Product Overview

Valiant's 'VCL-E1oP' E1 over Packet (8E1 Port IEEE-1588v2 Version) TDM over IP equipment supports transmission of up to 8 x E1 links over IP / Ethernet, MEF or MPLS Packet Switched Networks (PSNs) and synchronization using IEEE-1588v2 protocol. IEEE-1588 packet synchronization mechanism provides frequency and time-of-day synchronization for all points of the network to a common, single (GPS) source.

Highlights

- Switching Capacity upto 9 Gbps, non-blocking
- 4 x GigE Network Ports Copper, Fiber, or Copper plus Fiber

  Optical SFP based (1000Base-FX) and Electrical (10/100/1000Base-T) Ethernet port options
  - 4 x 10/100/1000BaseT Copper Ports
  - 4 x 1000BaseFX Optical Fiber Ports
    (may use a combination / mix of any 4 Copper or Fiber Ports)
- Less than 4ms latency on the E1 channels
- Synchronize ToD (Time of Day) and Frequency of all nodes to a centralized / common GPS Receiver
- IEEE-1588 packet synchronization mechanism provides frequency and time-of-day synchronization for all points of the network to a common, single source.

Includes the following inputs:
- 1 PPS Input from GPS Receiver (BNC Connector)
- 1 x NMEA Input from GPS Receiver (DB9 Connector)

Includes the following outputs:
- 1 x 1 PPS Output / 1 x IRIG-B Output (50 Ohms, BNC Connector)
- 1 x NMEA Output from GPS Receiver (DB9 Connector)
- 1 x 2.048Mbits Synchronized Clock Output (RJ45 Connector)

E1 Clock recovery and synchronization techniques

- Synchronize to a GPS Input
- IEEE-1588v2 Clock Recovery, IEEE-1588v2 Master / Slave, BCMA (Best Master Clock Algorithim)
- Synchronization to an External Clock (ECLK)
- Adaptive Clock Recovery (ACLK)
- Recovered Clock (RCLK) / Loop-Timed Clock
- Asymmetrical (One-Clock and Two-Clock) Clock
- Synchronization to an Internal Clock
- Automatic clock priority selection with fall back
- Plesiochronous Clocking.

Key Features - E1 and E1 over Packet Engine

- Supports 8 independent E1 interfaces
- Supports CESoPSN, SAToP, IETF-PWE3 (Pseudo-wire) transport mechanisms.
- Supports IP, MPLS and MEF8 (Metro Ethernet) tagging.
- Supports three E1 framing modes - Framed, Unframed and Multi-Framed with CAS signaling.
- Supports point-to-point, point-to-multipoint and drop and insert applications.
- Jitter and Wander exceeds G.812, G.823 / G.824 and G.8261 and TDM specifications.
- RJ45 - 120 ohms balanced E1 interfaces. Optional 75 Ohms BNC interface
- E1 Local and Remote Loop-back (RLOOP) facility for testing and diagnostics.

Key Features - Ethernet / IP Network Interface

- Point-to-point, point-to-multipoint applications based on IP addressing. Supports drop and insert applications.
- Port Control Ingress Rate Limiting.
- 1+1 Ethernet link redundancy
  - Rapid Spanning Tree Protocol.
  - Ethernet Port Trunking.
  - ITU-T G.8032.
- User configurable MTU (E1oP payload) packet size up to 1800 Bytes.
- Configurable payload size for each bundle.
- Switch supports jumbo frame sizes of up to 9728 Bytes.
- Supports 802.1Q based QoS, 802.1p based packet priority.
- Port Based Priority (Classifying Services).
- DSCP and 802.1Q / 802.1p based packet tagging and prioritization.
- Flow Control in an Ethernet Packet Networks (Regulating Traffic)
- Port / Customer based bandwidth allocation (Port Rate Limiting)
- 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.
- Synchronizing traffic management
- Broadcasting Network and Broadcast equipment synchronization.

