



## VCL-DX<sup>TM</sup>

E1, 2 Mbps  
PURE-DATA<sup>TM</sup>, Drop-Insert  
Digital Data Multiplexer

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## Product Overview

The VCL-PURE-DATA™ - VCL-DX™ digital data, 2Mbps ~ 30 Channel E1 , Drop-Insert Multiplexer provides full range of digital data services to subscribers located at different locations, requiring to interconnect and establish data network over an E1 link. The VCL-DX is a simple, yet powerful E1 Channel Bank for connecting and integrating analog communication equipment with digital E1 services.

**The VCL-DX, E1, Drop-Insert Multiplexer may be used in a Drop-Insert or a Terminal mode To provide**

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

**Data Interfaces includes:**

- V.35, n X 64 Kbps
- V.36, n X 64 Kbps
- X.21, n X 64 Kbps
- RS530, n X 64 Kbps
- G.SHDSL, n X 64 Kbps
- 10BaseT - Router
- Fractional E1

The VCL-DX 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-DX, E1 Multiplexers, for digital data applications.

The VCL-DX has an effective, CLI (text) 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-DX, E1,  
Drop-Insert, Digital Data Multiplexer**

## Features

- Digital Data services.
- Any combination ("mix-n-match") of Digital Data services deployed from a single VCL-DX "Smart Shelf".
- Drop and Insert applications.
- Digital Data option may be used for internet access or video conferencing application.
- Wireless applications including interconnecting of Cellular Networks.
- Interconnecting VoIP networks.
- 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, compact construction.

## Highlights

- Field upgradable to provide 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 subrack.
- Extensive set of alarms.
- User Selectable Internal or Loop-Timed clock options

## Transmission Mediums

The VCL-DX 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

## Application of VCL-DX

- Digital data, or real-time video conferencing services (V.35, V.36, X.21, Rs530, 10BaseT Router, high-speed digital data interface options allows point-to-point network solutions for providing a video conferencing channel of up to 1984 Kbps).
- Drop & Insert applications.
- Wireless network applications.
- High-speed data ports for digital communication links providing Leased Lines access to Internet Service Provider (ISPs) with speeds ranging from 64Kbps up to 1984 Kbps digital data interface options.
- Micro-Cellular infrastructure applications for providing cell-switch connectivity.
- Wide area networking

## User Configurable Interface Card(s)

### ~ Data Interfaces:-

- V.35, n X 64 Kbps
- V.36, n X 64 Kbps
- X.21, n X 64 Kbps
- RS530, n X 64 Kbps
- G.SHDSL, n X 64 Kbps
- 10BaseT - Router
- Fractional E1

**Technical Specifications - E1 Interface (Main Link)**

Number of Interfaces	2
Conformity (Electrical)	G.703
Frame Structure	As per ITU (CCITT) G.704
Signaling	Channel Associated Signaling
PCM Sampling Rate	8000 Samples/sec
Encoding Law	A Law as per ITU (CCITT)
Bit Rate	2048 Kbps $\pm$ 50 ppm
Code	HDB3
Nominal Impedance	120 $\Omega$ balanced / 75 $\Omega$ unbalanced (75 $\Omega$ option)
Peak Voltage of a mark	
For 120 $\Omega$ Balanced interface	3.0 V $\pm$ 0.3 V
75 $\Omega$ Unbalanced interface	2.37 V $\pm$ 0.237 V
Peak Voltage of a space	
for 120 $\Omega$ Balanced interface	0 V $\pm$ 0.3 V
75 $\Omega$ Unbalanced interface	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	> 12dB
102.4 KHz to 2048KHz	> 18dB
2048KHz to 3072 KHz	> 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

**High Speed Synchronous “n X 64” Data Interface Type: V.35**

Interface	V.35
Number of Interfaces per Card	1, (“N” x 64KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” = 31) - User Selectable
Conformity	V.35
Mode	Synchronous
Bit Rate	64 Kbps to 1984 Kbps
User Interface	DCE

**High Speed Synchronous “n X 64” Data Interface Type: V.36**

Interface	V.36
Number of Interfaces per Card	1, (“N” x 64KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” =31) - User Selectable
Conformity	V.36
Mode	Synchronous
Bit Rate	64 Kbps to 1984 Kbps
User Interface	DCE

