VCL-Ethernet over Multi E1 (4/8/16E1)
10/100Base-T / 100Base-FX to 4/8/16E1 Interface Converter

Product Brochure & Data Sheet

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Product Overview

Valiant's Ethernet over 4/8/16E1 Converter allows the user to send Ethernet data, between two points, over E1 Links. E1 Interfaces are 75 Ohms / 120 Ohms. Ethernet Interface options may be ordered as 10/100 Base-T Electrical Ethernet or 100Base-FX Optical Ethernet over 850nm **/** 1310nm / 1550nm single mode optical fiber interfaces.

This equipment is available in 4E1, 8E1 and 16E1 Port versions.

The equipment must be always installed and used in pairs, with one terminal being installed at either end of the E1 Link.

The VCL-Ethernet over 4/8/16E1 Converter is an Ethernet extension device, which utilizes TDM telecom infrastructure (the telecom network of E1s, or of PDH, SDH and E1/E3/SDH microwave etc.) for carrying Ethernet data. It converts the Ethernet data into E1 frame format for transmission over the existing TDM (E1) links and then re-converts the E1 back into Ethernet data at the far-end terminal, to BRIDGE two Ethernet LANs over the existing E1 based telecom network. The device can effectively utilize the existing TDM network to transport Ethernet data at low investment.

Features and Highlights

- Provides 4 Ethernet 10/100BaseT (Electrical) Ports for each converter
- Optional provides 3 Ethernet 10/100BaseT (Electrical) Ports and 1 Ethernet (Optical) Port for each converter
- Supports VCAT (virtual concatenation) and LCAS (link capacity adjustment scheme) protocol, and complies with ITU-T G.7042 Specifications
- Mapping to E1 complies with ITU-T G.7043 and G.8040 specifications
- Supports VLAN tagging as per 802.1Q
- Supports 802.1 based QoS feature
- Supports base priority classification for incoming 802.1Q packets
- Supports IEEE 802.1p standard recommended Class of Service traffic categorization
- Supports 802.1P priority classification for ingress packets
- Provides 4 different user selectable ratios (0:1, 1:2, 1:5 and 1:10) for delivery of high and low priority packets
- Supports 802.1 p based classification of 802.1Q based VLAN Packets which provides a mechanism for implementing Quality of Service (QoS)
- User selectable ports for enabling / disabling the QoS service
- Supports port based priority if the Equipment fails to classify the 802.1Q packets
- Supports port based Ethernet bandwidth limit for ingress traffic
- Port based Ethernet limit allows user to provide different speed for the different customers to utilize bandwidth according to their requirement
- Supports differential delay of up to 120ms on E1 Links
- Complies with IEEE 802.3 specifications
- Supports X.86, LAPS and HDLC transmission protocols
- Supports 10M / 100M, Half / Full duplex and auto-negotiate mode.

- Configurable frame size upto 1916 bytes (MTU size)
- Supports GFP-F encapsulation complying with ITU-T G.7041
- Provides Automatic smooth adjustment of Ethernet bandwidth as per the availability of carrier (E1) links
- Alarm Display select switch
- Provides error frame statistic
- Supports automatic removal and addition of E1 Links without interrupting current services
- Available with MAC address list filtration, learning and updating functions
- A large external SDRAM buffering for handling data bursts
- Supports two synchronization clock modes, Internal clock and Network clock (Loop-Timed clock).

Salient Features

- Data rate recovery after restoration of lost E1 (LCAS)
- Automatic data rate management according to number of available E1 links
- Maximum cable length supported (upto 1000 feets / 333 meters)

Alarms and Indicator Monitoring

- Power Indicator
- General Alarm Indicator for E1 and Ethernet Link
- Descriptive E1 alarm by alarms select DIP switch
- E1 Alarm for individual E1 port (1-16)
- Code Violation History (CV_HIS) Alarm on E1 port
- Loss Of Signal (LOS) Alarm on E1 port
- Group ID (GID) mismatch alarm
- Generic Framing Procedure (GFP_LOF) Loss Of Frame Alarm
- Ethernet Link Indicator
- Ethernet Speed Indicator
- Ethernet History Error Alarm (ETH_ERR)
- SNMP Diagnostic and Monitoring.

