# Copper to Fiber

## Overview

Fiber Driver® copper to fiber media conversion modules from MRV make it easy to merge legacy copper network elements with new or existing fiber optic infrastructure, allowing LAN communications to be extended to distances of up to 130 km or more. In addition, the Multimode Extender (MX) technology found in select Fiber Driver products breaks the transmission barrier of multimode fiber with link distances of up to 10 km.

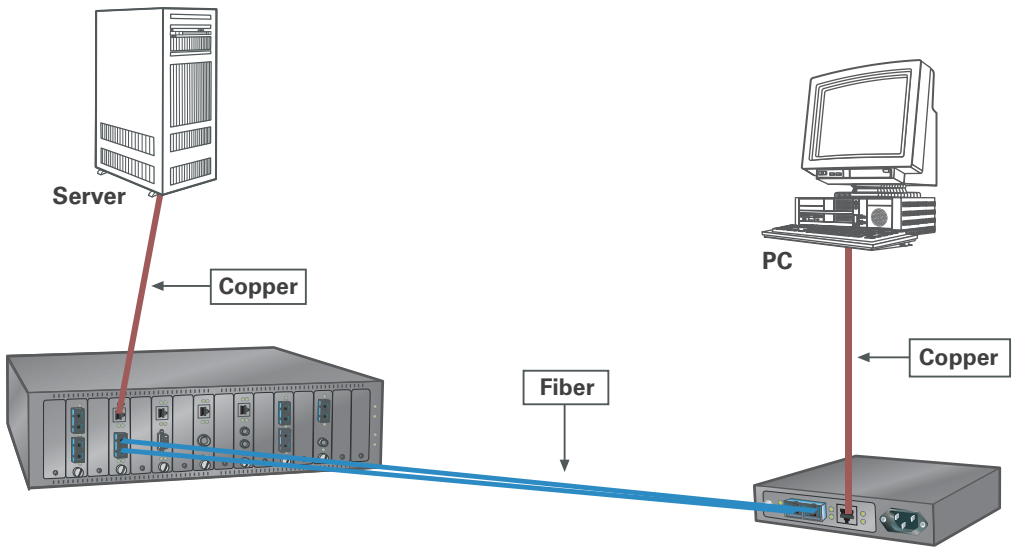
Copper to multimode and copper to single mode solutions are available for Ethernet, Fast Ethernet, Gigabit Ethernet and Copper Gigabit Ethernet, OC-3/STM-1, DS3 and E3. (Additional Ethernet copper to fiber solution are provided by our signal repeater and switch modules.)

The Fiber Driver product family provides more conversion solutions with greater distances and better manageability than any other product line on the market. For additional information, including pricing and availability, contact your nearest authorized MRV representative.

## Features

- Network transparent copper to fiber media conversion
- Link distances of up to 130 km over single mode fiber
- Link distances of up to 10 km over multimode fiber
- Protocols supported: Ethernet, Fast Ethernet, Gigabit Ethernet and Copper Gigabit Ethernet, OC-3/STM-1, DS3 and E3
- Compatible with all appropriate protocol standards
- Hot swappable, plug-n-play functionality
- 1-Slot form factor: Fits all Fiber Driver chassis
- SNMP managed, MegaVision Web supported
- Link Integrity Notification* (LIN) for end-to-end link state continuity

*Available on select models



| Physical Specifications: Copper to Fiber | |
|---|---|
| **Operating Temperature Range:** | 0°C to 50°C (32°F to 122°F) |
| **Operating Temperature Range (LT):** | -40°C to 60°C (-40°F to 140°F) |
| **Storage Temperature:** | -40°C to 85°C (-40°F to 185°F) |
| **Storage Temperature (LT):** | -45°C to 85°C (-49°F to 185°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:** | 120 - 240 g (4.2 - 8.5 oz) depending on configuration |
| **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 |

