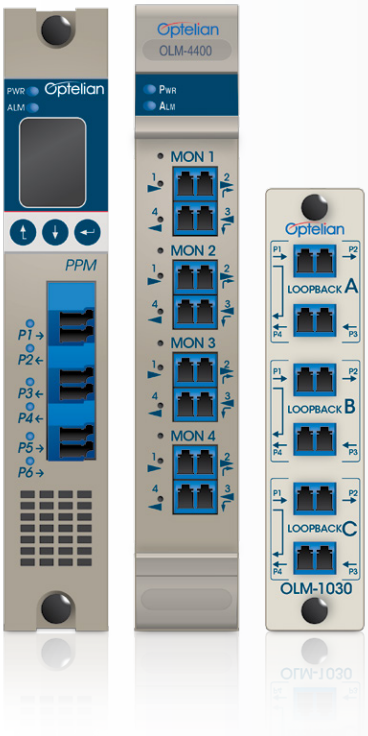
Optelian

LightFLEX




# Monitoring and Protection

## Optical Link Monitor and Path Protection Module

The Optical Link Monitoring and Path Protection solution set provides a high-availability service offering with always-available network lines, and continuous monitoring of client services for fault and degradation conditions. The Path Protection Module (PPM) card is used to implement a protected line service for any desired client service. The Optical Link Monitor (OLM) system provides link monitoring and fault detection capabilities. These enable service providers to maintain high availability, reduce operational cost, and ensure Service Level Aggreements (SLA) are met.

### Implementation

- OLM cards are deployed at central sites and remote service endpoints
- OLM continuously monitors line quality and detects faults
- PPM cards are deployed at service endpoints to map client services onto protected paths
- PPM continuously monitors the primary path and, upon LOS, automatically switches to the secondary path

### Features

- PPM performs service restoration in under 20 ms to maximize availability
- OLM detects and reports fiber degradation, round-trip delay, and service loss
- The solution can be deployed independently or together in the same network
- Monitoring and protection are automated, fully transparent, and protocol independent

The OLM system consists of an OLM-4400 line card and an OLM-1030 passive loopback card. A single OLM-4400 monitors up to four fiber optic links. The system monitors round-trip loss and Tx and Rx power levels. It generates alarms when measured values cross pre-set thresholds, identifying the location of a fault without manual intervention.

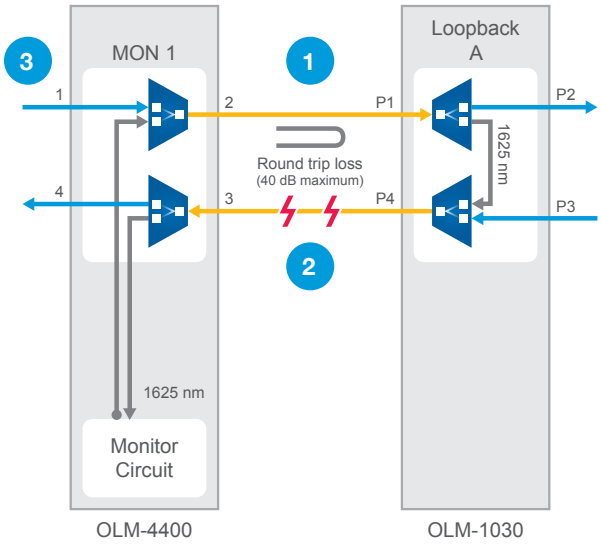
The PPM provides automatic 1+1 facility protection to unprotected service endpoints. PPM automatically switches on provisionable power or signal degrade thresholds. Alarms can be generated or suppressed. Operators set reversion behaviour to be automatic or manually selected, as desired.

The solution is typically deployed in wholesale, mobile backhaul or edgeless service applications where no active demarcation equipment exists. Service issues are detected in real time and isolated. Network operators have the tools to ensure high availability and adherence to SLAs.

# Monitoring and Protection

## Optical Link Monitor

The OLM-4400 is deployed in an OMS shelf at the local side of the line. This active card adds an out-of-band optical monitor wavelength to the customer's CWDM or DWDM transmission signal without interference.
The OLM-1030 is deployed in a passive CMS shelf at the remote end of the line. This passive loopback module allows the customer signal to pass through, and loops the monitor wavelength back to the OLM-4400. The OLM-4400 measures the received optical power of the returned monitor wavelength to calculate the round-trip link loss.




**1 Monitors optical channel**
- Programmable optical power thresholds
- Alarm raised when link loss exceeds threshold
- Pro-active monitoring

**2 Rapidly detects fiber cuts**
- Minimal user configuration required
- Fiber cut raises LOS alarm

**3 Monitors quality of service on fiber loops**
- Alarms raised when power threshold is crossed
- SNMP traps can be sent to the Optelian management interface

## OLM end-to-end system specifications

| Parameter | Value |
|---|---|
| **Input wavelength range** | 1264 nm to 1618 nm |
| **Monitor channel wavelength range** | 1626 nm to 1636 nm |
| **Insertion loss** | 5 dB (maximum) |
| **Link loss ( one direction)** | 20 dB (maximum) |
| **Return loss** | 45 dB (minimum) |

