
Universal T1 / E1 Analyzer PCI Cards



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Universal T1 / E1 Analyzer Cards



- Universal T1 / E1 is an enhanced PC-Based T1 and E1 solution that is capable of both T1 and E1 interfacing.
- PCI versions are available with dual T1 / E1 interfaces.
- Includes optional features extend the capability far beyond the most expensive T1 / E1 testers.

What the unit does ?

- Used for installation, test, and troubleshooting of T1 E1 lines - routine testing of errors, such as bit errors, frame errors, and bipolar violation.
- Capability of T1 or E1 PCM signal visualization, capture, storage, analysis, and emulation.
- Includes BERT, voice band analysis, data, signaling, and protocol analyzer all in one.
- Most all “[basic applications](#)”, and “[special applications](#)” are available for Universal HD T1 E1 cards including Comprehensive Analysis / Emulation of voice, digits, tones, fax, modem, raw data, and Echo Testing.
- Capable of simulating as well as decoding and demodulating fax calls over T1 / E1 lines using [Fax Simulator](#) and [FaxScan™](#).
- Compares incoming T1 (E1) pulses against the pulse shape mask specified by the ITU G.703 standard.
- Emulates and decodes all 24 for T1 (32 for E1) channels simultaneously for signaling bits, power level, frequency, and multi-frame data.

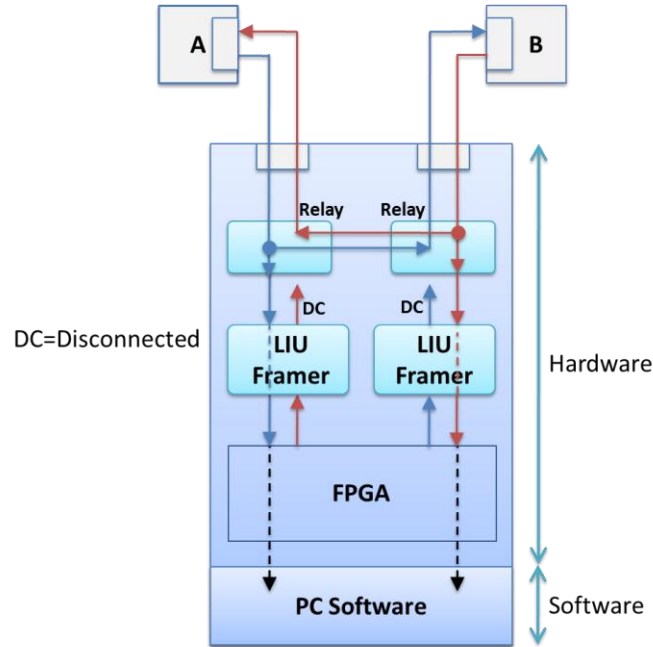
Benefits

- Scalable
 - Extremely simple to very complex configuration (with optional software).
- Upgradable
 - Instant field upgradeable with software download.
- Cost effective
 - Integrated hardware for T1 as well as E1 testing.

Benefits

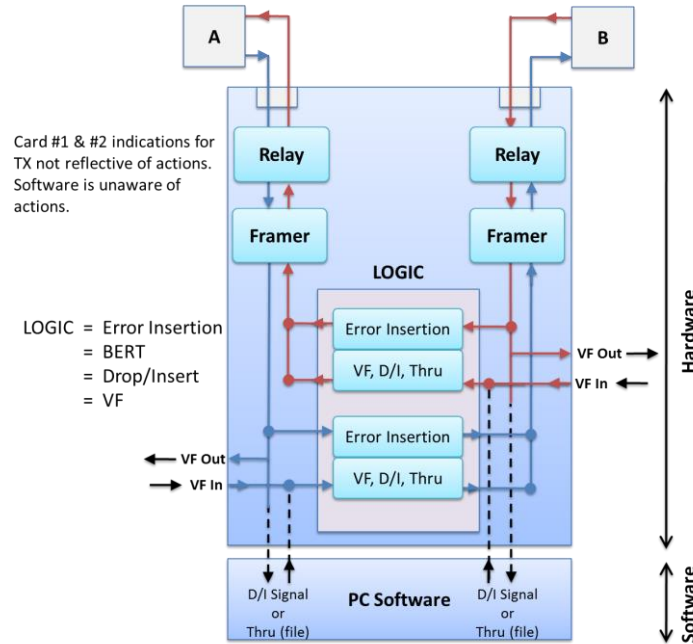
- Compatibility with Windows 8 and above operating systems and user friendly real-time software.
- Boards can be plugged into either a 5 V or 3.3 V PCI bus.
- Boards are significantly faster, and significantly more efficient.
- CPU utilization with the newer boards is negligible.
- Adjustable transmit clock frequency (+ / - 300ppm) for testing frequency lock sensitivity of T1 or E1 equipment.
- Supports two new port modes : Cross-port loopback mode and Through mode.

