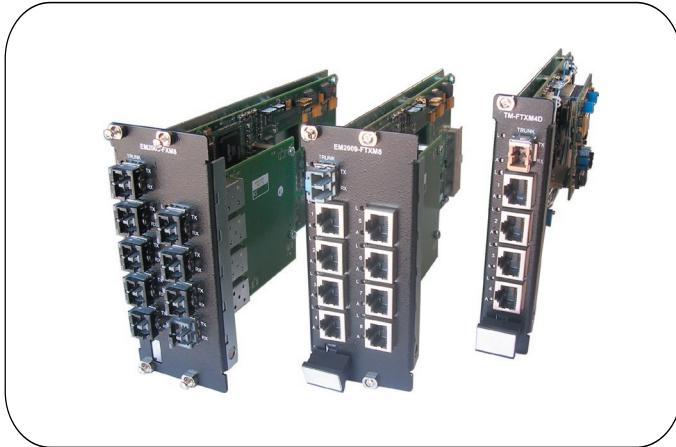


## Datasheet

# 4/8 Fast Ethernet TDM - LambdaDriver® Module (EM2009-FXM/FTXM)



EM2009-FXM/FTXM

### Overview

The LambdaDriver® EM2009-FXM/ EM2009-FTXM modules use an advanced Time Division Multiplexing (TDM) technology for their Fast Ethernet ports, which can interconnect 10 Mbps and 100 Mbps IEEE 802.3 standard networks over a single Full-Duplex fiberoptic trunk. Trunk lengths can range from a couple of kilometers to hundreds of kilometers. Typical applications include:

- 1) Point-to-point interconnection of up to 8 LANs, one per port and fully isolated from one another (unlike with a switching technology), over one or two fibers.
- 2) CWDM/DWDM Ring interconnection using up to 8 FE channels/ services per wavelength while allowing the coexistence of additional services on different wavelengths.

Four 4-port models and four 8-port models are currently available: Each model is identified by two options for the access ports (i.e., SFP or RJ45) and two options for the trunk ports (i.e., SFP or fixed transceiver). A unique feature enables the auto-negotiation function to be

### Features

- 4 or 8 SFP based 100BASE-FX ports
- 4 or 8 copper 10BASE-T or 100BASE-TX ports  
IEEE 802.3 compliant
- Auto MDI/MDIX crossover capability.
- Supports both auto-negotiation systems and legacy systems without auto-negotiation capability.
- Trunk port data rate 2.5Gbps
- Loopback on every port
- Performance monitoring
- Link Integrity Notification
- Support of local/remote loopback tests per port
- SFP Digital Diagnostics monitoring as per SFF-8472
- Front panel status LEDs
- SFP digital diagnostics as per SFF-8472

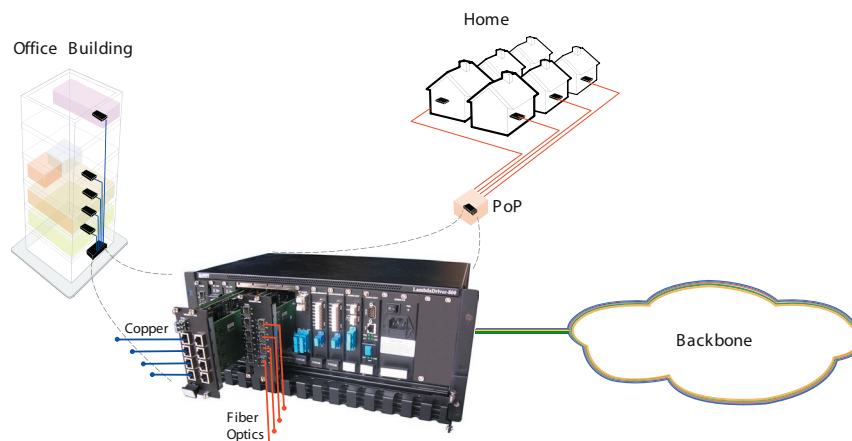
### Applications

- Fully separated Ethernet services aggregation
- Fiber bottleneck relief - 8 times more capacity over the same fiber
- Private LAN's aggregation over one wavelength in MAN WDM networks

applicable across the whole trunk, not just locally. This means that in case a 10 Mbps LAN is connected on one side of the link and a 100 Mbps LAN is connected on the other side of the link, the auto negotiation will work over the whole link to reduce the 100 Mbps speed to 10 Mbps speed on the appropriate side. SFP-based ports support any Fast Ethernet SFP. The 4-port models occupy one slot space. The 8-port models occupy two slot spaces.

