



# **VCL-MX Version 6 DXC 80 E1, 160Mbps Digital Access Cross Connect Switch**

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## **Product Brochure**

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## Product Overview

The VCL-MX Version 6 DXC - 80 E1, 160Mbps Digital Access Cross Connect is a modular switch which may be scaled from 8 E1 Ports to up to 80 E1 Ports. The VCL-MX Version 6, E1 DACS (E1 DXC) offers full cross-connect functionality to cross-connect between 64Kbps time-slots (DS-0s), “n”x64Kbps consecutive DS-0s and Fractional E1 channels to full E1 channels.

The VCL-MX Version 6 DXC - 80 E1, 160Mbps Digital Access Cross Connect Switch, occupies 6U high (264 mm) rack-space and is a complete 19-inch standalone unit that provides a 64Kbps time-slot (DS-0) cross-connect fabric for up to 80 E1 ports. This product offers 1+1 -48V DC Power Supply Redundancy, 1+1 Control Card and Processor Redundancy, 1+1 Cross-Connect (TSI) Redundancy, 1+1 Timing (Synchronization Clock Circuitry) Redundancy. This DXC offers “user selectable” clock / timing synchronization priority. The Dual Power Inputs allow the equipment to be powered from two separate power sources. AC input external adapter is an optional for AC mains operation.



## Key Features and Highlights

- 160Mbps, 80 E1 fully non-blocking cross-connect at 64Kbps (DS-0) level (2480 DS-0 any to any time-slot cross-connect)
- Scalable from 8 E1 Ports to 80 E1 Ports
- 1+1 Control Card Processor Redundancy
- 1+1 Cross-Connect / TSI Redundancy
- 1+1 Timing (Synchronization Clock) Redundancy
- 1+1 -48V DC Power Supply Redundancy (Dual Power Input allows the equipment to be powered from two separate -48V DC sources)
- Bit Error Rate (BER) monitoring BER thresholds to generate BER alarms automatically whenever alarm limits are exceeded
- Telnet remote access. SSH for secured remote access
- SNMP traps
- Maintains Access Security Log
- USB and RS232, Interface for local connection through the serial interface to the “Network Control and Management Software”
- User Selectable Internal, External and Loop-timed clock synchronization priority options
- Local and remote loopback facility.

## System Access, Control and Management Options

- Telnet
- SSH
- CLI Control Interface (HyperTerminal or VT100)
- SNMP V2 Traps (MIB File provided)
- GUI (Graphical User Interface).

## OAM: Operation and Management Ports

- RS232 Serial Port
- USB COM Port
- 10/100BaseT Ethernet for remote 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 un-successful attempts. Logged information includes the ID and the IP address of the accessing entities. Alerts the administrator if the un-successful 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.

## System Overview and Architectural Details

VCL-MX Version 6, is a scalable DXC which may be used to cross-connect at DS-0 (64Kbps time-slot level) from 8 E1 Ports to 80 E1 Port (160Mbps). The VCL-MX Version 6 DXC has a multi-slot chassis with TDM backplane. In the chassis, there are ten (10) E1 interface card slots. Each E1 Interface Card has 8 E1 Ports.

Two slots are reserved for 1+1 redundant control cards which includes the redundant cross connect, processor, TSI and clock synchronization / timing functions. One dedicated slot exists for an OAM card and two slots for 1+1 redundant power supply 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 - 80 E1, 160Mbps Digital Access Cross Connect Switch supports high-density E1 interface cards.

