
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.

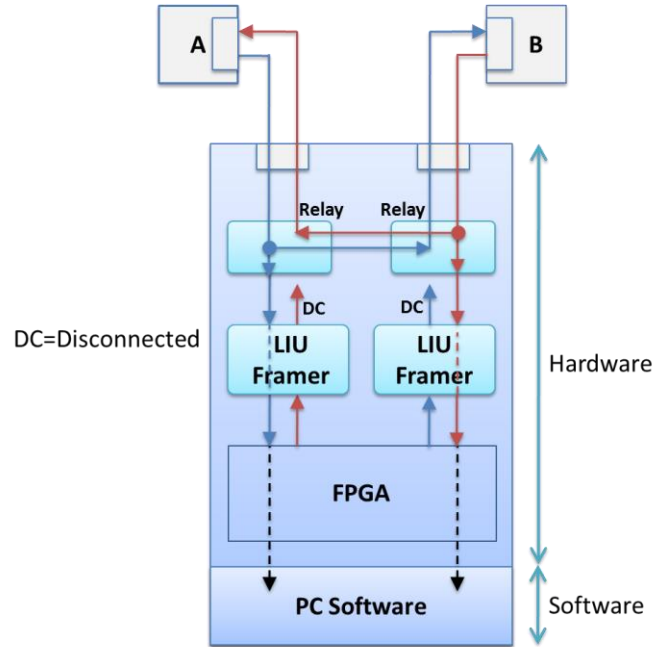
Benefits

- 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

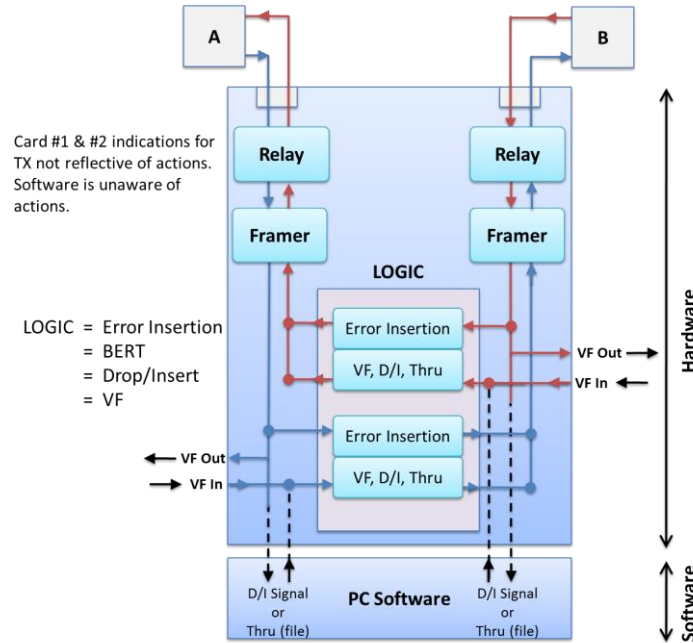
- Compatibility with Windows® 10 OS and user friendly real-time software.
- Boards can be plugged into either a 5 V or 3.3 V PCI bus.
- Boards are significantly faster, and significantly more efficient.
- CPU utilization with the newer boards is negligible.
- Adjustable transmit clock frequency (+ / - 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.