Integrated 8 Port Electrical Ethernet Switch Card and 8 Port Optical Ethernet Switch Card (Optional)

- Plug-In 8 Port Electrical Ethernet Switch Card (Optional)
  - Electrical Ethernet Card provides 8 x 10 / 100BaseT full-duplex (RJ-45) Ethernet ports.
- Plug-In 8 Port Optical Ethernet Switch Card (Optional)
  - Optical Ethernet Card provides 8 x 100Base-FX Optical (SFP) Ethernet ports.
- Fully managed Layer2 Switches which offer QoS by implementing IEEE802.1p, 802.1Q VLANs and Differentiated Services (Diffserv) and packet priority classification protocols for traffic management and optimization
- The optional Substation Hardened Managed Switch cards are designed to operate in rugged environments even in extreme temperature conditions. No external fans or forced air cooling is required.
- IEC 61850-3 and IEEE 1613 complied.

Applications Cellular / Mobile

- Backhaul 2G and 3G/LTE services using a single Ethernet infrastructure
- Port based Priority feature allows the user to assign priority to the 2G and 3G/LTE traffic ports
- VLAN based Priority feature allows the user to assign priorities to different types of service traffic
- User can assign highest priority to TDM traffic to ensure un-uninterrupted transmission of E1 links even under heavy 3G traffic conditions
- User can configure a particular TDM link should be given preference over the other TDM links
- Flow Control feature allows Ethernet based flow to minimize link disruptions and lost packets due to data bursts
- Ingress Ethernet Rate Limiting allows to assign the bandwidth as per customer requirements
- Separating traffic by applications and classes by assigning 802.1Q based VLANs
- To synchronize cell sites:
- Frequency synchronize all BTSs and BSCs with the MSC using IEEE-1588v2 phase synchronized frequency
- Distribute Time-Of-Day across all nodes of the network with 500ns (0.5 micro-second) accuracy
- Distribute 1 PPS across all nodes of the network
- Distribute NMEA information across all nodes of the network.

Applications Power and Transportation

- Backhaul legacy voice, low speed legacy data and high speed Ethernet services using a single Ethernet infrastructure
- Frequency synchronization across the entire network with IEEE-1588v2 phase synchronized frequency
- Distribute Time-Of-Day across networks with 500ns (0.5 micro-second) accuracy
- Distribute IRIG-B time across the entire network for synchronizing all RTUs, **Synchrophasors** / PMUs and Protection Relays to a common network clock
- Distribute Time-Of-Day across all nodes of the network with 500ns (0.5 micro-second) accuracy
- Applications Include
- Smart Grid
- Air Traffic Control
- Railways
- Road Traffic Management

Hardware Highlights

- 19-Inch rack mountable
- Available in 3U form factor with various connector options
- 1+1 Redundant Power Supplies, AC and DC, or AC plus DC
- Extended Temperature Range: (-40^0 C to +60^0 C)
- EMI / EMC Complaint
- Real time battery backed clock

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 and Low Temperature 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
- Network Performance Alarms
- Network Performance Monitoring and Diagnostics
- Online / remote upgrade of firmware

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
- Password Protection
- Supports SSH and Radius for secured access control

OAM: Operation and Management Ports

- RS232 Serial Port
- USB COM Port
- 10/100/1000BaseT Ethernet Management for In-band remote access.

Power Supply Options

- Dual Redundant Power Supplies
- 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 or DC
- EMI/EMC compliant.

Regulatory Compliance

- Safety - IEC60950
- CERoHS
- 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

NMS (with SSH / Telnet) OAM port Specifications

Network Interface	RJ-45 10/100/1000BaseT (Auto sensing)
Compatibility	Ethernet Version 2.0IEEE802.3
Protocols supported	ARP, UDP/IP, TCP/IP, Telnet, SNMP
Management	SNMP, Serial login, Telnet login

