PL-4000G 4.8T | 12x400G Transponder

Mix of 400GbE and 100GbE over 400G wavelengths for high-capacity ultra-long-haul applications

Features Overview

- Pay-as-you-grow architecture based on standard pluggable coherent optical modules
- Operation modes:
  - 12 x 400GbE transponder
  - 48 x 100GbE transponder
- Supported services: 100GbE, 400GbE
- Supported line FEC:
  - CFEC (OIF-ZR standard)
  - oFEC (OpenROADM/Open ZR+ standards)
  - SD-FEC (FlexO-4e standard)
- Standard MSA pluggable modules:
  - 12 x 400GbE QSFP-DD-DR4/DR4+/FR4/LR8/FR8 clients
  - 48 x 100GbE QSFP-DD-DR4/DR4+/FR4 clients
- Comprehensive line and service performance monitoring
- Integrated EDFA, mux/demux and optical switch (optional)
- Facility protection using an integrated optical switch (optional)
- Remote management with 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

100GbE/400GbE Transponder

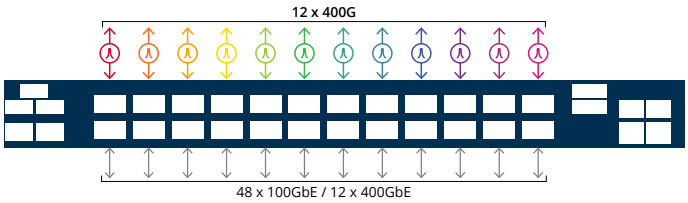
The PL-4000G has twelve 400G uplinks, supporting pluggable optical modules, and delivering up to 4.8T, in long haul and ultra-long haul networks. It is a modular and cost-effective high capacity solution for rolling out 400GbE and 100GbE services, or increasing existing network capacity. PL-4000G integrates mux/demux, EDFA and OSW to deliver the entire optical layer. This flexible solution enables pay-as-you-grow architecture.

Main Benefits

- **Cost-effective high capacity transport mix of 100GbE and 400GbE client services**
- **Up to 12 x 400GbE transponders**
- **Up to 48 x 100GbE transponders**
- **Integrates EDFA, mux/demux and optical switch**
- **Modular and cost-effective for future growth and maintenance**
- **Low power consumption, high density device ports**

Open Interoperability

The device provides full demarcation point between the service and the DWDM network. It is interoperable with any third party switch or router, providing full visibility and performance monitoring of both the optical transport layer and the service interfaces.



PL-4000G Transponder Diagram

Recommended Applications

- Long-haul, and ultra-long-haul networks of up to 4,000 km
- High capacity networks
- 400G links to bolster existing DWDM infrastructure
- Last mile access/aggregation CPE for 100/400GbE managed services

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Technical Specifications

Product Configurations

Transponder:
- Up to 12 x 400GbE
- Up to 48 x 100GbE

Optical Amplifiers: Up to two EDFA modules (optional)

Mux/Demux: 12ch module (optional)

Optical Switch: 1+1 facility protection (optional)

Uplink Characteristics

Line Side Mode:
- 200G/300G/400G OpenROADM
- 200G/300G/400G OpenZR+
- 400G FlexO-4e

Optical Interface:
- QSFP-DD-DCO

Tunability range:
- DWDM ITU-T G.694.1 grid
- C-band, with Flex Grid support

QSFP-DD-DCO OpenROADM:

FEC Support: oFEC, CFEC and SD-FEC

Tx Power:
- **400G ULH:** 1.5dBm to -8.5dBm
- **400G 16QAM:** 1dBm to -9dBm
- **300G 8QAM:** 1dBm to -9dBm
- **200G 8QAM:** 1dBm to -9dBm
- **200G QPSK:** 1dBm to -9dBm
- **100G QPSK:** 1dBm to -9dBm

Rx Sensitivity at High OSNR (>36dB):
- **400G ULH QPSK:** -27dBm
- **400G 16QAM:** -20dB (FlexO - oFEC)
- **300G 8QAM:** -23dBm
- **200G 8QAM:** -28dBm
- **200G QPSK:** -28dBm
- **100G QPSK:** -32dBm

OSNR Sensitivity:
- **400G ULH:** 16.9dB @-12dB
- **400G 16QAM:** 23.5dB @-14dBm
- **300G 8QAM:** 18dB @-16dBm
- **200G 8QAM:** 17.5dB @-16dBm
- **200G QPSK:** 15.7dB @-18dBm
- **100G QPSK:** 12dB @-20dBm

Chromatic Dispersion Tolerance:
- **400G ULH:** 58,000ps/nm
- **400G 16QAM:** 12,000ps/nm
- **300G 8QAM:** 48,000ps/nm
- **200G 8QAM:** 48,000ps/nm
- **200G QPSK:** 48,000ps/nm
- **100G QPSK:** 80,000ps/nm

QSFP-DD-DCO ZR:
- **FEC Support:** CFEC
- **Tx power:** -8dBm
- **Rx power:** 13dBm to -23dBm
- **400G 16QAM CFEC OSNR Tolerance at -12dBm Rx Power:** typical 26dB
- **Rx sensitivity at high OSNR (>36dB):** 400G 16QAM/CFEC -20dBm
- **Chromatic Dispersion Tolerance:** 400G OIF ZR: 2,400ps/nm

Client Characteristics

Service Types:
- 400Gb Ethernet
- 100Gb Ethernet

Optical Interface:
- **400GbE:** QSFP-DD-DR4/FR4/LR8/FR8
- **100GbE:** QSFP-DD-DR4/DR4+/FR4

FEC Support:
- **400GbE:** KP4-FEC RS(544,514)
- **100GbE:** KR4-FEC RS(528,514) or no-FEC

Amplifier

Applications: Booster, pre-amp

Output Power:
- **Booster:** up to 20dBm
- **Pre-amp:** up to 5dBm

Input Power:
- **Booster:** -24dB to +10dBm
- **Pre-amp:** -36dB 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

Management Protocols:
- SNMP v1/v2/v3, HTTP/HTTPS, CLI over RS-232 or over Telnet/SSH, 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), terminal loopback, PRBS, event log, alarms

Performance Monitoring:
- Layer-1/2 PM for 100/400GbE services
- FlexO
- FEC Corrected/Uncorrected errors
- Optical PM for optical ports

Visual Indicators:

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, 560W max

PSU Redundancy:

Single/dual feeding, hot swappable

Cooling Unit:

Hot swappable fan unit

Environmental

Operating Temperature:

-5ºC to 45ºC (+23ºF to +113ºF) operational

Humidity: 5% to 85% RH

Storage: 85ºC

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, 21", 23"

Approvals & Standards
- FIPS 140-3 Level 2 compliant
- CE, FCC, RoHS, REACH
- NEBS ready

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