



ORION TELECOM NETWORKS INC.

VCL-MX™ Version 2-DLX (Deluxe Version) 4 x E1, 30 Channel Drop-Insert Voice and Data Multiplexer

VCL-MX, Voice and Data Multiplexer

Product Brochure & Data Sheet

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Product Overview

The VCL-MX Version 2-DLX, (Deluxe Version), 4 E1, 30 Channel Voice and Data, Drop-Insert 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 Version 2-DLX is a simple, yet powerful E1 Channel Bank for connecting and integrating analog communication equipment with digital E1 services.

The VCL-MX Version 2-DLX, 4 E1, Drop-Insert Multiplexer provides voice telephony and digital data services which may include:

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

- Toll Quality Voice Services
- Interconnect LAN (Campus Network)
- Interconnect Computer Terminals
- Provide LAN-WAN Interconnectivity
- Provide Leased Lines on DSL for SOHO Applications

Voice Interfaces

- FXO, FXS
- E&M (2 Wire and 4 Wire)
- FXS-FXS (Hot-line)
- GEN-GEN Magneto

Data Interfaces

- RS232
- G.703 @ 64 Kbps, co-directional
- iDSL @ 128 Kbps

The VCL-MX Version 2-STD, E1 Interface operates at a primary rate of 2.048 Mbits/sec 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.

The VCL-MX Version 2-STD has an effective, CLI (text) and GUI (Graphical User Interface) based "Network Management System", which may be used for configuring the system, subsequent remote monitoring and management of the inter-connected systems in the network. Both Inband and Out-of-Band configuration and monitoring options are available. An extensive set of alarms, for easy maintenance are provided in the system.

VCL-MX Version 2-DLX (Deluxe Version)

Voice and Data Drop-Insert Multiplexer with In-band Management Interface.

Available Interfaces:

- Voice Interfaces: FXO / FXS / E&M / Hotline / GEN-GEN Magneto
- Data Interfaces: RS232 / iDSL / G.703
- OAM Card - SNMP and NMS
- Dual feed (1+1 Redundant) -48V DC Input



VCL-MX Version 2-DLX (Deluxe Version)

Features

- 4 E1 Control Card for Point-to-Point, Point-to-Multi point, Add-Drop (drop-insert), Tree and Star topology tree and Star topology
- 4 E1 non-blocking cross-connect at 64Kbps (DS-0) level
- Dual feed (1+1 Redundant) -48V DC Input
- SNMP V2 Monitoring with NMS for monitoring multiple nodes over an IP Network, from a central location
- Telnet management
- In-band and Out-of-band management
- GUI (Graphical User Interface)
- In-band access for configuration and monitoring
- Power supply failure monitoring
- Wide Range (-18V DC to -72V DC) for -48V DC Power Input
- Ringer card failure monitoring
- User programmable voice levels with 15dB Programmable gain settings for FXS and E&M interfaces
- Multiple clock synchronization options
- E1 Synchronization

Clock options:

- Internal clock (Stratum 3)
- Loop-timed Clock from any E1 Span
- External 120 Ohms Bits clock
- External 75 Ohms TTL clock

Features

- Voice and Low Speed Digital Data services
- Any combination ("mix-n-match") of Voice and Low Speed Digital Data services deployed from a single VCL-MX "Smart Shelf"
- Drop and Insert applications
- Digital Data option may be used for internet access or video conferencing application
- Wireless applications including Cellular Networks
- Digital Microwave Radio
- SCADA applications
- Frame Relay circuit termination
- Powerful Network Management System for monitoring and network control
- Compliance with all relevant ITU-T (CCITT) recommendations
- 3U high 19 inch rack mounting version

Highlights

- Field upgradable to provide voice, data or both services
- Flexibility on use of transmission medium-copper, fiber or wireless
- Choice of Interfaces for Data Applications
- RS-232, PC Interface "Network Control and Management Software"
- In-band system configuration and management interface
- Out-of-band system configuration and management interface through 10BaseT Terminal (Optional)
- Channel assignment independent of slot position in the sub-rack
- Extensive set of alarms
- User Selectable Internal or Loop-timed E1 synchronization clock options

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

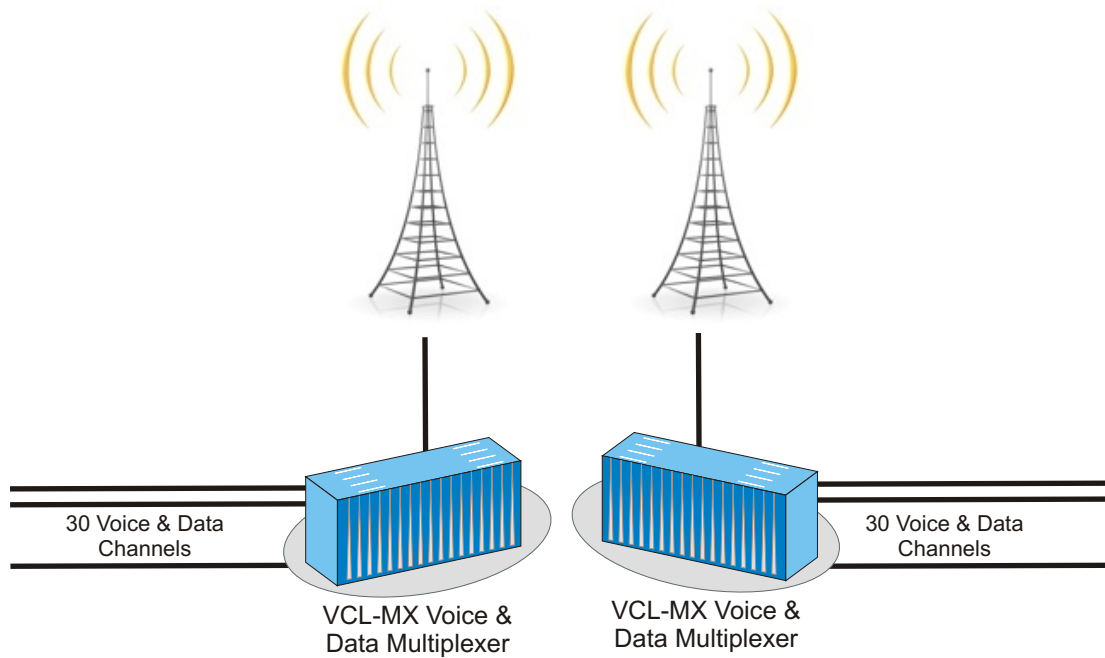
Applications of VCL-MX Version 2-DLX

- Junction Mux - for digital interconnection of analog exchanges
- Drop & Insert applications
- Wireless network applications
- 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

