to adapt to network growth and changes.

Main Benefits

- **Cost-effective 200G capacity over single wavelength**
- **Highly integrated 1U muxponder and transponder**
- **Supports flexible mix of client interface protocols**
- **Embedded GCM-AES-256 encryption for all protocols**
- **User-configurable 100G/200G operation mode**

Modular, Cost-effective 200G Transport Solution

The PL-2000M provides a modular and cost-effective way of rolling out services or uplifting existing network capacity. It is low power consumption, saves rack space and reduces the overall solution CAPEX and OPEX by increasing the capacity of enterprise DCI and metro networks.

The PL-2000M can multiplex 2x100G clients into a single coherent CFP2 uplink, providing low cost high spectral efficiency.

The device seamlessly integrates with PacketLight's products to deliver carrier grade, high-end 200G solutions.
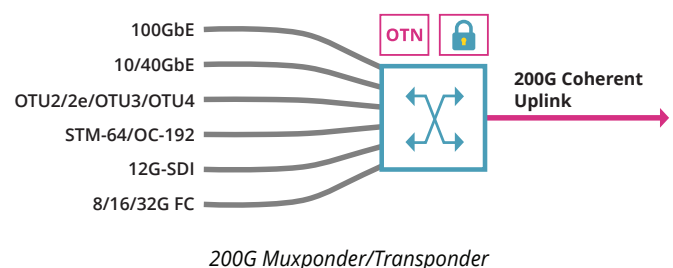
200G Muxponder/Transponder

Technical Specifications

Product Configurations

Muxponder: Aggregation of up to 20 multi-service, multi-rate, multi-protocol client interfaces: Ethernet, Fibre Channel, SONET/SDH, and OTN into a 200G uplink.

Dual 100G Transponder: 2x100GbE mapped into 1x200G uplink

100G Transponder and 10X10G Muxponder: 100GbE + 10x10GbE mapped into 1x200G uplink

Optical Amplifiers: Optional up to two EDFA modules

Mux/Demux: Optional 2ch mux/demux module

Optical Switch: 1+1 facility protection

Uplink Characteristics

Bit Rate:
- 200G OTUC2'V2 - 2x132.2680Gbps
- 100G OTU4V2 - 131.1026Gbps

Optical Interface: CFP2 coherent (ACO)

Tuneability range:
- DWDM ITU-T G.694.1 grid
- C-band, with flex-grid support
- Channels 13-60.5, with 50GHz spacing

FEC Support:
- Standard ITU-T G.709 GFEC
- Enhanced HD-FEC, or SD-FEC

Optical Output Power:
- 100G: -2dBm to +3dBm
- 200G: -5dBm to 0dBm

OSNR:
- 100G: 12dB at 0.1nm
- 200G: 23dB at 0.1nm

Sensitivity:
- 100G: -21dBm
- 200G: -18dBm

Optical Monitoring: Tx and Rx power, dispersion, OSNR

Client Interfaces Characteristics

Service types:
- 10GbE, 40GbE, 100GbE,
- 8G/16G/32G Fibre Channel
- 12G-SDI
- STM-64/OC-192
- OTU2, OTU2e, OTU4

Optical Interface:
- SFP+: LR (1310nm), SR (850nm), ER (1550nm), ZR (1550nm), C/DWDM
- SFP28: LR (1310nm), SR (850nm)
- QSFP+: LR4 (1310nm), ER4 (1310nm), SR4 (850nm), LR PSM
- QSFP28: LR4 (1310nm), ER4 (1310nm), SR4 (850nm), CWDM4 (CWDM)

Amplifier

Applications: Booster, pre-amp

Output Power:
- Booster: +4 to +14dBm
- Pre-amp: +5dBm

Input Power:
- Booster: 0 to +10dBm
- Pre-amp: -25 to -9dBm

Gain:
- Booster: +4 to +14dB
- Pre-amp: +18dB

Operating Modes:
- Automatic gain control (AGC)
- Automatic power control (APC)

Network Management

Management Ports:
- 2xRJ-45 LAN port 10/100MBase-T
- 2xSFP MNG ports 100/1000MBase-X
- RJ-45 serial port
- RJ-45 external alarm port
- OTN in-band GCC channel