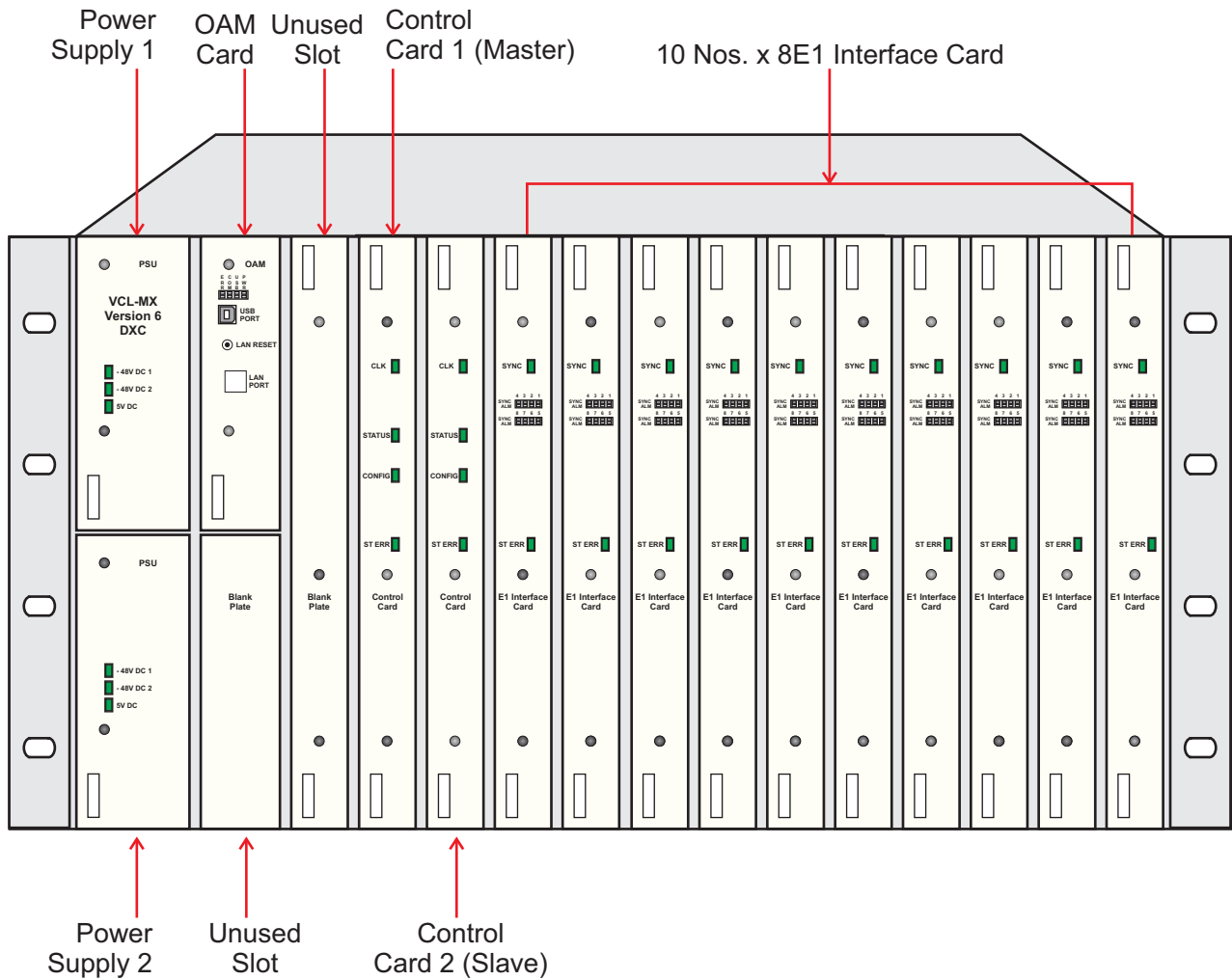
An extensive set of alarms, for easy maintenance are provided in the system.

## Timing (Clock) 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), 2.048 Mbits and 120 Ohms (Bits clock)
Default Option	Internal Clock

## System Management

VCL-MX Version 6 - 80 E1, 160Mbps Digital Access Cross Connect Switch offers a variety of management options. The equipment may be configured using CLI (English text) commands, or a GUI (Graphical User Interface). The management and configuration commands may be executed from a VT100 terminal, Windows HyperTerminal, any DOS based system, Linux or UNIX based system, or Telnet (remote configuration and management).



The equipment provides a wide choice of access ports for connecting to and executing management and configuration commands through its OAM Card.

The OAM card provides:

- COM Port (RS232 Serial Port)
- USB 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).

The OAM card supports:

- A) Telnet
- B) SSH
- C) SNMP, V2
- D) Additionally, a Windows based GUI (Graphical User Interface) for easy configuration, management and access.

