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# USB Based T3 E3 Analysis and Emulation

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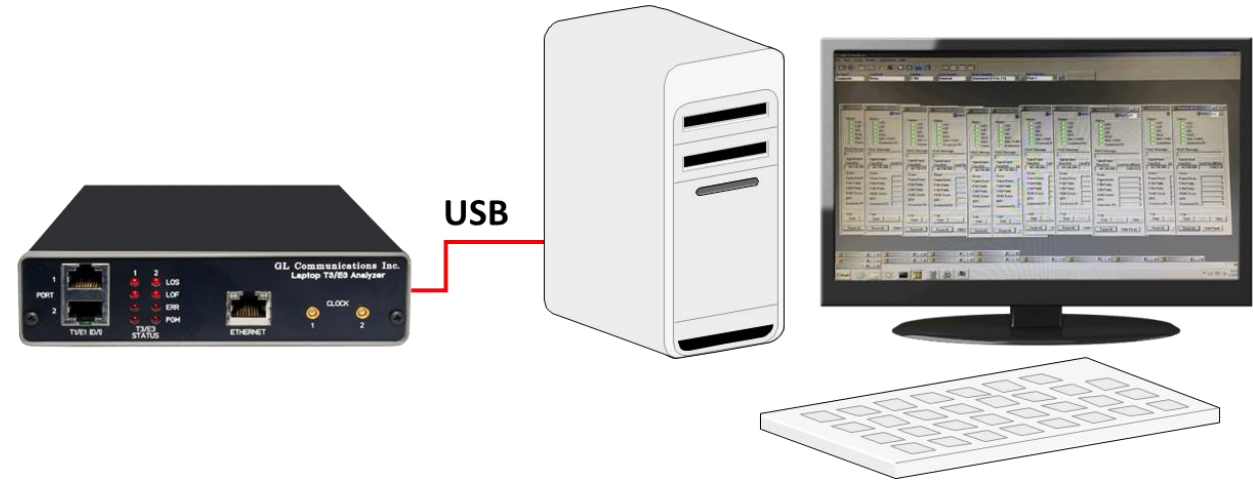
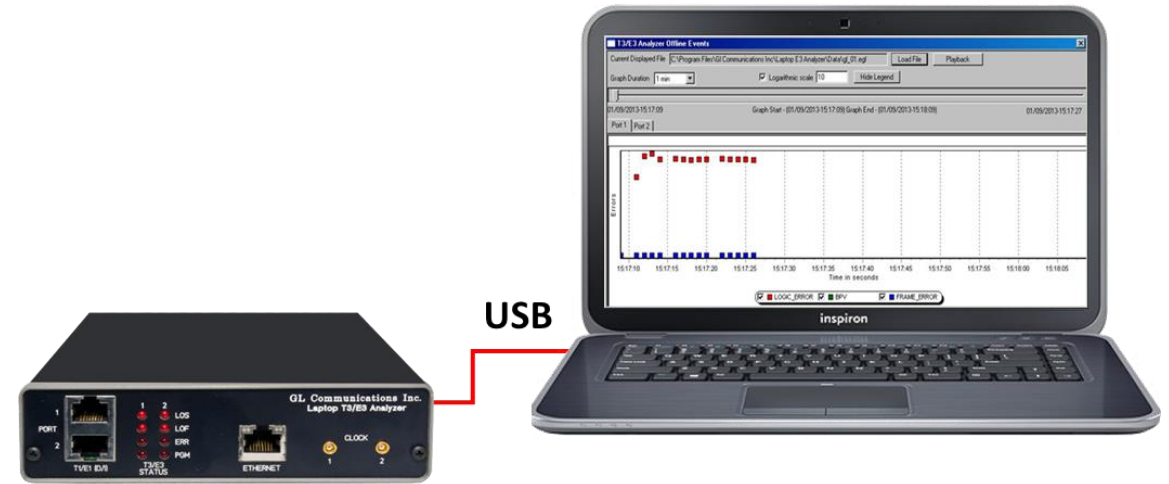
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# Index

- Overview
- Basic Applications
  - Loopback, Clock, Framing Formats
  - Structured/Unstructured Modes
  - Transmit and Receive Configuration
  - Monitor T3 E3 Lines
  - Alarm Generation and Error Injection
  - Tx Rx Memory Loopback
  - Monitor Received Data
  - Multiplex and De-multiplex T1 or E1 signals
  - Bit Error Rate Test (BERT)
- Optional Applications
- Record and Playback Software
  - Playback (Transmit from File)
  - Record (Capture to File)
- Protocol Analysis
  - HDLC, PPP, ATM, Frame Relay
- Protocol Emulation
  - HDLC, PPP
- Scripting and Automation

# USB Based T3 E3 Analyzer

- Lightest (1.75 pounds) unit available in the market
- Small footprint, easy to carry in the pouch of a Notebook PC - perfect for air travel
- Cost Effective
- Connects to a PC via a USB 2.0 port and Ethernet Port
- T3, E3, T1, E1, Ethernet interfaces supported
- Remote access for controlling and monitoring



# Front and Rear Views of the Analyzer

- Used for installation, test, and troubleshooting of T3 E3 T1 E1 Ethernet lines
- Dual data stream capture capability
- Dropping and inserting T1 or E1
- Full Ethernet analysis
- HDLC, ATM, FR, and PPP analysis
- Used with GL's portable T1 E1 analyzer for individual T1, E1 analysis



# Summary of Features and Benefits

- 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
- Simultaneously record/playback the entire T3 (DS3)/E3 in framed or unframed modes up to hard disk capacity
- Flexible clocking - internal, recovered (from T3 (DS3)/E3, T1 (DS1) or E1) and external

# Summary of Features and Benefits (Contd.)

- General T3 (DS3)/E3 signal testing capabilities
  - Alarms – monitoring and logging
  - Monitor T3 (DS3)/E3 frequency, line level and various errors
  - Alarm generation and error injection
  - Decode and simulate Far End Alarm Channel (FEAC) messages
  - T3 (DS3)/E3 error counters
  - Dual BERT and G.821 Analysis
- Scripting and automation through GL's Windows Client Server (WCS) approach
- Monitor / manage the analyzer remotely via Ethernet port (future enhancement)

# Summary of Features and Benefits (Contd.)

- Channelized (Structured) Testing
  - Multiplex/De-multiplex T1 (DS1)/E1 signals (Drop and Ins)
  - Receivers for bidirectional monitoring with Dual T1 (DS1)/E1 drop
  - Transmit multiplexed externally inserted or internally generated T1 E1 streams into T3 (DS3)/E3
  - Stress test M13 (E13) multiplexers and 3/1 Digital cross connect systems
  - Dual channel drop and insert of T1 or E1 signals from any one of the T3 (DS3)/E3 signals
  - Broadcast or loopback individual T1 or E1 within the T3 (DS3) /E3
  - Generates 28 T1s or (21 E1s) signals within the T3 (DS3) or 16 E1s within E3 output
- Unchannelized Testing
  - WAN Testing
  - Protocol testing for ATM, PPP, HDLC, and Frame Relay
  - Transmit / Verify HDLC frames with user defined headers

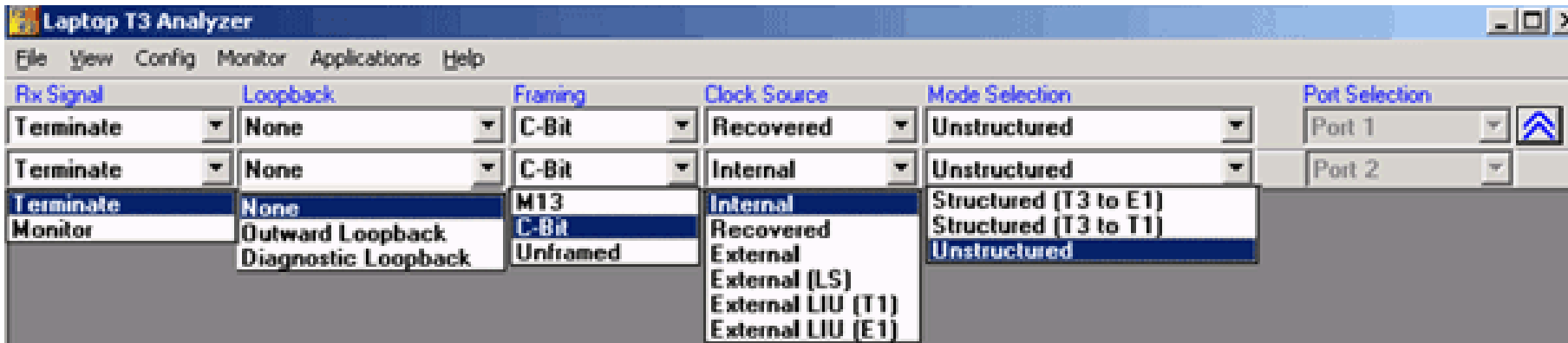
# Basic Applications

- Loopback Modes, Clock, Framing Formats, Structured/Unstructured Modes
- Transmit and Receive Configuration
- Monitor T3 E3 Lines
- Alarm Generation and Error Injection
- Tx Rx Memory Loopback
- Monitor Received Data
- Multiplex and De-multiplex T1 or E1 signals
- Bit Error Rate Test (BERT)

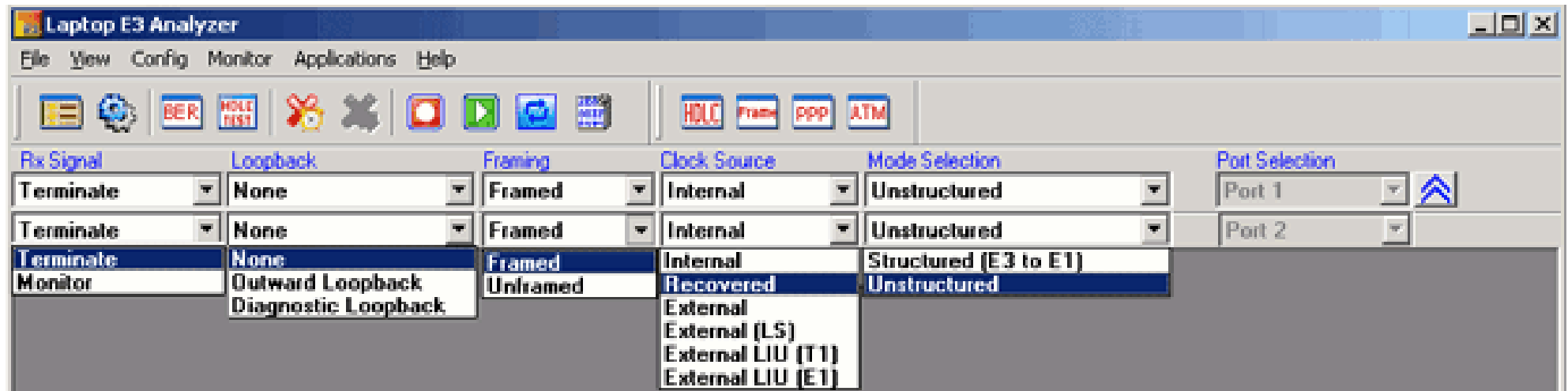


# Loopback Modes, Clock, Framing Formats, Structured/Unstructured Modes

## T3 Interface Configuration Parameters



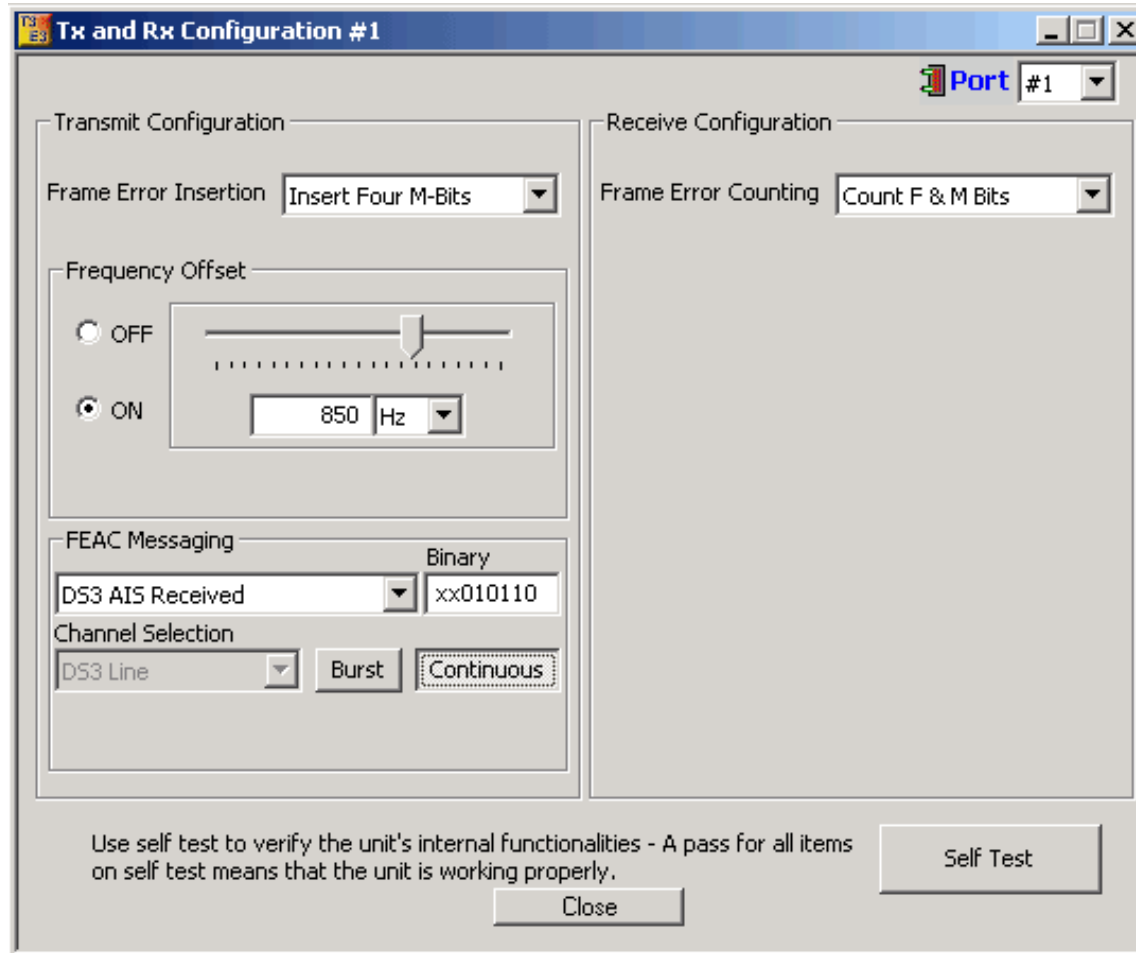
## E3 Interface Configuration Parameters