Cross-port Through Mode



- This mode is similar to the standard “Outward Loopback” which allows monitoring T1/E1 lines “in-line” while still being protected from loss of power to the board.

Cross-port Transmit Mode



- Used for Drop and Insert applications in which the board analyzes the traffic running between two pieces of T1/E1 equipment. This feature also eliminates complex cabling.

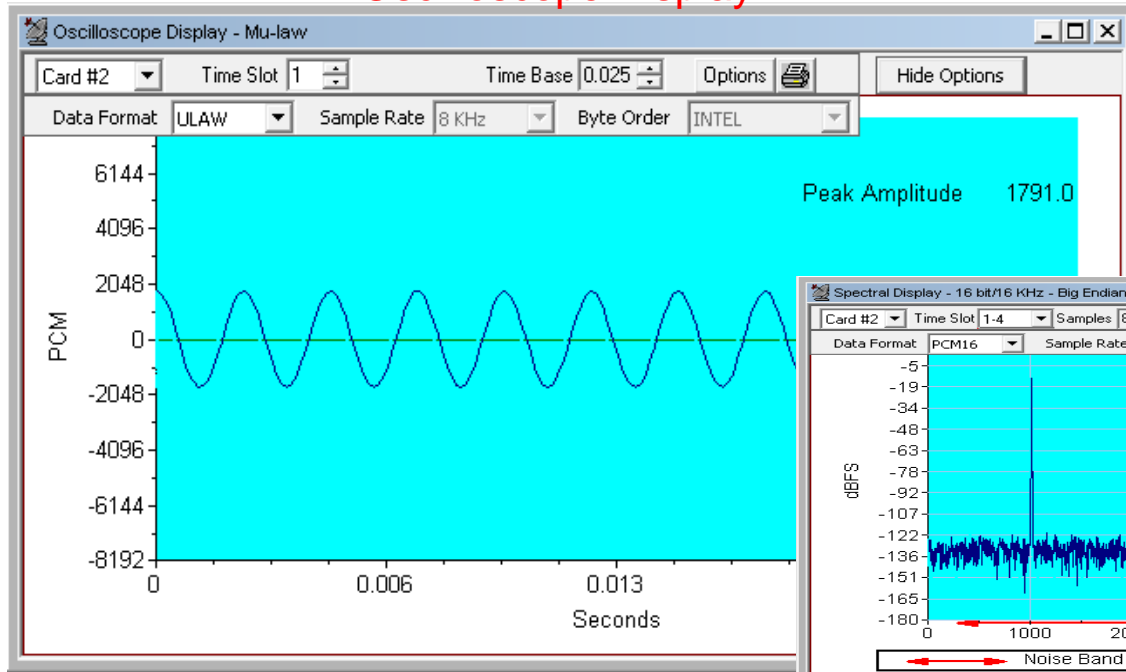
T1 / E1 Basic Software

- VF Options
- Monitoring Options
- Intrusive Testing
- Windows Client / Server – Remote access to T1 / E1 server; Clients - C++, C#, TCL