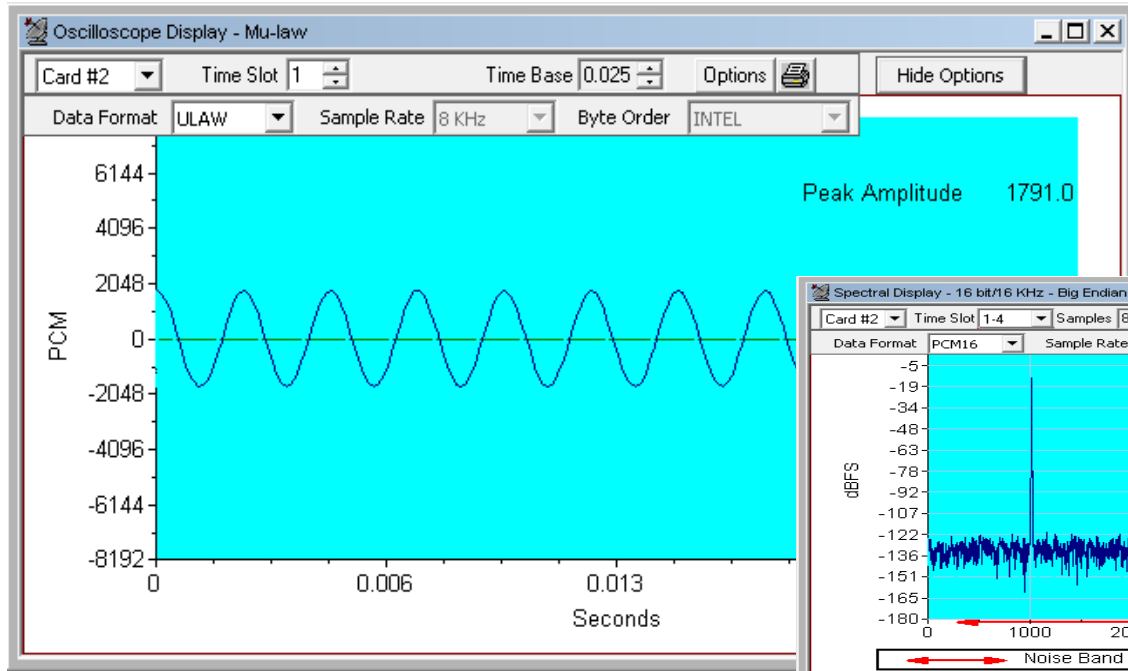
T1 / E1 Basic Software

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

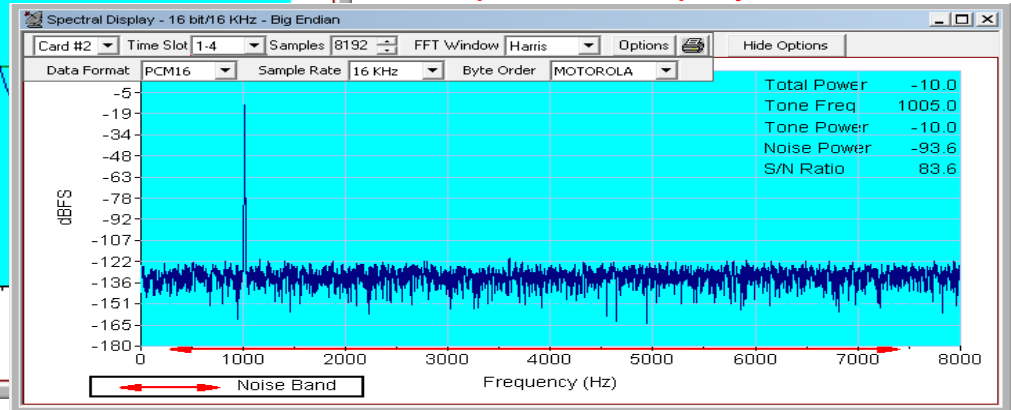
- VF Options
 - Speaker
 - Drop and Insert
 - VF In / Out TS settings
- Monitoring Features
 - Monitor T1 / E1 Line
 - Byte Values and Binary Byte Values
 - Signaling bits, Power Level, DC Offset, and Frequency
 - Multiframes and Real-time Multiframes
 - T1 / E1 Data as Real-time Bitmap
 - Time-slot 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

