Datasheet
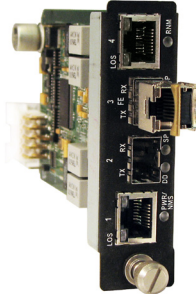
T1/E1/J1 with Ethernet and Remote Management

EM316FDT1E1RM

Overview

The Fiber Driver® EM316FDT1E1RM module combines two T1/E1 copper ports, one Ethernet SFP port with 10/100Base-TX SFP included, and one trunk SFP port to extend copper LANs over optical distances. The E1/T1 and Ethernet signals are multiplexed over the TDM fiber-optic trunk.

The EM316FDT1E1RM includes advanced remote management that allows the CO-resident converter to fully manage its CPE partner and their interconnecting optical link.

Each EM316FDT1E1RM is configurable as either a central office (CO) converter or as a customer premises (CPE) remote converter to provide the managed T1/E1 and Ethernet service. This module fills the roles of several legacy network components, with SFP options increasing the trunk link applications still further.

The module optical links run at 125 Mbps, supporting Fast Ethernet/OC-3 SFPs. The SFP-based interfaces allow connection to many media types limited only by pluggable fiber optic interface options:
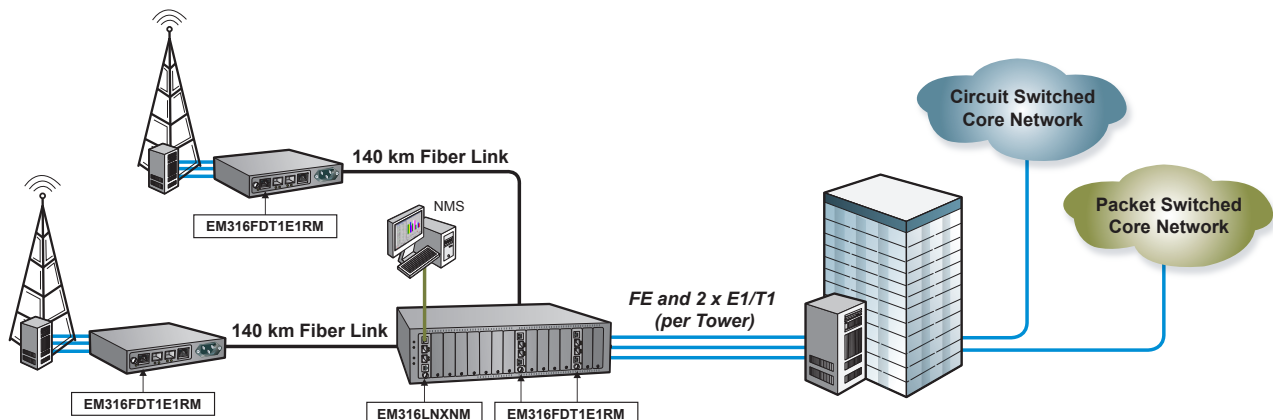
- Single or dual fiber
- Multi-mode (MM) or MM extended (MMX)
- Single-mode at 1310 nm or 1550 nm (up to 120 km)
- Coarse and dense wave division multiplexing (CWDM and DWDM)

Highlights

- Multiplexer with optical SFP trunk conversion
  - Two T1/E1 ports
  - 10/100 Ethernet SFP port*
  - Optical SFP trunk port

- Remote Management
  - Inventory management (module, SFP)
  - Remote module and port management
  - Link management
  - Alarm management
  - Last gasp

- DIP switch selectable T1(ANSI T1.403) or E1 (G.703) functionality

- Copper T1/E1 ports settable to MDI or MDIX

- Jitter attenuation on copper ports for improved BER performance

- AMI/B8ZS/HDB3 line code support (T1/E1)

- Link Integrity Notification (LIN)
  - LIN link fault pass-through (AIS for T1/E1)
  - LIN for Ethernet port

- Network management and diagnostics
  - Per port loopback
    - T1/E1 and Ethernet local loopback
    - Trunk interface remote loopback
  - T1E1 PRBS generator and analysis
  - Selectable single counter T1/E1 error monitoring
  - Port counters for the Fast Ethernet access SFP interface (port 3)
  - Optical performance monitoring through SFP Digital Diagnostics (SFF-8472)

- Fiber Driver chassis and hot-swap support

- SFP Digital Diagnostics (SFF-8472)

- Advanced SNMP management

* Copper 10/100Base-TX SFP with auto-negotiation included

Figure 1: Wireless Backhaul with Repeater Tower Extension

Most available SFPs use MSA-compliant (SFF-8724) Digital Diagnostics, which specifies advanced optical performance monitoring for proactive network administration and maintenance. The small SFP form-factor is designed for portability and interoperability, so inventory costs and downtime may be reduced with fewer spare parts shared between many systems.

A DIP switch sets the module to serve a T1 or an E1 copper media conversion and link extension. The RJ-48 copper port impedance is selectable by DIP switch to 100 ohm (T1) or 120 ohm (E1). Similarly, a DIP switch selection provisions the copper ports as MDI and MDIX for plug-n-play connectivity.
The EM316FDT1E1RM also supports Ethernet. An autonegotiating 10/100Base-TX copper SFP is provided with the module.

