Optical Networking Solutions for Telcos and Enterprises
Complete Solutions Set for WDM and Dark Fiber Applications

Building agile CWDM/DWDM infrastructure based on the latest technologies providing rich feature set combined with flexible network design to meet the most demanding network needs.

PacketLight’s carrier-class CWDM, DWDM and OTN optical platforms offer the flexibility to build a cost-effective, highly efficient network for enterprises, telcos and managed services providers. PacketLight products are compact highly integrated solutions that meet the challenges faced by operators with simplified plug and play deployment and easy management for transport networks, data centers, storage facilities and enterprise connectivity.

PacketLight’s product portfolio is designed with the following feature set:

Carrier Grade Reliability
PacketLight Networks offers reliable, carrier grade CWDM, DWDM and OTN solutions that ensure access to business and critical data while protecting investment with scalable, pay-as-you grow architecture without service disruption, and carrier class service with guaranteed SLA (Service Level Agreement).

Rich High-end Feature Set
PacketLight’s unique, integrated (1U) architecture is carrier grade feature rich and allows scalability, manageability and ease of use and maintenance to support any WDM infrastructure from simple Point-to-Point networks to carrier class metro access rings and linear add-and-drop networks.

Flexibility and Scalability
PacketLight’s product suite offers multirate Transponders, Muxponders, Optical Amplification, pluggable optics and ROADM to provide unlimited flexibility to build a cost effective, scalable, highly efficient optical network infrastructure for carriers, enterprise campuses and Data Centers.

Compact, Low Power Consumption Solution
PacketLight products present the leading edge in small footprint WDM products. They have the highest port density in 1U footprint, thus decreasing the cost of space and power consumption, the two issues that are the biggest challenges for data centers and central offices.

Operate Your Network With Ease
PacketLight’s NMS/EMS LightWatch and the built-in free web bassed management tools provide remote configuration, performence monitoring, fault management, and ease of administration capabilities that enable a user to quickly adapt to the equipment without complicated education process.

Solutions that Provide Solid Savings
PacketLight’s modular design allows customers true pay-as-you-grow architecture to significantly decrease CAPEX. In addition, simplified operation and remote management eliminate high maintenance cost decreasing the overall OPEX of the organization.
The PL-300 family of products extend PacketLight's optical network solution capabilities by providing a wide range of passive optical modules: Mux/Demux, DCM, OADMs. The PL-300 provides the needed optical layer functions of 4/8/16/44/88 DWDM wavelength Multiplexing, 4/8/16 CWDM wavelength Multiplexing. Supporting both Single Fiber and Dual Fiber infrastructure. All solutions can operate over existing 10G networks and seamlessly grow to 100G network. The PL-1000T is CFP2 ready and can be used as a media converter.

### 100G METRO AND LONG Haul PLATFORMS

PacketLight's product platform PL-1000GM/GT/T is unique 1RU Metro and Long Haul 100G Muxponder/Transponder. The PL-1000GM/GT/T is an OIF standards based 1RU 100G platform that aggregates Multirate Multiprotocol 8G/10G and 40G services such as 10G/40G Eth, 8G/10G FC and OC192/STM64, OTU2/OTU3 in a single 100G OTU4 uplink trunk. PacketLight's 100G solutions offer multirate transport capability and a smooth transition from 10G/40G to 100G client interfaces. OTN Transponder platform

The PL-1000TN is a carrier-class 1U metro CWDM/DWDM platform with a built-in OTN option for transporting 10Gbps of data, voice and storage applications, as well as video over dark fiber and WDM networks. The PL-1000's capabilities, dimensions and competitive cost make it the ideal solution for evolving Metro Ethernet networks, enterprise networks, campus environments, as well as central office connectivity and backbone networks. The PL-1000/1000TN supports up to six 10G services. Each service is configured independently, using PacketLight's user-friendly web-based management tool. Additionally, by stacking multiple PL-1000s, customers can expand up to 88 wavelengths, thus achieving a high level of scalability and low initial investment in a pay-as-you-grow model.

### OTN TRANSPONDER PLATFORM

PacketLight's 1000TE/PL-1000/PL-400 are all-in-one optical transponders, Low Latency, C/DWDM Multirate transponder. The product suite, supporting 8G FC, 10G and 16G FC as well as sub-10G services. PacketLight platforms provide rich feature set, cost effective compact 1U and low power consumption Transponder based solution. They are designed as efficient transport devices and support a full spectrum of sub-10G and 8G/10G and 16G FC services used for data, SAN, Video and TDM networks. All our platforms are CLE equipment ideal for satisfying Data Center and Enterprise Optical Transport Needs.

### MUXPONDER SOLUTIONS

PacketLight’s family Muxponder solutions provide transparent multiplexing of up to 16 multirate/multiprotocol sub-10G services into a single protected 10G OTU2 wavelength or dual independent 10G OTU2 uplinks thus aggregating into a 20G link. With its multiprotocol and multirate support, the 10G OTU2 uplink can aggregate simultaneously SDH/SONET, Eth, Fibre channel and Video services, thus providing a perfect access platform for multiple clients’ needs in an elegant, low latency 1U box. Low cost GbE muxponders of 4xGbE or 10x GbE on to 4G or 10G uplinks.

### RECONFIGURABLE OPTICAL ADD DROP SOLUTIONS

The PL-1000RO offers the ROADM functionality based on the most advanced next generation WSS (wavelength-selective switching) technology. The PL-1000RO is configured dynamically to add/drop selected wavelengths at any node in the network and seamlessly change the network node capacity as needed. In addition, it automatically maintains the equalization and power balance of the added and bypass wavelengths. The PL-1000RO also integrates EDFAs delivering effective long distance DWDM solutions. Colorless, directionless supporting mesh and both 50GHz and 100GHz ITU grids.

### AMPLIFICATION SOLUTIONS

The PL-1000IL is designed to extend the power link budget of DWDM solutions in a cost effective manner. The PL-1000IL provides amplification for a range of optical solutions starting from 4 wavelengths to up to full C-Band and incorporates 6 main types of low-noise EDFAs (Erbium-Doped Fiber Amplifiers) Booster, Inline, Midstage, Pre-Amplifier and RAMAN. PL-1000IL fully integrates with PacketLight’s WDM product line.

### PASSIVE MULTIPLEXING SOLUTIONS

The PL-300 family of products extend PacketLight’s optical network solution capabilities by providing a wide range of passive optical modules: Mux/Demux, DCM, OADMs. The PL-300 provides the needed optical layer functions of 4/8/16/44/88 DWDM wavelength Multiplexing, 4/8/16 CWDM wavelength Multiplexing. Supporting both Single Fiber and Dual Fiber infrastructure.

### LightWatch OSS MANAGEMENT

LightWatch EMS/NMS is a carrier-class element/network management system for network configuration, provisioning, monitoring and management. Fully compliant with TMN standards, the LightWatch system features advanced FCAPS capabilities.

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FEATUE OVERVIEW

Highest 100G density feature set in the market. Compact 1U platform with low power consumption ideal for long haul 100G applications up to 2,000Km.

Various Muxponder configurations for aggregation services into a single Coherent OIF standard base 100G OTU4 Uplink:
- 10 x 10G
- 1x40G + 6x10G
- 2 x 40G + 2x 10G

100G coherent Transponder mode supporting 100GBase-SR10/LR10/LR4/ER4

Supported clients: 10G LAN/WAN, 8G/10G Fibre Channel, STM64/OC-192, OTU2, OTU2e, 40GBase-SR4/LR4, OTU3, OTU3e, 100GBase-SR10, LR10, LR4, ER4

Standards based ITU-T G.709 100G Forward Error Correction (FEC) GFEC

Supports Full C-Band Tunable DWDM Line sides

Comprehensive Line and Service performance Monitoring

Integrated EDFA

Remote management with In-band or Out-band Optical Supervisory Channel

Dual DC feeding and pluggable FAN Unit

Supports standard MSA client pluggable SFP+ (8G/10G), QSFP+ (40G), and CFP (100G)

Operates on both dual or single fiber

100G OTU4 OTN COHERENT MUXPONDER & TRANSPONDER SUPPORTING 8G/10G/40G/100G SERVICES

The PL-1000GT is PacketLight's 100G Multiprotocol Multirate Muxponder/Transponder for high capacity long haul optical transport solutions.

It is ITU-T OIF standard based platform for providing a unified 100G optical transport layer supporting various client services including: 40G/100G LAN, 10G LAN/WAN, STM64/OC-192, OTU2/3/4 and 8G/10G FC over a single coherent 100G OTU4 wavelength.

The PL-1000GT is designed to provide 100G transport solution in modular and cost effective way for building long distance networks. It uses pluggable optical modules on all the client optical interfaces, as well as standard based protocols on both client and line side. It is targeted for meeting the market demands for low power consumption, rack space savings and reduction in the overall solution CAPEX and OPEX by increasing the spectral efficiency of the optical transport solution by a factor of 10.

The PL-100GT resolves the market dilemma of having to choose between 40G and 100G solutions by mapping up to two 40G clients into a 100G uplink. The platform thus allows migration from current to future service requirement (protocols and rates) seamlessly without infrastructure replacement.

The PL-100GT integrates with PacketLight's PL-2000 and PL-1000TN to deliver carrier-grade, high-end OTN network solutions capable of serving multiple applications and protocols of Data, Storage, TDM, ATM and Video networks.

Highly suitable for applications such as:
- Building efficient Long-haul networks up to 2000Km spans
- Increasing the capacity and spectral efficiency of existing 10G/40G long-haul networks
- Implementing backbone for Utility, Oil and Gas and mining industry
- High bandwidth connectivity for data center and cloud computing

LONG HOLE UP TO 2000Km
## TECHNICAL SPECIFICATIONS

### Product Configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>10x10G Muxponder</td>
<td>Up to 10 Multiservice &amp; rate 10G clients mapped each to ODU2 and aggregated to OTU4 100G uplink</td>
</tr>
<tr>
<td>1x40G and 6x10G Muxponder</td>
<td>Up to 6 Multiservice &amp; rate 10G clients mapped each to ODU2 and 40G LAN mapped to ODU3 aggregated to OTU4 100G uplink</td>
</tr>
<tr>
<td>2x40G and 2x10G Muxponder</td>
<td>Up to 2 Multiservice &amp; rate 10G clients mapped each to ODU2 and 2x 40G LAN mapped to ODU3 aggregated to OTU4 100G uplink</td>
</tr>
<tr>
<td>100G Transponder</td>
<td>100GbE LAN to OTU4 100G uplink</td>
</tr>
<tr>
<td>EDFA</td>
<td>Optional EDFA module</td>
</tr>
</tbody>
</table>

### Uplink Interface

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bite Rate</td>
<td>127.157GHz (OTU4v with 20% SD FEC)</td>
</tr>
<tr>
<td>Optical Interface</td>
<td>DWDM OIF standard based coherent</td>
</tr>
<tr>
<td>Tune-ability range</td>
<td>ITU-T G.694.1 Channels 15-60, with 50GHz spacing</td>
</tr>
<tr>
<td>FEC Type Support</td>
<td>Standard ITU-T G.709 GFEC or enhanced HG-FEC</td>
</tr>
<tr>
<td>Optical Reach</td>
<td>2000Km, 40,000ps/nm</td>
</tr>
<tr>
<td>Optical Output Power</td>
<td>0dBm</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>-18dBm, OSNR with SD FEC 14dB</td>
</tr>
<tr>
<td>OTN Overhead</td>
<td>OTU4/ODU4 OH monitoring</td>
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</tbody>
</table>