# Transmit and Receive Configurations

Tx/Rx parameters for the T3 signal

Tx/Rx parameters for the E3 signal



**Tx and Rx Configuration #1** Port #1

**Transmit Configuration**

Frame Error Insertion: Insert Four M-Bits

Frequency Offset:

OFF

ON 850 Hz

**Receive Configuration**

Frame Error Counting: Count F & M Bits

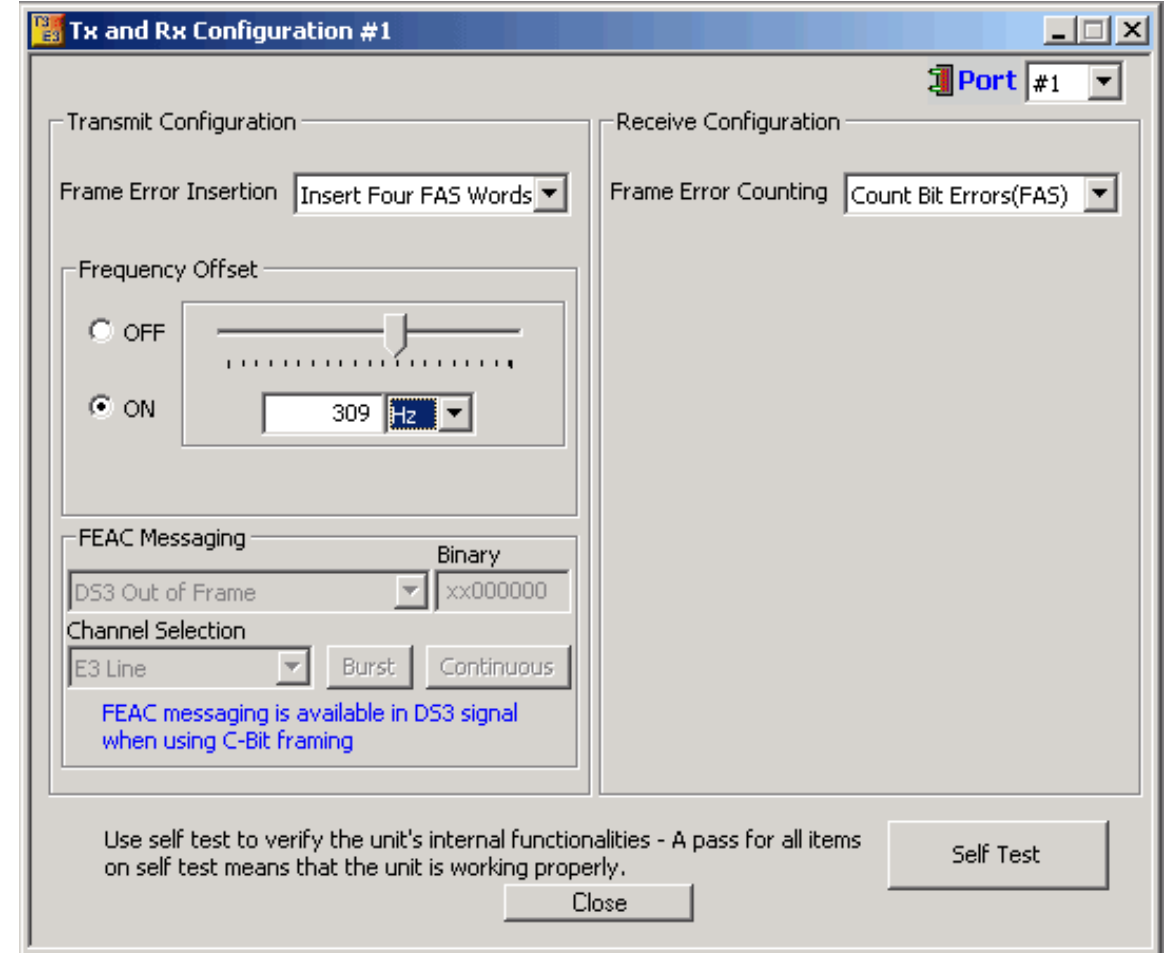
**FEAC Messaging** Binary

DS3 AIS Received: xx010110

Channel Selection: DS3 Line Burst Continuous

Use self test to verify the unit's internal functionalities - A pass for all items on self test means that the unit is working properly.

Self Test Close



**Tx and Rx Configuration #1** Port #1

**Transmit Configuration**

Frame Error Insertion: Insert Four FAS Words

Frequency Offset:

OFF

ON 309 Hz

**Receive Configuration**

Frame Error Counting: Count Bit Errors(FAS)

**FEAC Messaging** Binary

DS3 Out of Frame: xx000000

Channel Selection: E3 Line Burst Continuous

FEAC messaging is available in DS3 signal when using C-Bit framing

Use self test to verify the unit's internal functionalities - A pass for all items on self test means that the unit is working properly.

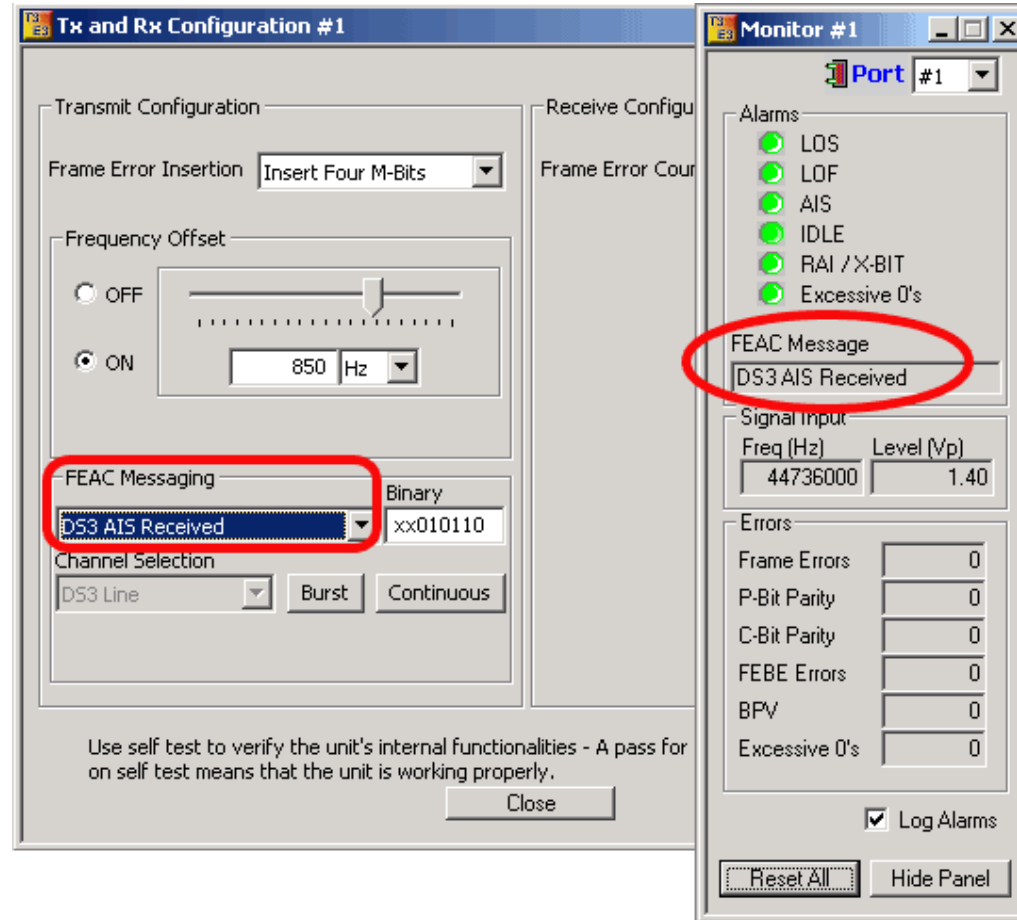
Self Test Close

# Transmit and Receive Configurations (Contd.)

- Possible frame error insertions in T3
  - Single FAS word (1111)
  - Single FAS word (0000)
  - Four FAS words (1100)
  - Four FAS words (0011)
- Possible frame error insertions in T3
  - Single F Bits
  - Single M Bits
  - Four F Bits
  - Four M Bits
- Frequency Offset ranging from +50 to -50 ppm for the internal clock source
- Standard and User-defined FEAC Message transmission (only for T3 Systems with C-Bit Parity Framing Format)
- Frame Error Counting
  - E3 - Bit Errors (FAS), Word Errors (FAS)
  - T3 - F and M Bits , F Bits , M Bits
- Self Test the unit

# Transmit and Receive Configurations (Contd.)

FEAC Message (only for T3 Systems with C-Bit Parity Farming Format)



- Using the FEAC channel, alarm or status information from the far-end terminal can be sent back to the near-end terminal. The Monitor T3 Line indicates the incoming FEAC message

# Alarm and Error Display for T3 (DS3) and E3

The image displays two software windows, 'Monitor #2' and 'Monitor #1', showing alarm and error status for T3 (DS3) and E3 ports. Both windows have a 'Port' dropdown menu and a 'Log Alarms' checkbox. The 'FEAC Message' field is empty in both. The 'Signal Input' section shows frequency and level values. The 'Errors' section shows counts for various error types.

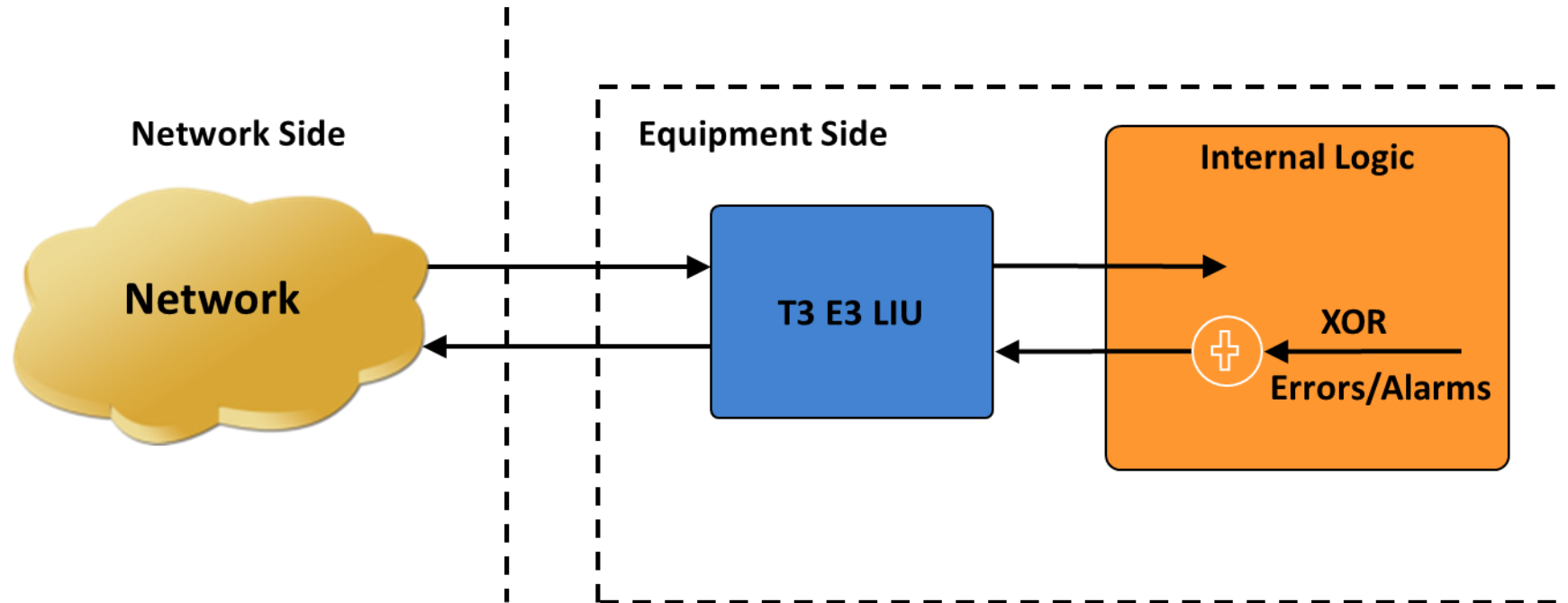
Port	Alarms	FEAC Message	Signal Input (Freq (Hz) / Level (Vp))	Errors	Log Alarms
#2	LOS (Green) LOF (Yellow) AIS (Green) IDLE (Yellow) RAI / X-BIT (Green) Excessive 0's (Green)	---	44736000 / 1.22	Frame Errors: 5 P-Bit Parity: 2 C-Bit Parity: 0 FEBE Errors: 1 BPV: 2 Excessive 0's: 0	<input type="checkbox"/>
#1	LOS (Green) LOF (Green) AIS (Green) RAI / X-BIT (Green) Excessive 0's (Green)	---	34368000 / 1.69	Frame Errors: 0 CV: 0 Excessive 0's: 0	<input checked="" type="checkbox"/>

