ORION TELECOM NETWORKS INC.

VCL-LD T1, DCME
(Digital Circuit Multiplication Equipment)
Voice Compression Equipment

Product Brochure & Data Sheet

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CAUTION
ELECTROSTATIC
SENSITIVE
DEVICES

DO NOT OPEN OR HANDLE
**EXCEPT AT A**
STATIC-FREE WORKSTATION

INTRODUCTION

VCL-LD™ T1, DCME (Digital Circuit Multiplication Equipment) Voice Compression Equipment provides 24, "toll quality" voice channels using an 6:1 compression ratio (8:1 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 T1 with signaling support for PRI ISDN (Q.931), SS7 / C7 , Common Channel 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.
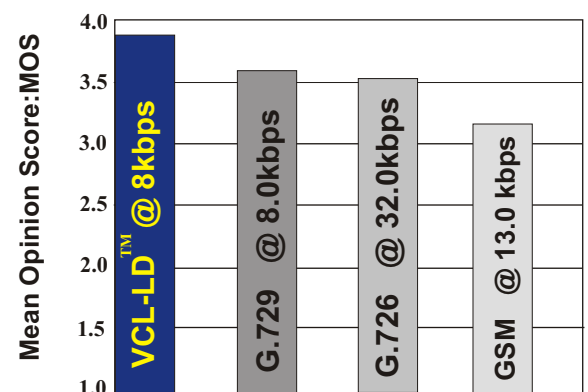
Voice Quality Vs. Bit Rate

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 intend 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

* See options

FEATURES

- Support for multiple signaling platforms   including PRI ISDN and SS7 /C7 Common Channel Signaling.
- Echo cancellation: Echo canceller card cancels echo up to 128ms.
- T1, 24 voice channels in 256Kbps bandwidth (4, DS-0's) for voice only application.
- T1, 24 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.
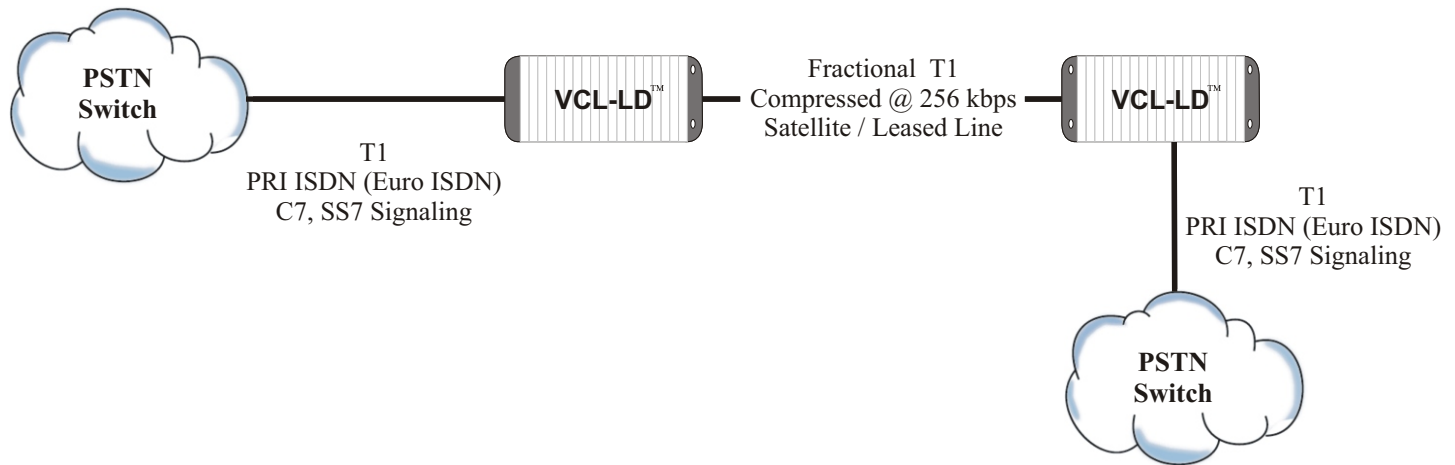
HIGHLIGHTS