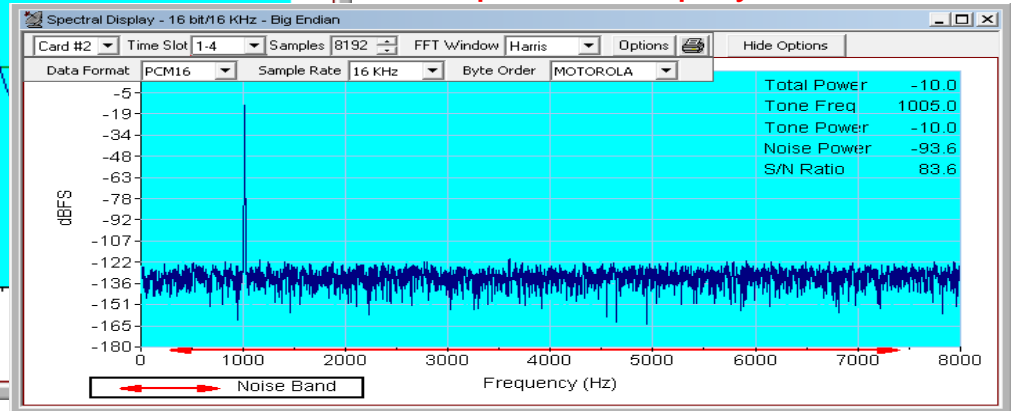
- VF Options
 - Speaker
 - Drop and Insert
 - VF In / Out TS settings
- Monitoring Features
 - Monitor T1 / E1 Line
 - Byte Values and Binary Byte Values
 - Signaling bits, Power Level, DC Offset, and Frequency
 - Multiframes and Real-time Multiframes
 - T1 / E1 Data as Real-time Bitmap
 - Time-slot Window
- Monitoring Features...
 - ASCII Timeslot Display
 - Oscilloscope, and Power Spectral
 - Audio Monitoring
 - Active Voice Level
 - Jitter Measurement
 - Pulse Mask Display
 - Capture Dialed Digits
 - Realtime Strip Chart
 - Realtime Multichannel Audio Bridge
 - Signaling Bit Transitions

