VALIANT COMMUNICATIONS

VCL-9009 : EDFA Optical Amplifier

Product Overview:

VCL-9009, EDFA Optical Amplifier is designed to amplify and boost an optical input and transmit it, without additional mid-span signal repeaters, over extended single mode optical spans. The optical transmitter of the VCL-9009 is designed to increase the output power so that the input optical signal may be transmitted over an extended distance.

VCL-9009 is a high stability output power EDFA (Erbium Doped Fiber Amplifier) which may be used to provide an optical signal gain of up to 20dBm. The stability pump laser and unique ATC (automatic temperature control) and AGC (automatic gain control) circuits incorporated in the unit ensures excellent optical characteristics and high stability that allow the unit to operate over a wide temperature range and harsh environmental conditions. The high stability and high precision OAM (Operation and Management) interface uses a strong password control and provide secure access and advanced monitoring capabilities. The unit can be securely monitored and managed remotely using SSH and SNMPv3.

Advanced GFF (gain flattening filter) with excellent optical path design ensure a linear, low noise optical output.

The optical circuit is designed especially for digital optical fiber communication system including:

1. Lower noise figure
2. The high output booster and high sensitivity pre-amplifier improve the system loss budget.
3. Broad input power range and output power is user adjustable.

VCL-9009, provides a highly secure management interface which can also be incorporated in any third-party network management system which uses standard SSH and SNMPv3 communication protocols. The OAM (Operation and Management) include 10/100BaseT Ethernet, USB and Serial RS-232 interfaces. MIB file is also provided with the equipment for integration with third-party NMS.

Key Features and Highlights:

1. Supports SNMPv2 and SNMPv3 protocol for remote management and monitoring.
2. Supports extensive alarm and statistics reporting.
3. Supports SSH for secure (encrypted) communications.
4. Supports password-controlled access with password strength monitoring.
5. Provides time-stamped alarm and event logging.
6. Supports NTP and IEEE 1588v2 PTP clock synchronization options for accurate time-stamping of all alarms and events.
7. Supports dual (1+1 redundant) power inputs.
8. Suitable for use in ruggedized environmental deployments. May be used over an extended temperature range between -10C and +60C.
9. Complies with CISPR 32, Class A conducted and radiated emissions norms.
10. Provides a wide range of power supply input options including 24V DC, 48V DC, 110V DC, 220V DC and 110/240V, 50/60Hz.
11. Available in a compact, industrial, corrosion resistant, 19” rack mount chassis.
12. Supports AGC (Automatic Gain Control) optical gain output and APC (Automatic Power Control) with user settable gain options.
13. Covers C-Band: Carrier 40 or 80 channels.
14. Supports wide range (-20dBm ~ +5dBm) input optical power.
15. LED indication to show the alarm status.
16. Temperature monitoring with temperature controlled variable fan speed cooling.

Access and Control:

- Secure, password-controlled access with password strength monitoring
- SNMPv3 management protocol for management and monitoring
- Time-stamped alarm and event logging
- NTP and IEEE 1588v2 PTP clock synchronization options for accurate time-stamping of all alarms and events
  - NTP time synchronization option to synchronize time-stamp with NTP Server
  - IEEE 1588v2 Slave emulation option to synchronize time- stamp with PTP Grandmaster (Power Profile).

Extended distance applications using the VCL-9009, Optical (EDFA) Amplifier:

Interfaces	Optical-loss budget	Wavelength
IEEE C37.94	62dB	1550nm Single-mode with Valiant's SFPs.
STM-1 / OC-3	59dB	
STM-4 / OC-12	55dB	
STM-16 / OC-48	44dB	
STM-64 / OC-192	26dB	
1G Ethernet	44dB	
10G Ethernet	26dB	

Management and Monitoring:

- Serial RS232 and USB interfaces for local terminal access
- 10/100BaseT Ethernet Interface for remote access over an IP network
- Encrypted Password Protection
- Telnet (with clear text disable option)
- SSH - Secured remote access using Secure Shell Protocol over IP links
- SNMPv2 / SNMPv3 Traps and NMS for secure, real time remote monitoring
- Centralized NMS option for remote monitoring and management of up to 2,000 units from central site over an IP network
- Visual LED alarms
- Dry contact external alarm relay to connect an external alarm on an annunciator panel, which can be wired up for either NO or NC condition.

Power Consumption:

- < 20 Watts.

Power Supply Options:

- 24V DC, range 18V DC~32V DC
- 48V DC, range 36V DC~70V DC
- 110V DC/ 220V DC, range 110V~250V DC
- 110V AC / 220V AC, 50/60Hz
- Dual / redundant power supply inputs.