The VCL-MX has an effective, CLI (text) and GUI based “Network Management Interface”, which may be used for configuring and monitoring multiple systems from a single central location.

### **Status Monitoring**

- Synchronization Clock Selection
- Status of alarms
- Enabled / Disabled status of 2.048 Mbps E1 ports
- Monitoring the 80 Port E1 DACS status and configuration
- Monitoring of E1 Link status: LOS, LOF, AIS, ES, SES, UAS.

### **Alarm Status and Monitoring**

- Loss of incoming signal at all 2.048 Mbps E1 Ports
- Configuration error alarm.

### **LED Indication**

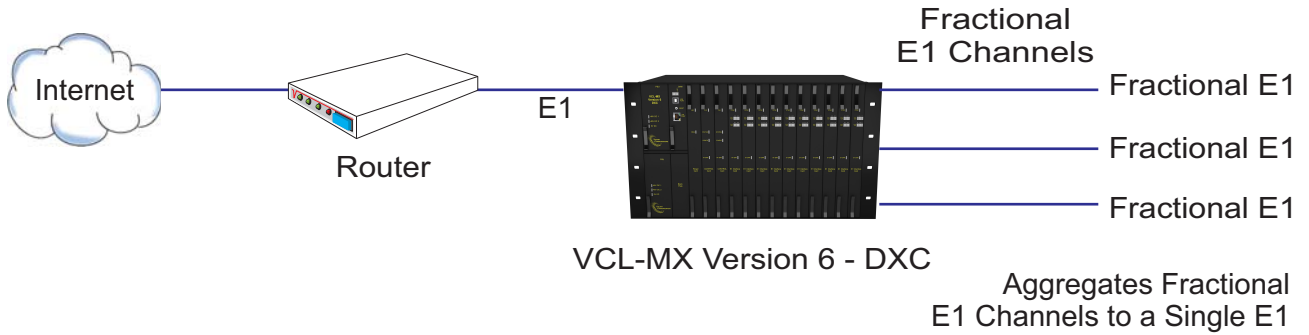
- 1 to 80 E1 Ports LED indicators
- 5V DC present
- -48V DC present
- Configuration error.

### **External Alarm - Contact Closures**

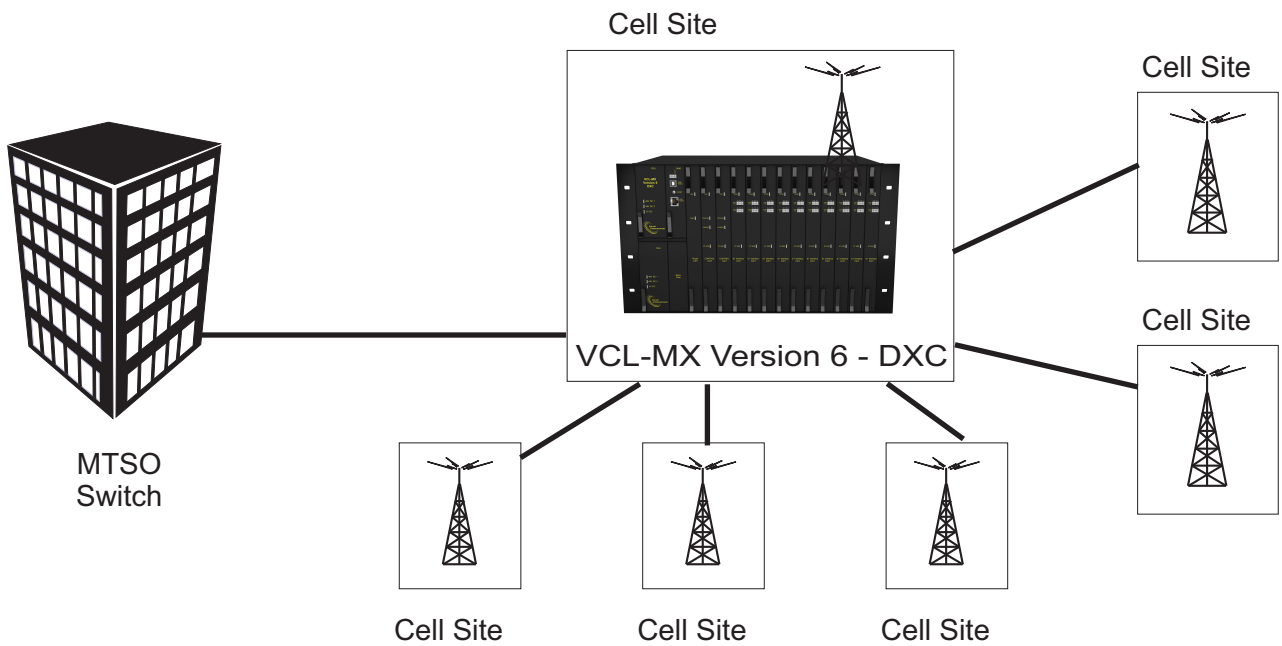
- 1 Alarm relay Type - Form “C”