## STANDARD

Ordering Info

| Part Number | Function | Protocol | Connectors* Port/Link | Wavelength (nm) | Minimum Loss Budget (dB) | Range** Approx. (km) |
|---|---|---|---|---|---|---|
| **DUAL FIBER** | | | | | | |
| **EM316E/M** | 10Base-TX to 10Base-FX MM | Ethernet | RJ-45/ST | 820 | N/A | 0 - 4 |
| **EM316E/MX** | 10Base-TX to 10Base-FX Extended MM | Ethernet | RJ-45/ST | 1310 | N/A | 4 - 10 |
| **EM316E/S1** | 10Base-TX to 10Base-FX SM | Ethernet | RJ-45/ST | 1310 | 15 | 5 - 30 |
| **EM316E/S2** | 10Base-TX to 10Base-FX SM | Ethernet | RJ-45/ST | 1310 | 25 | 25 - 50 |
| **EM316E/S3** | 10Base-TX to 10Base-FX SM | Ethernet | RJ-45/ST | 1550 | 25 | 50 - 100 |
| **EM316E/S4** | 10Base-TX to 10Base-FX SM | Ethernet | RJ-45/ST | 1550 | 31 | 50 - 125 |
| **EM316E/S5** | 10Base-TX to 10Base-FX SM | Ethernet | RJ-45/ST | 1550 | 34 | 50 - 135 |
| **EM316F/M** | 100Base-TX to 100Base-FX | Fast Ethernet | RJ-45/DSC | 1310 | N/A | 0 - 2 |
| **EM316F/MX** | 100Base-TX to 100Base-FX Extended MM | Fast Ethernet | RJ-45/DSC | 1310 | N/A | 2 - 8 |
| **EM316F/S** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1310 | 12 | 0 - 20 |
| **EM316F/S1** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1310 | 17 | 0 - 35 |
| **EM316F/S2** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1310 | 24 | 25 - 45 |
| **EM316F/S3** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1550 | 24 | 35 - 90 |
| **EM316F/S4** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1550 | 29 | 40 - 110 |
| **EM316F/S5** | 100Base-TX to 100Base-FX SM | Fast Ethernet | RJ-45/DSC | 1550 | 33 | 45 - 130 |
| **EM316O3C/M** | OC-3/STM-1 Coax to OC-3/STM-1 MM | OC-3/STM-1 | BNC/DSC | 1310 | N/A | 0 - 2 |
| **EM316O3C/S** | OC-3/STM-1 Coax to OC-3/STM-1 SM | OC-3/STM-1 | BNC/DSC | 1310 | 12 | 0 - 20 |
| **EM316O3C/S1** | OC-3/STM-1 Coax to OC-3/STM-1 SM | OC-3/STM-1 | BNC/DSC | 1310 | 17 | 0 - 35 |
| **EM316O3C/S2** | OC-3/STM-1 Coax to OC-3/STM-1 SM | OC-3/STM-1 | BNC/DSC | 1310 | 24 | 25 - 45 |
| **EM316O3C/S3** | OC-3/STM-1 Coax to OC-3/STM-1 SM | OC-3/STM-1 | BNC/DSC | 1550 | 24 | 35 - 90 |
| **EM316DS3/M** | DS3 Coax to DS3 MM | DS3 | BNC/DSC | 1310 | N/A | 0 - 2 |
| **EM316DS3/MX** | DS3 Coax to DS3 Extended MM | DS3 | BNC/DSC | 1310 | N/A | 2 - 8 |
| **EM316DS3/S** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1310 | 12 | 0 - 20 |
| **EM316DS3/S1** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1310 | 17 | 0 - 35 |
| **EM316DS3/S2** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1310 | 24 | 25 - 45 |
| **EM316DS3/S3** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1550 | 24 | 35 - 90 |
| **EM316DS3/S4** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1550 | 29 | 40 - 110 |
| **EM316DS3/S5** | DS3 Coax to DS3 SM | DS3 | BNC/DSC | 1550 | 33 | 45 - 130 |
| **EM316E3/M** | E3 Coax to E3 MM | E3 | BNC/DSC | 1310 | N/A | 0 - 2 |
| **EM316E3/MX** | E3 Coax to E3 Extended MM | E3 | BNC/DSC | 1310 | N/A | 2 - 8 |
| **EM316E3/S1** | E3 Coax to E3 SM | E3 | BNC/DSC | 1310 | 17 | 0 - 35 |
| **EM316E3/S2** | E3 Coax to E3 SM | E3 | BNC/DSC | 1310 | 24 | 25 - 45 |
| **EM316E3/S3** | E3 Coax to E3 SM | E3 | BNC/DSC | 1550 | 24 | 35 - 90 |
| **EM316E3/S4** | E3 Coax to E3 SM | E3 | BNC/DSC | 1550 | 29 | 40 - 110 |
| **EM316E3/S5** | E3 Coax to E3 SM | E3 | BNC/DSC | 1550 | 33 | 45 - 130 |

