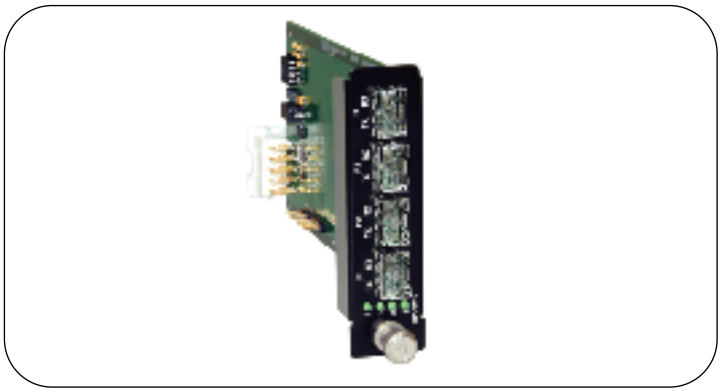
# SFP Multi-Rate Dual Transponder



## Overview

Combining software selectable data rates, any-port-to-any-port connectivity, and the use of Small Form Factor Pluggable (SFP) optical transceivers, the Fiber Driver SFP Multi-Rate Dual Transponder (EM316DMR) from MRV Communications defines a new level of deployment flexibility and inventory management. It enables the implementation of an extremely wide range of optical infrastructure solutions from media conversion and signal repeating to lambda conversion, Wave Division Multiplexing (WDM), and Optical Add/Drop Multiplexing (OADM). It can be used to create self-healing redundant links for mission critical applications, and be used to implement physical layer multicasting of any protocol within its range.

Deployment of the SFP Multi-Rate Dual Transponder is quick and easy. The module is placed into a Fiber Driver chassis, the selected SFP transceivers are inserted, and the ports set to the corresponding data rate. Changing the connection type at a later time only requires changing the SFP transceivers and setting the module to the new data rate.

SFP transceivers can easily be reused again at different locations for different applications, maximizing the investment in equipment and optics, and reducing the need for on-hand inventory. The industry's non-proprietary SFP MultiSource Agreement (MSA) ensures that a large selection of system compatible SFP optics is available from MRV Communications and other sources.

The Fiber Driver SFP Multi-Rate Dual Transponder performs full 3R signal regeneration - retransmission, reshaping, and retiming - per channel at any selected data rate from 100 Mbps to 2.7 Gbps (100 MHz to 2.7 GHz). This range covers Fast and Gigabit Ethernet, FDDI, ESCON, SONET (OC-3, OC-12, OC-48 and OC-48 with FEC), Fibre Channel (1 Gbps & 2 Gbps), Serial Digital Video Interface (SDI) SMPTPE-269 and SMTPE-292, DVB, and HDTV (1.5 Gbps). If desired, the signal retiming function can be bypassed to create a protocol transparent, 2R connection.

The data rate can be set through one of several management interfaces available via the Fiber Driver Network Management Module - SNMP, Telnet, or the local CLI - or by jumpers located on the module itself. The data rates that can be selected using the onboard jumpers are Fast and Gigabit Ethernet, Fibre Channel (1 Gbps & 2 Gbps), and SONET (OC-3 - OC-48).

## Features

- Supports any data rate from 100 Mbps to 2.7 Gbps, from Fast Ethernet to OC-48
- Utilizes SFP transceivers
- High port density - four data ports per single slot module
- Any-port-to-any-port connectivity including port to multiport
- Performs 3R signal regeneration
- Supports SFP digital diagnostics as per SFF-8472
- SNMP manageable, MegaVision Web supported
- Wide range of applications: media conversion, signal repeating, lambda conversion, WDM, OADM, self-healing redundant links, and physical layer multicasting

## Benefits

- Ultimate in flexibility and scalability
  - Add/Change optics and adjust data rates as needed
  - Maintain single item inventory
- SFP MSA (MultiSource Agreement)
  - Choose the best of the breed optics from MRV Communications or the vendor of choice
  - Solutions for multiple standard wavelength (850 nm, 1310 nm. 1550 nm)
  - Solutions for CWDM wavelength as per ITU G.694.2 (1470nm to1610nm with 20 nm spacing)
  - Future solutions for DWDM (ITU-T G.694.1 (2002))
- Wide application use - media conversion, signal repeating, lambda conversion, WDM, OADM