Applications

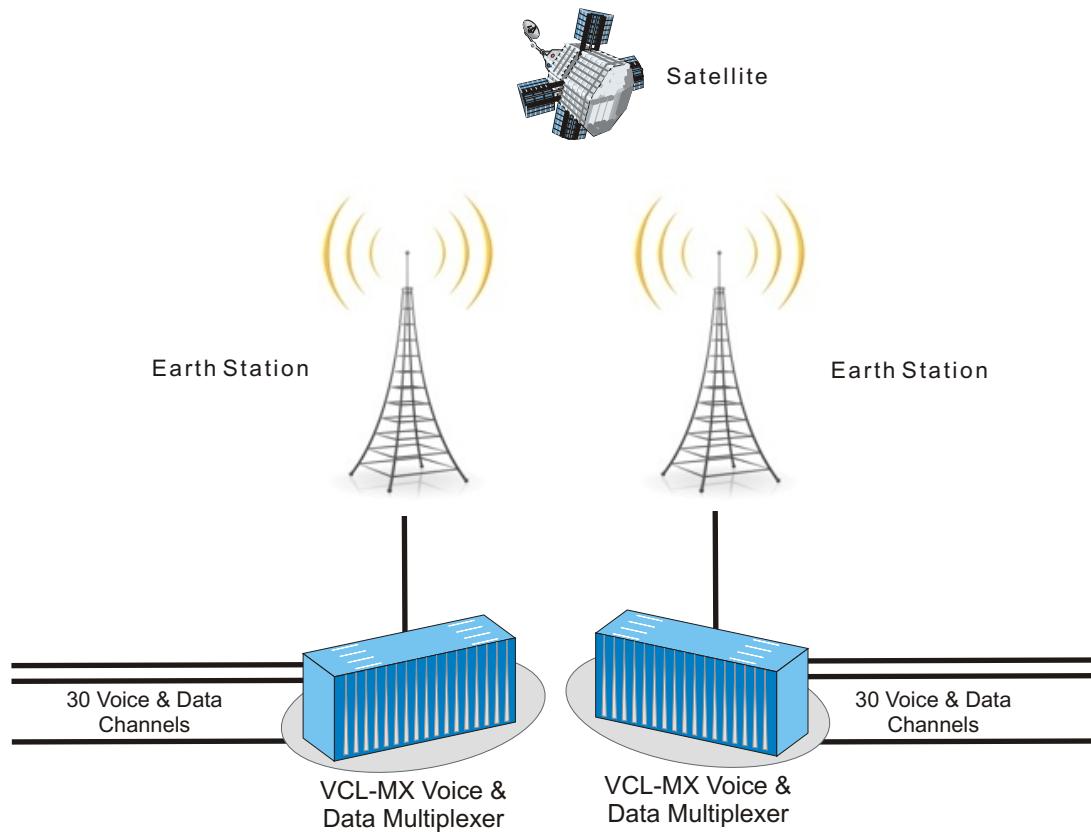
Applications # 01

VCL-MX E1, 2Mbps Voice & Data Multiplexers Connecting over Digital Microwave Radio Links



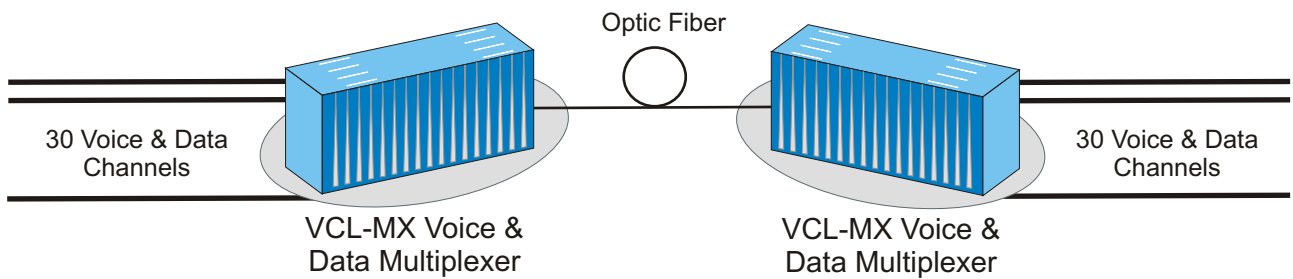
Applications # 02

VCL-MX E1, 2Mbps Voice & Data Multiplexer Connecting over Digital Satellite Circuits



