

Product Overview

Valiant's VCL-MX Version 6 80 E1 Multiplexer may be used for inter-connecting legacy voice and data networks, provisioning and managing bandwidth on a E1 channelized level as well as 64Kbps, DS-0 time-slot level and as a digital-access cross-connect equipment. Due to the changing traffic patterns, there is a need to support multiple services from the same equipment like integrated data transport, better network management etc. This necessitated evolution to next generation E1 Multiplexer.



Redundant control card and power supply options make it an ideal choice for network service providers seeking to integrate and provide legacy and the next generation services from a single platform.

Next generation E1 Multiplexer has emerged as one of the most economical and technologically viable solutions for transmitting both voice and data over carrier networks. This technology offers savings on investments/power and space to service providers.

Valiant Communications Limited provides efficient solutions in this field using the E1 Multiplexer series products. E1 Multiplexer provides a full range of solutions in this evolving field of next generation telecom solutions. E1 Multiplexer family provides the unique advantage of carrying both data and voice over PDH. In addition to being affordable, these products have built-in modularity, which allow easy upgradeability. This upgradeability feature allows the customer to evolve in a "build-as-you-grow" concept. Along with the Valiant as Network Management solution the E1 Multiplexer family provides the following features:

- Easy network manageability
- Lower cost per line
- Easy upgradeability
- Carrying both data and voice over PDH
- Easy integration to SDH network
- Higher reliability

Key Features

VCL-MX Version 6, 80 E1, 160Mbps Multiplexer provides the advanced features and capabilities, listed below:

- 160Mbps, 80 E1 fully non-blocking cross-connect at 64Kbps (DS-0) level (2480 DS-0 any to any time-slot cross-connect)
- Multi-service platform may be used to provide a wide variety of voice and data services from single chassis
- 1+1 E1 Link Protection / E1 Port Redundancy
- 1+1 Control Card Processor Redundancy
- 1+1 Cross-Connect Redundancy
- 1+1 Timing (Synchronization Clock) Redundancy. User selectable synchronization priority
- 1+1 48V DC Power Supply Redundancy (Dual Power Input allows the equipment to be powered from two separate sources)
- 144 FXO or 144 FXS channels per unit
- 72 E&M 2-wire / 4-wire channels per unit
- Any "mix" of data and voice channels in a single unit
- Universal Slots slot independent system so that any type of interface card may be inserted and used in any card slot
- Supports R2 CAS, ITU-T Q.421 and ITU-T Q.422 signaling
- Supports CAS Custom / User Programmable ABCD signaling
- Bit Error Rate (BER) monitoring BER thresholds to generate BER alarms automatically whenever alarm limits are exceeded
- Supports Long Loops of up to 1200 Ohms
- Supports 75 VRMS and 90 VRSM Ring Voltage Options
- Supports A-law and Mu-law voice coding
- Supports sinusoidal un-balanced ring output
- Provides a ring of ≥ 75 volts RMS into a load of 5 R.E.N. on each channel with a 0.30 Erlang traffic pattern (5 R.E.N. load = 5 parallel phone load on each line)
- May be used in a Point-to-Point, Point-to-Multi point, Add-Drop (drop-insert), Tree and Star topology
- Telnet
- SSH for secured access
- SNMP traps
- Maintains Access Security Log
- In-band and Out-of-band management
- GUI (Graphical User Interface)

Additional Features

- Voice and Digital Data services
- Any combination ("mix-n-match") of Voice and Digital data services deployed from a single VCL-MX "Smart shelf" - 4, 8, 12, 16 channels per card
- Integrated IEEE C37.94 Teleprotection Interface
- 4 Command, Integrated VCL-TP Teleprotection / Protection Coupler Interface Card
- Digital Data option may be used for internet access or video conferencing application
- Wireless applications including Cellular Networks
- Digital Microwave Radio
- SCADA applications
- ATM/Frame Relay circuit termination
- Powerful Network Management System for monitoring and network control
- Compliance with all relevant ITU-T (CCITT) recommendations
- 19-inch, 6U high construction.