## OLM-4400 specifications

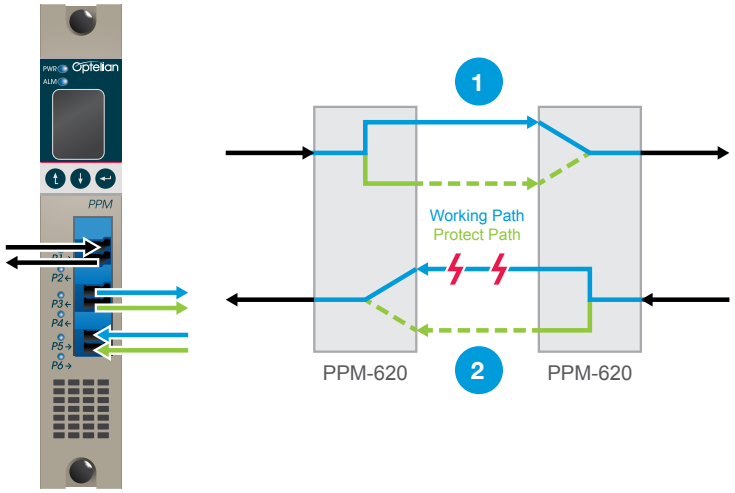
| Parameter | Value |
|---|---|
| **P1 power range** | -27 dBm to 15 dBm |
| **P4 power range** | -27 dBm to 5 dBm |
| **Monitor output power (P2)** | 3 dBm to 5 dBm |
| **Monitor channel isolation** | 40 dB (minimum) |
| **Transmit/receive (P1/P3/P4) monitor accuracy** | ±1.5 dB (maximum) |
| **Power consumption** | 10 W (maximum) |
| **Operating temperature** | -5°C to 55°C (23°F to 131°F) |
| **Relative humidity (non-condensing)** | 5% to 95% |
| **Dimensions (H x W x D)** | 17.5 cm x 3.0 cm x 22.9 cm (6.9 in. x 1.2 in. x 9.0 in.) |
| **Optical connectors** | LC/PC |

## OLM-1030 specifications

| Parameter | Value |
|---|---|
| **Operating temperature** | -40°C to 65°C (-40°F to 150°F) |
| **Relative humidity (non-condensing)** | 5% to 95% |
| **Dimensions (H x W x D)** | 10.2 cm x 2.8 cm x 14.7 cm (4.0 in. x 1.1 in. x 5.8 in.) |
| **Optical connectors** | LC/PC |

## Path Protection Module (PPM)

Optical 1+1 protection is provided by primary and secondary transmit paths. A PPM card is deployed in an active OMS shelf at the originating end of a line, and another PPM card is deployed in an OMS shelf at the destination end of the line. In the receive direction, the optical power levels of the primary and secondary line input ports are continuously monitored. Upon detected loss of the primary (working) path, the card automatically switches to the secondary (protecting) path. When the primary path becomes available, the card will either automatically revert (switch back to primary), or remain on the secondary path until manually set by the user, based on the card configuration chosen by the network operator.




**1 Monitors optical loss**
- Settable Receiver LOS threshold
- Continuous monitoring

**2 Rapidly detects fiber cuts**
- Automatic switch on fiber cut
- Fiber cut raises LOS alarm
- Automatic switch on LOS threshold
- Alarm raised when loss threshold is exceeded

# Monitoring and Protection

## PPM specifications

| Parameter | Value |
|---|---|
| **Operating wavelength** | 1470 nm to 1625 nm<br>1290 nm to 1360 nm |
| **Rx switch** | |
| **Insertion loss (including connectors)** | 2.0 dB (maximum) |
| **Crosstalk** | 55 dB (minimum) |
| **Optical return loss** | 40 dB to 45 dB |
| **Optical switch time** | 9 ms to 14 ms |
| **Repeatability** | -0.1 dB to +0.1 dB |
| **Optical input power** | 14 dBm (maximum) |
| **Settable LOS threshold** | -10 dBm to -30 dBm |
| **Power monitor accuracy** | ±1 dB (typical) |
| **Switch type** | Latching |
| **Tx switch** | |
| **Insertion loss (including connectors)** | 3.1 dB to 4.0 dB |
| **Optical input power** | 24 dBm (maximum) |
| **Return loss** | 55 dB (minimum) |

## PPM Electrical, Mechanical and Environmental Specifications

| Parameter | Value |
|---|---|
| **Operating temperature** | -5ºC to 65ºC (23ºF to 149ºF) |
| **Relative humidity (non-condensing)** | 5% to 85% |
| **Power dissipation** | 3 W (maximum) |
| **DC power supply** | -48 V nominal |
| **Dimensions (H x W x D)** | 17.5 cm x 3 cm x 23.4 cm (6.9 in. x 1.2 in. x 9.2 in.) |

## Ordering Information

| Model number | Part number | Description |
|---|---|---|
| **OLM-4400** | 1015-0400 | Optical link monitor with 4 monitors |
| **OLM-1030** | 1015-0401 | Loopback, 3 CKTS, LGX single-slot, LC |
| **PPM-620** | 1004-2420 | PPM with 50/50 splitter |



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