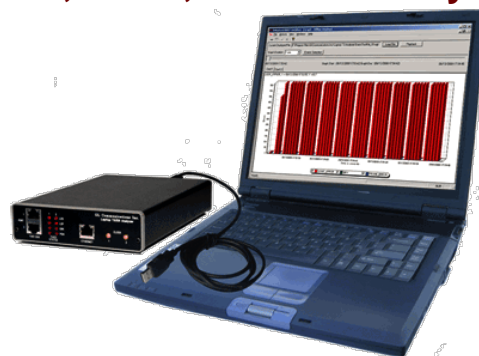


T3/E3, T1/E1, Ethernet Analyzer



GL's T3/E3 T1/E1 Ethernet Analyzer is one of the most powerful and portable test instruments in the market. It comes with a variety of interfaces including T3, E3, T1, E1, Ethernet, and USB. The USB interface is used to connect to a Notebook PC for storage, display, and control.

GL's T3/E3 Analyzer unit can be used in conjunction with GL's Laptop T1/E1 Analyzer thus providing a complete T3/E3 (44.736/34.368 Mbps), T1/E1 (1.544 Mbps / 2.048Mbps), and DSO (64Kbps) testing solution. The T3/E3 Receiver non-intrusively monitors a T3/E3 bit stream, and present comprehensive diagnostics of PCM impairments and alarm messages in real-time. The user selected T1 (or E1) is dropped or inserted at the T1/E1 output interface provided on the T3/E3 card.

T3/E3 analyzer can also capture (record) two complete T3/E3 streams to the hard drive as a binary file. It can also transmit (playback) already captured binary file through the T3/E3 stream. The T3 (E3) Transmitter can multiplex an externally supplied T1 (or E1) bit stream into the T3 (E3) signal. It is also designed to stress test M13 (E13) multiplexers and 3/1 Digital Cross Connect Systems.

Main features

- One of the smallest and lightest T3 (DS3)/E3, T1/E1 and Ethernet analysis platforms with dual data stream capture capability.
- Multiple interfaces for analysis (T3 (DS3)/E3, T1/E1 and Ethernet) and control (USB and Ethernet) to support a wide array of testing scenarios.
- Plug and play through USB 2.0 control interface.
- Software selectable T3 (DS3)/E3 interface along with T1 (DS1) and E1 Drop and Insert.
- Dual T3/E3 Receivers and Transmitters for non-intrusive and intrusive testing of both eastbound and westbound signals at the same time.
- Comprehensive T3, E3, T1, E1 and Ethernet testing solution
- General T3 (DS3) /E3 signal testing capabilities - Alarms, frequency, line level, various errors, FEAC messages, Dual BERT, and G.821 Analysis
- Channelized (Structured) Testing such as -Multiplex/De-multiplex T1 (DS1)/E1 signals (Drop and Insert), transmitting multiplexed externally inserted or internally generated T1/E1 streams into T3 (DS3)/E3.
- Generates 28 T1s or (21 E1s) signals within the T3 (DS3) or 16 E1s within E3 output.
- Unchannelized (Unstructured) Testing includes WAN Testing, Protocol testing for ATM, PPP, HDLC, and Frame Relay, & Transmit / Verify HDLC frames with user-defined headers
- Flexible clocking - internal, recovered (from T3 (DS3) /E3, T1 (DS1) or E1) and external.
- Scripting and Automation through GL's well-known Windows Client Server (WCS) approach.
- Monitor / Manage the Analyzer remotely via Ethernet port (future enhancement).

For more details, please visit our web page <http://www.gl.com/laptopt3e3.html>

Transmit externally inserted or internally generated T1/E1 streams into T3/E3

Manage remotely via an Ethernet interface

T3/E3 data capture using file & playback applications

Protocol testing for ATM, PPP, HDLC, and Frame Relay

Drop/insert T1/E1 signals from both ports

Dual bert, G.821 analysis, error injection, alarm generation

Monitor T3 E3 signal status, frequency, level, and various frame errors

Propagation delay emulation and measurement

T3 and T3/T1 FEAC loop commands

Flexible clocking (internal, recovered, external)

Stress test M13 (E13) multiplexers and 3/1 Digital cross connect systems



GL Communications Inc.

