PCIe Based Octal & Quad T1 E1 Boards

Analysis and Emulation Hardware

High Density Applications, Up to 64 T1 E1s in a Rack PC

Windows & Linux Drivers

T1 E1 Software Selectable

4-Port T1 E1 Mother Board w/ 4-Port T1 E1 Daughter Card

PCI Express x1 Lane

Terminate & High Impedance Interfaces

Compatible with almost all T1 E1 Applications

Overview

GL's **Octal & Quad T1 E1 boards** are high density boards that provide Four (4) or Eight (8) RJ-48 T1 E1 ports and multiples thereof. For example, configurations of 8, 12, 16, 64 T1 E1s in a single rack are possible. Possible applications include (see Figures - below).

- T1 or E1 interfacing – Software Selectable
- PCI Express x1 Lane/Board
- TDM, ISDN, SS7 – High Density Voice
- VoIP, Frame Relay, Multilink Frame Relay, PPP and Multilink PPP, HDLC
- Most all "basic applications" and "special applications" are available for Quad and Octal T1 E1 cards
- Call Recording, Generation, and Monitoring for hundreds to thousands of calls in one platform
- Windows® and Linux Drivers for Open Source Applications
- Media (VoIP) Gateway, IP PBX, and IVR Applications i.e. Asterisk (TM)
- Router with Multi T1 E1 WAN Interfaces i.e. MLPPP (Multi Link PPP)
- Supports "**Cross-Port Through**" and "**Cross-Port Transmit**" Modes – these configurations make cabling with Drop/Insert and Fail-Safe Inline Monitoring very easy
- **High Density and High Speed** – The boards (with Direct Memory Access) are significantly faster and significantly more efficient
- Octal boards are compatible with dual and quad core motherboards and software that simulate dual and quad cores (hyper-threading)

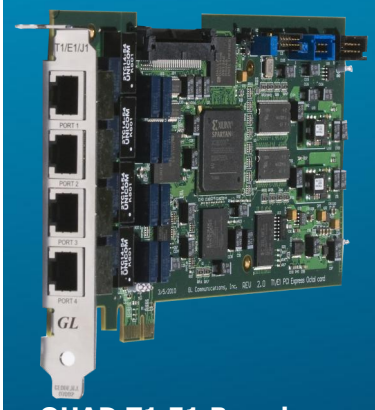
GL's offers other popular forms of T1 E1 analysis hardware such as Portable USB T1 E1 Analyzer with dual T1 E1 ports & smallest form factor, tProbe™T1 E1 Analyzer Unit - an enhanced version of USB based T1 E1 VF & Serial Data analyzer with expansion capabilities, Universal T1 E1 Analyzer Boards - a dual port PCI based T1 E1 analyzer offering higher speed factor and smaller dimensions. Please call us for more information on these.

Physical Specifications

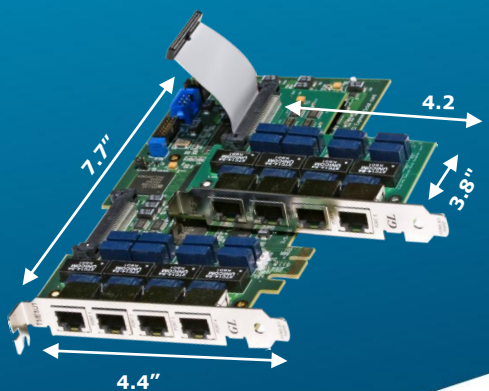
Main Board 7.7 inches x 4.4 inches ; PCIe X1 Connector Interface to PC

Daughter Board 3.8 inches x 4.2 inches ; Without PC Interface

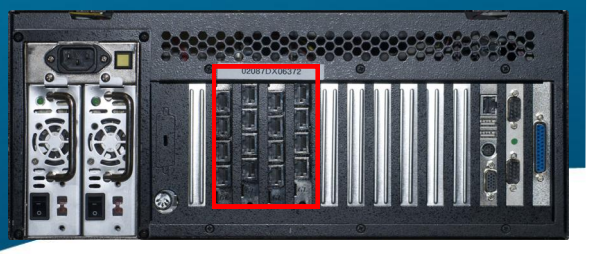
For more information, visit http://www.gl.com/pci-octal-t1-e1-analysis-board.html



QUAD T1 E1 Board



OCTAL T1 E1 Boards



OCTAL T1 E1 Boards on Rack PC

GL Communications Inc.

818 West Diamond Avenue - Third Floor. Gaithersburg, MD 20878

Web Page Address: http://www.gl.com/ (V) 301-670-4784 (F) 301-670-9187 E-Mail Address: gl-info@gl.com

Basic and Optional Applications

Available with user-friendly GUI for Windows® 7, and XP Operating Systems with support for almost all existing T1 E1 Analyzer applications including comprehensive analysis / emulation of Voice, Data, Protocol, Analog, Digital, and Echo Testing.

