



NARROWBAND ECHO CANCELLATION PLATFORM

QUAD 2 E1



Quad 2 E1 Carrier Shelf



Quad 2 E1 Enterprise Shelf



Ditech Networks' Quad 2 E1 offers the industry's leading hybrid echo tail coverage of up to 192 ms, giving service providers guaranteed echo coverage for all types of networks: wireline, wireless, VoIP, and international. In addition to cancelling hybrid echo, unidirectionally or bidirectionally, for added echo elimination, the Quad 2 E1 offers optional acoustic echo control and noise reduction. Utilizing the latest in digital signal processing technology, the Quad 2 E1's compact design allows support for up to 2,400 voice channels per shelf.

PRODUCT FEATURES

High Density Echo Cancellation

The Quad 2 E1 delivers high-capacity echo cancellation while providing voice quality features that include Adaptive Noise Reduction (ANR), unidirectional Acoustic Echo Control (AEC), and network voice level controls. Other innovative features include local or remote in-service software upgrading, and Reflectometry™ for real-time characterization and performance monitoring of each channel in a network.

Reflectometry combines advanced software algorithms with powerful DSP engines to detect subtle changes in network conditions and measure and report anomalies, allowing service providers to remotely identify and proactively address voice quality problems. Remote provisioning, control, and monitoring of the Quad 2 E1 is easy and efficient with Ditech's WinMAP™ software for terminal access and NetConsult™ EMS software for system element management.

Enterprise Solution

When installed in the 4sa Enterprise shelf, the Quad 2 E1 provides a cost-effective solution for Enterprise or Remote Office applications, providing echo cancellation for between 1 and 4 E1s in a compact, tabletop or rack-mountable, AC- or DC-powerable chassis with RJ-48, wire-wrap, or BNC connectors.

Carrier Solution

When installed in the 80sa Carrier shelf, the Quad 2 E1 provides a high-density narrowband echo cancellation solution that easily scales from 1 to 80 E1s per rack-mount shelf assembly. The 80sa Carrier shelf is available with either BNC or wire-wrap connector options and is engineered with dual redundant -48 VDC power and forced-air cooling for central office deployments. Up to 6 Carrier shelves can fit in a 2200 mm rack, for up to 480 E1s per rack.

- 192 ms hybrid echo tail coverage
- G.168-2002 compliance
- Optional Bidirectional HEC capability
- Reflectometry™ monitors tail circuit characterization per channel — ERL, ERLE, voice levels, delay data, and maximum historical delay
- Failsafe metallic bypass
- Alarm relay for urgent/deferred facility and equipment
- Local or remote in-service software upgrades
- Per DS0 and per E1 provisioning
- Easy-to-use local and remote management

APPLICATIONS

- Hybrid Echo Cancellation (HEC)
- Bidirectional HEC
- HEC with Acoustic Echo Control and Adaptive Noise Reduction

Shelf Options

Carrier Shelf (80sa High Density)
20 cards, 80 E1s maximum per shelf

4 BNC shelves maximum per 2200 mm rack (320 E1s)

6 Wire Wrap shelves maximum per 2200 mm rack (480 E1s)

Mounts for 19"/ 23" ANSI/EIA, 600 mm ETSI racks

Power Consumption
11W maximum per card, <95mW per DSO

Fully loaded shelf: 220W, 4.4A @ -48 VDC

Fan assembly: 18W (per shelf)

Input Voltage
Dual A&B -48 VDC: -36 to -60 VDC

Dimensions (H x W x D)
Quad 2 E1 card:
241 x 21 x 229 mm

BNC shelf (15 U):
375 x 440 x 340 mm

Wire Wrap shelf (10 U):
250 x 440 x 310 mm

Fan assembly (2.4 U):
59 x 440 x 310 mm

Weight
Quad 2 E1 card: 0.54 kg

Empty BNC shelf: 10.0 kg

Empty Wire Wrap shelf: 8.6 kg

Enterprise Shelf (4sa)

