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# Introducing USB Based T1 E1 Analyzer Unit

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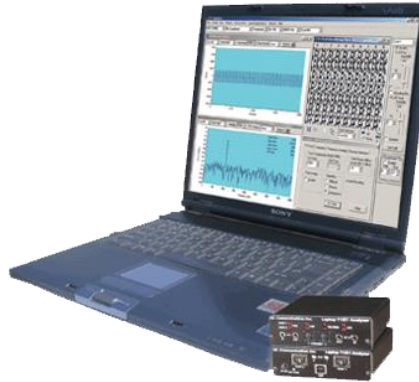
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Website: <https://www.gl.com>

# Portable USB T1 E1 Analyzer Unit



- T1 and E1 variants for basic testing needs.
- Optional features that extend the capability far beyond the most expensive T1 / E1 testers.
- Lightweight, small footprint, easy to carry in the pouch of a Notebook PC - perfect for air travel.
- Connects to a PC via a USB 2.0 port.
- Access it remotely.

# What the unit does ?



- Used for installation, test, and troubleshooting of T1 or E1 lines.
- 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 USB Based T1 E1 Analyzer 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™.

# Why the product is superior?

- Small package packs big performance
- Scalable
- Cost effective

# Benefits

- Compatibility with Windows 8 and above operating systems with user-friendly real-time software.
- USB 2.0 interface for complete access to T1 or E1 rate signals.
- Lightweight (less than 2 lbs) and small footprint (5" x 4" x 1.5"), convenience of using with a Notebook PC.
- Scalable - extremely simple to very complex configuration (with optional software).
- Instant field upgradeable with software download.
- Cost effective - one small footprint platform can do everything.
- Two (2) ports and four (4) ports captures of T1 and E1 signals with one or two USB T1 E1 Analyzers connected to a single PC.

# T1 / E1 Basic Software

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

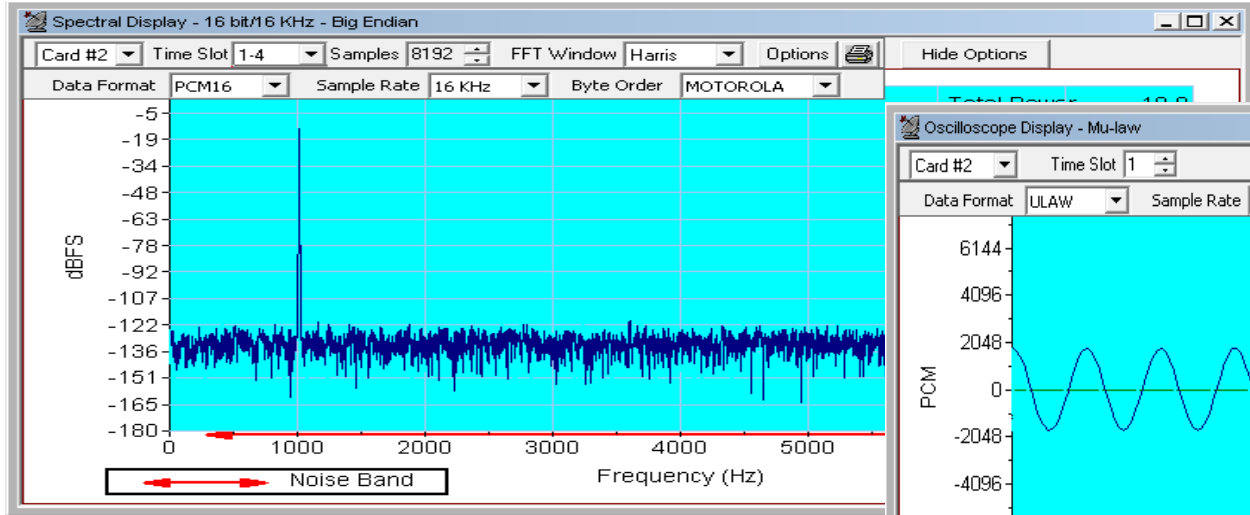
- T1E1 Line Interface Options
  - Framing Formats
  - Tx Rx Configurations
  - Clock options
  - Loop-backs
  - Monitor T1/E1 Line
  - Connection Options
  - Encoding Options