The EM316FDT1E1RM's built-in remote management capabilities provide a separate management communication channel that is multiplexed over the fiber optic link in parallel with to the T1/E1 and Ethernet signals. The CO converter fully manages its CPE partner through this remote management channel with full monitoring and provisioning capabilities. The CO module shares management data with an EM316LNXNM-OT Network Management module residing in the CO chassis including full inventory management, link and module monitoring, full provisioning, and alarm condition identification and propagation.

The EM316FDT1E1RM firmware microcode is downloadable to the CO and CPE modules from the EM316LNXNM-OT manager for field upgrades and future enhancements.
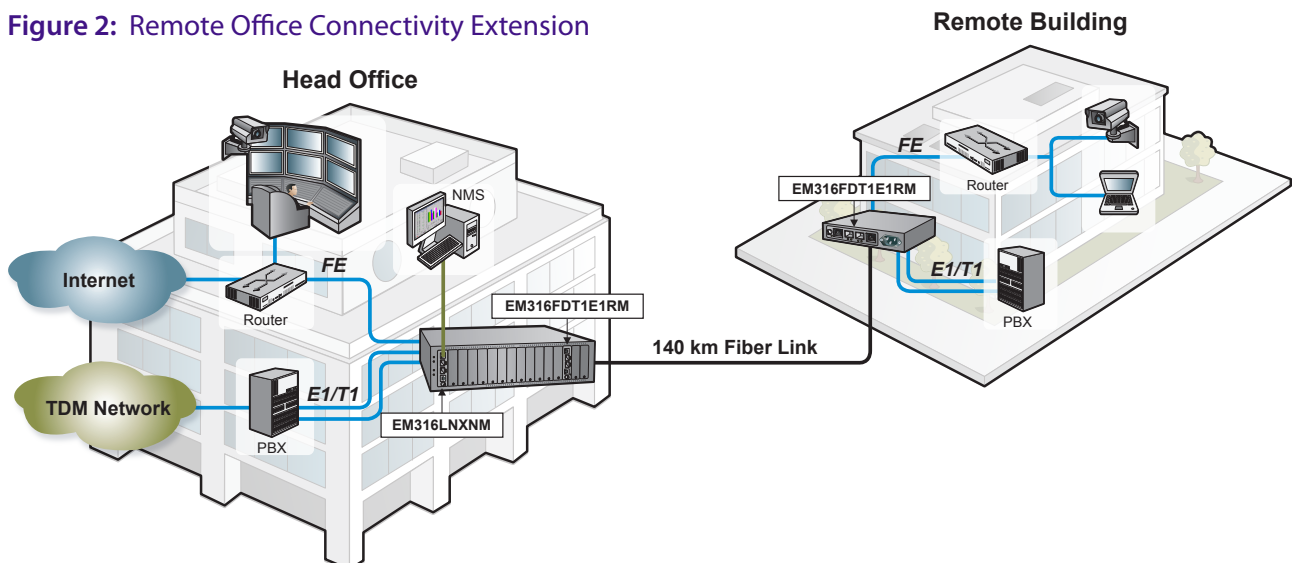
The EM316FDT1E1RM offers network diagnostics features for easy deployment and field troubleshooting. These advanced tools include local and remote loopback and a built-in PRBS T1/E1 generator with error analysis.

The CPE module can identify a power failure at the remote site to send a "last-gasp" alarm indication. Management can remotely distinguish a power failure from a link or module failure.

Link Integrity Notification (LIN), a special MRV feature in Fiber Driver modules, propagates link loss from an EM316FDT1E1RM interface to affected interfaces. A fiber link loss propagates to the user ports. A copper link loss propagates to its peer copper port over the fiber optic link. Standard T1/E1 Alarm Indication Signal (AIS) alarms report signal loss. For the Ethernet port, link loss causes the remote port to disable its transmitter.

The EM316FDT1E1RM provides T1/E1 and Ethernet performance statistics. On each T1E1 channel, the user can monitor one type of error at a time from multiple possible error types: CV, BPV, CV+EXZ, BPV+EXZ. Ethernet packet counters for receive and transmit are provided.

Figure 2: Remote Office Connectivity Extension

Physical Specifications

Maximum Power	1A @ 5V
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Relative Humidity	85% maximum, non-condensing
Physical Dimensions (H x W x D)	75 mm x 25 mm x 175 mm (3" x 1" x 7")
Weight	Approximately 143 g (5.1 oz)
Regulatory Compliance	FCC Part 15, Class A; IC, Class A; EMC Directive: Emission (Class A) and Immunity; WEEE Directive: Wheelie Bin Mark; RoHS Directive; China RoHS; REACH SVHC

	Model	Function	Protocol	Connectors
Ordering Info	EM316FDT1E1RM	T1/E1/J1 and Ethernet multiplexer with optical SFP link (10/100 Base-Tx Ethernet SFP included).	T1/E1/J1, Ethernet 10/100Base-TX	SFP (x2) / RJ-48 (x2)

Visit the MRV website at www.mrv.com or contact your nearest authorized MRV dealer for more information.

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