### Client Interfaces

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service type</td>
<td>10GbE LAN/WAN, 40GbE LAN, 100GbE LAN, 8G/10G FC, STM-64/OC-192, OTU2, OTU2e, OTU2f, OTU3</td>
</tr>
<tr>
<td>Optical Interface</td>
<td>SFP+ : LR(1310nm), SR (850nm), ER (1550nm), ZR (1550nm) CFP/DWDM CFP+ : LR-4 (1310nm), SR-4 (850nm) CFP : LR-4(1310nm), LR-10 (WDM), SR-10 (850nm), ER-4 (1310nm)</td>
</tr>
</tbody>
</table>

### Amplifier

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>Booster, Pre-Amp</td>
</tr>
<tr>
<td>Output Power</td>
<td>Booster: +14dBm, +17dBm, Preamp: +5 dBm</td>
</tr>
<tr>
<td>Input Power</td>
<td>Booster: -24 to +16 dBm, Preamp: -36 to -15 dBm</td>
</tr>
<tr>
<td>Gain</td>
<td>Booster: +10 to +22 dB, Preamp: +18 dB</td>
</tr>
<tr>
<td>Operating Modes</td>
<td>AGC (Automatic Gain Control), APC (Automatic Power Control)</td>
</tr>
<tr>
<td>Eye Safety</td>
<td>Automatic laser power reduction upon fiber cut or disconnection</td>
</tr>
</tbody>
</table>

### Network Management

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Ports</td>
<td>• 1RJ-45 LAN port 10/100Mbase-T • 2x SFP MNG ports 100/100MBase-X • RS-232 Serial port • DB9 External Alarm port • OTN GCC Inband channel</td>
</tr>
<tr>
<td>Protocols</td>
<td>SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNMP, TFTP, FTP</td>
</tr>
<tr>
<td>Management</td>
<td>Web browser over HTTP/HTTPS, LightWatch PacketLight NMS/EMS or 3rd party EMS NMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH</td>
</tr>
<tr>
<td>OAM</td>
<td>Facility Loopback (Client and Line Interfaces), PRBS, ALS Event Logger Alerts</td>
</tr>
<tr>
<td>Performance Monitoring</td>
<td>Layer 1 PM for all Services OTN PM for Uplink Optical Power RX levels for all optical ports</td>
</tr>
<tr>
<td>Visual Indicators</td>
<td>LED status indicators for: client and line ports, Management and LAN ports, amplifier, system Critical/Major/Minor and Power Supply</td>
</tr>
<tr>
<td>Software Upgrade</td>
<td>Traffic Hitless – dual image</td>
</tr>
</tbody>
</table>

### Power Supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>-48VDC, 6A max, Dual feeding</td>
</tr>
<tr>
<td>Cooling Unit</td>
<td>Hot Swappable Fan Unit</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-5°C to 50°C C (+23°C F to+122°F) Operational</td>
</tr>
<tr>
<td>Humidity</td>
<td>5% to 85% RHI</td>
</tr>
</tbody>
</table>

### Physical Dimensions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>1.77&quot; (1 RU) (H) x 17.32&quot;(W) x 9.05&quot;(D) 45 mm (H) x 440mm (W) x 230 mm (D)</td>
</tr>
<tr>
<td>Weight</td>
<td>8Kg / 17.64 lb (Max)</td>
</tr>
<tr>
<td>Mounting</td>
<td>19&quot;, ETSI and 23&quot;</td>
</tr>
</tbody>
</table>

### Approvals & Standards

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvals &amp; Standards</td>
<td>CE, FCC, RoHS, REACH ISO 9000, NEBS Compliant</td>
</tr>
</tbody>
</table>

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![Image of the device](image_url)
FEATURE OVERVIEW

Highest 100G density feature set in the market. Compact 1U platform with low power consumption ideal for CPE (Customer Premises Equipment).

Various Muxponder configurations for aggregation services into a 100G OTU4 DWDM Uplink:
- 10 x 10G
- 1 x 40G + 6 x 10G
- 2 x 40G + 2 x 10G

100G Transponder mode

Supported clients:
10G LAN/WAN, 8G/10G Fibre Channel, STM64/OC-192, OTU2, OTU2e, 40GBase-SR4/LR4, OTU3, OTU3e, 100GBase-SR10

Standards based ITU-T G.709 100G Forward Error Correction (FEC) GFEC

Supports Full C-Band Tunable DWDM Line sides

Comprehensive Line and Service performance Monitoring

Integrated EDFAs, Mux/Demux, DCM

Remote management with In-band or Out-band Optical Supervisory Channel

Dual AC or DC pluggable Power Supply and pluggable FAN Unit

Supports standard MSA pluggable SFP+ (8G/10G client), QSFP+ (40G client), CXP (100G client) and CFP (uplink)

Operates on both dual or single fiber

100G MULTIPROTOCOL MULTIRATE MUXPONDER/TRANSPONDER FOR METRO AND DATA CENTER HIGH CAPACITY SOLUTIONS

The PL-1000GM is PacketLight’s 100G Multiprotocol Multirate Muxponder/Transponder for high capacity optical transport solutions. It is highly integrated platform for providing a unified 100G optical transport layer supporting various client services including protocols: 40G/100G LAN, 10G LAN/WAN, STM64/OC-192, OTU2/3 and 8G/10G FC.

The PL-1000GM is designed to provide 100G transport solution in modular and cost effective way for rolling out services. It uses standards based, pluggable optical modules on all the optical interfaces on both client and line side. It is targeted for meeting the market demands for low power consumption, rack space savings and reduction in the overall solution CAPEX and OPEX by increasing the capacity of enterprise and metro networks.

The PL-1000GM supports a flexible mix of 10G/40G client interfaces for current and future needs aggregating them into a 100G uplink. The platform thus allows migration from current to future service requirement (protocols and rates) without the need to replace the unit.

The PL-1000GM seamlessly integrates with PacketLight’s PL-2000 and PL-1000TN to deliver-carrier, grade high-end 100G solutions capable of serving multiple applications and protocols for Enterprise/Data Center and Metro networks ranging from the Data, Storage, TDM, ATM and Video networks.

The PL-1000GM 1U device supports up to two integrated optical amplifiers, Mux/Demux and DCM providing the smallest, most integrated transport solution of its kind reaching up to 120Km without intermediate sites.

Ideal for Metro networks applications ranging up to 200km such as:
- High capacity enterprise and campus networks
- High bandwidth connectivity for data center and cloud computing
- Last mile access/aggregation CPE for 10/40/100G managed service
- Providing 100G links over existing infrastructure
## TECHNICAL SPECIFICATIONS

### Product Configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10x10G Muxponder</td>
<td>Up to 10 Multiservice &amp; rate 10G clients mapped each to ODU2 and aggregated to OTU4 100G uplink</td>
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<tr>
<td>1x40G and 6x10G Muxponder</td>
<td>Up to 6 Multiservice &amp; rate 10G clients mapped each to ODU2 and 40G LAN mapped to ODU3 aggregated to OTU4 100G uplink</td>
</tr>
<tr>
<td>2x40G and 2x10G Muxponder</td>
<td>Up to 2 Multiservice &amp; rate 10G clients mapped each to ODU2 and 2x 40G LAN mapped to ODU3 aggregated to OTU4 100G uplink</td>
</tr>
<tr>
<td>100G Transponder</td>
<td>100GbE LAN to 100G OTU4 uplink</td>
</tr>
</tbody>
</table>

### Optical Amplifiers

- **DCM**: Optional up to two EDFA modules
- **Mux/DeMux**: Optional 4ch Mux/DeMux module

### Uplink Characteristics

- **Bite Rate**: 112Gb/s
- **Optical Interface**: CFP LR-4 WDM 4 x 28Gb/s OTU4
- **Tune-ability range**: DWDM ITU-T G.694.1 Channels 15-60, with 50GHz spacing
- **OTN Support**: Standard ITU-T G.709 GFEC or enhanced HG-FEC

### Optical Reach

- **25Km**

### Optical Output Power

- **0dBm-2dBm per lane**

### Sensitivity

- **-10dBm, 19dB OSNR**

### Optical Monitoring

- **Tx and Rx Power per lane**

### Client Interfaces Characteristics

- **Service type**: 10GbE LAN/WAN, 40GbE LAN, 100GbE, 8G/10G FC, STM-64/OC-192 OTU2, OTU2e, OTU2f
- **Optical Interface**: SFP+: LR (1310nm), SR (850nm), ER (1550nm), and C/DWDM QSF+: LR-4 (1310nm), SR-4 (850nm), CXF-SR-10 (850nm)

### Amplifier

- **Applications**: Booster, Pre-Amp
- **Output Power**: Booster: +4 to +14 dBm, Preamp: +5 dBm
- **Input Power**: Booster: 0 to +10 dBm, Pre-Amp: -25 to -9 dBm
- **Gain**: Booster: +10 to +22 dB, Preamp: +18 dB
- **Operating Modes**: AGC (Automatic Gain Control), APC (Automatic Power Control)

### Mux/DeMux

- **Channels**: 4 DWDM channels
- **Spacing**: 100GHz
- **Insertion loss**: <4dB end to end

### Network Management

- **Management Ports**: 1RJ-45 LAN port 10/100Mbase-T
  - 2x SFP MNG ports 100/1000Mbase-X
  - RS-232 Serial port
  - DB9 External Alarm port
  - OTN GCC Inband channel
- **Protocols**: SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNTP, TFTP and FTP
- **Management**: Web browser over HTTP/HTTPS, LightWatch PacketLight NMS/EMS, or 3rd party EMS NMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH
- **OAM**: Facility Loopback (Client and Line Interfaces), PRBS, Event Logger, Alarms, ALS
- **Performance Monitoring**: Layer 1 PM for all Services
- **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**: Traffic Hitless – dual image
- **DCM Type**: Tunable DCM or Fixed DCM
- **Fiber Type**: G.652
- **Fiber Span**: 20-100Km
- **Max Insertion loss**: <5dB
- **Standard**: ITU G.671
- **Power Supply**: AC/DC ~100 to ~240 VAC, 36 to -72 VDC, 180W max
- **PSU Redundancy**: Single/Dual feeding, Hot Swappable
- **Cooling Unit**: Hot Swappable Fan Unit
- **Operating Temperature**: -5°C to 50°C (+23°F to+122°F) Operational
- **Humidity**: 5% to 85% RHI
- **Physical Dimensions**: Size 1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D)
  - 45 mm (H) x 440mm (W) x 230 mm (D)
- **Weight**: 7.5Kg / 17.64 lb (Max)
- **Mounting**: 19”, ETSI and 23”
- **Approvals & Standards**: CE, FCC, RoHS, REACH ISO 9000, NEBS Compliant

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FEATURE OVERVIEW

Compact 1U demarcation platform with low power consumption ideal for CPE (Customer Premises Equipment) and Data Center Environment

100G Transponder mode supporting 100GBase-SR10/LR10/LR4/ER4 Client Interface

Standards based ITU-T G.709 100G Forward Error Correction (FEC) GFEC

Supports Full C-Band Tunable DWDM Line sides

Comprehensive Line and Service performance Monitoring

Integrated EDFAs, Mux/Demux, DCM

Remote management with In-band or Out-band Optical Supervisory Channel

Dual AC or DC pluggable Power Supply and pluggable FAN Unit

Supports standard MSA pluggable optics-
- Uplink -CFP
- Client - CFP & CFP2

Operates on both dual or single fiber

Support for 1+1 facility protection

1U, 100G TRANSPONDER PLATFORM FOR METRO AND DATA CENTER HIGH CAPACITY SOLUTIONS

The PL-1000T is PacketLight’s 100G Transponder for high capacity optical transport solutions.

It is highly integrated platform for providing a unified 100G optical transport layer- supporting various 100G client services including LR4/ER4/LR10 and SR10 and seamlessly interface with any third party equipment..