Monitoring Features

Oscilloscope Display

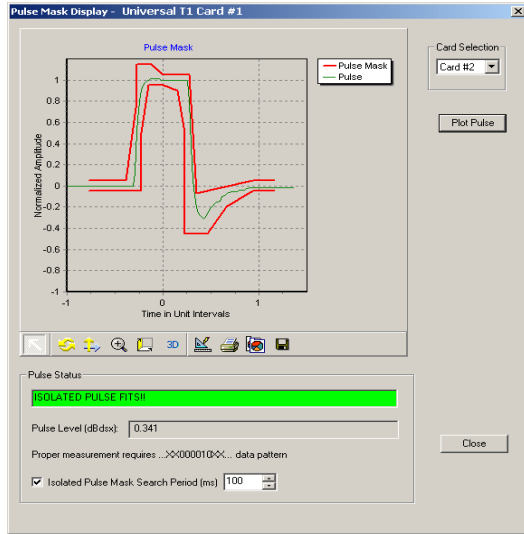


Spectral Display

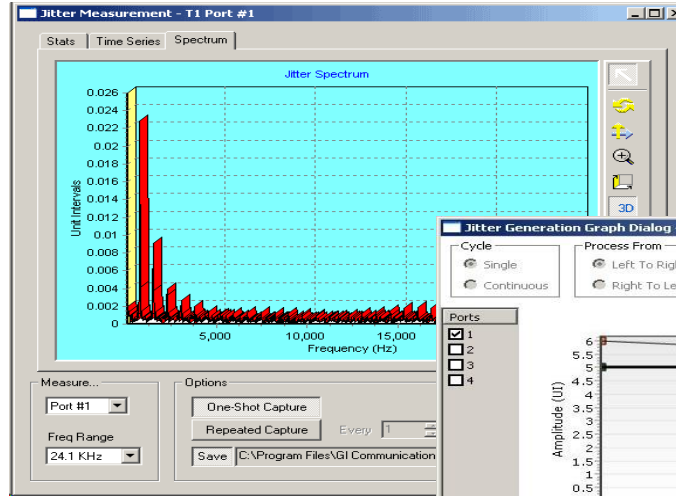


Jitter Measurement and Pulse Mask

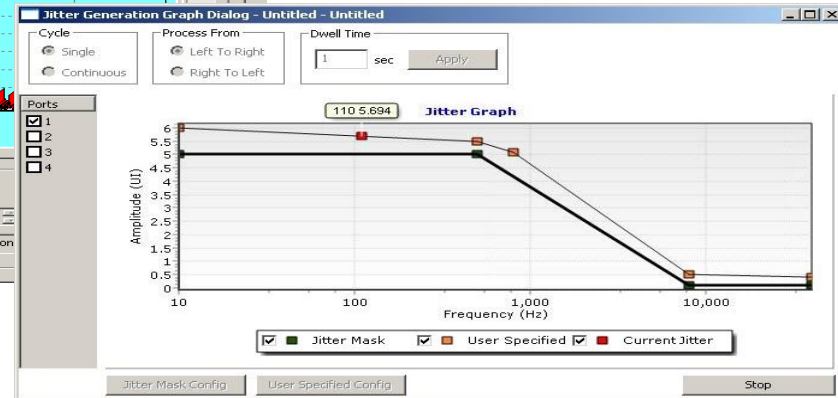
Pulse Shape Display



Jitter Measurement



Jitter Generation



- Intrusive Tests
 - 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
 - Jitter Generation
 - Transmit Dialling Digits

Enhanced BERT and Tx Signaling BITS

Transmit Signaling BITS

Tx Signaling Bits

Ts#	A	B	C	D	Ts#	A	B	C	D	Ts#	A	B	C	D
00	0	1	0	1	08	0	1	0	1	16	0	1	0	1
01	0	1	0	1	09	0	1	0	1	17	0	1	0	1
02	0	1	0	1	10	0	1	0	1	18	0	1	0	1
03	0	1	0	1	11	0	1	0	1	19	0	1	0	1
04	0	1	0	1	12	0	1	0	1	20	0	1	0	1
05	0	1	0	1	13	0	1	0	1	21	0	1	0	1
06	0	1	0	1	14	0	1	0	1	22	0	1	0	1
07	0	1	0	1	15	0	1	0	1	23	0	1	0	1

Signaling: 0000 A, 0001 B, 0010 C, 0011 D, 0100 E, **0101 F**, 0110 G, 0111 H, 1000 I, 1001 J, 1010 K

Buttons: Save, Deselect All, Transmit, Load, Select All, Close

Device Selection: Card #1

Signaling Bits

Card #2

TS 0	0101	TS 8	0101	TS 16	0101
TS 1	0101	TS 9	0101	TS 17	0101
TS 2	0101	TS 10	0101	TS 18	0101
TS 3	0101	TS 11	0101	TS 19	0101
TS 4	0101	TS 12	0101	TS 20	0101
TS 5	0101	TS 13	0101	TS 21	0101
TS 6	0101	TS 14	0101	TS 22	0101
TS 7	0101	TS 15	0101	TS 23	0101

Enhanced BERT

Enhanced BERT Untitled

File Actions View Windows Help

Card #1: Tx, RxTx, Result, Graph

Card #2: Tx, RxTx, Result, Graph

All Cards: Result

Tx Settings - Card #1

Transmit Receive Coupled Settings (Tx+Rx) Apply To All Cards

Unframed BER Patterns: QRSS, 31, User Defined Pattern: 0

Timeslot Selection: "Control + click" to select TS

0	4	8	12	16	20
1	5	9	13	17	21
2	6	10	14	18	22
3	7	11	15	19	23

Error Rate (Logic Error): 10^-3

User Defined Rate: 0.01

Single Error Insertion: Logic Error, BPV

Sub Channel Selection: 0

Graph - Online Display

Real-Time Display Graph Duration: 1 min

06/13/2013-10:18:58 Graph Start - (06/13/2013-10:24:26) Graph End - (06/13/2013-10:25:26)

