

Datasheet

Optical Amplifiers



Overview

Fiber Driver® EM316EDFA modules provide a multi-function, low-noise, Erbium-Doped Fiber Amplifier (EDFA) solution ideal for metro Dense Wavelength Division Multiplexing (DWDM) as well as single wavelength distance extension applications.

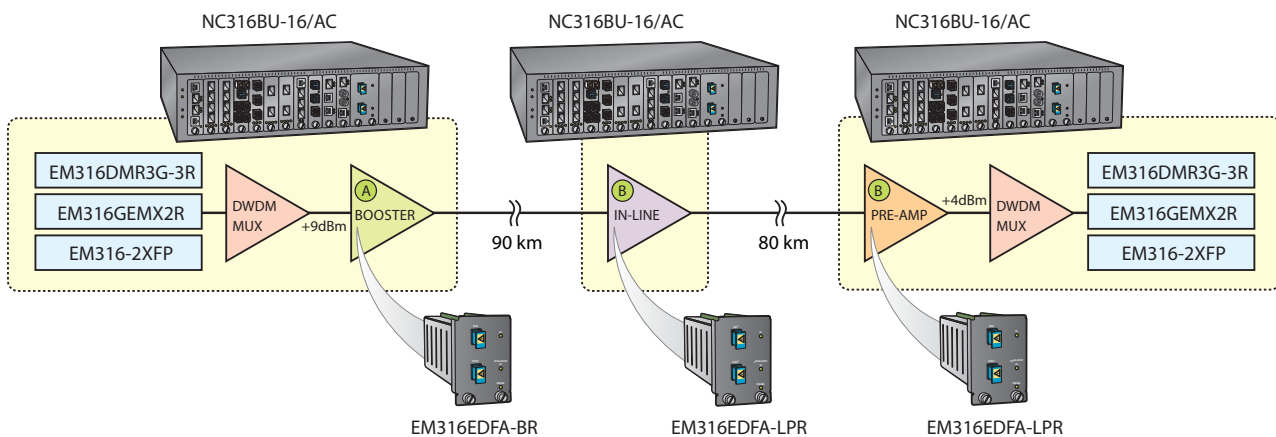
The EM316EDFA-BR, EM316EDFA-SBR, and EM316EDFA-LPR are part of the Fiber Driver optical multi-service platform solution family. The EM316EDFA-BR and EM316EDFA-SBR are optical boosters that extend transmission range. The EM316EDFA-LPR may be either an in-line repeater or a pre-amplifier that can strengthen weak signals, optionally extending the link range as well. By performing two functions, the EM316EDFA-LPR also reduces some inventory requirements.

The EM316EDFA modules employ a state-of-the-art optical design and sophisticated control circuitry. This technology provides constant gain even when wavelengths are added or dropped in the network. Any fluctuations caused by wavelength filtering are handled by ultra-fast transient suppression.

Features

- Three models
 - EM316EDFA-BR (booster amplifier)
 - EM316EDFA-SBR (single wavelength booster)
 - EM316EDFA-LPR (in-line and pre-amplifier)
- Applications
 - Metro DWDM distance extension
 - Single wavelength distance extension
- Automatic Gain Control (AGC)
- Managed and non-managed operation
- Advanced performance monitoring
 - Input and output power levels
 - Signal gain
 - Temperature
 - Supply voltage
- Gain flattening filters (GFF) on BR and LPR models
- Manual (SNMP management) and automatic power shutdown
- Status LEDs
 - Input power OK
 - Output power OK
- Hot-swap support
- Fiber Driver® two-slot and sixteen-slot chassis compatibility

Long Haul Application



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When paired with the Fiber Driver Network Management Module (EM316LNXXNM-OT), full monitoring and configuration capabilities are supported locally with serial RS-232 and remotely with RJ-45 and SFP Ethernet interfaces. Telnet and secure shell (ssh) provide convenient access for remote command line management while MegaVision Pro®, a network management system (NMS) from MRV, provides a graphical user interface (GUI) to control the modules using SNMP. Either way, costly service calls are greatly reduced.

EM316EDFA advanced performance monitoring capabilities include real time reporting of input and output power levels, temperature, and signal gain.