The PL-1000T provides 100G transport solution in modular and cost effective way for rolling out 100G services. It uses standards based, pluggable optical modules on all optical interfaces on both client and line side. It is designed for meeting the market demands for low power consumption and rack space savings thus reducing the overall solution CAPEX and OPEX and increasing the capacity of enterprise and metro networks.

The PL-1000T 1U device supports up to two integrated optical amplifiers, Mux/Demux and DCM providing the smallest, most integrated transport solution of its kind reaching up to 120Km/34dB without intermediate sites.

PL-1000T is ideal for the following applications:
- High capacity enterprise and campus networks ranging up to 200km
- Acting as a media convertor between the different 100G optical interfaces
- High bandwidth connectivity for data center and cloud computing
- CPE for 100G managed services
- Providing 100G links over existing infrastructure
### TECHNICAL SPECIFICATIONS

#### Product Configurations

<table>
<thead>
<tr>
<th>Product Configurations</th>
<th>Description</th>
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<tbody>
<tr>
<td>100G Transponder</td>
<td>100GbE LAN to 100G OTU4 uplink</td>
</tr>
<tr>
<td>100G Media convertor</td>
<td>Converting 100GE LAN optical modules</td>
</tr>
<tr>
<td>Optical Amplifiers</td>
<td>Optional up to two EDFA modules</td>
</tr>
<tr>
<td>DCM</td>
<td>Optional tunable or fixed DCM</td>
</tr>
<tr>
<td>Mux/DeMux</td>
<td>Optional 4ch Mux/DeMux module</td>
</tr>
</tbody>
</table>

#### Uplink Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uplink Rate</td>
<td>112Gb/s</td>
</tr>
<tr>
<td>Optical Interface</td>
<td>CFP LR-4 WDM 4 x 28Gb/s OTU4</td>
</tr>
<tr>
<td>Tune-ability range</td>
<td>DWDM ITU-T G.694.1 Channels 15-60, with 50GHz spacing</td>
</tr>
<tr>
<td>OTN Support</td>
<td>Standard ITU-T G.709 GFEC or enhanced HG-FEC</td>
</tr>
<tr>
<td>Optical Reach</td>
<td>25Km</td>
</tr>
<tr>
<td>Optical Output Power</td>
<td>0dBm-2dBm per lane</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>-10dBm, 19dB OSNR</td>
</tr>
<tr>
<td>Optical Monitoring</td>
<td>Tx and Rx Power per lane</td>
</tr>
</tbody>
</table>

#### Client Interfaces Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Interface</td>
<td>CFP: LR-4(1310nm), LR-10 (WDM), SR-10 (850nm), ER-4 (1310nm) CFP2: LR-4 (1310nm)</td>
</tr>
</tbody>
</table>

#### Amplifier

<table>
<thead>
<tr>
<th>Applications</th>
<th>Booster, Pre-Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power</td>
<td>Booster: +4 to +14 dBm Preamp: +5 dBm</td>
</tr>
<tr>
<td>Input Power</td>
<td>Booster: 0 to +10 dBm Pre-Amp: -25 to -9 dBm</td>
</tr>
<tr>
<td>Gain</td>
<td>Booster: +10 to +22 dB Pre-Amp: +18 dB</td>
</tr>
<tr>
<td>Operating Modes</td>
<td>AGC (Automatic Gain Control), APC (Automatic Power Control)</td>
</tr>
</tbody>
</table>

#### Mux/DeMux

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channels</td>
<td>4 DWDM channels</td>
</tr>
<tr>
<td>Spacing</td>
<td>100GHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>&lt;4dB end to end</td>
</tr>
</tbody>
</table>

#### Approvals & Standards

- CE, FCC, RoHS, REACH
- ISO 9000, NEBS Compliant

#### Network Management

<table>
<thead>
<tr>
<th>Management Ports</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Ports</td>
<td>1RU-4S LAN port 10/100Mbase-T</td>
</tr>
<tr>
<td></td>
<td>2x SFP MNG ports 100/1000MBase-X</td>
</tr>
<tr>
<td></td>
<td>RS-232 Serial port</td>
</tr>
<tr>
<td></td>
<td>DB9 External Alarm port</td>
</tr>
<tr>
<td></td>
<td>OTN GCC inband channel</td>
</tr>
</tbody>
</table>

#### Protocols

- SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNT, TFTP and FTP

#### Management

- Web browser over HTTP/HTTPS, LightWatch PacketLight NMS/EMS, or 3rd party EMS NMS over SNMP, CLI over RS-232 or Telnet/SSH
- TL1 over RS-232 or Telnet/SSH

#### Performance Monitoring

- Layer 1 PM for all Services
- OTN PM for Uplink
- 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

- Traffic Hitless – dual image

#### DCM

- DCM Type: Tunable DCM or Fixed DCM
- Fiber Type: G.652
- Fiber Span: 20-100Km
- Max insertion loss: <5dB
- Standard: ITU G.671

#### Power Supply

- AC/DC: ~100 to ~240 VAC, -36 to -72 VDC, 160W max
- PSU Redundancy: Single/Dual feeding, Hot Swappable
- Cooling Unit: Hot Swappable Fan Unit

#### Environmental

- Operating Temperature: -5°C to 50°C (+23°F to +122°F) Operational
- Humidity: 5% to 85% RHI

#### Physical Dimensions

<table>
<thead>
<tr>
<th>Specification</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D) 45 mm (H) x 440mm (W) x 230 mm (D)</td>
</tr>
<tr>
<td>Weight</td>
<td>7.5Kg / 17.64 lb (Max)</td>
</tr>
<tr>
<td>Mounting</td>
<td>19”, ETSI and 23”</td>
</tr>
</tbody>
</table>

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**PRODUCT DESCRIPTION**

The PL-2000, a member of PacketLight’s Muxponder Family, is a perfect solution for simplifying the management and maintenance as well as reducing the overall cost of CWDM/DWDM solution. The PL-2000 significantly lowers the number of wavelengths needed for the CWDM/DWDM network as well as the number of required filters thus reducing the size and cost of EDFA’s and the management complexity of the network.

The PL-2000 provides an efficient and flexible aggregation layer of multiprotocol/multirate sub-10G services into 10G uplink trunk thus reducing the number of wavelengths needed for a sub-10G solution by a factor of 8 on average. Increasing fiber utilization and spectral efficiency of data transport further reduces the solution cost and operation complexity.

With its multiprotocol and multirate support, the 10G OTU2 uplink can aggregate simultaneously SDH/SONET, Eth, Fibre channel and Video services, thus providing a perfect access platform for multiple clients’ needs and allows merging of legacy and new services transparently.

PacketLight’s PL-2000 transparently multiplexes up to 16 client services into a single or dual independent 10G wavelengths, in an elegant, transparent layer-1, ultra low latency mapping to 10G uplink pipe without packet loss and with Enhanced Forward Error Correction (EFEC) suitable for extremely long distance amplified DWDM network.

PL-2000 is fully integrated with PacketLight’s WDM product family. The PL-2000 can be managed by HTTP/HTTPS web browsers, CLI, PacketLight’s EMS or by any 3rd party SNMP system.

This solution fits perfectly:
- Service providers multi service access platform
- Transporting multi-services over long distance optical network
- Upgrading legacy infrastructure with new services
- Building efficient and flexible CWDM/DWDM solutions for Enterprises
- Fast deployment of services over existing OTN Networks

**FEATURE OVERVIEW**

- Increasing the spectral efficiency of CWDM/DWDM networks with user configurable Single or Dual Low Latency 10G Muxponders
- Up to 16 multiprotocol and multirate services aggregation over a single or dual independent 10G wavelengths
- Service type supported are:
  - Fast Ethernet, GbE, 1/2/4G FC/FICON, STM-1/OC-3, STM-4/OC-12, STM-16/OC-48, DVB-ASI, SD-SDI, HD-SDI, and 3G HD-SDI
- Dual standard based Optical Transport Network (OTN) OTU2 Uplinks
- Supporting three Forward Error Correction (FEC) and EFEC types
- 1+1 Facility uplink protection
- Supports both Line and Service performance monitoring
- Optional integrated EDFA and/or MUX/DEMUX modules
- Cost-effective, compact 1U platform with low power consumption ideal for CLE (Customer Located Equipment)
- Remote management with In-band or Out-band Optical Supervisory Channel (OSC)
- Dual AC or DC pluggable Power Supply and pluggable FAN Unit
- Supports standard MSA SFPs (client) and XFPs (uplink) & C-Band Tunable XFPs

**DEMOGRAPHIC**

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## TECHNICAL SPECIFICATIONS

### System
- **Topology**: Point to point or Ring
- **Transport Network Medium**: Access/Metro CWDM/DWDM or Dark Fiber
- **Protection**: 1+1 Facility

### Product Configurations
- **Dual 10G OTU2 Muxponder**: Up to 16 multiservice & rate clients mapped over two independent OTU2 uplinks
- **Single protected 10G OTU2 protected uplink**: Up to 16 multiservice & rate clients mapped over protected OTU2 uplink
- **EDFA**: Optional EDFA module
- **Mux/Demux**: Optional Mux/Demux module

### Amplifier
- **Output Power**: 14, 17, 20 or 23 dBm
- **Input Power**: -36 dBm up to 16 dBm
- **Gain**: 10 dB to 22 dB
- **Operating Modes**: AGC (Automatic Gain Control), APC (Automatic Power Control)
- **Eye Safety**: Automatic laser power reduction upon fiber cut or disconnection

### Mux/Demux
- **Channels**: 2/4/8 CWDM or DWDM Channels
- **Spacing**: 50/100 GHz (for DWDM)

### Muxponder Uplink
- **Bit Rate**: 10.7092G (OTU-2)
- **Optical Interface**: Pluggable XFP transceiver
- **OTN support**:- G.709 GFEC (RS)
- **Muxponder Service**: G.975.1.1.4
- **Muxponder Service**: G.975.1.1.7

### Network Management
- **Ports**: CONTROL, LAN, OSC, External Alarms
- **Protocols**: SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS
- **Management Applications**: Web browser over HTTP/HTTPS, PacketLight EMS or 3rd party EMS over SNMP, CLI over RS-232 or Telnet/SSH
- **OAM**: Facility Loopback, Event Logger, Alarms, Automatic Laser Shutdown (ALS), External Alarms
- **Performance Monitoring**: Intervals of Layer-1 errors, current and previous day errors, Optical power RX/TX levels
- **Inband Management**: Embedded channel in the overhead of the Muxponder uplink signal
- **Visual Indicators**: LED status indicators for optical ports, Critical, Major/Minor alarms, Amplifier, power supply and system
- **Software Upgrade**: Traffic Hitless-dual image

### Management Ports and Physical Interfaces
- **CONTROL**: RS-232, BD-9
- **LAN**: 10/100MBase-T, RJ-45
- **OSC (MNG1 & MNG2)**: 100 Base-FX, SFP
- **Inband Channel**: Based on GCC OTN overhead
- **External Alarms**: 1-input and 1-output, DB-9

### Power Supply
- **AC/DC**: -100 to ~240 VAC, -36 to -72 VDC, 68W max
- **PSU Redundancy**: Single/Dual feeding, Hot Swappable
- **Cooling Unit**: Hot Swappable Fan Unit

### In-Band Channel
- **NT/E1**: Based on GCC OTN overhead

### Environmental
- **Operating Temperature**: -5°C to 50°C (+23°F to +122°F)
- **Humidity**: 5% to 85% RHI

### Physical Dimensions
- **Size**: 1.77”(1 RU) (H) x 17.32”(W) x 9.05”(D)
- **Weight**: 5.5 Kg / 12.1 lb (Max)
- **Mounting**: 19”, ETSI and 23"

### Approvals & Standards
- CE, FCC, RoHS, REACH
- ISO 9000, NEBS Compliant
The PL-1000TN is an advanced, highly integrated 8G/10G OTU2 OTN solution with transport capacity of 60G within compact 1U.