**High Speed Synchronous “n X 64” Data Interface Type: X.21**

Interface	X.21
Number of Interfaces per Card	1, (“N” x 64KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” =31) - User Selectable
Conformity	X.21
Mode	Synchronous
Bit Rate	64 Kbps to 1984 Kbps
User Interface	DCE

**High Speed Synchronous “n X 64” Data Interface Type: RS530**

Interface	RS530
Number of Interfaces per Card	1, (“N” x 64KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” =31) - User Selectable
Conformity	RS530
Mode	Synchronous
Bit Rate	64 Kbps to 1984 Kbps
User Interface	DCE

**High Speed Synchronous “n X 64” Data Interface Type: G.SHDSL**

Interface	G.SHDSL
Number of Interfaces per Card	1, (“N” x 64KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” = 31) - User Selectable
Compliance	ITU G.SHDSL (ITU-T / G.991.2) ETSISDSL (ETSITS 101 524)
Handshake Support	ITU G.hs (ITU-T G.994.1)
Mode	Synchronous
Bit Rate	128 Kbps to 1984 Kbps (User Selectable)
User Interface	LTU

**High Speed Synchronous “n X 64” Data Interface Type: 10BaseT Ethernet Router**

Interface	10BaseT (Router)
Number of Interfaces per Card	1, (“N x 64” KBits/sec. per Card)
Bandwidth	(“N” x 64 Kbits / sec. Interface maximum value of “N” =31) - User Selectable
IP routing	RIP-I, RIP-II, static routing, IP filters, BootP client and relay, DHCP relay
IPQoS	Bandwidth management (CBR, VBR), Prioritization (6 levels), RTP auto detection, DiffServ/TOS support
Bandwidth Optimization	SW Compression (optional), MLPPP and Bandwidth on Demand, Connection on Demand and IPX spoofing
Interoperability	PPP
Supported RFCs	1058, 1213, 1315, 1332, 1334, 1389, 1471, 1472, 1473, 1474, 1490, 1493, 1519, 1542, 1573, 1604, 1631, 1638, 1661, 1662, 1722, 1723, 1724, 1812, 1850, 1962, 1974, 1990

**Fractional E1 Interface**

Number of Interfaces	1
Impedance	120 Ohms
Conformity (Electrical)	G.703
Frame Structure	As per ITU (CCITT) G.704
Bit Rate	2048 Kbps ± 50 ppm
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
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

**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

**Clock**

Timing Options	Internal Clock, Loop-Timed Clock
Synchronization Sources	Internal Clock, span clock timing derived from incoming HDB3 links (Loop Timed)
Default Option	Internal Clock

## Management Interface

### Local Management Interface

RS232, operating @ 9.6 Kbps CLI (text) based Interface, Hyper Terminal (VT-100 Emulation).

### In-band Management Interface for Remote Terminals

RS232, operating @ 9.6 Kbps CLI (text) based Interface, Hyper Terminal (VT-100 Emulation).

