T3 E3 Optional Applications

GL Communications Inc.
818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: info@gl.com
Website: https://www.gl.com

Optional Applications

- Scripting and Automation
- Record and Playback Software
  - Playback (Transmit from File)
  - Record (Capture to File)
- Protocol Analysis
  - HDLC, PPP, ATM, Frame Relay
- Protocol Emulation
  - HDLC, PPP
- T1/E1 Send/Receive Server
- Channelized USB T3 E3
- Client and Server

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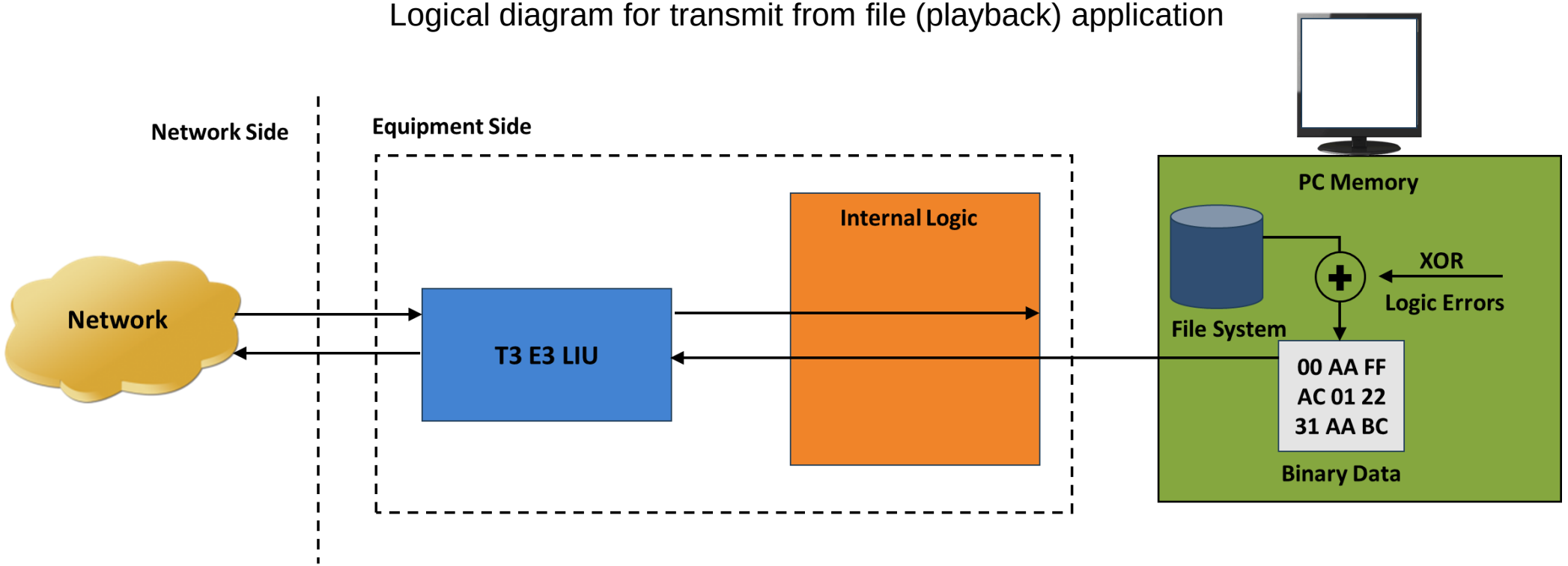
Playback (Transmit from File)

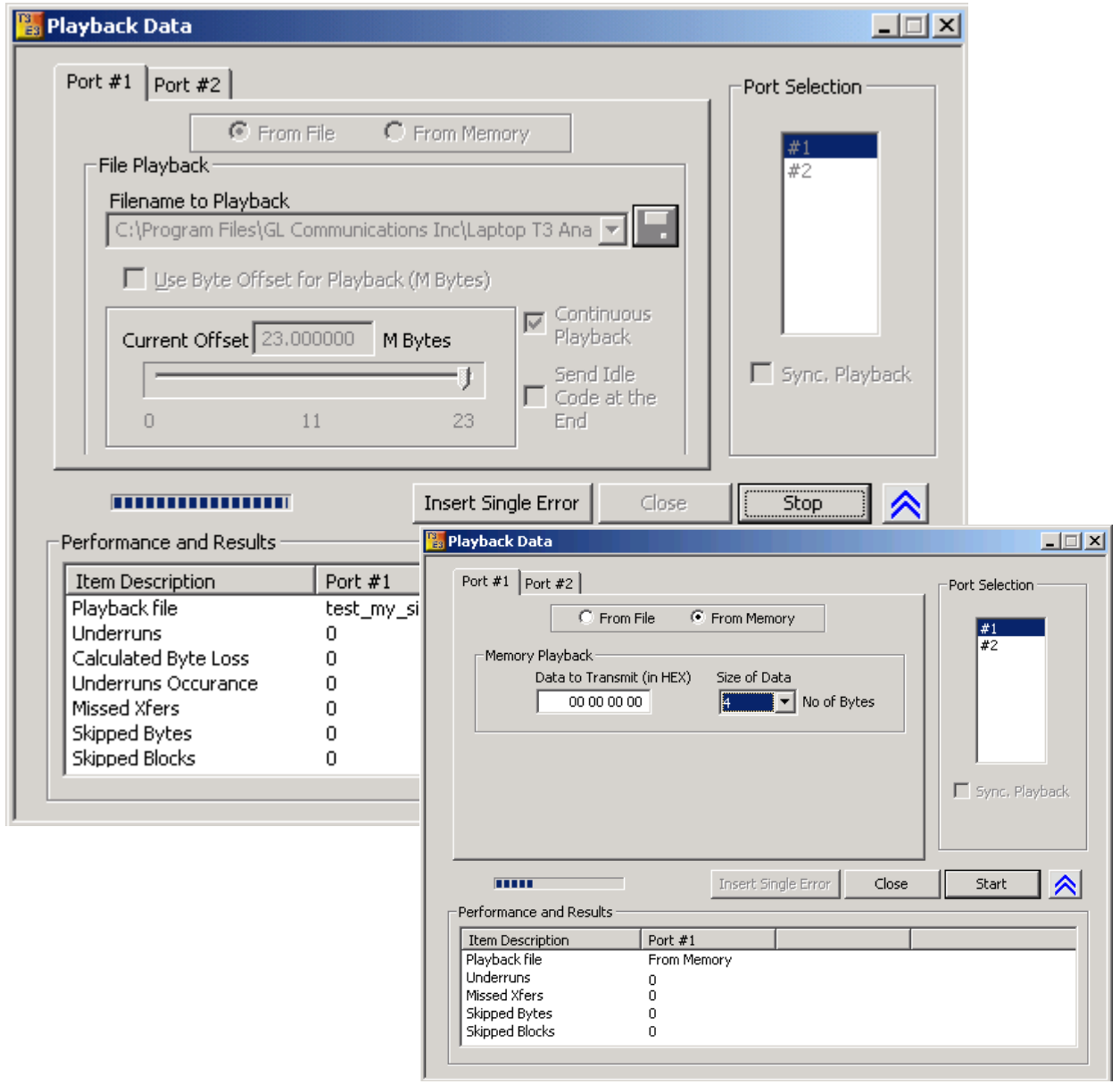
Logical diagram for transmit from file (playback) application



- The transmit file application permits transmission of a file of any length or transmission of data from memory in hex format

Playback (Transmit from File) GUI

- User Interface for transmit from file/memory (playback) application
- From Memory and /or File Playback –
  - In file playback, files of any length can be transmitted continuously (without loss)
  - In memory playback, data to be transmitted (in HEX) with maximum size of 4 bytes

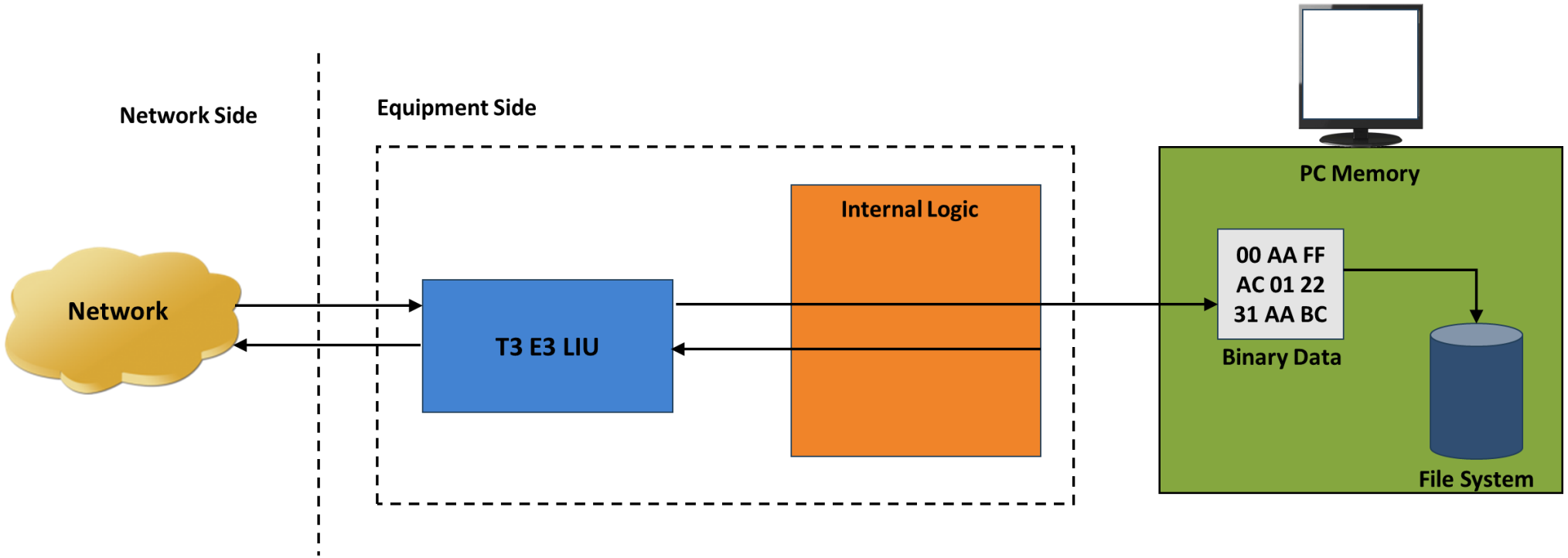


Playback (Transmit from File) (Contd.)

- Transmit flat binary file or user selected file over T3 E3
- Playback over framed or unframed T3 E3
- Continuous playback or single instance playback
- Manual insertion of single error along with the data stream play back
- Statistics such as Underruns, MissedXfer, Skipped Bytes and Blocks can be observed for the selected port

Record (Capture to File)

Logical diagram for capture (record) application



- Permits continuous or limited capture of data on the T3 E3 lines
- Save the captured data in binary file format
- Supports synchronized capture for multiple cards

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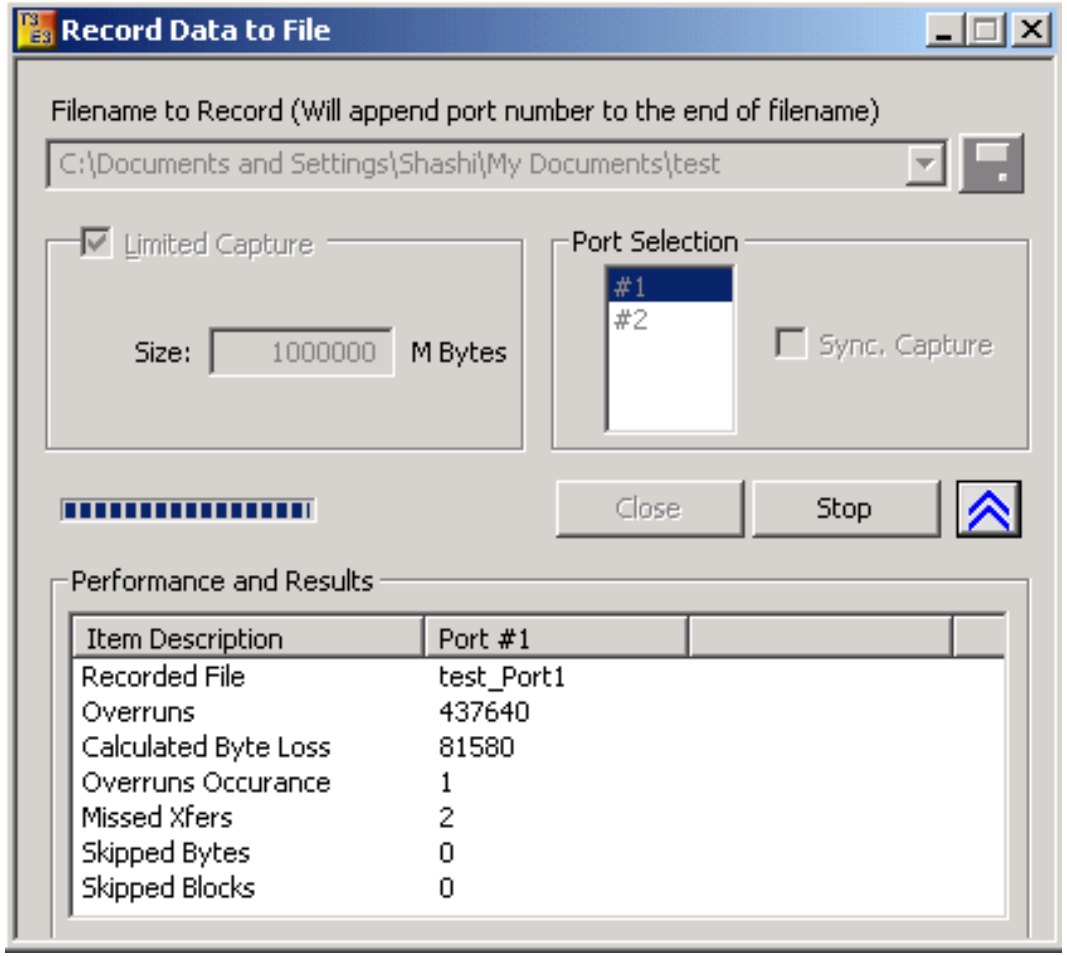
Record (Capture to File)

