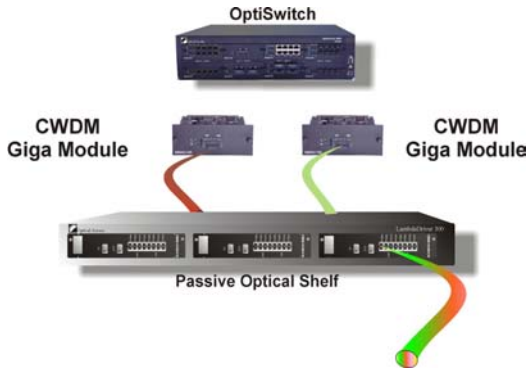
Lambda Driver Passive (LDP) 300

Installation Guide



Standards Compliance

UL 1950; CSA 22.2 No 950; FCC Part 15 Class A; CE-89/336/EEC, 73/23/EEC

FCC Notice

WARNING: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.
It is suggested that the user use only shielded and grounded cables when appropriate to ensure compliance with FCC Rules.

A 'Declaration of Conformity', in accordance with the above standards, has been made and is on file at *MRV ™*.

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Document Number: ML46431 **Document Revision:** Rev. 02 **Release Date:** October 2002

About this Guide

Audience

This guide is intended for the use of network technical stuff that wish to apply and install the Lambda Driver Passive (LDP) 300 optical access shelf. The technician is expected to have working knowledge of:

- Networking
- WDM

This document describes the procedure and the correct process of installing the LDP300 step by step followed by pictures.

Related Documents

MRV maintains a policy of continual improvements to its products even after the Installation Guide is released for publication and distribution. Consequently, the Installation Guide may no longer accurately describe the new features within the product. In such event, an additional document, called Release Notes – which contains information about the product not found in the Installation Guide – is provided. The Release Notes document, therefore, serves as a supplement to the Installation Guide and overrides the Installation Guide in regard to issues on which discrepancies exist between the two.

Organization

This manual is organized into the following:

Safety Requirements – specifies the safety requirements that must be met at all times.

Overview – provides a general introduction to the LDP300.

Required Tools – describes the tools we need for the installation.

Installation steps – shows how to mount, network connect, and hardware configure the LDP300.

Components – describes the different components of the product

Specifications *–Product specification* - *g*ive the general specifications of the LDP300.

Appendix A: Cleaning Optical Connectors – describes a recommended procedure for cleaning optical connectors.

Typographical Conventions

The typographical conventions used in this document are as follows:

Convention	Explanation
CourierBold	This typeface represents information provided by/to the system.
Italics	This typeface is used for emphasis.
ⓘ	This icon represents important information.

Convention	Explanation
	This icon represents risk of personal injury, system damage, or data loss.

Safety Requirements

Caution!

To reduce risk of electrical shock and fire and to maintain proper operation, ensure that the safety requirements stated hereunder are met!

Before Installing

Inspection Ensure by inspection that no part is damaged.

Covers Leave the protective covers (e.g., dust caps on optical connectors, etc.) on the LDP300 modules at all times except when the LDP300 modules are to be installed.

Before Lighting On

Blank Panels Ensure that every vacant slot is covered with a Blank Panel. (This protects the LDP300 against harmful physical intrusion.)

Temperature Operate LDP300 only at a location where the ambient temperature is in the range 0 to 45 ^{o}C (32 to 113 ^{o}F).

Humidity Operate LDP300 only at a location where the ambient humidity is non-condensing and less than 85 %.

Dust Ensure that the site for LDP300 is dust-free. (Less than 1,000,000 particles per cubic meter or 30,000 particles per cubic foot is OK.)

During Operation

Do not connect or disconnect cables during lightning strikes or thunderstorms.

Servicing

Only qualified service personnel must carry out all servicing.

