

PL-4000M 400G Muxponder

Aggregation of flexible mix of services into a 400G DWDM uplink

Features Overview

- Flexible high capacity architecture based on 400G pluggable digital coherent optical modules
- Supported clients: 10/25/100Gb Ethernet, 16/32G Fibre Channel, OTU2/2e/4
- Flexible mix of client services mapped into a single 400G DWDM wavelength
- Supports O-FEC on the line side
- Uplinks: Dual 400G CFP2-DCO Open ROADM pluggable coherent modules
- Clients:
 - 4 x QSFP28 for 100GbE or OTU4
 - 24 x SFP+ / SFP28 for all others
- Layer-1 GCM-AES-256 encryption
- Elliptic Curve Diffie-Hellman key exchange
- Comprehensive line and service performance monitoring
- Integrated EDFAs pre-amp/booster (optional)
- Facility protection using an integrated optical switch (optional)
- Remote management using in-band GCC or out-of-band OSC
- Easy maintenance with field-replaceable parts:
 - Dual hot pluggable power supply units (AC/DC)
 - Fan unit

400G Metro and 200G Long Haul Applications

The PL-4000M is a modular and cost-effective solution for rolling out multi-rate 10/25/100GbE, 16/32G FC, OTU2/2e/4 services, or increasing existing network capacity. The device delivers 400G in a 1U chassis using dual 400G CFP2-DCO Open ROADM standard-based pluggable coherent modules for metro and long haul applications.

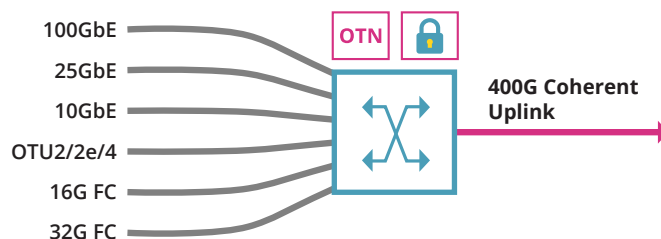


Main Benefits

- Cost-effective high capacity transport of 400G over single wavelength
- Supports flexible mix of client interface protocols
- Embedded Layer-1 GCM-AES-256 encryption
- Integrated EDFAs and optical switch in 1U chassis
- User-configurable 200G/400G operation mode

Flexible Architecture, Facility Protection

The PL-4000M provides full demarcation point between the service and the OTN/DWDM uplink, and is interoperable with any third party switch or router. This provides full visibility and performance monitoring of both line optical transport layer (OTN) and 10/25/100GbE, 16/32G FC, and OTU2/2e/4 service interfaces.



400G Muxponder Diagram

Recommended applications:

- 400G metro / long haul applications, up to 1,200 km
- 200G long haul applications ranging up to 2,500 km
- High capacity DCI for enterprise, campus and cloud computing networks
- 400G links to bolster existing OTN/DWDM infrastructure
- Last mile access/aggregation CPE for 100GbE managed services
- Secured and encrypted communication for 10/25/100GbE, and OTU2/2e/4 services



Layer-1 encryption

1U

1U rack mount



Cost-effective solution

Technical Specifications

Product Configurations

400G Muxponder: Flexible mix of client interfaces aggregated into a 400G uplink

Optical Amplifiers: Up to two EDFA modules (optional)

Optical Switch: 1+1 facility protection (optional)

Uplink Characteristics

Bit Rate:

- 400G OTUC4
- 200G OTUC2

Optical Interface:

Dual CFP2-DCO 400G uplinks

Tuneability Range:

- DWDM ITU-T G.694.1 Grid
- C-band, with flex-grid support

FEC Support:

- O-FEC

CFP2-DCO:

- Tx power 400G: -10dBm to 0dBm
- Rx power 400G: -23dBm
- 400G 16QAM OSNR Tolerance at -12dBm Rx Power: typical 21.8dB, min. 22.8dB
- 200G QPSK OSNR Tolerance at -17dBm Rx Power: typical 13.9dB, min. 14.9dB
- Rx Sensitivity at High OSNR: 400G 16QAM -22.5dBm, 200G QPSK -30dBm

Chromatic Dispersion Tolerance:

- 400G: 26,000ps/nm
- 200G: 50,000ps/nm

Optical Monitoring:

- Tx and Rx power
- Chromatic dispersion
- OSNR

Client Characteristics

Service Types:

- 10GbE, 25GbE, 100GbE
- 16G/32G Fibre Channel
- OTU2/2e/4

Optical Interface:

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

Amplifier

Applications: Booster, pre-amp

Output Power:

- Booster: up to 20dBm
- Pre-amp: up to 5dBm

Input Power:

- Booster: -24dBm to +10dBm
- Pre-amp: -36dBm to -10dBm

Gain:

- Booster: 5dB to 22dB
- Pre-amp: 13dB to 22dB

Operating Modes:

- Automatic gain control (AGC)
- Automatic power control (APC)

Network Management

Management Ports:

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

Protocols: SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, TACACS+, SNMP, TFTP & SFTP

Management:

- Web browser over HTTP/HTTPS,
- PacketLight LightWatch™ NMS/EMS, or third party NMS over SNMP
- REST, NETCONF
- CLI over RS-232 or CLI over Telnet/SSH

OAM:

- Facility loopback (client and line interfaces), terminal loopback, PRBS, event log, alarms

Performance Monitoring:

- Layer-1/2 PM for 10/25/100GbE services
- OTN PM for uplink and OTU2/2e/4 services
- Optical PM 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, -44 to -60 VDC, 300W max

PSU Redundancy: Single/dual feeding, hot swappable

Cooling Unit: Hot swappable fan unit

Environmental

Operating Temperature: -5°C to 45°C (+23°F to +113°F) operational

Humidity: 5% to 85% RH

Storage: 85°C

Physical Dimensions

1U:

- 1.77" (H) x 17.32" (W) x 15.75" (D)
- 45mm (H) x 440mm (W) x 400mm (D)

Weight: 8.4kg / 18.5lb (max)

Mounting: 19", ETSI and 23"

Encryption

Functionality: Full speed, transparent Layer-1 encryption for selected services or for the 400G OTUC4 uplink

Compliance:

- FIPS 140-2 Level 2
- CNSA Top Secret Suite 2015

Algorithms:

- Encryption/decryption: GCM-AES-256
- Key exchange: ECC CDH, Curve P-384
- Message digest: SHA-384

Authentication:

- Role-based user/password authentication

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