**FEATURE OVERVIEW**

Cost-effective, compact 1U platform with low power consumption ideal for CLE (Customer Located Equipment)

6 independent standard based Multirate OTU2 OTN transponders

Providing full OTN managed layer

Supported clients: 10G LAN/WAN, 8G/10G Fibre Channel, STM64/OC192

Supports G.Sup43 standard mappings

Three Forward Error Correction (FEC) types: GFEC, EFEC and UFEC

Supports Full C-Band Tunable DWDM Line sides

1+1 Facility uplink protection

Comprehensive Line and Service performance monitoring

Optional integrated EDFAs, Mux/Demux and/or Optical Switch modules

Remote management with In-band or Out-band Optical Supervisory Channel (OSC)

Dual AC or DC pluggable Power Supply and pluggable FAN Unit

Supports standard MSA pluggable SFP+ (client) and XFPs (uplink)

Operates on both dual fiber or single fiber solutions

**UP TO 6 MULTIPROTOCOL TRANSPONDERS FOR MAPPING 8G/10G SERVICES OVER OTU2 NETWORKS**

The PL-1000TN is a member of PacketLight’s Optical Transport Network family. It is highly integrated solution for unified transport of different protocols such as 10G LAN/WAN, STM64/OC-192 and 8G/10G FC over common optical transport layer.

The PL-1000TN 1U device supports up to two integrated optical amplifiers and Mux/Demux providing the smallest integrated transport solution of its kind.

The PL-1000TN is designed to meet the market demands for low power consumption, rack space savings and reduction in the overall solution CAPEX and OPEX.

The OTN layer provides two additional key benefits:

1) Easy common management and maintenance of the optical layer infrastructure regardless of the service type.

2) Enhanced Forward Error Correction forming an effective ROADM based solutions.

This solution fits perfectly to the following applications:

- Transporting 8G/10G clients over long distance optical network
- Edge CPE device for end to end managed services over carrier OTN backbone Robust Packet optical network infrastructure
- ROADM based applications as Multirate OTN transponder
- Building efficient CWDM/DWDM solutions for Enterprises
- Reducing the cost of backbone solution by reducing the number of required regenerators
## TECHNICAL SPECIFICATIONS

### System
- **Topology**: Point to point, Ring, Linear Add Drop over Dual or Single Fiber
- **Transport Network Medium**: Access/Metro CWDM, DWDM or Dark Fiber/Long Distance Optical fiber networks/OTN OTU2 Backbone networks

### Protection
- 1 + 1 Facility

### Product Configurations
- **Multirate OTU2 Transponder**
  - Non APS: Up to 6 independent client signals mapped into corresponding OTU2 line protocols
  - APS 1+1: Up to 3 dual independent client signals mapped into corresponding 10G OTU2 line protocols
- **Multirate Transparent Transponder**
  - Non APS: Up to 6 transparent transponders
  - APS: Up to 3 Multirate transparent transponders
- **Multirate Regenerators**
  - Up to 3 Multiservice clients Regenerators
- **EDFA**
  - Up to two EDFA modules
- **Mux/Demux**
  - Up to two Mux/Demux modules
- **Optical Switch**
  - 1+1 APS <50Ms Switch Time Optical Module

### Optical Amplifier
- **Output Power**: 14, 17, 20 or 23dBm
- **Input Power**: -36 dBm up to 16 dBm
- **Gain**: 10 dB to 22 dB
- **Operating Modes**
  - AGC (Automatic Gain Control), APC (Automatic Power Control)
- **Eye Safety**
  - Automatic laser power reduction upon fiber cut or disconnection

### Mux/Demux
- **Channels**: 4/8/16 CWDM or DWDM Channels
- **Spacing**: 50/100GHz (for DWDM)

### Line (Uplink)
- **Protocols**
  - OTU2 (10.709)
  - OTU1e (11.049) as per G.Sup43
  - OTU2e (11.095) as per G.Sup43
  - OTU1f (11.27)
  - OTU2f (11.317)
- **FEC Types**
  - G.709 GFEC (RS)
  - G.975.1 EFEC 1.4
  - G.975.1 UFEC 1.7
- **Optical Interface**
  - Up to 6 Pluggable XFP transceiver
  - DWDM, Tunable DWDM
  - CWDM

### Client Service
- **Client Protocols**
  - 10GBE LAN/WAN (10.312/9.953)
  - 8G/10G FC (8.5G/10.518)
  - STM64/OC192 (9.953)
- **Optical Interface**
  - Up to 6 Pluggable SFP+ transceiver
  - 850nm Multi Mode
  - 1310nm Single Mode

### Network Management
- **Ports**: CONTROL, LAN, OSC, External Alarms
- **Protocols**: SNMP, FTP, HTTP/HTTPS, Telnet/SSH
- **Management Applications**: Web browser over HTTP/HTTPS, PacketLight NMS/EMS or 3rd party EMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH
- **OAM**
  - Facility Loopback
  - Event Logger
  - Alarms
  - Automatic Laser Shutdown (ALS)
  - External Alarms
- **Performance Monitoring**
  - Intervals of Layer-1 errors, current and previous day errors
  - Optical power Rx/Tx levels
- **Inband Management**
  - Embedded channel in the overhead of the OTU2 uplink
- **Visual Indicators**
  - LED status indicators for optical ports, Critical/Major/Minor alarms, Amplifier, power supply and system

### Software Upgrade
- Traffic Hitless- dual image

### Management Ports and Physical Interfaces
- **Control**: RS-232, BD-9
- **LAN**: 10/100Baset, RJ-45
- **OSC (MNG1 & MNG2)**: 100 Base-FX, SFP
- **Inband Channel**
  - Based on GCC OTN overhead
- **External Alarms**
  - 1-Input and 1-Output, DB-9

### Power Supply
- **AC/DC**
  - ~90 to ~246 VAC, -36 to -72 VDC, 70W max
- **PSU Redundancy**
  - Single/Dual feeding, Hot Swappable

### Cooling Unit
- **Hot Swappable Fan Unit**

### Environmental
- **Operating Temperature**: -5°C to 55°C (+23°F to +131°F) Operational
- **Humidity**: 5% to 85% RHI

### Physical Dimensions
- **Size**: 1.77”(1 RU) (H) x 17.32”(W) x 9.05”(D)
- **Weight**: 5.5 Kg / 12.1 lb (Max)
- **Mounting**: 19”, ETSI and 23”

### Approvals & Standards
- **CE, FCC, RoHs, REACH**
- **ISO 9000, NEBS Compliant**

### Configuration
- **Licensed Based**: 2,4,6 Transponders
PL-1000TE is Low Latency Multirate and Multi-Protocol transponder providing high capacity optical transport solution for rates from 100M up to 16G in a single 1RU unit

FEATURE OVERVIEW

Multirate and Multi-Protocol 8 transponder configurable from 100Mbps up to 16Gbps in compact 1U chassis

Supports the following client service type-
- Data: 100/1000Base-T/GbE/
- 10G Ethernet
- Storage: 1G/2G/4G/8G/16G FC
- SONET/SDH: STM1/OC3, STM4/OC12, STM16/OC48, STM64/OC192
- CPRI: 614M to 9.8G rates
- Video: SD-SDI, HD-SDI

Low latency connectivity, ideal for Data Center connectivity applications

Remote management and topology discovery of the optical network

Supports the innovative IEEE 802.3 FEC (Forward Correction Code) capability for rates up to 16G FC, increasing the link budget and improving BER performance

Pluggable SFP/SFP+ optics for both service and uplink side allowing maximum flexibility, as well as, ease of maintenance and operation

Supports full C-Band Tunable DWDM Line sides (SFP+)

Optional integrated EDFAs, Mux/Demux and Optical Switch modules

1+1 facility protection for ring and point to point topologies.

Bidirectional performance monitoring for all services

Supports single and dual fiber connections

Dual AC or DC pluggable Power Supply and pluggable FAN Unit

PRODUCT DESCRIPTION

PL-1000TE is an advanced, all-in-one CWDM/DWDM optical transport product supporting up to 8 transponders with flexible mix of industry standard based protocols. It integrates a rich and cost effective feature set in a compact 1U chassis with low power consumption.

The PL-1000TE is designed for CWDM/DWDM solutions that require high throughput, transparent and low latency, data, storage, TDM and Common Public Radio connectivity. By combining a variety of multi-rate services, The PL-1000TE allows maximum flexibility and scalability for fiber optic connectivity. The availability of sub 10G, 10G and 16G flexible services mix in the same product, provides transparent migration capability from sub 10G to 10G services with zero downtime.

PL-1000TE allows easy upgrade or expansion of the required services by simply adding the needed pluggable optical modules (SFPs/SFP+) in the available slots or by stackable solution. This architecture provides true scalability at the minimum possible cost.

The PL-1000TE supports the full spectrum of FC protocol rates: 1Gbps, 2Gbps, 4Gbps, 8Gbps, and 16Gbps. and wide spectrum of Common Public Radio Interface (CPRI) protocol rates. Together with its extremely low latency, low power consumption, small foot print (1U, ETSI) and affordability, The PL-1000TE is the best in class CWDM/DWDM solution for connecting two data centers or back up sites.

The PL-1000TE is designed to support point-to-point, Linear ADM, Ring and Regenerator topologies with facility protection. The PL-1000TE is a highly integrated device incorporating optional Mux/DeMux, EDFAs and an optical switch module, enabling a simple and cost effective upgrade of existing infrastructure with any type of service.

The PL-1000TE is highly suitable for applications such as:
- High capacity low latency, data center connectivity
- Efficient connectivity for campus, ISP and enterprise networks
- Delivery of high bandwidth managed services over dark fiber
- Upgrade of existing WDM networks to support 10GEth and 16G FC services
- CPRI communication between RE and REC
- High throughput Metro Ethernet connectivity
- Solving bottlenecks in fiber exhausted optical networks
## TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topology</strong></td>
<td>Point-to-point, Ring, LinearGradient ADM Regenerator, Dual or Single Fiber</td>
</tr>
<tr>
<td><strong>Transport Network Medium</strong></td>
<td>Metro CWDM, DWDM &amp; Dark Fiber</td>
</tr>
<tr>
<td><strong>Protection</strong></td>
<td>1+1 Facility</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transponder</strong></td>
<td>850/1310nm to C/DWDM, 3R, 2x4/1x8 wavelengths Mux/Demux</td>
</tr>
<tr>
<td><strong>Transponder + Amp</strong></td>
<td>850/1310nm to DWDM, 3R, 2x4/1x8 wavelengths Mux Demux 1/2 EDFA (Booster, Pre-Amp)</td>
</tr>
<tr>
<td><strong>Optical Switch</strong></td>
<td>1+1 Facility Protection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CWDM Link</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wavelength</strong></td>
<td>ITU-T G.694.2 1270-1610nm, 20nm spacing</td>
</tr>
<tr>
<td><strong>OSC</strong></td>
<td>1310nm, 1290nm</td>
</tr>
<tr>
<td><strong>Optical Reach</strong></td>
<td>120Km for 1.25Gbps, 80Km up to 4.25/8/10Gbps, 40Km for 16G FC</td>
</tr>
<tr>
<td><strong>Optical Output Power</strong></td>
<td>0dBm (min) to +5dBm (max)</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>-28dBm APD, -18dBm PIN</td>
</tr>
<tr>
<td><strong>Optical Monitoring</strong></td>
<td>Tx &amp; Rx power</td>
</tr>
<tr>
<td><strong>Link Attenuation</strong></td>
<td>&lt;4dB (Mux + DeMux)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DWDM Link</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wavelength</strong></td>
<td>ITU-T G.694.1 Channels 15-60, 100GHz spacing, optional tunable SFP+ with 50GHz spacing</td>
</tr>
<tr>
<td><strong>OSC</strong></td>
<td>1490nm, 1510nm</td>
</tr>
<tr>
<td><strong>Optical Reach</strong></td>
<td>400Km for 1.25Gbps, 200Km for 2.66Gbps, 80Km for 4.25/8/10Gbps, 40Km for 16G FC</td>
</tr>
<tr>
<td><strong>Optical Output Power</strong></td>
<td>Sub 10G: 0dBm (min) to +4dBm (max) 8/10G: -1dBm (min) to +2dBm (max)</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>Up to 2.66Gbps: -28 dBm APD 4/8/10G: -24dBm APD, -14dBm PIN</td>
</tr>
<tr>
<td><strong>Optical Monitoring</strong></td>
<td>Tx &amp; Rx power</td>
</tr>
<tr>
<td><strong>Link Attenuation</strong></td>
<td>&lt;4dB (Mux + DeMux)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Side</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interface Rates</strong></td>
<td>125Mbps up to 14.025Gbps</td>
</tr>
<tr>
<td><strong>Optical Interface</strong></td>
<td>850nm/1310nm/1550nm</td>
</tr>
<tr>
<td><strong>Optical Services</strong></td>
<td>1G/2G/4G/8G/16G FC, FICON, FE, GbE (LX, SX), STM-16/OC-48, 10G Eth LAN/WAN, 614.4/1228.8/2457.6/3072.0/4915.2/6144.0/9830.4M CPRI</td>
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<tr>
<td><strong>Copper Services</strong></td>
<td>100/1000MBase-T</td>
</tr>
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<table>
<thead>
<tr>
<th>Environmental</th>
<th></th>
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<tbody>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-5° C to 50° C (+23° F to+122° F) Operational</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>5% to 85% RHI</td>
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</table>