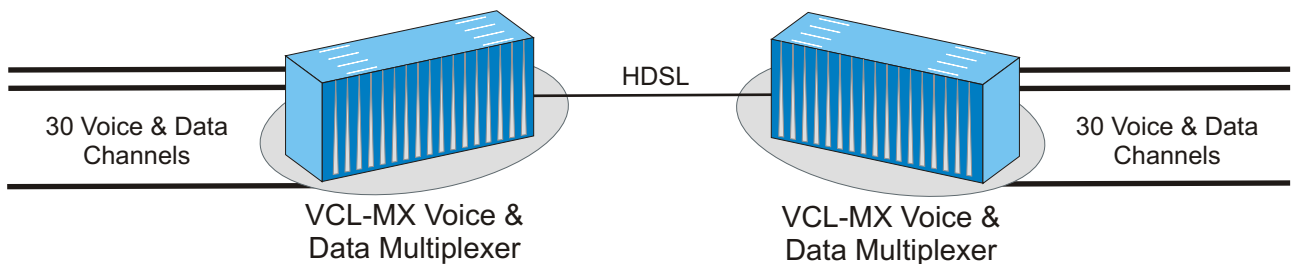
Applications # 03

**VCL-MX E1, 2Mbps Voice & Data Multiplexers
Connecting over Optical Fiber Links**



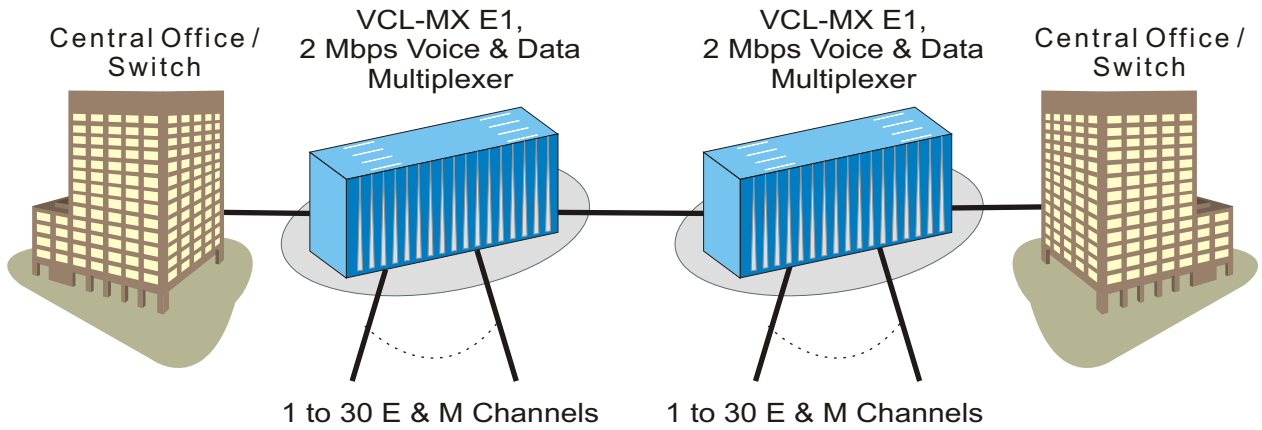
Applications # 04

**VCL-MX E1, 2Mbps Voice & Data Multiplexer
Connecting over HDSL Links**



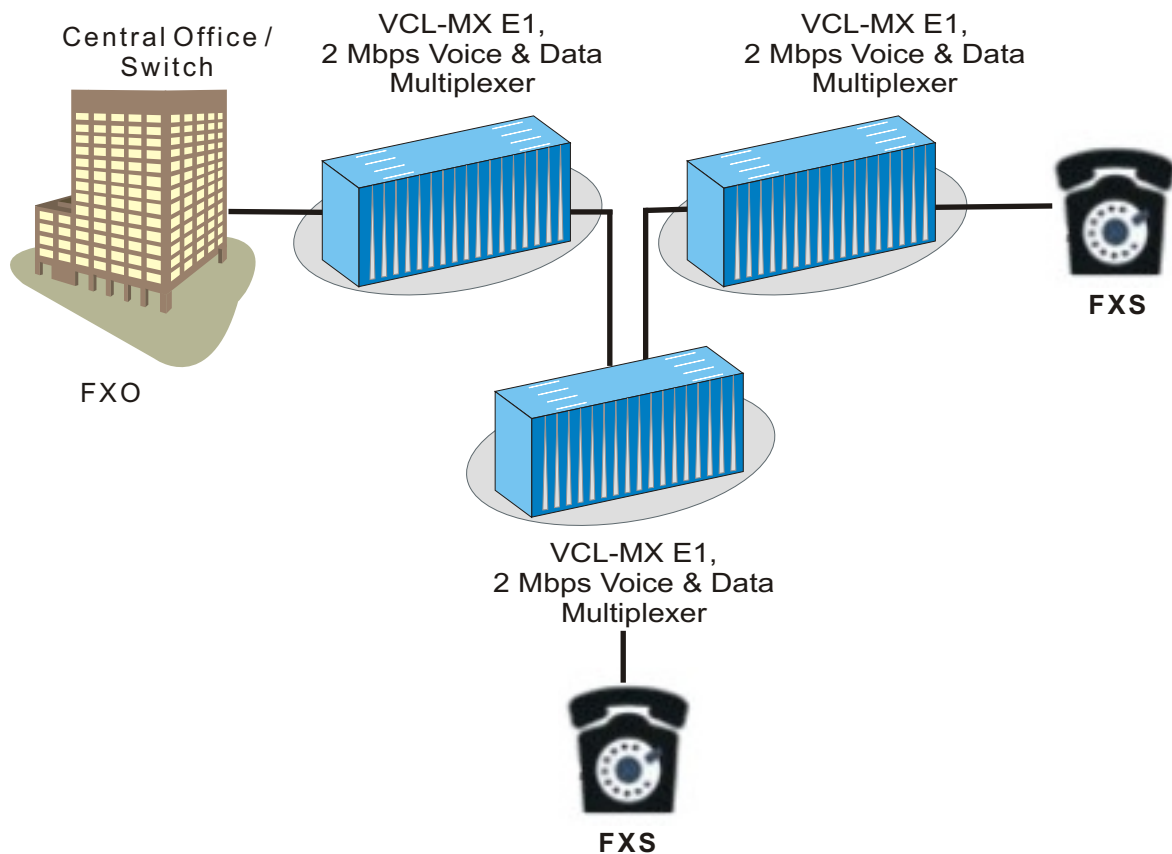
Applications # 05