Highlights

- Field upgradable to provide voice, data or both services
- Flexibility on use of transmission medium-copper, fiber or wireless
- Choice of Interfaces for Voice and Data Applications
- USB and RS232, Interface for local connection through the serial interface to the "Network Control and Management Software"
- In-band and Out-of-band system configuration and management interface
- Channel assignment independent of slot position in the sub-rack
- Extensive set of alarms
- User Selectable Internal, External and Loop-timed clock synchronization priority options
- Universal slots - any interface card can plug in at any interface slot
- OAM Card.

Security and Password Features:

System Access, Control and Management Options:

- Telnet
- SSH
- CLI Control Interface (HyperTerminal or VT100)
- SNMP V2 Traps (MIB File provided)
- Additionally, a Windows based GUI (Graphical User Interface) for easy configuration, management and access.

OAM: Operation And Management Ports

- RS232 Serial Port (COM Port)
- USB COM Port
- 10/100BaseT Ethernet Port (each multiplexer may be assigned an IP address and connected to a LAN / IP network for remote access and management through the 10/100BaseT Ethernet Port for out-of-band configuration, management and access).

Security and Protection

- Secured Access via SSH V2
- Password Protection: Password Protection in compliance with the mandatory clauses of the GR-815-CORE-2 specifications for secured access control

- Logging: Maintains a log of all successful and unsuccessful attempts. Logged information includes the ID and the IP address of the accessing entities. Alerts the administrator if the unsuccessful logging attempts exceed 3
- Security Audit: All access logs for up to 30 days are maintained for security audit purposes
- Security log entry of any request or activity including that user-ID (including IP address, if applicable), to establish user accountability
- Report Generation / Audit Trail
- Security Administration.

Transmission Mediums

The VCL-MX offers an excellent flexibility on the choice of transmission medium over which it may be deployed. The transmission medium can be either of the following:

- Copper
- Optical Fiber
- Wireless.

Multi-service platform

VCL-MX Version 6 - E1 160Mbps Multiplexer supports both data and voice traffic.

For voice traffic, it supports the following interfaces:

- FXO
- FXS
- E&M (2Wire / 4Wire)
- Hot-Line (Ring-Down)
- Ring Generator (75V RMS)

For data traffic, it supports the following interfaces:

- Channelized E1 / Fractional E1 data
- RS-232 asynchronous data
- Sub-rate multiplexing to provide 4 asynchronous data channels in a single 64Kbps time-slot
- V.24 synchronous data / asynchronous data
- G.703, @ 64 Kbps, co-directional
- V.35, V.36, X.21, V.11, RS530, RS449 synchronous, "n"x64Kbps data
- Relay I/O Card (Dry Relay open/close contact)
- Universal DCE / DTE synchronous "n"x64Kbps data interface
- Ethernet Interface Card - 10/100BaseT
- 8E1 plus 100Mbps Ethernet fiber optical transport interface along with the following:
 - EOW (Engineering Order Wire) channel for end to end installation and maintenance
 - Local and remote loop back for diagnostics
 - 1+1 Fiber Path protection
 - ALS (Auto Laser Shutdown) facility for eye safety
 - 10/100M Ethernet Port - 100 Mbps Ethernet data transmission rate complies with IEEE 802.3
 - IEEE C37.94 Teleprotection Interface

The Multiplexer may be used in Terminal or Drop-Insert configuration to provide:

- Toll Quality Voice Services
- Interconnect LAN (Campus Network)
- Interconnect computer terminals various types of data terminals
- Provide LAN-WAN Interconnectivity.

Configuration and Flexibility

VCL-MX Version 6 - E1 160Mbps Multiplexer can be configured as an Add-Drop Multiplexer (ADM) and Terminal Multiplexer (TMUX). It can support diverse topologies like point-to-point, ring, star and tree.

It can be configured in various topologies supporting both electrical and optical interfaces. It can take modular cards, which would enable the customers to start small and grow as traffic demands scale.

Synchronization

Timing Options	Internal Clock, Loop-Timed Clock, External Clock. User selectable synchronization priority
Synchronization Sources	Internal Clock, span clock timing derived from incoming HDB3 links (Loop-Timed), External Clock, 75 Ohms (TTL), and 2.048 Mbits / 120 Ohms (BITS clock)
Default Option	Internal Clock (Stratum 3)

Application of VCL-MX

POTS (voice), digital data or real-time video conferencing services (V.35, V.36, X.21) high-speed digital data interface options allow point-to-point network solutions for providing a video conferencing channel of up to 1920 Kbps).