The application of the SFP Multi-Rate Dual Transponder varies by the type of SFPs employed. The module can be used as a media converter to connect network segments of different media types, or even as a lambda converter to connect network elements operating at different wavelengths. For example, using the required SFPs, a Multimode link operating at 850 nm can be connected to a Singlemode link operating at 1550 nm. In addition, with its 3R functionality the EM316DMR can be configured with long-haul optics and be deployed as a repeater in a link spanning hundreds of kilometers.

In conjunction with an externally connected Mux/Demux unit such as the 4- or 8-channel Fiber Driver CWDM Passive Mux/Demux (EM316PA4N / EM316PA8N), the SFP Multi-Rate Dual Transponder can be made part of a sophisticated, SFP-based WDM solution. It can be used to create a static trunk WDM system, a trunk switching WDM system, or a WDM repeater with or without lambda conversion. Deployed along a WDM trunk at customer service points using MRV Communications' passive OADM technology, the SFP Multi-Rate Dual Transponder can create a sophisticated Add/Drop topology.

By default the EM316DMR is configured to support two separate, independent data connections; ports 1 & 2 are paired, and ports 3 & 4 are paired. However, the EM316DMR does support any-port-to-any-port connectivity. Port assignments can be changed through management at any time, allowing data routes to be changed as needed. This feature also enables the module to perform physical layer multicasting for any protocol. For example, the device can be configured so that the data signal entering port 1 is retransmitted out ports 2, 3, and 4 simultaneously.

In mission critical installations that demand maximum uptime, EM316DMRs can be used to create a self-healing redundant link. In the event of link loss, the modules are configured to automatically switch from the primary data path to the secondary data path. The switchover occurs in microseconds without the reconvergence times and data loss associated with OSPF or Spanning Tree.

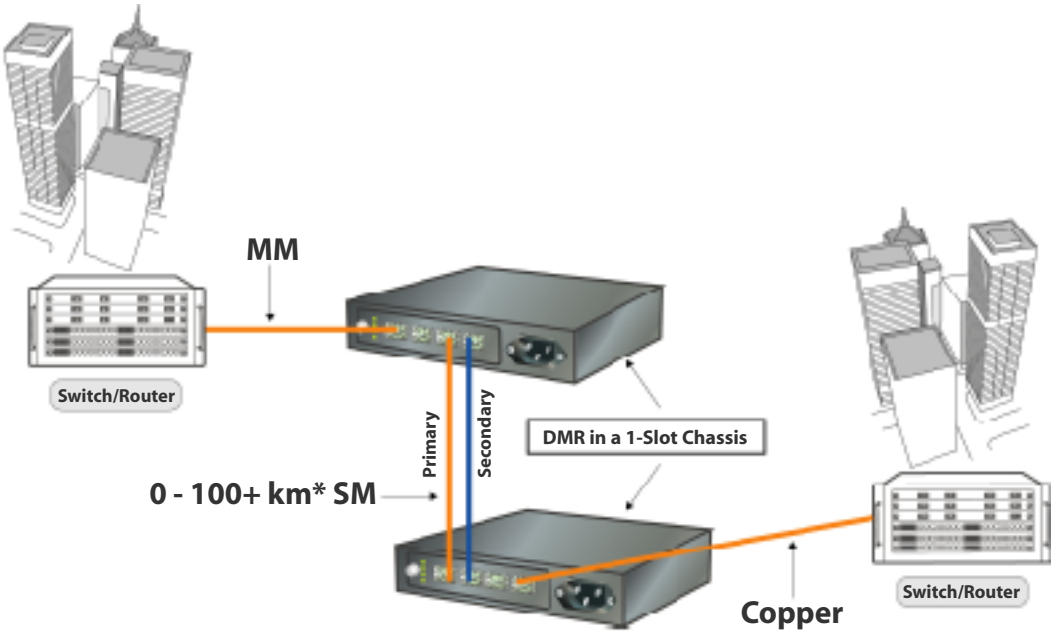
The Fiber Driver SFP Multi-Rate Dual Transponder is a hot-swappable, single-slot module that is compatible with any powered Fiber Driver chassis. Through the Fiber Driver Network Management Module, the SFP Multi-Rate Dual Transponder is SNMP manageable and fully supported through the GUI of MegaVision Web, MRV Communications' comprehensive Network Management System (NMS).