### Out-of-Band Management Interface - Optional

10 / 100 BaseT - User Assigned IP Address

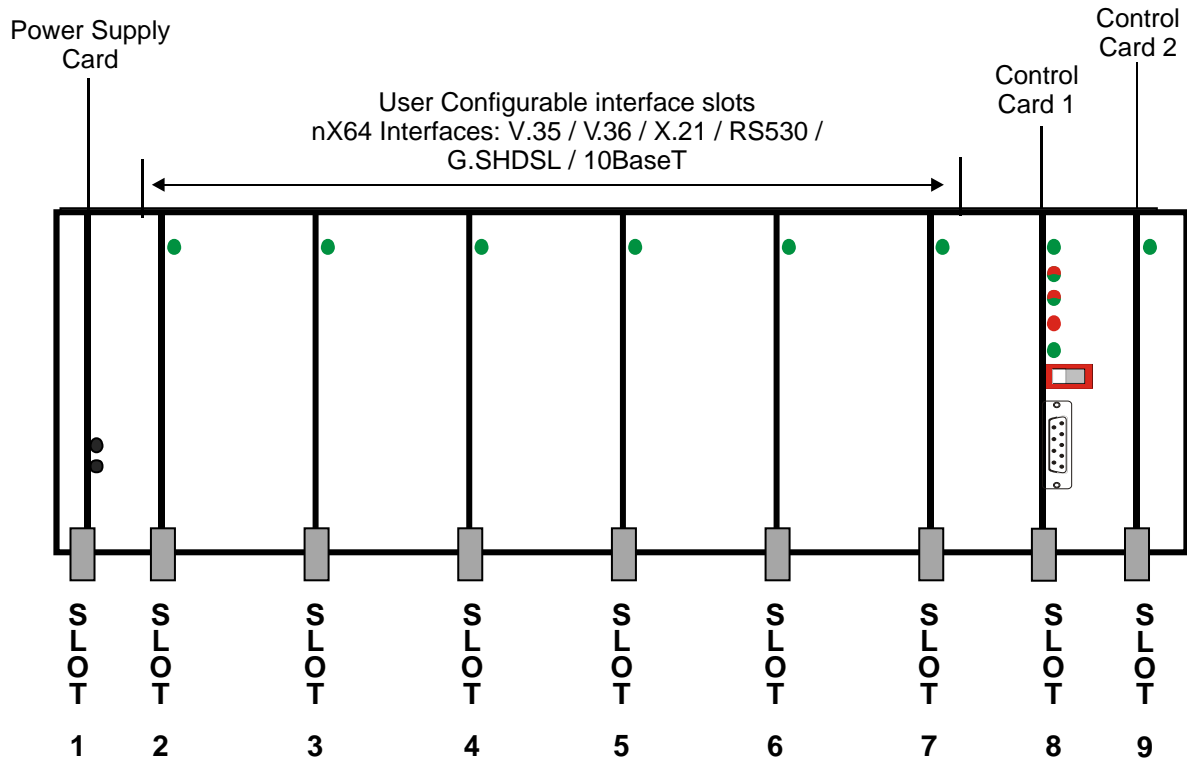
## Environmental

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

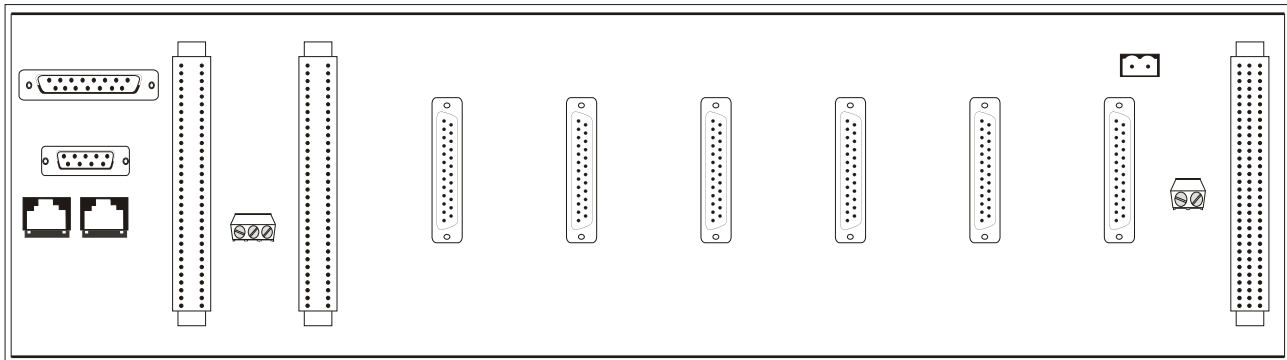
## Power Supply

Input DC voltage	-48V DC ( nominal )
Range of input	-40V to -60V DC
Output voltages	+5V
Full Load Output Current	8A at +5V
Input Voltage Reversal Protection	Provided in the Card
Over Current Protection	10A for +5V
Short Circuit Protection	Current limit - 6A. Recovers on removal of short
Efficiency at full load	>86%
Ripple at full load	<5mVrms
Spike at full load	<50mV
Power Consumption	20W (Worst - Case) - all data circuits active.

