ORION TELECOM NETWORKS INC.

VCL-EC™
E1 Echo Canceller
1U, 19 inch Version with Telnet

E1, 1U Echo Canceller

Product Brochure & Data Sheet

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Product Overview

Orion offers a compact, robust and cost effective E1 Echo Canceller solution in 19 inch, 1U high (44mm height) chassis (accomodates 1, E1 Echo Canceller with telnet, per shelf). Echo cancellation on each channel is 64ms. bidirectional/128ms. unidirectional echo tails - user selectable. T1 Echo Canceller is also offered and available.

E1 Echo Canceller 1U (44 mm high) 19 inch Version with Telnet

Orion offers echo cancellation and voice quality enhancement solutions for the following network situations:

- Wireline
- Wireless
- Satellite
- International Gateway
- IP Gateway

The E1 Echo Canceller solutions are also ideally suited for long distance telephony, GSM, CDMA, TDMA, VoIP, satellite and radio communication applications. The echo canceller equipment offers fault recovery feature. It offers automatic by-pass upon power-supply failure (i.e. it offers E1 circuit by-pass in the event of power supply failure).

Type of E1 Echo Canceller offered

E1 Echo Canceller solution in 19 inch, 1U high (44mm height) chassis and accomodates 1, E1 echo canceller with telnet, per shelf. Echo cancellation on each channel is 64ms. bidirectional/128ms. unidirectional echo tails - user selectable. E1 Inputs and Outputs are balanced 120 Ohms, RJ-45

Unique E1 Echo Canceller Features

USER PROGRAMMABLE TAIL-SIDE: Echo cancellers are always required to be installed in such that, the tail-side of the echo canceller always faces towards the source of the echo. Our E1 echo cancellers has a User Configurable tail-side so that the user may remotely change the direction of the tail-side of the echo canceller - without having to physically change the E1 connections on the echo canceller card.

USER PROGRAMMABLE SIGNALING OPTION: The E1 Echo Canceller supports the following signaling protocols: Signaling pass-through: Signaling protocols supported: 30B+D PRI ISDN (Euro ISDN) Signaling, 31B (31 voice channels) with out-of-band Signaling, R2 CAS Signaling, SS7 Signaling (on any user selected time-slot). All signaling options are User Selectable/User Programmable.

USER PROGRAMMABLE DEDICATED DATA CHANNELS: The user may specify/define the dedicated data channels so that they are always and completely by-passed from the echo cancellation circuitry - leaving those specifically assigned dedicated time-slots for digital data transmission (including video transmission).

The E1 Echo Canceller supports 2100 Hz fax/analog data modem tone detection and echo canceller disabling on all channels.

Signaling Support

The E1 Echo Canceller supports the following signaling protocols:
Signaling pass-through: Signaling protocols supported:

- 30B+D PRI ISDN (Euro ISDN) Signaling
- 31B (31 voice channels) with out-of-band Signaling
- R2 CAS Signaling
- SS7 Signaling (on any user selected time-slot)
- All signaling options are user selectable/user programmable

Highlights

- Compact E1 Echo Canceller solution in 19 inch, 1U high (44mm height) chassis and accomodates 1, E1 Echo Canceller with telnet, per shelf
- Provides voice echo cancellation of up to 64ms. Bidirectional/128ms. unidirectional - User Selectable / User Programmable.
- Meets ITU-T G.164, G.165, G.168 (2000/ 2002) requirements for echo cancellation
- Signaling protocols: Pass-Through: Signaling protocols supported
  - 30B+D PRI ISDN (Euro ISDN) Signaling
  - 31B (31 voice channels) with out-of-band Signaling
  - R2 CAS Signaling
  - SS7 Signaling (on any user selected time-slot)
  - All Signaling options are User Selectable/ User Programmable
- The echo canceller supports fax/modem G.164 and G.165 (2100 Hz) tone disable
- Carrier-grade voice quality per AT&T Voice Quality Assessment Lab
- Remote access through telnet over LAN/ TCP-IP link (10/100BaseT)
- Easy-to-use Graphical User interface (GUI) and text based CLI commands for management and configuration