It supports the SFP standard including digital diagnostics as per SFF-8472. Together with the Network Management Module it provides real-time access to information such as transceiver type (protocol, range, vendor, etc.), transceiver temperature, TX/RX optical power, and transceiver supply voltage.

For additional information on this or any of the full line of MRV Communications products, including pricing and availability, contact your MRV Communication sales representative.

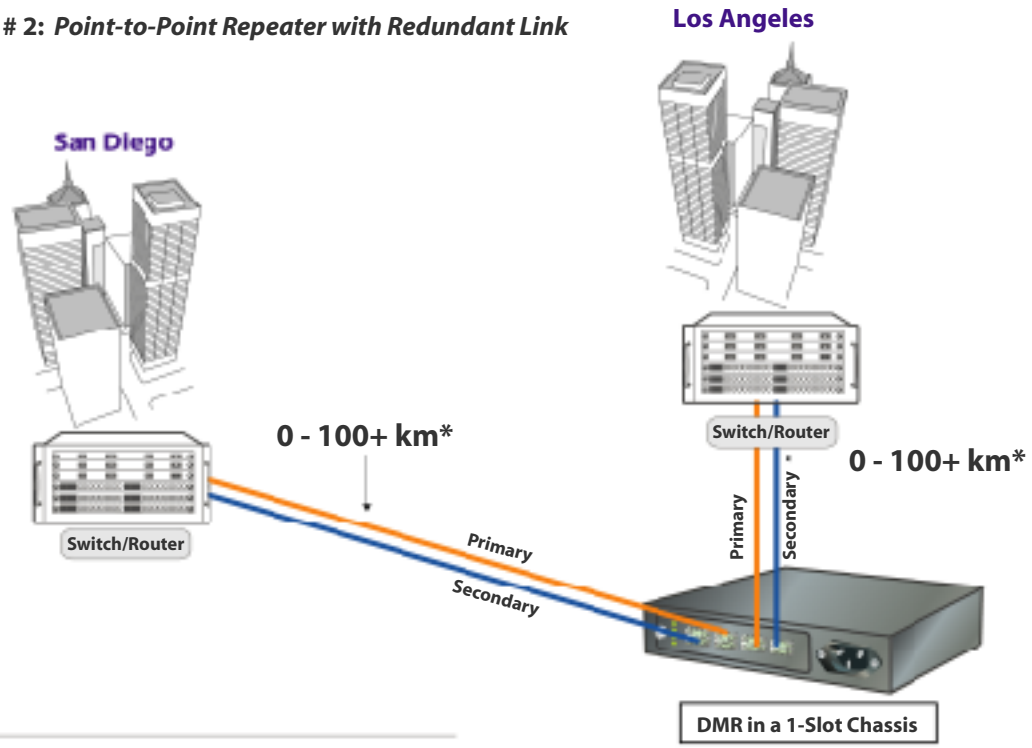
For specifications and ordering information, see the last page of this document.