# Alarm and Error Display for T3 (DS3) and E3 (Contd.)

- **Available alarms are –**
  - LOS - (Loss of Signal)
  - LOF - (Loss of Frames)
  - AIS - (Alarm Indication Signal)
  - Idle
  - RAI/X-Bit
  - Excessive 0's
- **Error Indications**
  - Frame
  - P- Bit parity
  - C-Bit parity
  - FEBE
  - BPV
  - CV
  - Excessive zeros

# Alarm Generation and Error Insertion

Logical diagram for alarm generation application



- Internally generates various types of errors and / or alarms and transmits them on the outgoing T3(DS3)/E3 stream
- Automatically inserts single bit errors or at regular intervals of time (secs)

# Alarm Generation and Error Insertion (Contd.)

Alarm and Error Generation Options for T3 (DS3) and E3 Analyzer

Alarm And Error Generation #1

Port #1

E3 Errors

	Single	Cont.
Frame Errors	1	<input checked="" type="checkbox"/>
CV	1	<input checked="" type="checkbox"/>
Excessive 0's	1	<input checked="" type="checkbox"/>

E3 Alarms

- LOS
- AIS
- RAI / X-BIT

Error Rate

10<sup>-3</sup>

User Defined Rate

1.00E-002

Close

Alarm And Error Generation #1

Port #1

T3 Errors

	Single	Cont.
Frame Errors	1	<input type="checkbox"/>
P-Bit Parity	1	<input checked="" type="checkbox"/>
C-Bit Parity	1	<input type="checkbox"/>
FEBE Errors	1	<input type="checkbox"/>
BPV	1	<input type="checkbox"/>
Excessive 0's	1	<input type="checkbox"/>

T3 Alarms

- LOS
- LOF
- AIS
- IDLE
- RAI / X-BIT
- Excessive 0's

Error Rate

10<sup>-3</sup>

User Defined Rate

1.00E-002

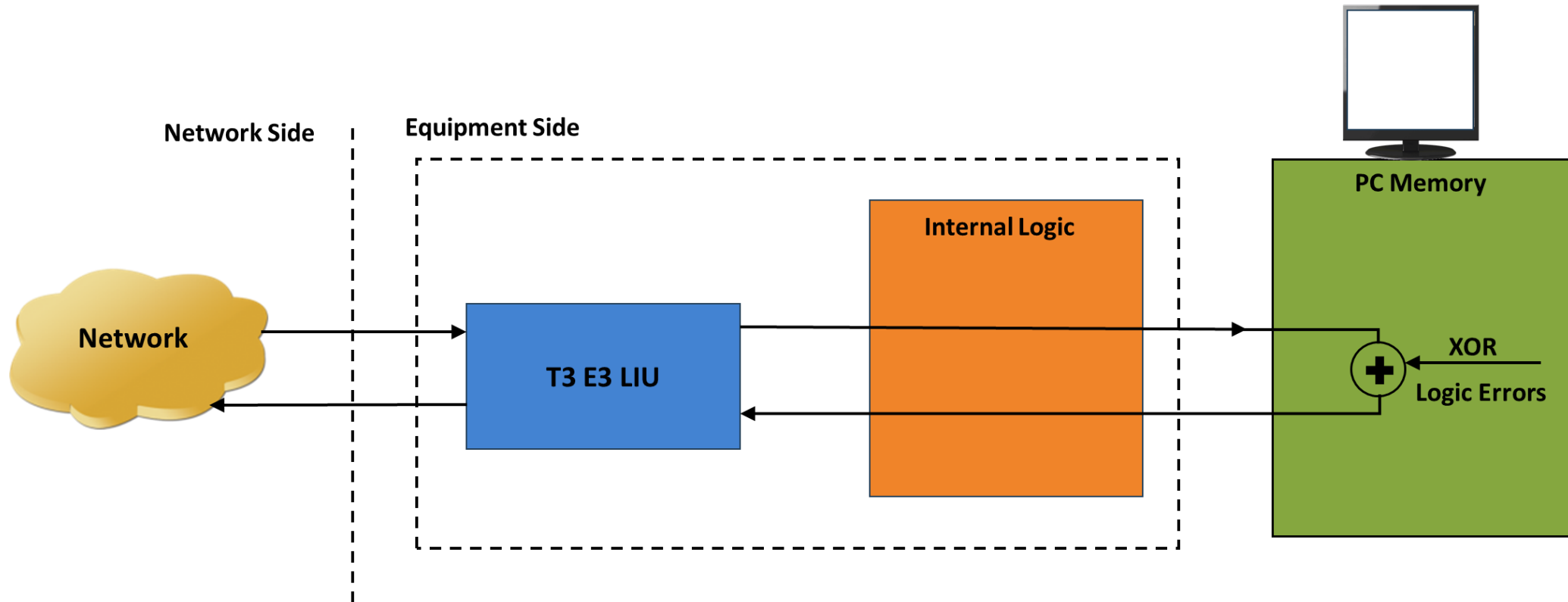
Close

- Alarms - LOS (Loss of Signal), LOF (Loss of Frames), AIS (Alarm Indication Signal), Idle, RAI/X-Bit, Remote Alarm Indication (RAI)
- Errors – Frame, P-Bit Error (T3 Only), C-Bit Error (T3 Only), FEBE Error (Far End Block Errors) (T3 Only), BPV - BiPolar Violation (T3 Only), Excessive 0's, CV Errors (E3 Only)



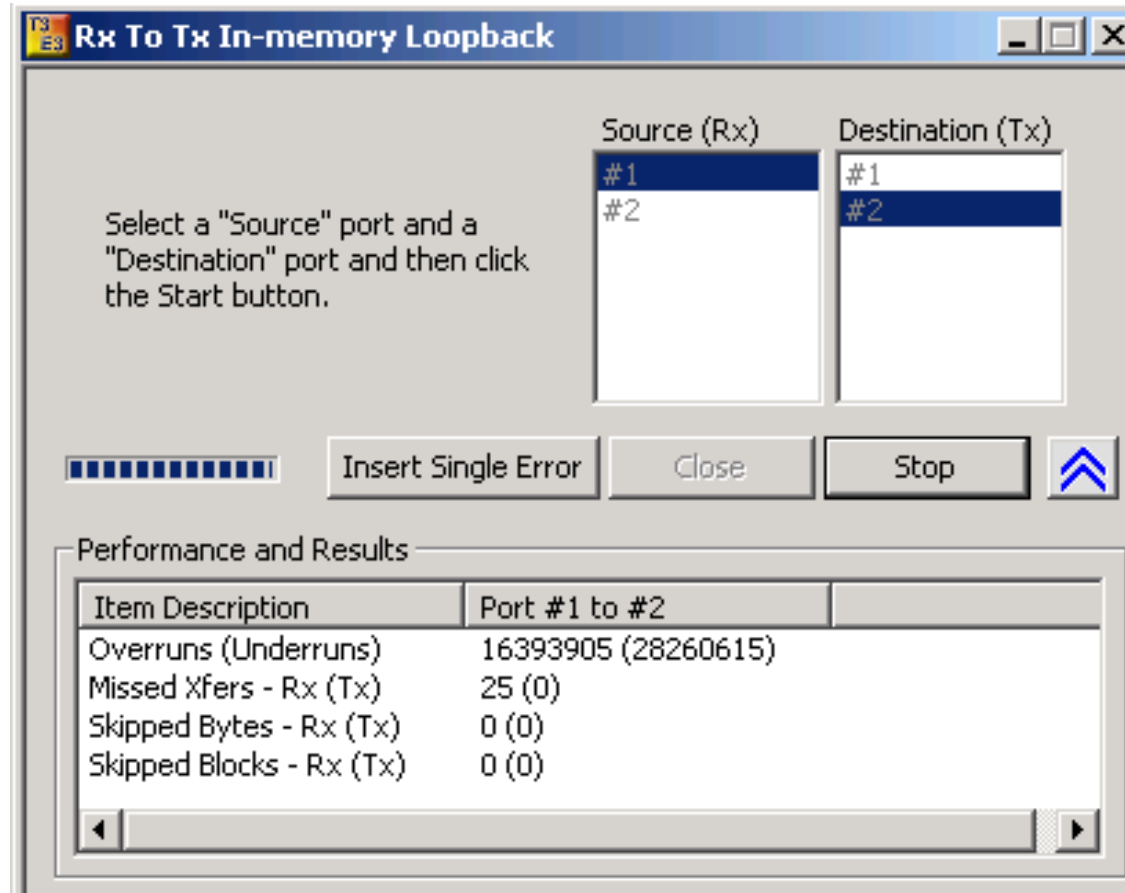
# Tx Rx Memory Loopback

Logical Diagram for Transmit and Receive Memory Loopback for T3 (DS3)/E3 Analyzers



- With the loopback, the data received from the network is retransmitted back via the PC memory
- Optionally logic errors (XOR) can be inserted into the loopback stream during loopback
- Allows insertion of single bit errors manually

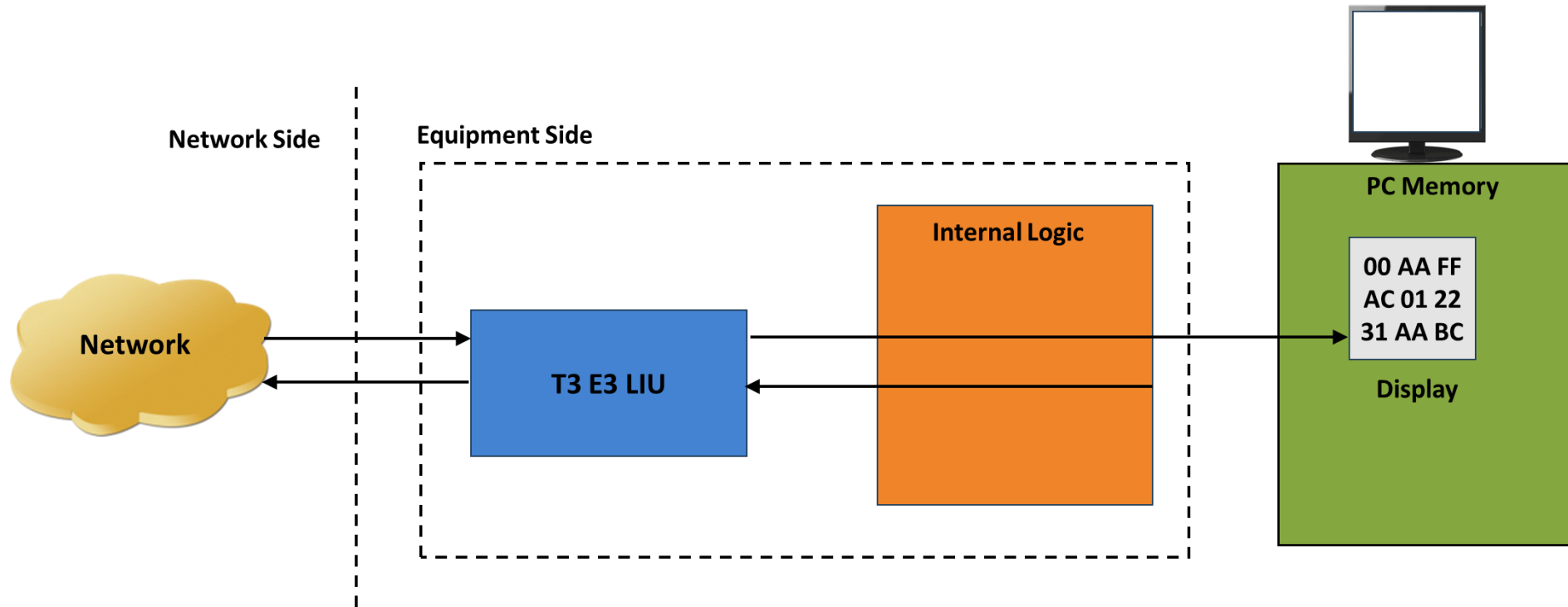
# Tx Rx Memory Loopback (Contd.)



