



||| Bhumika International Inc.

VCL-30TM
E1, 2 Mbps
30 Channel Drop-Insert Multiplexer

Product Brochure & Data Sheet

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Product Overview

The VCL-30, 2Mbps ~ 30 Channel E1, 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-30 is a simple, yet powerful E1 Channel Bank for connecting and integrating analog communication equipment with digital E1 services.

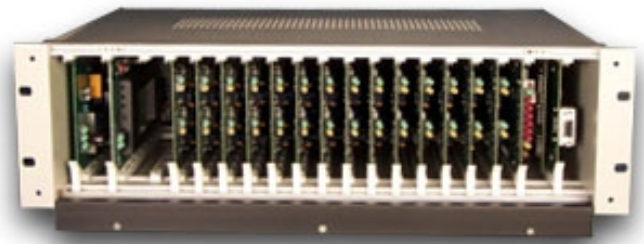
The VCL-30, E1, Drop-Insert Multiplexer provides voice telephony and digital data services which may include:

- Voice Telephony (FXO, FXS, E&M).
- Data Communication (V.35, V.24, 64Kbps Co-directional)
- Wireless (Cellular, Microwave Radio) Communication.
- Interconnecting computer terminals.
- Interconnecting LAN (Local Area Networks).
- Providing leased data lines and real-time video links to subscribers at speeds ranging from 64Kbps up to 1.024Mbps, using the "N"x64, V.35 data interface card.

The available data interface options include:

- G.703, co-directional, synchronous data interface @ 64Kbps.
- V.35, synchronous data interface @ 64Kbps."N" x 64Kbps, V.35, user configurable, synchronous data interface. The value of "N" may be configured by the user according to bandwidth requirements.
- V.24 / RS232, asynchronous data interface for low-speed data applications ranging from 300Bps to 19.2Kbps.
- BRI ISDN "U" Interface.
- iDSL (ISDN DSL) leased line interface.
- 10BaseT Ethernet

The VCL-30 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-30, E1 Multiplexer, for voice and Data applications.



**VCL-30, E1,
Drop-Insert Multiplexer**

The system also supports a full range of voice interfaces with user programmable speech output levels, which include:

- 2 wire analog voice interface (FXO, FXS) for subscriber dial-up applications.
- 2 wire and 4 wire E&M interface(s) for connecting large PABX(s) , or, for inter-connecting analog telephone switches.
- Configuring any two voice (FXS - FXS) channels to provide Hotline facility.

The VCL-30 has an effective, Windows 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.

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

Features

- Voice and Digital Data services.
- Any combination ("mix-n-match") of Voice and Digital Data services deployed from a single VCL-30 "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, compact construction.

Highlights

- Field upgrade possible 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".
- Channel assignment independent of slot position in the subrack.
- Extensive set of alarms.
- Synchronization to different user selectable clock sources (User Selectable Priority Assignment).

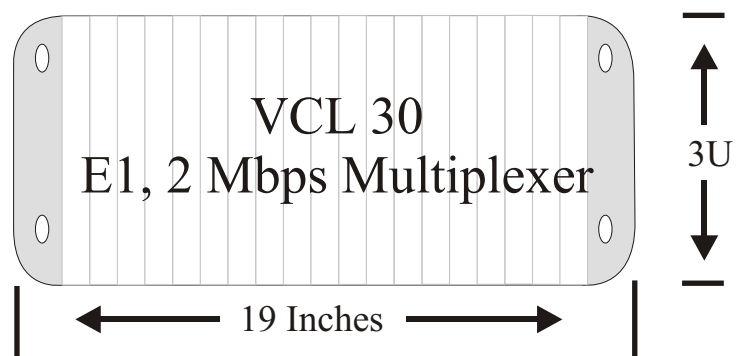
Transmission Mediums

The VCL-30 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:

- Ordinary copper cable pairs
- Optical fiber cables
- Wireless, for deploying voice, data or video conferencing services.

Application of VCL-30

- POTS (voice), digital data, or real-time video conferencing services (V.35 high-speed data port allows point-to-point network solutions for providing a video conferencing channel of up to 1024Kbps).
- Junction Mux - for digital interconnection of analog exchanges.
- 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 1024Kbps. (V.35 Interface)
- 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 download) transmission standards for analog dial-up modems.