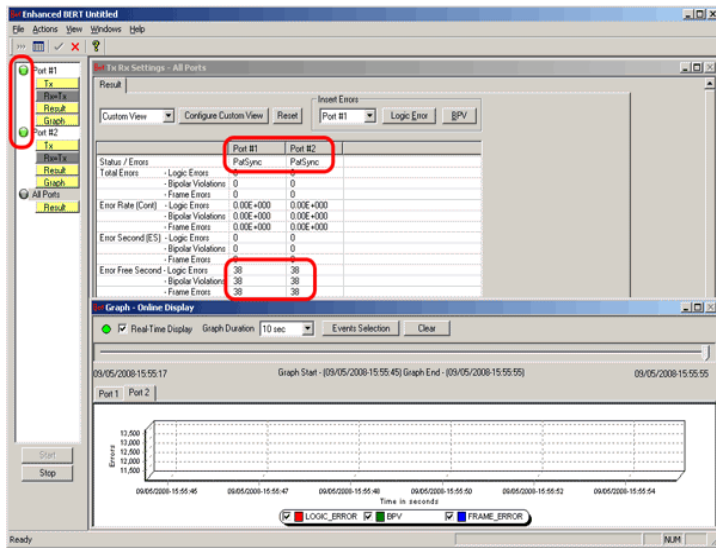
818 West Diamond Avenue - Third Floor. Gaithersburg, MD 20878 • (V) 301-670-4784 (F) 301-670-9187

Web Page Address: <http://www.gl.com/> • E-Mail Address: gl-info@gl.com

Applications

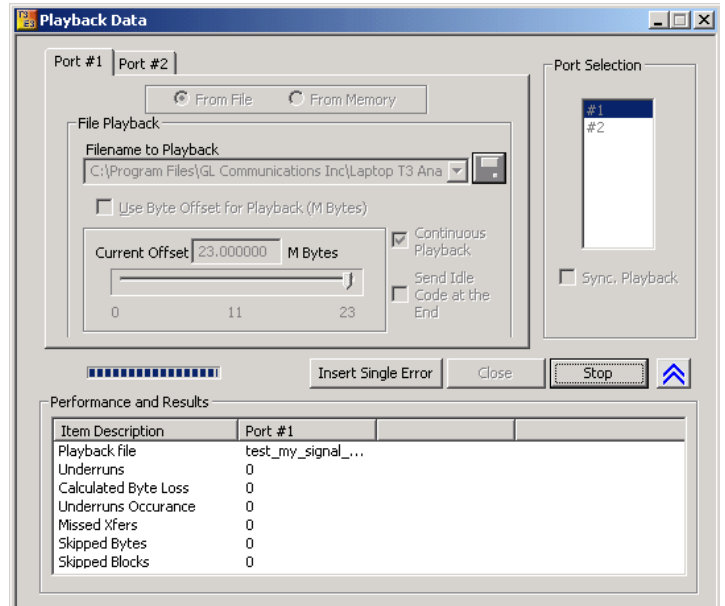
BERT (Full Frame and Unframed)

- Test Patterns:
 - PRBS: QRSS, 26-1, 29-1, 211-1, 215-1, 220-1, 223-1
 - Static: All 1s, All 0s, 1010, 1 in 7, 3 in 24., CSU Loop-Up, CSU Loop-Down, NIU Loop-Up, NIU Loop-Down
 - User Defined: 1 bits to 32-bits
- Performance Analysis: ITU-T G.82, G.826, M.2100, M.2110, M.2120
- Bit Error Insertion: Single Manual error, Automated error rate 10⁻² through 10⁻⁹, User defined error rate
- Logging
- Graphical Display



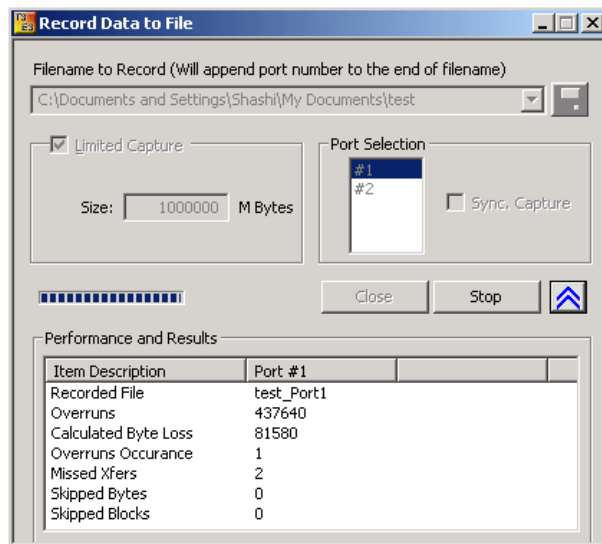
Playback Data (Raw file)