- Used for diagnostic purposes
- Memory Loopback and Bit Error Rate Test applications can be run on two different ports simultaneously to verify the operation of the analyzer unit

# Monitor Received Data

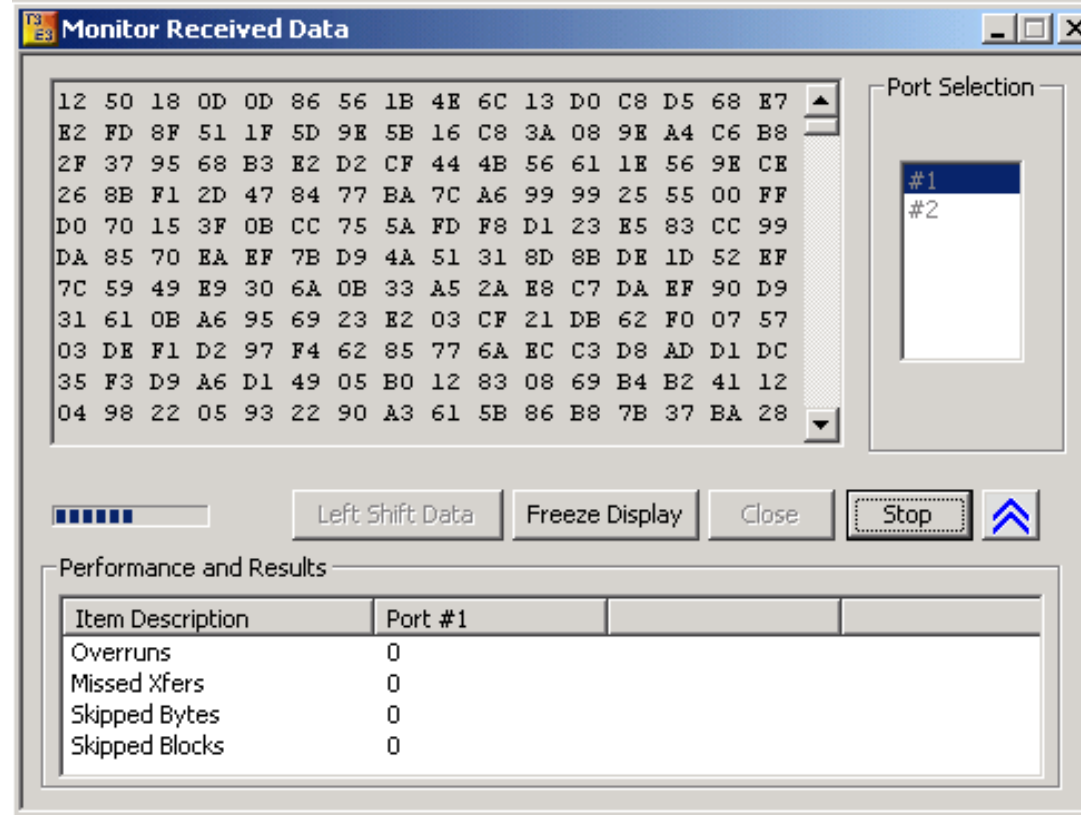
Logical diagram for the Monitor Received Data application



- This application can monitor raw bit values on the selected ports. The raw bytes received from the network at the T3 interface are monitored and displayed on the selected ports

# Monitor Received Data (Contd.)

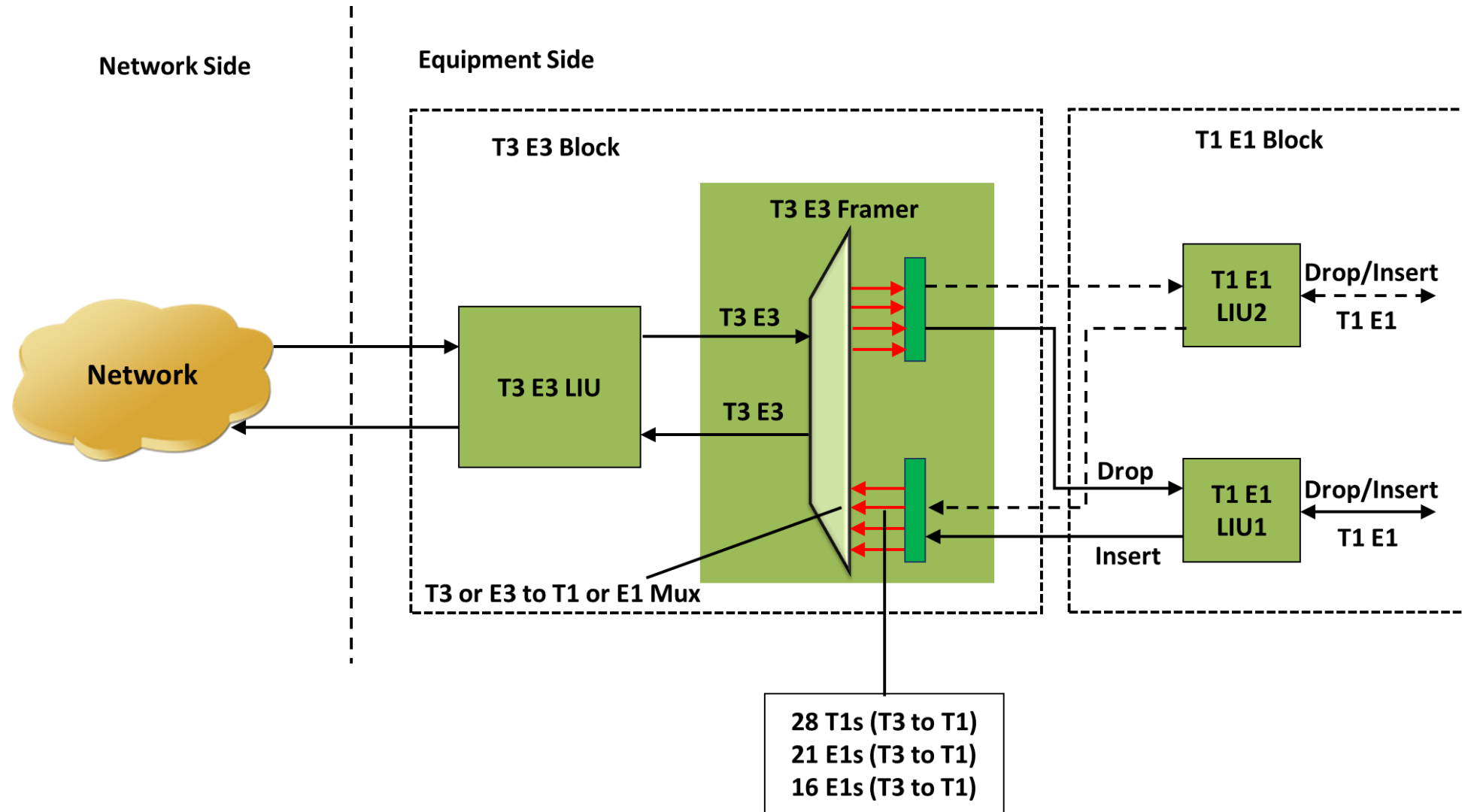
User Interface for the Monitor Received Data Application



- Can be used for quickly testing the byte alignment of the received data
- Underruns, MissedXfer, Skipped Bytes, and Skipped Blocks display provides the receive data pipe performance

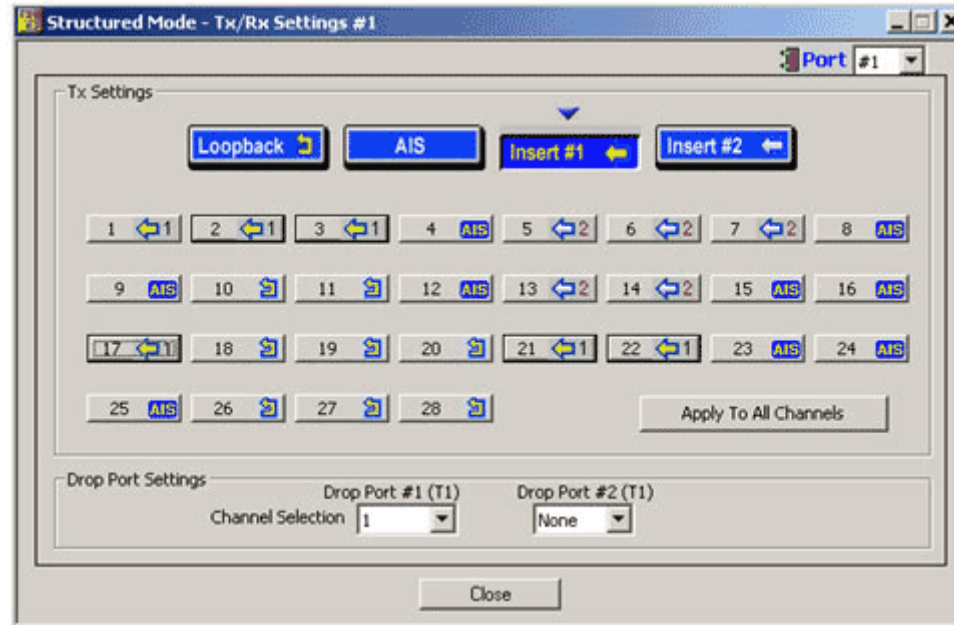
# Multiplex and De-multiplex T1 or E1 signals

Logical Diagram for Drop and Insert Structured Mode



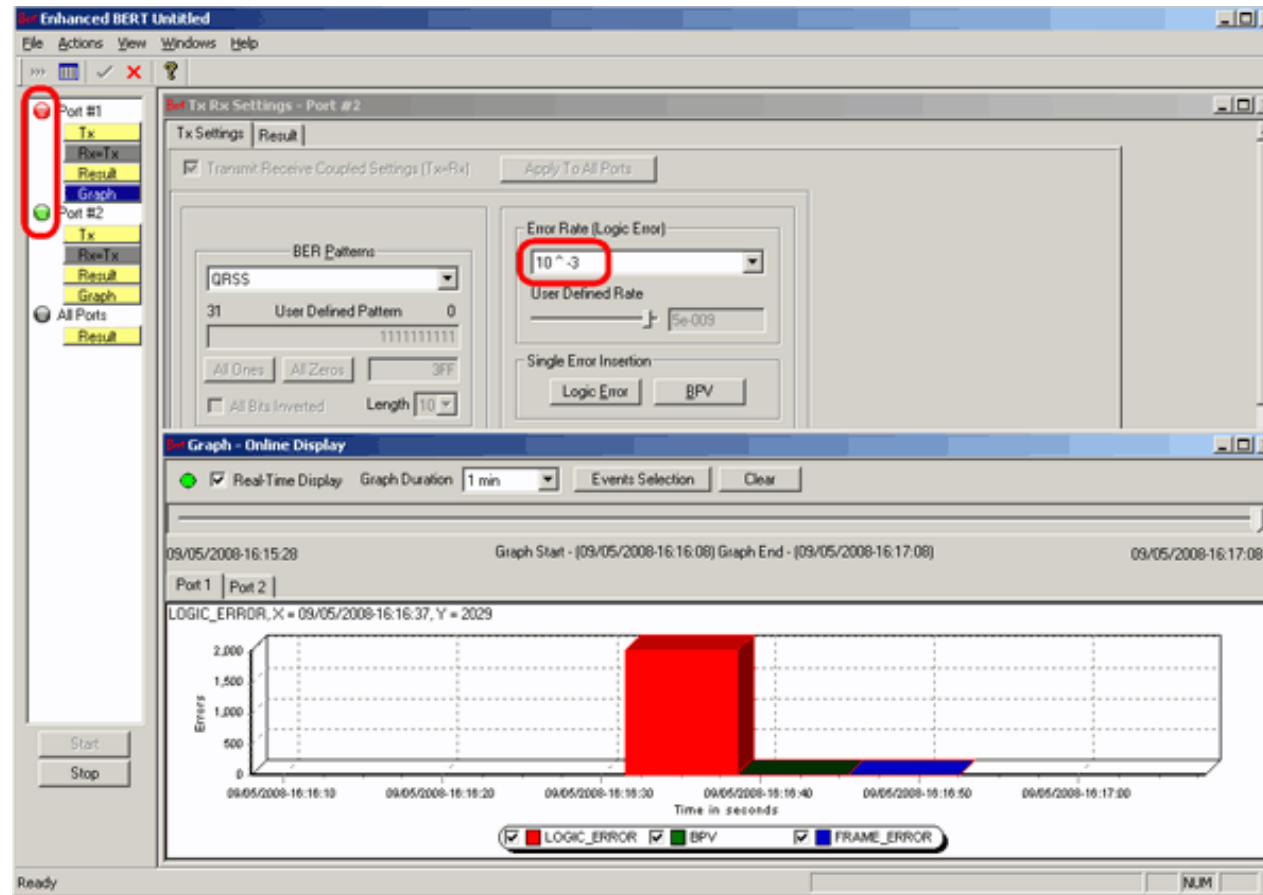
# Multiplex and De-multiplex T1 or E1 signals (Contd.)

