PL-4000M 600G | 400G/2x300G Muxponder/ADM

Multi-protocol multi-rate optical transport solution for metro and long haul networks

Features Overview

- Flexible high capacity architecture based on 400G pluggable digital coherent optical modules
- Supported clients: 10/25/100Gb Ethernet, 16G/32G Fibre Channel, OTU2/2e/4
- Flexible mix of client services mapped into 100/200/300/400G DWDM wavelengths
- Supports oFEC on the line side
- **Uplinks:**
  - Dual 400G CFP2-DCO OpenROADM pluggable coherent modules
  - Single 400G Non-DWDM QSFP-DD
- **Range of modulation modes:** 16QAM, 8QAM, QPSK
- **Clients:**
  - Up to 6 x QSFP28 for 100GbE or OTU4
  - 24 x SFP+ / SFP28 for lower rate services
- Layer-1 GCM-AES-256 encryption
- Elliptic Curve Diffie-Hellman key exchange
- Comprehensive line and service performance monitoring
- Flexible OTN cross connect
- Integrated pre-amp/booster EDFAs (optional)
- Facility protection using an integrated optical switch (optional)
- OTN SNCP 1+1 service protection for ring applications
- Remote management using in-band GCC or out-of-band OSC
- Remote management and fiber monitoring with OSC OTDR SFP
- **Easy maintenance with field-replaceable parts:**
  - Dual hot pluggable power supply units (AC/DC)
  - Fan unit

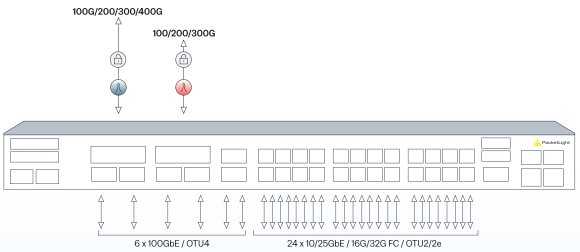
Muxponder/ADM Capabilities

The PL-4000M is a cost-effective solution for rolling out multi-rate services, or increasing existing network capacity. The device delivers 600G using flexible cross connect matrix and dual 400G CFP2-DCO OpenROADM 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
- User-configurable operation mode
- Supports 100/200/300G ring application
- Low power consumption, high density device ports

PL-4000M Diagram



Flexible Architecture, Facility Protection

The PL-4000M provides full demarcation point between the service and the OTN/DWDM network, 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 the service interfaces.

Recommended applications

- 300G/400G metro / long haul applications
- 100G/200G long haul applications
- High capacity DCI
- 400G links to bolster existing OTN/DWDM infrastructure
- Secured and encrypted communication for 10/25/100GbE, and OTU2/2e/4 services

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Technical Specifications

Product Configurations

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

Dual 100/200/300G Muxponder: mix of client interfaces aggregated into two 100/200/300G uplinks

Optical Amplifiers: Up to two EDFA modules (optional)

Optical Switch:
1+1 facility protection (optional)

DWDM Uplink Characteristics

Optical Interface:
Dual CFP2-DCO 400G uplinks

Tuneability Range:

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

FEC Support:
oFEC

CFP2-DCO:
Tx power 400G: -8dBm to +3dBm

Rx Sensitivity at High OSNR (>36dB):

- 400G 16QAM: -20dBm
- 300G 8QAM: -23dBm
- 200G QPSK: -28dBm
- 100G DEQPSK: -31dBm

OSNR Sensitivity:

- 400G 16QAM: 24dB
- 300G 8QAM: 20.5dB
- 200G QPSK: 15.7dB
- 100G DEQPSK: 12.9dB

Chromatic Dispersion Tolerance:

- 400G: 24,000ps/nm
- 300G: 48,000ps/nm
- 200G: 48,000ps/nm
- 100G: 77,000ps/nm

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)

Non-DWDM Uplink Characteristics

Optical Interface:
Single QSFP-DD FR4/LR4 uplink

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

Management Protocols:
HTTP/HTTPS, CLI over RS-232 or CLI over Telnet/SSH, SNMPv2/3, Syslog, RADIUS, TACACS+, SNTP, TFTP & SFTP, REST, NETCONF

NMS:
PacketLight LightWatch™ NMS, or third party NMS over SNMP

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

Performance Monitoring:

- Optical PM for all optical ports
- OTN PM for uplink and OTU2/2e/4 services
- L1 PM for 10/25/100GbE and 16G/32G FC
- L2 PM for 10/25/100GbE

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 or -44 to -60 VDC, 50/60 Hz, 240W max

PSU Redundancy:
Single/dual feeding, hot swappable

Cooling Unit:
Hot swappable fan unit

Environmental

Operating Temperature:
0ºC to 45ºC (32ºF to 113ºF)

Humidity: 5% to 85% RH

Storage: 85ºC

Air Flow: Front to back

Physical Dimensions

Size:

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

Weight: 14kg / 30.9lb (max)

Mounting: 19", ETSI and 23"

Encryption

Functionality:

- Full speed, transparent Layer-1 optical encryption for selected services or for the OTUC4/OTUC3/OTUC2/OTUC1 uplink/s
- Supports QKD/PQC

Algorithms:

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

Authentication:
Role-based user/password authentication

Certifications:
FIPS 140-3 Level 2

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

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