VALIANT COMMUNICATIONS

Product Overview:

Valiant's 'VCL-PG, 16/32E1 Packet Monitoring Solution' may be used to groom up to 16 / 32 x E1 channels and convert their payload to RFC 5086, RFC 5087 and RFC 4553 compliant Ethernet Packets.

The 'VCL-PG, 16/32E1 Packet Monitoring Solution' is equipped with a highly reliable clock recovery mechanism for low jitter and wander control, even under variable network conditions.

The 16/32 x E1 Port 'VCL-PG, 16/32E1 Packet Monitoring Solution' provides 4xGigabit combo Ethernet ports for Ethernet link redundancy, and QoS by implementing 802.1Q based VLAN, Differentiated Services (Diffserv/DSCP), Port based Priority and 802.1p packet priority classification protocols for network optimization. Port mirroring is also available so that the copy of same data may be output to duplicate servers for "Server" redundancy.

Applications of VCL-PG, 16/32E1 Packet Monitoring Solution:

The VCL-PG, 16/32E1 Packet Monitoring Solution has been designed for "lawful data intercept' and "call monitoring" applications and may be used to convert the payload of the E1 channels that are being monitored to RFC compliant Ethernet packets, which can then be routed to / monitored by "lawful data intercept' and "call monitoring" Servers that are used for national security applications.

Application Diagram:

E1 Clock recovery and synchronization techniques:

- Recovered Clock (RCLK) / Loop-Timed Clock
- Asymmetrical (One-Clock and Two-Clock) Clock
- Synchronization to an External Clock (ECLK)
- Synchronization to an Internal Clock
- Automatic clock priority selection with fall back
- Plesiochronous Clocking.

RFCs Supported:

RFC 5086	Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (12/2007)
RFC 5087	Time Division Multiplexing over IP (12/2007)
RFC 4553	Structure-Agnostic Time Division Multiplexing (TDM) over Packet (06/2006)

Key Features - VCL-PG, 16/32E1 Packet Monitoring Solution:

- Supports 16 / 32 independent E1 interfaces.
- Supports IP, MPLS and MEF8 (Metro Ethernet) tagging.
- Supports three E1 framing modes - Framed, Unframed and Multi-Framed E1 channels.
- Absolute and Differential timestamps.
- Jitter and Wander conforms to G.823 / G.824 and G.8261 and TDM specifications.
- RJ45 - 120 ohms balanced and 75 ohms un-balanced E1 interfaces options.
- 4 GigE Combo Ethernet ports
- 4 x 10/100/1000BaseT Copper Ports.4 x 1000BaseFX Optical Fiber Ports.
- 1+1 Ethernet link redundancy.

Key Highlight - VCL-PG, 16/32E1 Packet Monitoring Solution:

- User configurable MTU (payload) packet size up to 1800 Bytes.
- Configurable payload size for each bundle
- Supports 802.1Q based QoS, 802.1p packet priority.
- Port Based Priority (Classifying Services)
- Port / Customer based bandwidth allocation (Port Rate Limiting)
- MPLS, MEF and UDP tagging for Ethernet traffic.
- Separate IP Address for TDM traffic and equipment management
- VLAN tagging for TDM traffic and equipment access / management
- Single / Double 802.1 VLAN tagging (Q in Q VLAN Tagging) - User configurable.

Hardware Highlights:

- 19-Inch rack mountable, 1U form factor (44mm high)
- 1+1 Redundant Power Supplies, AC and DC, or AC plus DC
- Extended Temperature Range: (-20^0 C to +60^0 C)
- EMI / EMC Complaint
- Real time battery backed clock with life in excess of 10 years.

Key Features Explained:

- **Port Based Priority (Classifying Services)** – Port based Priority feature allows the user to assign priority to the individual Ethernet ports, so that traffic can be regulated according to the port on which that service is connected. The user may also assign highest priority to TDM (E1/E3) traffic and Ethernet services on a lower priority.
- **VLAN Based Priority (Classifying Services)** – VLAN based Priority feature allows the user to assign priorities to different VLANs carrying various types of services / traffic according based on user categories and preferences. The user may assign highest priority to TDM (E1/E3) traffic and Ethernet services on a lower priority. User may also configure which TDM link should be given preference over the other TDM links when the uplink bandwidth falls below a particular threshold.
- **Flow Control in an Ethernet Packet Networks (Regulating Traffic)** – Flow Control feature allows the user to regulate Ethernet traffic flow to minimize packet loss due to data bursts.
- **Port Mirroring** – Provide duplicate copies of monitored data on a 2nd Ethernet Port.