- Playback flat binary file over T3/E3
- User selected file without any size constraints
- Playback over framed or unframed T3/E3
- Option for continuous playback or single shot
- Allows manual insertion of bit error



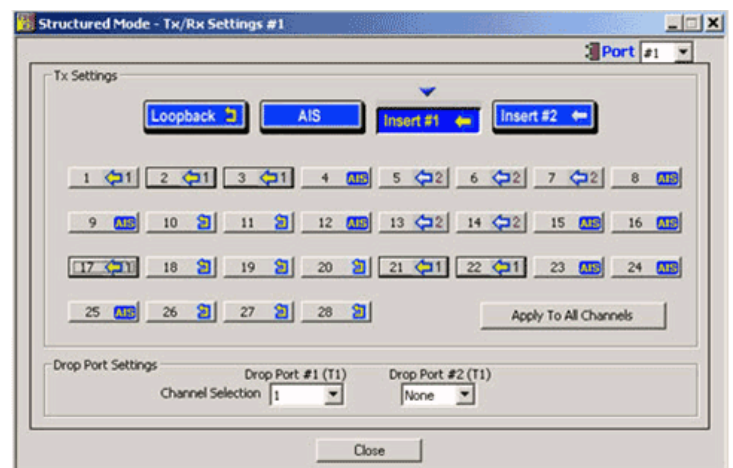
Record Data to File (Raw)

- Capture incoming data into binary flat File
- Each T3/E3 Signal is captured into separate files
- Synchronized capture from both ports
- Unframed T3/E3 or Framed T3/E3
- Capture up to user selected size or manually stop



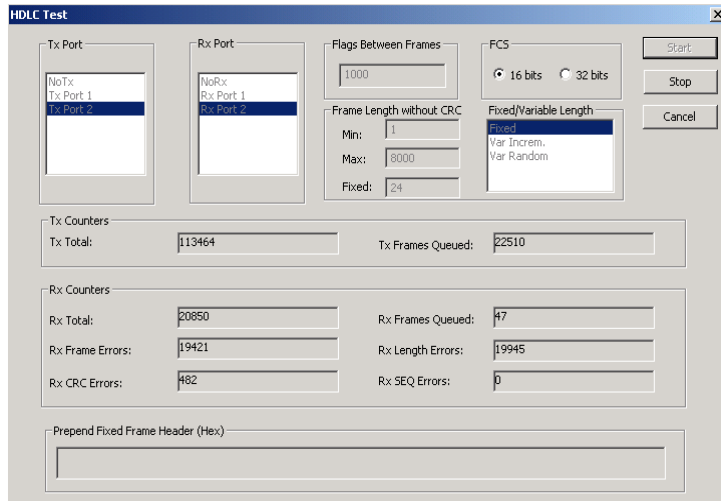
Multiplex and Demultiplex T1/E1 Signals

Up to two users' selected T1 (or E1) channels can be externally inserted using the T1/E1 input/output interface into any one of the transmitted T3 (DS3) or E3 signal. The inserted T1 or E1 signal can be selectively transmitted through one or more of the T1/E1 transmit channels or broadcasted through all the T1/E1 channels. Similarly up to two user selected T1/E1 channels can be dropped.



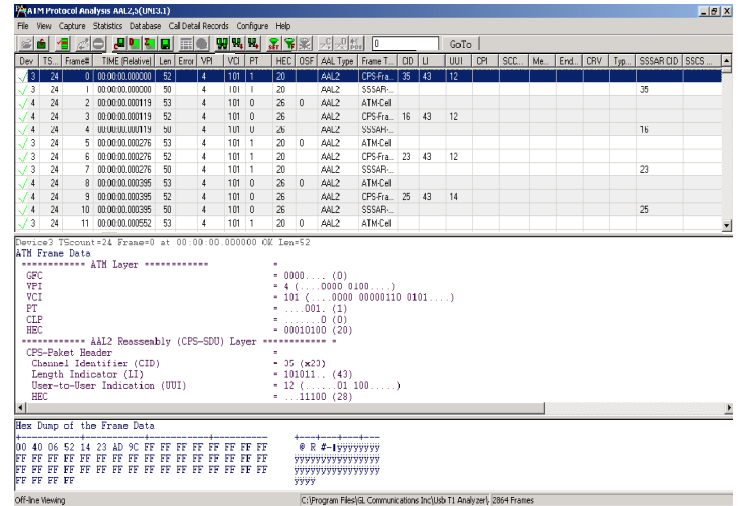
HDLC Tx/Rx Test

- Transmit HDLC at wire speed
 - Generate HDLC frames of varying length
 - HDLC frames contain sequence numbers
 - User controllable flags in between frames
 - User selectable HDLC frame size
 - Option for CRC16 or CRC32 bits
 - Allows pre-pending user-defined frame header for each HDLC frame, which allows to create PPP, Frame-relay simulation
- Receive and analyze HDLC at wire speed
 - Verify received HDLC frames for integrity
 - Analyzer receives frames and counts CRC errors, frame errors, length error and sequence errors