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

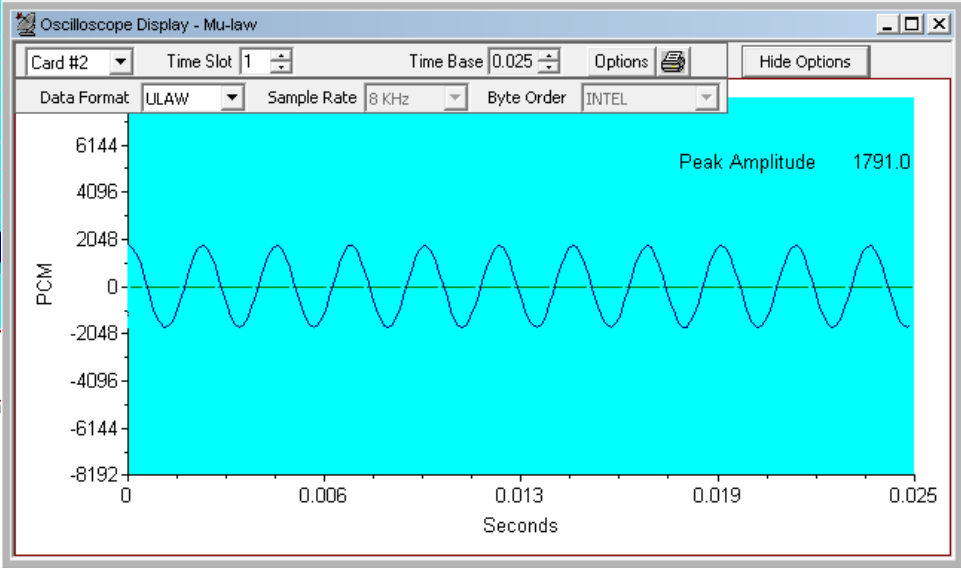


# Monitoring Features

Oscilloscope Display



Spectral Display



- 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
  - Transmit Dialing Digits

# Enhanced BERT and Tx Signaling Bits

## Enhanced BERT

The screenshot shows the 'Enhanced BERT Untitled' application window. The 'Tx Rx Settings - Card #1' tab is active, displaying various configuration options for transmission and reception. Below the settings, the 'Graph - Online Display' section shows a 'TeeChart' graph of errors over time. The graph displays three error types: LOGIC\_ERROR (red), BPV (green), and FRAME\_ERROR (blue). The x-axis represents time in seconds, and the y-axis represents the number of errors.

## T1 or E1 Basic Software

The screenshot shows the 'Tx Signaling Bits' application window. It features a grid of 24 signaling bit configurations, each with a 'Ts#' and four bits (A, B, C, D). The configurations are as follows:

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

Additional controls include 'Save', 'Deselect All', 'Transmit', 'Load', 'Select All', 'Close', and 'Device Selection' (set to 'Card #1').

The screenshot shows the 'Signaling Bits' application window for 'Card #2'. It displays a grid of 24 signaling bit configurations, each with a 'TS#' and four bits (A, B, C, D). The configurations are as follows:

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

# 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 tx clock source internal #*;
404: set outward driver loopback off #*;
404: get tx 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
```

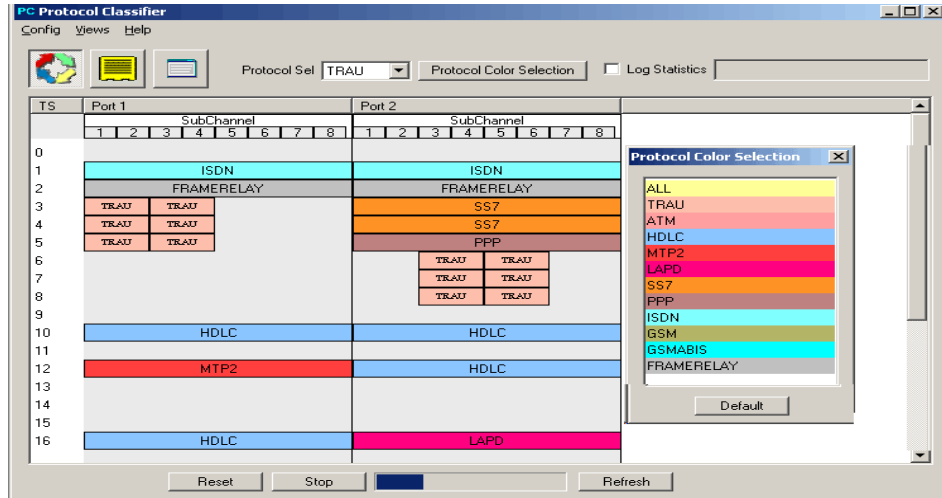
# T1 / E1 Special Applications

- Protocol Analysis
  - ISDN, HDLC, SS7, Frame Relay, TRAU, CDMA, DCME, T1 Facility Data Link.
  - E1 Maintenance Data Link, UMTS, PPP, ATM, GSM, V5.x, CAS, 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.
  - Capture, Analysis, & Emulation
    - BER / Playback.
    - Manual & Automated Record / Playback files.
    - Call Capture and Analysis (CCA).
    - Multiple Call Capture and Analysis.

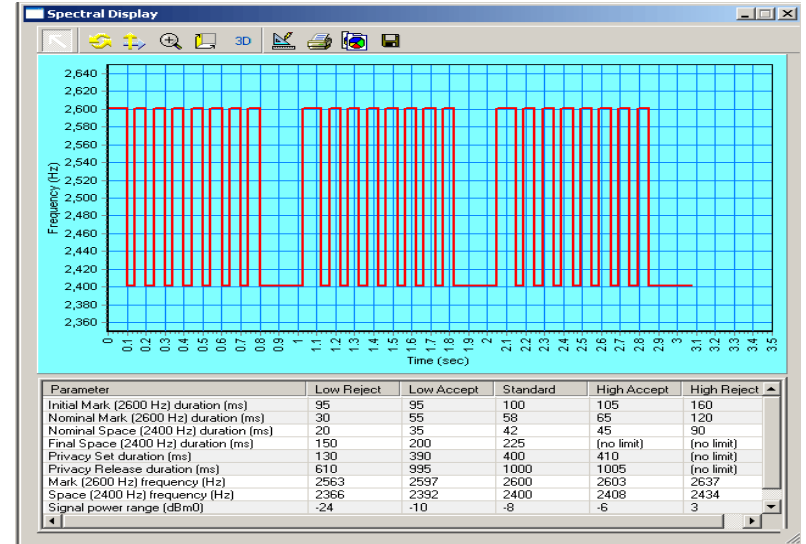
- Voice Band Analysis Software
  - Call Data Records (CDR)
  - Voice Band Analyzer (VBA)
- Fax Emulation and Analysis
  - Fax Simulator
  - Fax Analysis using GLInsight™ or FaxScan™
- Echo Cancellation Testing / Compliance
  - Manual
  - Semi-automated
  - Automated
- WCS Modules
  - Transmission/reception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

## Protocol Identifier



## SS1 Analyzer and Emulator



# Call Capture and Analysis

## 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

TS Display: 1

## Multi Call Capture and Analysis

**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

**PPP Protocol Analysis PPP**

File View Capture Statistics Database Configure Help

Dev	TSlot	SubCh	Fram...	TIME (Relative)	Len	Error	PPP Laye...	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	00:00:00.088625	14		Link Cont	Echo-Request		
✓ 1	1-31		3	00:00:00.092000	14		Link Cont	Echo-Reply		
✓ 1	1-31		4	00:00:09.993996	14		Link Cont	Echo-Request		
✓ 2	1-31		5	00:00:09.994625	14		Link Cont	Echo-Reply		
✓ 2	1-31		6	00:00:10.082625	14		Link Cont	Echo-Request		
✓ 1	1-31		7	00:00:10.083000	14		Link Cont	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 00100  
----- Link Control Layer -----  
Code = 00001001 Echo-  
Identifier = 172 (xAC)  
Length = 8 (x0008)  
Magic Number = 165410210 (x00000000)

Hex Dump of the Frame Data  
FF 03 C0 21 09 AC 00 08 09 DC 19 2E 85 63

Off-line Viewing D:\misc\MLPPP.hdl 23 726 Fr