*Default connectors listed, other connectors are optional
**All specifications, distance claims and operational parameters are based on industry average fiber cable performance; 9µ Singlemode performance of 0.25 dB/km for 1550 nm and 0.5 dB/km for 1310 nm, and 62.5µ Multimode performance of 3 dB/km for 850 nm and 1.5 dB/km for 1300 nm. For non-standard fiber applications or additional information contact MRV Communications

## STANDARD (continued)

Ordering Info

| Part Number | Function | Protocol | Connectors* Port/Link | Wavelength (nm) | Minimum Loss Budget (dB) | Range** Approx. (km) |
|---|---|---|---|---|---|---|
| **SINGLE FIBER** | | | | | | |
| **EM316ESF/S2** | 10Base-TX to 10Base-FX Single Fiber SM | Ethernet | RJ-45/SC-APC | 1310 | 20 | 10 - 40 |
| **EM316ESF/S3** | 10Base-TX to 10Base-FX Single Fiber SM | Ethernet | RJ-45/SC-APC | 1550 | 22 | 30 - 90 |
| **EM316ESF/S4** | 10Base-TX to 10Base-FX Single Fiber SM | Ethernet | RJ-45/SC-APC | 1550 | 26 | 40 - 105 |
| **EM316FSF/S** | 100Base-TX to 100Base-FX Single Fiber SM | Fast Ethernet | RJ-45/DSC | 1310 | 7 | 0 - 15 |
| **EM316FSF/S2** | 100Base-TX to 100Base-FX Single Fiber SM | Fast Ethernet | RJ-45/DSC | 1310 | 18 | 0 - 35 |
| **EM316FSF/S3** | 100Base-TX to 100Base-FX Single Fiber SM | Fast Ethernet | RJ-45/DSC | 1550 | 18 | 25 - 70 |
| **EM316FSF/S4** | 100Base-TX to 100Base-FX Single Fiber SM | Fast Ethernet | RJ-45/DSC | 1550 | 24 | 35 - 100 |
| **EM316FSF/S5** | 100Base-TX to 100Base-FX Single Fiber SM | Fast Ethernet | RJ-45/DSC | 1550 | 28 | 50 - 110 |
| **EM316O3CSF/S2** | SONET OC3 Coax to Single Fiber SM | OC-3/STM-1 | BNC/SC-APC | 1310 | 18 | 0 - 35 |
| **EM316O3CSF/S3** | SONET OC3 Coax to Single Fiber SM | OC-3/STM-1 | BNC/SC-APC | 1550 | 18 | 25 - 70 |
| **EM316DS3SF/S** | DS3 Coax to DS3 Single Fiber SM | DS3 | BNC/SC-APC | 1310 | 7 | 0 - 15 |
| **EM316DS3SF/S2** | DS3 Coax to DS3 Single Fiber SM | DS3 | BNC/SC-APC | 1310 | 18 | 0 - 35 |
| **EM316DS3SF/S3** | DS3 Coax to DS3 Single Fiber SM | DS3 | BNC/SC-APC | 1550 | 18 | 25 - 70 |
| **EM316DS3SF/S4** | DS3 Coax to DS3 Single Fiber SM | DS3 | BNC/SC-APC | 1550 | 24 | 35 - 100 |
| **EM316E3SF/S2** | E3 Coax to E3 Single Fiber SM | E3 | BNC/SC-APC | 1310 | 18 | 0 - 35 |
| **EM316E3SF/S3** | E3 Coax to E3 Single Fiber SM | E3 | BNC/SC-APC | 1550 | 18 | 25 - 70 |
| **DUAL WAVELENGTH SINGLE FIBER** | | | | | | |
| **EM316WEC/S2** **EM316WET/S2** | 10Base-TX to 10Base-FX Dual-Wavelength Single Fiber SM | Ethernet | RJ-45/SC- APC | 1310, 1550 | 22 (@1310 nm) | 10 - 45 |
| **EM316WEC/S3** **EM316WET/S3** | 10Base-TX to 10Base-FX Dual-Wavelength Single Fiber SM | Ethernet | RJ-45/SC- APC | 1310, 1550 | 24 (@1310 nm) | 30 - 50 |
| **EM316WFC/S2** **EM316WFT/S2** | 100Base-TX to100Base-FX Dual-Wavelength Single Fiber SM | Fast Ethernet | RJ-45/SC | 1310, 1550 | 15 (@1310 nm) | 0 - 30 |
| **EM316WFC/S3** **EM316WFT/S3** | 100Base-TX to100Base-FX Dual-Wavelength Single Fiber SM | Fast Ethernet | RJ-45/SC | 1310, 1550 | 22 (@1310 nm) | 10 - 45 |
| **EM316WFC/EZX** **EM316WFT/EZX** | 100Base-TX to100Base-FX Dual-Wavelength Single Fiber SM | Fast Ethernet | RJ-45/SC | 1550, 1590 | 32 (@1550 nm) | 30 - 130 |