The aggregate trunk speed is 2.5 Gbps (even in the 4-port models) so that these modules can use regular OC48 SFPs, providing distances of up to 80 km without power or dispersion compensation. They can also use CWDM/DWDM SFPs to allow higher service aggregation over a single fiber or MMX SFP's for a transport distance of up to 2 km over Multimode fibers.

For distances greater than 80 km, models with a fixed trunk port can be used (instead of SFP based trunk ports) to support distances of up to 400 km (600 km optional) without the need for DCM's (Dispersion Compensation Modules).



The Link Integrity Notification (LIN) functionality is fully supported only in SFP-based models (EM2009-FXM). On all modules (including the EM2009-FTXM), the access ports are disabled when there is no reception on the trunk port.

When combined with the LambdaDriver® Element Management module, full monitoring and configuration capabilities become available locally at a craft terminal via the RS-232 interface and remotely at a TELNET or SNMP station via an Ethernet/Fast Ethernet interface.

MRV's MegaVision Web®-based SNMP management application provides remote control, thus reducing the costly need for many in-field services.

The LambdaDriver® EM2009-FXM/EM2009-FTXM modules fully support Digital Diagnostics provided by the SFPs per Multi-Source Agreement (SFF-8472), including Optical Transmit Power, Optical Receive Power, and Temperature Measurements. Each port possesses the loopback functionality for maintenance purposes. On the aggregation port, a BER counter is provided for improved link performance monitoring.

The modules are hot-swappable and supported by all models of the LambdaDriver chassis.

Technical Specifications	
<b>Connectors</b>	EM2009-FXM8: 8 x FE- SFP on the access side, Trunk – OC48 SFP EM2009-FXM4: 4 x FE- SFP on the access side, Trunk – OC48 SFP EM2009-FTXM8: 8 x RJ48 on the access side, Trunk – OC48 SFP EM2009-FTXM4: 4 x RJ48 on the access side, Trunk – OC48 SFP TM-FXxxx: 2xMu on the Trunk side
<b>Operating Temperature</b>	-5 to 45 °C
<b>Storage Temperature</b>	-10 to 70 °C
<b>Relative Humidity</b>	85% maximum, non-condensing
<b>Dimensions (W x H x D)</b>	Model with 4 ports: 26.93 mm (1.06 in) x 130.7 mm (5.145 in) x 227.5 mm (8.956 in) Model with 8 ports: 54.18 mm ( 2.13 in) x 130.7 mm (5.145 in) x 227.5 mm (8.956 in)
<b>Weight</b>	0.7 kg (1.5 lb)
<b>WDM grid</b>	DWDM: ITU - T- G.694.1 CWDM: ITU - T- G.694.2
<b>Minimum laser power*</b>	+1.5 dBm
<b>Minimum receiver power*</b>	-32 dBm +/- 1 dBm
<b>Dispersion penalty</b>	DL3TYPE : 2dB at 5,400 ps/nm DL4TYPE : 2dB at 6,500 ps/nm DL6TYPE : 2dB at 12,800 ps/nm

\* For SFP based (on trunk) modules, please refer to appropriate SFP datasheet.

Ordering Information	Description
EM2009-FXM4/P	4 FE SFP ports TDM Multiplexer channel card with SFP trunk interface
EM2009-FTXM4/P	4 10/100BaseTX ports TDM Multiplexer channel card with SFP trunk interface
EM2009-FXM8/P	8 FE SFP ports TDM Multiplexer channel card with SFP trunk interface
EM2009-FTXM8/P	8 10/100BaseTX ports TDM Multiplexer channel card with SFP trunk interface
TM-FXM4DL3/xx	4 FE SFP ports TDM Multiplexer channel card with DWDM trunk interface up to 300km
TM-FTXM4DL3/xx	4 10/100BaseTX ports TDM Multiplexer channel card with DWDM trunk interface up to 300km
TM-FXM8DL3/xx	8 FE SFP ports TDM Multiplexer channel card with DWDM trunk interface up to 300km Driver-800, 8 slot Chassis with single DC power supply (48V DC)
TM-FTXM8DL3/xx	8 10/100BaseTX ports TDM Multiplexer channel card with DWDM trunk interface up to 300km
TM-FXM4DL4/xx	4 FE SFP ports TDM Multiplexer channel card with DWDM trunk interface up to 400km
TM-FTXM4DL4/xx	4 10/100BaseTX ports TDM Multiplexer channel card with DWDM trunk interface up to 400km
TM-FXM8DL4/xx	8 FE SFP ports TDM Multiplexer channel card with DWDM trunk interface up to 400km Driver-800, 8 slot Chassis with single DC power supply (48V DC)
TM-FXM8DL4/xx	8 10/100BaseTX ports TDM Multiplexer channel card with DWDM trunk interface up to 400km

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