- Adjustable gain/loss settings on all channels. Provides the user the flexibility to adjust and optimize the voice, transmit and receive levels
- Local access through COM port (RS232 serial port)
- Non-linear processor with comfort noise insertion
- E1 link by-pass on power failure. This feature helps to maintain the link integrity even in the event of power failure
- Option for user to select voice echo cancellation or digital-data transmission selectively on each time-slot for selective echo cancellation. This feature allows the user to use selected time-slots for data transmission to enable digital data/CCS signaling transmission
- Transmission (data mode), while keeping the echo cancellation "ON" on the remaining time-slots (voice mode), on which echo is required to be cancelled
- Ensure echo canceller maintains excellent performance at all times in presence of tones or signals including DTMF tones
- Fully integrated independent 30-channel voice echo canceller

Applications

- GSM, CDMA, TDMA and Cellular Base Stations
- Digital Circuit Multiplication Equipment (DCME) : Satellite Communications and Multiplexers
- PCS, mobile and digital cordless wireless systems
- PBX and central office systems
- Datacomm: Voice over Frame Relay, Voice over ATM and Voice over Internet
- Voice over ATM, Frame Relay or packet switching systems and fax transmissions
- Central Office and PBX: Network Trunks, Echo Canceller Pool, Common Equipment and Audio Conferencing Bridges
- Voice over datacomm including Voice over Internet (VoIP), Voice over ATM (VoATM) and Voice over Frame Relay (VoFR)

Fault Recovery

The echo canceller equipment offers fault recovery feature. It offers automatic by-pass upon power-supply failure (i.e. it offers E1 circuit by-pass in the event of power supply failure).

Clock

Internal	(Stratum 3 Level)
Loop-timed External	75-Ohms - 2.048 MHz - 1.544 MHz

Datacomm Applications
- Voice over Frame Relay
- Voice over ATM
- Voice over Internet/LAN (VoIP)

Central Office and PBX Applications
- Network Trunks
- Echo Canceller Pool
- Common Equipment
- Audio Conferencing Bridges

Voice Over ATM Applications
- A multi-channel echo canceller resource or pool is shared among many channels to reduce cost
- Echo cancellation is done at a DS0 level

Satellite Communications Applications
- Digital Circuit Multiplication Equipment (DCME)

Wireless Applications
- Digital Cordless and Cellular Basestations
- GSM, CDMA
- Access Controllers

Voice over Frame Relay, ATM Applications
- Frame Relay and ATM routers and switches introduce large, variable and unpredictable delays
- Echoes from the Public Switched Telephone Network (PSTN) in combination with the delays from Frame Relay and ATM equipment yield objectionable speech quality

Regulation Compliance

- Meets CE requirnments
- Complies with FCC, Part 68 and Part 15 sub part A Specifications
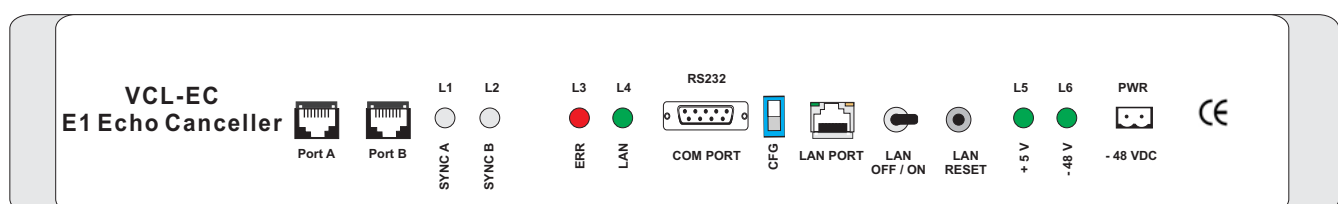- Safety - UL 1459 Issue 2

Management and Control

- Remote access through telnet over LAN/TCP-IP link (10/100BaseT)
- Local access through COM port (RS232 serial port)

**VCL-EC, E1 Echo Canceller, 1U 19 inch Version with Telnet
Shelf Description:**

The VCL-EC, E1 Echo Canceller is a 1U, 19 inch shelf, fitted with a back plane. The E1 interface, power input, alarm extension, COM Port, LAN and external clock are all accessed from the system front panel.