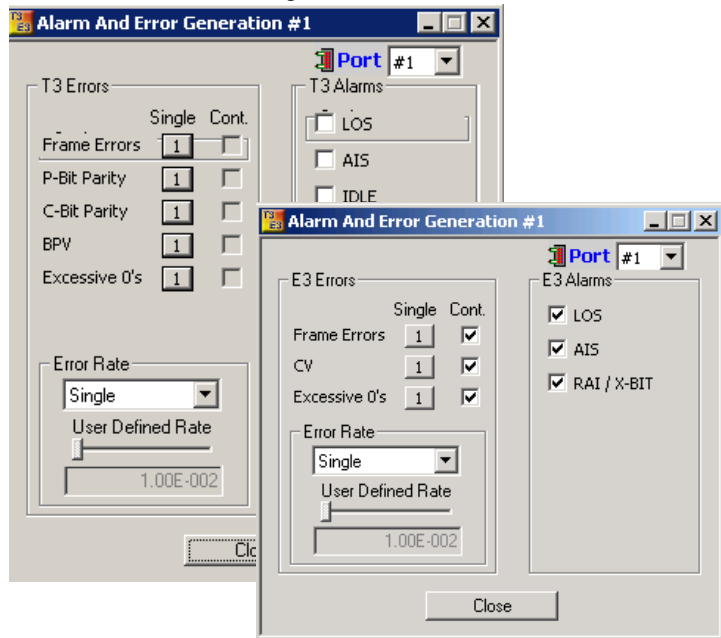
Protocol Analyzers

- HDLC Protocol Analyzer
 - Analyze HDLC over bidirectional T3/E3
 - All the capabilities as we have in T1/E1 analyzer
- Frame Relay Protocol Analyzer
 - Analyze Frame Relay over bidirectional T3/E3
 - All the capabilities as we have in T1/E1 analyzer
- PPP Protocol Analyzer
 - Analyze PPP over bidirectional T3/E3
 - All the capabilities as we have in T1/E1 analyzer
- ATM Protocol Analyzer
 - Analyze Direct-Mapped ATM over bidirectional T3 (E3 is coming soon)
 - All the capabilities as we have in T1/E1 analyzer



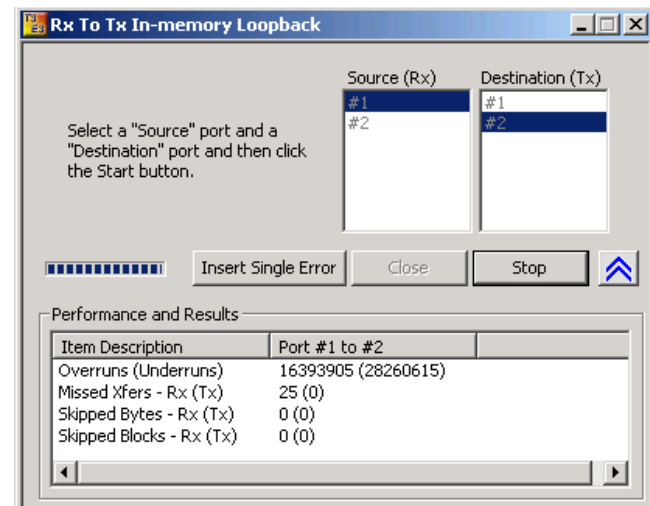
Alarm Generation and Error Injection

This application internally generates various types of errors and / or alarms and transmits them on the outgoing T3 (DS3)/E3 stream. The application can automatically insert errors at regular intervals of time (secs) or insert single bit errors.



Tx Rx Memory Loopback

This application is used for diagnostic purposes. It loops all the received data from the memory back to the transmitting port. Memory Loopback application can be run on one port, along with Bit Error Rate Test on the other port to verify the operation of this analyzer unit.



