

# VALIANT COMMUNICATIONS LIMITED



## **VCL-LD E1, DCME**

(Digital Circuit Multiplication Equipment)

## **Voice Compression Equipment**

### Product Brochure & Data Sheet

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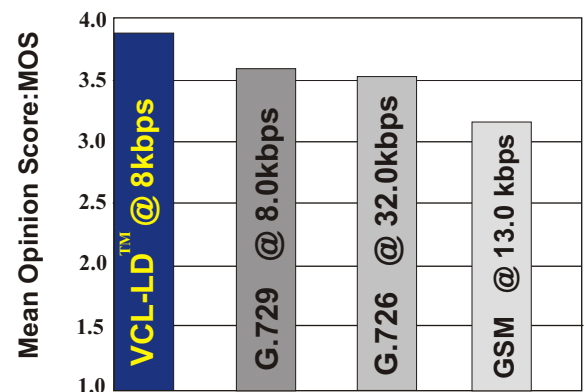
## INTRODUCTION

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 Quality Vs. Bit Rate

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.

### 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

\* See options

## FEATURES

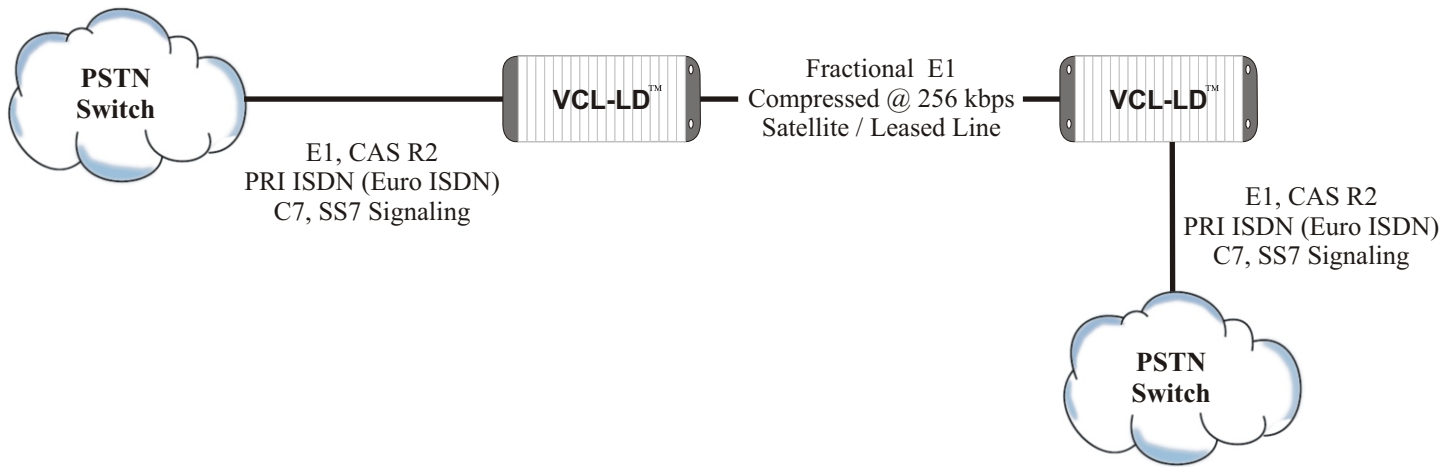
- Support for multiple signaling platforms including CAS R2, PRI ISDN and SS7 # Signaling.
- Echo cancellation: Echo canceller card cancels echo up to 128ms.
- E1, 30 voice channels in 256Kbps bandwidth (4, DS-0's ) for voice only application.
- E1, 30 voice channels in 384Kbps (6, DS-0's ) for voice, 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