# VCL-DX Digital Data Drop-Insert Multiplexer with In-band Management Interface and “n” X 64 Kbps data options



## Rear View



System Composition	Description	Part No.
19-Inch Shelf 3U high	19- Inch Shelf and Backplane	VCL-DX-001
Slot 1	Power Supply Card	VCL-DX-010
Slot 2 to 7	6 User Configurable “n” X 64 Kbps data interface(s)	As per user requirement
Slot 8	Control Card 1	VCL-DX-020
Slot 9	Control Card 2	VCL-DX-021

## Ordering Information

### VCL-DX E1 Core System (Common Equipment)

S No.	Part #	Product Description	Qty
1.	VCL-DX-020	Control Card 1, 30 Channel E1 Interface	1
2.	VCL-DX-021	In-Band Management Interface Card (Control Card 2)	1
3.	VCL-DX-001	19" Shelf 3U High (Sub-rack)	
4.	VCL-DX-010	(-) 48VDC Input Power Supply Card,	1

### VCL-DX, User Configurable Interfaces

S No.	Part #	Product Description	Qty
1.	VCL-MX-055	V.35, N x 64Kbps Synchronous Data Interface, ONE Interface per Card - User Selectable Data Rate of "N" (1 thru 31) - DCE	1
2.	VCL-MX-056	V.36, N x 64Kbps Synchronous Data Interface, ONE Interface per Card - User Selectable Data Rate of "N" (1 thru 31) - DCE	1
3.	VCL-MX-057	RS530, N x 64Kbps Synchronous Data Interface, ONE Interface per Card - User Selectable Data Rate of "N" (1 thru 31) - DCE	1
4.	VCL-MX-058	X.21, N x 64Kbps Synchronous Data Interface, ONE Interface per Card - User Selectable Data Rate of "N" (1 thru 31) - DCE	2
5.	VCL-MX-081	Fractional E1 - N x 64Kbps Data Interface, ONE Fractional E1 Interface per Card - User Selectable Data Rate of "N" (1 thru 31)	1
6.	VCL-MX-082	10BaseT - User Selectable Data Rate - N x 64Kbps (N = 1 thru 31) - ONE 10BaseT Interface per Card. FULL Data Routing Functions.	1
7.	VCL-MX-083	G.SHDSL - User Selectable Data Rate - N x 64Kbps (N = 1 thru 31), ONE G.HDSL Interface per Card (LT)	1
8.	VCL-MX-084	G.SHDSL - User Selectable Data Rate - N x 64Kbps (N = 1 thru 31), ONE G.HDSL Interface per Card (NT)	1
9.	VCL-MX-096	G.HDSL @ "n" x 64Kbps - (Remote) Customer Premises Equipment - with a 10BaseT interface. FULL Routing Functions.	1

## Ordering Information

<b><u>Optional and Accessories</u></b>			
S No.	Part #	Product Description	Qty
1.	VCL-30-01048	Power Supply (External) AC to DC Converter Portable External Converter Universal AC Input [93VAC-276VAC, 47Hz-63Hz] to DC Output [(-) 48VDC] - Optional 1 (Supports 1 channel bank)	1
2.	VCL-30-01048 19-RK	Power Supply (External) AC to DC Converter External Converter ] Universal AC Input [93VAC-276VAC, 47Hz-63Hz] to DC Output [(-) 48VDC] - Optional 2 (Supports up to 4 channel banks)	1
3.	VCL-30-75-Conv	75 Ohms to 120 Ohms Converter , G.703 Transformer Module (Balun) with RJ-45 and Female BNC	1
4.	Cables	V.35 (M34 - Winchester) - "n" x 64Kbps Connectorized Cable	1
5.	Cables	V.36 / X.21 / RS530 - "n" x 64Kbps Connectorized Cable	1
6.	Cables	Fractional E1 Connectorized Cables	1
7.	Cables	E1 Interface - RJ45 Connectorized Cable (Straight-Through & Cross-Over Cable - 1, ea.)	1
8.	Cables	NMS Connectorized Cables	1
9.	Cables	LMS Cables	1
10.	Manual	Documentation User Manual & System Software Disks	1 Set

Technical Specifications are subject to change.

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