1 card, 4 E1s maximum per shelf

Mounts for 19" or 23" ANSI/EIA racks

Rubber feet for tabletop mounting

Power Consumption
11W maximum per card, <95mW per DSO

Fully loaded shelf: 11W, 0.22A @ -48 VDC

Input Voltage
-48 VDC: -36 to -60 VDC

110/240 VAC, 50/60 Hz autosensing, universal

Dimensions (H x W x D)

Quad 2 E1 card:
241 x 21 x 229 mm

BNC shelf (1.8 U):
44 x 440 x 240 mm

RJ-48C/Wire Wrap shelf:
44 (1.8 U) x 440 x 240 mm

Weight
Quad 2 E1 card: 0.54 kg

Empty BNC shelf: 0.9 kg

Empty RJ-48C/Wire Wrap shelf:
0.9 kg

TECHNICAL SPECIFICATIONS

Hybrid Echo Cancellation

ERLE (Echo Return Loss Enhancement)
>35 dB (with 6dB ERL) at -10 dBm0 input
>65 dB with NLP enabled

ERL (Echo Return Loss)
Selectable Threshold Level: 0, 3, 6 dB

Comfort Noise
Per DSO

Convergence Time
<50ms for 30 dB or better (ERL + ERLE)

Tail Circuit Delay
Selectable: 24, 32, 48, 64, 96, 128, 160, 192 ms

Tone Disablers
ITU-T G.164, G.165

Re-Enable Modes
Low Energy, End of Call

Level Control

High Level Compensation (HLC)
Automatic Level Control (ALC) G.169
Fixed Gain/Loss (FGL)

Voice Quality Options

Unidirectional Acoustic Echo Control (AEC)
Adaptive Noise Reduction (ANR)
Unidirectional Adaptive Listener Enhancement (ALE)

Monitoring

Reflectometry™
ERL, ERLE, Max Delay, Send & Receive Levels
Actual measurements per 64Kbps channel

Alarm Monitoring
Local, distant, AIS, multiframe, distant multiframe
Dry contacts for Alarms and E2A Interface

Performance Monitoring
Referencing ANSI T1.231-1977

Network Interface

Line Rate
CEPT 2.048 Mbps
30/31 channel modes

Framing Format
Per ITU-T G.704: CAS or CAS + CRC-4

Line Encoding
HDB3 per ITU-T G.703, G.704

PCM Encoding
A-law per ITU-T G.711 (Segmented 13)

Jitter Tolerance
Per ITU-T G.823

Signaling Protocols
CAS, C5, CCS, Q50 (AB/CD)

Line Impedance (Card Types)
75 Ohm nominal, unbalanced for BNC
120 Ohm balanced for Wire Wrap

Maximum Cable Length
200 m using 75 Ohm cable
200 m using 120 Ohm cable

Synchronization

Through-timing

Terminal Control

Serial Interface
3 V.24 (RJ-11) ports (1 on faceplate, 2 on backplane)
Data transfer selectable up to 19200 baud

Local and Remote Provisioning
Local: CLI, WinMAP™ GUI
Multisite: NetConsul™ EMS

Front Panel Control

Alarm Indicators
LEDs for power/logon, ACO, and urgent and deferred facility and equipment alarms

Redundancy

Power Input
Carrier shelf: A&B fused inputs for failsafe source redundancy

Protection
Metallic bypass relays for failsafe operation
Fans alarmed; no single fan critical

Environmental

Operational
Temperature: 5° to 40°C
Short Term: -5° to 55°C
Humidity: 5 to 90%, non-condensing

Non Operational
Temperature: -40° to 70°C
Humidity: 5 to 95%, non-condensing

Heat Output
Fully loaded Carrier shelf: 750 BTU/hour

Reliability

MTBF Per Telcordia SR-332 Issue 1 May 2001
Quad 2 E1 card: 53 years at 40°C

Regulatory Information

UL 60950 / EN 60950
CAN/CSA-C22.2
EN 300 386-1 and -2
ETS 300 132-2 / EN 61000
EN 55002 (CISPR 22) Class B
CE Mark
NEBS Level 3 per Telcordia SR-3580



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