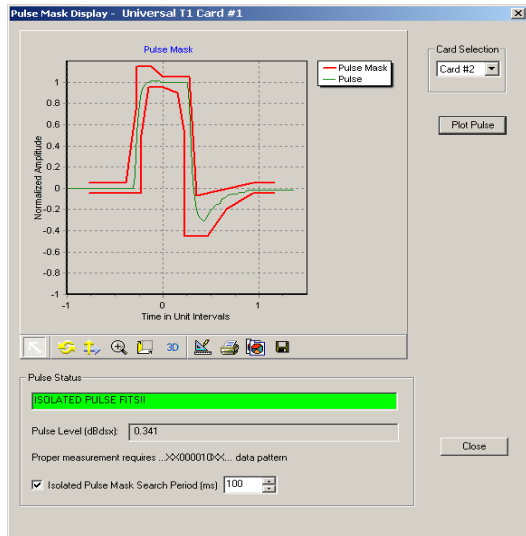


Spectral Display

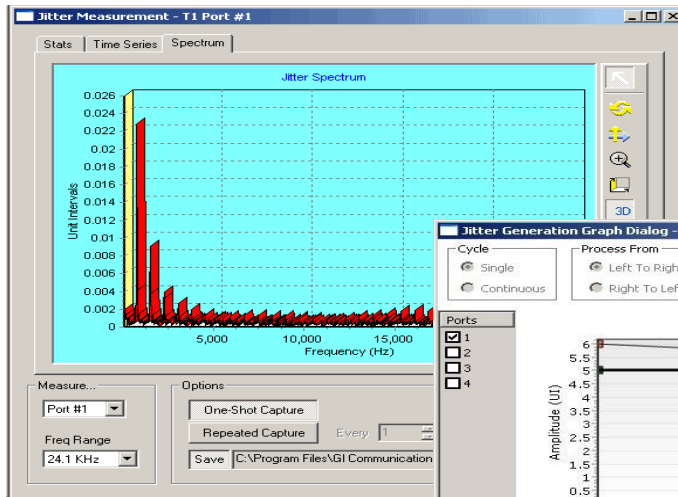


Jitter Measurement and Pulse Mask

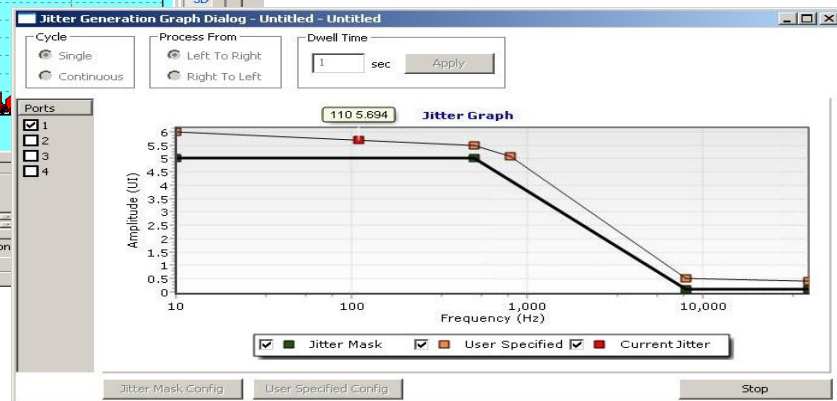
Pulse Shape Display



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

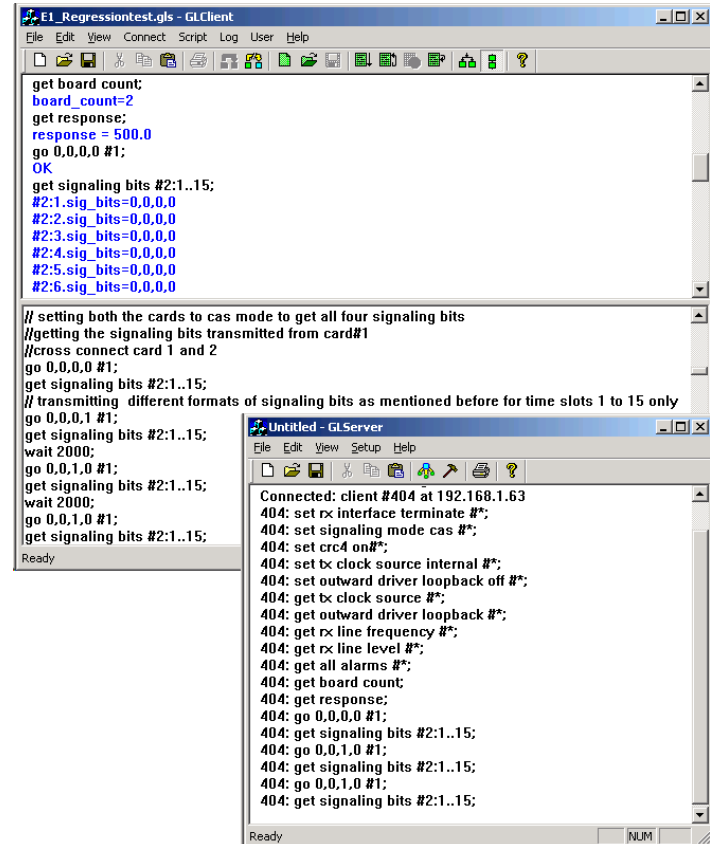
Transmit Signaling BITS

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

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 0,0,0,0 #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 0,0,0,0 #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