User interface for the Structured Mode (Drop / Insert) Settings



- Up to two user selected T1 (or E1) channels can be externally inserted using the T1 or 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 or E1 transmit channels or broadcasted through all the T1 or E1 channels
- Up to two user selected T1 or E1 channels can be dropped

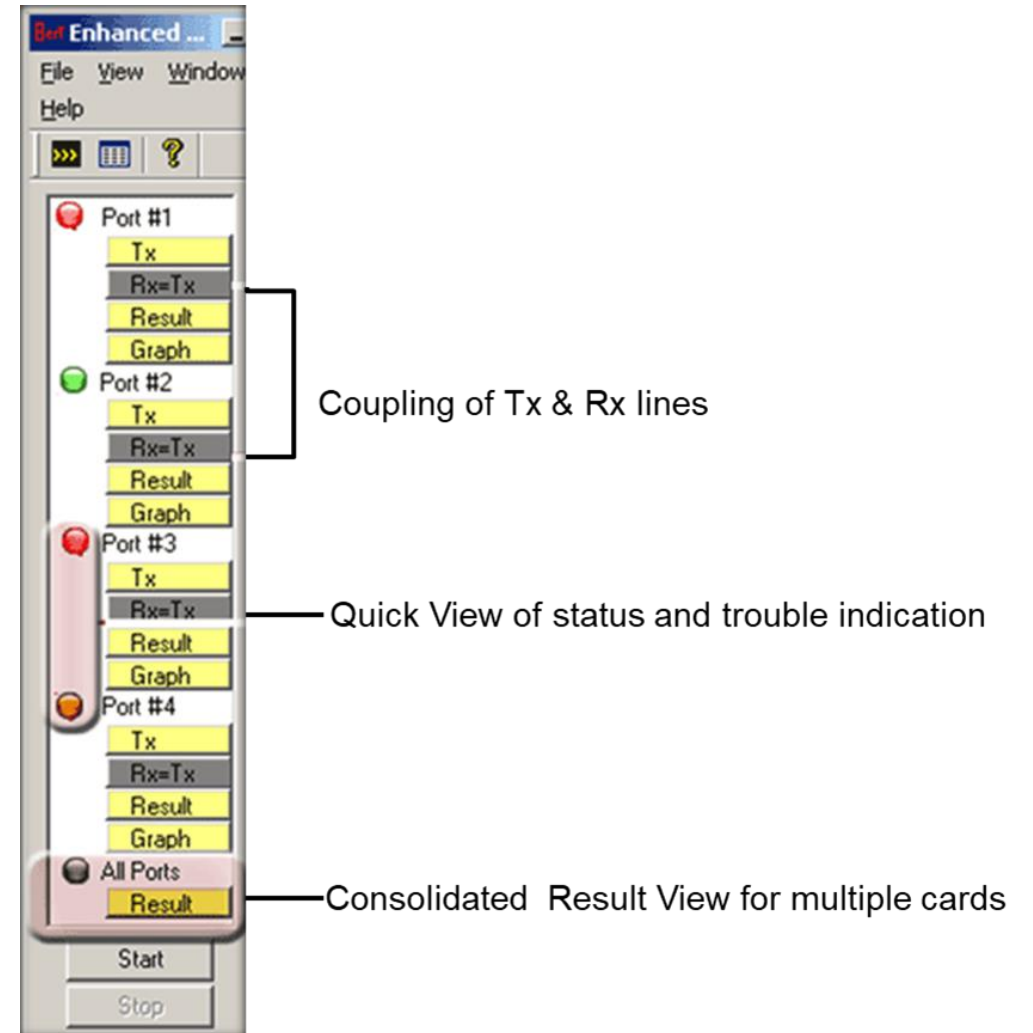
# Bit Error Rate Test - BERT (Full Frame and Unframed)



- GL's T3 E3 Bit Error Rate Tester application measures the correctness of data received on T3 E3 channels for a repetitive fixed or pseudorandom pattern for the given transmission

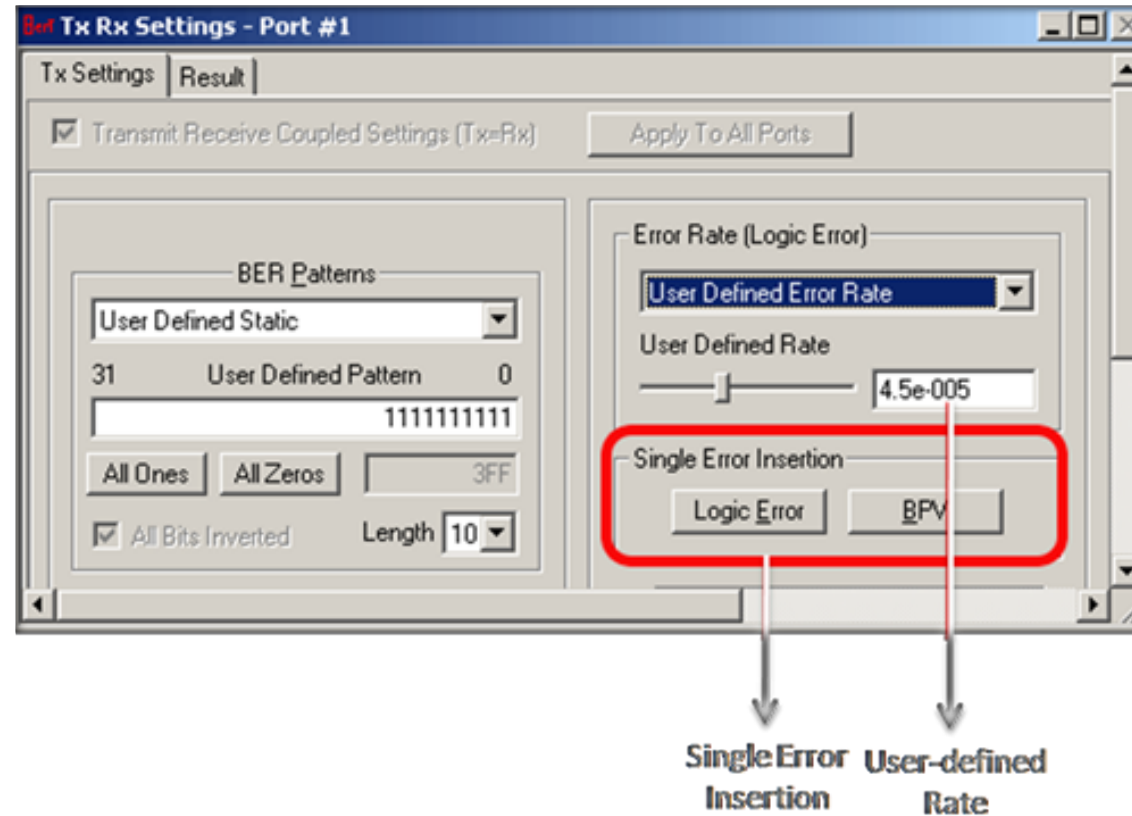
# Selection of Port – View Error Status, Results

- Quick view of the status and trouble indication
- Supports testing on multiple ports simultaneously with consolidated result view
- Tx and Rx settings for multiple ports can be independently controlled or they can be coupled (Apply to All) from a single card to all cards





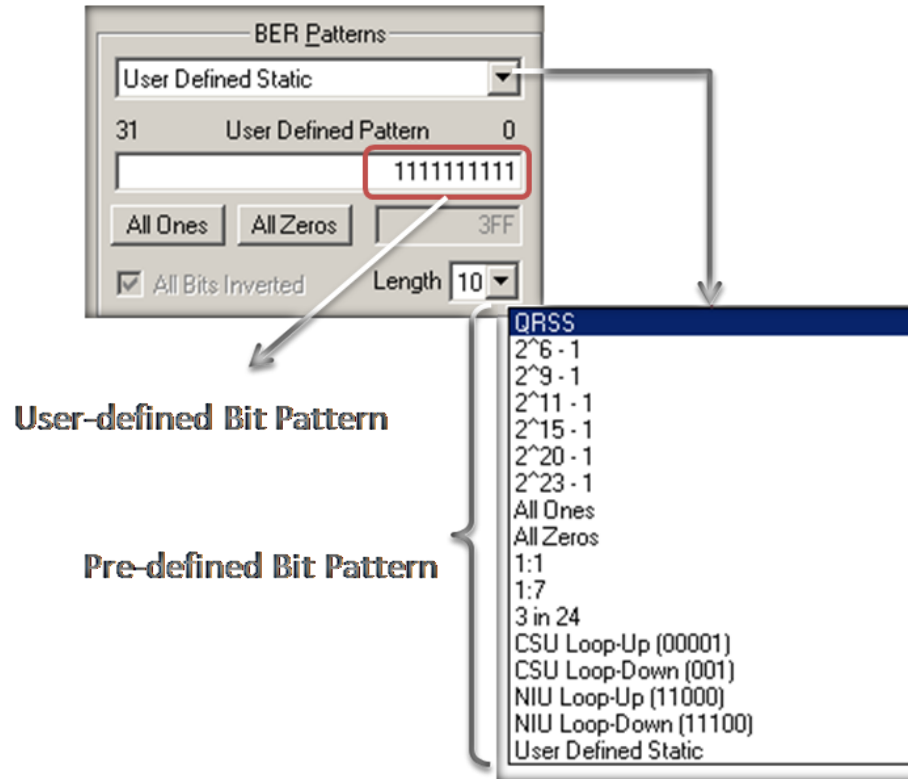
# Error and Bit Patterns Insertion



Single Error Insertion    User-defined Rate

- Supports predefined and user defined error insertion rate ranging from  $10^{-2}$  to  $10^{-9}$  (0.01 to 1e-009)
- Automatic insertion of Logic and BPV errors at regular intervals of time (secs) or just insert single bit errors into the transmit stream

# Static and User-Defined Pattern Selection

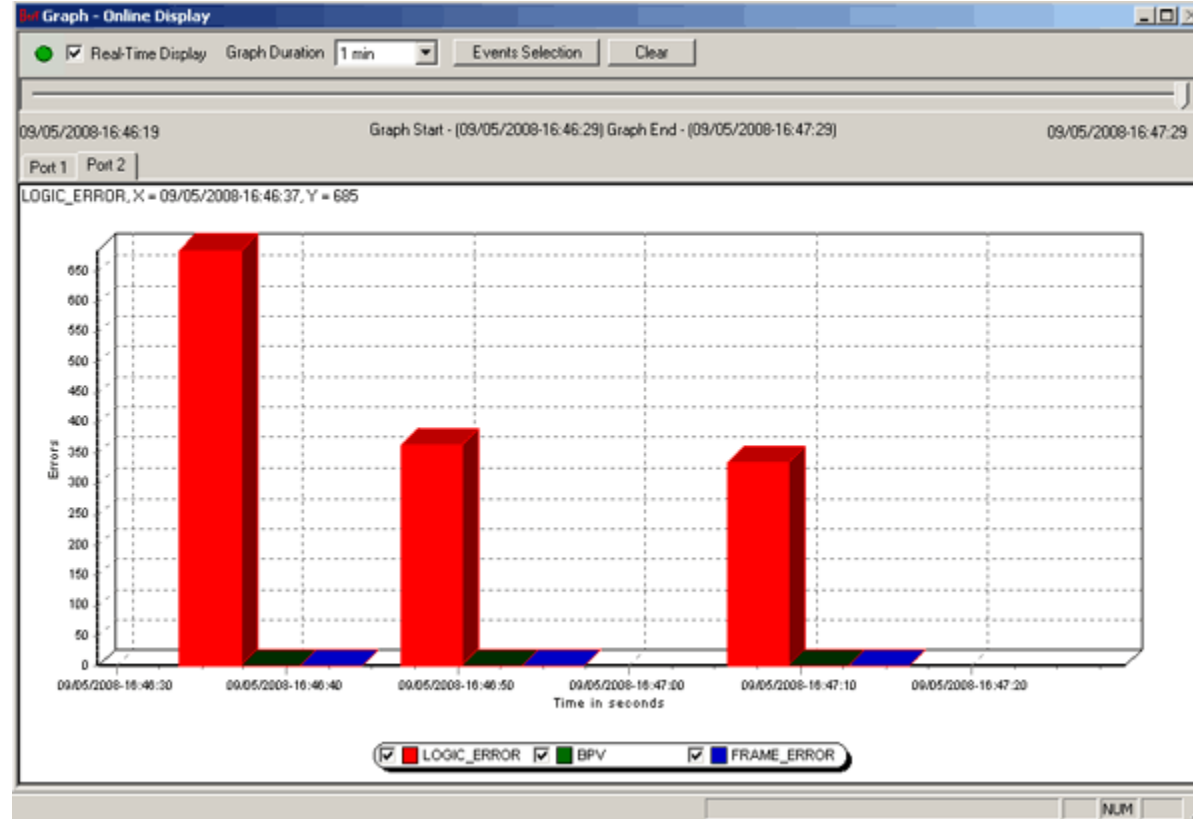


User-defined Bit Pattern

Pre-defined Bit Pattern

- Generates standard static bit patterns such as - QRSS,  $2^5-1$ , All ones, All zeros, 1:1, CSU Loop-Up (0001), CSU Loop-down (001), NIU Loop-UP (11000), NIU Loop-Down (11100), and more
- Generates user-defined static patterns of size up to 32 bits

