

## PRODUCT BRIEF

### KEY FEATURES

- ▶ Raman gain measurement and automatic gain control (AGC)
- ▶ Class 1M\* laser safety classification
- ▶ Detection of optical supervisory channel (OSC)
- ▶ Detection of open connectors and/or broken fiber up to few tens of kilometers from the pump module
- ▶ Optional high power connector cover switch safety mechanism
- ▶ Supports both co- and counter-propagating configurations
- ▶ Up to 18 dB average gain for G.652 fiber (three-pump model)
- ▶ Gain flattening optimization based on fiber type and pump power. Option for GFF
- ▶ PDG <0.3 dB (triple-pump solution), <0.6 dB (dual-pump solution)
- ▶ 1RU network-ready rack-mountable packaging
- ▶ Support for SNMP

### APPLICATIONS

- ▶ Long repeaterless links (e.g. island hopping, desert ranges and oil rigs)
- ▶ Low latency links (less FEC and O-E-O conversion)
- ▶ Storage area networks (SANs), remote locations, disaster recovery
- ▶ Security-sensitive applications
- ▶ Traversing challenging spans within multi-spans links
- ▶ Improving OSNR in long-haul and ultra-long haul links
- ▶ 40 Gb/s and 100 Gb/s transmission and/or increasing channel count to 80+ WDM channels

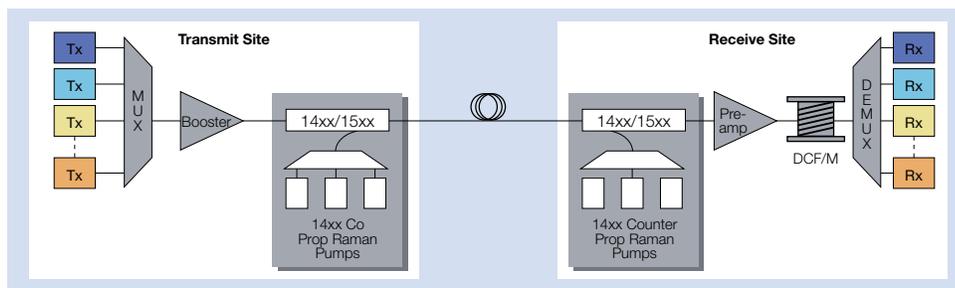
### OVERVIEW

Finisar's UltraSpan™ Raman is an intelligent pump unit for distributed Raman amplification applications. The Raman is part of the UltraSpan product family, a comprehensive portfolio of amplification equipment designed to address the challenges of ultra-long repeaterless links and long spans within multi-span links. The product is packaged in a 1RU rack-mountable network-ready unit, including built-in GUI and SNMP communications, and can thus be operated as a fully independent network element.

This amplifier is comprised of an intelligent Raman pump unit containing up to three 14xx nm semiconductor diode pump lasers, and full comprehensive electronic control. The pump unit provides up to 18 dB Raman gain for G.652 fiber (SMF), allowing a repeaterless link to be extended by up to 7 dB. Using patent pending technology, the Raman pump unit can operate in full automatic gain control (AGC) mode, thus allowing the Raman gain to be set with an accuracy of +/-0.7 dB.

The UltraSpan Raman is classified as Class 1M\* with respect to laser safety. The pump unit includes four parallel, nondependent eye safety mechanisms that shut down the unit in case of a fiber link disruption, including open connectors (both PC and APC) or broken fiber, even at a distance of a few tens of kilometers from the unit. This unique and comprehensive safety mechanism is extremely important due to the high pump power required for distributed Raman applications.

The Raman amplifier is also available as a module that can be integrated on a line card. Additionally, for stronger Raman requirements Finisar offers the High Power Amplification Terminal, a 3RU rack-mounted unit, capable of generating up to 2 W 14xx nm output power.



## KEY OPTICAL SPECIFICATIONS

Parameter	Specifications			Remarks
	Min.	Max.	Unit	
Wavelength Range	1529	1565	nm	
Wavelength Range, OSC	1500	1520	nm	
Input Power Range	-40	+5	dBm	At line port with Raman off
Input Power Range, OSC	-50	-10	dBm	
Maximum Pump Power		550 850	mW	2 pumps 3 pumps
Average Gain (G.652 fiber)		12 18	dB	Typical for 2 pumps Typical for 3 pumps
Gain Setting Accuracy in AGC Mode		+/- 0.7	dB	
Gain Flatness		0.9 1.2 <0.5	dB	2 pumps 3 pumps With GFF
Signal Insertion Loss		1.8	dB	
OSC Insertion Loss		1.8	dB	
Noise Figure		-1	dB	Worst case at typical gain At lower gains NF can reach 0 dB
PDG, PDL		0.3	dB	For triple pump model For dual pump model PDG <0.6 dB
PMD		0.2	psec	
OSC Drop Isolation	30		dB	CDRH 1040.10, IEC 60825-1
Laser Safety	Class 1M*			
Monitored Parameters	Pump power, signal power (either co- or counter-propagating), line back-reflection at 1400-1500 nm band and 1500-1520 nm band, sub modulation on OSC power			

## MECHANICAL, ENVIRONMENTAL, ELECTRONIC SPECIFICATIONS

Parameter	Specifications			Remarks
	Min.	Max.	Unit	
Dimensions (WxHxD)	430x44x280		mm	1RU
Front Panel Connectors	Communication: RJ45, 9-Pin D Type Power: 2 x 15-Pin Type			Supports Ethernet, RS232, and SNMP ver 2 and 3, or web server
High E2000 Cover Switch	Mechanical protection for eye safety			Optional
Fans	4			Including hot-swappable backup fan
Alarm LEDs	Output power, eye safety, communication, fan			Two color LEDs are used: Green - OK Red - Fault
Operating Environment Temperature	-5	+55	°C	
Storage Temperature	-40	+85	°C	
Humidity	5	90	%	
Standards	ETSI, NEBS Level 3			
Supply Voltage	-36 to -76		V	
Power Consumption	55		W	3 pumps
Supply Current @ 48 V Supply	1.5		A	3 pumps

\* Class 1M products are not hazardous under normal circumstances, but may pose an eye hazard when the laser output is viewed with certain optical instruments (for example eye loupes, magnifiers and microscopes) within a distance of 100 mm