Overview

MRV Optical Ethernet eWDM^{tm} solution is a WDM solution that supports optical networking for high-speed data communication in broadband applications. The WDM optical wavelengths can be configured in point-to-point, ring or hybrid mesh topologies.
The solution is based on a set of up to eight different optics (one for each different "color" or wavelength), OptiSwitch^{tm} Master Giga modules and a set of different Passive Optical components.

MRV's ' Ethernet WDM System currently includes the following components:

- OptiSwitch™ and **OptiSwitch^{tm} Master** Gigabit modules
- **Optical Add/Drop Multiplexer** (CWDM OADMs)
- **Optical Multiplexer/DeMultiplexer** (CWDM MUX/DMUX)
- **LDP300** - Passive Optical Shelf for all-optical chassis.

CWDM Gigabit Modules allow Gigabit Ethernet ports to link with fiber optic networks. The OptiSwitch^{tm} products lines eWDM^{tm} modules are built from integration of the modules with WDM optical technology. This combination adept an electronic data signal to laser light at a specific wavelength ("Color"), creating light at one of sixteen* specific wavelengths and receiving light at that same wavelength. The OptiSwitch™ Master modules allows Gigabit redundancy, security intrusion control, QoS, bandwidth management, routing and more.

CWDM Optical Add/Drop Multiplexer (CWDM OADM) is a scalable, passive optical "add" and "drop" Multiplexer. OADMs are wavelength-specific, and are set to any number of channels from one to 16*. Optional, Using 2 CWDM OADMs at each node in the Ring configuration provides a redundant architecture.

CWDM Optical Multiplexer/DeMultiplexer (CWDM MUX/DMUX) multiplexes and DeMultiplexer four, eight or sixteen* CWDM wavelength channels. This approach enables Linear ADM or point-to-point links to be created.

LDP300 - Passive Optical Shelf chassis is an All-Optics skeleton.
The LDP300 chassis is a one U rack designed for a standard 19-inch rack with a built-in modular architecture that can handle up to three CWDM OADMs or MUX/DMUX (of up to eight wavelengths or one MUX/DMUX of 16 wavelengths plus one up to eight wavelengths OADM/MUX/DMUX).

Required Tools

The section describes the tools we need for the installation.

Mounting bracket installation tools table

Part Number	Description	QTY
42766	Mounting ears for the LDP300 	2
0949	Ears Screw 	4
	Rack Screw + Screw-nut 	4
	Screwdriver 	1 flat tip screwdriver (mm): 0.8 x 4.0 x 100 1 Philips screwdriver (mm): pt x 80 1 Philips screwdriver (mm): 2pt x 100
	Connecting cables 	With OADM: One for each wavelength With MUX/DMUX: Two for each wavelength

Installation steps

The eWDM solution includes the LDP300 passive chassis, CWDM OADM plug-in modules, CWDM Mux/Demux plug-in modules, and CWDM OptiSwitch modules.
You must first install the LDP300 chassis, then the CWDM OADM or/and CWDM Mux/Demux plug-in modules, followed by the OptiSwitch CWDM modules you want to install.
This following procedure describes the correct procedures of installing the eWDM system step by step followed by pictures.

Step 1: Attached the ears to the LDP300

Connect the 4 holes using ears and the 4 screws and connect the earning in both sides of the LDP300 chassis.

Step 2: Mounting the LDP300 shelf on the rack

1. Align the mounting holes in the L brackets with the mounting holes in the equipment rack.
2. Secure the system shelf using four (two per side) rack screws through the elongated holes in the L bracket and into the threaded holes in the mounting post.
3. Use a tape measure and level to ensure that the system shelf is mounted straight and level.

Step 3: Installing the CWDM OADMs or/and Mux/Demux modules

Perform the following steps to install your OADM or/and Mux/Demux plug-in modules:

1. Loosen the captive screws on the blank module faceplate and remove the faceplate.
2. Gently push the module into the system shelf slot.

3. Use the handle ejector to inset the module into its place. This will ensure that you line up the captive screws on the module with the screw holes on the shelf.