External Alarms

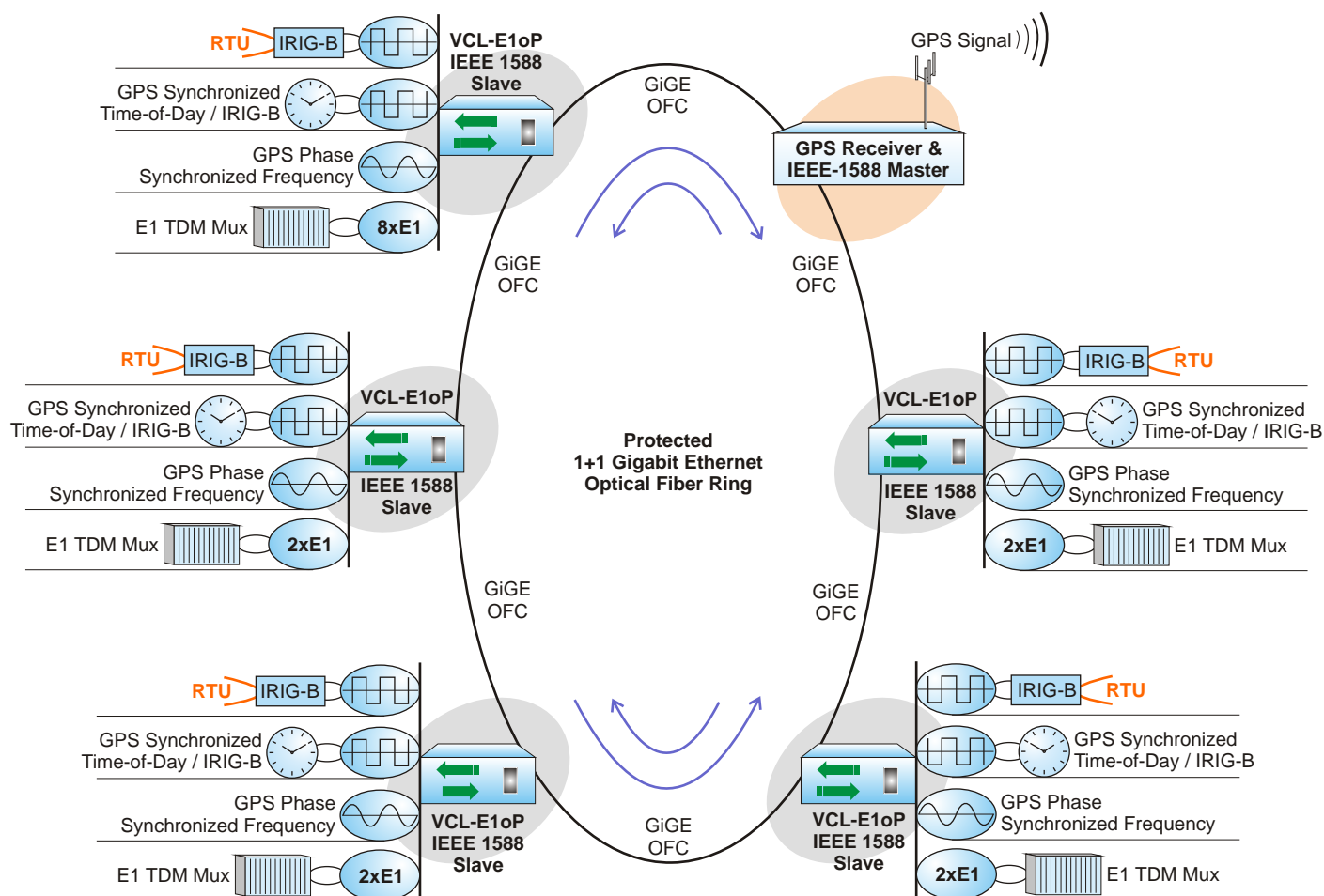- Dry Contact Relay - 2 Form C
- Rated upto 72V DC, 1Amp.