CE Compliance:

- Low Voltage Directive 2014/35/EU for 24V DC and 48V DC powered units
- Electromagnetic Compatibility 2014/30/EU

Other Regulatory Compliances:

- RoHS,
- CE Marking
- Complies with FCC Part 68 and EMC FCC Part 15

Technical Specifications:

Optical Booster Amplifier – Characteristics:

Parameter	Min.	Typ.	Max.	Units	Remark
Wavelength Range	1529	1550	1561	nm	
Output Power	-	-	+17	dBm	
Gain	-	-	20	dB	
Flatness	-	1.0	1.5	dBm	@typical gain
Input Power[1]	-20	-	5	dBm	
Output Power Stability	-	±0.1	dB		
NF (In=0dBm, λ=1550nm)	-	5.0	5.5	dB	@max Output, typical gain
PMD (Polarization Mode Dispersion)	-	-	0.5	Ps	
PDG (Polarization Dependent Gain)	-	-	0.3	dB	
RL (Optical Return Loss)	45	-	-	dB	
Pump Leakage at Input & output	-	-	-30	dBm	
Eye Safety	Class1 M.Based on. - Pump Back Reflection - ASE in 1500-1520 band				

*[1] *When input power is lower than -26dBm, the unit shall send out an alert and when input power is lower than -28dBm, pump laser output shall be turned off.*

Electromagnetic Standards Compliance:

- EN 50081-2
- EN 50082-2
- IEC 61000-6-2 (immunity)
- IEC 61000-6-4 (emission)
- Complies to IEEE and IEC standards.

Physical Dimensions

- Rack mounting: Standard 1U, 19-Inch. Rack Mount
- H x D x W: 44 x 341 x 483 mm
- Weight: 2.5 kg.

Environmental:

Operating Temperature	-20 C to +60 C
Maximum Operating Humidity	95% R.H., non-condensing
Maximum Operating Altitude	Up to 3,000 meters above sea level
Operation	Complies with ETS 300 019 Class 3.2
Storage Temperature	-40 C to +70 C
Storage	Complies with ETS 300 019 Class 1.2
Maximum Storage Humidity	98% R.H., non-condensing
Maximum Storage Altitude	Up to 3,000 meters above sea level
Transportation	Complies with ETS 300 019 Class 2.3

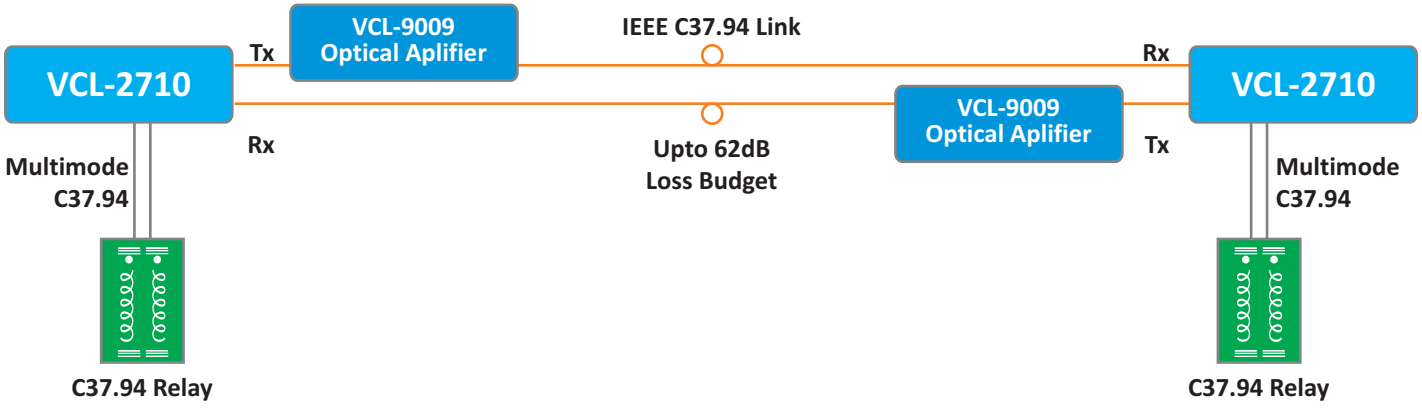
EMI, EMC, Surge Withstand and other Compliances:

EN 50081-2	EN 50082-2	IEC 60068-2-29
IEC 61000-4-6 (Conducted Immunity)	IEC 60068-2-6	IEC 60068-2-2
IEC 60068-2-78	IEC 60068-2-1	IEC 60068-2-14
CISPR 32 / EN55032 Class A (Conducted Emission and Radiated Emission)		
IS 9000 (Part II Sec. 1-4, Part III Sec. 1-5, Part IV, Part 14 Sec. 1-3)		
IEC 60870-2-1	IEC 61000-4-5	IEC 61000-4-8
IEC 61000-4-3 (Radiated Immunity)		IEC 61000-4-2
IEC 61000-4-11	IEC 61000-4-4	

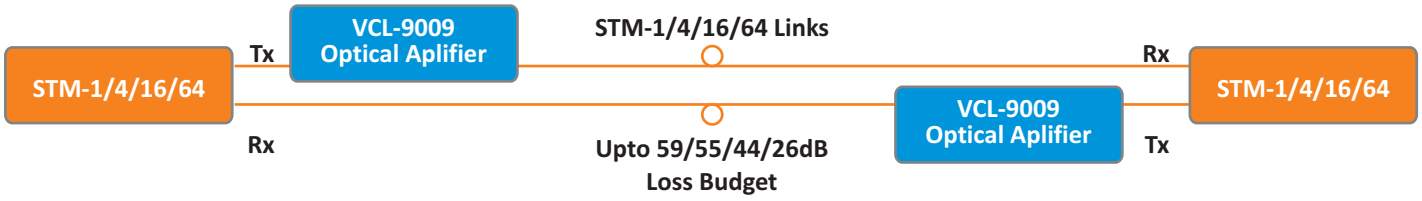
- ESD, Voltage and Surge Withstand: Meets and exceeds IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5, Level 3 specifications.
- Immunity to Voltage Dips, Short Power Supply Interruptions and Voltage Variations meets and exceeds IEC 61000-4-11, Level 1 specifications.

Application Diagram:

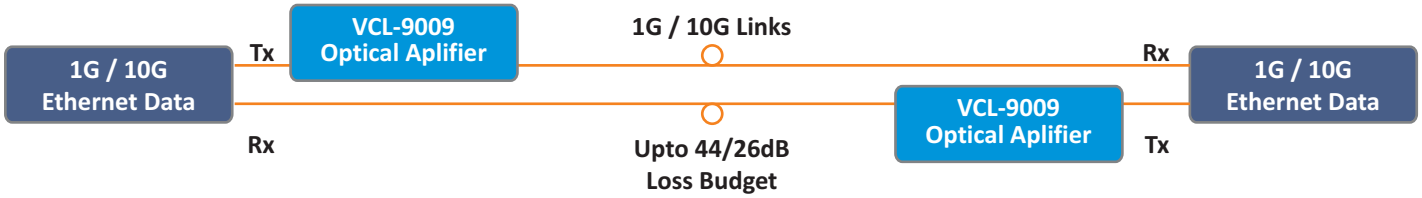
Application #1



Application #2



Application #3



Ordering Information:

Part#	Description
VCL-9009-20	VCL-9009, EDFA Optical Amplifier, 20dBm Output Power 19-inch 1U High Rack Mount version **Installation Kit:** System Core Cables, Mounting Hardware [# Add Power Supply Options – as required]

Add Power Supply Option (Any One Option):

Part#	Description
AC220	1 x 110~240V, 50/60Hz,AC Power Supply Input
DC024	1 x 24VDC Power Supply Input
DC048	1 x 48VDC Power Supply Input
DC220	1 x 110V~250VDC Power Supply Input
AC220R	2 x 110~240V, 50/60 Hz, AC Power Supply Input [Redundant]
DC024R	2x 24VDC Power Supply Input [Redundant]
DC048R	2 x 48VDCPower Supply Input [Redundant]
DC220R	2 x 110V~250VDC Power Supply Input [Redundant]
ACDC024	1 x 110~240V AC, 50/60 Hz, Power Supply Input 1 x 24VDC Power Supply Input
ACDC048	1 x 110~240V AC, 50/60 Hz, Power Supply Input 1 x 48VDC Power Supply Input
ACDC220	1 x 110~240V AC, 50/60 Hz, Power Supply Input 1 x 110~250VDC Power Supply Input
DC024DC220	1 x 24V DC Power Supply Input 1 x 110~250VDC Power Supply Input
DC048DC220	1 x 48VDC Power Supply Input 1 x 110~250VDC Power Supply Input
DC024DC048	1 x 24VDC Power Supply Input 1 x 48VDC Power Supply Input

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Technical specifications are subject to changes without notice.
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