## PPP Packet Data Analysis

**Traffic Analyzer - Summary View**

File View Call Summary Settings Help

Sip Calls Show All Sessions

Call Summary Registraton Summary Alert Summary

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	Average Inter A...
Call#000001	0001@192.168.40.245	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
Call#000002	0001@192.168.40.245	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
Call#000003	0002@192.168.40.245	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**

Counter Type Counters

Total Packet Count	8472
Total Calls	67
Active Calls	0
Completed Calls	24
Planned Calls(Completed)	0

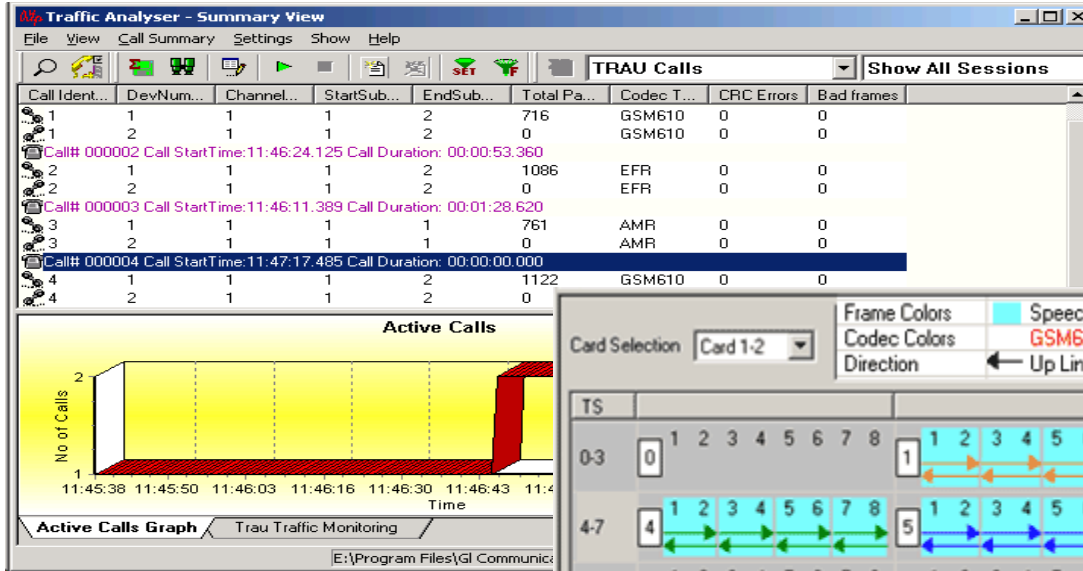
Counter Type Counters

Total SIP Packets	2904
SIP Calls	67
SIP Active Calls	0

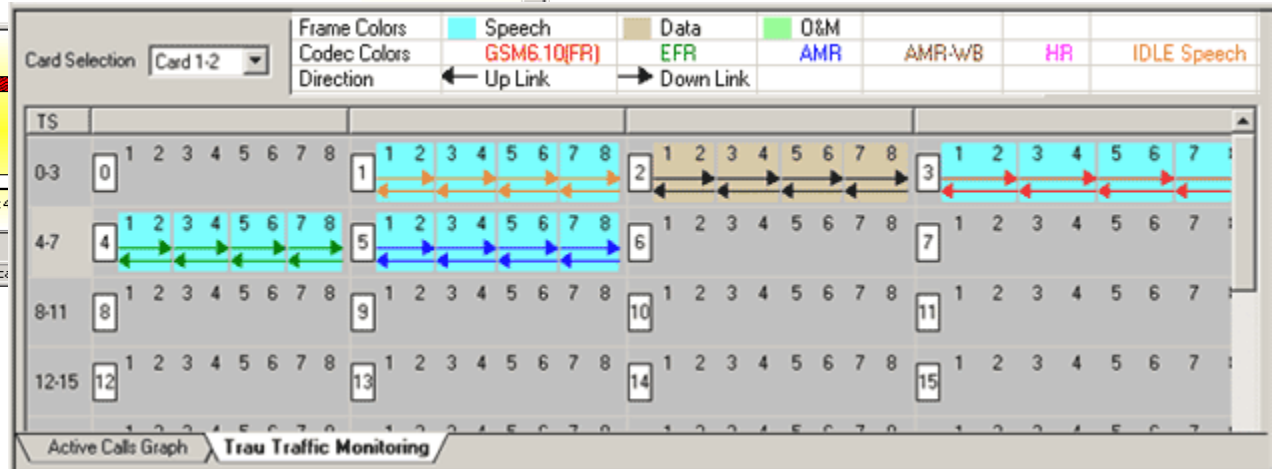
Active Calls Graph Average Jitter Distribution E-Model RTP Packets Graph SIP H323 RTP MEGACO

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

Add Delete Insert Start Abort Refresh Start All Abort

MAPS DUT

PAGING CoMmanD → 11:44:13.296000

=====  
BT  
T-bit  
Message Group  
Message Type  
Channel number  
IE Identifier  
Channel Type  
Time Slot #  
Paging Group  
IE Identifier  
Paging Group  
MS Identity  
IE Identifier  
Length Of MS  
Type of ident  
Odd/Even Ind.

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	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
4	MTC.gls	9341141852	Abort	Transmitting File	Terminate		Pass
5	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
6	MTC.gls	9341141853	Abort	Transmitting File	Terminate		Pass
7	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
8	MTC.gls	9341141854	Abort	Transmitting File	Terminate		Pass
9	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
10	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
11	MTC.gls	9341141855	Abort	Transmitting File	Terminate		Pass
12	RX_Channel Activat...	4	Completed	Transmitting File	None		Pass
13	MTC.gls	9341141856	Abort	Transmitting File	Terminate		Pass
14	MTC.gls	9341141857	Completed	RR Connection Failed	None		Unknow

Abort

MAPS DUT

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

=====  
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