**VCL-MX E1, 2Mbps Voice & Data Multiplexer
Connecting at the Central Office/Switch - E & M Interfaces**



Applications # 06

**VCL-MX E1, 2Mbps Voice & Data Multiplexer
Using in a Subscriber Loop Point to Point or Drop/Insert Application**

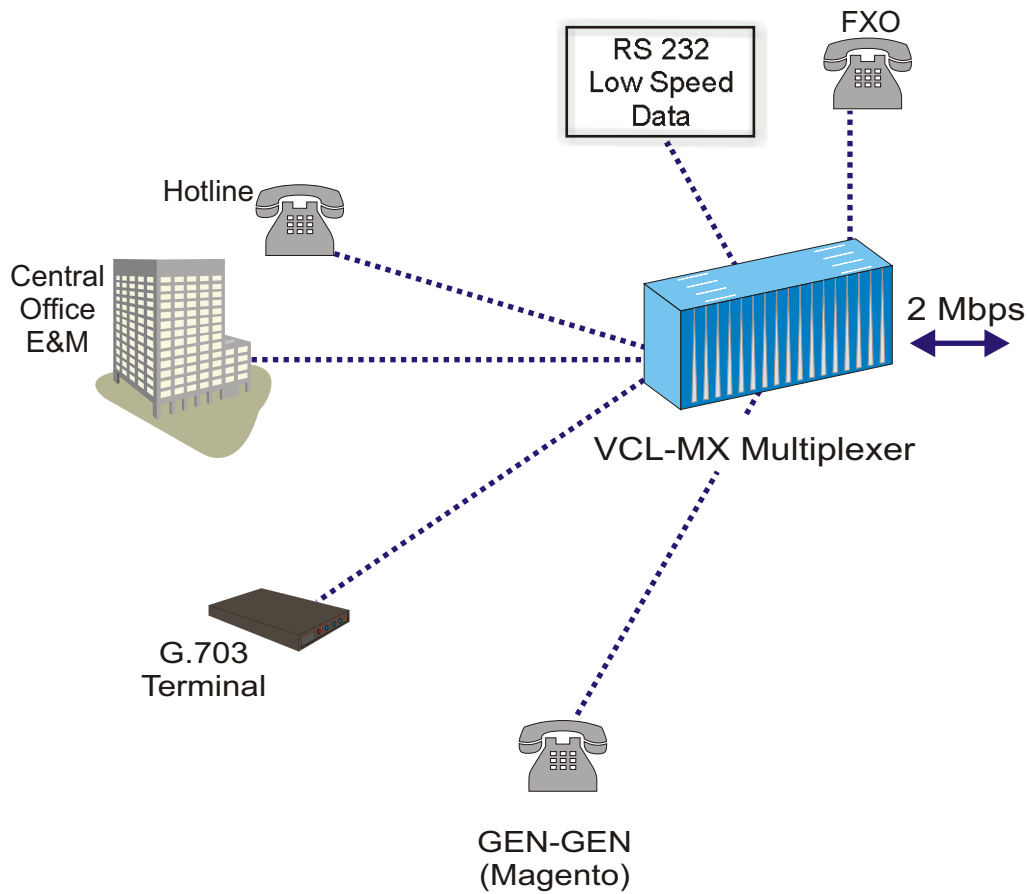


FXO/JNC 2 wire exchange loop interface card

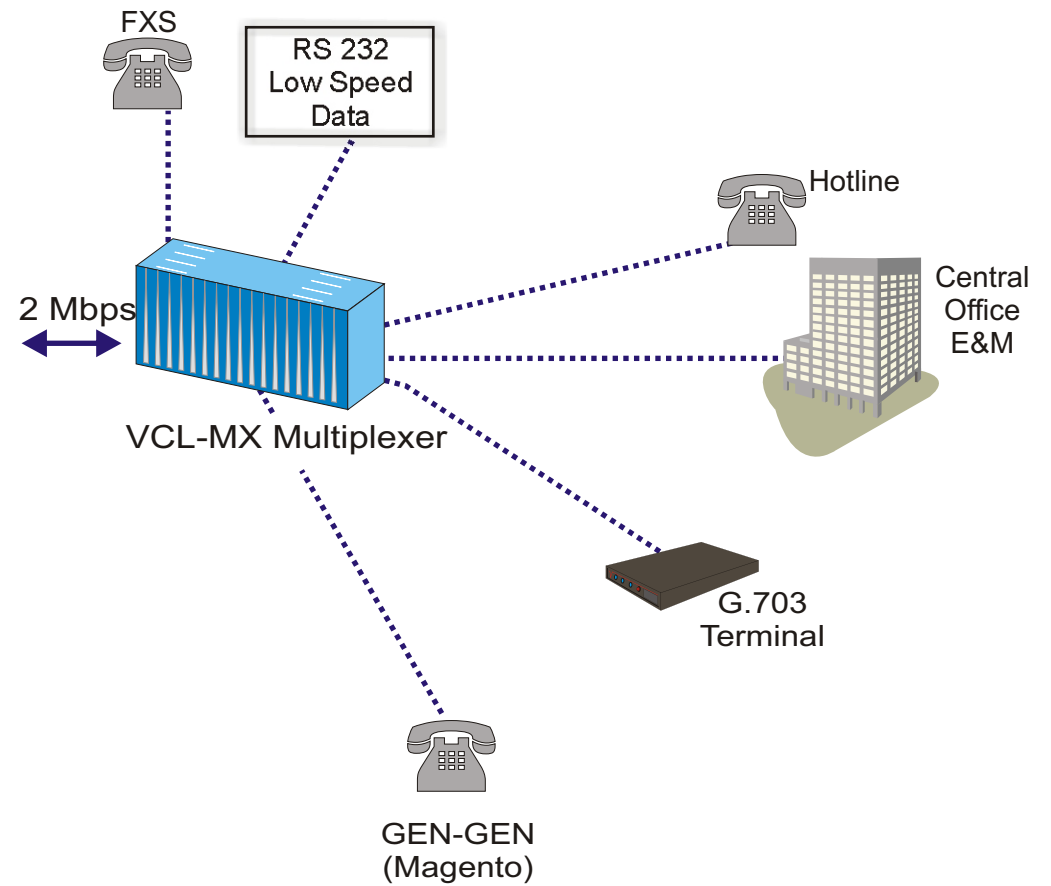
FXS/SLC wire subscriber loop interface card