Card 1 Card 2

Errors

Legend: LOGIC_ERROR BPV FRAME_ERROR

Ready

Client Server

- Allow the user (with an appropriate client) to operate analyzers remotely, write scripts for automation, or provide multi client connectivity to a single T1 E1 VF Data analyzer.

```
E1_Regressiontest.gls - GLClient
File Edit View Connect Script Log User Help
get board count;
board_count=2
get response;
response = 500.0
go 0,0,0 #1;
OK
get signaling bits #2:1..15;
#2:1.sig_bits=0,0,0,0
#2:2.sig_bits=0,0,0,0
#2:3.sig_bits=0,0,0,0
#2:4.sig_bits=0,0,0,0
#2:5.sig_bits=0,0,0,0
#2:6.sig_bits=0,0,0,0

// setting both the cards to cas mode to get all four signaling bits
//getting the signaling bits transmitted from card#1
//cross connect card 1 and 2
go 0,0,0 #1;
get signaling bits #2:1..15;
// transmitting different formats of signaling bits as mentioned before for time slots 1 to 15 only
go 0,0,0,1 #1;
get signaling bits #2:1..15;
wait 2000;
go 0,0,1,0 #1;
get signaling bits #2:1..15;
wait 2000;
go 0,0,1,0 #1;
get signaling bits #2:1..15;
Ready

Untitled - GLServer
File Edit View Setup Help
Connected: client #404 at 192.168.1.63
404: set rx interface terminate #*;
404: set signaling mode cas #*;
404: set crc4 on#*;
404: set bx clock source internal #*;
404: set outward driver loopback off #*;
404: get bx clock source #*;
404: get outward driver loopback #*;
404: get rx line frequency #*;
404: get rx line level #*;
404: get all alarms #*;
404: get board count;
404: get response;
404: go 0,0,0,0 #1;
404: get signaling bits #2:1..15;
404: go 0,0,1,0 #1;
404: get signaling bits #2:1..15;
404: go 0,0,1,0 #1;
404: get signaling bits #2:1..15;
Ready NUM
```

T1 / E1 Special Applications

- Protocol Analysis
 - ISDN, HDLC, SS7, Frame Relay, TRAU, CDMA, DCME, T1 Facility Data Link
 - E1 Maintenance Data Link, UMTS, PPP, ATM, GSM, V5.x, GPRS, GR303, SS1
- Protocol Emulation
 - ISDN, HDLC, MLPPP, MLPPP Conformance, CAS, TRAU, SS7,
 - SS7 conformance suite, GSM A, GSM Abis, MAP, CAMEL, Frame Relay, ATM IMA, and SS1

T1 / E1 Special Applications

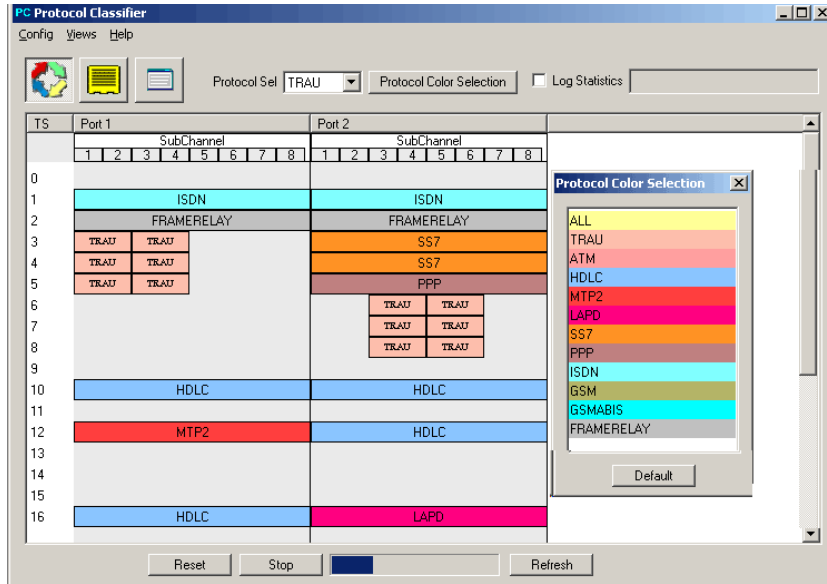
- Capture, Analysis, and Emulation
 - BER, Playback
 - Manual and Automated Record / Playback files
 - Call Capture and Analysis (CCA)
 - Multiple Call Capture and Analysis