Key Features Explained:

- **Port Based Priority (Classifying Services)** – Port based Priority feature allows the user to assign priority to the individual Ethernet ports, so that traffic can be regulated according to the port on which that service is connected. The user may also assign highest priority to TDM (E1/E3) traffic and Ethernet services on a lower priority.
- **VLAN Based Priority (Classifying Services)** – VLAN based Priority feature allows the user to assign priorities to different VLANs carrying various types of services / traffic according based on user categories and preferences. The user may assign highest priority to TDM (E1/E3) traffic and Ethernet services on a lower priority. User may also configure which TDM link should be given preference over the other TDM links when the uplink bandwidth falls below a particular threshold.
- **Flow Control in an Ethernet Packet Networks (Regulating Traffic)** – Flow Control feature allows the user to regulate Ethernet traffic flow to minimize packet loss due to data bursts.
- **Port Mirroring** – Provide duplicate copies of monitored data on a 2nd Ethernet Port.

System Management, Monitoring and Alarm Interfaces:

- NMS (Network Management System) to monitor multiple units from single Central Location.
- External Alarm - Dry contact relay alarms are also available at rear of the system to connect the system to an external alarm.
- Supports system temperature monitoring with High Temperature threshold and Low Temperature threshold alarms and SNMP Traps.
- Supports SNMP V2 Monitoring and Traps.
- Self-test for checking system errors upon system boot up.
- Event Logging.
- Clock Performance Alarms.
- Performance Alarms.
- Performance Monitoring and Diagnostics.

System Access, Control and Management Options:

- Telnet.
- CLI Control Interface (HyperTerminal or VT100).
- SNMP V2 Traps (MIB File provided).
- Windows based GUI (Graphical User Interface) for easy configuration, management and access. Ability to monitor multiple units from a single NMS.

Management Port Options:

- RS232 Serial Port.
- USB COM Port.
- 10/100/1000BaseT Ethernet

Technical Specifications

VCL-PG, 16/32E1 Packet Monitoring Solution Packetizer Engine:

Max number of logical links	Up to 128
Synchronization clock Recovery	- Recovered Clock (RCLK)/ Loop-Timed Clock - Asymmetrical (One-Clock and Two-Clock) Clock - Synchronization to an External Clock (ECLK) and an Internal Clock - Automatic fall back
Max number of Ethernet	- 4 x Gigabit Optical Ethernet Ports (SFP) - 4 x 10/100/1000Base-T Electrical Ethernet
Note: may use a combination of any 4 ports only.	
Supported Transport CESoPSN	ETF-PWE3, SAToP, in accordance with RFC 5086, RFC 5087 and RFC 4553
Supported PSN (Packet Switched Networks) type	UDP, IP, MPLS and MEF
QoS	802.1q, 802.1p packet Priority

E1 Interface

Number of E1 Channels	16 / 32 (supporting 64Kbps upto 2.048Mbps on each port)
Framing Formats	Unframed, framed and Multi-frame (with or without CRC-4)
Line Coding	HDB3
Compliance	ITU-T G.703, G.704, G.706 and G.732
Jitter and Wander	Complies to ITU-T G.823, G.824
Line Impedance	120 Ohms balanced - Optional 75 Ohms
Protection	- Optional Metallic and Longitudinal Protection - ESD protection

Ethernet Interface

Number of Ports	- 4 Gigabit optical ports and - 4 GigE (electrical) ports, complies with IEEE802.3, 802.1Q and 802.1P *Note: may use a combination of any 4 ports only.*
Electrical	10/100/1000 Auto-negotiation / MDI-X (Auto-sensing), Full-Half Duplex, RJ45 Electrical Connector
Optical	1000Base-FX (Gigabit Ethernet), SFP
Protection	ESD protection
Maximum Frame Size	9000 Bytes (Jumbo Frames)
Switching Capacity	Upto 6 Gbps, Non-blocking

