

# VCL-LD E1 DCME Voice Compression Equipment

## INTRODUCTION

VCL-LD™ E1, DCME (Digital Circuit Multiplication Equipment) Voice Compression Equipment provides 30, "toll quality" voice channels using an 8:1 compression ratio (10:1 Compression Ratio without the signaling channel), in a bandwidth of 256kbps\*. This is accomplished using an advanced digital signal processor (DSP) based Viterbi decoder with automatic voice/silence detection (VAD) and adaptive comfort noise generation (CNG).

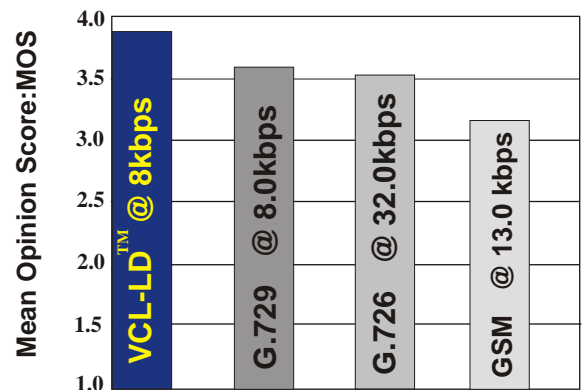


The interface to the local PSTN network is ITU-T G.703, G.704 compliant E1 with signaling support for R2, CAS (ABCD) Digital Signaling, PRI ISDN (Q.931), SS7 and C7 Signaling.

VCL-LD is a natural choice for satellite communications, digital mobile radio applications, cellular network operators, long distance telephony service providers (including pre-paid calling card operators), corporate customers, call-center operators wanting to optimize on expensive bandwidth usage and offer a competitively priced, toll-quality service to their customers.

Voice compression technology has been proven to outperform CELP, RELP, VSELP, MELP, ECELP, MP-MLQ, LPC-10 and other competitive technologies. Numerous evaluations have shown its ability to provide performance equal to today's digital cellular systems at under half the data rate.

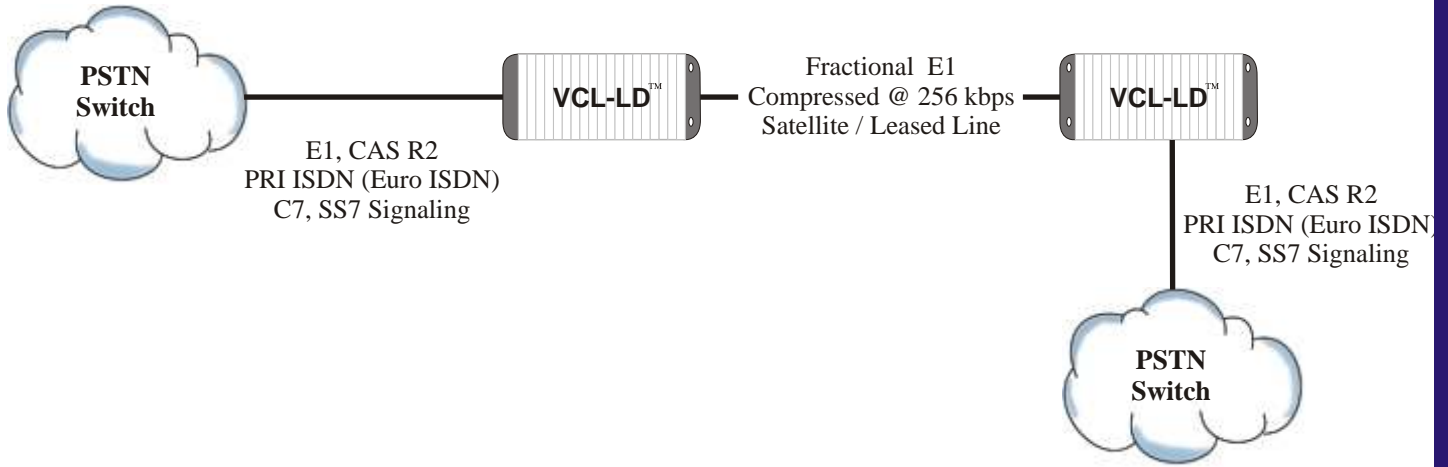
The Voice Activation Detection (VAD) algorithm along with the Comfort Noise Insertion (CNI) performs useful functions in systems trying to convert periods of silence, that exist in normal conversation, to savings in system bandwidth. The comfort noise is intended to give the listener the feeling that the call is still connected as, opposed to producing absolute silence which can give the impression that the call has been dropped.