## COPPER TO FIBER WITH LIN (Link Integrity Notification)

Ordering Info

| Part Number | Function | Protocol | Connectors* Port/Link | Wavelength (nm) | Minimum Loss Budget (dB) | Range** Approx. (km) |
|---|---|---|---|---|---|---|
| **DUAL FIBER** | | | | | | |
| **EM316EFAN/M** | 10/100Base-TX Auto-Negotiation to100Base-FX MM | Ethernet/Fast Ethernet | RJ-45/DSC | 1310 | N/A | 0 - 2 |
| **EM316EFAN/MX** | 10/100Base-TX Auto-Neg.to100Base-FX Extended MM | Ethernet/Fast Ethernet | RJ-45/DSC | 1310 | N/A | 2 - 8 |
| **EM316EFAN/S** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1310 | 12 | 0 - 20 |
| **EM316EFAN/S1** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1310 | 17 | 0 - 35 |
| **EM316EFAN/S2** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1310 | 24 | 25 - 45 |
| **EM316EFAN/S3** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1550 | 24 | 35 - 90 |
| **EM316EFAN/S4** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1550 | 29 | 40 - 110 |
| **EM316EFAN/S5** | 10/100Base-TX Auto-Negotiation to100Base-FX SM | Ethernet/Fast Ethernet | RJ-45/DSC | 1550 | 33 | 45 - 130 |
| **EM316GCL/M** | 1000Base-TX to 1000Base-SX MM | Gigabit Ethernet | RJ-45/DSC | 850 | DL | 0 - 0.5 |
| **EM316GCL/MX** | 1000Base-TX to 1000Base-LX Extended MM | Gigabit Ethernet | RJ-45/DSC | 1310 | DL | 0 - 2 |
| **EM316GCL/S1** | 1000Base-TX to 1000Base-LX SM | Gigabit Ethernet | RJ-45/DSC | 1310 | 7 | 0 - 10 |
| **EM316GCL/S2** | 1000Base-TX to 1000Base-LX SM | Gigabit Ethernet | RJ-45/DSC | 1550 | 8 | 0 - 30 |
| **EM316GCL/S3** | 1000Base-TX to 1000Base-LX SM | Gigabit Ethernet | RJ-45/DSC | 1550 | 15 | 30 - 60 |

*Default connectors listed, other connectors are optional
**All specifications, distance claims and operational parameters are based on industry average fiber cable performance; 9µ Singlemode performance of 0.25 dB/km for 1550 nm and 0.5 dB/km for 1310 nm, and 62.5µ Multimode performance of 3 dB/km for 850 nm and 1.5 dB/km for 1300 nm. For non-standard fiber applications or additional information contact MRV Communications
DL = Dispersion Limited