<table>
<thead>
<tr>
<th>Amplifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applications</strong></td>
<td>Booster, Pre-Amp</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>Booster: +14dBm, +17dBm, +20dBm, +23dBm Preamp: +5 dBm</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>Booster: -24 to +16 dBm Preamp: -36dBm up to 16dBm-15 dBm</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>Booster: +10dB to +22 dB Preamp: +18 dB</td>
</tr>
<tr>
<td><strong>Operating Modes</strong></td>
<td>AGC (Automatic Gain Control), APC (Automatic Power Control)</td>
</tr>
<tr>
<td><strong>Eye Safety</strong></td>
<td>Automatic laser power reduction upon fiber cut or disconnection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Ports</strong></td>
<td>• 1RJ-45 LAN port 10/100Mbase-T • 2x SFP MNG ports 100/1000MBase-X • RS-232 Serial port • DB9 External Alarm port</td>
</tr>
<tr>
<td><strong>Protocols</strong></td>
<td>SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNTP, TFTP and FTP</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Web browser over HTTP/HTTPS, LightWatch Packetlight NMS/EMS, or 3rd party EMS NMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH</td>
</tr>
<tr>
<td><strong>OAM</strong></td>
<td>Facility Loopback (Client and Line Interfaces), PRBS, Event Logger, Alarms, ALS</td>
</tr>
<tr>
<td><strong>Performance Monitoring</strong></td>
<td>Layer 1 PM for all Services, Optical Power Tx, Rx levels for all optical ports</td>
</tr>
<tr>
<td><strong>Visual Indicators</strong></td>
<td>LED status indicators for: client and line ports, Management and LAN ports, amplifier/s, System Critical/Major/Minor and Power Supply</td>
</tr>
<tr>
<td><strong>Software Upgrade</strong></td>
<td>Traffic Hitless – dual image</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Optical Switch</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topology</strong></td>
<td>Protected point to point</td>
</tr>
<tr>
<td><strong>Switching time</strong></td>
<td>Less than 50ms</td>
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<tr>
<td><strong>Signal WL</strong></td>
<td>C and L band</td>
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<tr>
<td><strong>Max input power</strong></td>
<td>27dBm</td>
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<tr>
<td><strong>Insertion loss</strong></td>
<td>Transmit side 3.8dB Receiver side 1.2dB</td>
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<table>
<thead>
<tr>
<th>Power Supply and Fans</th>
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</thead>
<tbody>
<tr>
<td><strong>AC</strong></td>
<td>90 to 240VAC, 50/60 Hz, 1.5 A max</td>
</tr>
<tr>
<td><strong>DC</strong></td>
<td>-48VDC, 3A max</td>
</tr>
<tr>
<td><strong>PSU Redundancy</strong></td>
<td>Single/Dual feeding, Hot Swappable</td>
</tr>
<tr>
<td><strong>Cooling Unit</strong></td>
<td>Hot Swappable Fan Unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D) 45 mm (H) x 440mm (W) x 230 mm (D)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>5.5Kg / 12.1 lb (Max)</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>19”, ETSI and 23”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals &amp; Standards</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CE, FCC, RoHS, REACH</strong></td>
<td>ISO 9000, NEBS Compliant</td>
</tr>
</tbody>
</table>
Pl-1000
Simplicity and Innovation in 10G Connectivity Solutions

The PL-1000 is a carrier class leading 1U Metro DWDM platform, for transport of 10G Data, Voice and Storage Applications, over dark fiber and WDM networks

FEATURE OVERVIEW

Highly flexible metro DWDM platform for transport of data, storage, and voice applications over dark fiber and C/DWDM networks

Performs bidirectional 3R ensuring error free operation over distance Supports 10G Eth LAN/WAN, OC-192/STM-64, 10G FC in any mix

Cost-effective, compact 1U platform with low power consumption ideal CLE (Customer Located Equipment)

Remote management with dedicated optical supervisory channels Pluggable XFP interface for both service and WDM channels, allowing maximum flexibility as well as ease of maintenance and operation

Support for 10G Tunable XFP’s

Pay-as-you-grow architecture

Supports facility protection

Bidirectional performance monitoring for 10G Eth LAN/WAN, 10G FC and OC-192/STM-64 services

Support for Single fiber and Dual fiber operation

PRODUCT DESCRIPTION

PL-1000 is designed primarily to address the growing needs for high data capacity applications such as IPTV, Triple play and NGN which needs to be transported over existing or new fiber infrastructures.

The PL-1000’s capabilities, dimensions and competitive cost make it the ideal solution for evolving metro Ethernet networks, enterprise networks, campus environments and central office connectivity.

The PL-1000 supports up to 4 high-speed 10G services. Each Service is configured independently, using PacketLight’s user-friendly Web-based management tool. The PL-1000 can be managed by any 3rd party SNMP system or with PacketLight’s EMS.

The PL-1000 is designed to support point-to-point, Linear ADM and ring topologies with Facility protection. The PL-1000 is a highly integrated device, incorporating Mux/DeMux, EDFA and optical switch for both its transponder and regenerator modes, also enabling simple and cost effective upgrade of existing infrastructure to carry 10G services.

The PL-1000 seamlessly integrates with PacketLight’s WDM product family thus enabling a mixture of 10G and sub 10G services over the same fiber and supporting stackable solution operation of up to 40 DWDM wavelengths. All optical transceivers, both on the service side and on the WDM-uplink side, are pluggable and replaceable allowing pay-as-you-grow budget planning and simplified maintenance.

The PL-1000 is highly suitable for applications such as:

- Interconnection of LAN, TDM and SAN over remote metro sites
- High bandwidth managed service over dark fiber
- Simple upgrade of existing CWDM or DWDM networks to support 10G services
- High throughput Metro Ethernet connectivity
- Effective infrastructure for triple play, NGN and DSLAM backhaul
- Efficient central office and local exchange connectivity
### TECHNICAL SPECIFICATIONS

#### System
- **Topology**: Point-to-Point, Ring, Linear ADM
- **Transport Network Medium**: Metro CWDM/DWDM / Dark Fiber
- **Software Upgrade**: Traffic Hitless – dual image
- **Protection**: 1+1 Facility

#### Product Options
- **Transponder**: 850/1310nm to DWDM, 3R, 2/4 wavelengths Mux & Demux
- **Transponder + Booster Amp**: 850/1310nm to DWDM, 3R, 2/4 wavelengths Mux Demux, 1/2 EDFA (Booster, Pre-Amp)
- **Regenerator**: DWDM to DWDM 3R, 4 wavelengths 2 X Mux & 2 X Demux & 2 X EDFA

#### DWDM Link
- **Wavelength**: ITU-T G.694.1 Ch15 - 60, 50GHz/100GHz spacing
- **Optical Supervisory Channel**: 1490nm, 1510nm
- **Optical Reach**: 40, 80, 120, 200Km
- **Optical Power Output**: -1dBm (min) to +2dBm (max)
- **Sensitivity**: -24dBm APD, -14dBm PIN
- **Optical Monitoring**: Tx & Rx power
- **Link Attenuation**: <4dB (Mux + DeMux)

#### Service Side
- **Interface Rates**: 9.95328Gbps up to 10.709255Gbps
- **Optical Interface**: 850nm / 1310nm / DWDM
- **Services**: 10G Eth LAN/WAN, OC-192/STM-64, 10G FC, OTU2 in any mix

#### Optical Switch
- **Topology**: Protected point to point
- **Switching time**: Less than 50ms
- **Signal WL**: C and L band
- **Max input power**: 27dBm
- **Insertion loss**: Transmit side 3.8dB, Receiver side 1.2dB

#### Approvals & Standards
- CE, FCC, RoHS, REACH
- ISO 9000, NEBS Compliant

---

#### Amplifier
- **Applications**: Booster, Pre-Amp
- **Output Power**: 14dBm, 17dBm, 20dBm, 23dBm
- **Input Power**: -36dBm up to 16dBm
- **Gain**: 10dB to 22dB
- **Operating Modes**: AGC (Automatic Gain Control), APC (Automatic Power Control)
- **Eye Safety**: Automatic laser power reduction upon fiber cut or disconnection

#### Network Management
- **Management Ports**: • 1RU-45 LAN port 10/100Mbase-T • 2x SFP MNG ports 100/1000MBase-X • RS-232 Serial port • DB9 External Alarm port
- **Protocols**: SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNTF, TFTP and FTP
- **Management**: Web browser over HTTP/HTTPS, LightWatch PacketLight NMS/EMS, or 3rd party EMS NMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH
- **OAM**: Facility Loopback (Client and Line Interfaces), PRBS, Event Logger, Alarms, ALS
- **Performance Monitoring**: Layer 1 PM for all Services, Optical Power Tx, 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**: Traffic Hitless – dual image

#### Power Supply
- **AC/DC**: 90 to 246VAC, -36 to -72VDC, 78W max
- **PSU Redundancy**: Single/Dual feeding, Hot Swappable
- **Cooling Unit**: Hot Swappable Fan Unit

#### Physical Dimensions
- **Size**: 1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D) 44 mm (H) x 440mm (W) x 230 mm (D)
- **Weight**: 5.5Kg (Max)
- **Mounting**: 19”, ETSI and 23”

#### Environmental
- **Operating Temperature**: -5°C to 50°C (+23°F to+122°F) Operational
- **Humidity**: 5% to 85% RHI
FEATURE OVERVIEW

Supports up to 8 channels of CWDM or DWDM over dark fiber

Supports 1G/2G/4G FC & FICON, ESCON, Fast Ethernet, GbE, STM-1/OC-3, STM-4, OC-12, STM-16/OC-48, OTU1 (OTN), DVB-ASI, SD-SDI, HD-SDI, 3G HD-SDI

Increase fiber utilization using two sets of 4xGbE Muxponders

Low latency connectivity, ideal for trading floor applications

Performs bidirectional 3R ensuring error free operation over distance

Cost-effective, compact 1U platform with low power consumption ideal for CLE (Customer Located Equipment)

Remote management with both optical supervisory channels and in-band management

Pluggable SFP interface for both service and WDM channels, allowing maximum flexibility as well as ease of maintenance and operation

Redundant pluggable PSUs & Fan Unit

Pay-as-you-grow architecture

Supports single and dual fiber connections

Support for 1+1 facility protection

Performance Monitoring for GbE, FC and SONET/SDH services

PRODUCT DESCRIPTION

PL-400 is designed primarily as an efficient C/DWDM transport device, and is typically deployed as a CLE (Customer Located Equipment) in enterprise campus environments and in central offices.