Applications # 07

VCL-MX, E1 Multiplexer Interfaces Cards - Voice and Data applications



VCL-MX, E1 Multiplexer Interfaces Cards - Voice and Data applications



User Configurable Interface Card

<p>Voice Interface</p> <ul style="list-style-type: none"> • POTS service from a Central Office Switch (FXO & FXS) • Hot Line (FXS-FXS) • 2 Wire and 4 Wire, E&M applications • 15W, sine-wave, 75VRMS / 86VRMS 20Hz/ 25 Hz Ringer for FXS and Hot-line (FXS-FXS) interfaces • GEN-GEN Magneto 	<p>Data Interfaces</p> <ul style="list-style-type: none"> • RS232 • G.703 @ 64 Kbps, co-directional • iDSL @ 128 Kbps <p>System Management</p> <ul style="list-style-type: none"> • OAM / Telnet / SNMP • NMS (Network Management System)
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Technical Specifications - E1 Interface (Main Link) (VCL-MX-015-V2-DLX)

Number of Interfaces	4
Conformity (Electrical)	G.703
Frame Structure	As per ITU (CCITT) G.704
Signaling	Channel Associated Signaling
PCM Sampling Rate	8000 Samples/sec
Encoding Law	ALaw as per ITU (CCITT)
Bit Rate	2048 Kbps \pm 50 ppm
Code	HDB3
Nominal Impedance	120 Ω balanced / 75 Ω unbalanced (75 Ω option)
Peak Voltage of a mark For 120 Ω Balanced interface 75 Ω Unbalanced interface	3.0 V \pm 0.3 V 2.37 V \pm 0.237 V
Peak Voltage of a space for 120 Ω Balanced interface 75 Ω Unbalanced interface	0 V \pm 0.3 V 0V \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	6 dB at 1 MHz
Return Loss at: 51.2 KHz to 102.4 KHz 102.4 KHz to 2048KHz 2048KHz to 3072 KHz	> 12dB > 18dB > 14dB
Jitter Tolerance	As per ITU (CCITT) G.823
Loss and recovery of frame alignment	As per clause 3 of ITU (CCITT) G.732
Loss and recovery of multiframe alignment	As per clause 5.2 of ITU (CCITT) G.732

2 Wire - Voice Frequency Interface(s) - FXS (VCL-CB-025)

Number of Channels per Card	2
Interface Type	FXS
Maximum Number of Channels	30
Transmission performance	Fully Compliant to ITU (CCITT) G.712 (G.713, G.714) specification
Line Impedance	600 Ω (900 Ω optional)
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss	-2.0dB Nominal (User adjustable)
Idle Channel Noise	\leq -65dB
Return Loss	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Ring Frequency	25 Hz (20Hz, Optional)
Ring Voltage	\geq 75 volts RMS into a load of 5 R.E.N. With a 0.30 Erlang traffic pattern
Subscriber Loop Current	\geq 23mA into a subscriber loop of 1000 Ohms
Overload Level	+3.14dBm \pm 0.5dBm
Battery Reversal	All channels
Dial Pulse Speed	8-12 pps - Pulse Dialing / DTMF Dialing

2 Wire - Voice Frequency Interface(s) - FXS (VCL-CB-025-EXT)

Number of Channels per Card	2
Interface Type	FXS - Ext
Maximum Number of Channels	30
Transmission performance	Fully Compliant to ITU (CCITT) G.712 (G.713, G.714) specification
Line Impedance	600 Ω (900 Ω optional)
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss (nominal)	-2dB (user adjustable range of -2dB to -8dB)
User selectable range for insertion loss	1dB to 7dB
Input level minimum	-11dB
Input level maximum	3.2dB
Transmit Gain	0 to 16dB (user configurable)
Receive Attenuation	0 to 16dB (user configurable)
Idle Channel Noise	\leq -65dB
Return Loss	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Ring Frequency	25 Hz (20Hz, Optional)
Ring Voltage	\geq 75 volts RMS into a load of 5 R.E.N. with a 0.30 Erlang traffic pattern
Subscriber Loop Current	\geq 23mA into a subscriber loop of 1000 ohms
Overload Level	+3.14dBm \pm 0.5dBm
Battery Reversal	All channels
Dial Pulse Speed	8 -12 pps - Pulse Dialing/DTMF Dialing

2 Wire - Voice Frequency Interface(s) - FXO (VCL-CB-030)

Number of Channels per Card	2
Interface Type	FXO
Maximum Number of Channels	30
Transmission performance	Fully Compliant to ITU (CCITT) G.712 (G.713, G.714) specification
Line Impedance	600 Ω (900 Ω optional)
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss	-2.0dB Nominal (User adjustable)
Idle Channel Noise	\leq -65dB
Return Loss - 2 wire	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Ring Frequency	25 Hz (20Hz, Optional)
Ring Voltage	\geq 75 volts RMS into a load of 5 R.E.N. with a 0.30 Erlang traffic pattern
Subscriber Loop Current	\geq 23mA into a subscriber loop of 1000 ohms
Overload Level	+3.14dBm \pm 0.5dBm
Battery Reversal	All channels
Dial Pulse Speed	8 -12 pps - Pulse Dialing/DTMF Dialing

E&M 2 Wire / 4 Wire Voice Frequency Interface (VCL-CB-035)

Number of Channels per Card	2
Interface Type	2W / 4W E&M
Maximum Number of Channels	30
Transmission performance	Fully compliant to ITU (CCITT) G.712 Specification
Line Impedance	600 Ohms
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss / Gain	-2.0dB Nominal (User adjustable between 0dB and 16dB)
Idle Channel Noise	\leq -65dB
Return Loss	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Overload Level	+3.14dBm \pm 0.5dBm
E&M Signaling Rate	10 pps