### Application Diagrams

#### ISP Digital Cross Connect Application - Providing Fractional E1s to Subscribers



#### Backhaul - Cellular Application using VCL-MX Version-6 - DXC



## Technical Specifications

### E1 Interface Card: (Part No. VCL-MX-1520-E1-5.0)

Maximum number of interfaces	80 E1 Interfaces with full capability to cross-connect at DS-0, 64Kbps time-slot level, as well as to inter connect to voice and digital data services between 80 incoming E1 Ports (i.e. 80 separate E1 Links, 2480 DS-0 - any to any time-slot cross-connect).
Number of interfaces per E1	8 E1 Interfaces with full capability to cross-connect at Interface Card DS-0, 64Kbps time-slot level as well as to inter-connect to voice and digital data services between 80 incoming E1 Ports (i.e. 80 separate E1 Links).
Connectors	DB-25 / RJ-45 / RJ-48C
Conformity (electrical)	G.703
Frame structure	As per ITU (CCITT) G.704
Bit rate	2048 Kbps $\pm$ 50 ppm
Signaling	Channel Associated Signaling
PCM sampling rate	8,000 samples/sec
Code	HDB3
Nominal impedance	120 Ohms balanced / 75 Ohms unbalanced
Peak voltage of a mark For 120 $\Omega$ balanced interface 75 $\Omega$ unbalanced interface	3.0 V $\pm$ 0.3 V 2.37 V $\pm$ 0.237 V
Peak voltage of a space For 120 $\Omega$ balanced interface 75 $\Omega$ unbalanced interface	0 V $\pm$ 0.3 V 0 V $\pm$ 0.237 V
Nominal pulse width	244 ns
Pulse mask	As per ITU (CCITT) Rec. G.703
Output jitter	< 0.05 UI (in the frequency range of 20Hz to 100 KHz)
Permissible attenuation	6dB at 1 MHz
Return loss at: 51.2 KHz to 102.4 KHz 102.4 KHz to 2048 KHz 2048 KHz to 3072 KHz	> 12dB > 18dB > 14dB
Jitter tolerance	As per ITU (CCITT) G.823
Frame alignment	As per ITU (CCITT) G.732
Loss and recovery of frame alignment	As per Clause 3 of ITU (CCITT) G.732
Loss and recovery of Multi-frame alignment	As per Clause 5.2 of ITU (CCITT) G.732

**Control Card - Processor, Timing and TSI Card: (Part No. VCL-MX-1500-E1)**

Control Card Redundancy	Yes
Processor	1+1 Redundant ARM7 Self Learning Self Healing Automatic Fail-Over and Recovery
Timing and TSI	1+1 Redundant Self Learning Self Healing Automatic Fail-Over and Recovery

**OAM - Management Interface Card**

- COM Port (RS232 Serial Port)
- USB 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
- Telnet
- SSH
- SNMP, V2
- Windows based GUI (Graphical User Interface) for easy configuration, management and access.

