

## XFP-to-XFP 10-Gigabit Repeaters



### Overview

The Fiber Driver® XFP-to-XFP media modules from MRV Communications combine ultra high-speed protocol support with the flexibility of XFP transceivers that support SONET OC-192, SONET OC-192 with Forward Error Correction (FEC), 10 Gigabit Ethernet, 10 Gbps Fiber Channel, and G.709. The 2XFP modules enable an extremely wide range of optical infrastructure solutions including media conversion, signal repeating, lambda conversion, and Wave Division Multiplexing (WDM).

2XFPs are an economical alternative for enterprise applications. They are also ideal for large telecommunications carriers moving very large amounts of data to distances over 100 kilometers.

2XFPs are compact, hot-swappable, one-slot modules with two XFP interface ports. Installation and setup is simple plug-n-play. Insert the module into any powered Fiber Driver chassis, insert the XFP transceivers required for the protocol and distance of the application, and then connect to the network.

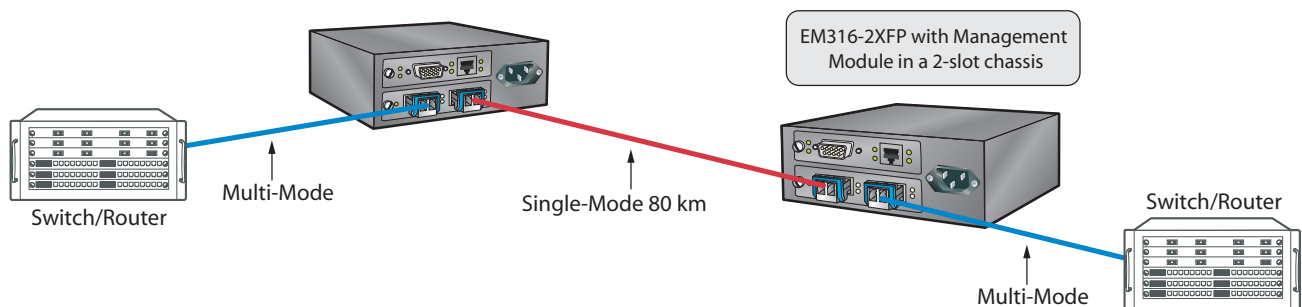
### Features

- XFP-to-XFP repeater, converter, and WDM transponder
- Multiple data rate support (9.95 to 11.32 Gbps)
- Flexibility and scalability
  - Add or change optics to adjust data rates as needed
  - Single item module inventory
- Link Integrity Notification (LIN)
- Hot-swap support (module and interfaces)
- Fiber Driver chassis compatibility
- Management through EM316NM or EM316LNxNM-OT
  - Full graphical management with MegaVision Pro®
  - SNMP management
  - Command line interface (CLI)
- XFP feature control through management module
  - Digital Diagnostics
  - Analog hardware monitoring
  - XFI and Lineside loopback modes (XFP dependent)

### Benefits

- Extend fiber optic links to hundreds of kilometers
- Reduce capital and operating expenses

### Typical Application: Multi-mode to Single-mode Conversion



## Datasheet

Changing the connection type only requires changing the hot-swappable XFP transceivers. Because the transceivers are portable, inventory may be shared with other applications to maximize the return on investment. Together, the 2XFP modules and XFP transceivers greatly reduce the need for on-hand parts inventory.

2XFP modules fully support the XFP MSA standard including Digital Diagnostics. Through a Fiber Driver

network management module, they support SNMP and MegaVision Pro®, the MRV Communications comprehensive network management system. The management module monitors XFP status, determines hardware configuration, and provides vendor information.

For more information on Fiber Driver and other MRV products, visit <http://www.mrv.com> or contact MRV sales as listed below.

### Physical Specifications

<b>Operating Temperature Range*</b>	0°C to 60°C (32°F to 140°F)
<b>Storage Temperature</b>	-40°C to 70°C (-40°F to 158°F)
<b>Relative Humidity</b>	85% maximum, non-condensing
<b>Physical Dimensions</b>	25 mm x 75 mm x 175 mm deep (1" x 3" x 7" deep)
<b>Weight</b>	Approximately 213 g (7.5 oz)
<b>Regulatory Compliance</b>	FCC Part 15 (Class A); IC (Class A); EMC Directive: Emission (Class A) and Immunity; RoHS Directive;
	China RoHS; WEEE Directive

\*Operating Range listed is for the module only. Operating Range of pluggable interface(s) used may differ.