The PL-400 supports up to 8 high-speed services (2Mbps–4.25Gbps). Each service is configured independently using PacketLight’s user-friendly on board Web-based management tool. The PL-400 can be managed by any 3rd party SNMP system or with PacketLight’s EMS.

The PL-400 is designed to support point-to-point, Linear ADM, and ring topologies with facility protection.

The PL-400 is a highly integrated device, incorporating Mux/DeMux and EDFA for both transponder, muxponder and regenerator modes.

The PL-400 seamlessly integrates with PacketLight’s WDM product family thus enabling mixture of low and high bit services over the same fiber and supporting stackable solution operation of up to 40 DWDM, 16 CWDM wavelengths.

All optical transceivers, both on the service side and on the WDM-uplink side, are pluggable and replaceable allowing pay-as-you-grow budget planning and simplified maintenance and full optical performance monitoring of the optical layer.

The PL-400 is highly suitable for applications such as:

- Interconnection of SAN and LAN islands over remote data centers
- High bandwidth managed service over dark fiber
- Low Latency connectivity for trading applications
- Fiber relief for high-capacity multi-tenant buildings and campuses.
- Aggregation of DSLAM and Ethernet switch traffic on a single fiber from access to core
- Video transport over C/DWDM and Dark Fiber
# TECHNICAL SPECIFICATIONS

## System

**Topology**  
Point-to-point, Ring, Linear ADM  
Dual or Single Fiber

**Muxponder**  
2x 4GbE 850/1310nm

**Transport Network Medium**  
Metro CWDM/DWDM / Dark Fiber

**Software Upgrade**  
Traffic Hitless – dual image

**Protection**  
1+1 Facility

## Product Options

**Transponder**  
850/1310nm to C/DWDM, 3R,  
4/8 wavelengths Mux & Demux

**Transponder + Booster Amp**  
850/1310nm to DWDM, 3R,  
4/8 wavelengths Mux Demux,  
1/2 EDFA (Booster, Pre-Amp)

**Regenerator**  
C/DWDM to C/DWDM 3R  
8 wavelengths 2X Mux &  
2X Demux & 2X EDFA

## CWDM Link

**Wavelength**  
ITU-T G.694.2 1270-1610nm  
20nm spacing

**Optical Supervisory Channel**  
1310nm, 1290nm

**Optical Reach**  
120Km for 1.25Gbps,  
80Km up to 4.25Gbps

**Optical Power Output**  
0dBm (min) to +5dBm (max)

**Sensitivity**  
-28dBm APD, -18dBm PIN

**Optical Monitoring**  
Tx & Rx power

**Link Attenuation**  
<4dB (Mux + DeMux)

## DWDM Link

**Wavelength**  
ITU-T G.694.1 Channels 15-60,  
100GHz spacing

**Optical Supervisory Channel**  
1490nm, 1510nm

**Optical Reach**  
400Km for 1.25Gbps, 200Km for  
2.66Gbps, 80Km for 4.25Gbps

**Optical Power Output**  
0dBm (min) to +4dBm (max)

**Sensitivity**  
-28 dBm APD

**Optical Monitoring**  
Tx & Rx power

**Link Attenuation**  
<4dB (Mux + DeMux)

## Service Side

**Interface Rates**  
2Mbps up to 4.25Gbps

**Optical Interface**  
850nm/1310nm C/DWDM

**Optical Services**  
1G/2G/4G FC, FICON, ESCON,  
GBE (LX, SX), STM-1/OC-3, STM-4/  
OC-12, STM-16/OC-48, 2.66G OTN,  
100FX, DVB-ASI, SD-SDI, HD-SDI and  
3G HD-SDI in any mix

**Copper Services**  
10/100/1000MbBase-T, E3/DS3,  
E1/T1

## Amplifier

**Applications**  
Booster, Pre-Amp

**Output Power**  
14dBm, 17dBm, 20dBm, 23dBm

**Input Power**  
-36dBm up to 16dBm

**Gain**  
10dB to 22dB

**Operating Modes**  
AGC (Automatic Gain Control),  
APC (Automatic Power Control)

**Eye Safety**  
Automatic laser power reduction  
upon fiber cut or disconnection

## Network Management

**Management Ports**  
10/100MbBase-T, RJ-45, RS-232, DB9

**Protocols**  
SNMP, HTTP, HTTPS, Telnet, SSU, Syslog,  
RADIUS

**Management**  
Web browser over HTTP/HTTPS, Packet-  
Light EMS or 3rd party EMS over SNMP,  
CLI over RS-232 or CLI over Telnet/SSH

**OAM**  
Loopbacks  
PRBS  
Event Logger  
Alarms  
PM for GbE, FC (based on 8b/10b CV)  
and SONET/SDH (based on B1 CV)

**Management Ch.**  
2x Optical Supervisory Channel (OSC)  
2x In-Band Channels

**Visual Indicators**  
LED status indicators for client ports,  
line interfaces, power and system

**Software Upgrade**  
Traffic Hitless-dual image

## Power Supply

**AC/DC**  
90 to 246VAC, -36 to -72VDC, 68W max

**PSU Redundancy**  
Single/Dual feeding, Hot Swappable

**Cooling Unit**  
Hot Swappable Fan Unit

## Physical Dimensions

**Size**  
1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D)  
45 mm (H) x 440mm (W) x 230 mm (D)

**Weight**  
5.5Kg /12.1lb (Max)

**Mounting**  
19”, ETSI and 23”

## Environmental

**Operating Temperature**  
-5º C to 50º C (+23º F to+122º F)  
Operational

**Humidity**  
5% to 85% RHI

## Approvals & Standards

CE, FCC, RoHS, REACH  
ISO 9000, NEBS Compliant
PL-1000RO Reconfigurable Optical Add-Drop Multiplexer (ROADM)

ROADM based network architecture simplifies configuration and management of complex DWDM network infrastructure. It offers highly flexible wavelength routing capabilities suitable for mesh, ring, linear add/drop, core and edge DWDM network topologies.

PacketLight’s PL-1000RO offers the ROADM functionality based on the most advance next generation WSS (Wavelength Selective Switch) technology.

PacketLight colorless, directionless, contententionless and gridless ROADM architecture that provides high flexibility for mesh and ring networks.

The user configures the PL-1000RO dynamically to add/drop selected wavelengths at any node in the network and seamlessly change the network node capacity as needed. In addition, it automatically maintains the equalization and power balance of the added and bypass wavelengths. The PL-1000RO also integrates optional EDFA for amplifying the wavelengths thus delivering effective long distance DWDM solutions.

PacketLight colorless, directionless ROADM provide high flexibility for mesh and ring networks.

PL-1000RO simplifies network management and reduces operation costs (OPEX) by allowing deployment of new wavelengths remotely. PL-1000RO fully integrates with PacketLight’s WDM product line.

The PL-1000RO can be managed by any third party NMS system or with PacketLight’s EMS.
### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>2 Degree ROADM Parameter</th>
<th>Min</th>
<th>Max</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>10</td>
<td>11</td>
<td>dB</td>
<td>All Ports</td>
</tr>
<tr>
<td>Loss Uniformity</td>
<td>1.5</td>
<td></td>
<td>dB</td>
<td>All Ports</td>
</tr>
<tr>
<td>Channel Range</td>
<td>191.3</td>
<td>196.0</td>
<td>THz</td>
<td>Full C-band, 1529.55 to 1567.13 nm</td>
</tr>
<tr>
<td>Channel Count</td>
<td>48/96</td>
<td>Channels</td>
<td>50/100 GHz spacing ITU Grid (Ch13-CH60)</td>
<td></td>
</tr>
<tr>
<td>PMD</td>
<td>-0.2</td>
<td>0.2</td>
<td>ps/nm</td>
<td>In passband</td>
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<tr>
<td>Switch Speed</td>
<td>0.001</td>
<td>100</td>
<td>ms</td>
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<tr>
<td>VOA Range</td>
<td>0</td>
<td>15</td>
<td>dB</td>
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<th>Max</th>
<th>Units</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>13</td>
<td>14</td>
<td>dB</td>
<td>All Ports</td>
</tr>
<tr>
<td>Loss Uniformity</td>
<td>1.5</td>
<td></td>
<td>dB</td>
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<td>0.001</td>
<td>100</td>
<td>ms</td>
<td></td>
</tr>
<tr>
<td>VOA Range</td>
<td>0</td>
<td>15</td>
<td>dB</td>
<td></td>
</tr>
</tbody>
</table>

### Full C-Band Amplifier

- **Output Power**: 14dBm to 23dBm
- **Input Power**: -36dBm up to +16dBm
- **Gain**: 5dB to 38dB
- **Operating Modes**: AGC (Automatic Gain Control), APC (Automatic Power Control)
- **Eye Safety**: Automatic laser power reduction upon fiber cut or disconnection

### Physical Dimensions

- **Size**: 1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D)
- **Weight**: 8Kg (Max)
- **Mounting**: 19”, ETSI and 23”

### Environmental

- **Operating Temperature**: -5°C to 50°C (+23°F to +122°F) Operational
- **Humidity**: 5% to 85% RHI

### DCM

- **DCM Type**: Tunable DCM or Fixed DCM
- **Fiber Span**: 20-100Km
- **Max insertion loss**: <5dB
- **Standard**: ITU G.671

### Network Management

- **Management Ports**:
  - 2 RJ-45 LAN port 10/100Mbase-T
  - 2x SFP MNG ports 100/1000MBase-X
  - 8x SFP MNG ports 100MBase-X
  - RS-232 Serial port
  - DB9 External Alarm port
- **Management Protocols**: SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS, SNTP, TFTP and FTP
- **Management**: Web browser over HTTP/HTTPS, LightWatch PacketLight NMS/EMS, or 3rd party EMS NMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH
- **Performance Monitoring**: Layer 1 PM for all Wavelengths, OCM for Input and Output directions
- **Visual Indicators**: LED status indicators for: Management and LAN ports, Amplifier/s, System Critical/Major/Minor and Power Supply
- **Software Upgrade**: Traffic Hitless – dual image

### Power Supply

- **AC/DC**: 90 to 246VAC, -36 to -72VDC, 60W max
- **PSU Redundancy**: Single/Dual feeding, Hot Swappable
- **Cooling Unit**: Hot Swappable Fan Unit

### Approvals & Standards

- CE, FCC, RoHS, REACH
- NEBS Compliant, ISO-9001
### FEATURE OVERVIEW

- Supports 4/8/16/32 and 40 wavelength
- Cost effective, compact 1U platform with single or dual DWDM amplifiers
- Offers several EDFA types:
  - Booster,
  - Inline,
  - Pre-Amplifiers,
  - Midstage
  - Raman
- Supports AGC (Automatic Gain Control) and APC (Automatic Power Control) operation modes
- Monitoring on the input and output power and user configurable gain
- Embedded Optical Supervisory Channel for remote management and topology detection
- Dual AC or DC pluggable Power Supply and pluggable FAN Unit
- Supports single and dual fiber operation
- Built-In Eye Safety Mechanism

### PRODUCT DESCRIPTION

The PL-1000IL is designed to extend the power link budget of DWDM solutions in a cost effective manner. The PL-1000IL provides amplification for a range of optical solutions starting from 4 wavelengths to up to 40 wavelengths and incorporates several types of low-noise EDFAs Booster, Inline, Pre-Amplifier, Midstage and Raman.