# Graphical Result



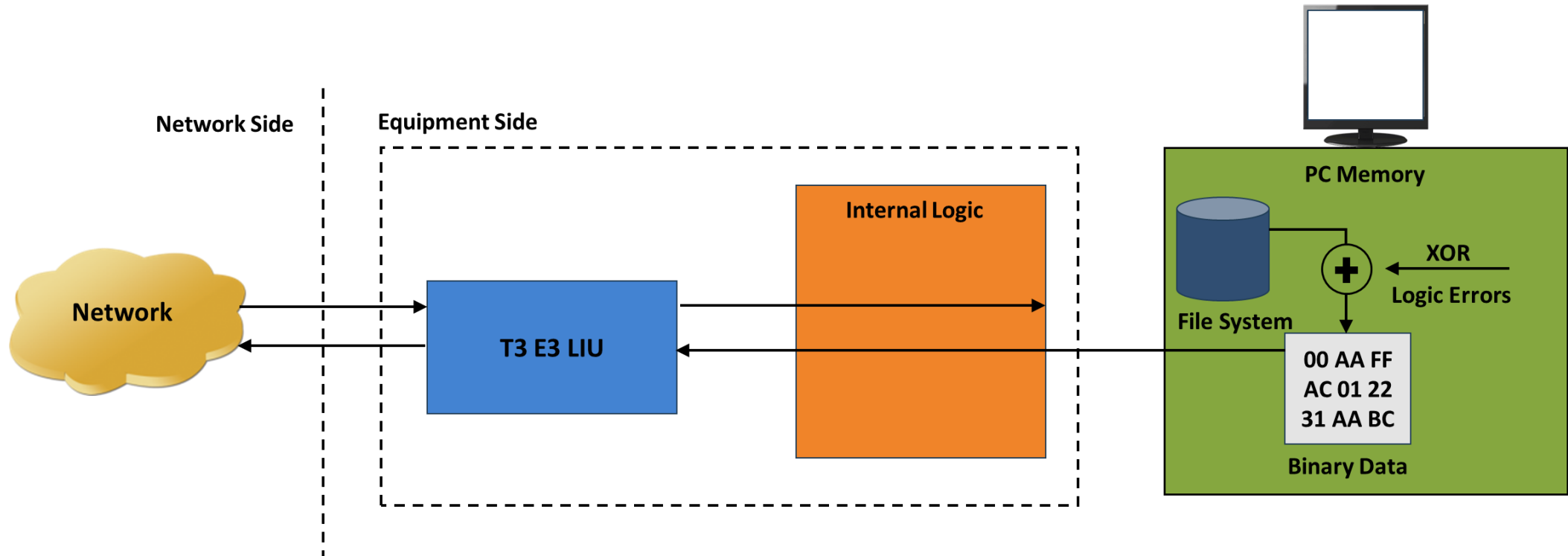
- The Error Count Vs Time graph of the bit error test results is displayed
- For real-time graph, the predefined or the user defined bit pattern and the errors can be inserted
- Offline graph display the saved (\*.xml) files are loaded for analysis
- Any of the events such as LOGIC\_ERROR, BPV, or FRAME\_ERROR can be set for the display

# Optional Applications

- Record and Playback Software
  - Playback (Transmit from File)
  - Record (Capture to File)
- Protocol Analysis
  - HDLC, PPP, ATM, Frame Relay
- Protocol Emulation
  - HDLC, PPP
- Scripting and Automation

# Playback (Transmit from File)

Logical diagram for transmit from file (playback) application



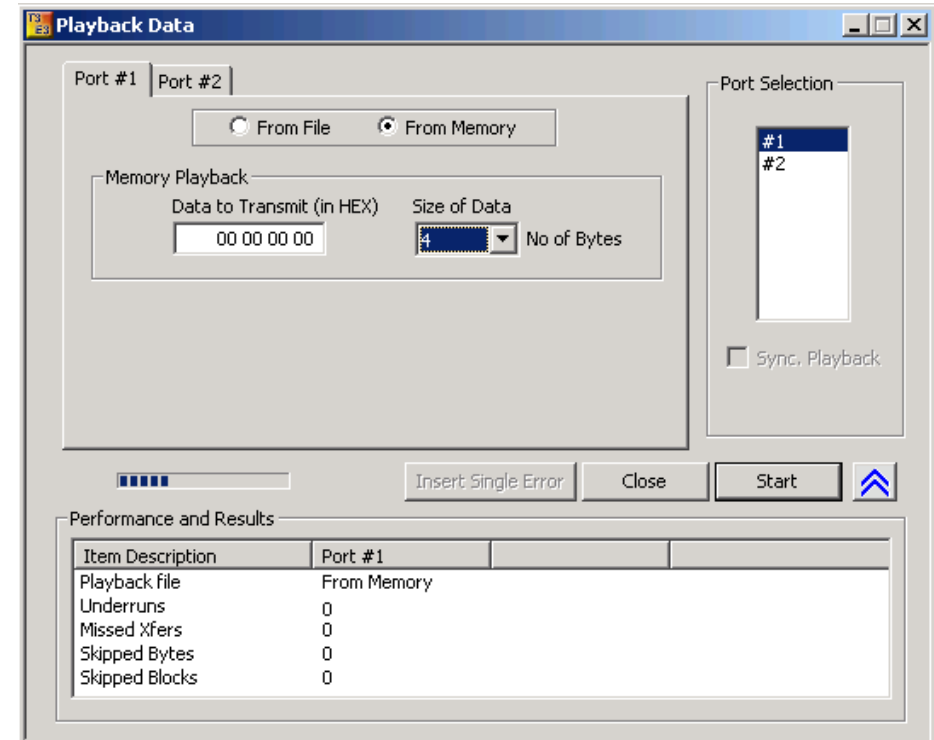
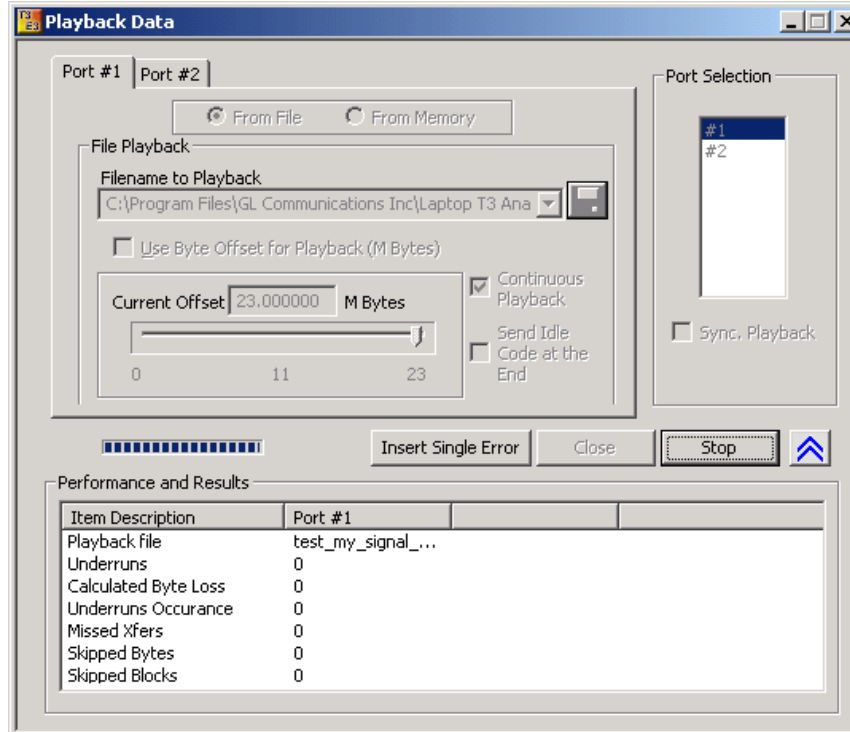
- The transmit file application permits transmission of a file of any length or transmission of data from memory in hex format

# Playback (Transmit from File) (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

# Playback (Transmit from File) (Contd.)

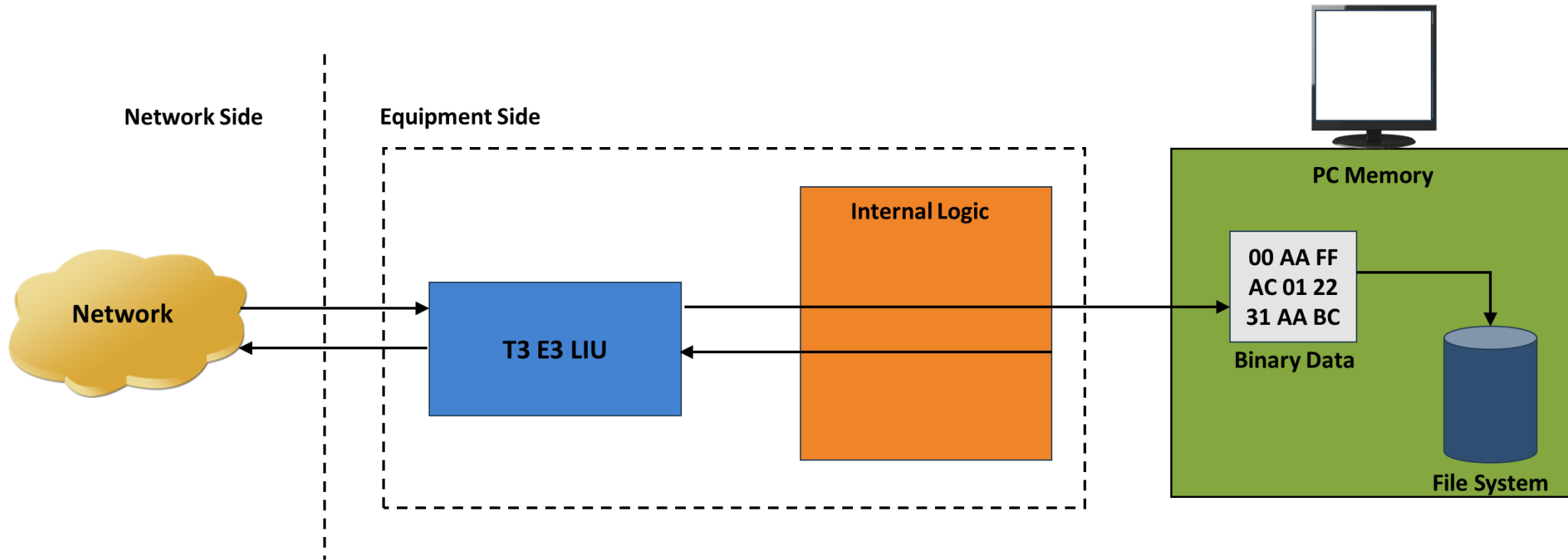
User Interface for transmit from file/memory (playback) application



- 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

# Record (Capture to File)

Logical diagram for capture (record) application



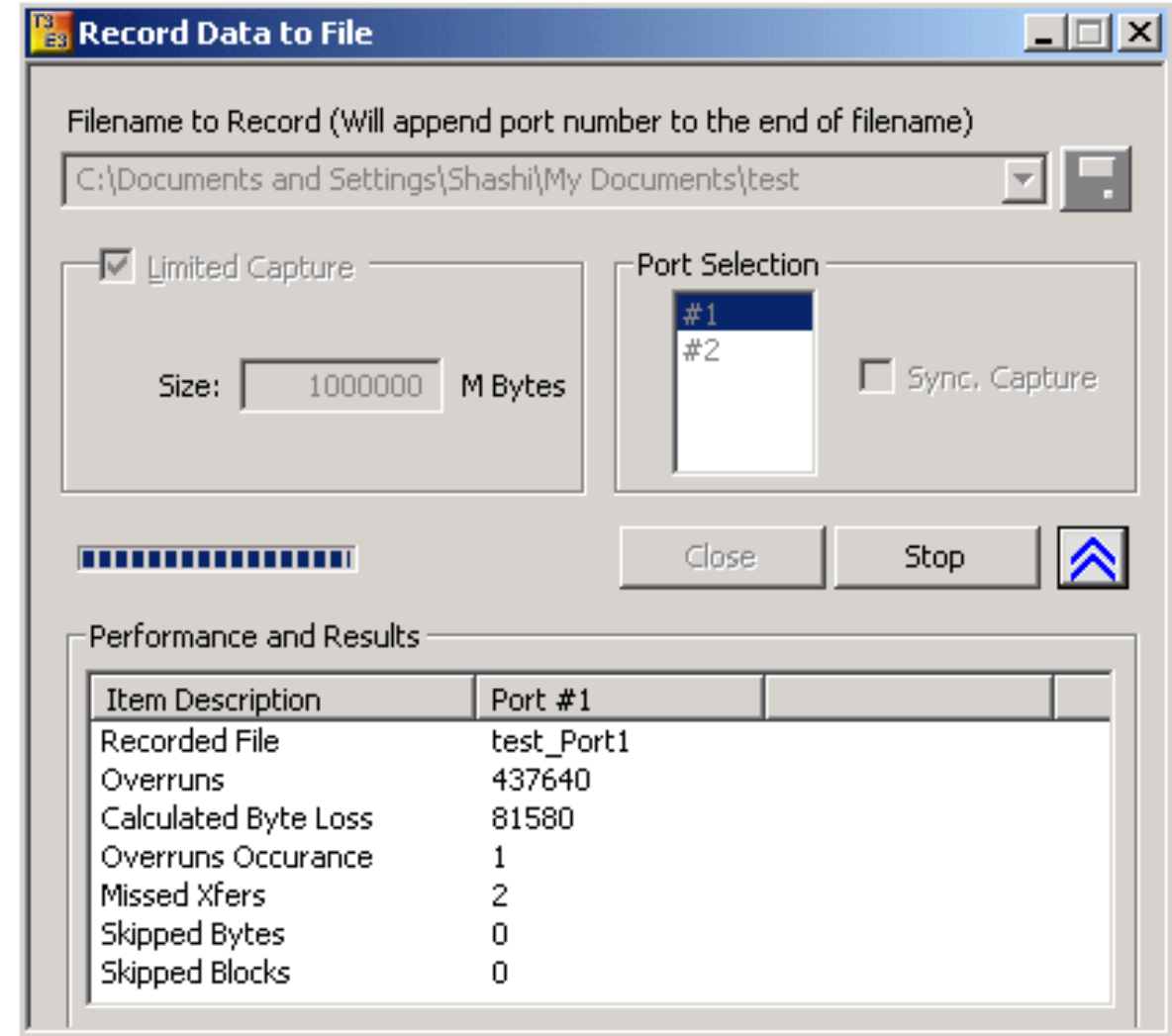
- Permits continuous or limited capture of data on the T3 or E3 lines
- Save the captured data in binary file format
- Supports synchronized capture for multiple cards



# Record (Capture to File) (Contd.)

User Interface for capture (record) application

- 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)



# HDLC Protocol Analysis

The screenshot displays the HDLC Protocol Analysis LAPD software interface. The main window shows a table of captured frames with the following columns: Dev, TS..., Su..., Frame#, TIME (Relative), Len, Error, C/R, SAPI, TEI, CTL, P/F, and N(S). The third frame (Frame# 3) is selected, showing a relative time of 00:00:27.031875 and a length of 38 bytes. Below the table, the details for this frame are shown, including the HDLC Frame Data + FCS and the LAPD Layer parameters.