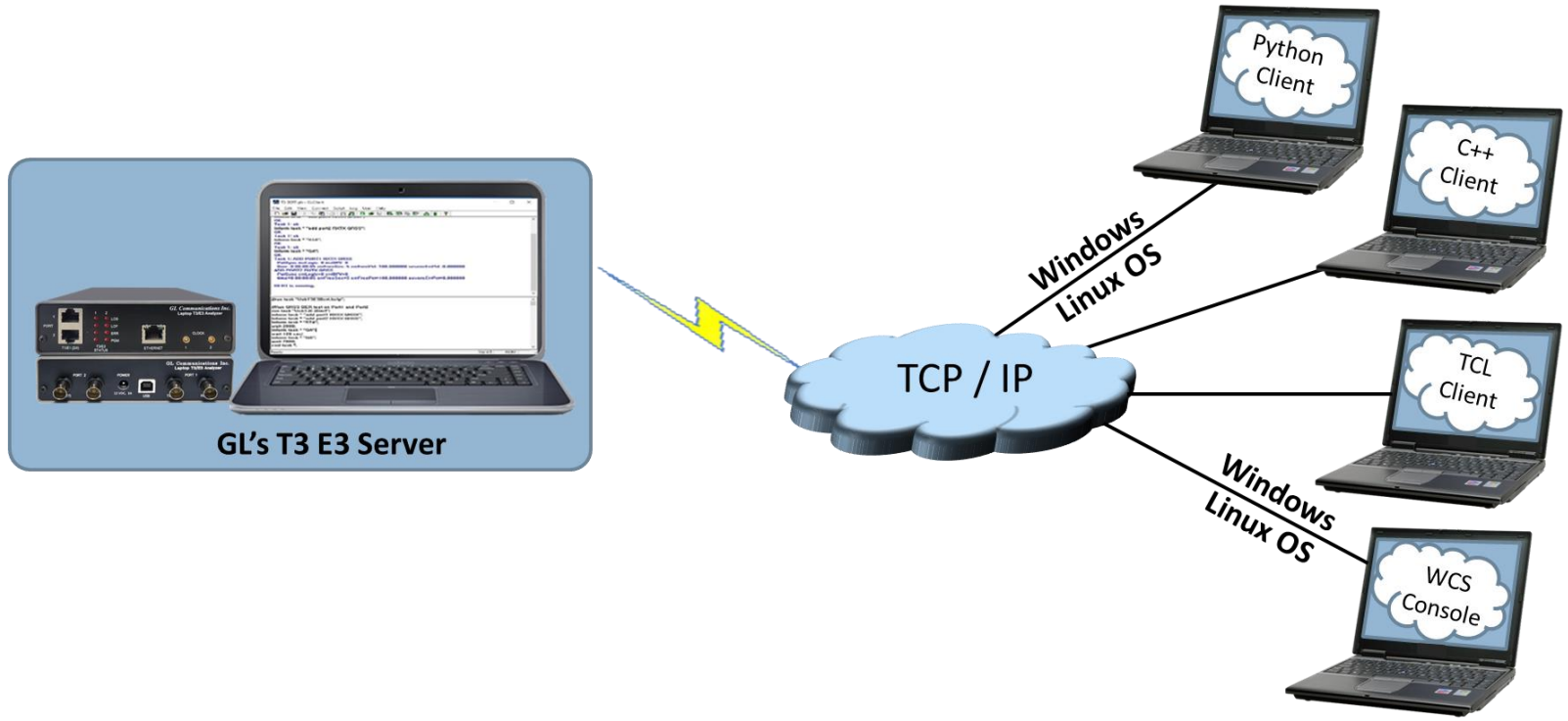
- Capture incoming data into binary flat file
- Synchronized capture from both ports
- Unframed T3 E3 or Framed T3 E3 Capture
- Limited Capture (specific number of Megabytes)

User Interface for capture (record) application



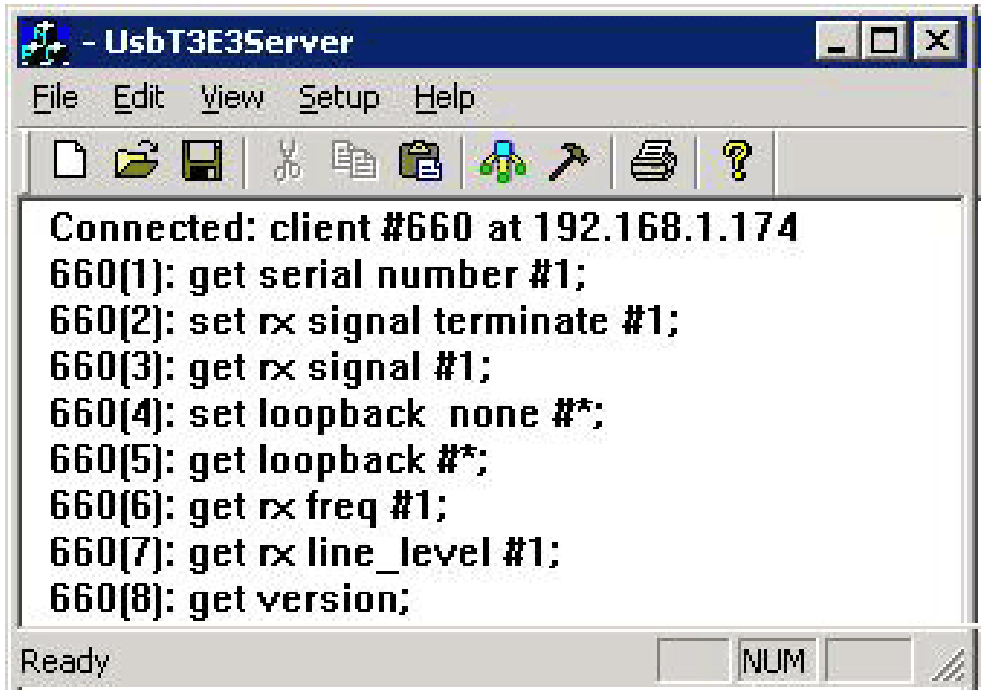
Windows Client Server Scripting and Automation

- GL's Windows Client/Server software is a non-GUI based program for remote, scripted, and automated control of T3 E3 configuration, capture, transmission and more
- Supported clients are C++, C#, Windows TCL, and Windows/Linux Python on Windows® and Linux® operating systems

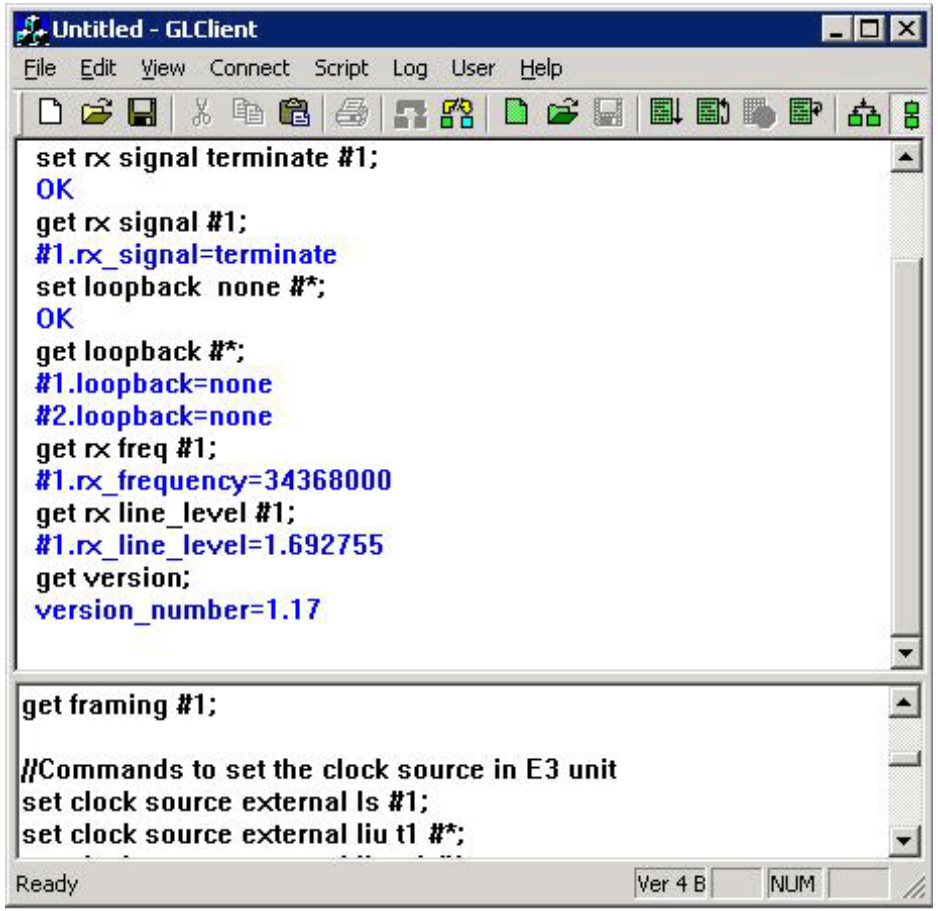


Windows Server and Client Interface

Server Interface



Client Interface



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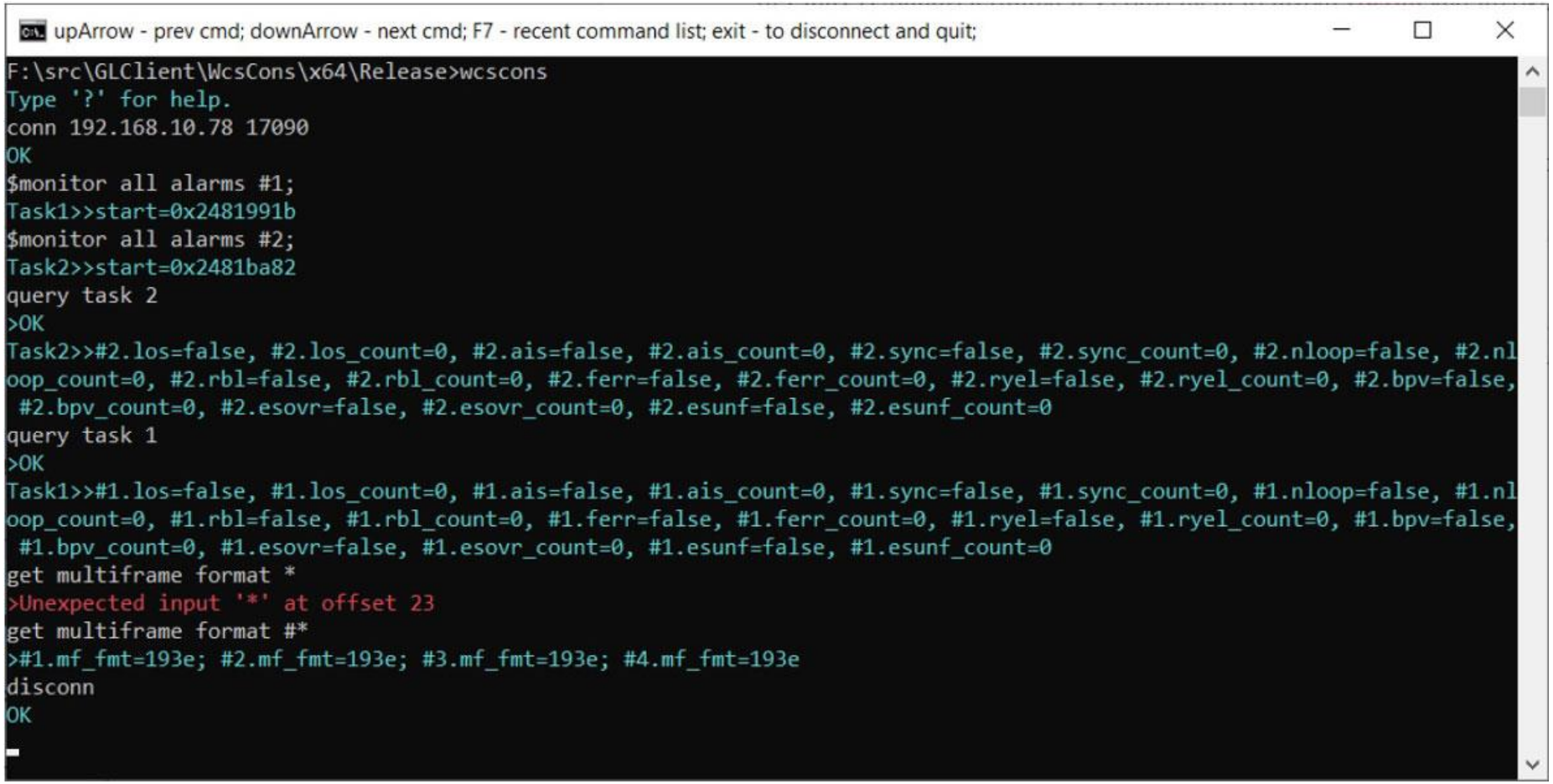
Windows/Linux Client Console

