

# PL-1000R DWDM Raman Amplification Solutions

## Counter-propagating Raman amplifier and hybrid Raman-EDFA

### Features Overview

- Counter-propagating Raman amplifier with optionally embedded booster and preamp EDFAs in 1RU
- Detection of open connectors and/or broken fiber up to few tens of kilometers from the pump module
- High power connector safety switch cover
- Supports the following Raman configurations:
  - Counter-propagating Raman
  - Hybrid Raman-EDFA
- Up to 12dB average gain for G.652 fiber (2-pump)
- Gain flattening optimization based on fiber type and pump power
- Effective noise figure (NF) of -1dB
- 1U footprint with low power consumption
- Dual AC or DC pluggable power supply and pluggable fan unit
- Web-based GUI and SNMP EMS management

### Distributed Raman Amplification

The PL-1000R is designed for distributed Raman amplification applications, cost-effectively extending the optical link power budget and significantly improving OSNR for building long distance DWDM solutions. It provides amplification for a range of optical solutions and incorporates several configurations of Raman amplifier, including counter-propagating and hybrid Raman-EDFA.



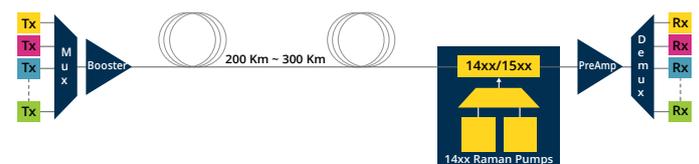
### Main Benefits

- Acts as terminal Raman amplifier and as inline hybrid Raman-EDFA
- Full remote monitoring
- Eye safety feature - automatically shuts down the Raman in case of fiber interruption
- Detects fiber disruption or cut tens of kilometers from the pump
- Integrates with PacketLight management platforms and transponder/muxponder products

### Laser Safety

The PL-1000R is fully managed, configured and monitored remotely as part of the network, via optical supervisory channel (OSC) or Inband (GCC). The Raman is controlled, adjusted and monitored by the user.

The Raman includes three eye safety mechanisms that shut down the unit in case of fiber link disruption, such as open connectors or broken fiber, even at a distance of a few tens of kilometers from the unit.



PL-1000R Raman Amplification Solution

### Recommended applications:

- Long repeaterless links
- Low latency links (less FEC and O-E-O conversion)
- Storage area networks (SANs), remote locations, disaster recovery
- Security-sensitive applications
- Improving OSNR in long-haul and ultra-long haul links
- 400G, 200G and 100G transmission and/or increasing channel count to 96 WDM channels



Low power consumption

1U

1U rack mount



Multi operation modes

## Technical Specifications

### Optical Specifications - Raman

**Wavelength Range:** 1529-1565nm

**Wavelength Range, OSC:** 1500-1520nm

**Input Power Range:** -47dBm to -5dBm

**Gain:** 12dB

**Maximum Pump Power:** 550mW  
(2 pumps)

**Average Gain (G.652 fiber):** 12dB  
(typical for 2 pumps)

**Operating Mode:** Automatic power control (APC)

**Gain Flatness:** +/-0.6dB

**Signal Insertion Loss:** 2.9dB

**Noise Figure:** -1dB

**PDG:** 0.3dB

**PMD:** 0.6psec

**Eye Safety:** Automatic laser power reduction upon fibre cut or disconnection

### Monitored Parameters

- Pump power
- Signal power
- Back-reflected power
- Operating temperature

### Optical Specifications - Booster EDFA

**Output Power:** Up to 23dBm

**Input Power:** -24dBm up to 14.5dBm

**Gain:** 8dB to 22dB

### Optical Specifications - PreAmp EDFA

**Output Power:** Up to 20dBm

**Input Power:** -36dBm up to -7dBm

**Gain:** 20dB

### Network Management

#### Management Ports:

- RJ45 10/100MBase-T
- 2xSFP 100Base-X
- RS-232 serial port
- DB9 alarm port
- 8xSFP 100Base-X MC ports

**Protocols:** SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, TACACS+, SNTp

**Management:** Web browser over HTTP/HTTPS, PacketLight LightWatch™ EMS or third party EMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH

**OAM:** Input/output power monitoring event logger and alarms

**Management Channel:** Optical supervisory channel (OSC)

**Visual Indicators:** LED status indicators for ports, eye safety, power and system

**Software Upgrade:** Dual image, hitless swap

### Power Supply

**AC/DC:** 90 to 246 VAC, 50/60 Hz, -36 to -60 VDC, 60W max

**PSU Redundancy:** Single/dual feeding, hot swappable

**Cooling Unit:** Hot swappable fan unit

### Physical Dimensions

#### 1U:

- 1.77" (H) x 17.32" (W) x 9.05" (D)
- 45mm (H) x 440mm (W) x 230mm (D)

**Weight:** 5.5kg / 12.1lb (max)

**Mounting:** 19", ETSI and 23"

### Environmental

**Operating Temperature:** -5°C to 50°C (+23°F to +122°F) operational

**Humidity:** 5% to 85% RH

### Approvals & Standards

- CE, FCC, RoHS, REACH
- NEBS ready