T1 / E1 Special Applications

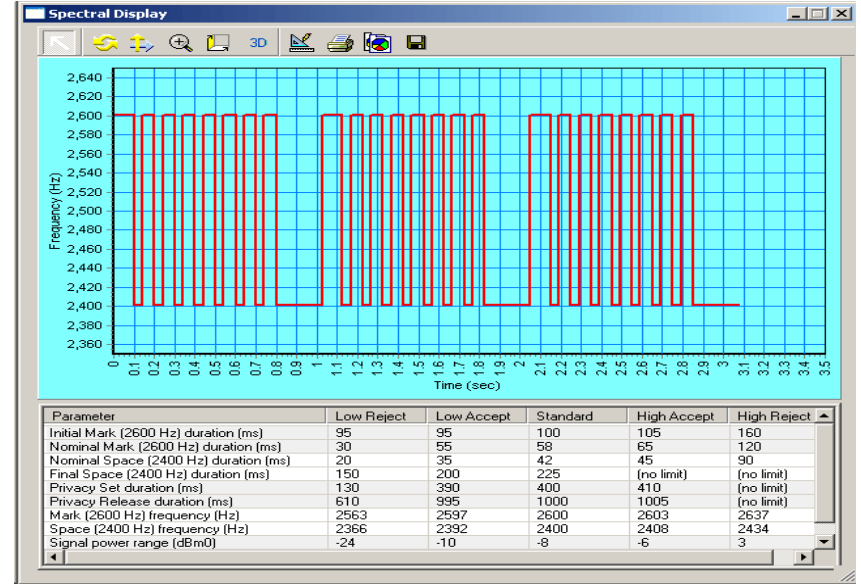
- Voice Band Analysis Software
 - Call Data Records (CDR)
 - Voice Band Analyzer (VBA)
- Fax Emulation and Analysis
 - Fax Simulator
 - Fax Analysis using GLInsight™ or FaxScan™
- Echo Cancellation Testing / Compliance
 - Manual
 - Semi-automated
 - Automated
- WCS Modules
 - Transmission/reception of files/digits
 - Multi-channel BERT
 - CAS Emulation
 - DSP operations, Dynamic DSP capability
 - SA Bits/ FDL/ HDLC/ TRAU/ MC-MLPPP/ SS7/ ISDN / ML Frame Relay
- Protocol Identifier
- Multi-Channel BERT
- Multiplex / Demultiplex Software
- Network Surveillance

Special Application

Protocol Identifier



SS1 Analyzer and Emulator



Call Capture and Analysis

Call Capture and Analysis

Multiple Call Capture and Analysis

Multiple Call Capture - UsbE1 Card #1 and #2

File Capture Settings

Capture Directory: D:\CapturedFiles\ManualCall1210091146

Capture File #1: Dec10w01.000

Bytes Captured: 17024

TS Display: 1

Capture File #2: Dec10E01.000

Bytes Captured: 17024

Signaling File: Dec1001.000.000

Timeslot Activity

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Multi Call Capture for Manual - Untitled

File Edit Trigger Options Process

CC No	Capture Name	West(Port)	East(Port)	Timeslots	Storage Location	Trigger Option	Action
1	CCA1	1	2	0-23	C:\Program Files\GL Communications Inc\Dual Ultra HD T1 Analyzer	Edit	Abort
2	CCA2	1	2	0-23	C:\Program Files\GL Communications Inc\Dual Ultra HD T1 Analyzer	Edit	Abort
3	CCA3	1	2	0-23	C:\Program Files\GL Communications Inc\Dual Ultra HD T1 Analyzer	Edit	Abort
4	CCA4	1	2	0-23	C:\Program Files\GL Communications Inc\Dual Ultra HD T1 Analyzer	Edit	Abort

TS	TS Status	West Filename	Bytes Captured(West)	East Filename	Bytes Captured(East)
0	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224
1	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224
2	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224
3	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224
4	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224
5	Capturing	C:\Program Files\GL Communications In...	742224	C:\Program Files\GL Communications Inc\Dual Ultra ...	742224