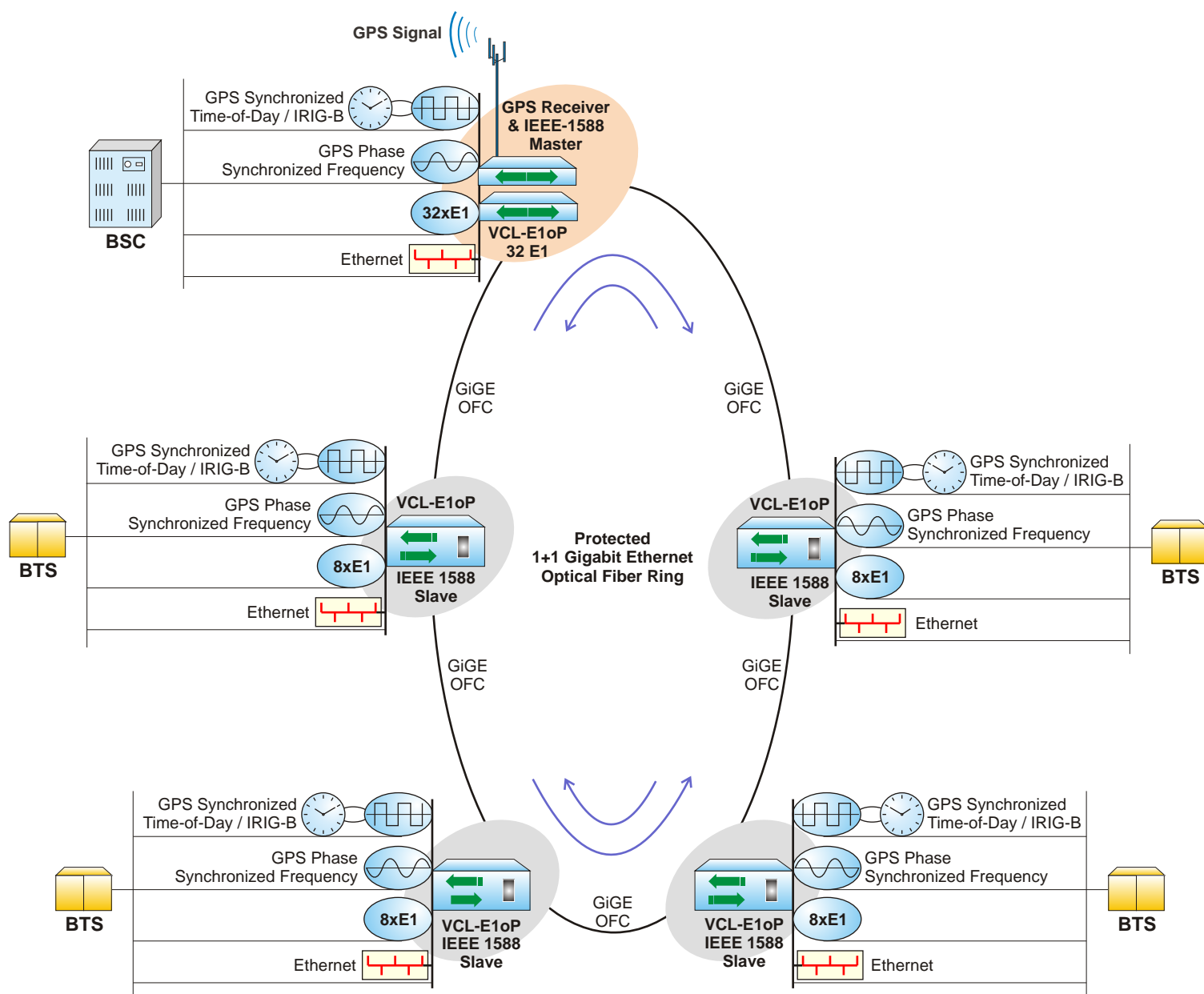## Chassis

- 3U High
- 19-inch rack-mounting

Mechanical Specification

Height	142 mm (3U)
Depth	260 mm
Width	480 mm (19 inch rack mountable)
Weight	5 Kgs.

Application Diagram for Power Utilities

Application Diagram for Cellular Networks

Technical specifications are subject to changes without notice.
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U.K.

Valiant Communications (UK) Ltd
1, Acton Hill Mews,
310-328 Uxbridge Road,
London W3 9QN, United Kingdom

E-mail: gb@valiantcom.com

U.S.A.

Valcomm Technologies Inc.
4000 Ponce de Leon, Suite 470
Coral Gables, FL 33146
U.S.A.

E-mail: us@valiantcom.com

INDIA

Valiant Communications Limited
71/1, Shivaji Marg,
New Delhi - 110015,
India

E-mail: mail@valiantcom.com