VCL-EC, E1, 1U Echo Canceller
Front View of the 1U Version

Technical Specifications

Network Interface

Number of Interfaces	2, 1-Input (RJ-45), 1-Output (RJ-45)
Line Rate	E1 - 2.048 Mbps
Line Code	HDB3 as per ITU-T G.703, G.704
Frame Structure	As per ITU-T G.704
PCM Encoding Law	A Law as per ITU-T G.711
Signaling	Pass-Through: Signaling protocols supported: - 30B+D PRI ISDN (Euro ISDN) Signaling - 31B (31 voice channel) with out-of-band Signaling - R2 CAS Signaling - SS7 Signaling (on any user selected time-slot) - All signaling options are User Selectable/User Programmable
PCM Sampling Rate	8000 samples/sec
Bit Rate	2048 Kbps ± 50 ppm
Jitter Tolerance	As per ITU-T G.823
Output Jitter	< 0.05 UI (in the frequency range of 20Hz to 100 KHz)
Nominal Line Impedance	100 Ohms Balanced RJ 45
Nominal Pulse Width	244 ns
Pulse Mask	As per ITU (CCITT) Rec. G.703
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

Echo Canceller

Echo Tail Cancellation	Up to 64ms. bidirectional/128ms. unidirectional -User Selectable
Tone Disabler	As per ITU-T G.164, G.165
ERLE (Echo Return Loss Enhancement)	>35dB (with 6dB ERL) at -10dBm0 >65dB with NLP enabled
ERL (Echo Return Loss)	Selectable Threshold Levels Options: 0, 3, 6 dB
Transmit/Receive Levels (Programmable)	Selectable Levels Options: -12, -9, -6, -3, ,0 +3, +6, +9
Comfort Noise Insertion	User Selectable - Enable/Disable
Local Monitoring and	RS232 serial interface for Management through a Control PC COM Port
Local and Remote Provisioning	CLI (text commands) and GUI
Front Panel Indicators	-In SYNC/Failure -LEDs for power on/off
Environmental-Operational	0^0 C to 50^0 C
Humidity	5% to 95%, non-condensing

VCL-EC, E1 Echo Canceller 1U - MTBF (Mean Time Between Failure) calculation as per Telcordia SR-332 - Issue 3

S. No.	Part #	Card Description	MTBF in Hours	MTBF in Years
1.	VCL-EC-1U-E1-AC	E1 Echo Canceller with Telnet 64ms. Bi-Directional / 128ms. Uni-Directional echo tails 19" Shelf 1U High Rack Mount Version Supports : - 1 x E1 120Ω RJ45 (F) - 1 x 100-240V AC Power Supply Input [Adapter option] - Management and Control - COM port (RS232 serial port) - Telnet over LAN/TCP-IP link (10/100BaseT)	178,700	20.40
2.	VCL-EC-1U-E1-DC	E1 Echo Canceller with Telnet 64ms. Bi-Directional / 128ms. Uni-Directional echo tails 19" Shelf 1U High Rack Mount Version Supports : - 1 x E1 120Ω RJ45 (F) - 1 x -48V DC Power Supply Input - Management and Control - COM port (RS232 serial port) - Telnet over LAN/TCP-IP link (10/100BaseT)	190,790	21.78

Power Consumption of E1 Echo Canceller, 1U 19 inch Version

Input Voltage = -48 VDC	Current (in Amps.)	Power Consumption (in Watts)
1 Unit	0.15	6.0

Power Supply Specifications

Input DC Voltage	-48V DC (nominal)
Range of Input	-40V to -60V DC
Output Voltages	+5V
Full Load Output Current	4A at +5V
Input Voltage Reversal Protection	Provided in the Card
Over Current Protection	10A for +5V
Short Circuit Protection	Current limit - 10A. 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

Mechanical Specifications

Height	44 mm.
Depth	260 mm.
Width	480 mm.
Weight	4 kgs.

Ordering Information

VCL-EC-1U-E1-AC	E1 Echo Canceller with Telnet 64ms. Bi-Directional / 128ms. Uni-Directional echo tails 19" Shelf 1U High Rack Mount Version Supports : - 1 x E1 120Ω RJ45 (F) - 1 x 100-240V AC Power Supply Input [Adapter option] - 1 x System Core Cables, Installation Accessories, Documentation, System User Manual / Disk etc (Set) Management and Control - COM port (RS232 serial port) - Telnet over LAN/TCP-IP link (10/100BaseT)
VCL-EC-1U-E1-DC	E1 Echo Canceller with Telnet 64ms. Bi-Directional / 128ms. Uni-Directional echo tails 19" Shelf 1U High Rack Mount Version Supports : - 1 x E1 120Ω RJ45 (F) - 1 x -48V DC Power Supply Input - 1 x System Core Cables, Installation Accessories, Documentation, System User Manual / Disk etc (Set) Management and Control - COM port (RS232 serial port) - Telnet over LAN/TCP-IP link (10/100BaseT)

Technical specifications are subject to changes without notice.
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