Optical amplifiers operate in three basic modes, depending upon their position in a data link: booster, in-line, and pre-amplifier. At the transmission end of the link, a booster amplifies the initial signal to extend the signal range. In the middle or at the receiving end of an optical link, the sensitive receiver of an in-line or pre-amplifier repeats the signal for extended range or clarity at the end of the link.

In WDM systems, input levels are sums of all the individual input levels from each input wavelength to the amplifier. Contact MRV support for more specific information.

EM316EDFA optical amplifiers use automatic gain control (AGC). The module maintains constant gain for each channel according to the gain parameter setting as long as the total output power does not exceed the maximum rated value (see Saturated Output values). The module is initialized with factory values configured for multi-channel applications.

As a state-of-the-art multi-channel DWDM optical amplifier, the EM316EDFA-BR and EM316EDFA-LPR are equipped with gain flattening filters (GFF) providing a flat gain response across the entire C-band and input power range. This feature is not required in the EM316EDFA-SBR module.

The EM316EDFA optical amplifiers provide automatic power shutdown when input falls below the threshold. Power shutdown may also be forced through the module management.

Fiber Driver EM316EDFA modules are compact, two-slot wide modules. The two-slot chassis supports the EM316EDFA modules in unmanaged applications, and the sixteen-slot chassis supports unmanaged mode or managed optical amplifier applications with the EM316LNXXNM-OT module. Other chassis do not support the two-slot EM316EDFA modules.

Contact your MRV Communications representative or visit <http://www.mrv.com> for additional information on Fiber Driver EM316EDFA modules and applications.

Specifications

Diagnostic LEDs	Power On, Input Optical Power (in range), Output Optical Power (in range)
Electrical Requirement	Power provided by chassis
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	50 mm x 75 mm x 175 mm deep (2" x 3" x 7" deep)
Weight	Approximately 272 g (9.6 oz)
Power Usage	1.5 - 6 W
Regulatory Compliance	FCC Part 15, Class A; IC, Class A; EMC Directive: Emission (Class A) and Immunity; EMC: LVD Directive: Electrical Safety (Laser Class 1M, TUV certified); RoHS Directive; China RoHS; WEEE Directive: Wheelie Bin Mark



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Optical Specifications (EM316EDFA-BR and EM316EDFA-SBR)

Parameters		Minimum	Typical	Maximum	Units
Spectral Range		1528	-	1563	nm
Saturation Output (@ +9dBm input)		18	-	-	dBm
Booster Small Signal Gain (@ -9dBm input)		-	9	-	dB
Expected Input Levels		-9	-	+9	dBm
Gain Flatness (BR only)		-	-	+/- 1.0	dB
Noise Figure	EM316EDFA-BR	-	6.5	7	dB
	EM316EDFA-SBR	-	5.5	6	
Polarization Mode Dispersion		-	0.3	0.5	ps
Polarization Dependent Gain		-	+/- 0.2	+/- 0.5	dB
Transient Overshoot (10 dB drop)		-	0.5	1.0	dB

Optical Specifications (EM316EDFA-LPR)

Parameters		Minimum	Typical	Maximum	Units
Spectral Range		1528	-	1563	nm
Saturation Output (@ -10dBm input)		15	-	-	dBm
In-line/Pre-amp Small Signal Gain (@ -25dBm input)		-	25	-	dB
Expected Input Levels		-25	-	-10	dBm
Gain Flatness		-	-	+/- 1.0	dB
Noise Figure		-	4.5	5.5	dB
Polarization Mode Dispersion		-	0.3	0.5	ps
Polarization Dependent Gain		-	+/- 0.2	+/- 0.5	dB
Transient Overshoot (10 dB drop)		-	0.5	1.0	dB

Ordering Information

Model	Function	Connectors Input / Output
EM316EDFA-BR	DWDM C-band EDFA booster optical amplifier, 2 slots	SC/SC
EM316EDFA-SBR	DWDM single wavelength EDFA booster optical amplifier, 2 slots	SC/SC
EM316EDFA-LPR	DWDM C-band or single wavelength EDFA in-line/pre-amplifier optical amplifier, 2 slots	SC/SC

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