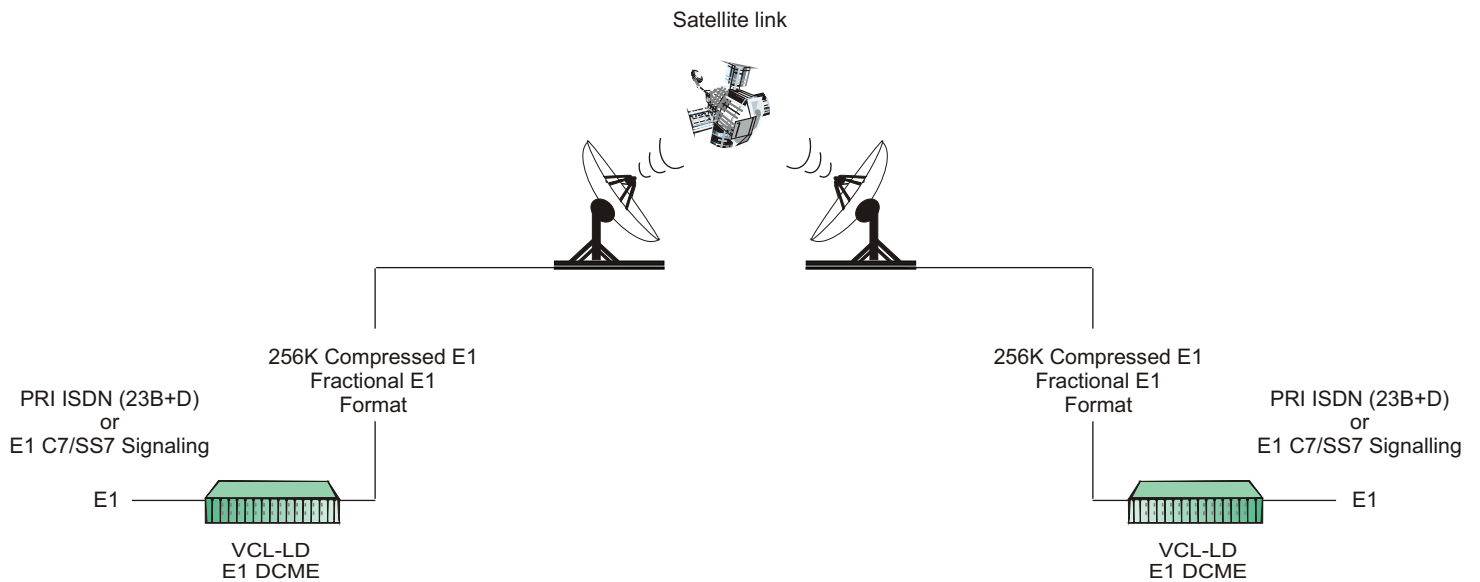
- E1, 30 Toll-Quality voice channels in 256Kbps of bandwidth.
- 8:1 compression ratio (10:1 without signaling channel).
- 128 ms. adaptive Echo Cancellation.
- DSP based Viterbi Decoder for superior voice quality.
- 3U high, compact construction.
- Extensive set of alarms.
- User selectable clock sources.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

# Application of VCL-LD™ DCME

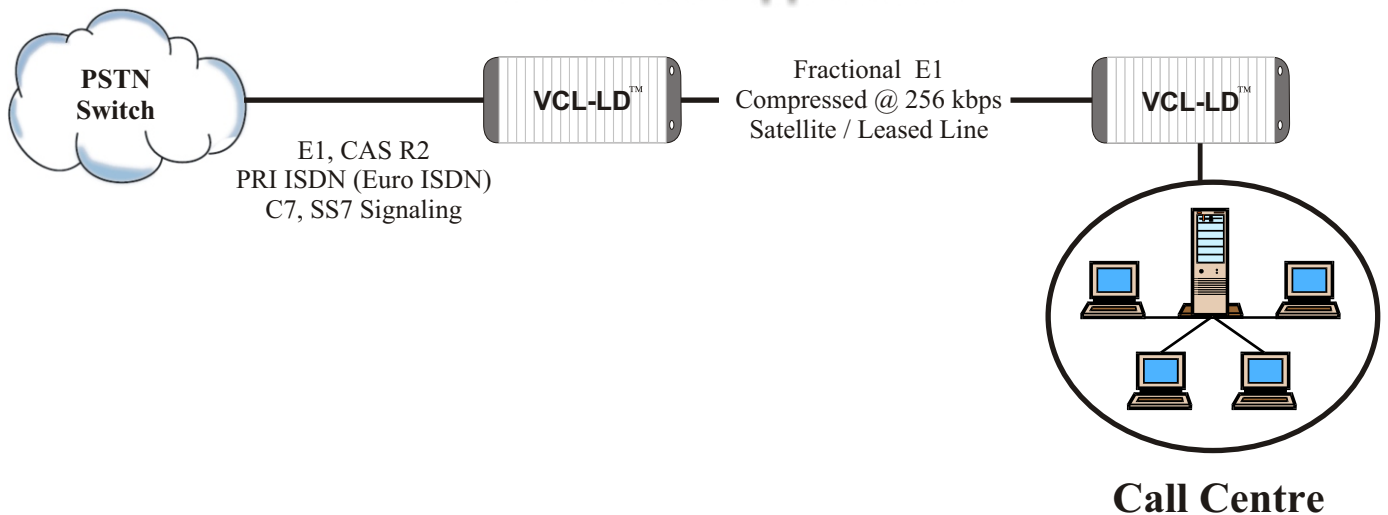
## International & Domestic Long Distance Telephony - A