Depending on the customer requirements, the PL-1000IL can operate in APC or AGC modes. The AGC operation mode enables seamless wavelengths add/drop functionality without interference to the other active channels. In addition, the EDFA gain is controlled, adjusted and monitored by the user. The APC operating mode allows the maintenance of constant output power.

The EDFAs are gain flattened and have low Optical Signal to Noise Ratio (OSNR), thus enabling cascading of several EDFAs to form amplified link over long distance. PL-1000IL is fully integrated with PacketLight’s WDM product family. In addition, PL-1000IL unit are fully managed, configured, and monitored via PacketLight’s user-friendly Web-based management tool, PacketLight’s EMS solution or any third party SNMP based management tool.

PL-1000IL is ideal for applications such as:

- Extending the optical link budget to meet distance and attenuation requirements of DWDM networks
- High throughput Metro Ethernet connectivity over large distances
- Upgrade the optical link budget to support 10G services
- Reducing number of regenerators and sites along fiber
- Overcome old fiber infrastructure high loss
<table>
<thead>
<tr>
<th>System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topology</strong></td>
<td>Point-to-point, Ring, Linear ADM</td>
</tr>
<tr>
<td><strong>Transport Network Medium</strong></td>
<td>Metro DWDM / Dark Fiber</td>
</tr>
<tr>
<td><strong>Software Upgrade</strong></td>
<td>Traffic Hitless – dual image</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Booster</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Power</strong></td>
<td>14dBm, 17dBm, 20dBm, 23dBm</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>-5dBm up to 16dBm</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>10dB to 20dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inline</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Power</strong></td>
<td>Up to 20dBm</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>-24dBm up to 13dBm</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>5dB to 22dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-Amplifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Power</strong></td>
<td>Up to 20dBm</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>-36dBm up to 15dBm</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>18dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Midstage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Power</strong></td>
<td>8dBm per Channel</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>-36dBm up to 15dBm</td>
</tr>
<tr>
<td><strong>Total Output Power</strong></td>
<td>up to 23dBm</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>up to 40dBm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of channels</strong></td>
<td>4, 8, 16, 32, 40</td>
</tr>
<tr>
<td><strong>Gain Flatness</strong></td>
<td>+/- 1dB</td>
</tr>
<tr>
<td><strong>Noise Figure</strong></td>
<td>4-6 dB</td>
</tr>
<tr>
<td><strong>PMD</strong></td>
<td>0.3 ps</td>
</tr>
<tr>
<td><strong>PDL</strong></td>
<td>0.3 dB</td>
</tr>
<tr>
<td><strong>Operating Modes</strong></td>
<td>AGC (Automatic Gain Control), APC (Automatic Power Control)</td>
</tr>
<tr>
<td><strong>Eye Safety</strong></td>
<td>Automatic laser power reduction upon fiber cut or disconnection</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Raman</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wavelength Range</strong></td>
<td>From 1529nm to 1565nm</td>
</tr>
<tr>
<td><strong>Input Power Range</strong></td>
<td>From -40dBm to +5dBm</td>
</tr>
<tr>
<td><strong>Average Gain (G.652 fiber)</strong></td>
<td>10dB with 2 pumps</td>
</tr>
<tr>
<td><strong>Noise Figure</strong></td>
<td>-1 dB at maximum gain</td>
</tr>
<tr>
<td><strong>Input Power</strong></td>
<td>At line port with Raman off</td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td>15 dB with 3 pumps</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>At lower gains NF can reach 0 dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Ports</strong></td>
<td>10/100MBase-T, RJ-45, RS-232, DB9</td>
</tr>
<tr>
<td><strong>Protocols</strong></td>
<td>SNMP, HTTP, HTTPS, Telnet, SSH, Syslog, RADIUS</td>
</tr>
<tr>
<td><strong>Management Web browser over HTTP/HTTPS, PacketLight EMS or 3rd party EMS over SNMP, CLI over RS-232 or CLI over Telnet/SSH</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OAM</strong></td>
<td>Input/Output Power Monitoring Event Logger Alarms</td>
</tr>
<tr>
<td><strong>Management Ch.</strong></td>
<td>2 xOptical Supervisory Channel (OSC)</td>
</tr>
<tr>
<td><strong>Visual Indicators</strong></td>
<td>LED status indicators for EDFA ports, power and system</td>
</tr>
<tr>
<td><strong>Software Upgrade</strong></td>
<td>Traffic Hitless-dual image</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC/DC</strong></td>
<td>90 to 246VAC, -36 to -72VDC, 60W max</td>
</tr>
<tr>
<td><strong>PSU Redundancy</strong></td>
<td>Single/Dual feeding, Hot Swappable</td>
</tr>
<tr>
<td><strong>Cooling Unit</strong></td>
<td>Hot Swappable Fan Unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>1.77&quot; (1 RU) (H) x 17.32&quot;(W) x 9.05&quot;(D)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>45 mm (H) x 440mm (W) x 230 mm (D)</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>5.5Kg /12.1lb (Max)</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>19&quot;, ETSI and 23&quot;</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-5°C to 50°C (+23°F to +122°F)</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>5% to 85% RHI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approvals &amp; Standards</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CE, FCC, RoHS 5/6</strong></td>
<td></td>
</tr>
<tr>
<td><strong>NEBS Compliant</strong></td>
<td></td>
</tr>
</tbody>
</table>
FEATURE OVERVIEW

Maximize fiber utilization & capacity with passive optical solution that is simple to install and maintain

Transparent optical Multiplexing of any DWDM or CWDM optical signal regardless of service type and rate

Support for Single and Dual fiber

Cost effective, compact, 1U, for 4/8/16/32/44/88 WDM Multiplexing solution

Supports a variety of network topologies and addresses add and drop service needs

Provides extended optical reach with dispersion compensation module (DCM)

Seamless operation with all PacketLight’s products to form up to 88 DWDM stackable solution for multiplexing optical services up to 100G each

Supports Full C-band and L-band

Supports 100GHz and 50GHz

PRODUCT DESCRIPTION

The PL-300 family of products extends PacketLight’s optical network solution capabilities by providing a wide range of passive optical modules. The PL-300 provides the needed optical layer functions of 4/8/16/32/44/88 DWDM wavelength Multiplexing, 4/8/16 CWDM wavelength Multiplexing, Optical Dispersion Compensation Module (DCM), Optical Add and Drop (OADMs), splitter and combiners.

The PL-300 interconnects seamlessly with PacketLight’s WDM product family and third party WDM products to form cost effective high capacity DWDM and CWDM solutions. The PL-300 provides low granularity wavelengths, add and drop capabilities and can be used to increase 4G and 10G solution reach.

The PL-300 is PacketLight’s foundation for multi-chassis application architecture. With the PL-300, a customer can start with a low cost solution that meets urgent needs and grow step by step to form a full 40 wavelength solution over a single or dual fiber as demand expands.

PL-300 is highly suitable for applications such as:

• Expansion of existing Fiber capacity with new services
• Building scalable high capacity pay as you grow optical networks
• Convergence of existing networks and new services over existing infrastructure
• Forming low cost fully passive optical solution, transparent to service rate & type
• Extending the optical reach with dispersion compensators
• Building cost effective add and drop networks
### PL-300 CWDM

**Standards**
ITU G.694.2, TU G.671

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Code CWDM</th>
<th># MUX WLs</th>
<th>COM Fiber</th>
<th>MUX 1 [nm]</th>
<th>MUX 2 [nm]</th>
<th>Insertion Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWDM 4ch Mux/Dmux</td>
<td>CWDM-1M-4W-1C-2F</td>
<td>4</td>
<td>Dual Fiber</td>
<td>1471-1513</td>
<td></td>
<td>&lt;4db</td>
</tr>
<tr>
<td>CWDM 8ch Mux/Dmux</td>
<td>CWDM-1M-8W-1C-2F</td>
<td>8</td>
<td>Dual Fiber</td>
<td>1471-1611</td>
<td></td>
<td>&lt;4db</td>
</tr>
<tr>
<td>CWDM 16ch Mux/Dmux</td>
<td>CWDM-1M-16W-1C-2F</td>
<td>16</td>
<td>Dual Fiber</td>
<td>1311-1611</td>
<td></td>
<td>&lt;6db</td>
</tr>
<tr>
<td>2 x CWDM 4ch Mux/Dmux</td>
<td>CWDM-2M-4W-2C-2F</td>
<td>4</td>
<td>Dual Fiber</td>
<td>1471-1531</td>
<td>1471-1531</td>
<td>&lt;4db</td>
</tr>
<tr>
<td>2 x CWDM 8ch Mux/Dmux</td>
<td>CWDM-2M-8W-2C-2F</td>
<td>8</td>
<td>Dual Fiber</td>
<td>1471-1611</td>
<td>1471-1611</td>
<td>&lt;4db</td>
</tr>
<tr>
<td>2 x CWDM 16ch Mux/Dmux</td>
<td>CWDM-2M-16W-2C-2F</td>
<td>16</td>
<td>Dual Fiber</td>
<td>1311-1611</td>
<td>1311-1611</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>Single Fiber CWDM 8ch Mux</td>
<td>CWDM-1M-8W-1C-1F</td>
<td>8</td>
<td>Single</td>
<td>1471-1611</td>
<td></td>
<td>&lt;4db</td>
</tr>
<tr>
<td>Single Fiber CWDM 16ch Mux</td>
<td>CWDM-1M-16W-1C-1F</td>
<td>16</td>
<td>Single</td>
<td>1311-1611</td>
<td>1311-1611</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>2 x Single Fiber CWDM 8ch Mux</td>
<td>CWDM-2M-8W-2C-1F</td>
<td>8</td>
<td>Single</td>
<td>1471-1611</td>
<td>1471-1611</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>2 x Single Fiber CWDM 16ch Mux</td>
<td>CWDM-2M-16W-2C-1F</td>
<td>16</td>
<td>Single</td>
<td>1311-1611</td>
<td>1311-1611</td>
<td>&lt;10db</td>
</tr>
</tbody>
</table>