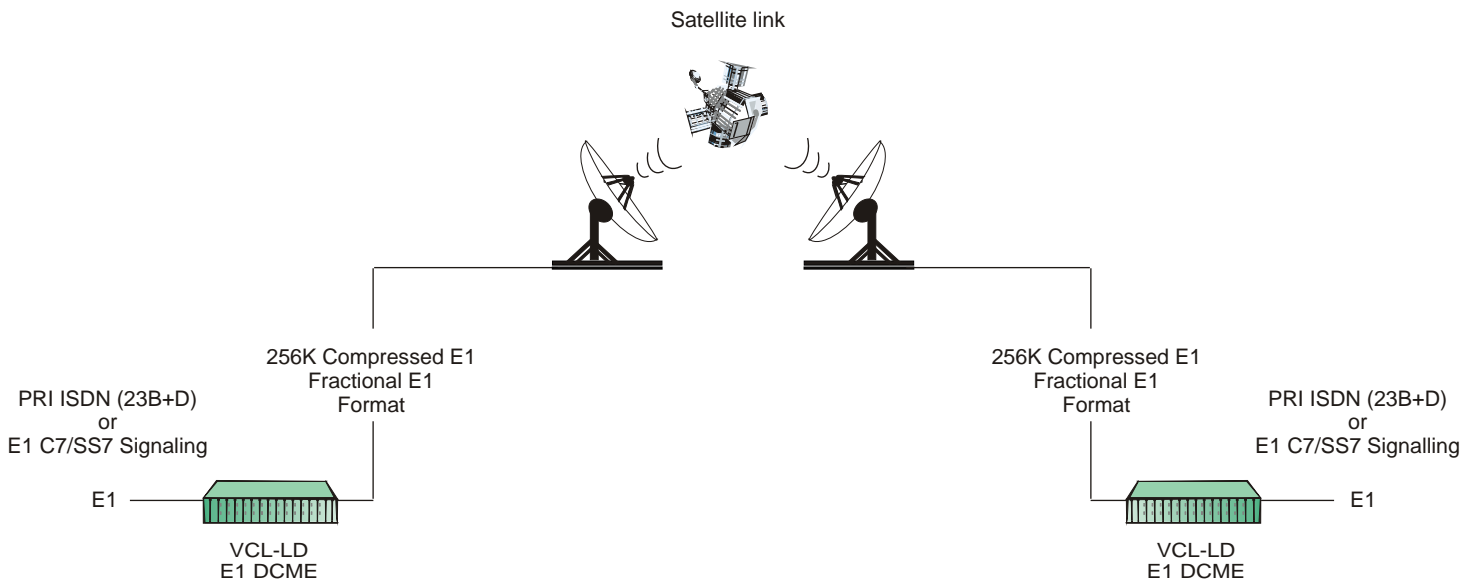
Voice Quality Vs. Bit Rate

# Application of VCL-LD™ DCME

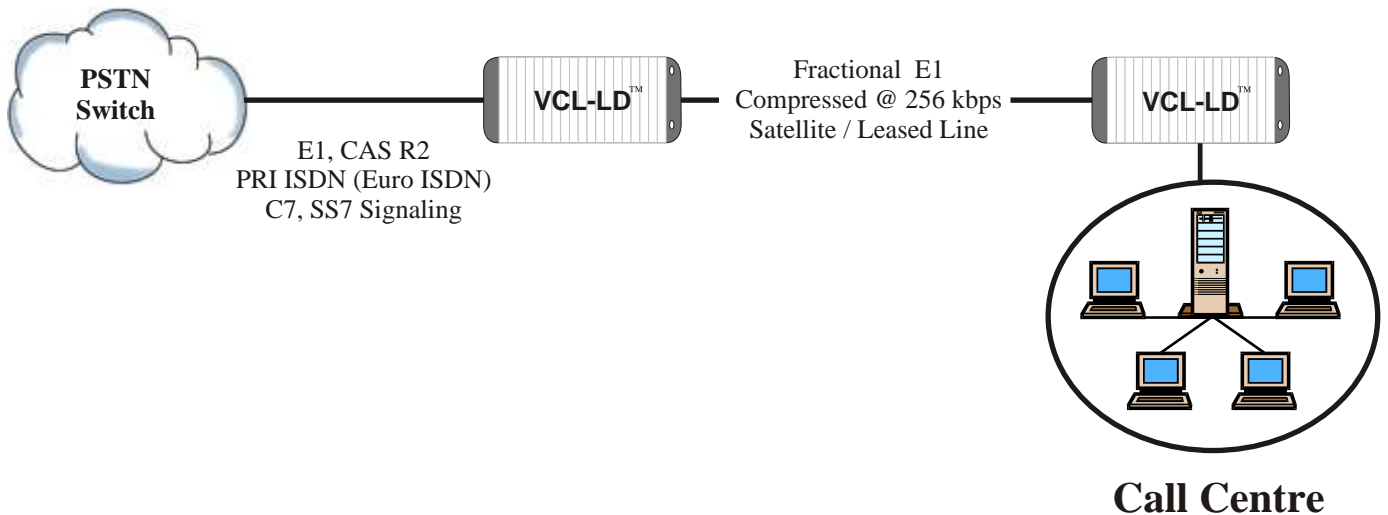
## International & Domestic Long Distance Telephony - A



## Long Distance Application - B



## Call Center Application



## APPLICATIONS:

- Satellite Communications
- Digital Mobile Radio
- Secure Communications
- Cellular Telephony and PCS
- Voice Multiplexing
- Long Distance Telephony
- Prepaid Calling Card Service
- Call Center Applications
- Rural Telephony
- Voice Mail