### Supported Protocols

Protocol	Data Rate (Gbps)	EM316-2XFP	EM316-2XFP-ET
10 Gigabit Ethernet	10.00000	XFP-10GD-SX	XFP-10GD-SX XFP-10GD-MMX XFP-10GD-LR XFP-10GD-IR2 XFP-10GD-LR2 XFP-DWIR204-XX XFP-DWLR08-XX (Table A) OR XFP-10GD-IR04P XFP-10GD-LR08P XFP-10GD-LR12P XFP-DWIR04P-XX XFP-DWLR08P-XX XFP-DWLR12P-XX (Table B)
10G Ethernet 64/66B Encoded	10.31250	XFP-10GD-MMX	
10G Ethernet 64/66B Encoded 255/238	11.04910	XFP-10GD-LR	XFP-10GD-SX
10G Ethernet 64/66B Encoded 255/237	11.09570	XFP-10GD-IR2	XFP-10GD-MMX
OC-192/STM-64	9.95300	XFP-10GD-LR2	XFP-10GD-LR
OC-192/STM-64 with FEC, Reed Solomon 255/238	10.56000	XFP-DWIR204-XX	XFP-10GD-IR2
OC-192/STM-64 with FEC, Reed Solomon 255/237	10.70900	XFP-DWLR08-XX	XFP-10GD-LR2
10G Fibre Channel	10.51875	(Table A)	XFP-DWIR204-XX
10G Fibre Channel 64/66B Encoded 255/238	11.27000		XFP-DWLR08-XX
10G Fibre Channel 64/66B Encoded 255/237	11.32000		(Table A)

## Datasheet

Ordering Info	Model Number	Description	Data Rate	Connectors	Compatible XFPs
	<b>EM316-2XFP</b>	10 Gig Transponder, based on dual XFP pluggable optics	Data rate independent, protocol transparent from 9.95 to 11.32 Gbps	XFP (x2)	See table A
	<b>EM316-2XFP-ET</b>	10 Gig Transponder, based on dual XFP pluggable optics with 10 Gig Ethernet LAN PHY External Reference Clock	Data rate independent, protocol transparent from 9.95 to 11.32 Gbps	XFP (x2)	See table A and table B

Wavelength, budget, and range are all dependent on the XFP transceivers installed in the module. Aside from the protocol-specific reference clock requirement, the XFP groups below provide equivalent signal quality and optical performance.

The XFP devices in Table A are compatible with both the EM316-2XFP and EM316-2XFP-ET modules. These XFPs do not require an external reference clock, and they support the XFI loopback mode.

Table A	Model Number	XFP Description (NO external reference clock required)
	<b>XFP-10GD-SX</b>	10-GbE, or 10GFC, MM, 850nm, 300M with Digital Diagnostics.
	<b>XFP-10GD-MMX</b>	10-GbE, or 10GFC, Extended MM, 1310nm, 500m with Digital Diagnostics.
	<b>XFP-10GD-LR</b>	OC192/STM-64, 10GE or 10G FC, SM, 1310nm, 10km, with Digital Diagnostics.
	<b>XFP-10GD-IR2</b>	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 40km, with Digital Diagnostics.
	<b>XFP-10GD-LR2</b>	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 80km, with Digital Diagnostics.
	<b>XFP-DWIR204-XX</b>	OC192/STM-64, 10GE or 10G FC, SM DWDM (XX + ITU C-Band Channels 17-61 for 100 GHz), 40 km, with Digital Diagnostics.
	<b>XFP-DWLR08-XX</b>	OC192/STM-64, 10GE or 10G FC, SM DWDM (XX + ITU C-Band Channels 17-61 for 100 GHz), 80 km, with Digital Diagnostics.
<b>XFP-CX4</b>	10GBase-CS4 Copper Transceiver, 15m, IEEE 802.3ak compliant.	

The XFP devices in Table B are compatible with the EM316-2XFP-ET module only. These XFPs require an external reference clock, and they support the XFI and lineside loopback modes.

Table B	Model Number	XFP Description (external reference clock required)
	<b>XFP-10GD-IR04P</b>	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 40km, with Digital Diagnostics.
	<b>XFP-10GD-LR08P</b>	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 80km, with Digital Diagnostics.
	<b>XFP-10GD-LR12P</b>	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 120km, with Digital Diagnostics.
	<b>XFP-DWIR04P-XX</b>	OC192/STM-64, 10GE or 10G FC, SM DWDM (XX + ITU C-Band Channels 17-61 for 100 GHz), 40 km, with Digital Diagnostics.
	<b>XFP-DWLR08P-XX</b>	OC192/STM-64, 10GE or 10G FC, SM DWDM (XX + ITU C-Band Channels 17-61 for 100 GHz), 80 km, with Digital Diagnostics.
<b>XFP-DWLR12P-XX</b>	OC192/STM-64, 10GE or 10G FC, SM DWDM (XX + ITU C-Band Channels 17-61 for 100 GHz), 120 km, with Digital Diagnostics.	

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