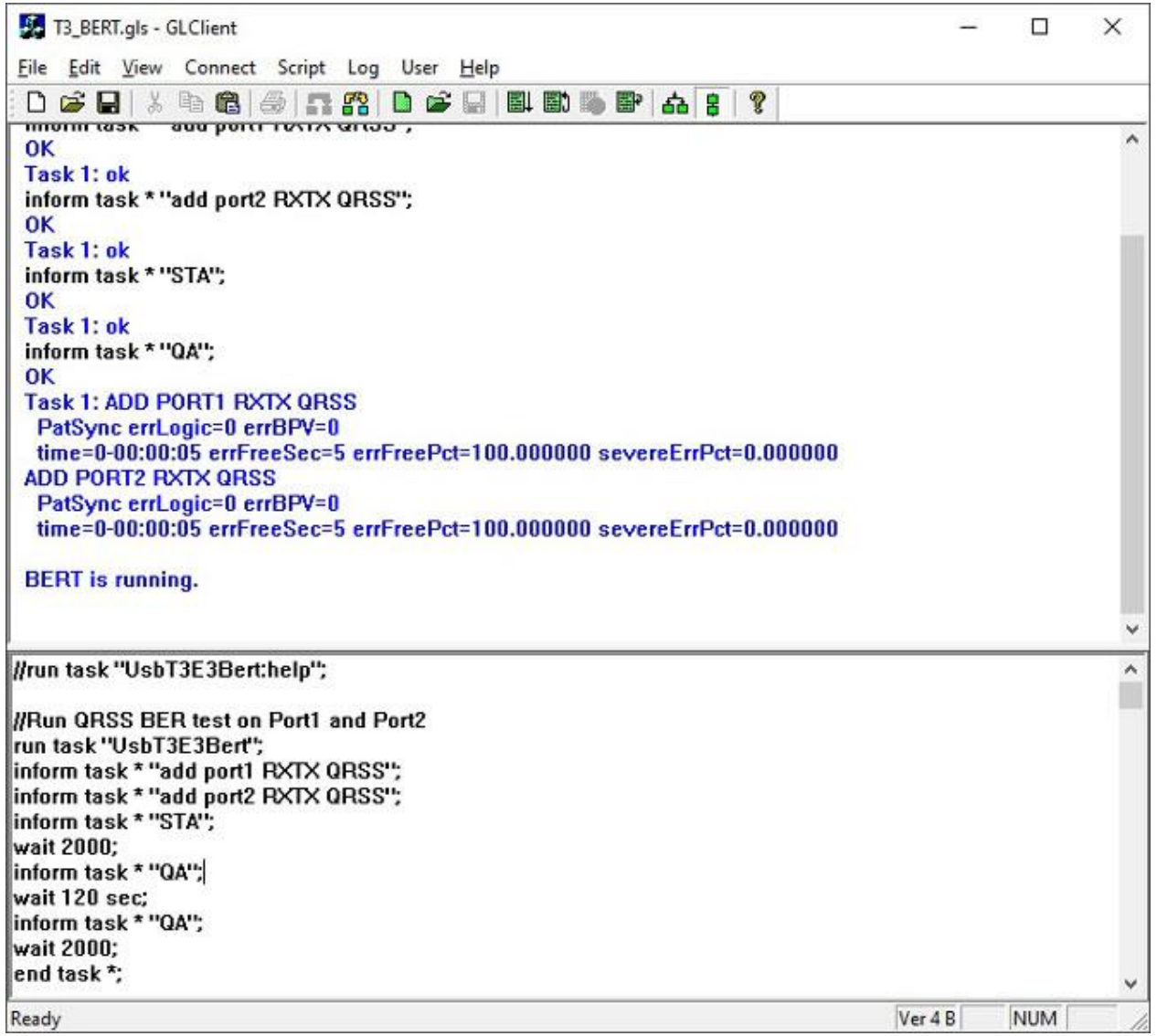
- Windows/Linux Client (WLC) is a Command Line Interface (CLI) application that issues commands to T1 E1 WCS server and display replies into Console/PowerShell/Terminal Windows. WLC works in Windows® and Linux® versions. However, through SSH or another remote access terminal it can be used on any operating system. WLC is a portable Windows/Linux WCS client communication library compatible with WCS server



WCS Module -TT3600/EE3600
Bit Error Rate Test (BERT)

BERT on framed or unframed unchannelized T3 E3 (UsbT3E3Bert) is an optional WCS Server side module that:

- Performs BERT on pseudo random patterns such as QRSS, 2^6-1, 2^9-1, 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, etc.
- Single or continuous Bit Error insertion for Logic and BPV errors
- Capability of remote operation, automation, and multi-site connectivity



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WCS Module - XX610
File Transmission and Reception

Tx/Rx Files on unframed unchannelized T3 E3 (UsbT3E3FileXmit) is a WCS Server side module that:

- Transmits data read from files
- Receives data to files
- Capability of remote operation, automation, and multi-site connectivity

Example:

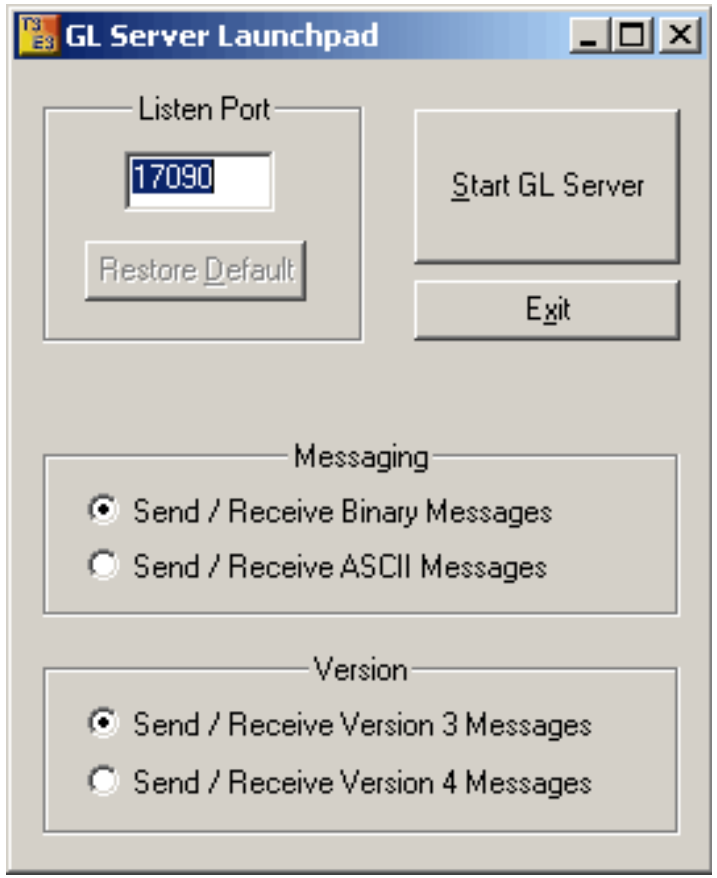
```
run task "UsbT3E3FileXmit" using "QEND";
inform task * "tx #1 'c:\seqhdl.dat' LIMIT 200000";
inform task * "start";
```

The above example transmits 200000 bytes from file ‘c:\seqhdl.dat’ and then stops.

Features

- Intrusive/Non-Intrusive T3 E3 Testing
- Performance monitoring and testing of multiple site locations from a single client
- Shared use of T3 E3 test equipment from multiple client locations
- Simultaneous testing of high capacity T3 E3 systems through a single client
- Integration of T3 E3 testing into more complex testing systems
- Capability of remote operation, automation, and multi-site connectivity
- Wild card and sequential operators available in the command syntax, allows to configure and control multiple elements of the test set using a fewer lines of commands
- Custom TCP/IP clients could be developed in any programming language to seamlessly integrate into existing testing program

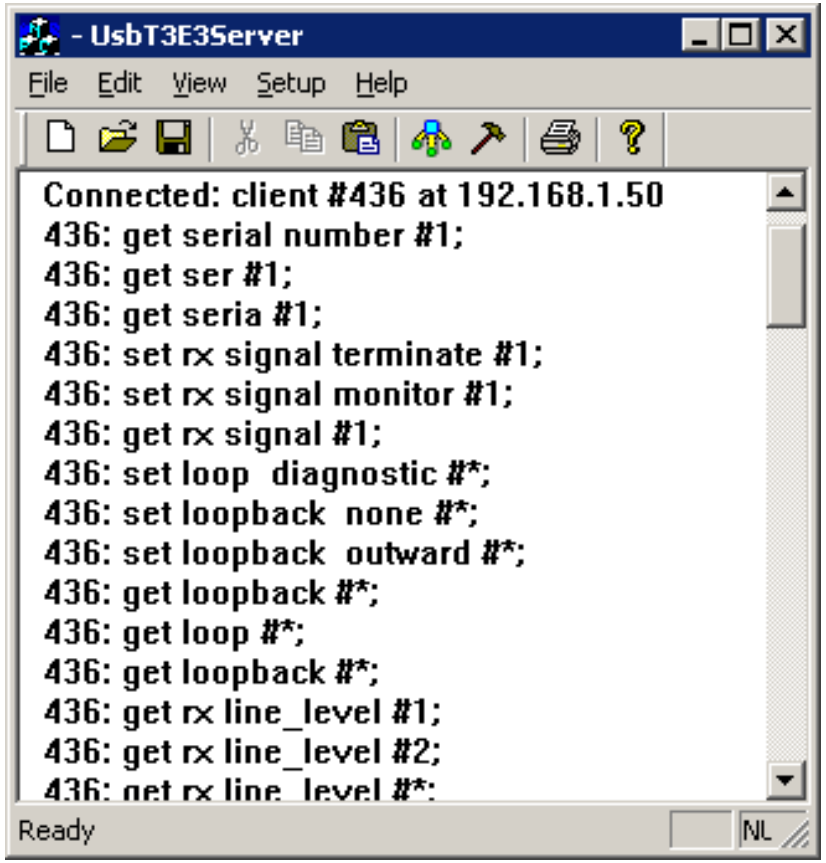
Server Initialization



- Specifies which TCP/IP port should be used to listen for incoming connection requests from clients, as well as the messaging options (ASCII or binary, version 3 or 4)

Server Interface

Server



- The display area in server is read-only, and normally shows a record of transactions of various types

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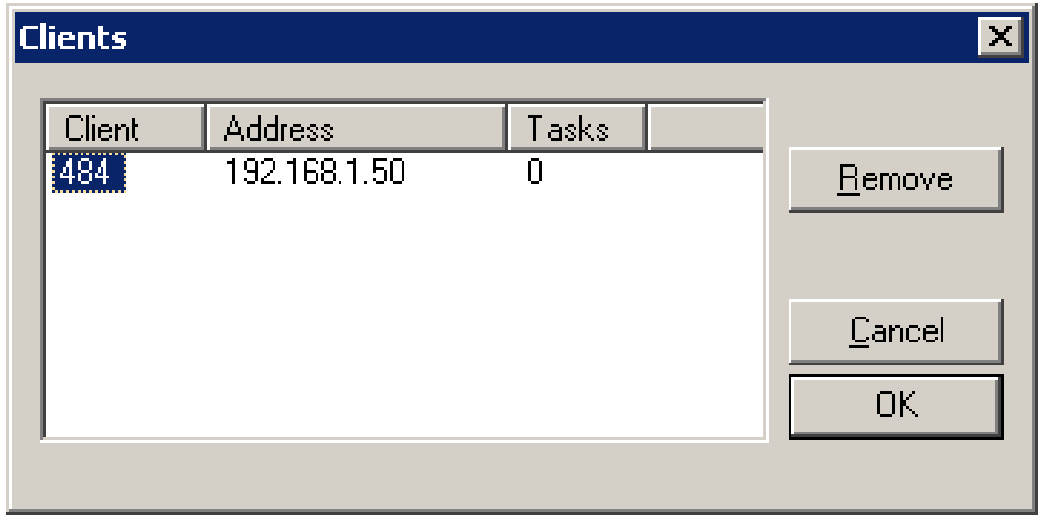
Server Functions