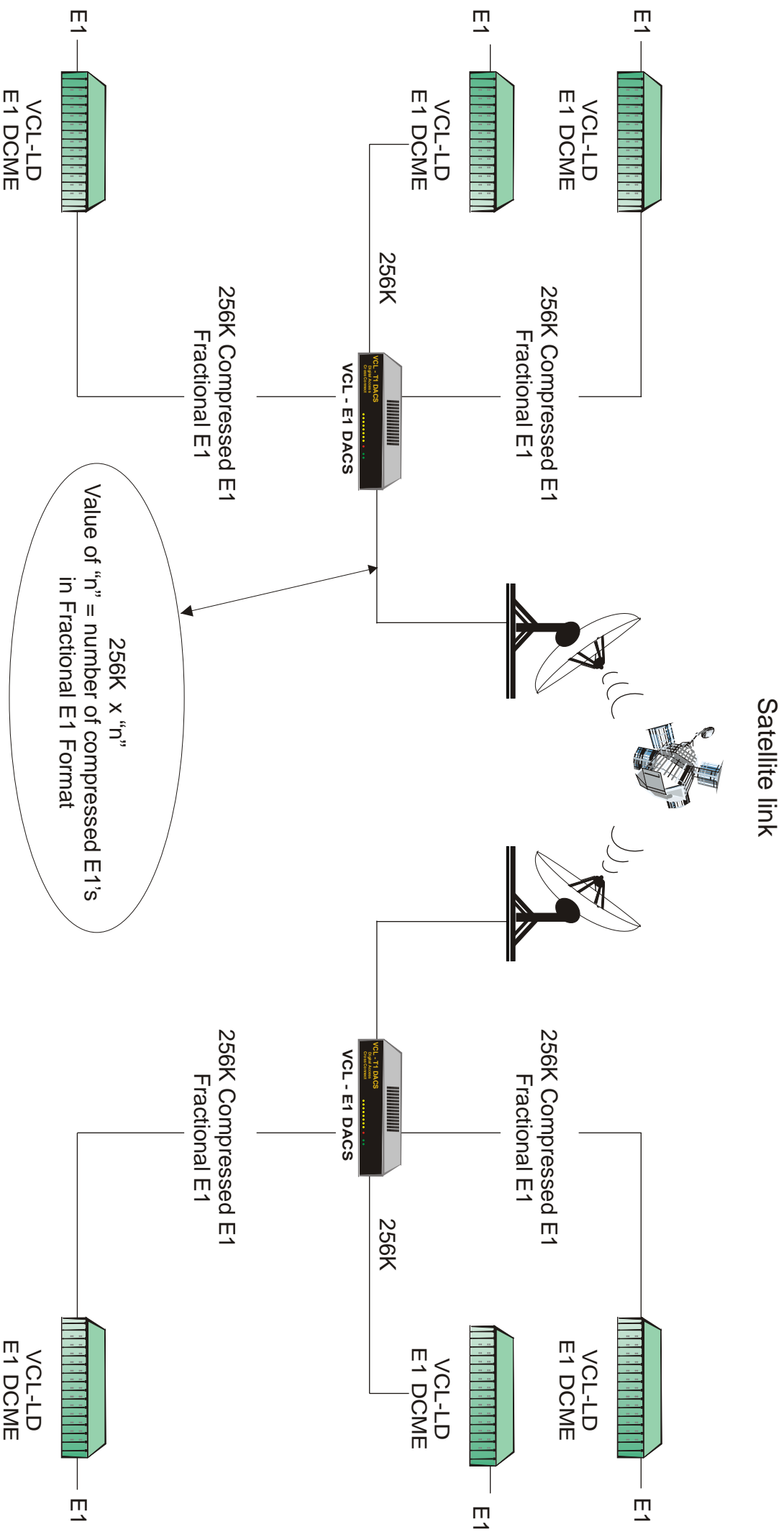
## FEATURES

- Support for multiple signaling platforms including CAS R2, PRI ISDN and SS7 # Signaling.
- Echo cancellation: Echo canceller card cancels echo up to 128ms.
- E1, 30 voice channels in 256Kbps bandwidth (4, DS-0's) for voice only application.
- E1, 30 voice channels in 384Kbps (6, DS-0's) for voice, fax and data modem support.
- Ideal choice for satellite communications, digital mobile radios, cellular network, long distance telephony service providers (including pre-paid calling card operators), corporate customers for linking intercity voice networks, national and international call-center applications, and ISPs wishing to provide reliable long distance telephony service to their customers.
- Modular Architecture - reduces downtime - dual port per card.
- Scalable - Build as you grow.
- Transport over point-to-point satellite links and dedicated leased lines.
- Superior Voice Quality.
- Robust to Bit Errors & Background Noise.
- High Quality Low Data Rate Speech Coding.
- Forward Error Correction.
- Voice Activity Detection (VAD) / Comfort Noise Insertion.
- Single and Dual Tone (DTMF) Detection and Generation.
- Minimal algorithmic processing delay.
- DTMF detection and regeneration.
- Support fax and data modems @ upto 33.6Kbps data rates.

## HIGHLIGHTS

- E1, 30 Toll-Quality voice channels in 256Kbps of bandwidth.
- 8:1 compression ratio (10:1 without signaling channel).
- 128 ms. adaptive Echo Cancellation.
- DSP based Vertibi Decoder for superior voice quality.
- 3U high, compact construction.
- Extensive set of alarms.
- User selectable clock sources.
- Support fax and data modems @ upto 33.6Kbps data rates.