4. Tighten the captive screws.

Removing the CWDM OADMs or/and Mux/Demux modules

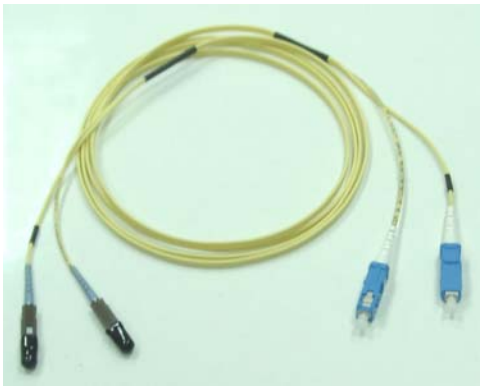
To remove a CWDM OADM or Mux/Demux modules, perform the following steps:

1. Loosen the captive screws of the module using a screwdriver.
2. Gently pull out the module using the handle ejector (push towards the connector)
3. Pull the plug-in module out of the shelf.
4. Replace the blank plug-in module faceplate if you do not intend to install another plug-in module.

Step 4: Connecting cables from the OptiSwitch™ to LDP300 CWDM system.

To connect your OptiSwitch to a module (Mux/DMUX or OADM) in the LDP300, perform the following step:

1. Insert EM2006 CWDM module into the OptiSwitch Master.
2. Clean all fiber-optic connectors on the cabling before inserting them into CWDM Mux/Demux (or OADM) connectors.



Connect the single pair fiber-optic cables from the EM2006 CWDM connectors (Rx/Tx) to the MUX/DMUX (or OADM) module equipment connectors (Rx/Tx)

Components

The chapter describes the different components of the product

Chassis

Function

LDP300 - Passive Optical Shelf chassis is an All-Optics skeleton.
The LDP300 chassis is a one U rack designed for a standard 19-inch rack with a built-in modular architecture that can handle up to three CWDM OADMs or MUX/DMUX (of up to eight wavelengths).

Layout

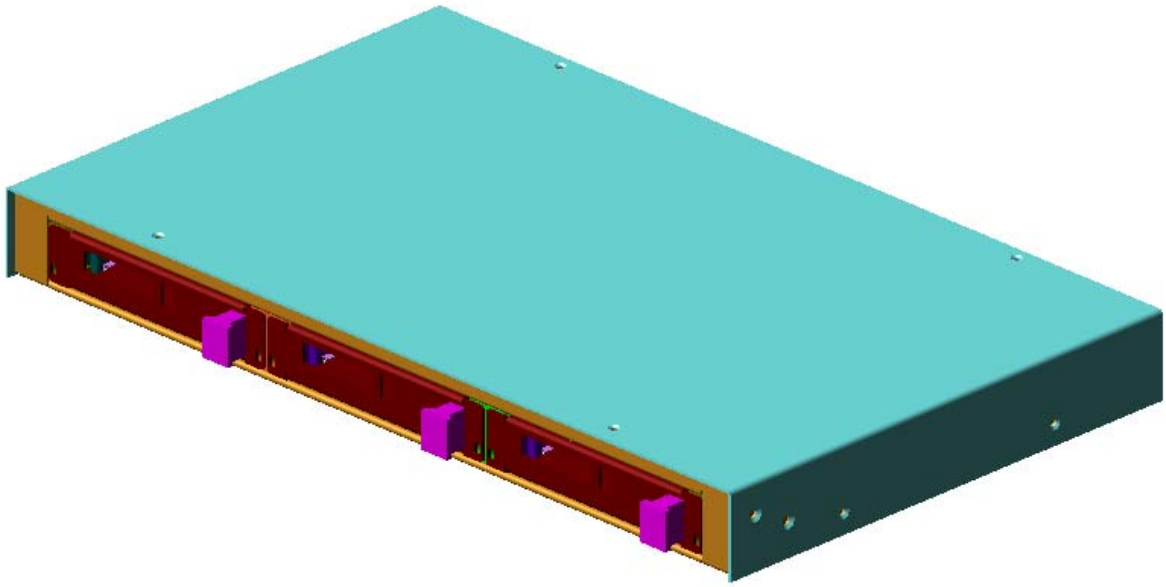


Figure 1: Chassis Layout

Mux Module

Function

Mux module multiplexes the egress channels[1] on the physical fiber.