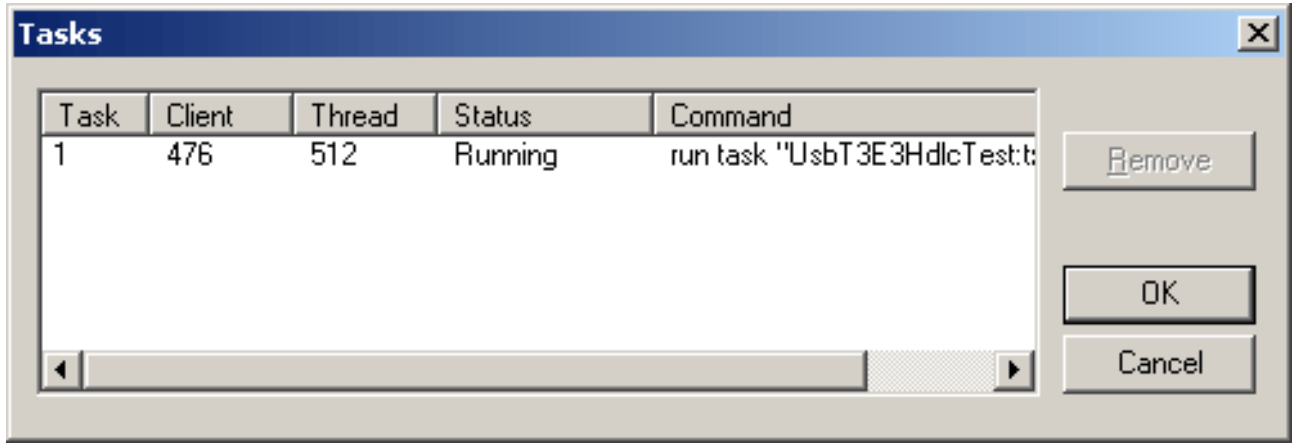
- The server performs 'actions' and 'tasks'
- An 'action' is in response to a 'command' initiated by a client. The server performs the action immediately and notifies the client of the result
- A 'task' involves real time generation and processing of data. Multiple tasks can be initiated without completion of previous tasks
- The server informs the client on tasks: started, status, complete, and so on
- Typical actions are - Get Software version, Rx Signal Settings, Loopback Settings, Alarm Monitoring, Tx Rx Framing Formats, Clock Source Settings, Mode Selection, Insert Errors and Get Error Counts, FEAC messages, Line Level and Signal Frequency and others

Client and Task Administration

Client Administration



Server Task Administration



- Client Administration allows you to obtain the list of currently connected clients
- Task Administration allows you to obtain the list of current tasks being executed on the task list

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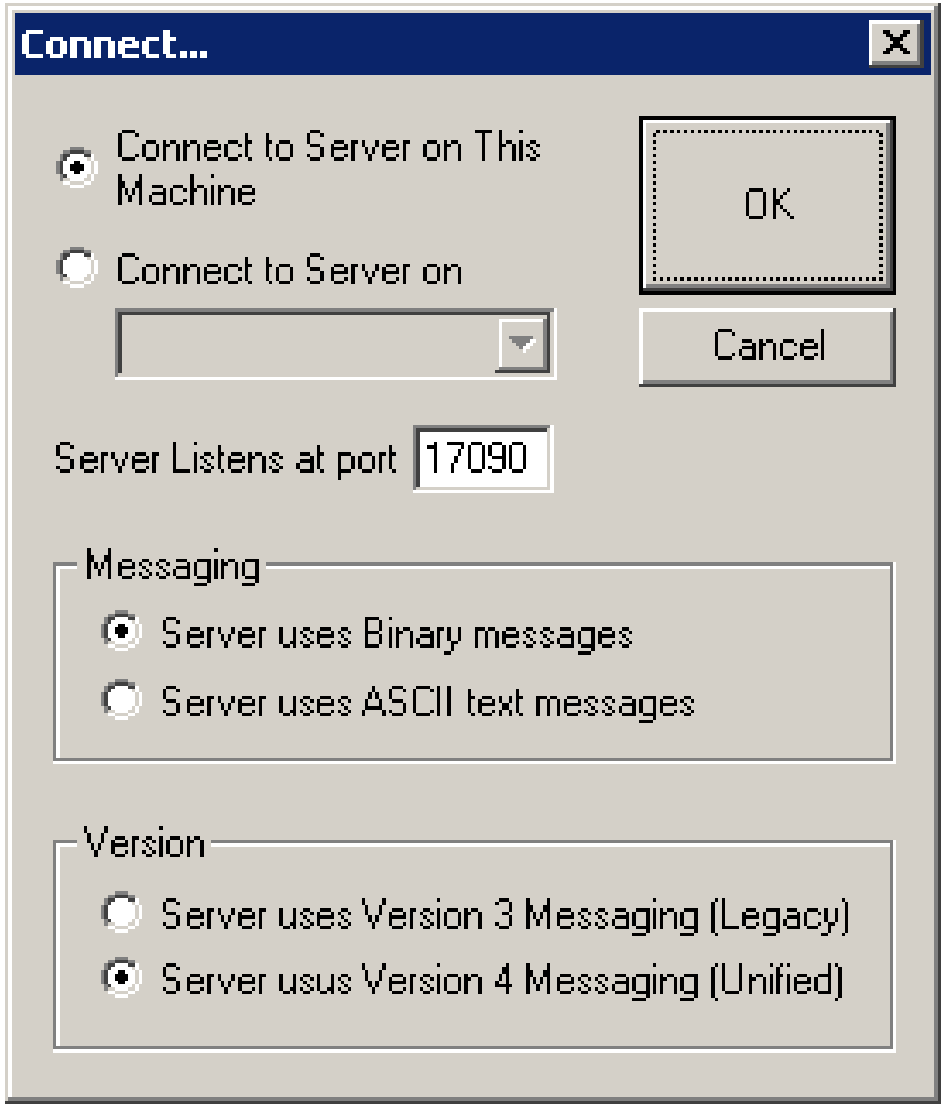
Client Connection

- Client connects and disconnects from servers, load and save batches of commands, and manage its log file through simple user controls
- Client software accepts text interactively from the user or from a previously saved file and forwards the text, line by line to the server
- Accepts notification messages from the server and displays the text field of the message



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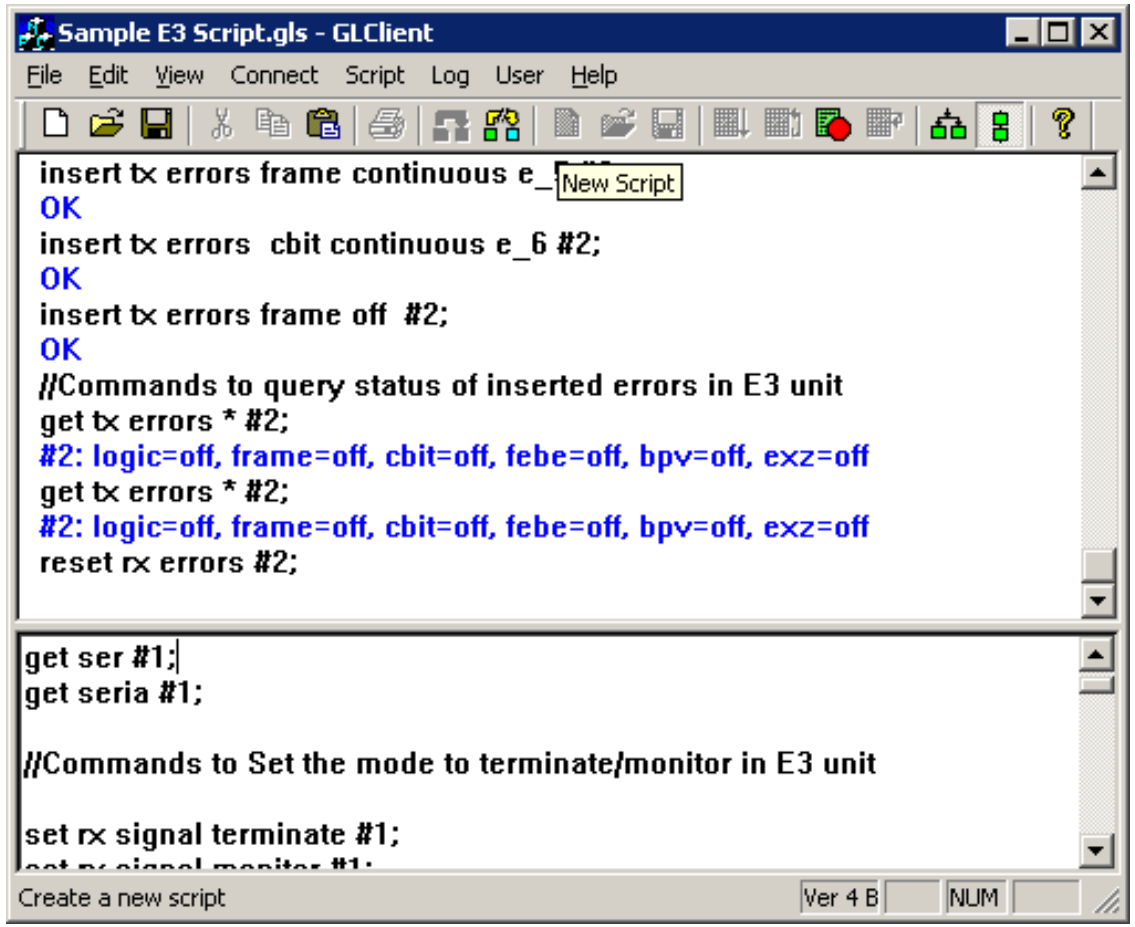
Client Interface

- T3 E3 Client is a Windows-based application (GLClient.exe) that is distributed freely along with T3 E3 Server. The T3 E3 unit in server mode can be easily controlled through several software clients at remote or local sites
- The workspace may be used to interactively enter and edit commands. The log area is a read-only that displays connects and disconnects, commands, and notifications in this window



Client Functions

- Compatible with Windows® and Linux® Operating Systems
- All commands are simple and self-explanatory
- Commands can be customized to implement interactive menu options to set Tx Rx Framing Formats, Clock Source, getting FEAC messages, Line level, signal frequency and so on
- Values returned from the server can be easily accessed and stored as user-defined variables
- Streamlines both the source script and the output by executing only the messages that user requests
- Multiple clients can access a single server simultaneously

Windows Client Server (WCS) Module

- WCS module XX635– PPP Emulation and Analysis

The PPP Tx/Rx Test is an optional WCS Server side module that**:**

- Sends PPP frames with or without impairments
- Receives PPP frames and logs the events
- Generated & received PPP traffic on each individual PPP link using source type
    - Sequence numbers
    - Hex string frame
    - Binary flat files
    - GL HDL trace files
    - Network traffic (routing & bridging)
- Impairments can be applied on individual PPP links
    - Frame duplication
    - CRC Error
    - Frame Error
    - Logical Error (AND, OR, and XOR)
- Capability of remote operation, automation, and multi-site connectivity

Sample Scripts

//Commands to set & get FEAC messaging

```
set tx feac 0x1D cont #1;
get tx feac #2;
```

//Command transmit 100 frames on each card.

```
run task "UsbT3E3HdlcTest:tx" using "QEND";
inform task 1 "#1..2 FRAMES 100";
inform task 1 "start";
```

//Commands to insert same Errors on both the cards

```
run task "UsbT3E3HdlcTest:tx";
inform task 1 "#1,2 SEQNUM FIXLEN 8 FRAMES 1200000 FLAGS 200";
inform task 1 "error rep 1000 skip 9 offs 3 xor f5";
inform task 1 "start";
```

Sample Scripts (Contd.)