Management Protocols:
- SNMP, HTTP, HTTPS, CLI over RS-232 or CLI over Telnet/SSH, Syslog, RADIUS, TACACS+, SNTP, TFTP & FTP, REST, NETCONF

NMS:
- PacketLight LightWatch™ NMS/EMS, or third party NMS over SNMP

OAM:
- Facility loopback (client and line interfaces), PRBS, event log, alarms
- Automatic laser shut-down (ALS)

Performance Monitoring:
- Layer-1 PM for all services (except for 32G FC)
- Layer-2 PM for Ethernet
- OTN PM for uplinks
- Optical power Rx levels for all optical ports

Visual Indicators: LED status indicators for client and line ports, Management and LAN ports, amplifier/s, system Critical/Major/Minor and Power Supply

Software Upgrade: Hitless traffic – dual image

Power Supply

AC/DC: 100 to 240 VAC, 50/60 Hz, -36 to -60 VDC, 250W max

PSU Redundancy: Single/dual feeding, hot swappable

Cooling Unit: Hot swappable fan unit

Environmental

Operating Temperature: -5ºC to 50ºC (+23ºF to +122ºF) operational

Humidity: 5% to 85% RH

Physical Dimensions

1U:
- 1.77" (H) x 17.32" (W) x 11.22" (D)
- 45mm (H) x 440mm (W) x 285mm (D)

Weight: 8.5kg / 18.75lb (max)

Mounting: 19", ETSI and 23"

Encryption

Functionality: Full speed, transparent Layer-1 encryption for selected clients or for the OTU4 uplinks

Algorithms:
- Encryption/decryption: GCM-AES-256
- Message digest: SHA-384

Authentication:
- Role-based user/password authentication

Compliance:
- FIPS 140-2 certified
- Common Criteria EAL2 certified
- CNSA Top Secret Suite B 2015 compliant

Note: For specific countries, models that include Layer-1 GCM-AES-256 based encryption will be marked with the suffix C.

Approvals & Standards
- CE, FCC, RoHS, REACH
- NEBS ready

PL-300 Passive Family

Up to 96ch Mux/Demux, DCM, OADM in 1U

Features Overview

- Passive transparent any rate, any service multiplexing
- Compliant with all optical networking products (ITU grid)
- DWDM passive optical mux/demux supported configuration: 4/8/16/48/96 channels
- CWDM passive optical mux/demux supported configuration: 4/8/16 channels
- Integrates up to four DCMs
- OADM for 1-4 wavelengths
- Supports single and dual fiber operation
- Integrates with all PacketLight products
- Stackable solution for multiplexing optical services up to 200G each
- Supports full C-band and L-band
- Supports 100GHz and 50GHz
- 1U, 19" rack mount chassis
- Simple installation and modularity
- Optional TAP Monitoring Port

Maximize Fiber Utilization & Capacity

The PL-300 provides passive optical layer functions for 4-96 DWDM wavelengths mux/demux, 4-16 CWDM wavelengths mux/demux, optical dispersion compensation module (DCM), optical add and drop (OADMs), splitters and combiners.

The passive optical network products interconnect seamlessly with PacketLight's transponder, muxponder, amplifier and ROADM product lines, and third party WDM products, to form cost-effective high capacity DWDM and CWDM solutions.

Main Benefits

- **Customized per customer application requirements**
- **Standards-based and can integrate with third party solutions**
- **Scalable solution, allowing customers to expand as needed, saving operating costs and resources**

Flexibility in Services over the Same Fiber

The PL-300 provides high granularity wavelength add and drop capabilities and offers a large set of passive optical modules that are tailored to the customers' network requirements.