System Composition

Core System Composition:

- Control Card 1
- Control Card 2
- Power Supply Card
- Backplane
- 19-Inch Shelf

Slot 1	Power Supply Card
Slot 2	Ringer Card
Slot 3 to 17	Voice/Data Interface Cards
Slot 18	Control Card 1
Slot 19	Control Card 2

Mechanical Specifications

Rack Mounting	Standard 19 Inch. DIN Rack
Height	133.33mm.
Depth	292mm.
Width	483mm.
Weight	7.50 Kg.

User Configurable Interface Card

~Voice Interface :-

- POTS service from a Central Office Switch. (FXO & FXS)
- Hot Line (FXS-FXS).
- 2 Wire and 4 Wire, E&M applications.
- 30W, sine-wave, 86VRMS Ringer.

~ Data Interfaces:-

- V.35 (64Kbps Synchronous Data) - 2 Interfaces (Dual Port) per card.
- N x 64 ("N" x 64Kbps Synchronous Data - One Interface per card).
- G.703 (64Kbps Synchronous Data) - 2 Interfaces (Dual Port) per card.
- V.24 (up to 19.2Kbps Synchronous /Asynchronous Data) 2 Interfaces (Dual Port) per card.
- BRI ISDN "U" Interface
- iDSL (ISDN DSL) leased line interface.
- 10BaseT Ethernet

Technical Specifications - E1 Interface

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 Ω balanced / 75 Ω unbalanced
Peak Voltage of a mark	
For 120 Ω Balanced interface	3.0 V \pm 0.3 V
75 Ω Unbalanced interface	2.37 V \pm 0.237 V
Peak Voltage of a space	
for 120 Ω Balanced interface	0 V \pm 0.3 V
75 Ω 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

2 Wire / 4 Wire - Voice Frequency Interface(s)

Number of Channels per Card	2
Interface Type	FXO, FXS, 2W / 4W E&M
Maximum Number of Channels	30
Transmission performance	Fully Compliant to ITU (CCITT) G.712 specification
Line Impedance	600 Ω (900 Ω optional)
Voice Channel Frequency	300Hz-3400Hz
Insertion Loss	-2.0dB Nominal (User adjustable in steps of 0.5 dB through Network Management Software)
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 40 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
Periodic Metering	16 KHz (Optional)
Dial Pulse Speed	8-12 pps

G.703 @ 64kbps, Synchronous Data Interface

Number of Interfaces per Card	2
Maximum Number	30, V.35, 64Kbits / sec. Interface
Conformity	To (CCITT) Rec. G.703
Mode	Synchronous, Co-directional
Bit Rate	64Kbps

High Speed Synchronous Data Interface V.35

Number of Interfaces per Card	2
Maximum Number	30, V.35, 64 Kbits / sec. Interface
Conformity	To (CCITT) Rec. V.35
Mode	Synchronous
Bit Rate	64 kbps
User Interface	DCE or DTE - User Configurable

High Speed Synchronous Data Interface "n X 64"

Number of Interfaces per Card	1, ("N" x 64KBits/sec. per Card)
Maximum Number	("N" x 64 Kbits / sec. Interface maximum value of "N" = 16)
Conformity	To (CCITT) Rec. V.35
Mode	Synchronous
Bit Rate	64 Kbps to 1024 Kbps
User Interface	DCE or DTE - User Configurable

Low Speed Data Interface V.24

Number of Interfaces per Card	2
Maximum Number	30
Conformity	To(CCITT) Rec. V.24
Mode	Synchronous/Asynchronous
Bit Rate	2.4/4.8/7.2/9.6/ 19.2 Kbps
User Interface	DCE or DTE - User Configurable

BASIC RATE ISDN Specifications

The BRI ISDN Access Module of the VCL-30, 2Mbps Drop-Insert Multiplexer shall terminate at either end on a "U" Interface - both on the Exchange Side / CO Side (in a NT Mode) and the Customer Side (in a LT Mode) and shall be used to deliver BRI ISDN (2B+D) from the Switch to the Customer Premises on the E1 link along with other voice and data services.