- T1, 24 Toll-Quality voice channels in 256Kbps* of bandwidth.
- 6:1 compression ratio (8:1 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.
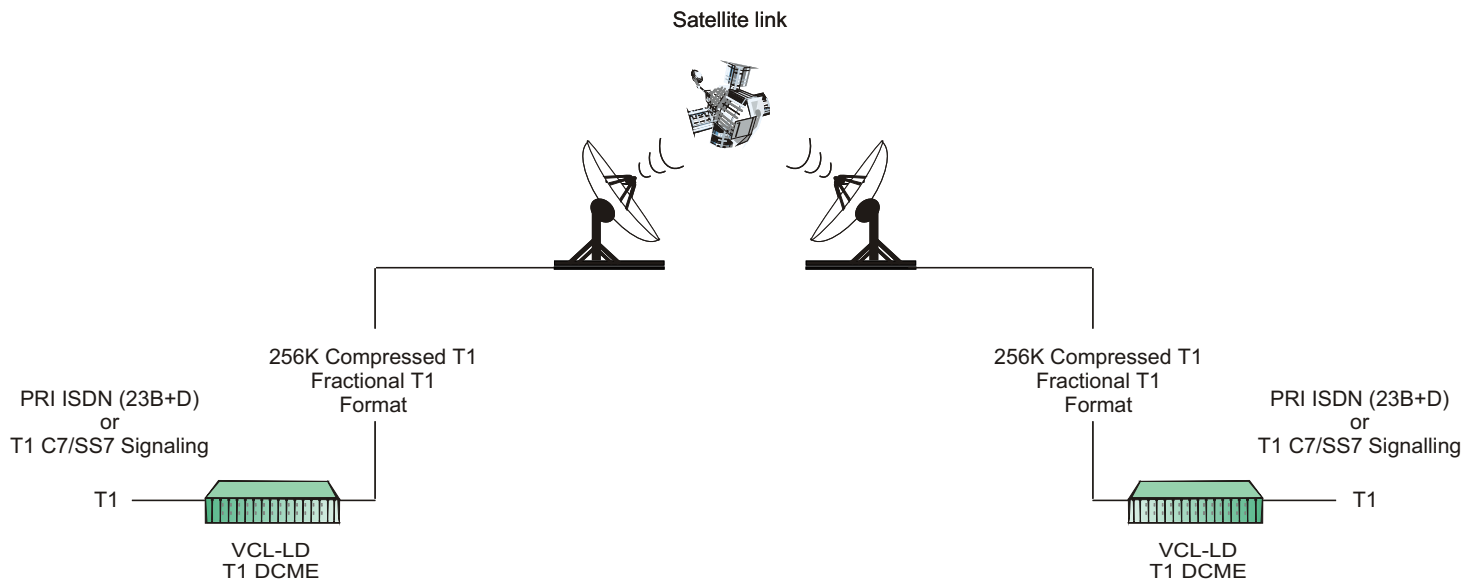- Support fax and data modems @ upto 33.6Kbps data rates.

