SFP+ Multi-Rate Dual Transponder

EM316DMR10G-3R

Overview

The Fiber Driver® 10-Gigabit Multi-Rate Dual Transponder (EM316DMR10G) from MRV extends deployment options and streamlines inventory management. It combines software-selectable data rates, connectivity mapping between any ports, and advanced Small Form-factor Pluggable (SFP+) optical transceivers supporting the latest high-speed protocols. The wide range of optical infrastructure solutions includes media-conversion, signal repeating, lambda conversion, Wave Division Multiplexing (WDM), and Optical Add/Drop Multiplexing (OADM). The EM316DMR10G supports redundancy for self-healing links in mission-critical applications. It also provides physical layer multicasting and broadcasting over any supported protocol.

Installing the EM316DMR10G-3R in any powered Fiber Driver chassis is quick and easy. Insert the module into the chassis, then insert the selected port transceivers and set the ports to the application data rate. To change the connection type later, simply replace the SFP+ transceiver and change the data rate.

SFP+ transceivers can be reused easily at different locations or for other applications. Reuse maximizes the investment in optical equipment, and it reduces the need for on-hand inventory.

The EM316DMR10G module performs full 3R signal regeneration (retransmission, reshaping, and retiming) on each channel at any selected data rate and protocol. The module is configurable through the Fiber Driver management interfaces: SNMP, Telnet, SSH, or the local serial port. Most data rates may also be set by jumpers located on the module itself for unmanaged operation.

Highlights

- Wide range of applications
  - Media conversion
  - Signal repeating
  - Lambda conversion
  - WDM
  - OADM
  - Self-healing redundant links
  - Physical layer multicasting
- Any-port-to-any-port connectivity
- Single-port-to-multi-port connectivity
- 3R signal regeneration
  - Retransmission
  - Reshaping
  - Retiming
- Wide data rate support
  - Gigabit Ethernet
  - 1/2/4/8 Gbps Fibre Channel
  - Any 10G protocol (up to 11.3 Gbps)
    - 10G Ethernet LAN or WAN PHY
    - 10G Fibre Channel
    - 10G SONET/SDH
    - G.709 FEC rates up to 11.3 Gbps
- Pseudo Random Bit Sequence (PRBS) sender/checker for connection testing
- SFP+ transceivers for flexible configuration
- High port density - four data ports per slot
- SNMP management through MegaVision Pro® and a Fiber Driver network management module
- SFP+ Digital Diagnostics
- Compatible with all Fiber Driver chassis

Benefits

- Flexible and scalable
  - Add or change optics to adjust data or media rates
  - Maintain single item inventory
- Wide range of optical and copper interfaces
  - Standard wavelengths (850 nm, 1310 nm, 1550 nm)
  - CWDM wavelengths
  - DWDM (ITU-T G.694.1-2002)
- Gigabit through 10G Ethernet, Fibre Channel, and WAN

Figure 1: Dual Converter/Repeater/Transponder
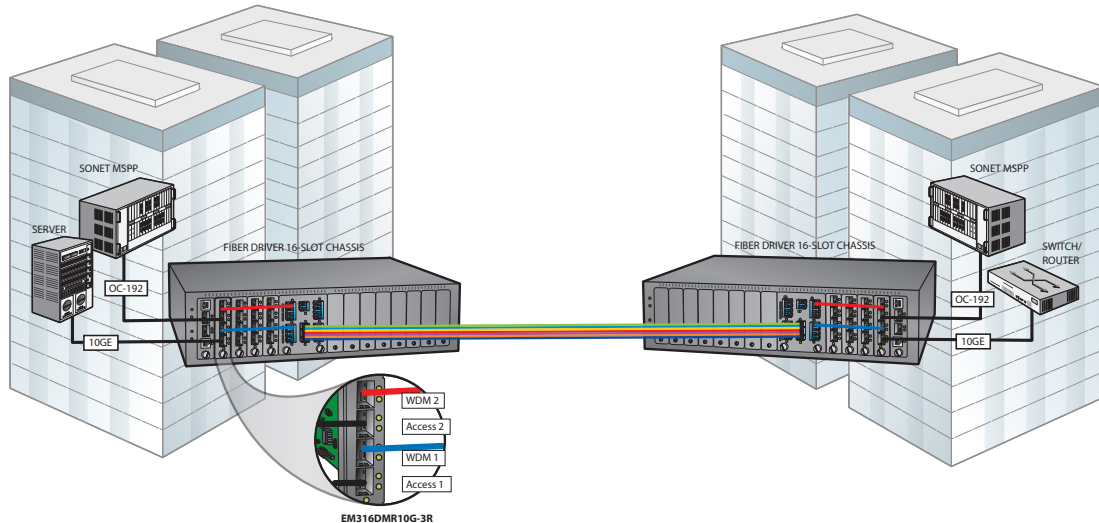
The EM316DMR10G application varies with the type of pluggable SFP+ transceivers installed. It can function as a media converter to connect network segments of different media types, or as a lambda converter to connect network elements operating at different wavelengths. For example, a multi-mode link operating at 850 nm can connect to a single-mode link operating at 1550 nm or a DWDM wavelength by using the required transceivers. The EM316DMR10G also works with long-haul optics to repeat and extend an optical link over hundreds of kilometers.