Layout

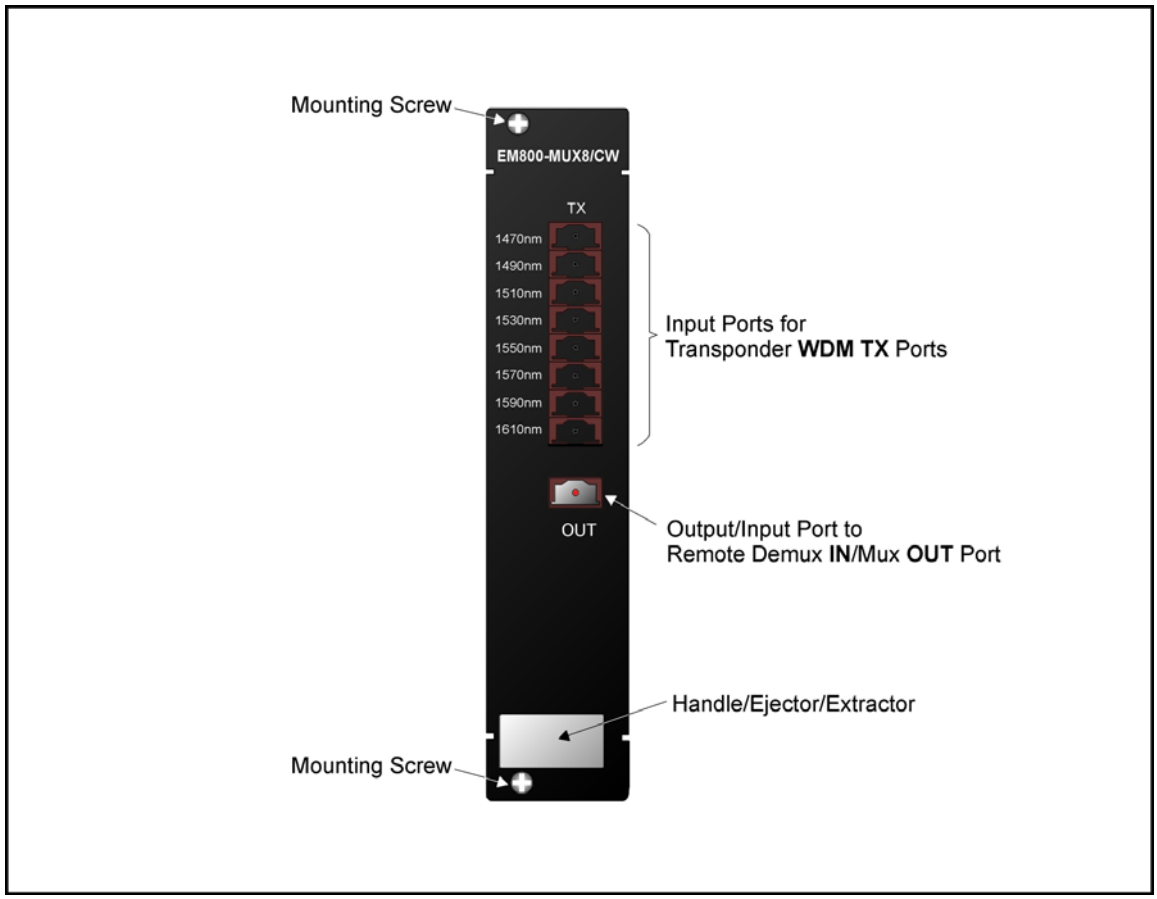


Figure 2: Mux Module Layout

[1] Channels carrying data out of LDP300.

Demux Module

Function

Demux module demultiplexes the ingress channels[2] on the physical fiber.