2 Wire / 4 Wire - Voice Frequency Interface(s) - E&M (VCL-MX-035-EXT)

Number of Channels per Card	2
Interface Type	E&M - Ext
Maximum Number of Channels	30
Transmission performance	Fully Compliant to ITU (CCITT) G.712 (G.713, G.714) specification
Line Impedance	600 Ω (900 Ω optional)
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss (nominal)	-2dB (user adjustable range of -2dB to -8dB)
User selectable range for insertion loss	1dB to 7dB
Input level minimum	-11dB
Input level maximum	3.2dB
Transmit Gain	0 to 16dB (user configurable)
Receive Attenuation	0 to 16dB (user configurable)
Idle Channel Noise	\leq -65dB
Return Loss - 2 wire	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Return Loss - 4 wire	300Hz - 3400Hz - \geq 20dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Overload Level	+3.14dBm \pm 0.5dBm
Dial Pulse Speed	Pulse / MFC Dialing / DTMF Dialing

Hot-Line Interface Card (VCL-CB-027)

Number of Channels per Card	2
Interface Type	Hot-line
Maximum Number of Channels	30
Transmission performance	Fully compliant to ITU (CCITT) G.712 (G.713, G.714) specification
Line Impedance	600 Ohms
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss	-2dB (nominal)
Idle Channel Noise	-65dB
Return Loss	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Ring Frequency	20 Hz (25Hz, optional)
Ring Voltage	\geq 75 volts RMS into a load of 5 R.E.N. with a 0.30 Erlang traffic pattern
Subscriber Loop Current	\geq 23mA into a subscriber loop of 1000 Ohms
Overload Level	+3.14dBm \pm 0.5dBm
Battery Reversal	All channels
Dial Pulse Speed	10 pps - Pulse Dialing / DTMF Dialing

GEN-GEN / Magneto Interface Card (VCL-MX-1478-GEN)

Number of Channels per Card	2
Interface Type	Magneto, 2-wire (GEN-GEN)
Line Impedance	600 Ohms
Voice Channel Frequency	300Hz-3400Hz
Ringing generator frequency	25Hz
Ring Voltage	75 volts RMS
Maximum Number of Channels	30
Transmission performance	Fully compliant to ITU (CCITT) G.712 specification
Insertion Loss / Gain	-2.0dB Nominal
Idle Channel Noise	-65dB
Return Loss	300Hz - 600Hz - \geq 12dB 600Hz - 3400Hz - \geq 15dB
Longitudinal Balance	\geq 46dB between 300Hz to 3400Hz
Overload Level	+3.14dBm \pm 0.5dBm

Low Speed Data Interface RS232 (VCL-CB-045)

Interface	RS232
Number of Interfaces per Card	2
Maximum Number	30
Conformity	RS232
Mode	Asynchronous
Bit Rate	50 Kbps to 19.2 Kbps
User Interface	DCE
Character Length	5 / 6 / 7 / 8 (Auto-Select)
Stop Bits	1 / 1.5 / 2 (Auto-Select)
Parity	Even / Odd / 0's / 1's / none (Auto-Select)

G.703 @ 64kbps, Synchronous Data Interface (VCL-CB-060)

Interface	G.703 @ 64 Kbps
Number of Interfaces per Card	2
Maximum Number	30 G.703, 64Kbits / sec. Interface
Conformity	To (CCITT) Rec. G.703
Mode	Synchronous, Co-directional
Bit Rate	64Kbps

Ring Generator Card (VCL-CB-040)

Rated Power	30W
Ring Voltage	75Vrms/86Vrms
Frequency	17Hz/20Hz/25Hz/50Hz

iDSL-iSDN DSL (VCL-CB-080)

"U" Interface	Meets ANSI T1.601-1992 requirements
Line Rate	160 Kbits/s
Frame Format	2B as per CCITT Rec.1.430 (B+B)
Line Code	2B1Q as per CCITT Rec.G.961
Accepted Line Attenuation	42dB at 40 KHz
Pulse Shape	As per CCITT Rec.G.961
Multiplexer Emulation	LT Emulation
Customer Premises Equipment	NT Emulation
Impedance	135 Ohms at 40KHz

Maximum distance : 5 km (4 miles) on 0.5 mm twisted Pan. Distance may vary with cable guage. For distance using various cable guages please refer chart below.

Distance in kms. (Miles)				
Data Rate (Kbps)	Wire Gauge (AWG/mm)			
	19 (.9mm)	22 (.6mm)	24 (.5mm)	26 (.4mm)
128 / 144	17.4 (10.8)	11.6 (7.2)	8.1 (5.0)	5.5 (3.4)

Protection

Central Office Terminal and Remote Terminal are protected against power surges and transients occurring from lightning and electric induction as per CCITT Rec. Table I/K-20 towards line side

E1 Synchronization Clock

Clock options:
- Internal clock (Stratum 3)
- Loop-timed Clock from any E1 Span
- External 120 Ohms Bits clock
- External 75 Ohms TTL clock

Power Supply (VCL-MX-010-DLX) (Dual Feed Power Input)

Input DC Voltage	-48V DC (nominal)
Range of Input	-18V DC to -72V DC
Output Voltages	5V, -5V, filtered -48V (for term. cards)
Maximum Load Output Current	8A at 5V, 0.5A at -5V
Input Voltage Reversal Protection	Provided in the Card
Over Current Protection	10A for 5V, 1.0A for -5V
Short Circuit Protection	Current limit - 6A. Recovers on removal of short
Efficiency at Full Load	>93%
Ripple at Full Load	<5mVrms
Spike at Full Load	<50mV

Power Consumption

Power Consumption	25 watts (with all 30 Voice Circuits)
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Environmental