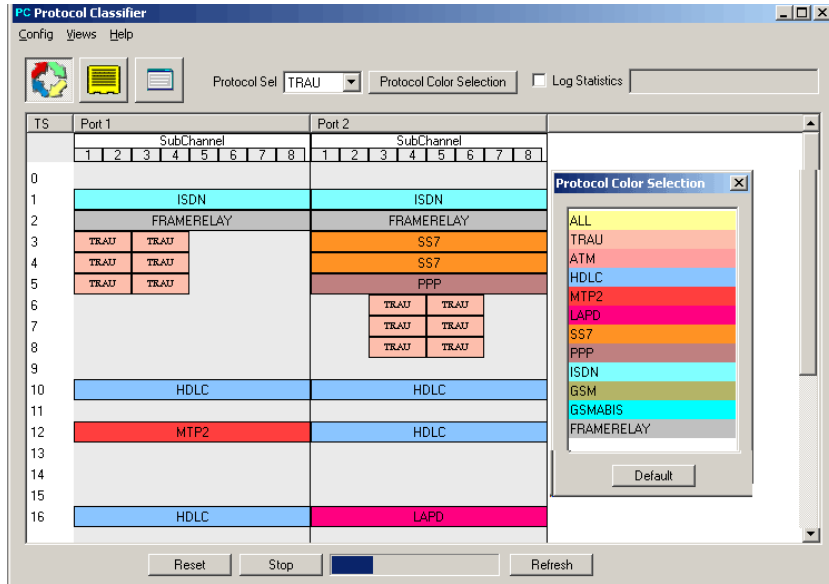
- Capture, Analysis, and Emulation
 - BER, Playback
 - Manual and Automated Record / Playback files
 - Call Capture and Analysis (CCA)
 - Multiple Call Capture and Analysis

T1 / E1 Special Applications

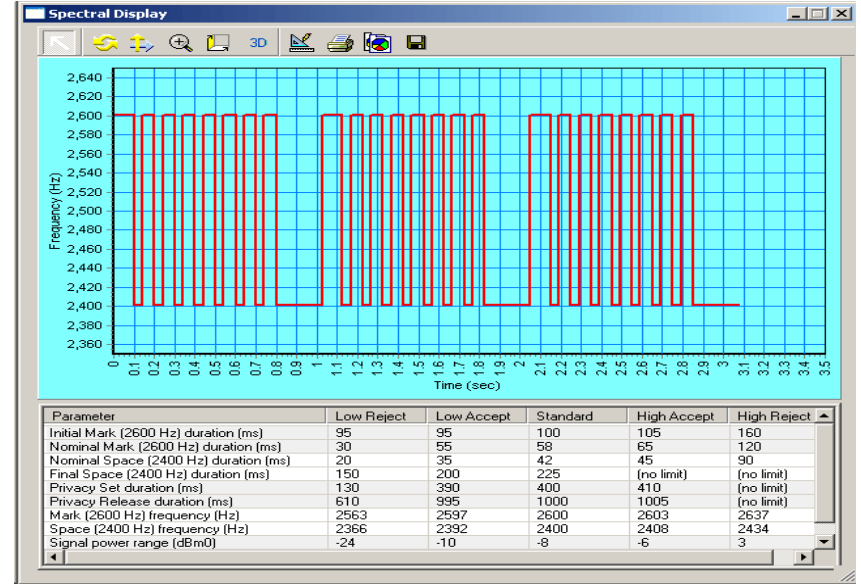
- Voice Band Analysis Software
 - Call Data Records (CDR)
 - Voice Band Analyzer (VBA)
- Fax Emulation and Analysis
 - Fax Simulator
 - Fax Analysis using GLInsight™ or FaxScan™
- Echo Cancellation Testing / Compliance
 - Manual
 - Semi-automated
 - Automated
- WCS Modules
 - Transmission/reception of 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

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

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' window. The top part is a table with columns: Dev, TSlot, SubCh, Fram..., TIME (Relative), Len, Error, PPP Layer..., LCP Code, IPCP Code, and BCF. The table lists several Link Control and Echo-Request/Reply packets. Below the table, there is a section for 'Hex Dump of the Frame Data' showing the raw bytes of a frame: FF 03 C0 21 09 AC 00 08 09 DC 19 2E 85 63.