Layout

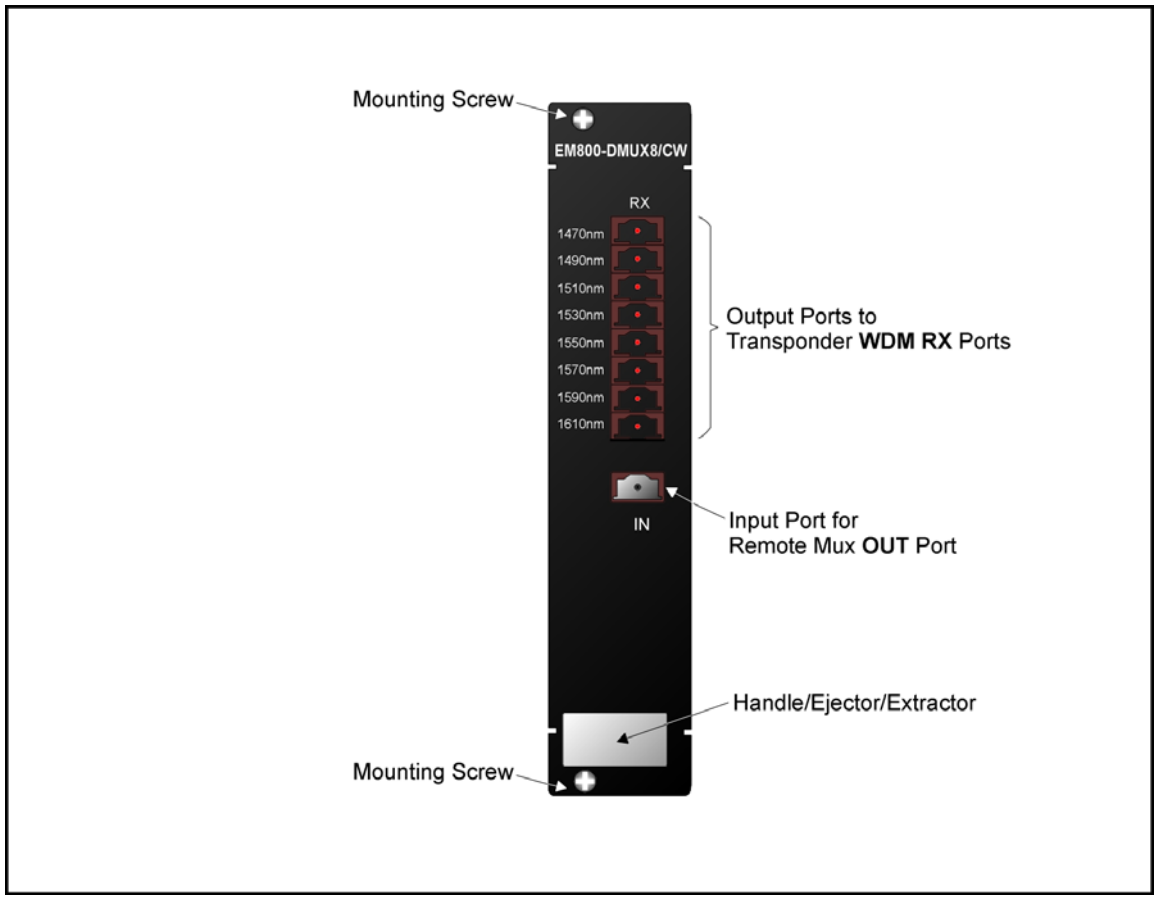


Figure 3: Demux Module Layout

[2] Channels carrying data into LDP300.

OADM Module

Function

Optical Add Drop Multiplexer (OADM) Module is a passive multiplexer that can add and/or drop a specific channel (wavelength) to/from an optical WDM signal, while all other channels are routed from the input to the output with minimal attenuation.