Management Control

- 10/100BaseT Ethernet management interface
- RS232 serial management interface
- Remote (Telnet) management interface
- Windows XP based Graphical User Interface (GUI)
- Windows 7 based Graphical User Interface (GUI)
- SNMP V2 Monitoring
- NMS (Network Management System) for monitoring multiple units from a single / central location.

Application

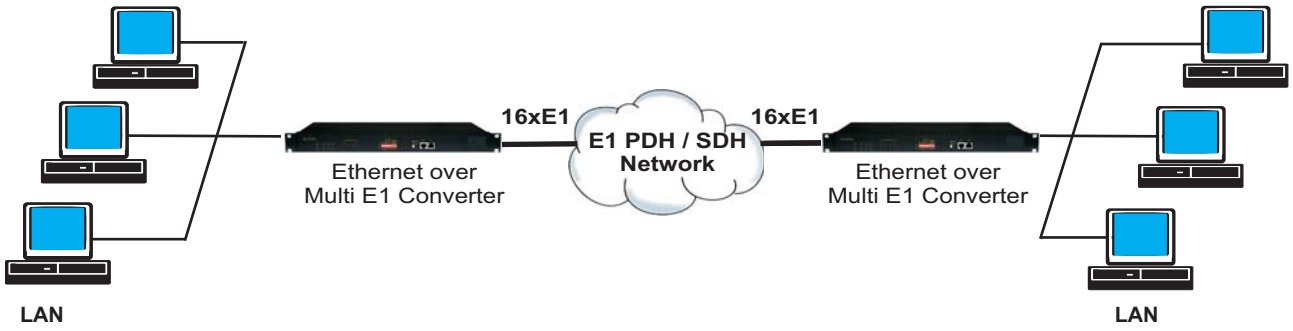
The equipment may be used for the following purposes:

1. Bridging Ethernet LANs over existing TDM (E1) telecom network.
2. Extending Ethernet networks utilizing TDM (E1) landline based telecom infrastructure.
3. Using telecom network of E1s/PDH/SDH microwave etc. carrying E1s to transport Ethernet data.
4. Interconnecting DSLAMS to Central Routers over PDH/SDH telecom networks.
5. Interconnecting IP based GSM base stations.
6. Interconnecting WiMax base stations.

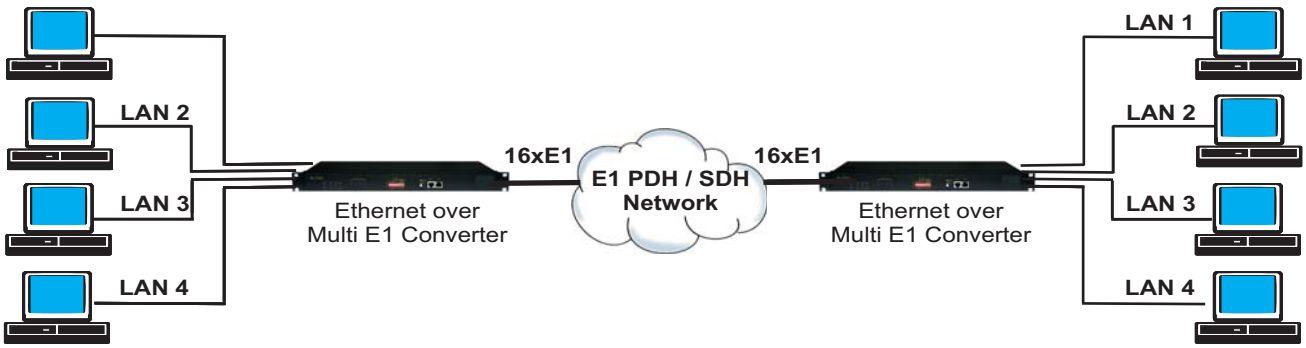
In all cases the equipment must be always installed and used in pairs, with one terminal being installed at either end of the network.