//Command for receive function operation

```
run task "UsbT3E3HdlcTest:rx" using "LOG 'c:\rx.log'";
inform task 1 "#2 FRAMES 1000 SEQNUM MSB2 ";
inform task 1 "start";
```

//Command to playback file

```
run task "UsbT3E3FileXmit" using "QEND";
inform task 1 "tx #1 'c:\usb_t3e3.bit' EOF";
inform task 1 "start";
```

//Command to record a limited number of frames

```
run task "UsbT3E3FileXmit" using "QEND";
inform task 2 "rx #2 'c:\rxdat' LIMIT 1000000";
inform task 2 "start";
```

//Command to playback file

```
run task "UsbT3E3FileXmit" using "QEND";
inform task 1 "tx #1 'c:\usb_t3e3.bit' EOF";
inform task 1 "start";
```

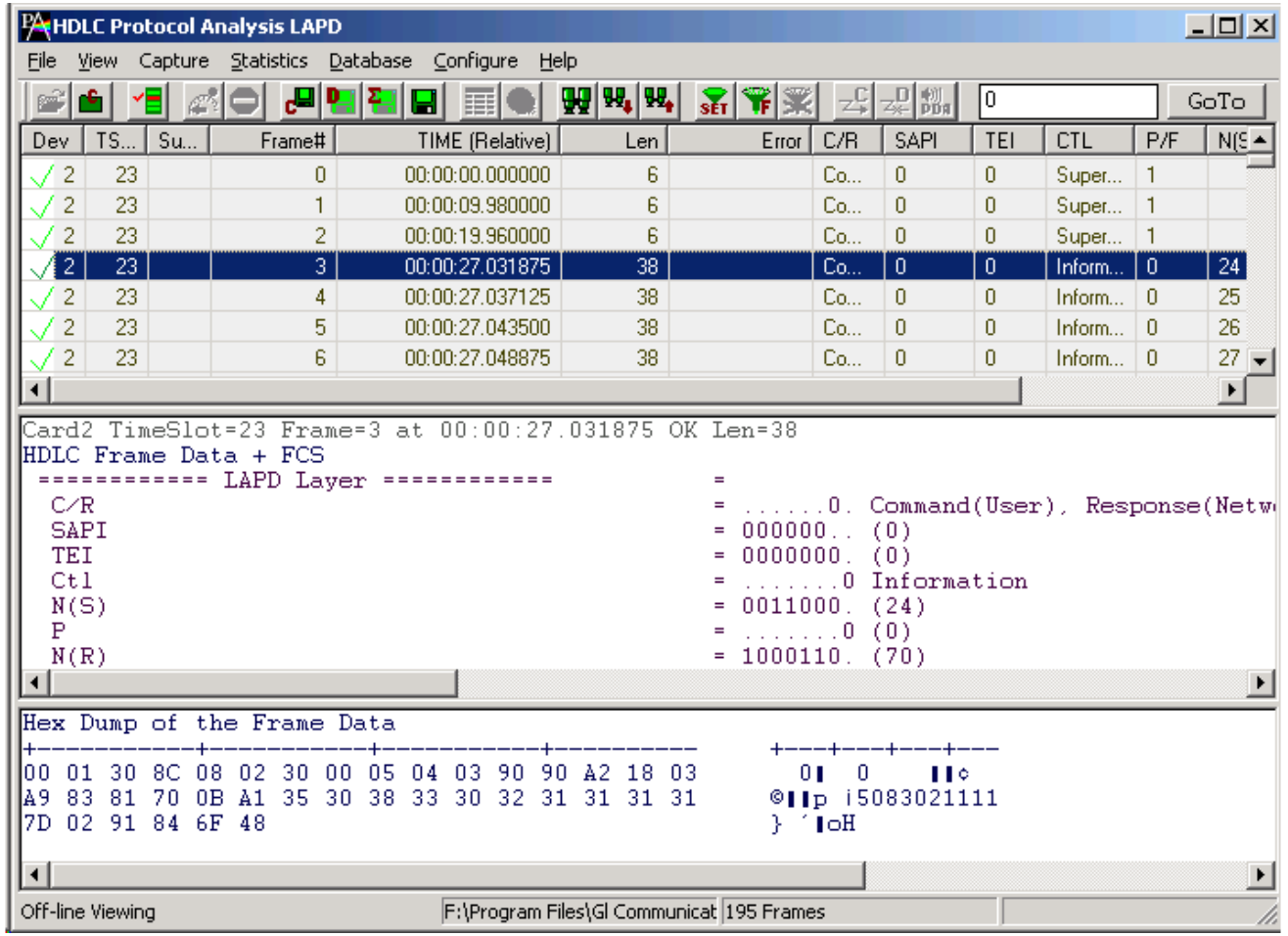
//Command to record a limited number of frames

```
run task "UsbT3E3FileXmit" using "QEND";
inform task 2 "rx #2 'c:\rxdat' LIMIT 1000000";
inform task 2 "start";
```

HDLC Protocol Analysis

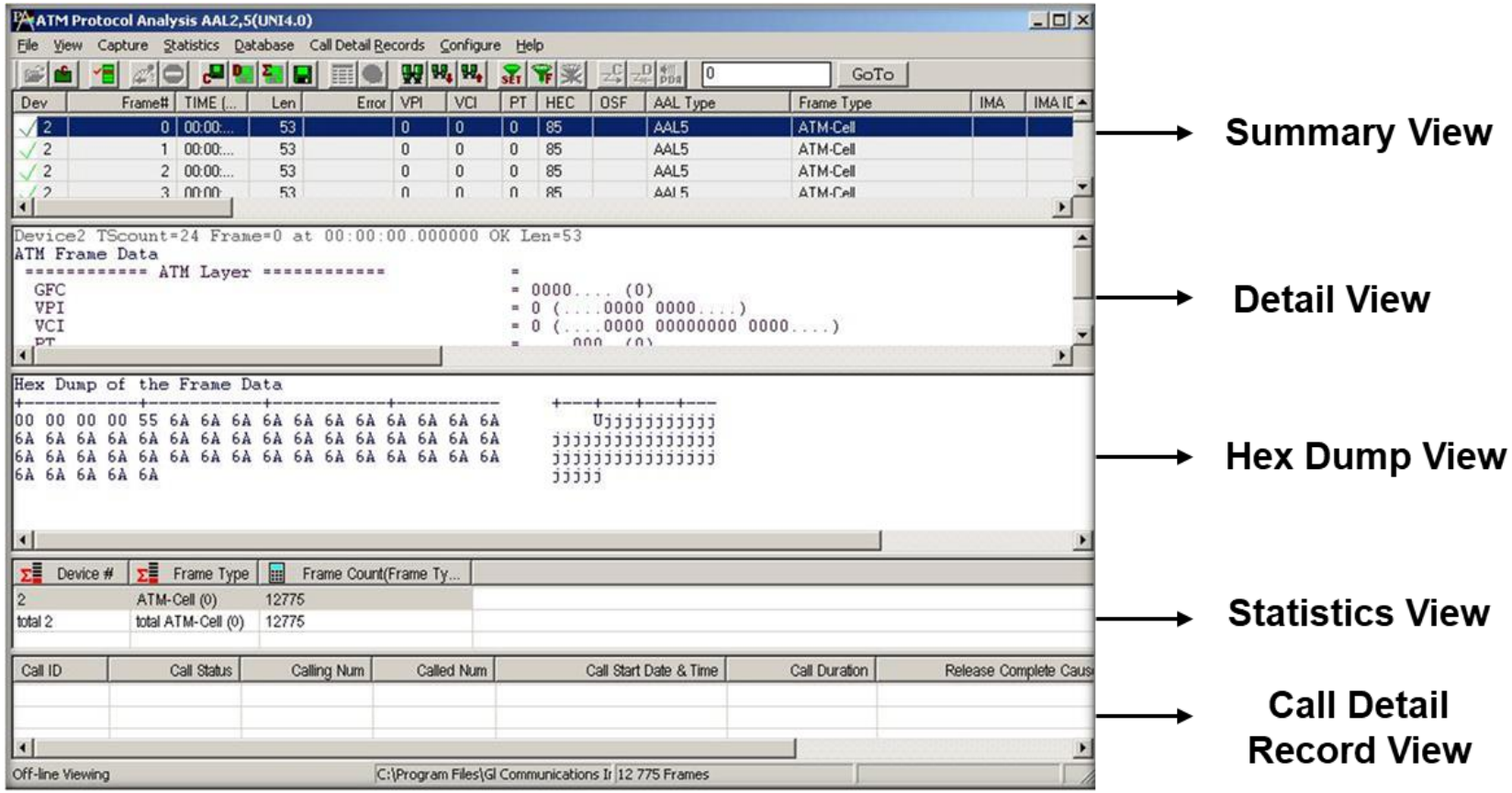
- GL's T3 (DS3) /E3 analyzer supports protocol decoding and analysis of ATM, Frame Relay, PPP, and HDLC
- All the protocol analyzers are based on similar architecture and supports sophisticated filtering, statistics and real-time capture options

Protocol Testing and Analysis



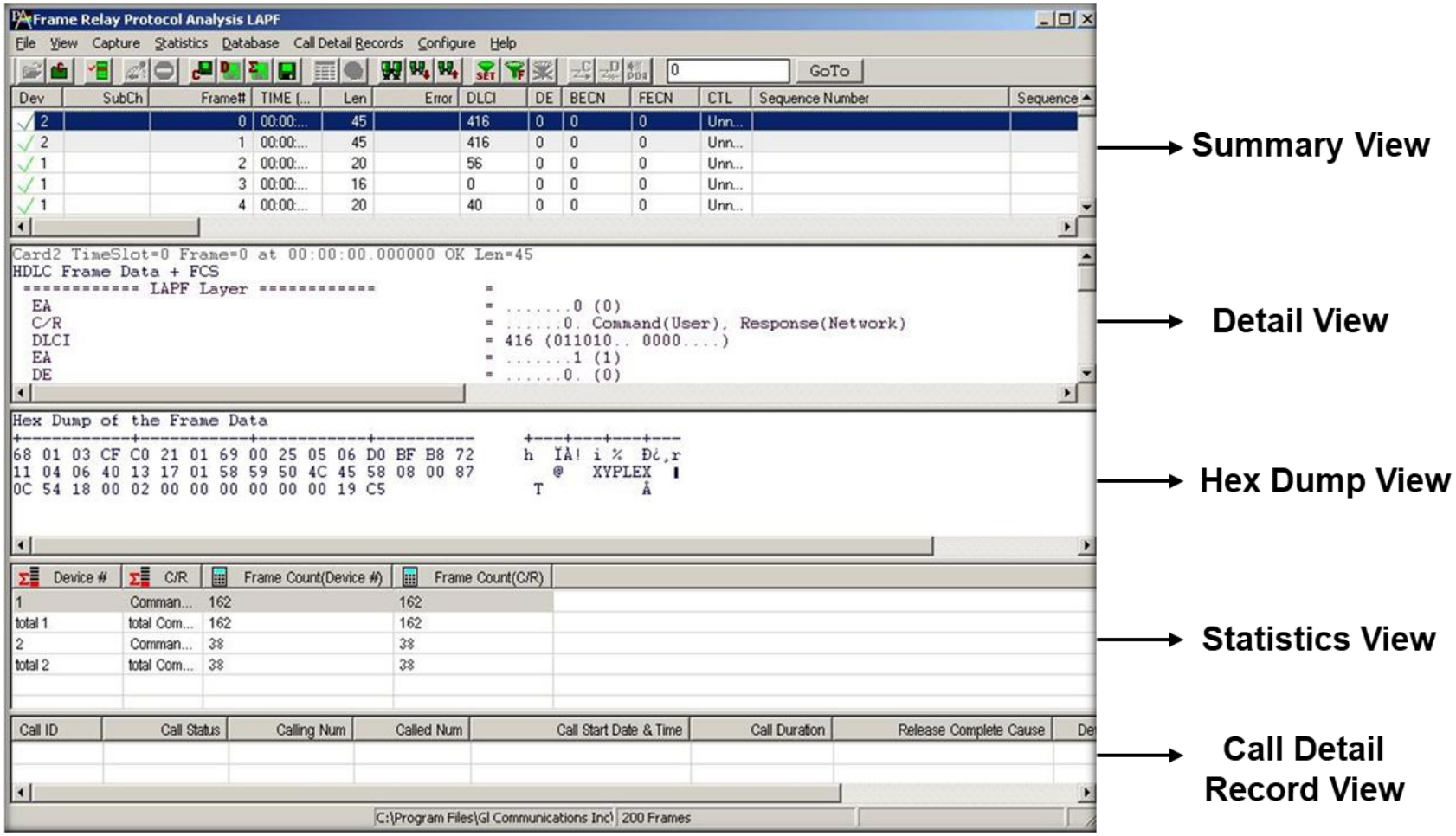
ATM Protocol Analysis

- Asynchronous Transfer Mode (ATM) is a flexible network, which carries voice, video, and data in the same way, i.e., fixed length cells
- Displays Summary, Detail, Hex-dump, Statistics, and Call Trace Views