**DMR Application # 1:** ***Point-to-Point Media Conversion with Redundant Link***



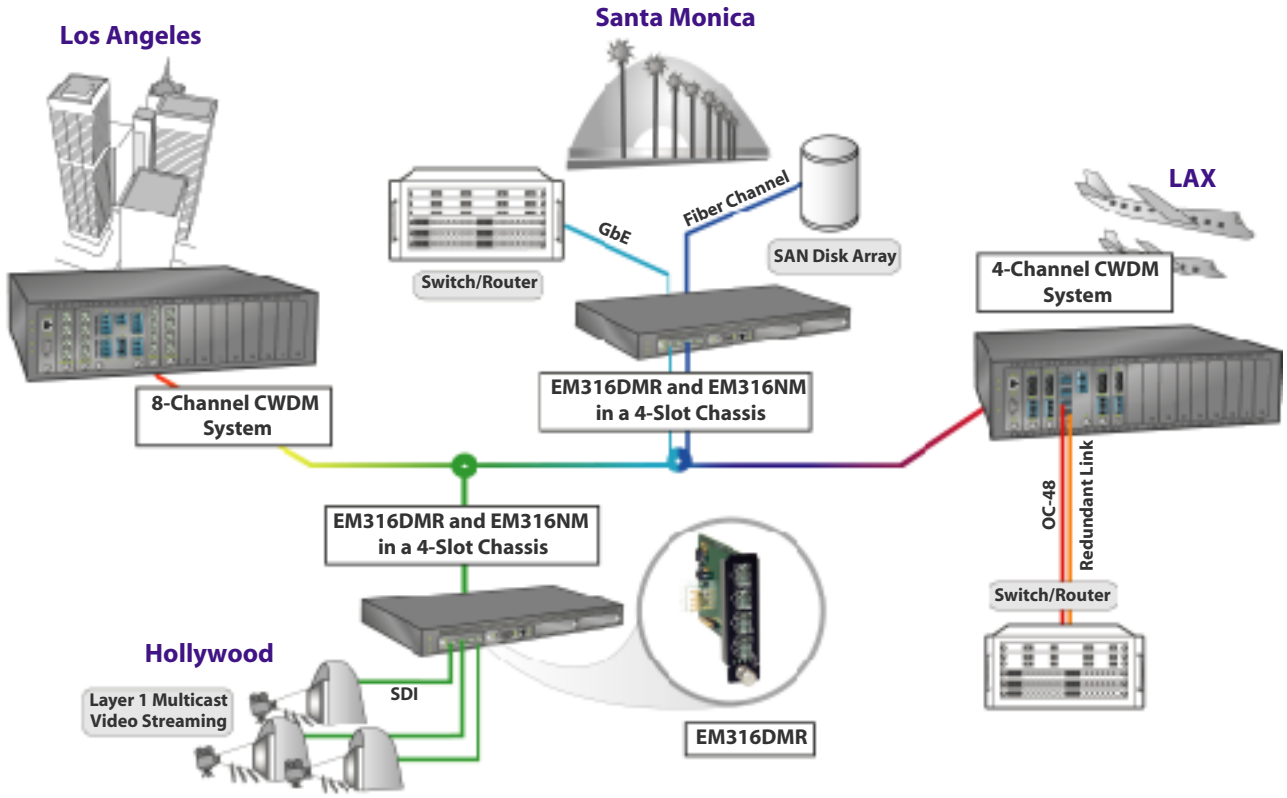

*Range determined by SFP transceivers used and quality of fiber plant

## DMR Application # 2: *Point-to-Point Repeater with Redundant Link*




*Range determined by SFP transceivers used and quality of fiber plant

## DMR Application Example #3: *8-Channel CWDM with OADM*



| Physical Specifications: Multi-Rate Dual Transponder | |
|---|---|
| **Operating Temperature Range:** | 0°C to 50°C (32°F to 122°F) |
| **Storage Temperature:** | -10°C to 60°C (-14°F to 140°F) |
| **Relative Humidity:** | 85% maximum, non-condensing |
| **Physical Dimensions:** | 25 mm x 75 mm x 175 mm deep (1" x 3" x 7" deep) |
| **Weight:** | Approximately 213 g (7.5 oz) |
| **Emission Compliance:** | FCC - PART 15, SUBPART B, 1999, CLASS A; CE MARK - EN 50081-1:1992; |
| | EN 50082:1997; EN 55024:1998; EN 55022:1998; AS/NZS 3548:1995 |
| | |

**Ordering Info**

| Part Number | Function | Protocol | Connectors | Wavelength | Budget (dB) | Range |
|---|---|---|---|---|---|---|
| EM316DMR-3R | Dual Multi-Rate SFP Converter up to OC-48 speeds with CDR | Any 100 Mbps - 2.7 Gbps | SFP (x4) | N/A (SFP dependent) | N/A (SFP dependent) | N/A (SFP dependent) |

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 **sales@mrv.com** or call us for assistance.

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