Layout

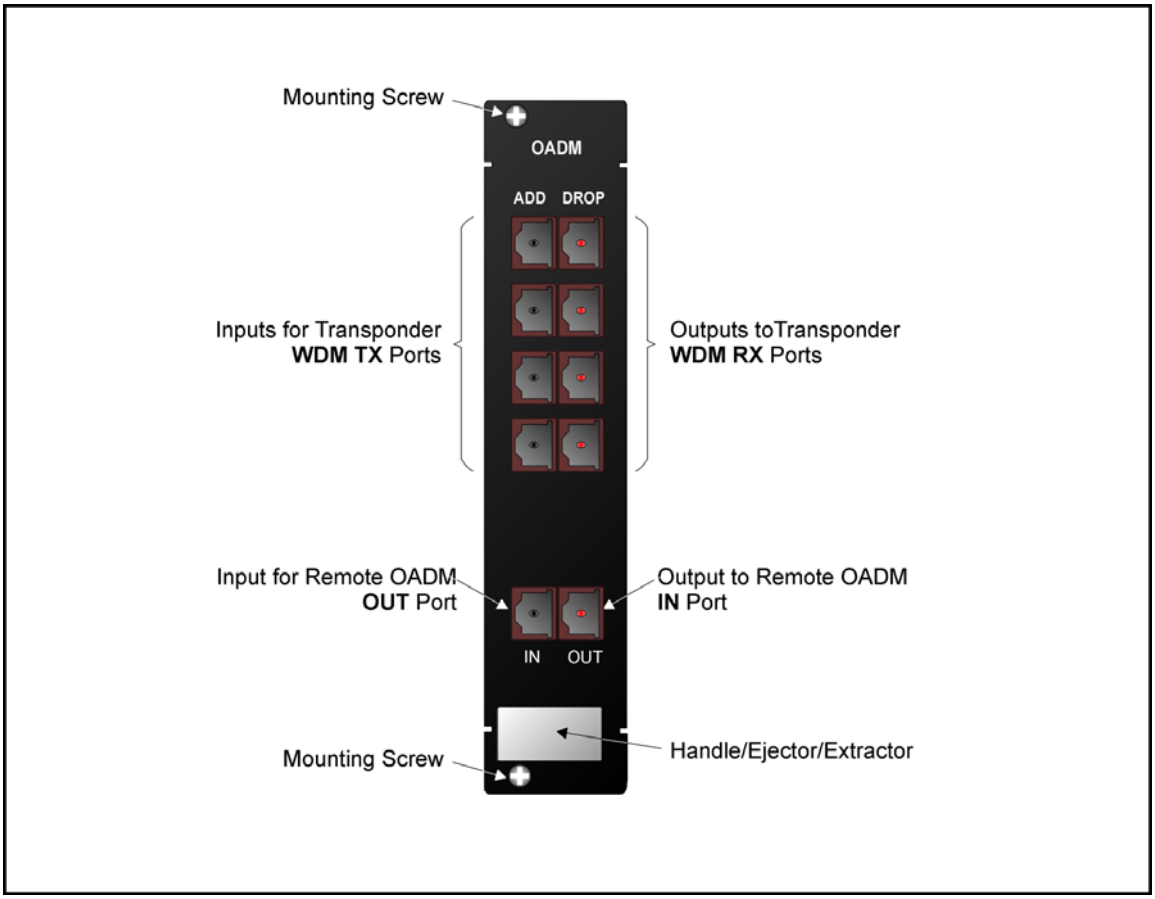


Figure 4: OADM Module Layout

Blank Panel Module

Function

Blank Panel Module covers a vacant slot in the LDP300.

It protects the user as well as the LDP300 installed modules.