Typical Application

Shared link mode



Discrete Link Mode



The IEEE 802.1p standard recommends the Class of Service traffic categories described in Table below:

Priority	Type of Traffic	Equivalent Application Traffic
0 (lowest)	Best effort	Ordinary LAN priority traffic
1	Background	File transfers, games, AIM
2	(spare)	Not used
3	Excellent effort	For critical users applications
4	Controlled load	For important applications
5	Video, < 100ms latency and jitter	Video application or mix with Voice
6	Voice, < 10ms latency and jitter	Voice application
7 (highest)	Network control	Critical traffic to maintain network

Technical Specifications

E1 Interface Specifications

Number of E1 interfaces	4/8/16 E1 interfaces (optional)
Line Rate E1	(2.048 Mbps ± 50 bps)
Line Code	HDB3
Framing	Un-Framed
Frame Structure	As per ITU-T (CCITT) G.704
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	120 Ohms / 75 Ohms (optional)
Nominal Pulse Width	244ns
Connector	RJ-45 (F) for 120 Ohms / BNC for 75 Ohms

Ethernet Interface Specifications

Number of Ethernet Interface

10/100BaseT (Electrical)	4
10/100BaseT (Electrical) + 100BaseFX Optical	3 Electrical and 1 Optical

Ethernet Interface Specifications - 10/100BaseT (Electrical)

Interface types	10/100BaseT
Standards compliance	IEEE 802.3
Transmission bit rate	10/100BaseT limited to Max. 2.048 Mbps
MTU size (frame size)	Upto 1916 bytes
Connectors	RJ-45 (10/100BaseT Electrical)
Supports VLAN tagging as per 802.1Q	
Supports 802.1 based QoS feature	
Supports IEEE 802.1p standard recommended Class of Service traffic categorization	
Supports Port based Ethernet bandwidth limit for ingress traffic	

WAN Protocol

Type	PPP
MTU size	Upto 1916 bytes
Delay compensation	Upto 120 ms
Supports VCAT (virtual concatenation) and LCAS (link capacity adjustment scheme) protocol, and complies with ITU-T G.7042 Specifications	
Mapping to E1 complies with ITU-T G.7043 and G.8040 specifications	
Supports X.86, LAPS and HDLC transmission protocols	
Supports GFP-F encapsulation complying with ITU-T G.7041	

Internet Bridge

LAN Table	Learns upto 5000 MAC Addresses
Operation Mode	VLAN-aware, VLAN-unaware
Filtering and Forwarding	Transparent or filtered

Ethernet Interface Specifications 100Base FX (Optical) - 850nm Multi Mode

Transmitter Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Center Wavelength	830nm	850nm	860nm
Output Spectral Width (RMS)			0.85nm
Average Output Power	-10dBm		-3dBm
Output Optical Eye	Complaint with ITU-T G.957		
Connectors	FC		

Receiver Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Receive Sensitivity	-24dBm		
Maximum Input Power			-3dBm
Operating Wavelength		850nm	
Connectors	FC		

Ethernet Interface Specifications 100Base FX (Optical) - 1310nm Single Mode

Transmitter Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Center Wavelength	1260nm	1310nm	360nm
Output Spectral Width (RMS)			6nm
Average Output Power	-15dBm	-12dBm	-8dBm
Output Optical Eye	Complaint with ITU-T G.957		
Connectors	FC		

Receiver Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Receive Sensitivity	-32dBm		
Maximum Input Power			-15dBm
Operating Wavelength	1100nm		1600nm
Connectors	FC		

Ethernet Interface Specifications 100Base FX (Optical) - 1550nm Single Mode

Transmitter Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Center Wavelength	1480nm	1550nm	1580nm
Output Spectral Width (RMS)			4nm
Average Output Power	-15dBm	-12dBm	-8dBm
Output Optical Eye	Complaint with ITU-T G.957		
Connectors	FC		

Receiver Optical Characteristics

Parameter	Minimum	Typical	Maximum
Optical Ethernet Data Rate		125Mb/s	
Receive Sensitivity	-32dBm		
Maximum Input Power			-15dBm
Operating Wavelength	1100nm		1600nm
Connectors	FC		

Clock Selection Options

- Internal clock
- Network clock or Looptimed clock (receiving clock from any E1 link)

E1 RJ-45 (Female) Pinout details

120 Ω RJ-45 (Female) Pinout		
PIN No.	**Definition of function**	**Signal Direction**
1	TX+ (transmitted data +)	E1 Data Input
2	TX- (transmitted data -)	E1 Data Input
3	NC	
4	RX+ (received data +)	E1 Data Output
5	RX- (received data -)	E1 Data Output
6	NC	
7	NC	
8	NC	