Gigabit Optical Ethernet Specifications

Type	SFP
Compliance	- Compliant with IEEE 802.3z
	- Fast Ethernet 1000BASE-LX
	- MSA Compliant
	- RoHS
	- EMI
	- ESD
	- DDM
Safety	Class 1 Laser Safety / IEC-60825 Compliant
Bit Rate	1.25 Gbps
Wavelength	1310 / 1550 nm
Distance	550m to 80Kms, as per order
Optical Connector	LC

Power Consumption

- Power Consumption <20 Watts

Power Supply Options

- Dual Redundant
- 1+1 AC power (100 to 240V AC, 50/60 Hz)
- 1+1 DC (-48V) power (40 to 72V DC)
- 1+1 DC (-24V) power (18 to 40V DC)
- AC plus DC (AC + DC), AC or DC
- EMI/EMC compliant.

Command Language

- Windows based GUI (Graphical User Interface).
- Command Line Interface (English text commands)

Management and Control Interfaces

- COM Port (RS232 Serial Port)
- 10/100/1000BaseT Ethernet Port (each multiplexer may be assigned an IP address and connected to a LAN / IP network for remote access and management through the 10/100/1000BaseT Ethernet Port for in-band configuration, management and access).
- Telnet
- SNMP, V2
- Additionally, a Windows based GUI (Graphical User Interface) for easy configuration, management and access.

AC Power Supply Specifications

Input AC Voltage	110 / 220 Volts AC
Range of input AC voltage	100 V to 240 V AC, 50Hz/60Hz.
AC Input Connector	IEC Connector

24V DC Power Supply Specifications

Power Supply	24V DC
Range of input	18V to 40V DC
Input voltage reversal protection	Provided
Under voltage protection	< 4.85V
Over voltage protection	> 5.15V
Efficiency at full load	> 90% @ 5V/4A (when input voltage 24V)
Ripple at full load	< 5mVrms
Spike at full load	< 50mV

48V DC Power Supply Specifications

Power supply	-48V DC
Range of input	-40V DC to -72V DC
Under voltage protection	< 4.85V
Over voltage protection	> 5.15V
Efficiency at full load	> 91% @ 5V/2A (When Input Voltage -48V)
Ripple at full load	< 5mVrms
Spike at full load	< 50mV

Environment

Temperature	-20^{0}C ~ +60^{0}C for Operation
Humidity	5% to 95% (at 35^{0}C) Non-condensing

Regulatory Compliance

- Safety - IEC 60950 Safety - IEC 60950
- CE
- RoHS
- Complies to ANS/IEC standards
- Complies with Telecom Part 68, FCC Part 15 and CISPR 22 Class A
- EMC EN55022: 1998 + A1 and A2
- EMC EN55024,
- Operation ETS 300 019 Class 3.2
- Storage ETS 300 019 Class 1.2
- Transportation ETS 300 019 Class 2.3

External Alarms:

- Dry Contact Relay - 2 Form C
- Rated upto 72V DC, 1 Amp.

Chassis:

- 1U High (44mm)
- 19-inch rack-mounting shelf
- Also available in Desktop / Table Top Version.

Mechanical Specification

Height	44 mm (1U)
Depth	260 mm
Width	480 mm (19 inch rack mountable)
Weight	4 Kgs.

NMS (with Telnet) OAM port Specifications

Network Interface	RJ-45 10/100/1000BaseT (Auto sensing)
Compatibility	Ethernet Version 2.0 IEEE802.3
Protocols supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP
Management	SNMP, Serial login, Telnet login
EMI Compliance	- Radiated and conducted emissions complies with Class B limits of EN55022:1998 - Direct and Indirect ESD complies with EN55024: 1999 - RF Electromagnetic Field Immunity complies with EN55024:1998 - Electrical Fast Transient/Burst Immunity complies with EN55024:1998 - Power Frequency MagneticField Immunity complies with EN55024:1998 - RF Common Mode Conducted Susceptibility complies with EN55024:1998

Ordering Information

S. No.	Part #	Product Descriptions	Remarks

1	VCL-PG-16E1
	GE-4OE-2120
		VCL-PG, 16E1 Packet Monitoring Solution
		19-inch 1U Rack Mount version
		Supports:
		- Upto 16 x E1 [RJ45 (F)]
		- 4 x Ethernet Ports (1000Mbps, Gigabit)
		  (4 x Electrical or Optical Ethernet port in any combination – User Configurable)
		  - 4 x Electrical Ethernet Ports [RJ45 (F)]
		  - 4 x Optical Ethernet Ports [SFP based / without SFPs]
		- High Stability Timing, Ultra Low Noise OCXO
		- 1 x System Core Cables, Installation Accessories, Documentation,
		  System User Manual / Disk (Set)
		- OAM [SNMP, Telnet (RJ45 Port) and Serial Port (USB and DB-9 COM Port)]
		  * Add Power Supply Option from below
			CORE UNIT without PSUs.