- Junction Mux - for digital interconnection of analog exchanges
- Point-to-Point, Point-to-Multi point, Add-Drop (drop-insert), Tree and Star topology applications
- Wireless network applications
- High-speed data ports for digital communication links providing Leased Lines access to Internet Service providers (ISPs) with speeds ranging from 64Kbps up to 1920 Kbps digital data interface options
- Micro-Cellular infrastructure applications for providing cell-switch connectivity
- Wide area networking
- Internet access over POTS lines - All POTS interfaces operate @ 64Kbps and support V.34 (33.6Kbps) dial-up modems.

System Overview and Architectural Details

The VCL-MX Version 6, 80 E1, 160Mbps Multiplexer provides full range of POTS (voice) and digital data services to subscribers located at different locations, requiring to interconnect and establish a voice and data network over an E1 Link. The VCL-MX is a simple, yet powerful E1 Channel Bank for connecting and integrating analog communication equipment with digital E1 services.

The VCL-MX Version 6 80 E1 160Mbps Multiplexer provides cross connect, voice telephony and digital data services for applications, which may include:

- E1 Multiplexer platform has been envisaged to address the growing demand for an ultra-compact Add-Drop Multiplexer (ADM) and provide Ethernet-over-PDH mapping functions. It can be configured in various topologies such as linear, star, ring and bus.

- VCL-MX Version 6 80 E1, 160Mbps Multiplexer has a multi-slot chassis with TDM backplane. In the chassis, there are ten (10) traffic slots meant for tributary cards (line cards). The line cards can support various type of interface cards, which include E1, Voice and very wide variety of Data interfaces.
- Two slots are reserved for 1+1 redundant system / control cards, which include the redundant cross connect, processor and aggregate interface functions. one dedicated slot exists for an OAM card, one for ring generation and two slots for 1+1 redundant power supply.

Safety: Laser protection

The optical interfaces of the VCL-MX Version 6 - E1 160Mbps Multiplexer come with Class 1, Small Form-factor Pluggable (SFP)-based optical line interfaces with digital diagnostics capability for SFPs on the optical interface cards.

Chassis / System Backplane

All connections are made at the rear of the chassis, providing interconnections between the various plug-in cards and to the network. VCL-MX Version 6 - E1 160Mbps Multiplexer and supports high-density PDH cards. The line cards terminate a combination of Voice, Data and E1 Interfaces.

The VCL-MX E1 Multiplexer has a 160 Mbits/sec backplane and provides a host of features including, channel drop and insert facility over a network of VCL-MX E1 Multiplexers, for voice and data applications.

An extensive set of alarms, for easy maintenance are provided in the system.

Power Supply

- -48V DC (nominal), -36V to -72V DC
- Power Consumption \leq 200 watts

Protection

- Remote / FXS (subscriber side) interface is protected against power surges and transients occurring from lightning and electric induction as per ITU-T Rec. K.20 towards line side.

Mechanical Specification

- (HxWxD): 266x 482x 270mm
- Weight: 12.5Kgs.

Environmental

- Temperature: -10°C to +60°C
- Humidity: 95% R.H. (Non-condensing)
- Altitude: Upto 9,000 feet

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 22 / EN55022 Class B (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 61000-4-12
IEC 61000-4-3 (Radiated Immunity)	IEC 61000-4-8	IEC 61000-4-16
IEC 61000-4-2	IEC 61000-4-10	Telcordia GR-1089 Surge and Power Contact
IEC 61000-4-4	IEC 61000-4-11	

- ESD, Voltage and Surge Withstand: Meets and exceeds IEC 61000-4-2, IEC 61000-4-4, IEC 61000-4-5, Level 4 specifications.
- Immunity to Voltage Dips, Short Power Supply Interruptions and Voltage Variations meets and exceeds IEC6 1000-4-11, Level 1 specifications.

Other Regulatory Compliances

- Meets CE requirements
- Complies with FCC Part 68 and EMC FCC Part 15

Technical specifications are subject to changes without notice.
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