* See options

Application of VCL-LD^{TM} DCME

International & Domestic Long Distance Telephony - A

PSTN Switch

VCL-LD^{TM}

Fractional T1
Compressed @ 256 kbps
Satellite / Leased Line

VCL-LD^{TM}

T1
PRI ISDN (Euro ISDN)
C7, SS7 Signaling

T1
PRI ISDN (Euro ISDN)
C7, SS7 Signaling

PSTN Switch

Long Distance Application - B

Satellite link

PRI ISDN (23B+D)
or
T1 C7/SS7 Signaling

256K Compressed T1
Fractional T1
Format

T1

VCL-LD
T1 DCME

256K Compressed T1
Fractional T1
Format

PRI ISDN (23B+D)
or
T1 C7/SS7 Signalling

T1

VCL-LD
T1 DCME

Call Center Application

PSTN Switch

VCL-LD^{TM}

Fractional T1
Compressed @ 256 kbps
Satellite / Leased Line

VCL-LD^{TM}

T1
RI ISDN (Euro ISDN)
C7, SS7 Signaling

Call Centre
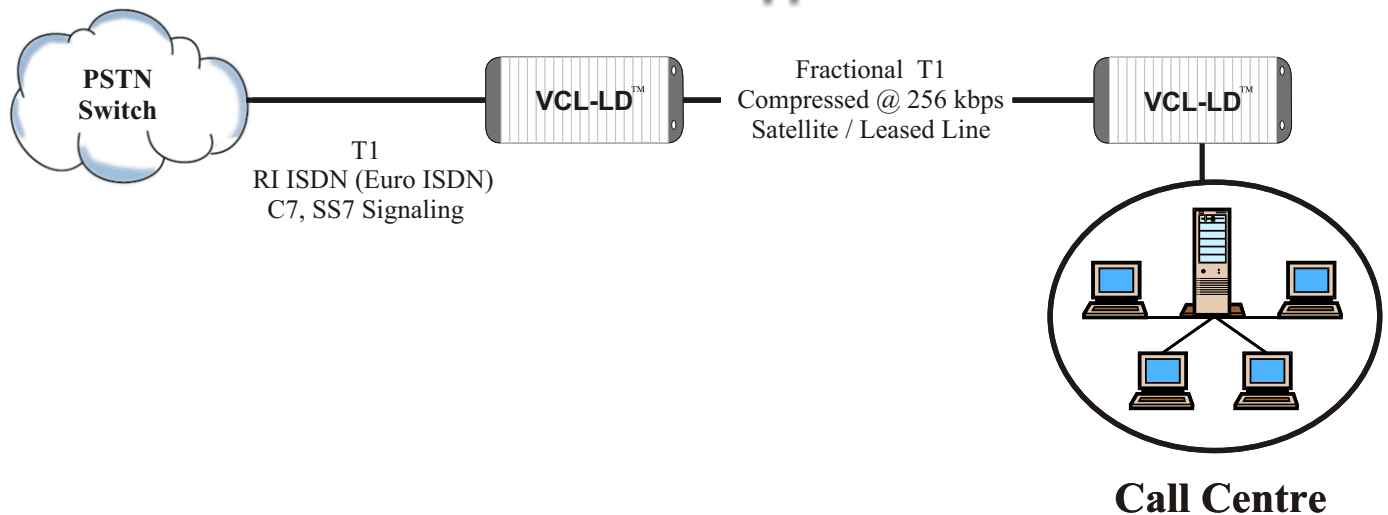
Long Distance Telephony
2 or Multiple T1's - DCME Application

VCL-LD
T1 DCME

VCL-LD
T1 DCME

VCL-LD
T1 DCME

T1

T1

T1

256K

256K Compressed T1
Fractional T1

256K Compressed T1
Fractional T1

VCL - T1 DACS

VCL-T1 DACS
Digital Access
CrossConnect

Satellite link

256K x "n"
Value of "n" = number of compressed T1's
in Fractional T1 Format

256K Compressed T1
Fractional T1

256K Compressed T1
Fractional T1

VCL - T1 DACS

VCL-T1 DACS
Digital Access
CrossConnect

256K

VCL-LD
T1 DCME

VCL-LD
T1 DCME

VCL-LD
T1 DCME

T1

T1

T1
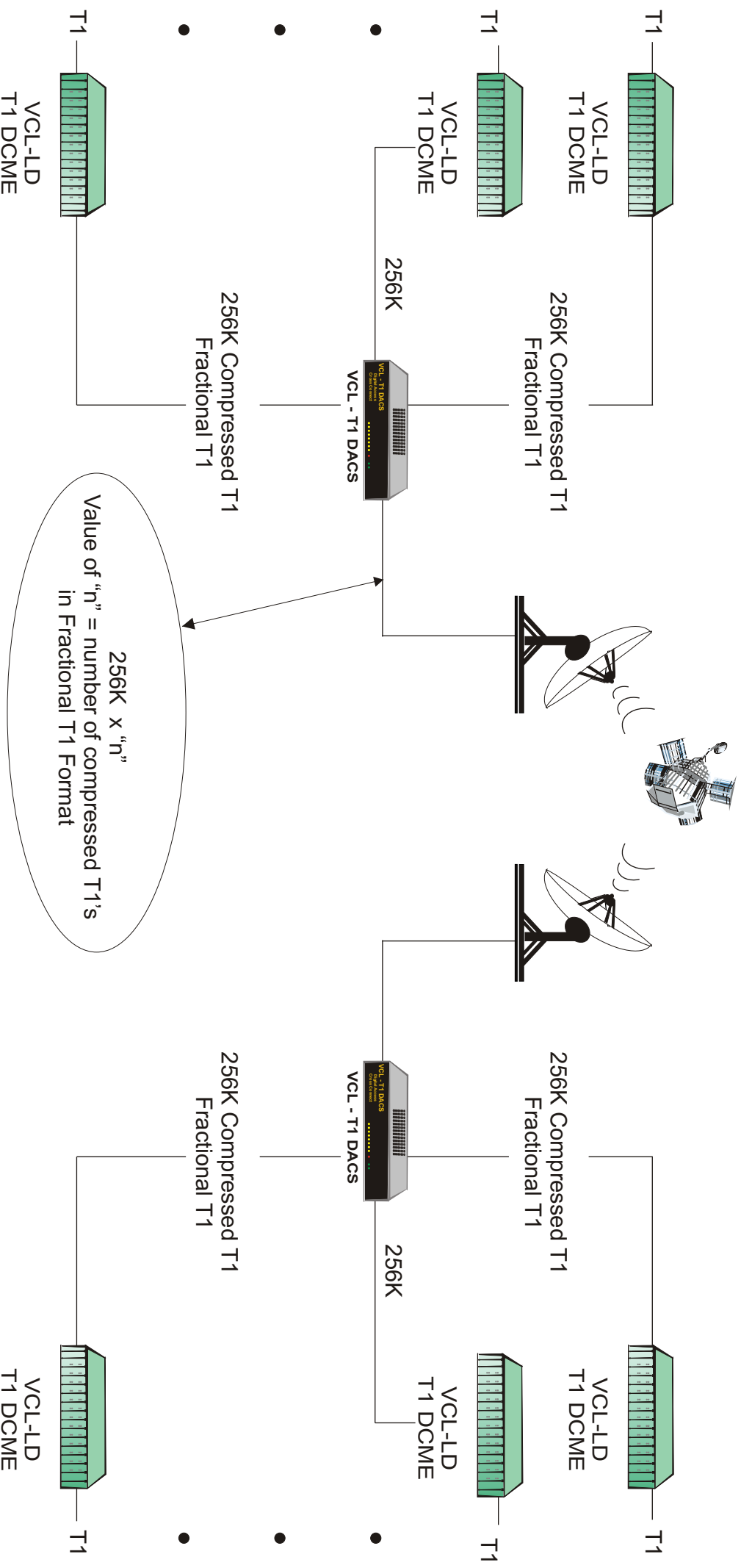
VCL-LD, T1 DCME (Digital Circuit Multiplication Equipment)
SHELF DESCRIPTION:

The VCL-LD, T1 DCME (Digital Circuit Multiplication Equipment) is a 3U, 19 Inch Shelf, fitted with a backplane that provides rear access of all external interfaces. The T1 interface, power input, alarm extention are all accessed from the backplane.

VCL-LD, T1 DCME (Digital Circuit Multiplication Equipment)

Front View of the Shelf
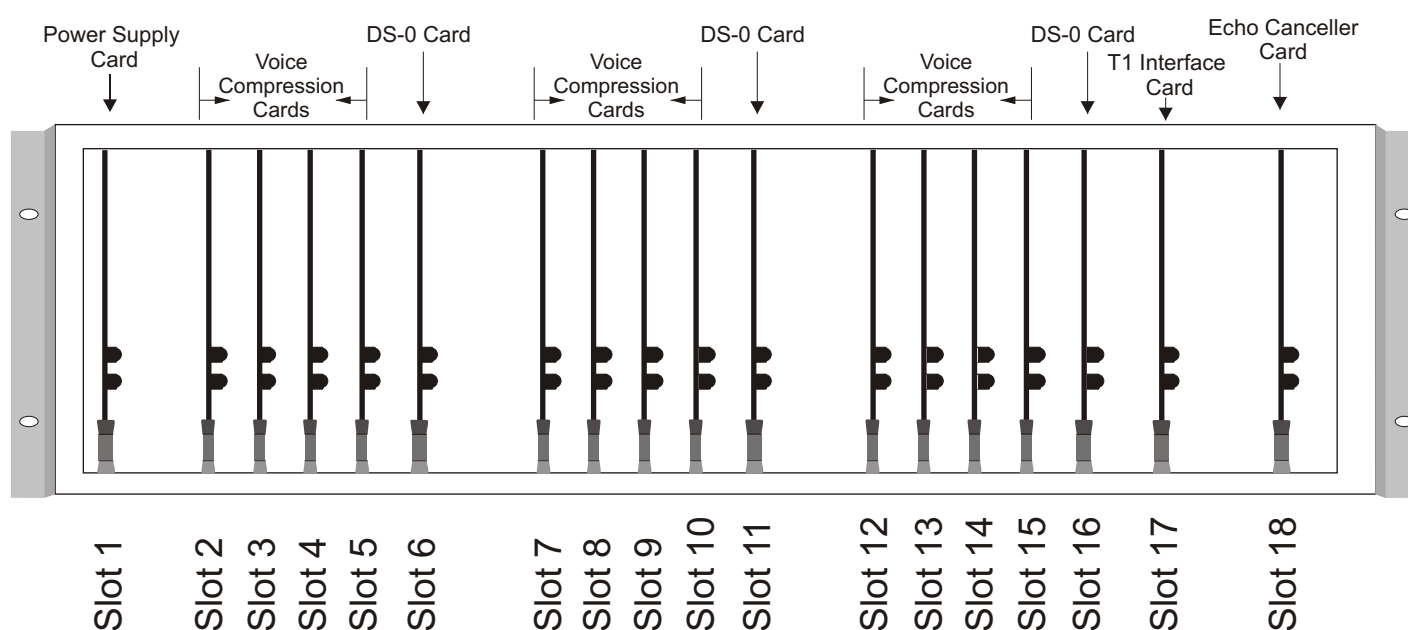
Front View (Left to Right)	Card Details	Orion Part No.
Slot 1:	PS, Power Supply Card	VCL-LD-110
Slot 2 to Slot 5:	VCC, Voice Compression Card	VCL-LD-220
Slot 6:	DS-0, DS-0 Card	VCL-LD-230
Slot 7 to Slot 10:	VCC, Voice Compression Card	VCL-LD-220
Slot11:	DS-0, DS-0 Card	VCL-LD-230
Slot12 to Slot15:	VCC, Voice Compression Card	VCL-LD-220
Slot 16:	DS-0, DS-0 Card	VCL-LD-230
Slot 17:	VCE, T1 Interface Card	VCL-LD-240
Slot 18:	EC, Echo Canceller Card (128ms Echo Cancellation)	VCL-EC128-T1