CCA Details Timeslots Map

Protocol Analysis

PPP Protocol Analysis

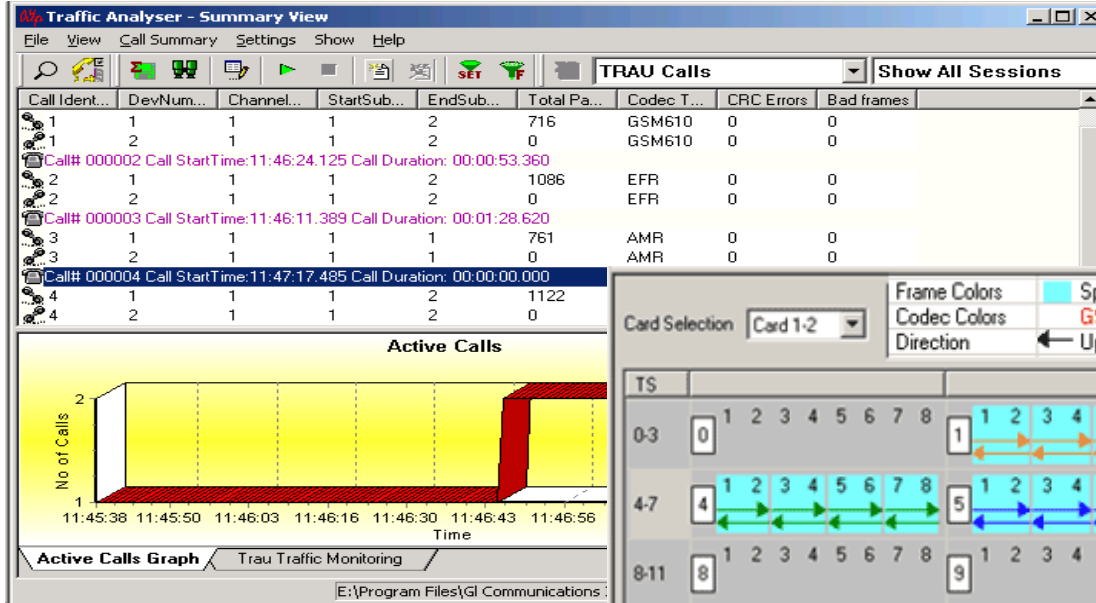
The screenshot shows the 'PPP Protocol Analysis PPP' window. The top menu includes File, View, Capture, Statistics, Database, Configure, and Help. Below the menu is a toolbar with various icons and a 'GoTo' field. The main area is a table with columns: Dev, TSlot, SubCh, Fram..., TIME (Relative), Len, Error, PPP Laye..., LCP Code, IPCP Code, and BCF. The table contains several rows of data, with the first row highlighted. Below the table, there is a section for 'Card1 TimeSlots=1-31 Frame=0 at 00:00:00.000000 OK Len=14' and 'HDLC Frame Data + FCS'. This section displays details for the PPP Link Layer, including Address (11111111 (255)), Ctl (0000011 (3)), and Protocol (11000000 00100001 Link Control). It also shows details for the Link Control Layer, including Code (00001001 Echo-Request), Identifier (172 (xAC)), and Length (8 (x0008)). At the bottom, there is a 'Hex Dump of the Frame Data' showing the hexadecimal values FF 03 C0 21 09 AC 00 08 09 DC 19 2E 85 63.

PPP Packet Data Analysis

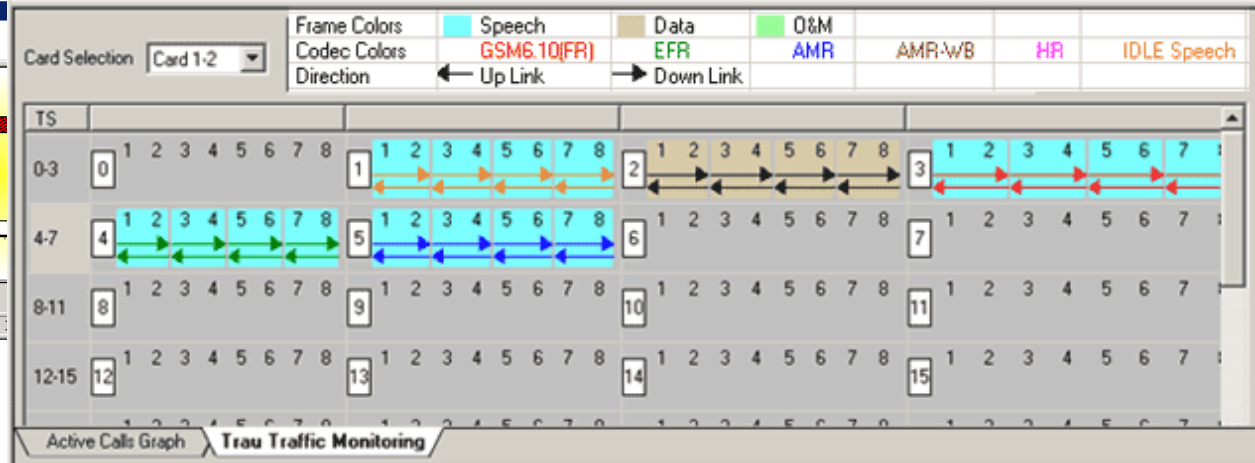
The screenshot shows the 'Traffic Analyzer - Summary View' window. The top menu includes File, View, Call Summary, Settings, and Help. Below the menu is a toolbar with various icons and a 'GoTo' field. The main area is a table with columns: Call #, SSRC, Payload, Packet Received, Conversat MDS/R..., Listening MDS/R..., Packets Discard..., Missing Packets..., Duplicate Packets..., Out Of Sequen..., Average Gap(ms), Average Delay, Average Jitter, and Averac Inter A... The table contains several rows of data, with the first row highlighted. Below the table, there is a section for 'Active Calls' which includes a 3D bar chart showing the number of calls over time. The x-axis is labeled 'Time' and ranges from 10:04:33 to 10:14:40. The y-axis is labeled 'No of Calls' and ranges from 0 to 1. The chart shows several red bars representing active calls. To the right of the chart, there are two counter tables. The first table shows 'Counter Type' and 'Count' for Total Packet Count (8472), Total Calls (67), Active Calls (0), Completed Calls (24), and Purged Calls(Completed) (0). The second table shows 'Counter Type' and 'Counters' for Total SIP Packets (2904), SIP Calls (67), and SIP Active Calls (0). At the bottom, there is a navigation bar with buttons for 'Active Calls Graph', 'Average Jitter Distribution', 'E-Model', 'RTP Packets Graph', and 'SIP / H323 / RTP / MEGACO'.