**Power Supply Card (VCL-MX-1510)**

Input DC voltage	-48V DC (nominal)
Range of input	-36V to -72V DC
Output voltage	+5V, Filtered -48V (for terminal cards)
Output voltage variation	± 5%
Full load current rating	4A at 48V DC
Input voltage reversal protection	Provided in the card
Over-current protection	4A at 48V DC
Short-circuit protection	Current limit 4A. Recovers on removal of short circuit
Efficiency at full load	> 91%
Ripple at full load	< 5mVrms
Spike at full load	< 50mV

**Power Consumption**

Maximum Power Consumption	90 watts
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## Environmental

Working temperature	-10°C ~ +60°C for operation
Relative humidity	95% R.H. (non-condensing)
Altitude	Upto 9,000 feet

## Dimensions

Height	266 mm (19" 6U high)
Depth	270 mm.
Width	482 mm.
Weight	7.0 Kgs.

## Regulation Compliance

- Meets CE requirements
- Complies with FCC, Part 68 and Part 15 sub part A specifications.

## Ordering Information

### VCL-MX Version 6, Upto 80 E1/T1, 160/120Mbps DACS / DXC [Core / Common Equipment]

S. No.	Part #	Product Description	Qty.
1	VCL-MX-1500-DXC-E1	E1 DACS Control Card Central processor, cross-connect and system control Card may be used in a 1 + 1 redundant Configuration Note: Please order 2 numbers for 1 + 1 redundancy	1
2	VCL-MX-1500-DXC-T1	T1 DACS Control Card Central processor, cross-connect and system control Card may be used in a 1 + 1 redundant Configuration Note: Please order 2 numbers for 1 + 1 redundancy	1
3	VCL-OAM-2104-5.0-v6-DXC	Management Card [SNMP, Telnet (RJ45 Port) and Serial Port (USB and DB-9 COM Port)], OAM - Operations and Management Card for connecting the multiplexer to be managed in a LAN - allows the USER to assign a unique IP address to each multiplexer connected in a LAN to be managed from a single point. Telnet, SNMP (V2)	1
4	VCL-MX-1506-DXC	19" Shelf 6U High (Sub-rack) fitted with DB25F Connectorized Backplane Max. Ten (10) traffic slots meant for tributary cards (line cards)	1
5	VCL-MX-1510-DXC	(-) 48VDC Input Power Supply Card may be used in a 1 + 1 redundant Configuration. <b>Note:</b> Please order 2 numbers for 1 + 1 redundancy	1

**User Configurable Interfaces**

S. No.	Part #	Product Description	Qty
1	VCL-MX-1520-E1-5.0	8 E1 Interface Card Full capability to cross connect at DS-0, 64Kbps time-slot level as well as to inter-connect to voice and digital data services between 80 incoming E1 Ports (i.e., 80 separate E1 Links, 2480 DS-0 – any to any time-slot cross-connect). (10 Cards / 80 Ports (Max) per Chassis)	10

**Cables and Accessories**

S. No.	Part #	Product Description	Qty.
1	VCL-1505-TER-DB37F-RJ45F-16PP-DXC	16xE1/T1, DB37 to RJ45 Termination Panel - 2 x DB37 (F) - 16 x RJ45 (F) 19", Rack Mount Version [DB37 / RJ45 cables not included]	0
2	VCL-1505-TER-DB37F-RJ45F-32PP-DXC	32xE1/T1, DB37 to RJ45 Termination Panel - 4 x DB37 (F) - 32 x RJ45 (F) 19", Rack Mount Version [DB37 / RJ45 cables not included]	1
3	VCL-1505-TER-DB37F-RJ45F-48PP-DXC	48xE1/T1, DB37 to RJ45 Termination Panel - 6 x DB37 (F) - 48 x RJ45 (F) 19", Rack Mount Version [DB37 / RJ45 cables not included]	1
4	VCL-HRNS 1264-4E10-DXC	E1/T1 4 Port Connectorized Cable [DB25M-Open] [2 cables each 8 Port E1/T1 card]	0
5	VCL-HRNS 1268-16E1Y37M-DXC	E1/T1 8 Port Y Connectorized Cable [2xDB25M-DB37M] [1 cable each 8 Port VCL-1505-TER-DB37F-RJ45F-16PP]	10
6	UMIKitMXV6-DXC	System Core Cables, Blank Space Blocking Plates, Installation Accessories, Documentation, System User Disk, etc. [Set].	1

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