The device supports a wide range of CWDM and DWDM mux/demux, OADMs and DCMs in various configurations, suitable for any type of CWDM, DWDM, OTN and ROADM network building block.
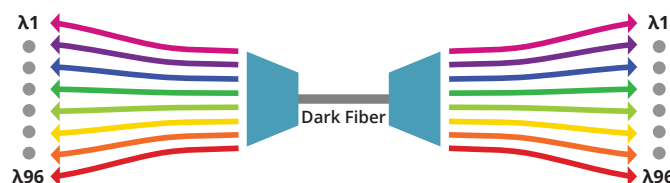
PL-300 Passive Product Family

Recommended applications:

- Expansion of existing fiber capacity regardless of service type
- Building scalable high capacity pay-as-you-grow optical networks
- Low cost fully passive optical layer solution, transparent to service rate and type
- Extending the fiber optical solution reach for 10G services with DCMs
- Building cost-effective add and drop networks
- Enables stackable solution of 100G/sub-100G products

Technical Specifications

	Description	# MUX WLs	MUX 1 [nm]	MUX 2 [nm]	Insertion Loss (Mux + Demux)
CWDM	Dual Fiber 4ch Mux/Demux	4	1471-1531		<4dB
	Dual Fiber 8ch Mux/Demux	8	1471-1611		<4dB
	Dual Fiber 16ch Mux/Demux	16	1311-1611		<6dB
	2 x Dual Fiber 4ch Mux/Demux	4	1471-1531	1471-1531	<4dB
	2 x Dual Fiber 8ch Mux/Demux	8	1471-1611	1471-1611	<4dB
	2 x Dual Fiber 16ch Mux/Demux	16	1311-1611	1311-1611	<6dB
	Single Fiber 8ch Mux	8	1471-1611		<4dB
	Single Fiber 16ch Mux	16	1311-1611		<6dB
	2 x Single Fiber 8ch Mux	8	1471-1611	1471-1611	<4dB
	2 x Single Fiber 16ch Mux	16	1311-1611	1311-1611	<6dB
DWDM	Dual Fiber 4ch Mux/Demux	4	CH28-CH31		<4dB
	Dual Fiber 8ch Mux/Demux	8	CH28-CH35		<4dB
	Dual Fiber 16ch Mux/Demux	16	CH20-CH35		<11dB
	Dual Fiber 48ch Mux/Demux	48	CH13-CH60		<11dB
	Dual Fiber 96ch Mux/Demux	96	CH13-CH60.5		<12dB
	2 x Dual Fiber 4ch Mux/Demux	4	CH28-CH31	CH28-CH31	<4dB
	2 x Dual Fiber 8ch Mux/Demux	8	CH28-CH35	CH28-CH35	<4dB
	2 x Dual Fiber 16ch Mux/Demux	16	CH20-CH35	CH20-CH35	<11dB
	Single Fiber 8ch Mux	8	CH28-CH35		<2.5dB
	Single Fiber 16ch Mux	16	CH20-CH35		<6dB
	Single Fiber 96ch Mux	96	CH13-CH60.5		<6.5dB
	2 x Single Fiber 8ch Mux	8	CH28-CH35	CH28-CH35	<3dB
	2 x Single Fiber 16ch Mux	16	CH20-CH35	CH20-CH35	<6dB
	2 x Single Fiber 8ch Mux Red/Blue	16	CH21-CH36	CH45-CH60	<12dB

DWDM Add/Drop Insertion Loss

Single ch.: Express 0.8dB, add/drop 1.5dB
Dual ch.: Express 1.3dB, add/drop 1.5 dB
Quad ch.: Express 2.5dB, add/drop 2.7dB

Splitters/Combiners Insertion Loss

DWDM: 1.5dB
CWDM: 0.8dB
1310nm: <1.5dB

DCM

Fibre Type: G.652 PMD: <1.2ps
Fibre Span: 20km-200km
Wavelength Range: 1527nm-1567nm
Residual Dispersion: <+/-2%
Max Insertion Loss: 3dB

Environmental

Operating Temperature: -5ºC to +50ºC (+23ºF to +122ºF) operational

Physical Dimensions 1U:

1U
- 1.77" (H) x 17.32" (W) x 9.05" (D)
- 45mm (H) x 440mm (W) x 220mm (D)

1.5U
- 2.65" (H) x 17.32" (W) x 9.05" (D)
- 66mm (H) x 440mm (W) x 220mm (D)

Weight: 3.5kg / 7.7lb (max)

Approvals & Standards

- RoHS, REACH, ETSI, Telcordia GR-12, NEBS ready
- Standards: ITU G.671