## Long Distance Application - B

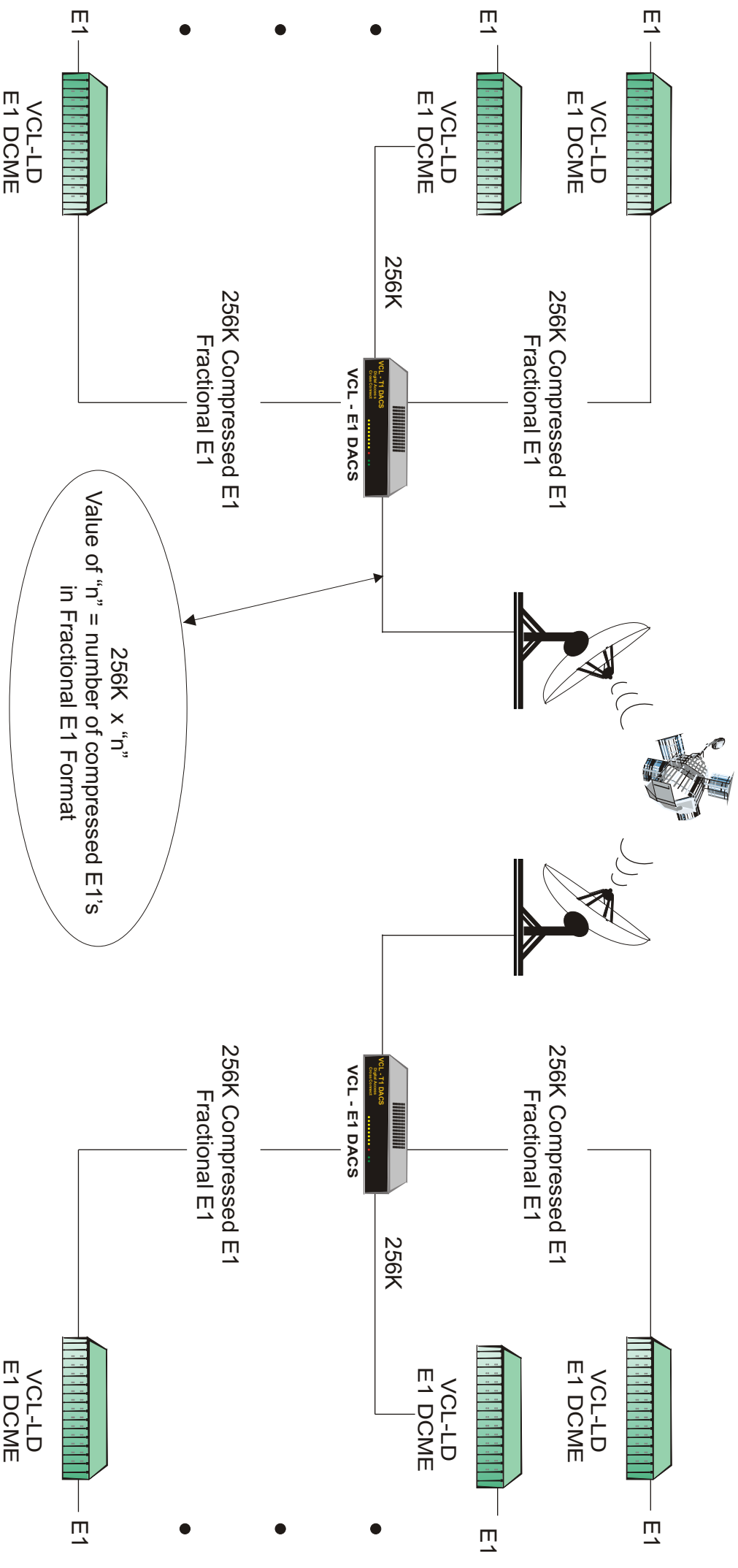


## Call Center Application



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

Satellite link

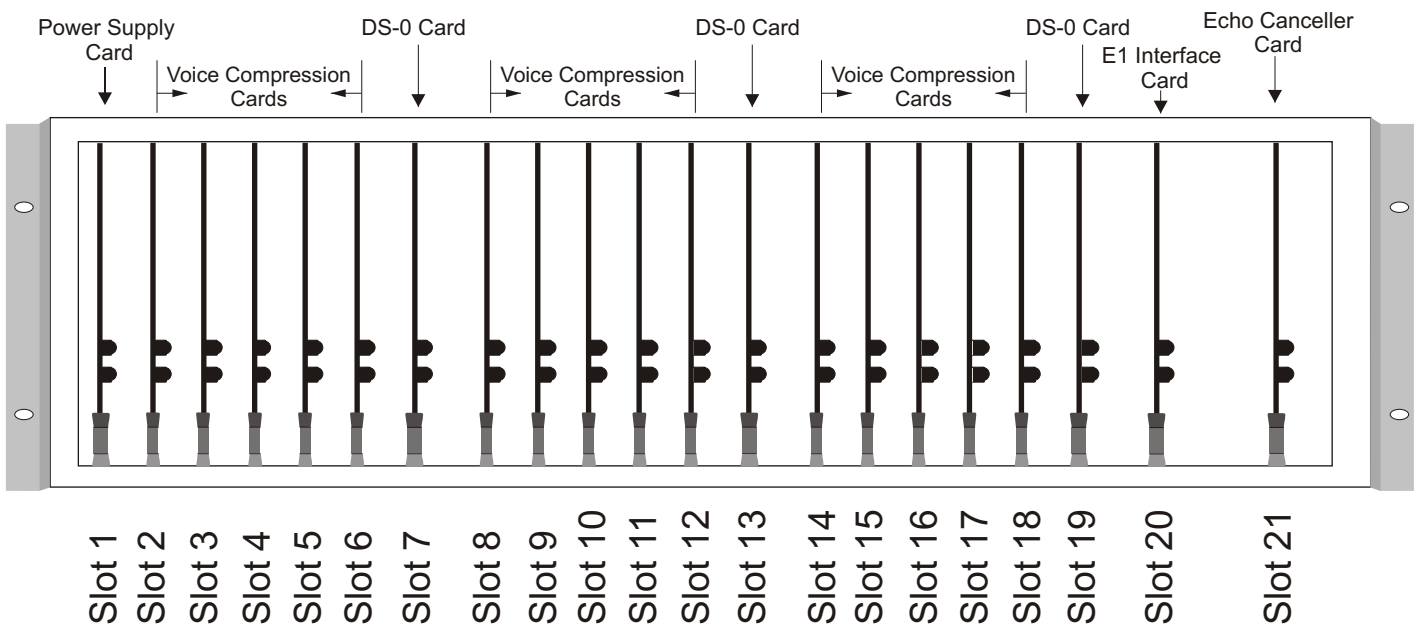


**VCL-LD, E1 DCME (Digital Circuit Multiplication Equipment)  
SHELF DESCRIPTION:**

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   | Valiant 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<br>(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 50 ppm   |
| Code  | HDB3   |
| Nominal Impedance                                 | 120 $\Omega$ balanced (75 $\Omega$ 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  |
| 2048 KHz to 3072 KHz                              | >14dB  |
| Jitter Tolerance                                  | As per ITU (CCITT) G.823   |
| Supported Signaling                               | Channel Associated Signaling, R2 Signaling<br>PRI (Primary Rate) ISDN Signaling (Q.931),<br>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 50 ppm  |
| Code                    | HDB3  |
| Nominal Impedance       | 120 $\Omega$ balanced (75 $\Omega$ 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 50 ppm                                      |
| Code                    | HDB3  |
| Nominal Impedance       | 120Ω balanced (75Ω 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         | 292mm                     |