Dev	TSlot	SubCh	Fram...	TIME (Relative)	Len	Error	PPP Layer...	LCP Code	IPCP Code	BCF
✓ 1	1-31		0	00:00:00.000000	14		Link Control	Echo-Request		
✓ 2	1-31		1	00:00:00.000625	14		Link Control	Echo-Reply		
✓ 2	1-31		2	00:00:00.008625	14		Link Control	Echo-Request		
✓ 1	1-31		3	00:00:00.092000	14		Link Control	Echo-Reply		
✓ 1	1-31		4	00:00:09.993996	14		Link Control	Echo-Request		
✓ 2	1-31		5	00:00:09.994625	14		Link Control	Echo-Reply		
✓ 2	1-31		6	00:00:10.082625	14		Link Control	Echo-Request		
✓ 1	1-31		7	00:00:10.083000	14		Link Control	Echo-Reply		

Card1 TimeSlots=1-31 Frame=0 at 00:00:00.000000 OK Len=14
HDLC Frame Data + FCS
----- PPP Link Layer -----
Address = 11111111 (255)
Ctl = 00000011 (3)
Protocol = 11000000 00100001 Link Control
----- Link Control Layer -----
Code = 00001001 Echo-Request
Identifier = 172 (xAC)
Length = 8 (x0008)
Magic Number = 165410210 (x00FC02F)

Hex Dump of the Frame Data

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. It displays a table of call statistics and an 'Active Calls' graph. The table has columns: Call #, SSRC, Payload, Packet Received, Conversat MOS/R..., Listening MOS/R..., Packets Discard..., Missing Packets..., Duplicate Packets..., Out Of Sequen..., Average Gap(ms), Average Delay, Average Jitter, and Averag Inter A... The graph shows the number of active calls over time, with a peak of 1 call around 10:07:52.

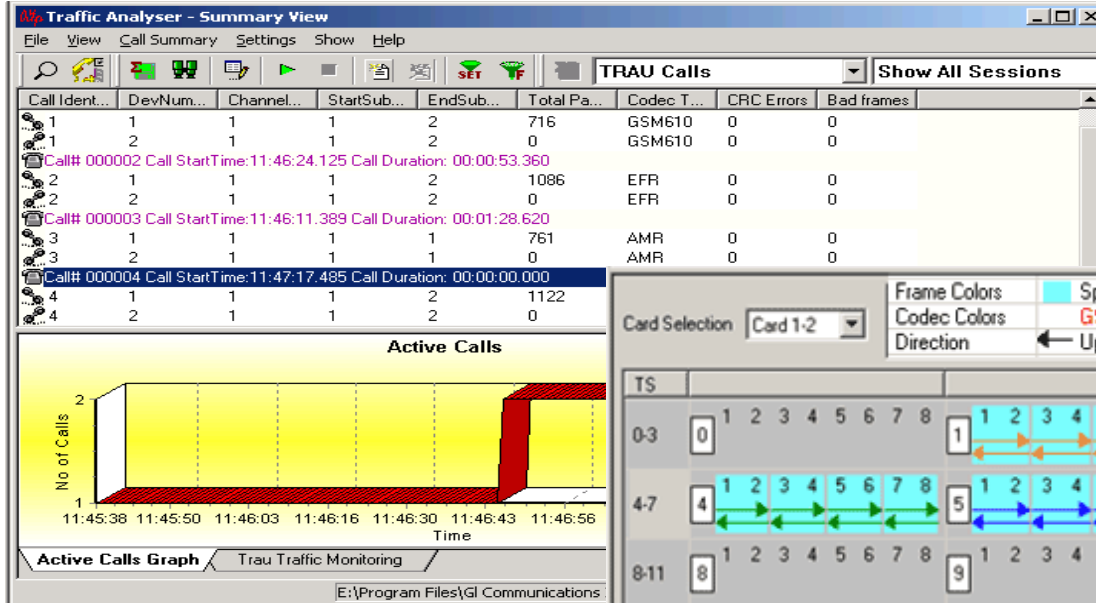
Call #	SSRC	Payload	Packet Received	Conversat MOS/R...	Listening MOS/R...	Packets Discard...	Missing Packets...	Duplicate Packets...	Out Of Sequen...	Average Gap(ms)	Average Delay	Average Jitter	Averag Inter A...
1	22145...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0
1	22117...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0
2	22141...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0
2	22194...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0
3	22137...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0
3	22168...	PCMU...	1	0.00 / 0	0.00 / 0	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	0.00	0.00	0.00	0

Active Calls
No. of Calls
Time
10:04:33 10:05:35 10:06:43 10:07:52 10:08:58 10:10:04 10:11:11 10:12:24 10:13:32 10:14:40