For detail information on the available applications for the Octal and Quad T1 E1 cards, please refer to http://www.gl.com/t1e1applications.html webpage.

Basic Software

Monitoring Options

- Monitor T1/E1 Line
- Byte Values & Binary Byte Values
- Signaling bits, Power Level, DC Offset, & Frequency
- Multi-frames, and Real-time Multi-frames
- T1/E1 Data as Real-time Bitmap
- Timeslot Window
- ASCII Timeslot Display
- Oscilloscope & Power Spectral
- Audio Monitoring & Active Voice Level

Intrusive Testing

- Drop and Insert
- Bit Error Rate Test
- Enhanced Bit Error Rate
- ATM BERT
- Transmit Tone
- Transmit Gaussian Noise
- Transmit Multiframe
- Transmit Signaling Bits
- Precision Delay Measurement
- Rx-to-Tx Loop back
- Error Insertion

Optional Software

Protocol Analysis

ISDN, HDLC, SS7, GSM, GPRS, UMTS, GR303, V5.x, Frame Relay, ATM, PPP, TRAU, CDMA, DCME, T1 Facility Data Link , E1 Maintenance Data Link, SS1 , Fax, Modem

Protocol Emulation

ISDN, SS7, ISUP Conformance Scripts, GSM Abis, GSM A, MAP, MLPPP, MLPPP Conformance, CAS, TRAU, SS1, Multi-link Frame Relay Emulation, Inverse Multiplexing over ATM

Windows Client / Server—w/ Remote access to T1/E1 server using Clients - C++, TCL, C#

Record / Playback Files—Manual, Automated

Capture, Analysis, & Emulation

DTMF / MF / MFCR2, Voice, Fax, Modem, Raw Data

Call Data Records

Voice Band Analysis Software

Multi-Channel BERT

Protocol Identifier

Traffic Classifier

Echo Cancellation Testing / Compliance -Manual, Semi-automated, & Automated –G.168, G.160, G.169

- Measure Loop Delay/ERL
- Delay Attenuate Timeslots
- Digital Echo Canceller Simulator
- Audio Processing Utility (APU)

Signaling Transitions Recording

Real-time Strip Chart

Real-time Multichannel Audio Bridge

Multiplex / Demultiplex Software

Network Surveillance, Voice Quality Testing

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Quad & Octal T1 E1 Boards – Specification

Physical Interface

T1/E1 Signal	RJ48c Connectors – Four (4) or Eight (8) per board
PC Interface	PCI Express X1 Lane Compliant to PCI Express Base Specification v1.1

Environmental Specifications

Temperature	Operating: 0 to 50° C Storage: -50 to 70° C
Relative Humidity	Operating: 10% to 90% (non-condensing) Storage: 0% to 95% (non-condensing)
Altitude	Operating: -100 to 12,000 ft. Storage: -100 to 40,000 ft.

T1/E1 Line Interface

Line Code Format	AMI, B8ZS (T1) or HDB3 (E1)
Framing Format	Unframed, D4 (T1), ESF (T1), CAS (E1), FAS (E1), CRC4
BERT Pattern Generation	Pseudorandom patterns: (63) 2^6-1, (511) 2^9-1, (2047) 2^11-1, (32767) 2^15-1, (1048575) 2^20-1, (8388607) 2^23-1, QRSS. T1 In-Band Loop Code Generation and Detection, Fixed patterns: All Ones, All Zeros, 1:1, 1:7, 3 in 24. Hardware Compliant: User pattern of up to 32 bits in length International, National & Extra Bits: User Defined (E1)
Drop and Insert	Any Contiguous set of digital timeslots and/or audio input
Facility Data Link	T1 ESF Mode: Transmit/Receive Messages, Bit-Oriented Messages, and files.
Loopbacks	Normal (Outward and Inward), Cross-Port Transmit Loopback, Cross-Port Through Loopback

(contd….)

(contd….)