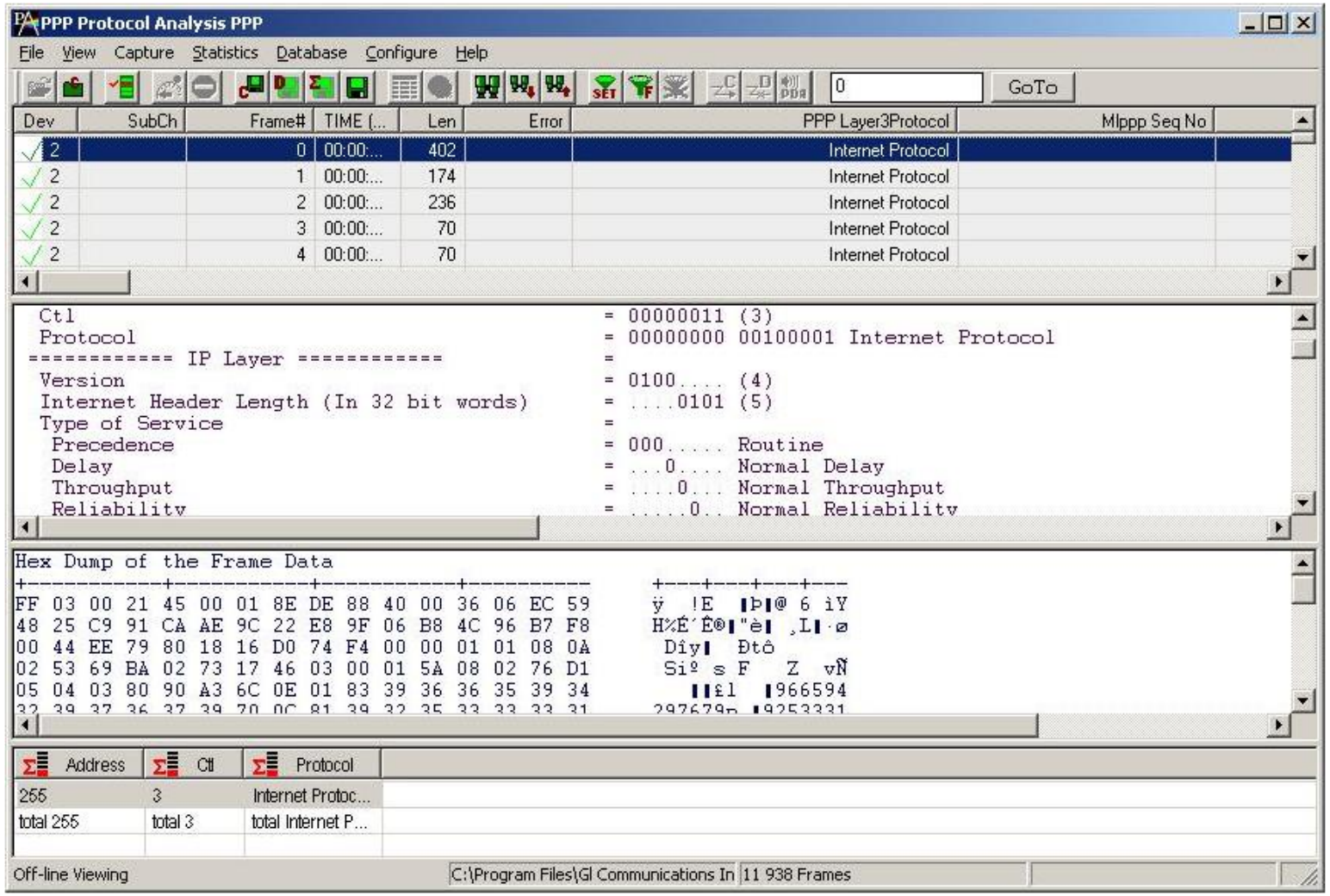
Frame Relay Protocol Analysis

- Frame Relay is commonly used data link protocol based on packet switching technology
- It is mainly incorporated by the corporate data networks due to its cost-effective data transmission, and flexible bandwidth
- Displays Summary, Detail, Hex-dump, Statistics, and Call Trace Views



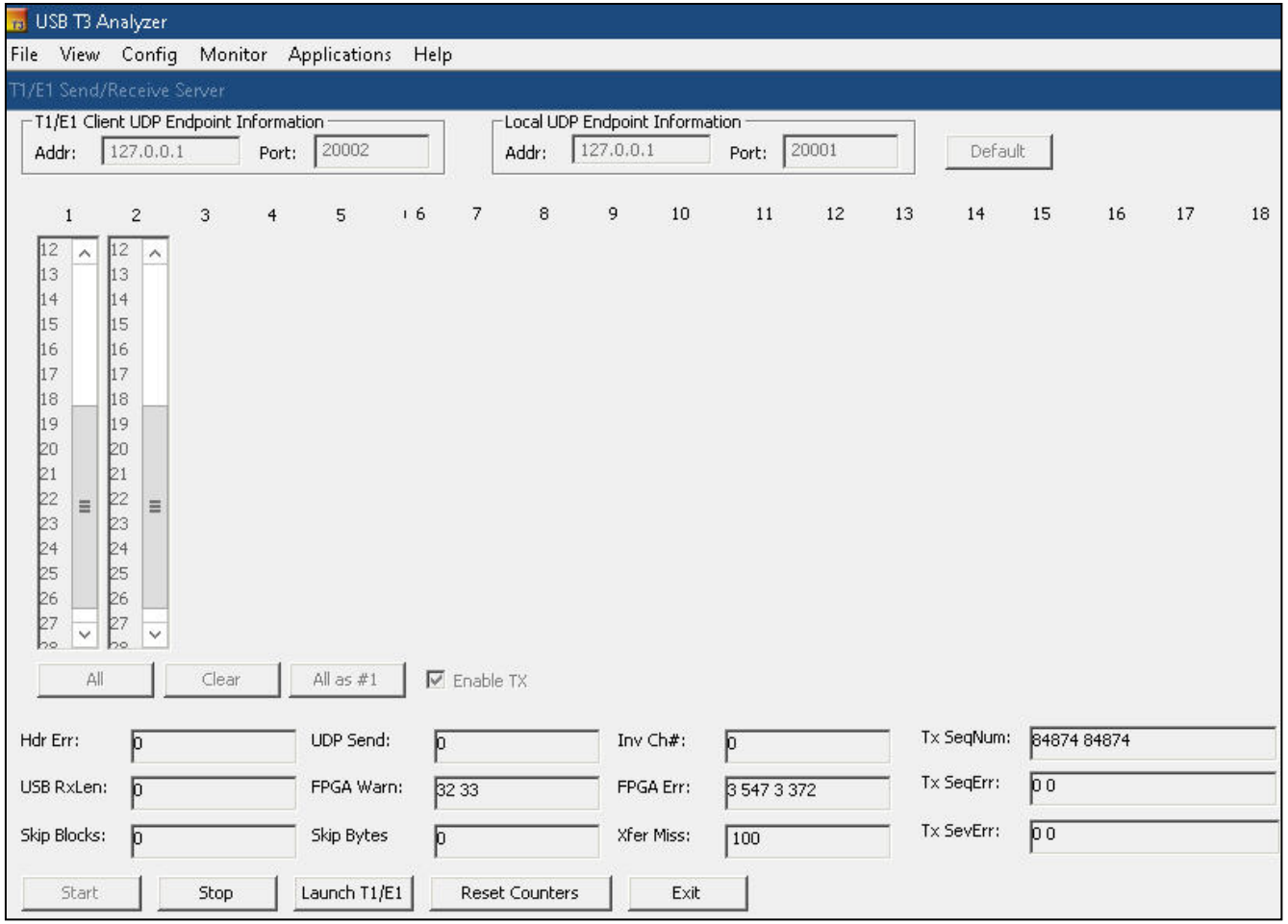
PPP Protocol Analysis

- It provides useful analysis of the PPP, MLPPP, and MC-MLPPP protocols which includes distribution of protocols, protocol fields, frame lengths and frame status



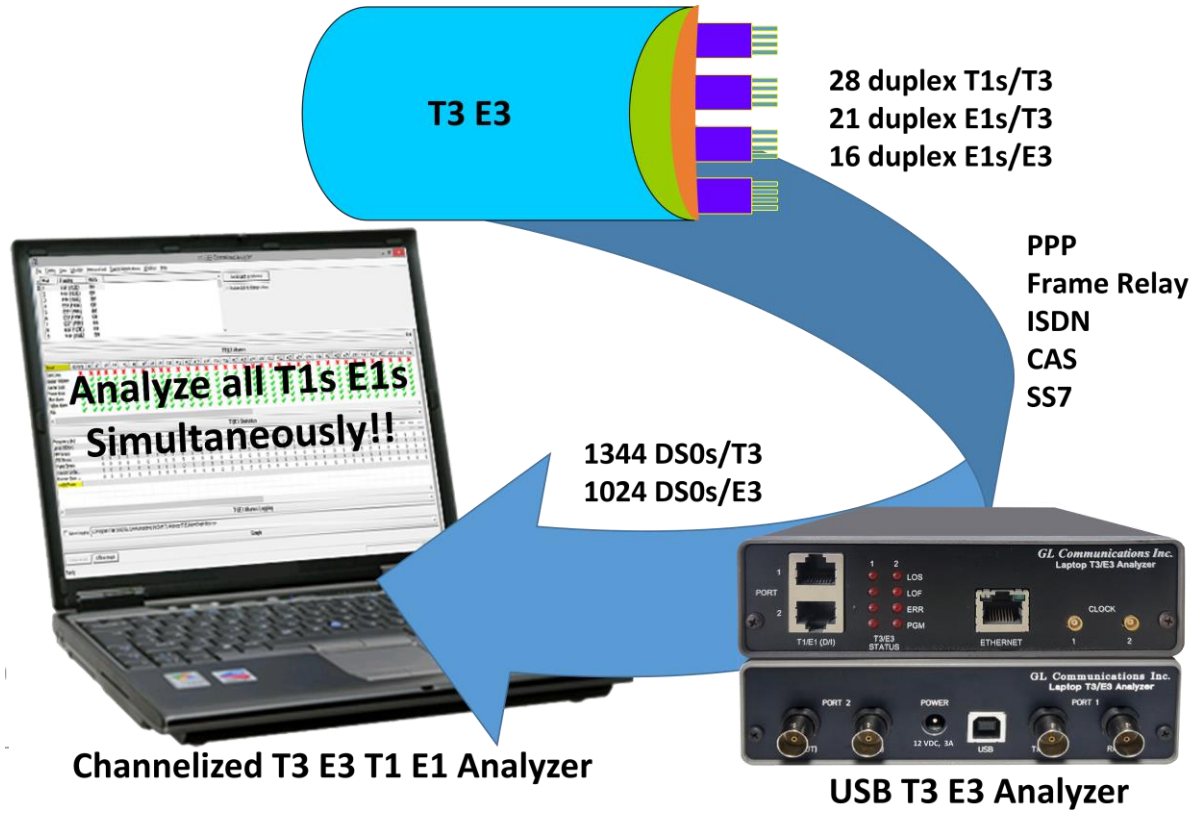
T1/E1 Send/Receive Server

- Runs as a service and performs channelization of a T3 E3 signals
- The T1/E1 Send/ Receive Server application within USB T3 E3 Analyzer acts as software based Multiplexer- Demultiplexer application capable of channelization of a T3 signal into 56 independent T1 channels, or 42 independent E1 channels and an E3 signal into 32 E1 channels



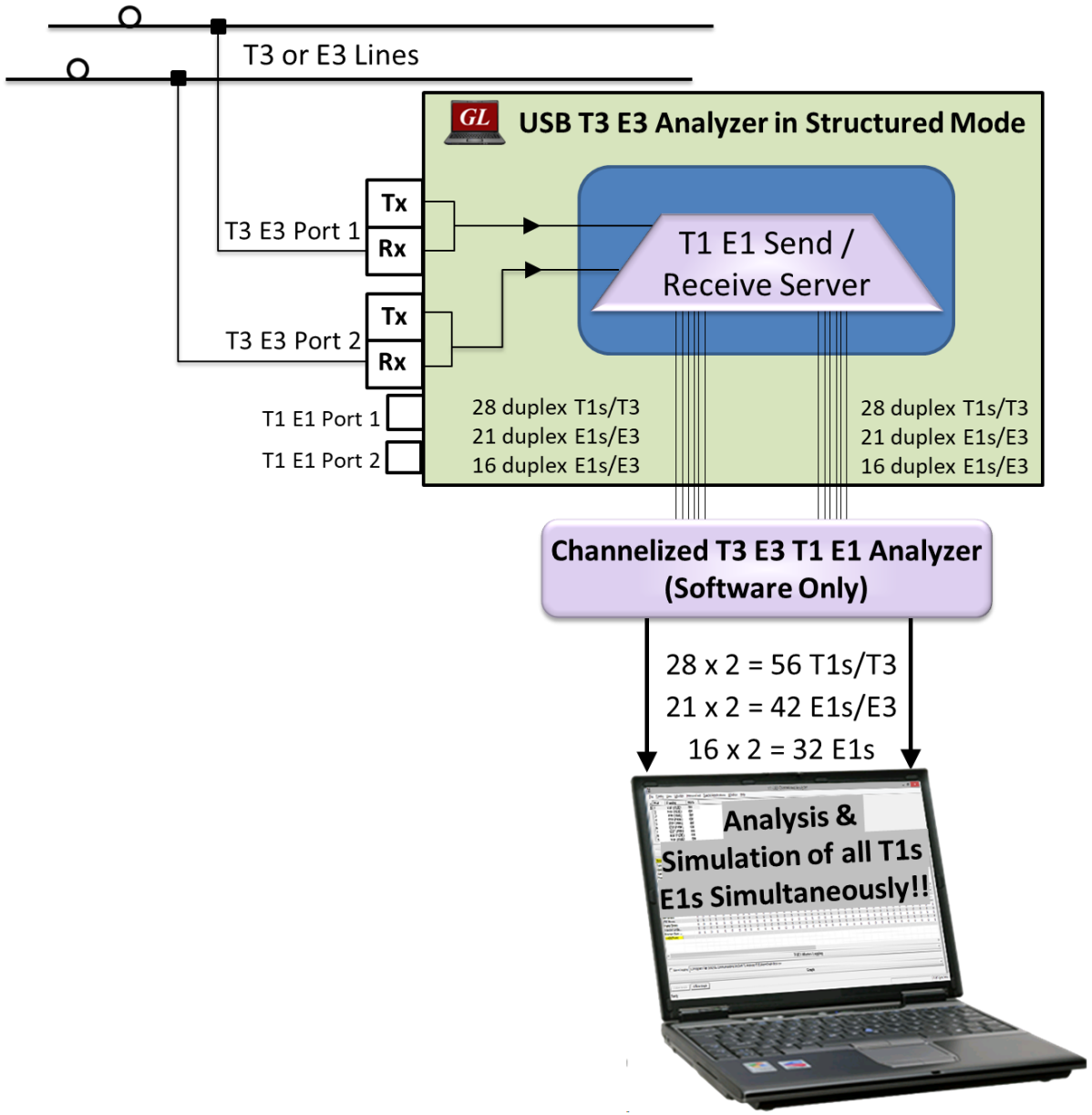
Channelized USB T3 E3 T1 E1 Analyzer

- Provides support for channelized T3 E3 to T1 E1
- Supports up to 56 T1s and 32 E1s channels per T3 E3 port
- Analysis of all 56 T1s (1.544 Mbps), E1 each), or 32 E1s (2.048 Mbps), each)
- Analysis of Fractional T1s and E1s, N x T1s or N x E1s
- Analysis of any combination of DS0s (64 kbps each) within the T1s or E1s, 56 x 24 = 1,344 DS0s for T1 or 32 x 32 = 1024 DS0s
- Supports structured and unstructured T1 E1 transmission and reception
- Supports all "basic applications" and "special applications" for T1 or E1 channels
- Supports Protocol Analysis of structured protocols – HDLC, ISDN, CAS, and more
- Supports carrying T1 E1 alarms in channelized T3 E3 lines
- Comprehensive analysis / emulation of Voice, Data, Fax, Protocol, Analog, and Digital signals, including echo and voice quality testing
- Extracting T1s E1s from multiple T3 E3 ports
- User selectable T1 and E1 channels to multiplex. The channel numbering is same as in De-multiplexing
- Unused channels will be treated as unequipped
- Broadcasts the selected T1 E1 channel data on all the 32 E1's or 56 T1's