## Long Distance Telephony 2 or Multiple E1's - DCME Application

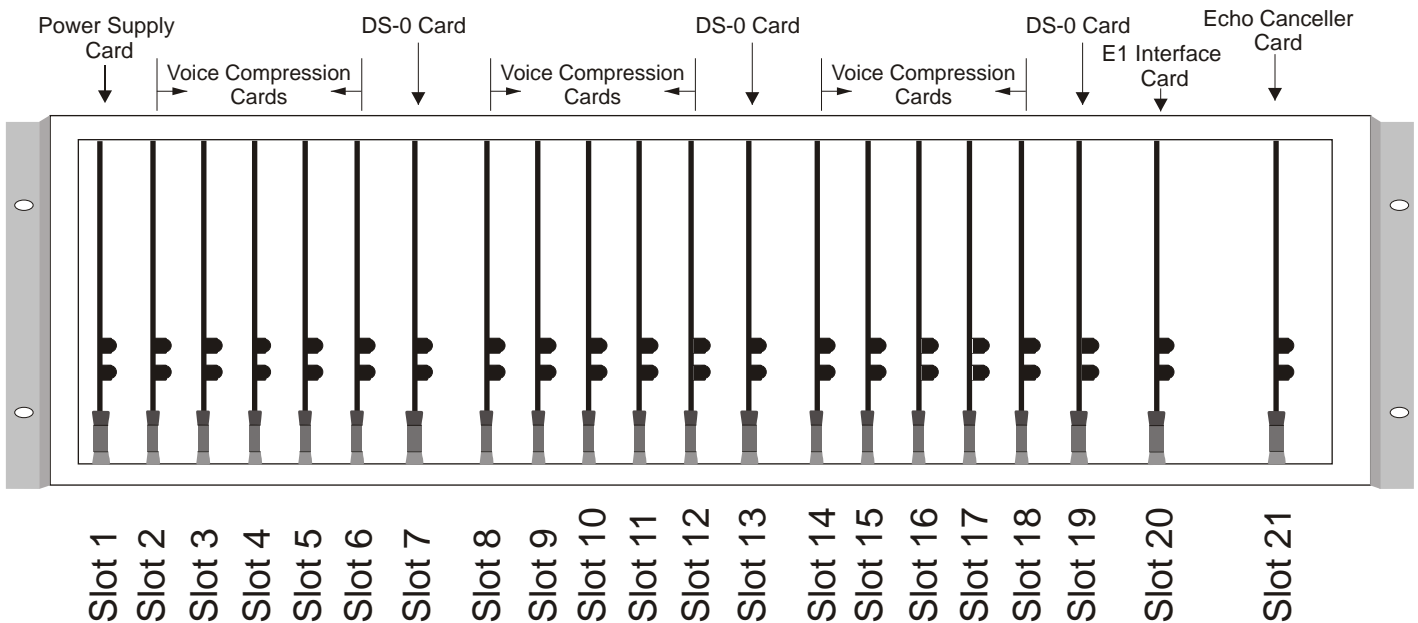


## VCL-LD, E1 DCME (Digital Circuit Multiplication Equipment) SHELF DESCRIPTION:

The VCL-LD, E1 DCME (Digital Circuit Multiplication Equipment) is a 3U, 19 Inch Shelf, fitted with a backplane that provides rear access of all external interfaces. The E1 interface, power input, alarm extension are all accessed from the backplane.

### VCL-LD, E1 DCME (Digital Circuit Multiplication Equipment)

#### Front View of the Shelf



Front View (Left to Right)	Card Details	Part No.
Slot 1:	PS, Power Supply Card	VCL-LD-110
Slot 2 to Slot 6:	VCC, Voice Compression Card	VCL-LD-120
Slot 7:	DS-0, DS-0 Card	VCL-LD-130
Slot 8 to Slot 12:	VCC, Voice Compression Card	VCL-LD-120
Slot 13:	DS-0, DS-0 Card	VCL-LD-130
Slot 14 to Slot 18:	VCC, Voice Compression Card	VCL-LD-120
Slot 19:	DS-0, DS-0 Card	VCL-LD-130
Slot 20:	VCE, E1 Interface Card	VCL-LD-140
Slot 21:	EC, Echo Canceller Card (128ms Echo Cancellation)	VCL-EC128

