



LaserPlus Model LP-OA EDFA



OPERATING MANUAL

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SAFETY

Safety Precautions

The optical emissions from the units are laser-based and may present eye hazards if improperly used. **NEVER USE ANY KIND OF OPTICAL INSTRUMENT TO VIEW THE OPTICAL OUTPUT OF THE UNIT.** Be careful when working with optical fibers. Fibers can cause painful injury if they penetrate the skin.

Laser Safety Procedure

ALWAYS read the product data sheet and the laser safety label before powering the product. Note the operation wavelength, optical output power and safety classifications.

If safety goggles or other eye protection are used, be certain that the protection is effective at the wavelength emitted by the device under test **BEFORE** applying power.

ALWAYS connect a fiber to the output of the device **BEFORE** power is applied. Power should never be applied without an attached fiber. If the device has a connector output, a connector should be attached that is connected to a fiber. This will ensure that all light is confined within the fiber waveguide, virtually eliminating all potential hazard.

NEVER look at the end of the fiber to see if light is coming out. **NEVER!** Most fiber optic laser wavelengths (1310nm and 1550nm) are totally invisible to the unaided eye and will cause permanent damage. Shorter wavelength lasers (e.g., 780nm) are visible and are very damaging. Always use instruments, such as an optical power meter, to verify light output.

NEVER, NEVER, NEVER look into the end of a fiber on a powered device with **ANY** sort of magnifying device. This includes microscopes, eye loupes and magnifying glasses. This **WILL** cause a permanent and irreversible burn on your retina. Always double check that power is disconnected before using such devices. If possible, completely disconnect the unit from any power source.

If you have questions about laser safety procedures, please call Olson Technology before powering your product.

INTRODUCTION

The Olson Technology, Inc. LaserPlus Model LP-OA Erbium Doped Fiber Amplifier (EDFA) is a cost-effective, full featured Optical Amplifier compatible with the *LaserPlus* product line manufactured by Olson Technology, Inc. Designed for optical amplification of CATV or L-Band signals, the LP-OA EDFA is ideal for CATV Hybrid Fiber Coax (HFC) applications and Fiber-to-the-Premise (FTTP) deployments using Active/Passive Optical Network (AON/PON) architectures. The LP-OA offers simple plug and play operation,

The Model LP-OA EDFA utilizes a high-quality, EDFA gain module that provides optical output powers ranging from +13dBm to +18dBm at the rated optical input power of +3dBm over a wavelength range from 1540nm to 1560nm. The EDFA has low electrical power dissipation. That maximizes reliability by minimizing self-heating.

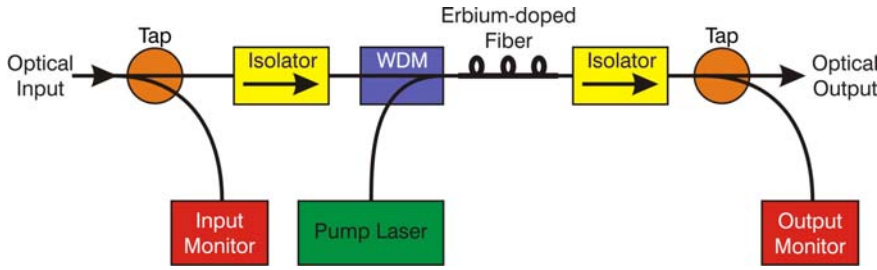


Figure 1 — Block Diagram of LP-OA EDFA

GENERAL FEATURES

The LP-OA includes five front panel indicators for *Optical Input Power*, *Optical Output Power*, *Laser Temperature*, *Pump Enable* and *Pump Status* that allow the health of the unit to be assessed at a glance. The unit also provides extensive SNMP capability that includes the ability to read the following parameters; *Optical Input Power*, *Optical Output Power*, *Module Temperature*, *Pump Laser Current*, *Pump Laser Power*, *Pump Laser Temperature* and alarms for *High Current*, *High Temperature*, *Temperature Stable* and *Laser Enable*.

PANEL LAYOUT

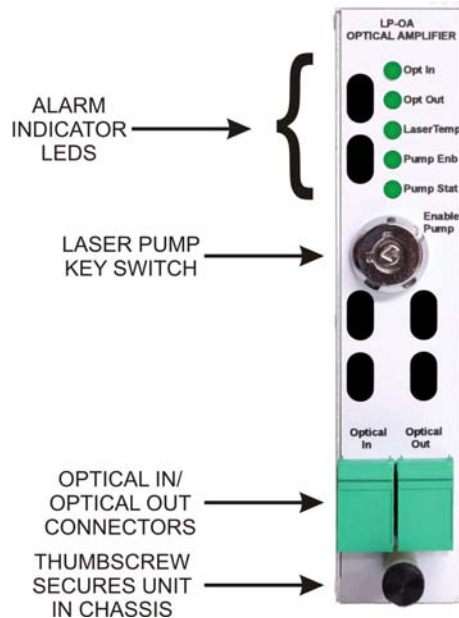


Figure 2 — EDFA Front Panel Layout

Technical Specifications

	Minimum	Typical	Maximum	Units
Optical Specifications				
Optical Output Power ¹	+13		+22	dBm
Optical Input Range ²	-6		+4	dBm
Gain with -30dBm Opt. In		31		dB
Gain with +3dBm Opt. In		13		dB
Noise Figure	5		6.5	dB
Pump Power Leakage		-30		dB
Optical Return Loss	45			dB
Optical Connector		SC/APC		
Electrical Specifications				
Power Supply Voltage		+5		V _{DC}
Power Supply Current		600		mA
Power Consumption		3		W
Environmental Specifications				
Operating Temperature	0		+50	°C
Storage Temperature	-10		+60	°C
Humidity ³	5		95	%
Physical Characteristics				
Weight		1		lb.
		2.2		kg
Dimensions (W x D x H)	4.5 H x 0.96W x 8.75D			in.
	114 H x 24.4W x 222 D			mm