Working Principle

- Channelized T3 E3 Analyzer software can capture, record, and monitor multiple T1 or E1 channels over Channelized T3 E3 links
- The analyzer can perform analysis and emulation of various types including Voice, Digits, Tones, Fax and Raw data



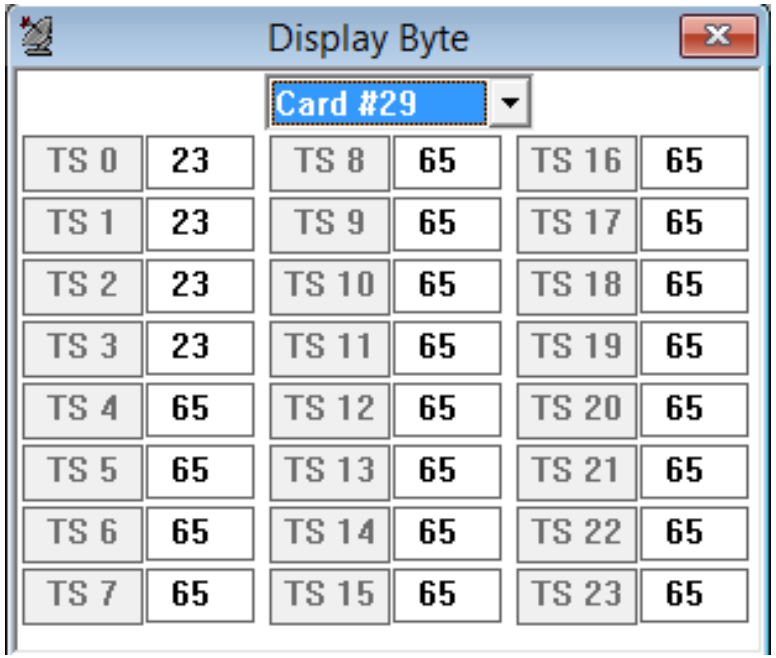
Basic and Optional Applications in Channelized T3 E3 Analyzer

Basic Monitoring Applications	Optional Monitoring Applications
• Byte Values • Binary Byte Values • Signaling Bits • DC Offset • Frequency • Power Level • Multi-frame Data • Timeslot Displays • ASCII Timeslot Display • Oscilloscope • Power Spectral • Audio (VF) and Active Voice Level Monitoring • Oscilloscope and Spectral Displays provide graphical analysis of signals For more details, refer to Basic Applications	• Capture Dialled Digits • Playback and Record • Automated Record/Playback (ARP) • Automated Continuous Capture (ACC) • Call Capture and Analysis • Multiple Call Capture & Analysis • Call Data Records • Voice Band Analyzer (VBA) For more details, refer to Optional Monitoring Applications

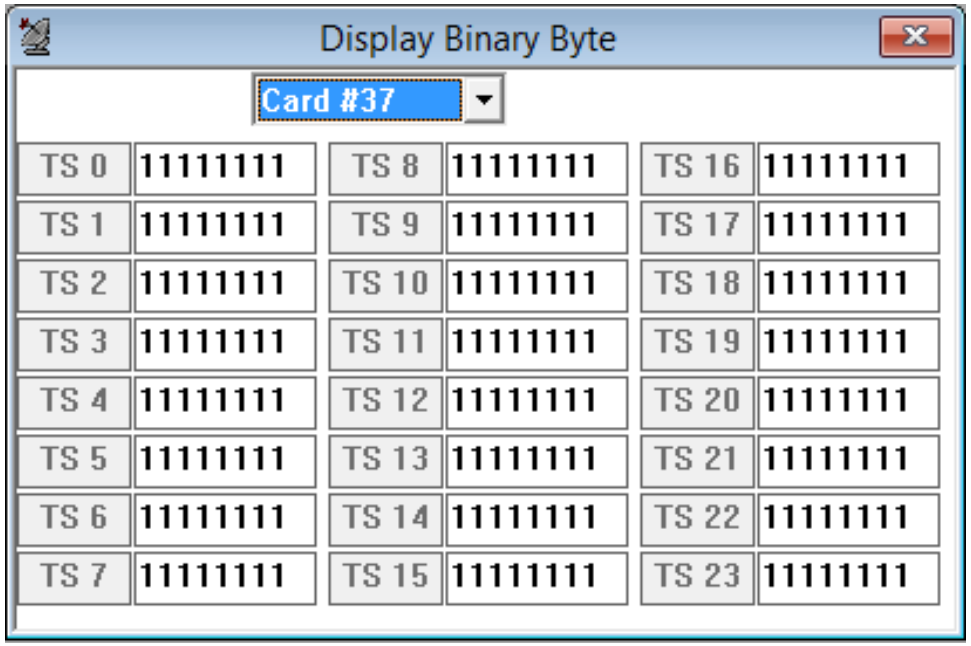
GL Communications

Byte Hex and Byte Binary Values

Byte Value

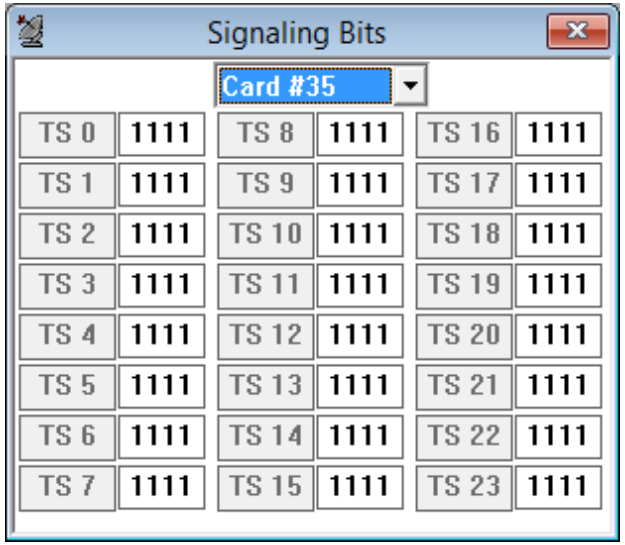


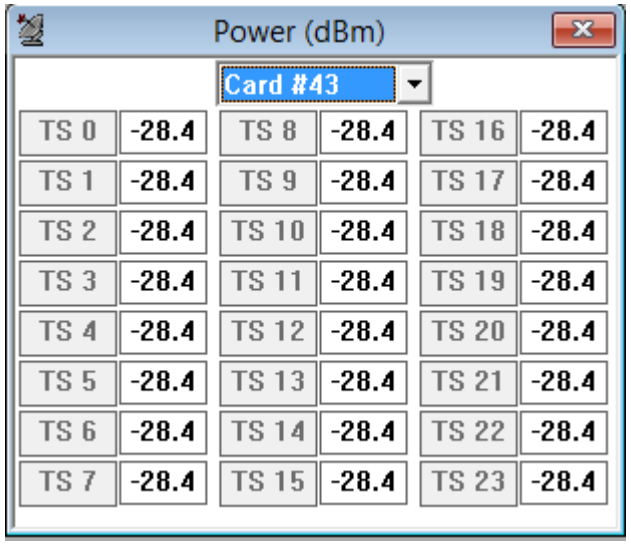
Binary Byte Value

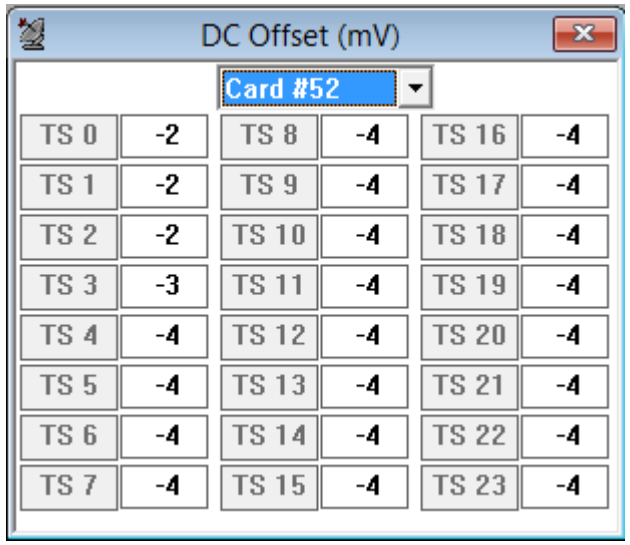


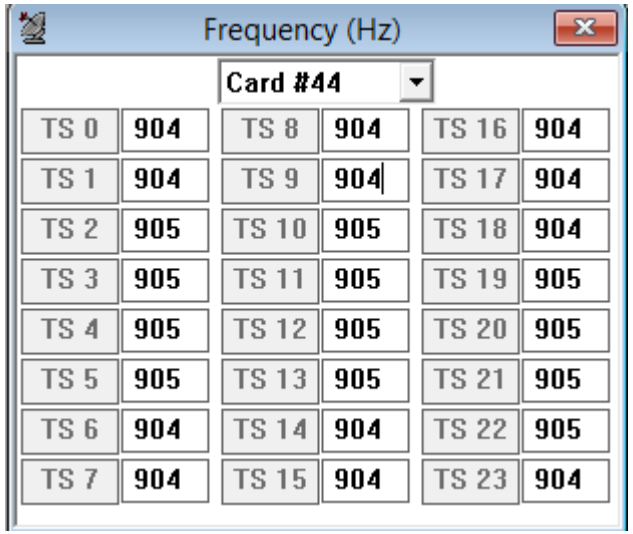
- Display the data values for each time slot in HEX data format
- Display the data values for each time slot in binary data format

Signaling Bits, Power Level, DC Offset, Frequency





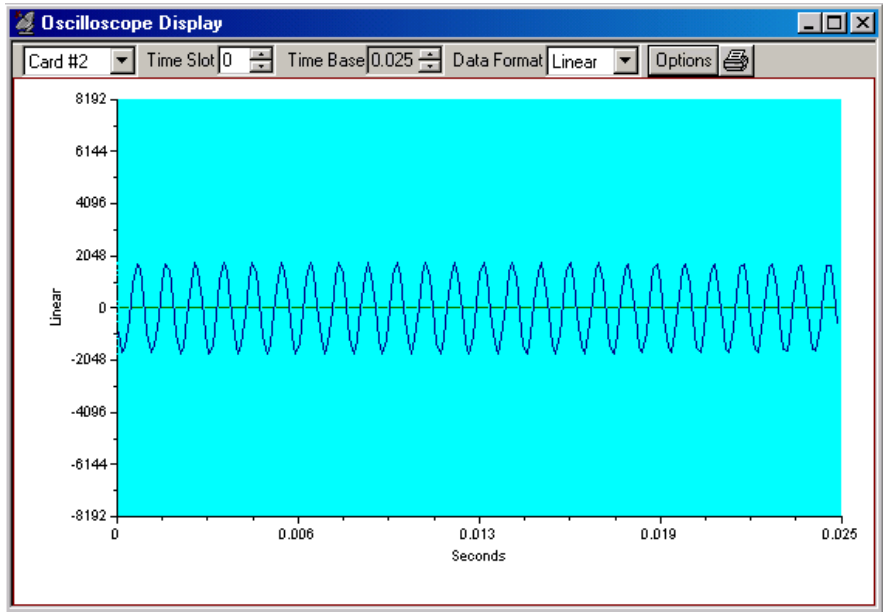




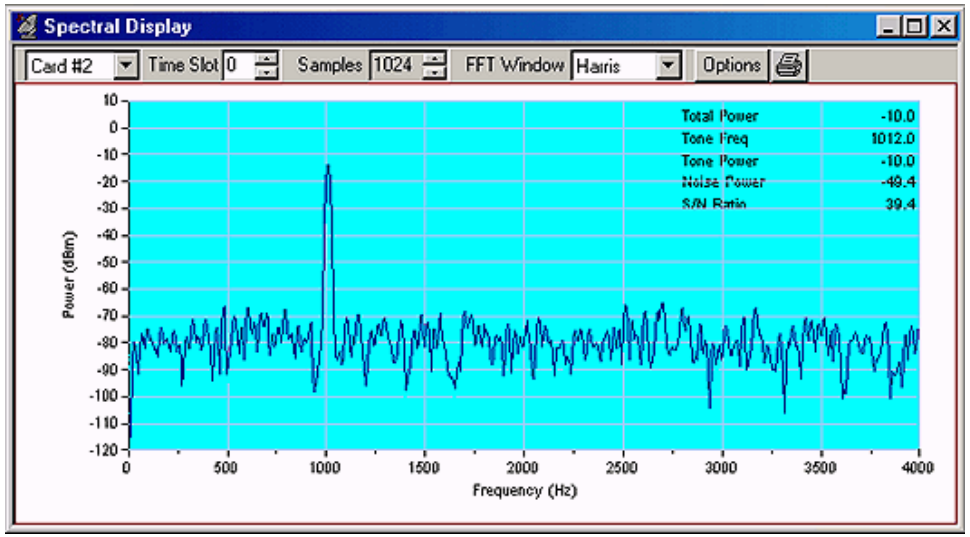
GL Communications

Oscilloscope and Spectral Display

Oscilloscope Display



Spectral Display



- Oscilloscope - Displays received data in real-time graphically as a function of time
- Spectral Display - Data received is displayed as a function of frequency