## COPPER TO FIBER WITH LIN (continued)

Ordering Info

| Part Number | Function | Protocol | Connectors* Port/Link | Wavelength (nm) | Minimum Loss Budget (dB) | Range** Approx. (km) |
|---|---|---|---|---|---|---|
| **SINGLE FIBER** | | | | | | |
| **EM316EFANSF/S2** | 10/100Base-TX Auto-Negotiation to100Base-FX, SF SM | Ethernet/Fast Ethernet | RJ-45/SC-APC | 1310 | 18 | 0 - 35 |
| **EM316EFANSF/S3** | 10/100Base-TX Auto-Negotiation to100Base-FX, SF SM | Ethernet/Fast Ethernet | RJ-45/SC-APC | 1550 | 18 | 25 - 70 |
| **EM316EFANSF/S4** | 10/100Base-TX Auto-Negotiation to100Base-FX, SF SM | Ethernet/Fast Ethernet | RJ-45/SC-APC | 1550 | 24 | 35 - 100 |
| **EM316EFANSF/S5** | 10/100Base-TX Auto-Negotiation to100Base-FX, SF SM | Ethernet/Fast Ethernet | RJ-45/SC-APC | 1550 | 28 | 50 - 110 |
| **EM316GCLSF/S2** | 1000Base-TX to 1000Base-LX Singe Fiber SM | Gigabit Ethernet | RJ-45/SC-APC | 1550 | 9 | 0 - 30 |
| **EM316GCLSF/S3** | 1000Base-TX to 1000Base-LX Singe Fiber SM | Gigabit Ethernet | RJ-45/SC-APC | 1550 | 12 | 10 - 45 |
| **DUAL WAVELENGTH SINGLE FIBER** | | | | | | |
| **EM316WEFANC/S2** **EM316WEFANT/S2** | 10/100Base-TX Auto-Negotiation to 100Base-FX Dual-Wavelength Single Fiber SM | Ethernet/Fast Ethernet | RJ-45/SC | 1310, 1550 | 15 (@1310 nm) | 0 - 30 |
| **EM316WEFANC/S3** **EM316WEFANT/S3** | 10/100Base-TX Auto-Negotiation to 100Base-FX Dual-Wavelength Single Fiber SM | Ethernet/Fast Ethernet | RJ-45/SC | 1310, 1550 | 22 (@1310 nm) | 10 - 45 |
| **EM316WEFANC/EZX** **EM316WEFANT/EZX** | 10/100Base-TX Auto-Negotiation to 100Base-FX Dual-Wavelength Single Fiber SM | Ethernet/Fast Ethernet | RJ-45/SC | 1550, 1590 | 32 (@1550 nm) | 30 - 130 |
| **EM316WGCLC/S2** **EM316WGCLT/S2** | 1000Base-TX to 1000Base-LX Dual-Wavelength Single Fiber SM | Gigabit Ethernet | RJ-45/SC | 1310, 1550 | 12 (@1310 nm) | 0 - 25 |
| **EM316WGCLC/S3** **EM316WGCLT/S3** | 1000Base-TX to 1000Base-LX Dual-Wavelength Single Fiber SM | Gigabit Ethernet | RJ-45/SC | 1310, 1550 | 24 (@1310 nm) | 25 - 50 |
| **EM316WGCLC/EZX** **EM316WGCLT/EZX** | 1000Base-TX to 1000Base-LX Dual-Wavelength Single Fiber SM | Gigabit Ethernet | RJ-45/SC | 1550, 1590 | 30 (@1550 nm) | 30 - 120 |

*Default connectors listed, other connectors are optional
**All specifications, distance claims and operational parameters are based on industry average fiber cable performance; 9µ Singlemode performance of 0.25 dB/km for 1550 nm and 0.5 dB/km for 1310 nm, and 62.5µ Multimode performance of 3 dB/km for 850 nm and 1.5 dB/km for 1300 nm. For non-standard fiber applications or additional information contact MRV Communications
DL = Dispersion Limited

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