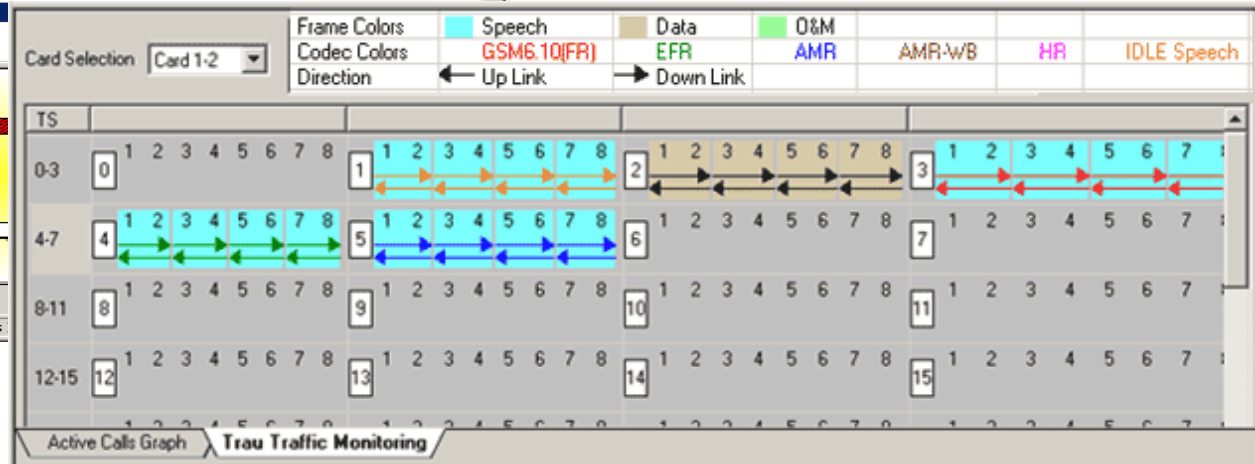
Counter Type Counters
Total SIP Packets 2904
SIP Calls 67
SIP Active Calls 0

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_C...	Pro0.xrn...	0x99999999	Abort		None		Pass	Infinite	0
2	BSC_MTC_C...	Pro1.xrn...	0x22222222	Start		None		Pass	1	0
3	BSC_MTC_C...	Pro2.xrn...	0x33333333	Start		None		Pass	Infinite	0
4	BSC_MTC_C...	Pro3.xrn...	0x44444444	Abort		None		Pass	Infinite	0
5	BSC_MTC_C...	Pro4.xrn...	0x55555555	Start		None		Pass	Infinite	0
6	BSC_MTC_C...	Pro5.xrn...	0x66666666	Abort		None		Pass	Infinite	0
7	BSC_MTC_C...	Pro6.xrn...	0x77777777	Abort		None		Pass	Infinite	0
8	BSC_MTC_C...	Pro7.xrn...	0x88888888	Abort		None		Pass	Infinite	0

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

MAPS (MTC) ↔ DUT (DUT)

BTSM Layer

T-bit = ...
Message Group = 000C
Message Type = 0001
Channel number = 000C
IE Identifier (Ch No) = 1001
Channel Type = ...
Time Slot # = ...
Paging Group = ...
IE Identifier (PGr) = 000C
Paging Group = 000C
MS Identity = ...
IE Identifier (MSId) = 000C
Length Of MS Identity = ...
Type of identity = ...
Odd/Even Ind. of identity digits = ...

Message Sequence: PAGING CoMmanD → 11:41:13.296000

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	Terminate		Pass
4	MTC.gls	9341141853	Abort	Transmitting File	Terminate		Pass
5	FX_Channel Activat...	9341141854	Completed	Transmitting File	Terminate		Pass
6	MTC.gls	9341141855	Abort	Transmitting File	Terminate		Pass
7	FX_Channel Activat...	9341141856	Completed	Transmitting File	Terminate		Pass
8	MTC.gls	9341141857	Completed	RR Connection Failed	None		Unknow

Buttons: Abort, Auto Trash, Trash

MAPS (MTC) ↔ DUT (DUT)

BTSM Layer

T-bit = ...
Message Group = 000C
Message Type = 0001
Channel number = 000C
IE Identifier (Ch No) = 1001
Channel Type = ...
Time Slot # = ...
Paging Group = ...
IE Identifier (PGr) = 000C
Paging Group = 000C
MS Identity = ...
IE Identifier (MSId) = 000C
Length Of MS Identity = ...
Type of identity = ...
Odd/Even Ind. of identity digits = ...

Message Sequence: PAGING CoMmanD ← 11:41:58.421000, CHANnel ReQuireD → 11:41:58.421000, Immediate Assignment → 11:41:59.515000, PAGING RESPONSE ← 11:41:59.515000, AUTHENTICATION REQUEST ← 11:41:59.859000

Thank you