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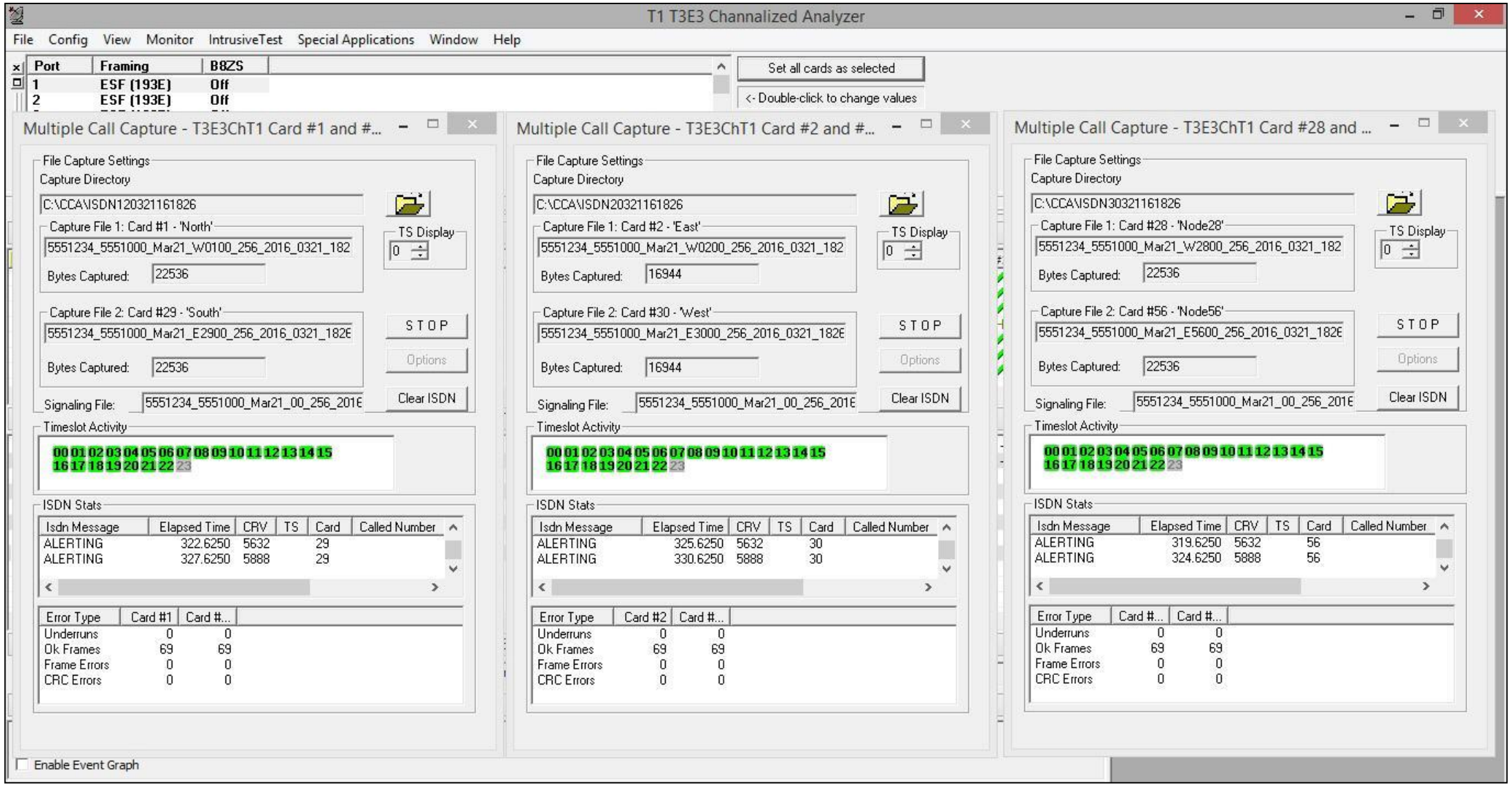
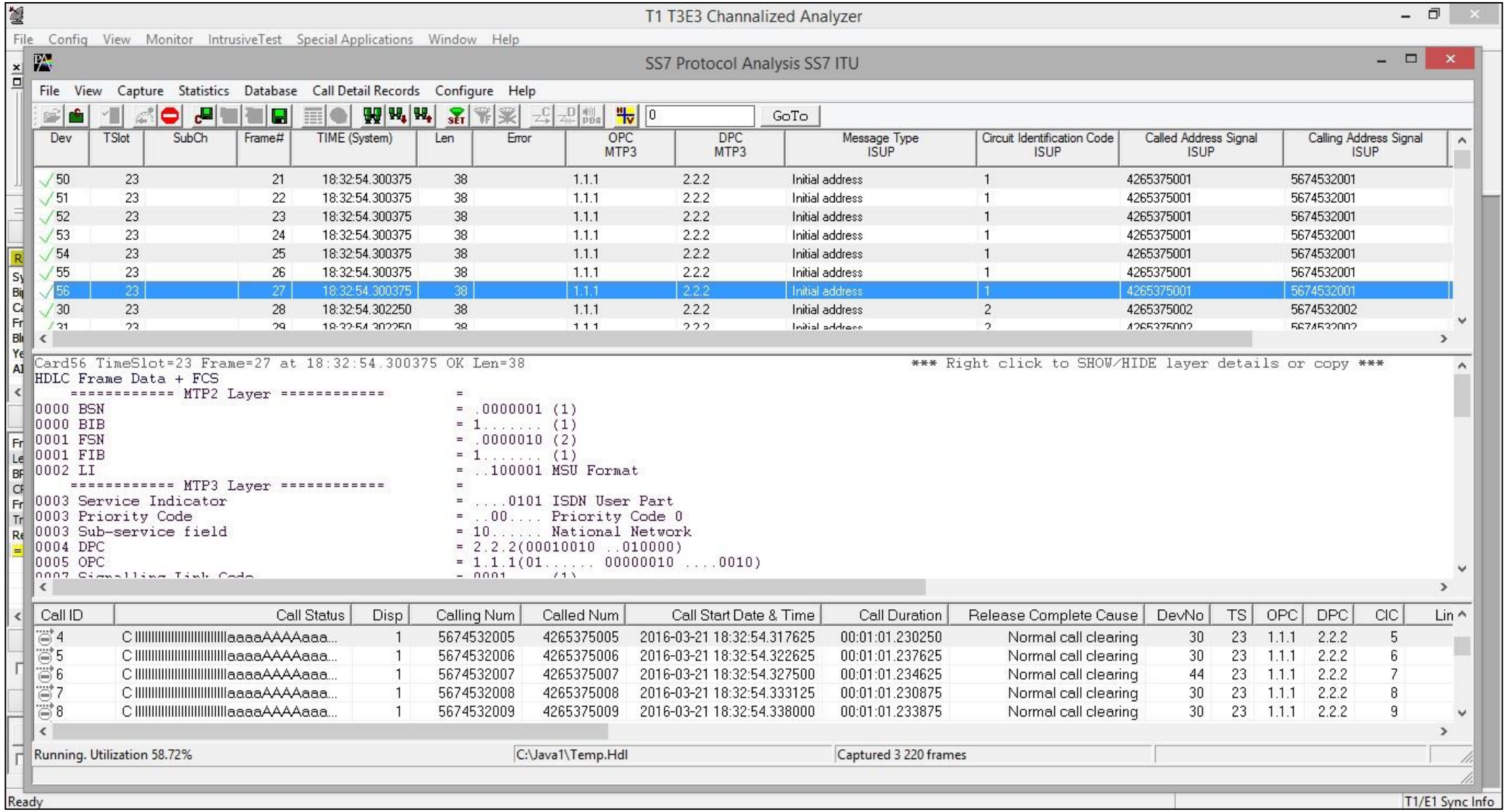
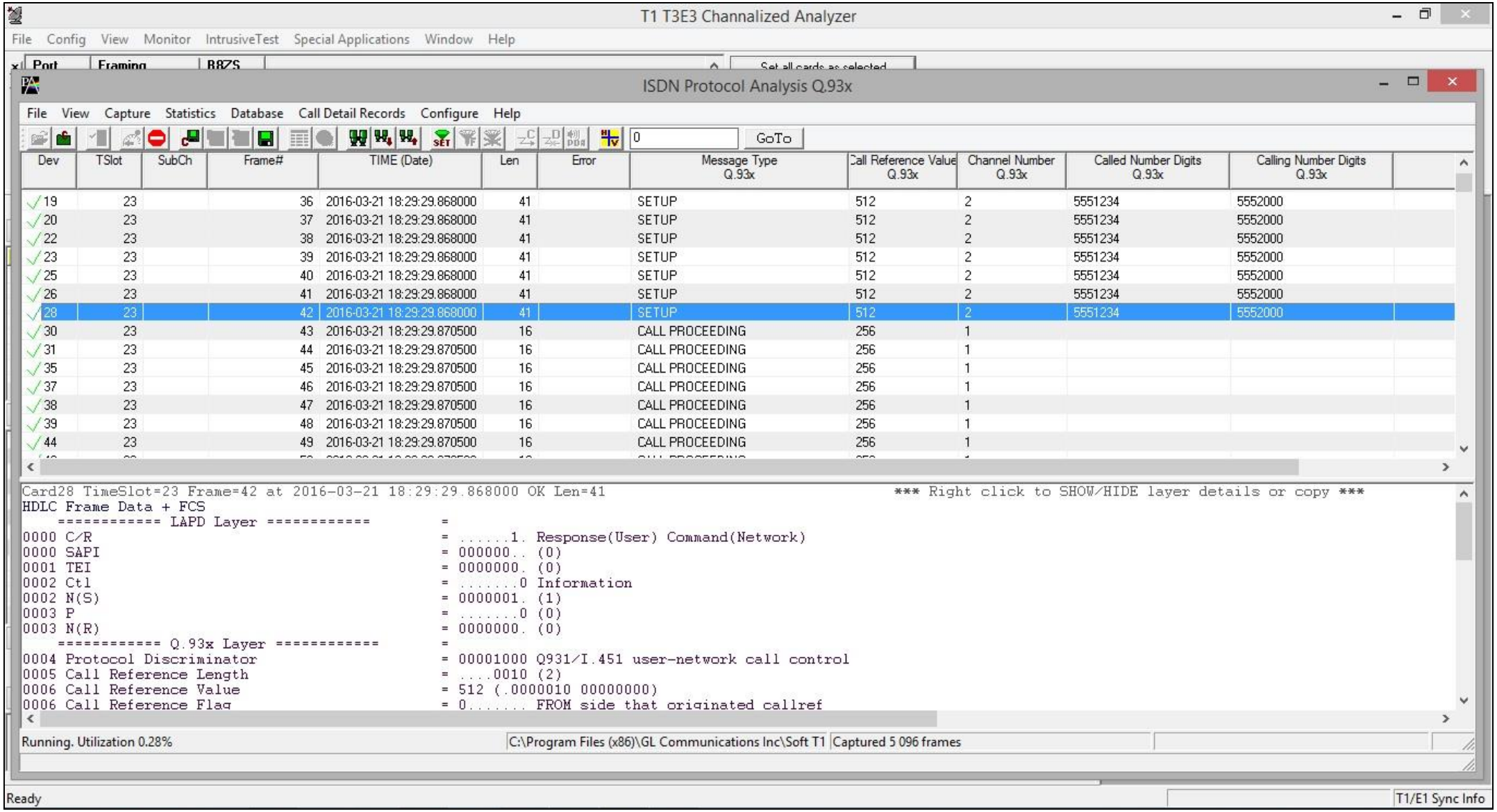
Call Capture and Analysis (CCA)



SS7 Analyzer



ISDN Analyzer



Thank you