Technical Specifications

Digital Network (PSTN) Interface 1544 Kbps
Telco - T1

Number of T1 Interfaces	1
Maximum number of Voice Channels per T1 Interface	24
Conformity	G. 703
Frame Structure	As per ITU (CCITT) G.704
Framing Options	D4, ESF (Selectable)
PCM Sampling Rate	8000 samples/ sec
Encoding Law	μ Law as per ITU (CCITT) G.711
Bit Rate	1544 Kbps 50 ppm
Code	B8ZS, AMI (Selectable)
Nominal Impedance	100 Ω balanced(75 Ω 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	Upto 18db max. (As per ITU-T 1.431)
Jitter Tolerance	As per ITU (CCITT) G.823, ITU-T 1.431
Supported Signaling	PRI (Primary Rate) ISDN Signaling (Q.931), SS7 Signaling/C7 Signaling Common Channel Signaling.

Clock Synchronization

Synchronization Sources	Internal Clock, or, Timing derived from the T1, link (Loop-Timed Clock)
Default Option	Internal Clock

Digital Carrier Interface 256 Kbps (Fractional T1)
Compressed - T1 (voice only application)

Number of T1 Interfaces	1 - Fractional T1 Interface @ 256Kbps
Compressed T1,Number of DS-0s	4 (First Four Time Slots)
Conformity	G. 703
Frame Structure	As per ITU-T G.704
Framing Option	D4, ESF (Selectable)
Bit Rate	1544 Kbps 50 ppm
Code	B8ZS, AMI (Selectable)
Nominal Impedance	100 Ω balanced (75 Ω 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	Upto 18db max. (As per ITU-T 1.431)

Jitter Tolerance	As per ITU (CCITT) G.823

Digital Carrier Interface 384 Kbps (Fractional T1)
Compressed - T1 (voice, fax & data modem support @ upto 33.6Kbps transmission)

Number of T1 Interfaces	1 - Fractional T1 Interface @ 384Kbps
Compressed T1,Number of DS-0s	6 (First Six Time Slots)
Conformity	G. 703
Frame Structure	As per ITU-T G.704
Framing Option	D4, ESF (Selectable)
Bit Rate	1544 Kbps 50 ppm
Code	B8ZS, AMI (Selectable)
Nominal Impedance	$100\,\Omega$ 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	Upto 18db max. (As per ITU-T 1.431)
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)	8.00 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 *1, required for every VCL-LD shelf*	1
5.	VCL-LD-240	T1, Interface card. Provides ONE uncompressed T1 interface and ONE compressed T1 (fractional T1) interface. *1, required for every VCL-LD shelf*	1
6.	VCL-LD-230	DS-0, Card, Aggregates 8 compressed voice channels to a DS-0 (64Kbps time-slot). *3, required for every VCL-LD shelf*	3
7.	VCL-LD-220	Voice Compression Card Dual channel voice compression card. *12, required for every VCL-LD shelf*	12
	VCL-LD-T1	**Complete - VCL-LD, T1 Voice Compression Terminal**	

Notes :

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Technical specification are subject to change without notice.

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