Ethernet RJ-45 (Female) Pinout details

Ethernet RJ-45 (Female) Pinout		
PIN No.	**Definition of function**	**Signal Direction**
1	TX+ (transmitted data +)	Data Output
2	TX- (transmitted data -)	Data Output
3	RX+ (received data +)	Data Input
4	NC	
5	NC	
6	RX- (received data -)	Data Input
7	NC	
8	NC	

Power Supply (Options)

AC Mains Input	100 V AC to 240 V AC (50Hz / 60 Hz)
DC Mains Input	-48V DC (36V to 72V)
Power Consumption	≤9W

Services Conditions

Ambient temperature	-20^{0}C ~ +65^{0}C
Relative humidity	≤ 90% (at 35^{0}C)

Mechanical Specifications

Height	44mm.
Depth	260mm.
Width	480mm.
Weight	2.7kgs.

Ordering Information

Power Supply Options

S. No.	Option	Description
1	AC Mains Input	100 V AC to 240 V AC (50Hz / 60 Hz)
2	DC Mains Input	-48V DC (36V to 72V)

E1 Impedance Options

S. No.	Option	Description
1	75 Ohms	BNC Connector
2	120 Ohms	RJ45 Connector

Ethernet Connector Options

S. No.	Option	Description
1	4 Electrical	All 4 RJ45 Connectors
2	3 Electrical + 1 Optical	3 RJ45 Connectors + 1 Optical Duplex FC Connector (850nm / 1310nm / 1550nm Optional)

Ordering Information - Ethernet over Multi E1 (4E1/8E1/16E1)

S. No.	Part	Description	Remarks
1	VCL-ETH-***E1O***-***PSU***	Deluxe Model: VCL-Ethernet over Multi E1: (10/100M over E1): Interface conversion bet. G.703 E1 and each 100BaseT (Ethernet over E1 / TDM) 19" Shelf 1U High Rack-Mount Version Supports : - 4 x Ethernet [100Mbps, Electrical RJ45 (F)] - **# E1 Options** [# Add E1 Options (E1O) from below] - 1 x System Core Cables, Installation accessories, Documentation, System User Manual / Disk etc (Set) - Management: CLI, GUI, SNMP ^ Suitable for Point-to-Point application * Add Power Supply Option from below (**PSU**)	CORE UNIT Without E1 and PSUs
2	VCL-ETH-***E1O***-***PSU***-1310SM-040	Deluxe Model: VCL-Ethernet over Multi E1: (10/100M over E1): Interface conversion bet. G.703 E1 and each 100BaseT (Ethernet over E1 / TDM) 19" Shelf 1U High Rack-Mount Version Supports : - 4 x Ethernet [100Mbps] - 3 x Electrical RJ45 (F) and - 1 x Optical, Duplex FC, 1310nm, 40Km, SM] - **# E1 Options** [# Add E1 Options (E1O) from below] - 1 x System Core Cables, Installation accessories, Documentation, System User Manual / Disk etc (Set) - Management: CLI, GUI, SNMP ^ Suitable for Point-to-Point application * Add Power Supply Option from below (**PSU**)	

Add E1 Options (E1O)

S. No.	Part	Description	Remarks
1	4-120	4 x E1 [120Ω RJ45 (F)]	Any one option
2	4-075	4 x E1 [75Ω DB37 (M) with DB37 (F)-BNC (F) Cable Adapter]	
3	8-120	8 x E1 [120Ω RJ45 (F)]	
4	8-075	8 x E1 [75Ω DB37 (M) with DB37 (F)-BNC (F) Cable Adapter]	
5	16-120	16 x E1 [120Ω RJ45 (F)]	
6	16-075	16 x E1 [75Ω DB37 (M) with DB37 (F)-BNC (F) Cable Adapter]	

* Add Power Supply Option (PSU)

S. No.	Part	Description	Remarks
1	AC	1 x 100-240V AC Power Supply Input	Any one option
2	DC	1 x (-) 48V DC Power Supply Input	
3	ACDC	1 x 100-240V AC Power Supply Input 1 x (-) 48V DC Power Supply Input	

Note:

Technical specifications are subject to changes without notice.
All brand names and trademarks are the property of their respective owners.
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