Layout

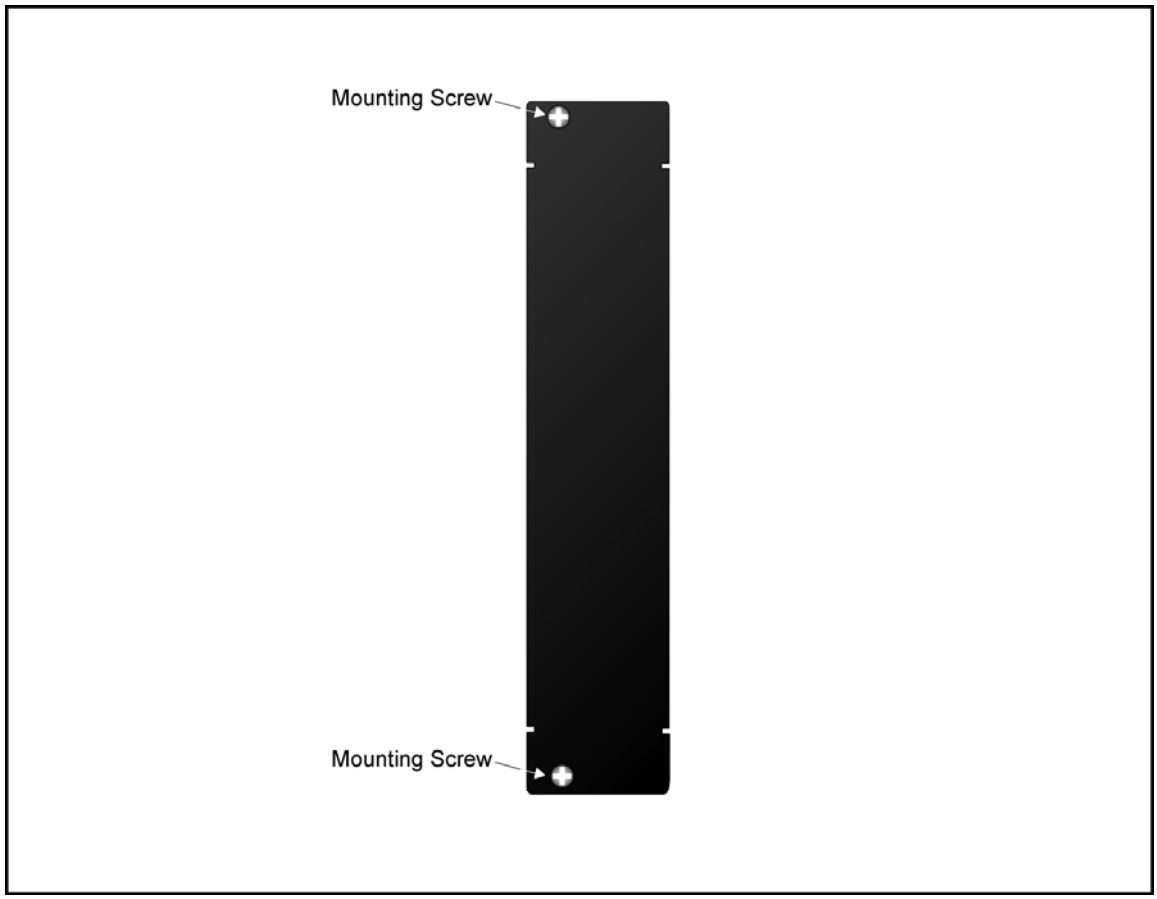


Figure 5: Blank Panel Module Layout

Channels

CWDM

The LDP300 can be configured to support up to 8 CWDM channels (carrier wavelengths). Each channel can carry data at any rate in the range 10 Mbps to 2.7 Gbps. The channels span the wavelength range 1470 to 1610 nm with 20 nm spacing between the wavelengths.

Table 1 shows the wavelengths of the CWDM channels.