Notes

- Optical power output options are as follows:

Part Number	Optical Output Power
LP-OA-13-SA	+13dBm
LP-OA-14-SA	+14dBm
LP-OA-15-SA	+15dBm
LP-OA-16-SA	+16dBm
LP-OA-17-SA	+17dBm
LP-OA-18-SA	+18dBm
LP-OA-19-SA	+19dBm
LP-OA-20-SA	+20dBm
LP-OA-21-SA	+21dBm
LP-OA-22-SA	+22dBm

- Recommended input power range. Lower optical powers will give a red light.
- Humidity is RH non-condensing.

Performance Graphs

Figure 3 shows the typical gain of the LP-OA EDFA. It is easiest to understand the operation of an EDFA once you realize that they are saturated output power devices. In other words, they tend to put out full power regardless of what the input conditions are. This makes the gain of the EDFA's versus the optical input power look very odd. Figure 3 shows the typical behavior of a +17dBm optical output power EDFA. Figure 3 suggests that the gain of the EDFA drops as the optical input power is increased. In fact, for optical inputs above about -10dBm, the optical output power is a constant +17dBm.

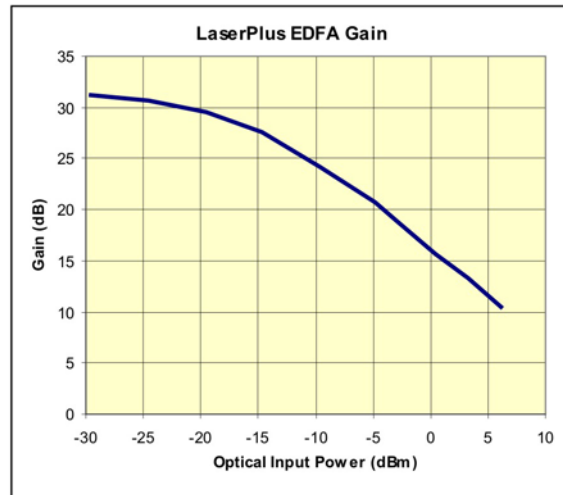


Figure 3 — Typical EDFA Gain

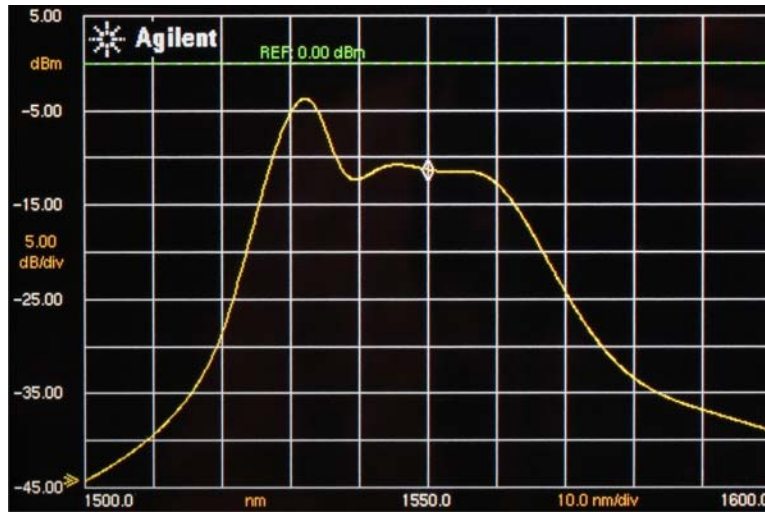


Figure 4 — Typical EDFA ASE Spectrum

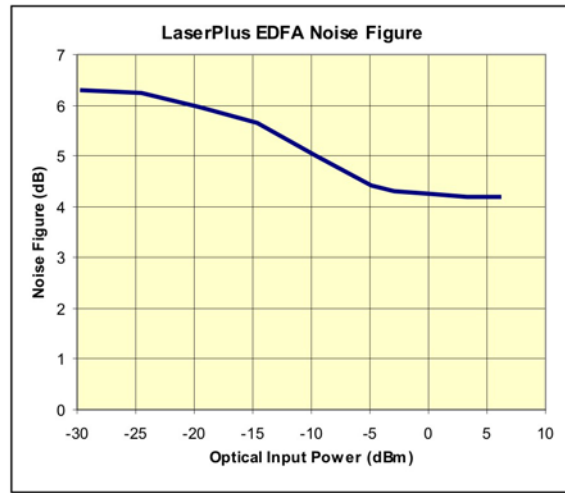


Figure 5 — Typical EDFA Noise Figure

DESCRIPTION OF STATUS ALARM

The front panel indicator LED indicator may be red, green, or off. When the LED is green the EDFA is operating properly. When the LED is off, the unit is off. A red LED indicates an alarm condition. The LP-OA includes five front panel indicators for Optical Input Power, Optical Output Power, Laser Temperature, Pump Enable and Pump Status that allow the health of the unit to be assessed at a glance. The unit also provides extensive SNMP capability that includes the ability to read the following parameters; Optical Input Power, Optical Output Power, Module Temperature, Pump Laser Current, Pump Laser Power, Pump Laser Temperature and alarms for High Current, High Temperature, Temperature Stable and Laser Enable.