Dev	TS...	Su...	Frame#	TIME (Relative)	Len	Error	C/R	SAPI	TEI	CTL	P/F	N(S)
✓ 2	23		0	00:00:00.000000	6		Co...	0	0	Super...	1	
✓ 2	23		1	00:00:09.980000	6		Co...	0	0	Super...	1	
✓ 2	23		2	00:00:19.960000	6		Co...	0	0	Super...	1	
✓ 2	23		3	00:00:27.031875	38		Co...	0	0	Inform...	0	24
✓ 2	23		4	00:00:27.037125	38		Co...	0	0	Inform...	0	25
✓ 2	23		5	00:00:27.043500	38		Co...	0	0	Inform...	0	26
✓ 2	23		6	00:00:27.048875	38		Co...	0	0	Inform...	0	27

Card2 TimeSlot=23 Frame=3 at 00:00:27.031875 OK Len=38

HDLC Frame Data + FCS

===== LAPD Layer =====

C/R = .....0. Command(User), Response(Netw  
SAPI = 000000.. (0)  
TEI = 0000000. (0)  
Ctl = .....0 Information  
N(S) = 0011000. (24)  
P = .....0 (0)  
N(R) = 1000110. (70)

Hex Dump of the Frame Data

```
+-----+-----+-----+-----+-----+-----+-----+-----+
00 01 30 8C 08 02 30 00 05 04 03 90 90 A2 18 03      0| 0  |c
A9 83 81 70 0B A1 35 30 38 33 30 32 31 31 31 31      @||p i5083021111
7D 02 91 84 6F 48                                     } '|oH
```

Off-line Viewing F:\Program Files\GL Communicat 195 Frames

- 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

# ATM Protocol Analysis

The screenshot displays the ATM Protocol Analysis software interface with the following sections:

- Summary View:** A table showing captured frames with columns for Device, Frame#, Time, Length, Error, VPI, VCI, PT, HEC, DSF, AAL Type, Frame Type, IMA, and IMA ID.
- Detail View:** A text-based representation of the ATM frame data, including fields like GFC, VPI, VCI, and PT.
- Hex Dump View:** A hex dump of the frame data with corresponding ASCII characters.
- Statistics View:** A summary table of frame counts per device and type.
- Call Detail Record View:** A table for recording call information such as Call ID, Call Status, Calling Num, Called Num, Call Start Date & Time, Call Duration, and Release Complete Cause.

Summary View

Detail View

Hex Dump View

Statistics View

Call Detail Record View

- 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

The screenshot displays the Frame Relay Protocol Analysis LAPP software interface. The main window is divided into several sections:

- Summary View:** A table showing captured frames with columns for Device (Dev), SubChannel (SubCh), Frame#, Time, Length (Len), Error, Data Link Connection Identifier (DLCI), Data Extension (DE), Backward Explicit Congestion Notification (BECN), Forward Explicit Congestion Notification (FECN), Control (CTL), Sequence Number, and Sequence. The table shows four frames with varying lengths and DLCI values.
- Detail View:** A text-based representation of the HDLC frame data, including the LAPP layer fields: EA, C/R, DLCI, EA, and DE.
- Hex Dump View:** A hex dump of the frame data, showing the raw bytes and their corresponding ASCII characters.
- Statistics View:** A table summarizing the frame counts for each device and C/R. It shows that device 1 has 162 total commands and device 2 has 38 total commands.
- Call Detail Record View:** A table for recording call details, including Call ID, Call Status, Calling Number, Called Number, Call Start Date & Time, Call Duration, Release Complete Cause, and Device (Dev).

Summary View

Detail View

Hex Dump View

Statistics View

Call Detail Record View

- 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

The screenshot displays the 'PPP Protocol Analysis' application window. At the top, there is a menu bar (File, View, Capture, Statistics, Database, Configure, Help) and a toolbar with various icons. Below the toolbar is a table with columns: Dev, SubCh, Frame#, TIME (...), Len, Error, PPP Layer3Protocol, and Mlppp Seq No. The table contains five rows of data, all with a checkmark in the 'Dev' column and 'Internet Protocol' in the 'PPP Layer3Protocol' column.

Dev	SubCh	Frame#	TIME (...)	Len	Error	PPP Layer3Protocol	Mlppp Seq No
✓ 2		0	00:00:...	402		Internet Protocol	
✓ 2		1	00:00:...	174		Internet Protocol	
✓ 2		2	00:00:...	236		Internet Protocol	
✓ 2		3	00:00:...	70		Internet Protocol	
✓ 2		4	00:00:...	70		Internet Protocol	

Below the table, the application shows a detailed view of the selected frame (Frame #0). It displays the following fields and values:

- Ctl = 00000011 (3)
- Protocol = 00000000 00100001 Internet Protocol
- IP Layer -----
- Version = 0100.... (4)
- Internet Header Length (In 32 bit words) = ....0101 (5)
- Type of Service =
- Precedence = 000..... Routine
- Delay = ...0.... Normal Delay
- Throughput = ....0.... Normal Throughput
- Reliability = .....0... Normal Reliability

Below this, there is a 'Hex Dump of the Frame Data' section showing hexadecimal values and their corresponding ASCII characters. The hex dump starts with FF 03 00 21 45 00 01 8E DE 88 40 00 36 06 EC 59 and continues with several lines of data.

At the bottom of the window, there is a summary table:

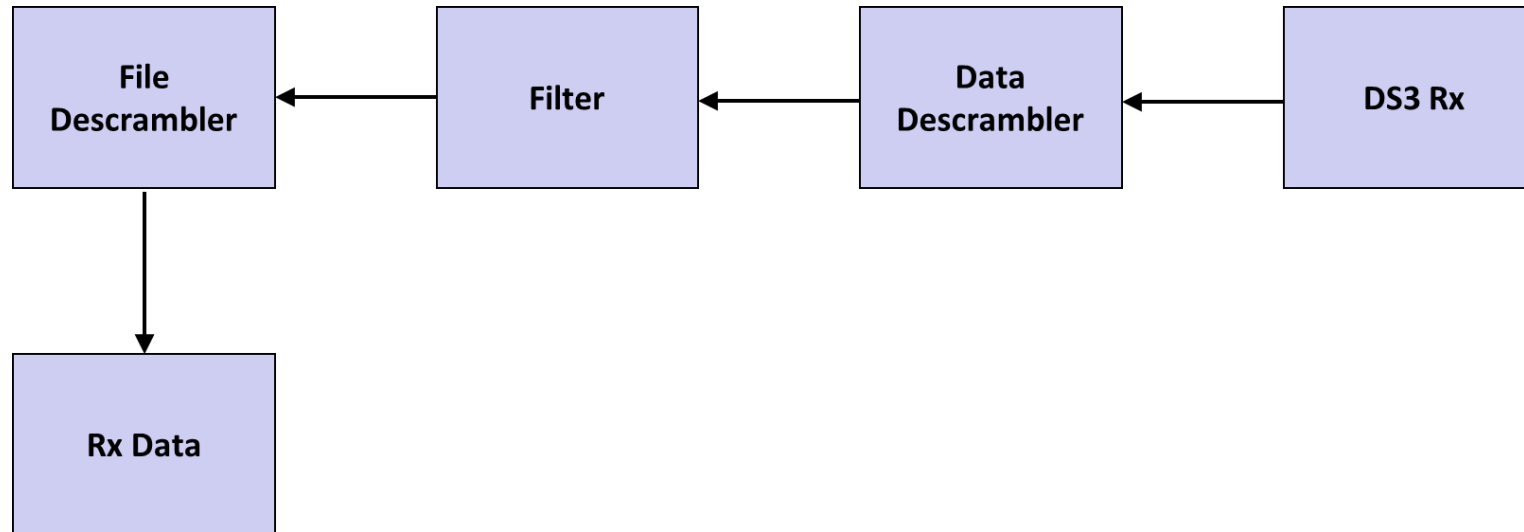
Σ Address	Σ Ctl	Σ Protocol
255	3	Internet Protoc...
total 255	total 3	total Internet P...

The status bar at the bottom indicates 'Off-line Viewing' and the file path 'C:\Program Files\Gl Communications In 11 938 Frames'.

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

# DSU Subrate

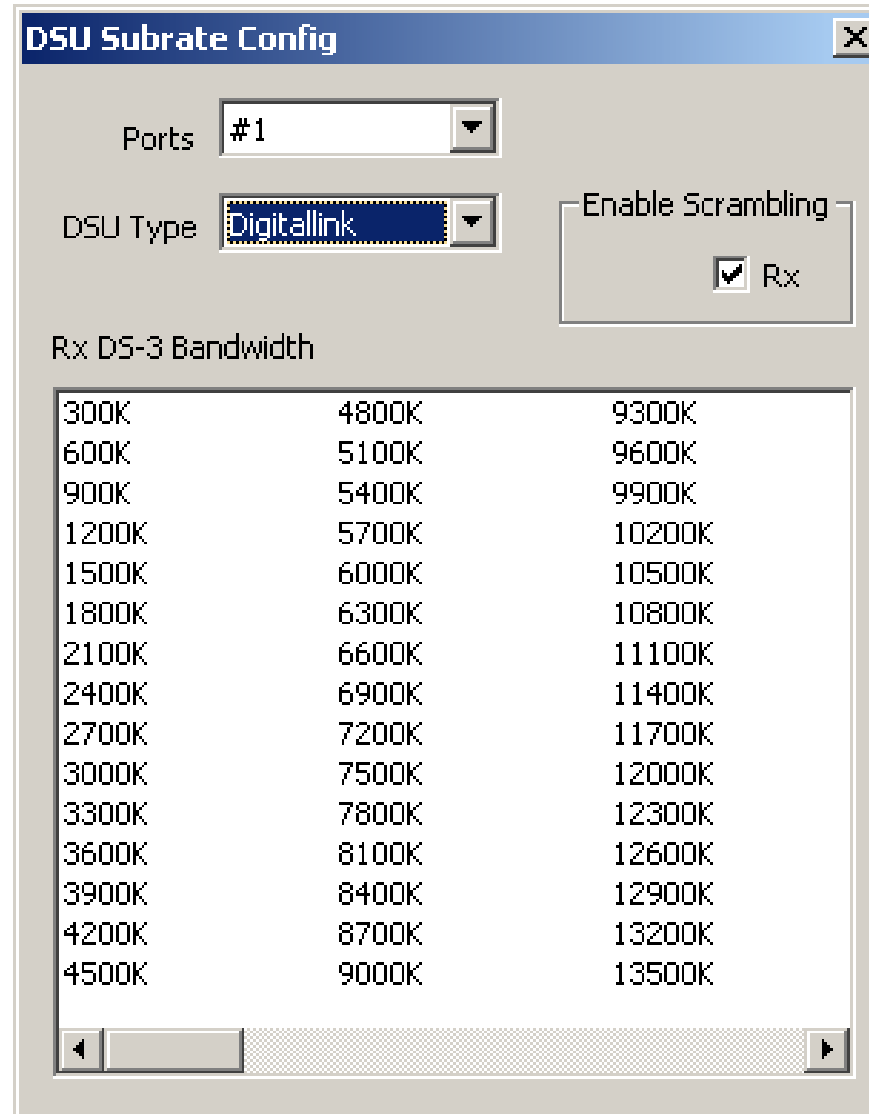
- Provides the ability to configure the DS3 subrates in each DSU mode
- Enable/Disable Scrambling for Tx and Rx depends on DSU selected



# Digital Link Substrate

Supports the following DSU vendors' algorithms for T3 interface:

- Digital Link
- Larscom
- Verilink
- Adtran



The image shows a software configuration window titled "DSU Substrate Config". It contains several settings:

- Ports:** A dropdown menu set to "#1".
- DSU Type:** A dropdown menu set to "Digitallink".
- Enable Scrambling:** A checkbox labeled "Rx" which is checked.
- Rx DS-3 Bandwidth:** A scrollable list of bandwidth options in a 3x10 grid.