Transmit

Display and Logging	Bit Errors, Bit Error Rate, Error Seconds, Error Free Seconds, %EFS, Severely Error Seconds, % SES, Degraded Minutes, %Dmin, Loss Pattern Sync Count, Loss of Sync Seconds, Available Seconds, %Available Seconds, Unavailable Seconds, Bipolar Violations, BPV Rate, BPV Seconds, BPV Free Seconds, Frame Errors, FE Rate, FE Seconds, FE Free Seconds, with Detailed logging into disk file. Resync In Progress, Loss of Signal, Blue Alarm, Change of Frame Alignment, Bipolar Violation, Frame Error, Carrier Loss, Yellow Alarm, Out of Frame Events Counter, Error Super frame Counter, Bipolar Violations, Remote Alarm, Distant Multiframe Alarm, Signaling All Ones, CAS Multiframe Error, CRC4 Error.
T1/E1 Interface	Hardware Compliant: ANSI: T1.403.1995, T1.231-1993, T1.408 AT&T: TR54016, TR62411 ITU: G.703, G.704, G.706, G.736, G.775, G.823, G.932, I.431, O.151, Q.161 ITU-T: Recommendation I.432-03/93 B-ISDN User-Network Interface-Physical Layer Specification ETSI: ETS 300 011, ETS 300 166, ETS 300 233, CTR12, CRT4 Japanese: JTG.703, JTI.431, (Future enhancement - JJ-20.11 - CMI Coding Only)
T1 Output Level	T1: 3.0V Base to Peak Selectable 0-655Ft Pulse Equalization Setting
E1 Output Level	E1: 3.0V ±0.3V Base to Peak
Line Built out Selections	0dB, -7.5dB, -15dB, -22.5dB
TX Capability	DSX-1 Outputs (to 655 feet)
Alarm Insertion	Blue, Yellow, Remote, Distant Multiframe, Bit 7 Zero Suppression D4 Yellow: 1 in S bit of frame 12 AIS-CI Code ESF-RAI CI Code Carrier Loss

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Quad & Octal T1 E1 Boards – Specification *(contd...)*

Transmit *(Contd...)*

Error Insertion	BPV, Bit Error, Frame Error, CRC Errors, Burst Frames, Fixed Error Rate, Random Error Rate, auto logic from 10 -2 to 10-9 for selectable 56K or 64Kps channels.
Internal Clock Specification	Standard: +/- 3ppm Optional: +/- 1ppm
Output Clock Source / Synchronization	Internal, Recovered

Receive

Input Impedance	100 ohms for Terminate and monitor (T1) 120 ohms for Terminate and monitor (E1) >1K ohms for Bridge
Terminations	Terminate, Monitor, Bridge
T1 Input Frequency	1.544MHz +/- 20 KHz
E1 Input Frequency	2.048Mhz +/- 20 KHz
Frequency Measurement	+/- 1ppm
Error Detection	Frame Error, CRC Error, CAS Mulitframe Error, BPV Error, Logic Error, Frame Alignment Error – 10 or 24 bits for sync time – 2/4, 2/5, or 2/6 frame bit in error frame select – Frame error bit corruption for 1 or 3 frame bits – E-Bit Error – Line Code Violation – Path Code Violation
Alarm Detection	D4 Yellow Alarm, ESF Yellow Alarm (Future Enhancement: J1 Yellow Alarm)
Intrinsic Jitter	Jitter Tolerance: Meets AT&T TR 62411 (Dec. 90) & Meets ITU-T G.823 Jitter Transfer: Meets AT&T TR 62411 (Dec. 90)

Receive *(Contd.)*

Input Range	Terminate	Monitor
T1:	– 0 to 36 dB (Long haul) – Monitor – Bridge	– 26 dB
E1:	Terminate – 0 to 43 dB (Long haul) – Monitor – Bridge	Monitor – 26 dB

PCM Interface

Transmit	**Synthesized Tone**: 15 Hz to 3975 Hz selectable in 1Hz steps, +3.0 dBm to -40 dBm in 0.1 steps selectable, Frequency sweep. **Dual Tone**: Single or any combination of tones. **Supervision**: User-defined states of A, B, (C, D) bits. **Signaling**: DTMF/MF Dialing Digits, ISDN, MFC-R2 **File Playback**: User created or recorded file. **Special Codes**: Milliwatt Codes, CSU Loop Up/Down Codes.
Receive	Display for All Channels: Signaling Bits, Power Level, Frequency, and Data. Graphical displays: Oscilloscope, Spectral, Spectrogram, Signal-to-Noise Signaling: DTMF/MF Dialed Digit Detection and Analysis, ISDN, MFC-R2 Recorder: Record Full/Fractional T1/E1/J1 Timeslots to hard disk file.

Miscellaneous

Propagation Delay Simulation: Up to 2 Seconds

Precision Delay Measurement : Up to 8 Seconds

Buyer's Guide

FTE001 – QuadXpress T1 E1 Main Board (Quad Port)
ETE001 – OctalXpress T1 E1 Daughter boards (Octal Port)
ETA001 — Basic Software for T1 (one required) - WIN XP / 7
EEA001 — Basic Software for E1 (one required) - WIN XP / 7
ETA008 , EEA008 — Eight Port License for T1, E1
ETA004, EEA004 — Four Port License for T1, E1
ETA002, EEA002 — Two Port License for T1

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