Protocol Analysis

TRAU Packet Data Analysis - Active Calls Graphs



TRAU Traffic Monitoring



Protocol Emulation

GSM Call Generation

Call Generation - MTC_BulkCall

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	BSC_MTC_Ca...	Pro0.xrn	0x99999999	Abort		None		Pass	Infinite	0
2	BSC_MTC_Ca...	Pro1.xrn	0x22222222	Start		None		Pass	1	0
3	BSC_MTC_Ca...	Pro2.xrn	0x33333333	Start		None		Pass	Infinite	0
4	BSC_MTC_Ca...	Pro3.xrn	0x44444444	Abort		None		Pass	Infinite	0
5	BSC_MTC_Ca...	Pro4.xrn	0x55555555	Start		None		Pass	Infinite	0
6	BSC_MTC_Ca...	Pro5.xrn	0x66666666	Abort		None		Pass	Infinite	0
7	BSC_MTC_Ca...	Pro6.xrn	0x77777777	Abort		None		Pass	Infinite	0
8	BSC_MTC_Ca...	Pro7.xrn	0x88888888	Abort		None		Pass	Infinite	0

Buttons: Add, Delete, Insert, Start, Abort, Refresh, Start All, Abort All

MAPS (MTC) ↔ DUT (DUT) | 11:44:13.296000

BTSM Layer

- T-bit
- Message Group
- Message Type
- Channel number
- IE Identifier (Ch No)
- Channel Type
- Time Slot #
- Paging Group
- IE Identifier (PGr)
- Paging Group
- MS Identity
- IE Identifier (MSId)
- Length Of MS Identity
- Type of identity
- Odd/Even Ind.of identity digits

Scripts | Message Sequence | Event Config | Script Flow | Profile

GSM Call Reception

Call Reception

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events Profile	Result
1	MTC.gls	9341141850	Abort	Transmitting File	Terminate		Pass
2	MTC.gls	9341141851	Completed	Establishing TRAU session	None		Pass
3	FX_Channel Activat...	9341141852	Completed	Transmitting File	None		Pass
4	MTC.gls	9341141853	Abort	Transmitting File	Terminate		Pass
5	FX_Channel Activat...	9341141854	Completed	Transmitting File	None		Pass
6	MTC.gls	9341141855	Abort	Transmitting File	Terminate		Pass
7	FX_Channel Activat...	9341141856	Completed	Transmitting File	None		Pass
8	MTC.gls	9341141857	Completed	RR Connection Failed	None		Unknow

Buttons: Abort, Auto Trash, Trash

MAPS (MTC) ↔ DUT (DUT) | 11:41:58.421000

BTSM Layer

- T-bit
- Message Group
- Message Type
- Channel number
- IE Identifier (Ch No)
- Channel Type
- Time Slot #
- Paging Group
- IE Identifier (PGr)
- Paging Group
- MS Identity
- IE Identifier (MSId)
- Length Of MS Identity

Scripts | Message Sequence | Event Config | Script Flow | Profile

Thank you