2	VCL-PG-32E1
	GE-4OE-2120
		VCL-PG, 32E1 Packet Monitoring Solution
		19-inch 1U Rack Mount version
		Supports:
		- Upto 32 x E1 [RJ45 (F)]
		- 4 x Ethernet Ports (1000Mbps, Gigabit)
		  (4 x Electrical or Optical Ethernet port in any combination – User Configurable)
		  - 4 x Electrical Ethernet Ports [RJ45 (F)]
		  - 4 x Optical Ethernet Ports [SFP based / without SFPs]
		- High Stability Timing, Ultra Low Noise OCXO
		- 1 x System Core Cables, Installation Accessories, Documentation,
		  System User Manual / Disk (Set)
		- OAM [SNMP, Telnet (RJ45 Port) and Serial Port (USB and DB-9 COM Port)]
		  * Add Power Supply Option from below
			CORE UNIT without PSUs.

Power Supply Options

1	AC220	1 x 100-240V AC Power Supply Input	Any One Option.
2	DC048	1 x (-) 48V DC Power Supply Input	
3	ACDC	1 x 100-240V AC Power Supply Input 1 x (-) 48V DC Power Supply Input	
4	AC220R	2 x 100-240V AC Power Supply Input [Redundant]	
5	DC048R	2 x (-) 48V DC Power Supply Input [Redundant]	

Gigabit Ethernet SFP Options

1	VCL-EMOD 0206	1.25Gbps SFP Transceiver Duplex LC, 850nm, 550m, MMF	Maximum 2 SFPs per CORE UNIT.
2	VCL-EMOD 0205	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 10Km, SMF	
3	VCL-EMOD 0231	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 20Km, SMF	
4	VCL-EMOD 0255	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 40Km, SMF	
5	VCL-EMOD 0155	1.25Gbps SFP Transceiver Duplex LC, 1550nm, 40Km, SMF	
6	VCL-EMOD 0256	1.25Gbps SFP Transceiver Duplex LC, 1550nm, 80Km, SMF	

Ordering Information

S. No.	Part #	Product Descriptions	Remarks
		Cables and Accessories Options	
1	VCL-HRNS 1280	1E1 75 Ohms Connectorized Cable [RJ45M-2BNCF, 28cm]	As per Site Requirement.
2	VCL-HRNS 1229	Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, SM]	
3	VCL-HRNS 1238	Optical Patch Cord Connectorized Cable [2LC-2LC, 10m, SM]	
4	VCL-HRNS 1242	Optical Patch Cord Connectorized Cable [LC-FC, 10m, SM]	
5	VCL-HRNS 1243	Optical Patch Cord Connectorized Cable [2LC-2FC, 10m, SM]	
6	VCL-HRNS 1239	Optical Patch Cord Connectorized Cable [LC-SC, 10m, SM]	
7	VCL-HRNS 1258	Optical Patch Cord Connectorized Cable [2LC-2SC, 10m, SM]	
8	VCL-ECON 1172	Connector (Attenuator LC-LC (10 db.))	
9	VCL-ECON 1173	Connector (Attenuator LC-LC (20 db.))	
10	VCL-ECON 1186	Connector (Attenuator FC-FC (10 db.))	
11	VCL-ECON 1187	Connector (Attenuator FC-FC (20 db.))	
12	VCL-ECON 1197	Connector (Attenuator SC-SC (10 db.))	
13	VCL-ECON 1198	Connector (Attenuator SC-SC (20 db.))	

Note:
1. SPFs to be added if 1000BaseSX/LX (Optical) Ethernet Ports are required.
2. Redundant power supply to be added, if required.
3. Select VCL-HRNS 1280 for E1 75 Ohms BNC (F).

Technical specifications are subject to changes without notice.
All brand name and trademarks are the property of their respective owners.
Revision 1.6 - September 28, 2018