### PL-300 DWDM C-band

**Standards**
ITU G.694.2, TU G.671

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Code DWDM</th>
<th># MUX WLs</th>
<th>COM Fiber</th>
<th>MUX 1 [nm]</th>
<th>MUX 2 [nm]</th>
<th>Insertion Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWDM 4ch Mux/Dmux</td>
<td>DWDM-1M-4W-1C-2F</td>
<td>4</td>
<td>Dual Fiber</td>
<td>CH28-CH31</td>
<td></td>
<td>&lt;4db</td>
</tr>
<tr>
<td>DWDM 8ch Mux/Dmux</td>
<td>DWDM-1M-8W-1C-2F</td>
<td>8</td>
<td>Dual Fiber</td>
<td>CH28-CH35</td>
<td></td>
<td>&lt;4db</td>
</tr>
<tr>
<td>DWDM 16ch Mux/Dmux</td>
<td>DWDM-1M-16W-1C-2F</td>
<td>16</td>
<td>Dual Fiber</td>
<td>CH20-CH35</td>
<td></td>
<td>&lt;6db</td>
</tr>
<tr>
<td>DWDM 40ch Mux/Dmux</td>
<td>DWDM-1M-40W-1C-2F</td>
<td>40</td>
<td>Dual Fiber</td>
<td>CH20-CH59</td>
<td></td>
<td>&lt;7db</td>
</tr>
<tr>
<td>DWDM 44ch Mux/Dmux</td>
<td>DWDM-2M-44W-1C-2F</td>
<td>44</td>
<td>Dual Fiber</td>
<td>CH17-CH60</td>
<td></td>
<td>&lt;7db</td>
</tr>
<tr>
<td>DWDM 88ch Mux/Dmux</td>
<td>DWDM-1M-88W-1C-2F</td>
<td>88</td>
<td>Dual Fiber</td>
<td>CH17-CH59.5</td>
<td>CH17-CH59.5</td>
<td>&lt;10db</td>
</tr>
<tr>
<td>2 x DWDM 4ch Mux/Dmux</td>
<td>DWDM-2M-4W-2C-2F</td>
<td>4</td>
<td>Dual Fiber</td>
<td>CH28-CH31</td>
<td>CH28-CH31</td>
<td>&lt;4db</td>
</tr>
<tr>
<td>2 x DWDM 8ch Mux/Dmux</td>
<td>DWDM-2M-8W-2C-2F</td>
<td>8</td>
<td>Dual Fiber</td>
<td>CH28-CH35</td>
<td>CH28-CH35</td>
<td>&lt;4db</td>
</tr>
<tr>
<td>2 x DWDM 16ch Mux/Dmux</td>
<td>DWDM-2M-16W-2C-2F</td>
<td>16</td>
<td>Dual Fiber</td>
<td>CH20-CH35</td>
<td>CH20-CH35</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>Single Fiber DWDM 8ch Mux</td>
<td>DWDM-1M-8W-1C-1F</td>
<td>8</td>
<td>Single</td>
<td>CH28-CH35</td>
<td></td>
<td>&lt;5db</td>
</tr>
<tr>
<td>Single Fiber DWDM 16ch Mux</td>
<td>DWDM-1M-16W-1C-1F</td>
<td>16</td>
<td>Single</td>
<td>CH20-CH35</td>
<td></td>
<td>&lt;6db</td>
</tr>
<tr>
<td>Single Fiber DWDM 40ch Mux</td>
<td>DWDM-1M-40W-1C-1F</td>
<td>40</td>
<td>Single</td>
<td>CH20-CH59</td>
<td></td>
<td>&lt;7db</td>
</tr>
<tr>
<td>2 x Single Fiber DWDM 8ch Mux</td>
<td>DWDM-2M-8W-2C-1F</td>
<td>8</td>
<td>Single</td>
<td>CH28-CH35</td>
<td>CH28-CH35</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>2 x Single Fiber DWDM 16ch Mux</td>
<td>DWDM-2M-16W-2C-1F</td>
<td>16</td>
<td>Single</td>
<td>CH20-CH35</td>
<td>CH20-CH35</td>
<td>&lt;6db</td>
</tr>
<tr>
<td>2 x Single Fiber DWDM 8ch Mux Red/Blue</td>
<td>DWDM-2M-16W-1C-1F</td>
<td>16</td>
<td>Single</td>
<td>CH21-CH36</td>
<td>CH45-CH60</td>
<td>&lt;6db</td>
</tr>
</tbody>
</table>

### Add - Drop

<table>
<thead>
<tr>
<th>Single Channel DWDM OADM</th>
<th>Insertion Loss</th>
<th>Express 0.8dB</th>
<th>Add/Drop 1 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Channel DWDM OADM</td>
<td>Insertion Loss</td>
<td>Express 1.3dB</td>
<td>Add/Drop 1.5 db</td>
</tr>
<tr>
<td>Quad Channel DWDM OADM</td>
<td>Insertion Loss</td>
<td>Express 2.5dB</td>
<td>Add/Drop 2.7dB</td>
</tr>
</tbody>
</table>

### DCM

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>G.652</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Span</td>
<td>20km - 200km</td>
</tr>
<tr>
<td>Wavelengths Range</td>
<td>1527nm-1567nm</td>
</tr>
<tr>
<td>Residual Dispersion</td>
<td>&lt; +/- 2%</td>
</tr>
<tr>
<td>Max Insertion Loss</td>
<td>3dB</td>
</tr>
<tr>
<td>PMD</td>
<td>&lt;1.2ps</td>
</tr>
</tbody>
</table>

### Physical Dimensions

| Size | 1.77” (1 RU) (H) x 17.32”(W) x 9.05”(D) |
| Weight | 45 mm (H) x 440mm (W) x 220 mm (D) |
| 3.5Kg (Max) |

### Environmental

- Operating Temperature: -5°C to +65°C (+23°F to +149°F)

### Approvals & Standards

- RoHS, REACH, ETSI
- Meets Telcordia GR-12
- NEBS Compliant, ISO9001

For further configuration options please contact info@packetlight.com
PacketLight LightWatch™ NMS/EMS

Network & Element Management Software for Telcos and Enterprise

PacketLight’s Lightwatch™ is a multi-platform Java-based network element management software. It provides full FCAPS functionality and is compliant with TMN standards.

PacketLight Lightwatch™ can operate on Windows and Linux and MAC OS environments. It is built with client-server architecture that is scalable for growth and fits specially into PacketLight’s pay-as-you-grow offerings.

Lightwatch™ is scalable to 500 network elements and 20 clients, supports MySQL database or Oracle 10g Express™.

NMS Highlights

- Hierarchical topology of the devices in the network
- User Account management
- Network Fault Management
- Network Inventory Management
- Task scheduling for network operation such as SW Download and Configuration Files upload and download
- Collects and stores Performance Management counters from all network elements
- Multi-Chassis Management
- Service Management Module

Client Server Architecture

LightWatch Dashboard
NMS Functionality

**Topology**
- Allows hierarchical domains in the network
- Provides Automatic network topology discovery
- Allows manual drawing of the connections between nodes
- Support Multi-Chassis display management

**Fault Management**
- Displays history of network Events
- Shows the current Alarms
- Supports Alarm correlation
- Supports Event filtering

**User Management:**
- Provides centralized management of user accounts
- Supports several Types of users with different access privileges:
  - Administrators
  - NetAdmins
  - Technicians
  - Users

**Task Scheduling**
- Supports Download of new SW version into group of network elements
- Supports Upload of Configuration Files from group of network elements
- Support Download of Configuration Files into group of nodes
- Support Download of license files to group of nodes
- Support Upload of log files from group of devices

**Inventory**
- Displays the Inventory of group of network elements
- Compiles with standard ENTITY-MIB (RFC-4133)
- Allows filtering of the network elements according to field values
- Support saving the inventory into CSV file

**Performance Management**
- Collects the PM from all devices in the network
- Displays the history of the 15 minutes and Day PM counters according to defined filter
- Allows export of the PM information to file with CSV format
EMS Functionality

EMS Highlights

• Displays the front panel of a single PacketLight Device
• Full control over network element parameters
• Status of the ports is reflected by the LEDs of the front panel

EMS Configuration

• Supports configuration of the device parameters
• Supports viewing the device status and parameters
• Supports maintenance operation to the node
• Access to the current PM counters of the network element

SMM- Service Management Module

• Automatic discovery of network topology
• Supports A to Z Service Provisioning wizard
• Supports display and highlight of defined service
• Manual and Automatic creation of service routes
• Display of service status and faults
Specifications

Hardware Requirements
• CPU Pentium 4 3.0 GHz or higher
• Minimum 2 GB RAM
• Free 0.5 GB for installation
• DVD Drive
• Color monitor supporting 1024x768 resolution or higher
• Network Interface card: minimum 100Mbps
Note: The above requirements refer to single-user installations managing up to 20 network elements. For larger networks, consult your PacketLight Partner

Software Requirements
For Windows based systems:
• Windows XP SP2 or later
• Windows 7
• Windows 2003/2008

For Unix based system:
• LINUX Red Hat Enterprise 5.2

Scalability
• Network Elements: Up to 500
• Clients: up to 20

Management Protocols
• Between Server to NE: SNMP v2c
• File transfer to/from NEs: TFTP
• Web browser to NE: HTTP/HTTPS
• CLI to NE: Telnet/SSH
• TL1 to NE: Telnet/SSH

Supported Products
• PL-1000, PL-1000E, PL-400, PL-1000TE
• PL-2000, PL-1000EM
• PL-1000TN
• PL-1000GM, PL-1000GT, PL-1000T
• PL-1000IL
• PL-1000RO
PacketLight’s optical network solutions are designed and engineered for smooth installation and uninterrupted service for its life span.

No business or organization can afford downtime in their communication network. PacketLight’s fiber optic professional team is your partner in design, planning, implementation and maintenance of your optical network. We are your consultants in optimization of optical networks in order to meet your business objectives and budgets. We are here to assist you in every step of the way in building reliable, scalable and cost effective optical solutions.

PacketLight Care Center (PLCC)

PLCC’s goals are to deliver exceptional support and consulting services to our customers. PLCC is a state-of-the-art support and engineering team with superior technical capabilities and certified personnel that serves as a backbone for providing professional and quick resolution of problems to ensure success of customer’s mission critical operations. We provide our customers with expert consulting and troubleshooting assistance, online tools, and variety of training programs. In addition, customers can take advantage of PLCC’s tools that monitor and simulate customer networks. PLCC service team provides support on a 24x7x365 model to our customers around the world with the mission critical services when needed.

- Pre-Sales Consulting
- 24x7 Technical Support
- International Training
- Turnkey Project
- Onsite Installation

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PLCC Support Packages

PacketLight PLCC offers three levels of support services that can be suited for any organization and any need.

<table>
<thead>
<tr>
<th>Software Upgrades</th>
<th>Extended Warranty</th>
<th>8 x 5 Phone Support</th>
<th>24 x 7 Phone Support</th>
<th>Spares-NBD Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL-CARE1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PL-CARE2</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PL-CARE3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**PL-CARE1** covers initial warranties for hardware and software for a fixed time period after shipment. The initial hardware warranty applies to repair of faulty PacketLight equipment while the initial software warranty includes new software versions and access to most updated maintenance versions for all PacketLight equipment.

PL-CARE1 covers equipment repairs for a limited period in accordance with the warranty agreement and per PLCC’s RMA guidelines.

**PL-CARE2** package includes all PL-CARE1 features as well as:
- Dedicated call center regarding nonfunctioning or faulty PacketLight products 24x7.

**PL-CARE3** package includes all PL-CARE1 and PL-CARE2 and the following features:
- Including spares that are dispatched from local offices or PacketLight headquarters, within the next business day (NBD).
INDUSTRY LEADING OPTICAL NETWORK MANUFACTURER

Established in 2000, PacketLight Networks offers a suite of leading CWDM and DWDM solutions for transport of data, storage, voice and video applications over dark fiber and WDM networks. Our products feature high quality and reliability along with performance and functionality at affordable prices. Our solutions are distinguished with low power consumption that is ideal for Customer Located Equipment (CLE) allowing maximum flexibility, as well as, ease of maintenance and operations and providing true Pay-as-you-grow architecture.

PacketLight products are represented by partners and resellers all over the world. Our products are deployed by all who are active in meeting the demands for metro ethernet, business continuity, triple play solutions and enterprise data sharing applications including:

- Carriers, service providers, and dark fiber providers
- Insurance and financial institutions
- Defense and other strategic government organizations
- Universities and campuses
- Enterprises and manufacturers
- IT integrators and data center providers
- Utility companies such as railway and power companies

PACKETLIGHT PARTNERS AND MANAGED SERVICES

PacketLight offers a worldwide network of resellers who provide you with a complete set of network services such as:

- Consultancy and network design
- Deployment services
- Managed services

Our partners bring a wealth of experience within the optical networking market and have successfully deployed hundreds of PacketLight solutions throughout the world. These partners offer our clients the benefit of their optical networking expertise by providing consultancy services that enable enterprise businesses to understand how to best implement a fiber based network for their organization.

They also offer deployment services for PacketLight equipment as well as network monitoring services fully managed from their state of the art NOCs. Many partners hold close relationships with local fiber providers and have ability to source out dark fiber for the clients, thus providing a fully end-to-end optical solutions to our customers.