Specifications (USB T1/E1 units, HD T1/E1 Cards)

Connectors

T3/E3	BNC (2 Tx, 2 Rx)
T1/E1	RJ-48-c (2 Tx, 2 Rx) for Drop/Insert
External Clock	MCX (2)
PC Interface	USB 2.0
External Power	9 VDC
Ethernet	1000Mbps

T3/E3 Line Interface

Output Amplitude	800mV +/- 50mV
Input Impedance	75 Ohms unbalanced (BNC)
Line Code	B3ZS (T3), HDB3 (E3)
Terminate Input Level	0.09Vp – 0.85Vp
Monitor Input Level	0.025Vp – 0.08Vp
Clock Source	Internal- +/- 1 PPM @25C [+/- 4.5 ppm (includes ageing, stability)]
Recovered	Clock recovered from receiver
External	TTL Level signal High Speed: (T3/E3 Rate) Low Speed: (2KHz, 8KHz, 2MHz, 1.5MHz) Recovered from Inserted T1/E1

T3/E3 Transmitter

T3/E3 Payloads:	Framed T3/E3 Data, Unframed T3/E3, Idle, AIS
T3 Framing Modes:	Unframed, M13 (ANSI T1-107 – 1995) - Structured (Channelized), and Unstructured (Unchannelized) C-bit (ANSI T1-107 – 1990) - Structured (Channelized), and Unstructured (Unchannelized)
E3 Framing Modes:	Unframed, E13 (for E3) - Structured (Channelized), and Unstructured (Unchannelized)
Framed T3/E3 Unstructured Payload:	Raw Data from File, ATM Cells (only for T3), HDLC Frames, BERT Patterns
Unframed E3 Payload:	Raw Data from File, BERT Patterns
Channel Structure:	T1, E1 (ITU-T G.747)
BERT Patterns:	QRSS, 2 ⁶ -1, 2 ⁹ -1, 2 ¹¹ -1, 2 ¹⁵ -1, 2 ²⁰ -1, 2 ²³ -1, User Defined up to 32-bits, other static patterns
T1 Payload:	Inserted T1, AIS, Loopback, BERT Patterns
E1 Payload:	Inserted E1, AIS, Loopback, BERT Patterns
Loopbacks:	Complete T3/E3 Signal, Selected T1s/E1s from incoming T3/E3

T3/E3 Receiver

T3 Framing Format:	M13 (ANSI T1-107 – 1995), C-bit (ANSI T1-107 – 1990), Unframed, Structured (Channelized), and Unstructured (Unchannelized)
E3 Framing Format:	E13, Unframed, Structured(Channelized), and Unstructured (Unchannelized)
Channel Structure:	T1/E1 (ITU-T G.747)
Framed T3/E3 Unstructured Payload:	Raw Data Captured to File, ATM Analysis (only for T3), HDLC Frames Analysis, BERT Patterns Measurement
Framed T3/E3 Structured Payload:	Raw Data Captured to File, BERT Patterns Measurement, Drop Selected T1(s)/E1(s)

Miscellaneous

T3/E3 Line Rate Offset:	+/- 50 PPM in 1 ppm Steps
Level Measurement:	Supported
Frequency Measurement:	+/- 1 PPM
T3 Error Add:	Payload Bit, Frame Errors, P-bit, C-bit, EXZ (for T3)
E3 Error Add:	Payload Bit, Frame Errors, Code Violation (CV) Error, EXZ, FAS
T3 Alarm Generation:	LOS, OOF, AIS, RAI (X-bit), Idle, FEAC Codes (Loopback and alarm/status codes)
E3 Alarm Generation:	LOS, OOF, RAI (X-bit);
E3 Alarm Monitoring:	LOS, LOF, AIS, RAI (X-bit), EXZ
T3 FEAC Codes:	Alarm status codes, loopback codes with channel indicator for T1
LED Indicators:	LOS, LOF, ERR, PGM
Operating temperature:	0 C deg to 40 C deg
Storage temperature:	- 10 C deg to 70 C deg
Relative humidity:	10 % min, 90 % max, non-condensing

Mechanical

Dimensions	1.6" high, 9.25" deep, 5.5" wide
Weight	1.75 lbs
Power Supply	Input: 9 V DC at 1 A

Buyers Guide:

[TE3001](#) - Portable (USB) Dual T3 E3 / T1 E1 Hardware Unit - requires TT3001 or EE3001
[TT3001/EE3001](#) - w/ Analyzer Basic Software for WIN XP/Vista

For complete buyers' list visit <http://www.gl.com/laptopt3e3.html>