| Width         | 482mm                     |
| Weight (Net)  | 8.50 Kgs.                 |

**VCL-LD™ - Digital E1, 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-100    | VCL-LD, 19 inch shelf - 3U High (sub-rack)  | 1                   |
| 2.      | VCL-LD-105    | VCL-LD, Connectorized Backplane, 3U High 1.   | 1                   |
| 3.      | VCL-LD-110    | -48 VDC Power Supply Card, Shelf Power Supply Card  | 1                   |
| 4.      | VCL-EC128     | E1, Echo-Cancellor<br>128 ms. Echo-Cancellation<br><i>1, required for every VCL-LD shelf</i>  | 1                   |
| 5.      | VCL-LD-140    | E1, Interface card.<br>Provides ONE uncompressed E1 interface and ONE compressed E1 (fractional E1) interface.<br><i>1, required for every VCL-LD shelf</i> | 1                   |
| 6.      | VCL-LD-130    | DS-0, Card,<br>Aggregates 10 compressed voice channels to a DS-0 (64Kbps time-slot).<br><i>3, required for every VCL-LD shelf</i>                           | 3                   |
| 7.      | VCL-LD-120    | Voice Compression Card<br>Dual channel voice compression card.<br><i>15, required for every VCL-LD shelf</i>  | 15                  |
|         | <b>VCL-LD</b> | <b>Complete - VCL-LD, E1 Voice Compression Terminal</b>   |                     |