Connect the EM316DMR10G with a MUX/DeMUX (like the Fiber Driver CWDM and DWDM passive modules) to build elaborate WDM solutions with the flexibility of pluggable optics. The EM316DMR10G can create a static trunk WDM system, a trunk-switching WDM system, a WDM repeater with or without lambda conversion, or a sophisticated Add/Drop topology.

The EM316DMR10G factory default configuration uses ports P1 & P2 and ports P3 & P4 for two independent data paths. Each path creates a separate repeater or converter between the ports in each path. This operating mode also allows complete flexibility to remap the data paths for any custom data flow within the module.

By resetting the EM316DMR10G-3R DIP switches to redundant operating mode, the four ports form two redundant pairs: P1/P2 & P3/P4. This configuration creates a single data path through the module with both upstream and downstream standby link protection for mission-critical installations. In the event of link loss in either direction, the connected module pair automatically switches from the primary to the secondary data path to re-establish the link. The switchover occurs in microseconds, without the latency and data loss common with higher-level solutions like OSPF or Spanning Tree.

The module also supports multicast and broadcast for single-direction transmissions like video. For example, the multicast configuration retransmits the data signal entering port P1 out from all ports, P1, P2, P3, and P4 simultaneously.

The EM316DMR10G module is hot-swappable and occupies a single-slot in any powered Fiber Driver chassis. It is manageable with a common line interface or SNMP through a Fiber Driver network manager installed in the same chassis. MegaVision Pro®, the MRV network management system, uses SNMP to provide full graphical administration for all Fiber Driver and other addressable systems in the network.

The EM316DMR10G-3R supports the SFF-8472 standard including digital diagnostics. Together with the network manager, it provides real-time access to information such as transceiver details, transceiver temperature, TX/RX optical power, and transceiver supply voltage.

Figure 2: Redundant Converter/Repeater/Transponder
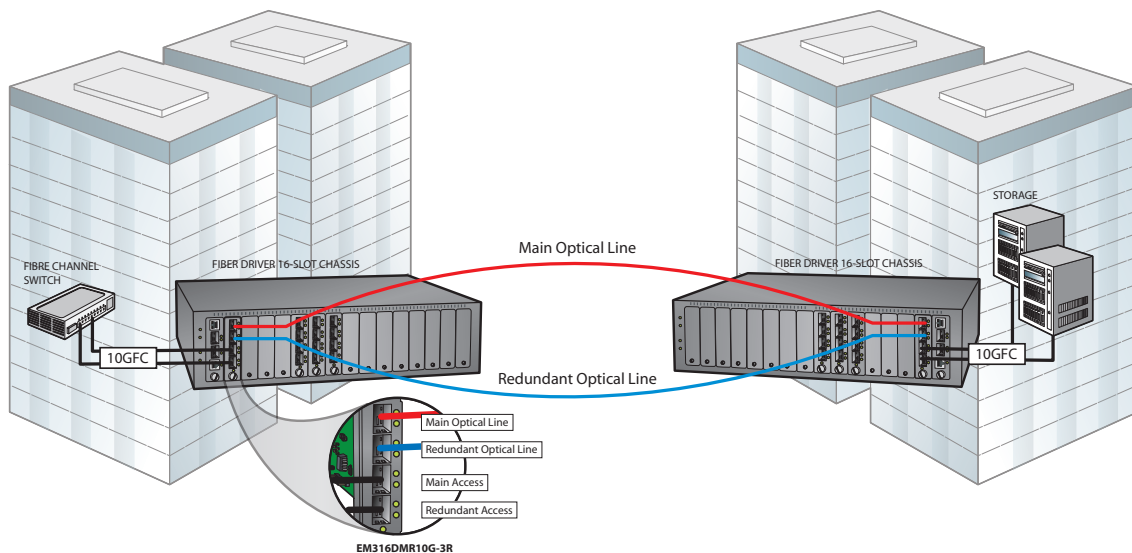
Physical Specifications

Operating Temperature	0°C to 60°C (32°F to 140°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Relative Humidity	85% maximum, non-condensing
Physical Dimensions	25 mm x 75 mm x 175 mm deep (3" x 3" x 7" deep)
Weight	Approximately 213 g (7.5 oz)
Regulatory Compliance	FCC Part 15, Class A; IC, Class A; EMC Directive: Emission (Class A) and Immunity; WEEE Directive: Wheelie Bin Mark; RoHS 2 Directive; China RoHS

	Model	Function	Protocols	Connectors	Wavelength (nm)	Range (km)
Ordering Info	**EM316DMR10G-3R**	Dual Multi-Rate Fiber Module, 1/2/4/8G Fibre Channel and any 10G rates 9.9-11.3 Gbps, four SFP+ interfaces with 3R	Gigabit Ethernet 1/2/4/8 Gbps Fibre Channel Any 10G rates 9.9-11.3 Gbps	SFP+ (x4)	SFP+ dependent	SFP+ dependent

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MRV has more than 50 offices throughout the world. Addresses, phone numbers and fax numbers are listed at www.mrv.com. Please e-mail us at **info@mrv.com** or call us for assistance.

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