Temperature and Humidity	0°C to + 50°C, 90% R.H. (Non-condensing)
Altitude	upto 9,000 feet

Management and Control Interfaces

<ul style="list-style-type: none"> Serial Management Port - RS232 Interface
<ul style="list-style-type: none"> USB Serial Port
<ul style="list-style-type: none"> 10/100 BaseT Telnet over a TCP/IP Network

System Access and Management

Windows XP and Windows 7 compatible GUI
Telnet - CLI (Command Line Interface)
SNMP V2 (MIB File provided with the equipment)
Inband Management of Remote Units over the E1 links
NMS - Network Management System

Command Language

Command Line Interface (English text commands)
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OAM / NMS (with Telnet) Specifications (VCL-OAM-1440)

Network interface	RJ-45 Ethernet 10BaseT or 100BaseT-TX (auto sensing)
Compatibility	Ethernet Version 2.0 IEEE802.3
Protocols supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP
LEDs	10Base-T and 100Base-TX Activity, Full/half duplex.
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 EN55024:1998
	RF Electromagnetic Field Immunity – complies with EN55024:1998
	Electrical Fast Transient/Burst Immunity – complies with EN55024:1998
	Power Frequency Magnetic Field Immunity – complies with EN55024:1998
	RF Common Mode Conducted Susceptibility – complies with EN55024:1998

Mechanical Specification

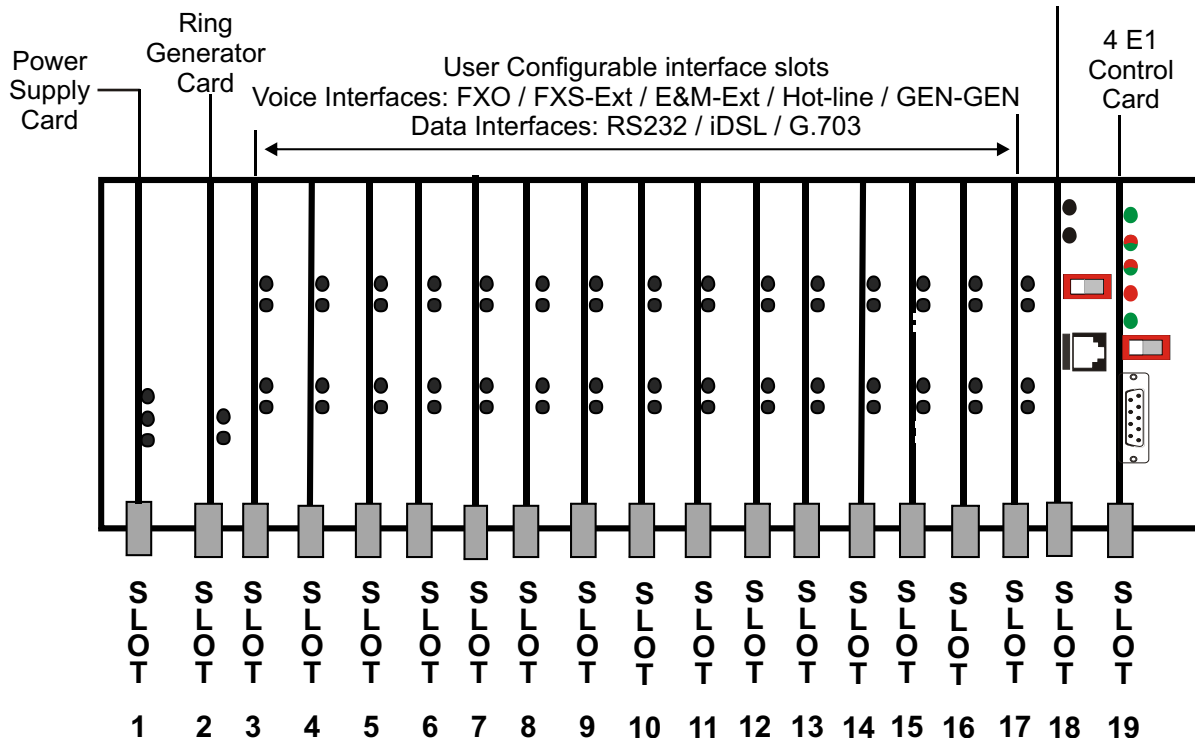
Rack Mounting	Standard 19 inch DIN rack
Height	3U (133.33 mm)
Depth	292 mm
Width	483 mm
Weight	7.00 Kgs.

VCL-MX-Version # 2

Front View

Voice and Data Drop-Insert Multiplexer without In-band Management Interface

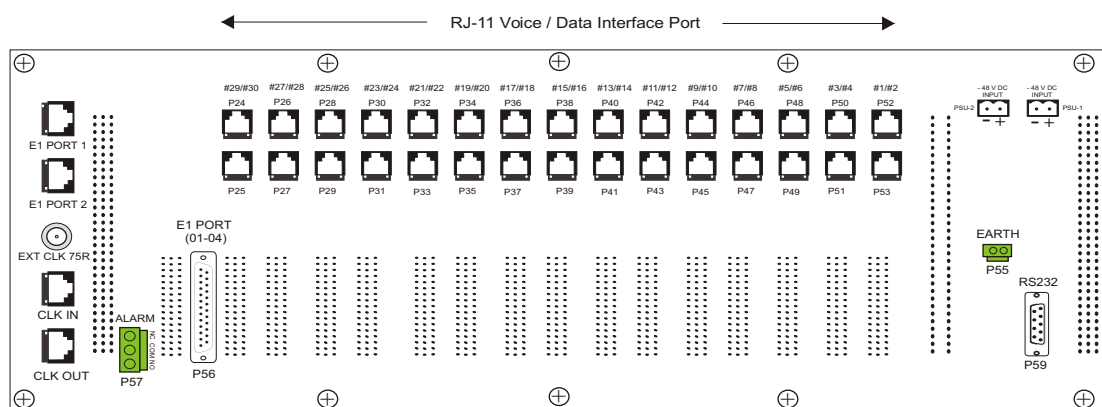
OAM / NMS



Available Interfaces:

Voice Interfaces: FXO / FXS / FXS-Ext / E&M / E&M-Ext / Hot-line / GEN-GEN (Magneto)
 Data Interfaces: RS232 / iDSL / G.703

Rear View



Core System Composition	Description	Part No.
19-Inch Shelf 3U high	19- Inch 120 Ohms Impedance Shelf & Backplane	VCL-MX-002-DLX
Slot 1	Power Supply Card	VCL-MX-010
Slot 2	Ringer Card	VCL-MX-040
Slot 3 to 17	15 User Configurable voice & data interface(s)	As per user requirement
Slot 18	OAM / NMS	VCL-OAM-1440
Slot 19	4 E1 Control Card with In-Band Management Interface	VCL-MX-015-V2-DLX

Ordering Information

VCL-MX E1 Core System (Common Equipment)		
S.No.	Part #	Product Description
1.	VCL-MX-015-V2-DLX	4 E1 Control Card, 30 Channel E1 Interface
2.	VCL-MX-001	19" Shelf 3U High (Sub-rack) to accommodate 30 Voice & Data Channels fitted with Connectorized Backplane - 120 Ohms Impedance
3.	VCL-MX-010	(-) 48V DC Input Power Supply Card, Dual Supply 30 Channel Power Supply Card (5V DC, -5V DC)
4.	VCL-OAM-1440	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, GUI, In-band and Out-of-band management.

VCL-MX, User Configurable Interface		
S.No.	Part #	Product Description
1	VCL-CB-025	Dual Port VF, RT (FXS) Line Interface Card 2, 64Kbps/Sec. VF Channels per Remote Terminal Line Card 15 (max) per system
2.	VCL-CB-025-EXT	Dual Port VF, RT (FXS) Line Interface Card 2, 64Kbps/Sec. VF Channels per Remote Terminal Line Card 15 (max) per system (programmable Tx and Rx level settings)
3.	VCL-CB-027	Dual Port VF, Hot-Line (FXS - Ring-Down) Line Interface Card 2, 64Kbps/Sec. Hot-Line Channels per Card 15 (max) per system
4.	VCL-CB-030	Dual Port VF, CO (FXO) Line Interface Card 2, 64Kbps/Sec. VF Channels per Central Office Line Card 15 (max) per system
5.	VCL-CB-035	Dual Port, E & M Cards, 2 Wire/4 Wire E&M Trunk Interface Card 15 (max) per system
6.	VCL-CB-035-EXT	Dual Port E&M Card, 2 Wire / 4 Wire E & M Trunk Interface Card 15 (max) per system (Programmable Tx and Rx settings / VF range 0 to -15dB (gain)
7.	VCL-CB-040	Ring Generator Card, Central Office Ring Generator Card 1 per system
8.	VCL-CB-045	Dual Port, RS232 Data Interface Card, Up to 19.2Kbps RS232 Asynchronous Data Interface Card, 2 Interfaces per Card 15 (max) per system
9.	VCL-CB-060	Dual Port, G.703, Co-Directional Data Interface Card 64Kbps Co-Directional G.703 Data Interface Card, 2 Interfaces per card 15 (max) per system

VCL-MX, User Configurable Interface		
S.No.	Part #	Product Description
10.	VCL-CB-080	iDSL Modem Card Central Office/ISP Multiplexer Side - transports 128 Kbps on a single twisted copper pair upto 5 KM (ISDN DSL)
11.	VCL-MX-1478-GEN	Dual Port VF, GEN-GEN Magneto Line Interface Card

Ordering Information

Optional and Accessories		
S.No.	Part #	Product Description
1	VCL-ACDC-48 -150W-3.2A	Power Supply (External) AC to DC Converter, DC to DC Converter, Desktop Version 150 Watts External Converter Converts Universal 85 V AC - 264 V AC, 47 Hz to 63 Hz Main Voltage, or 120 V DC -370 V DC to -48 V DC Output 3.2 Amps
2	VCL-ACDC-48 -150W-3.2A-RK	Power Supply (External) AC to DC Converter, DC to DC Converter 19 inch Rack Mount External Converter Universal AC Input [93VAC-276VAC, 47Hz-63Hz] or 120 V DC -370 V DC to -48V DC 3.2 Amps
3	VCL-1105-120/75 -BNCF-16	E1, 120 Ohms (RJ45) to E1, 75 Ohms (BNC Female Connector) Converter, may be used to convert up to 16, E1, 120 Ohms (RJ45) Interfaces to E1, 75 Ohms (BNC Female Connector) Interfaces.
4	VCL-EP5A 0002	Power Supply (External) AC to DC Converter Portable External Converter Universal AC Power Adapter VCL-065A-1Y48F1: AC Power 100-240 VAC~2A, 50-60Hz, Output: 48 VDC~1.35A 65W
5	BNC to BNC Cables	BNC to BNC Cable
6	Cables	RJ-11 connectorized Cables for FXS/FXO/Hotline/GEN-GEN Cards 2 x RJ-11 to open cables for each dual port interface card - 1 cable for each dual port interface card
7	Cables	E&M Connectorized Cables - 2 cables for each dual port interface card
8	Cables	RS232 Connectorized Cables - 2 cables for each dual port interface card
9	Cables	G.703 Connectorized Cables - 2 cables for each dual port interface card
10	Cables	iDSL Connectorized Cables - 2 cables for each dual port interface card
11	Cables	E1 Interface - RJ-45 Connectorized Cable (Straight-through and Cross-Over Cable - 2, each)
12	Cables	NMS (Ethernet) Connectorized Cables
13	Cables	LMS Cable - DB9 RS232 Serial Port
14	Cable	USB Port Cable
15	Manual	Documentation User Manual & System Software Disks

Notes : _____

Technical specifications are subject to changes without notice.
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