## Technical Specifications

### Digital Network (PSTN) Interface 2048 Kbps Telco - E1

Number of E1 Interfaces	1
Maximum number of Voice Channels per E1 Interface	30
Conformity	G. 703
Frame Structure	As per ITU (CCITT) G.704
PCM Sampling Rate	8000 samples/ sec
Encoding Law	A law as per ITU (CCITT) G.711
Bit Rate	2048 Kbps $\pm$ 50 ppm
Code	HDB3
Nominal Impedance	120 balanced(75 unbalanced* - optional).
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 2048 KHz to 3072 KHz	6 dB at 1 MHz >14dB
Jitter Tolerance	As per ITU (CCITT) G.823
Supported Signaling	Channel Associated Signaling, R2 Signaling PRI (Primary Rate) ISDN Signaling (Q.931), C7, SS7 Signaling.

### Clock Synchronization

Synchronization Sources	Internal Clock, or, Timing derived from the E1, HDB3 link (Loop-Timed Clock)
Default Option	Internal Clock

### Digital Carrier Interface 256 Kbps (Fractional E1) Compressed - E1 (voice only application)

Number of E1 Interfaces	1 - Fractional E1 Interface @ 256Kbps
Number of DS-0s	4 (First Four Time-Slots)
Conformity	G. 703
Frame Structure	G.704
Bit Rate	2048 Kbps $\pm$ 50 ppm
Code	HDB3
Nominal Impedance	120 balanced (75 unbalanced - optional)
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

### Digital Carrier Interface 384 Kbps (Fractional E1) Compressed - E1 (voice, fax & data modem support @ upto 33.6Kbps transmission)

Number of E1 Interfaces	1 - Fractional E1 Interface @ 384Kbps
Number of DS-0s	6 (First Six Time-Slots)
Conformity	G. 703
Frame Structure	G.704
Bit Rate	2048 Kbps $\pm$ 50 ppm
Code	HDB3
Nominal Impedance	120 balanced (75 unbalanced - optional)
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

### Power Supply

Input DC voltage	-48V DC ( nominal )
Range of input	-40V to -60V DC
Power Consumption	Less than 20 Watts (at full load)
-48VDC Input Voltage Reversal Protection	Provided (Standard)
Auto-Sensing	Optional (External Supply)

### Echo Canceller : Technical Specifications

- Provides voice echo cancellation of up to 128ms
- Conforms to ITU-T G.165 and ITU-T G.168
- G.164 /G.165 disable tone detection
- Non-Linear Processor with Comfort Noise Insertion
- Narrow-Band Detector
- Eliminates long echo tail.

## Environmental

Cooling	Natural, Convection cooling
Temperature	0°C to 50°C, Ambient

## Mechanical Dimensions

Rack Mounting	Standard 19 inch DIN rack
Height	3U, 133.35mm
Depth	260mm
Width	477mm
Weight (Net)	8.50 Kgs.

## VCL-LD™ - Digital T1, Voice Compression Equipment (DCME) (One VCL-LD Terminal shall be required at each end).

Sr. No.	Part #	Product Description	Quantity per System
1.	VCL-LD-200	VCL-LD, 19 inch shelf - 3U High (sub-rack)	1
2.	VCL-LD-205	VCL-LD, Connectorized Backplane, 3U High 1.	1
3.	VCL-LD-210	-48 VDC Power Supply Card, Shelf Power Supply Card	1
4.	VCL-EC228-T1	T1, Echo-Cancellor 128 ms. Echo-Cancellation <i>1, required for every VCL-LD shelf</i>	1
5.	VCL-LD-240	T1, Interface card. Provides ONE uncompressed T1 interface and ONE compressed T1 (fractional T1) interface. <i>1, required for every VCL-LD shelf</i>	1
6.	VCL-LD-230	DS-0, Card, Aggregates 10 compressed voice channels to a DS-0 (64Kbps time-slot). <i>3, required for every VCL-LD shelf</i>	3
7.	VCL-LD-220	Voice Compression Card Dual channel voice compression card. <i>12, required for every VCL-LD shelf</i>	12
	<b>VCL-LD-T1</b>	<b>Complete - VCL-LD, T1 Voice Compression Terminal</b>	