Table 1: CWDM Channels and their Wavelengths

Channel	Wavelength (nm)	Channel	Wavelength (nm)
1	1470	5	1550
2	1490	6	1570
3	1510	7	1590
4	1530	8	1610

Specifications

OptiSwitch^{tm} Master Gigabit modules:

Modules Physical Dimension	W x D x H 100.83 x 268.5 x 50.7 mm / 3.9 x 10.5 x 2Inch
EM2006-1GE/CWxx modules	Gigabit Link Module for the OptiSwitch Master Family with CWDM support (xx stand for different wavelengths)
EM2006-GER/CWxx modules	Gigabit Redundant Link Module for the OptiSwitch Master Family with CWDM support

LDP300 - Passive Optical Shelf:

The LDP300, xWDM Passive Optical Shelf, is a standard 19-inch chassis that is one rack unit (RU) in height. The LDP300 has three slots for hosting CWDM OADM modules or Mux/Demux plug-in modules

xWDM OADM Specifications:

Physical Dimensions	Plug-in module size
Environmental Specifications **Operating Temperature** **Storage Temperature**	32° to 140° F (0° to 60° C) -40° to 185°F (-40° to 85°C)
OADM maximum Attenuation (dB)	
Optical Wavelengths **CWDM**	1470 nm; 1490 nm; 1510 nm; 1530 nm; 1550 nm; 1570 nm; 1590 nm; 1610 nm

Type	In-Out loss	In-Drop/Add – Out loss
1 channel OADM	1.3	1.3/1.3
2 channel OADM	2.1	1.3/1.7
3 channel OADM	2.9	1.3/2.1
4 channel OADM	3.7	1.3/2.5

Optical Multiplexer / DeMultiplexer Specifications

Physical Dimensions	Plug-in module size
Environmental Specifications **Operating Temperature** **Storage Temperature**	32° to 140° F (0° to 60° C) -40° to 185°F (-40° to 85°C)
Wavelength Usage	Uni-directional
Multiplexer/ DeMultiplexer Insertion Loss	
Optical Wavelengths **CWDM**	1470 nm; 1490 nm; 1510 nm; 1530 nm; 1550 nm; 1570 nm; 1590 nm; 1610 nm

Type	In-Drop/Add – Out loss
4 channel MUX	1.6
4 channel DMUX	2.1
8 channel MUX	3
8 channel DMUX	3.3

Appendix A: Cleaning Optical Connectors

General

Intrusions (e.g., dust, grease, etc.) at the interface of two optical fibers, such as at a pair of coupled connectors, attenuate the signal through the fiber. Consequently, optical connectors must be cleaned before they are coupled with other connectors.

Tools and Equipment

Following are tools and equipment required for cleaning connectors.

- **Dust caps**
  Caps for protecting the connector from intrusions. A cap is usually made from flexible plastic. When placing a cap over a connector, avoid pressing it against the fiber ferula surface in the connector so as to prevent contamination.
- **Isopropyl alcohol**
  Solvent for contaminants.
- **Tissues**
  Soft multi-layered fabric made from non-recycled cellulose.

Procedure

The procedure for cleaning connectors is as follows:

1. If no stains are present, using a new clean dry tissue, gently rub, in small circular motions, the exposed fiber surface and surrounding area in the connector to remove dust.
2. If stains are present, moisten a new clean dry tissue with isopropyl alcohol and gently rub, in small circular motions, the exposed fiber surface and surrounding area in the connector to remove the stains.
3. Using a new clean *dry* tissue, gently rub, in small circular motions, the exposed fiber surface and surrounding area in the connector to remove the dissolved stains and excess isopropyl alcohol.
4. If a connector is not to be coupled with another immediately, cover it with a dust cap.

Glossary

OA	A device that directly amplifies an optical signal without first converting it into an electrical signal.
OADM	Optical multiplexing device that enables specific wavelengths to be added to or dropped from a WDM link while passing all other wavelengths to the next node on the link.
CWDM	A technology for multiplexing *widely* differing wavelengths on a single optical fiber. The range of wavelengths is typically 1470 to 1610 nm and the gap between the wavelengths is usually integral multiples of 20 nm.
DWDM	A technology for multiplexing *narrowly* spaced wavelengths on a single optical fiber. The wavelengths are in the infrared range, typically about 1550 nm and differ from one another usually by integral multiples of 0.2 to 1.6 nm.

More info

MRV Customers and Partners can obtain support via MRV representative.
For further information, please visit us at: www.mrv.com