The BRI ISDN "U" Interface shall have the following specifications:

"U" Interface	Meets ANSI T1.601-1992 requirements
Line Rate	160 Kbits/s
Frame Format	As per 2B+D of CCITT Rec. I 430
Line Code	2B1Q as per CCITT Rec.G.961
Accepted Line Attenuation	42dB at 40 Khz
Pulse Shape	As per CCITT Rec.G.961
CO Side "U" Interface	NT Emulation
Customer Side "U" Interface	LT Emulation
Impedance	135 Ohms at 40KHz

iDSL - ISDN DSL Specifications

"U" Interface	Meets ANSI T1.601-1992 requirements
Line Rate	160 Kbits/s
Frame Format	2B as per CCITT Rec.1.430
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

Customer Premises Desktop User Interfaces:

Customer Premises Desktop Interfaces - Option # 1: (V.35 interface @ 128Kbps)

Our CO / ISP side iDSL Modem cards - part # VCL-30-080 may be used with our V.35, baseband modem - Bhumika Part # VCL-30-090 (customer premises desk top equipment with V.35 Interface @ 128Kbps).

Customer Side / Remote / Side Desk-Top Equipment: Provides 128Kbps data transmission rate on a twisted pair upto 5KM from the VCL-30, Installation Site: Customer Interface - V.35 data interface @ 128Kbps

Power Supply 110VAC-220VAC, 50Hz/60Hz, UL and CE Approved.

Ordering Information: Bhumika Part # VCL-30-090 (desk-top customer premises equipment with V.35 interface @ 128Kbps).

Optional Accessories:

V.35 Data Interface Cable (with male / female M34 connector)

Customer Premises Desktop Interfaces - Option # 2: (10BaseT Ethernet - with IP Protocol Routing Functionality)

Our CO / ISP side iDSL Modem cards - part # VCL-30-080 may be used with our customer premises equipment with a 10BaseT Interface. Bhumika Part # VCL-30-095 - customer premises desk top equipment with 10BaseT Interface - IP Protocol Routing Functionality. (Firewall Protection - Optional).

Customer Side / Remote / Side Desk-Top Equipment: Provides 128Kbps data transmission rate on a twisted pair upto 5KM from the VCL-30, Installation Site: Customer Interface - 10BaseT Ethernet Interface with IP Protocol Routing Functionality. The 10BaseT Interface may be directly connected to a 10BaseT Network Interface Card installed on a PC, or to to a HUB to connect a complete customer LAN to the network.

Power Supply 110VAC-220VAC, 50Hz/60Hz, UL and CE Approved.

Ordering Information: Bhumika Part # VCL-30-095 (desk-top customer premises equipment with 10BaseT interface).

Maximum Distance : 5KM (4 miles) on 0.5 mm twisted Pan. Distance may vary with cable gauge

For distance using various cable guages please refer to chart below.

Distance in Kms. (Miles)				
Data Rate (Kbps)	Wire Gauge (AWG/mm)			
	19 (.9mm)	22 (.6mm)	24 (.5mm)	26 (.4mm)
128	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

Clock Synchronization

Synchronization Sources	Internal Clock, External Clock, timing derived from incoming HDB3 links (Loop Timed)
External Clock Input	As per ITU (CCITT) Rec. G.703
Impedance of External Clock Input Port	120 Ω balanced
Default Option	Internal Clock

ENVIRONMENTAL

Exchange Terminal	0°C to + 50°C, 90% R.H. (Non Condensing)
Subscriber Terminal	-10°C to +60°C, 90% R.H. (Non Condensing)

Power Supply

Input DC voltage	-48V DC (nominal)
Range of input	-40V to -60V DC
Output voltages	+5V, -5V, filtered -48V (for term. cards)
Full Load Output Current	4A at +5V, 0.5A at -5V
Input Voltage Reversal Protection	Provided in the Card
Over Current Protection	6A for +5V, 0.5A for -5V
Short Circuit Protection	Current limit - 6A. Recovers on removal of short
Under Voltage	< 4.5V
Over Voltage	5.4V to 5.6V
Efficiency at full load	>70%
Ripple at full load	<5mVrms
Spike at full load	<50mV
Power Consumption	21W - with all 30 Voice Circuits 42W (Worst - Case) - all data circuits.

Technical specification are subject to change without notice.

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Revision 06, April 20th, 2006

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