300K	4800K	9300K
600K	5100K	9600K
900K	5400K	9900K
1200K	5700K	10200K
1500K	6000K	10500K
1800K	6300K	10800K
2100K	6600K	11100K
2400K	6900K	11400K
2700K	7200K	11700K
3000K	7500K	12000K
3300K	7800K	12300K
3600K	8100K	12600K
3900K	8400K	12900K
4200K	8700K	13200K
4500K	9000K	13500K

# Larscom Subrate

## DSU Subrate

**DSU Subrate Config** [X]

Ports: #1

DSU Type: Larscom

Enable Scrambling:  Rx

Rx DS-3 Bandwidth

- 3200K
- 6300K
- 9500K
- 12600K
- 15800K
- 18900K
- 22100K
- 25300K
- 28400K
- 31600K
- 34700K
- 37900K
- 41100K
- 44210K



# Verlink Subrate

## DSU Subrate

**DSU Subrate Config** [X]

Ports: #1

DSU Type: Verlink

Enable Scrambling:  Rx

Rx DS-3 Bandwidth

1600K	25300K
3200K	26800K
4700K	28400K
6300K	30000K
7900K	31600K
9500K	
11100K	
12600K	
14200K	
15800K	
17400K	
18900K	
20500K	
22100K	
23700K	

# Adtran Subrate

## DSU Subrate

**DSU Subrate Config**

Ports: #1

DSU Type: Adtran

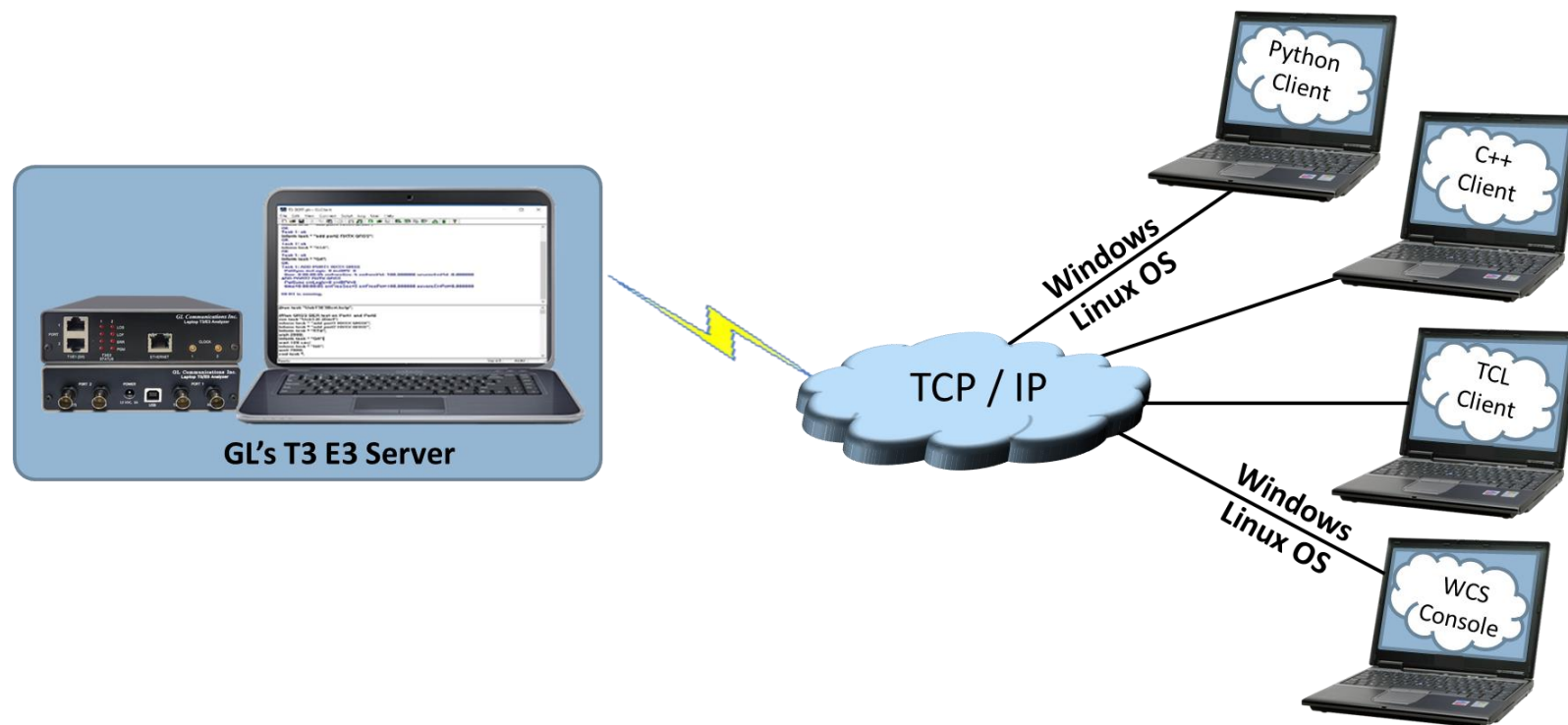
Enable Scrambling:  Rx

Rx DS-3 Bandwidth

80K	1200K	2330K
150K	1280K	2410K
230K	1350K	2480K
300K	1430K	2560K
380K	1500K	2630K
450K	1580K	2710K
530K	1650K	2780K
600K	1730K	2860K
680K	1800K	2930K
750K	1880K	3010K
830K	1950K	3080K
900K	2030K	3160K
980K	2110K	3230K
1050K	2180K	3310K
1130K	2260K	3380K

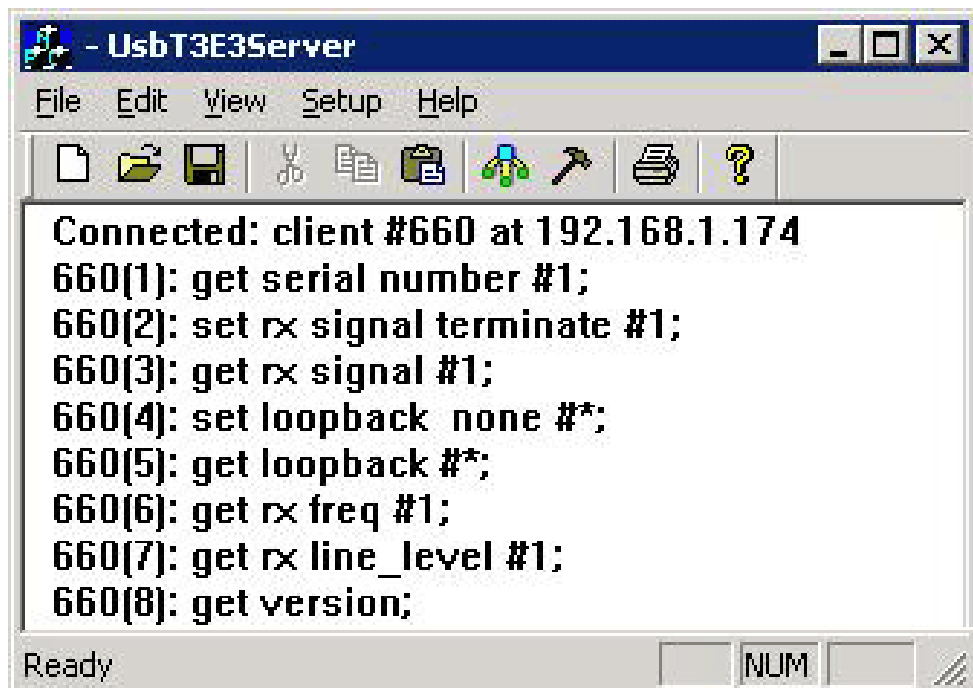
# Windows Client Server for T3 E3 Analysis

- 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



# Windows Server and Client Interface

## Server Interface

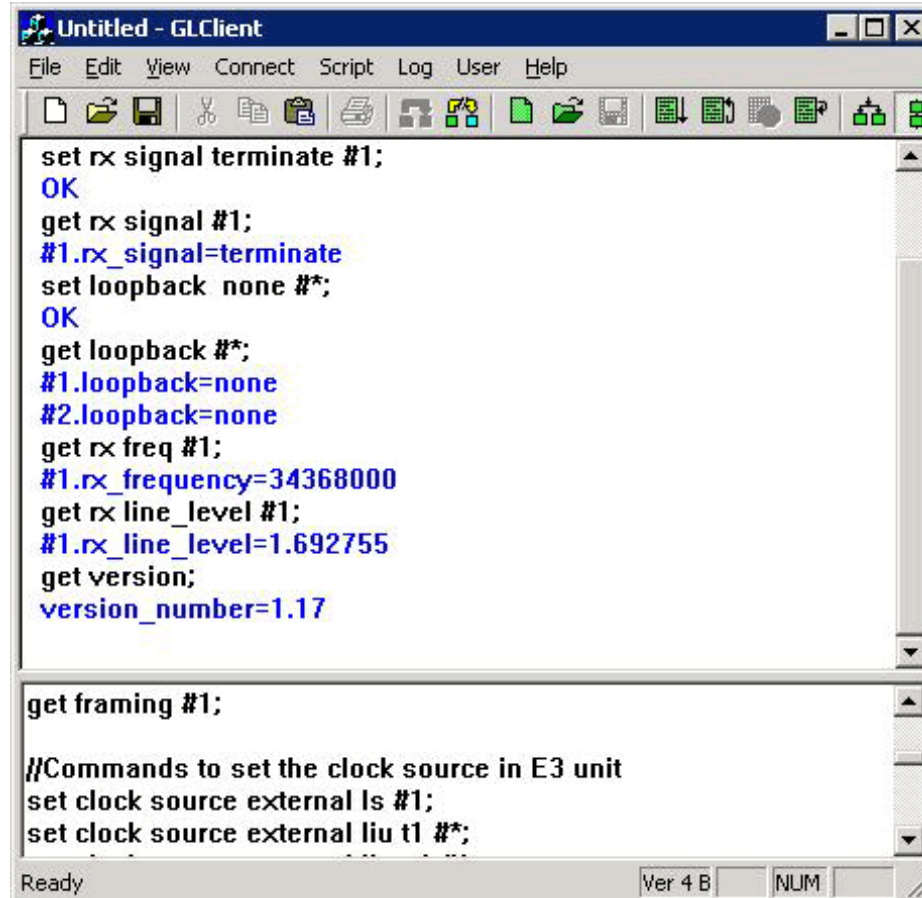


The screenshot shows the 'UsbT3E3Server' application window. The title bar reads '- UsbT3E3Server'. The menu bar includes 'File', 'Edit', 'View', 'Setup', and 'Help'. Below the menu bar is a toolbar with icons for file operations and a help icon. The main text area displays the following log:

```
Connected: client #660 at 192.168.1.174
660(1): get serial number #1;
660(2): set rx signal terminate #1;
660(3): get rx signal #1;
660(4): set loopback none #*;
660(5): get loopback #*;
660(6): get rx freq #1;
660(7): get rx line_level #1;
660(8): get version;
```

The status bar at the bottom shows 'Ready' and a 'NUM' indicator.

## Client Interface



The screenshot shows the 'GLClient' application window. The title bar reads 'Untitled - GLClient'. The menu bar includes 'File', 'Edit', 'View', 'Connect', 'Script', 'Log', 'User', and 'Help'. Below the menu bar is a toolbar with various icons. The main text area displays the following commands and responses:

```
set rx signal terminate #1;
OK
get rx signal #1;
#1.rx_signal=terminate
set loopback none #*;
OK
get loopback #*;
#1.loopback=none
#2.loopback=none
get rx freq #1;
#1.rx_frequency=34368000
get rx line_level #1;
#1.rx_line_level=1.692755
get version;
version_number=1.17
```

Below this, there is a section for framing and clock source settings:

```
get framing #1;

//Commands to set the clock source in E3 unit
set clock source external ls #1;
set clock source external liu t1 #*;
```

The status bar at the bottom shows 'Ready', 'Ver 4 B', and a 'NUM' indicator.

# 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

```
Ctrl upArrow - prev cmd; downArrow - next cmd; F7 - recent command list; exit - to disconnect and quit;
F:\src\GLClient\WcsCons\x64\Release>wscscons
Type '?' for help.
conn 192.168.10.78 17090
OK
$monitor all alarms #1;
Task1>>start=0x2481991b
$monitor all alarms #2;
Task2>>start=0x2481ba82
query task 2
>OK
Task2>>#2.los=false, #2.los_count=0, #2.ais=false, #2.ais_count=0, #2.sync=false, #2.sync_count=0, #2.nloop=false, #2.nloop_count=0, #2.rbl=false, #2.rbl_count=0, #2.ferr=false, #2.ferr_count=0, #2.ryel=false, #2.ryel_count=0, #2.bpv=false, #2.bpv_count=0, #2.esovr=false, #2.esovr_count=0, #2.esunf=false, #2.esunf_count=0
query task 1
>OK
Task1>>#1.los=false, #1.los_count=0, #1.ais=false, #1.ais_count=0, #1.sync=false, #1.sync_count=0, #1.nloop=false, #1.nloop_count=0, #1.rbl=false, #1.rbl_count=0, #1.ferr=false, #1.ferr_count=0, #1.ryel=false, #1.ryel_count=0, #1.bpv=false, #1.bpv_count=0, #1.esovr=false, #1.esovr_count=0, #1.esunf=false, #1.esunf_count=0
get multiframe format *
>Unexpected input '*' at offset 23
get multiframe format #*
>#1.mf_fmt=193e; #2.mf_fmt=193e; #3.mf_fmt=193e; #4.mf_fmt=193e
disconn
OK
```

Thank you