
T1 E1 Analyzer – Special Applications



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- Call Capture and Analysis with Traffic Activated Triggering
- Call Data Records
- Voice Band Analyzer
- Protocol Analysis and Emulation
- Protocol Identifier
- Echo Test Solutions
- MC BERT

T1 E1 Special Applications

- Record / Playback
 - Playback File,
 - Record Data to File
 - Record from Multiple Cards
 - Automated Record / Playback
 - Automated Continuous Capture
- Call Capture and Analysis
 - Multiple Call Capture
 - Call Data Records
 - Voiceband Analyzer
 - View PCM Files (Adobe Audition/Goldwave/Audacity)
 - Multiple Call Capture
- Echo Test Solutions
 - Measure Loop Delay / ERL
 - Delay Attenuate Timeslots
 - Delay Attenuate Timeslots - Single channel
 - Digital Echo Canceller Simulator
 - GLC View - Waveform Viewer
- Multi-Channel BERT
- Protocol Identifier and Classifier
- Voice Quality Assessment

T1 E1 Special Applications (Contd.)

- Protocol Analysis
 - HDLC, Physical Layer Analyzer, ISDN, SS7, Frame Relay, GR-303, ATM, DDS, GSM, MLPPP, TRAU, GPRS, CDMA, V5.x, CAS, UMTS, E1 Maintenance Data Link, T1 Facility Data Link, SS1, DCME
- Protocol Emulation
 - E1 Maintenance Data Link, T1 Facility Data Link, ISDN, ISUP, MAP, CAS
 - GSM, HDLC, TRAU, SS1
 - Multilink Frame Relay, Multi-link PPP, ATM IMA
- Windows Client / Server Modules

Supported T1 E1 Platforms



Front Panel

Back Panel

**tProbe™ - Portable USB based T1 E1 VF
FXO FXS and Serial Datacom Analyzer**

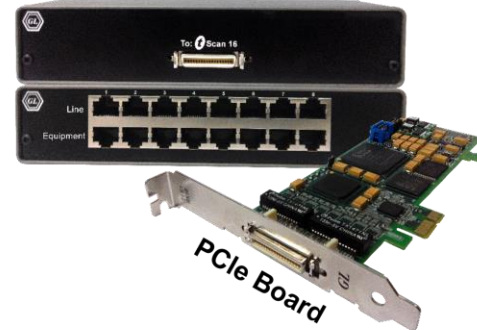


Quad / Octal T1 E1 PCIe Card



Dual T1 E1 Express (PCIe) Board

**tScan16™ with
16-port T1 E1 Breakout Box**



PCIe Board

Supported T3 E3 Platforms

Front Panel



Back Panel

**Portable USB based
Dual T3 E3 Analyzer Unit**

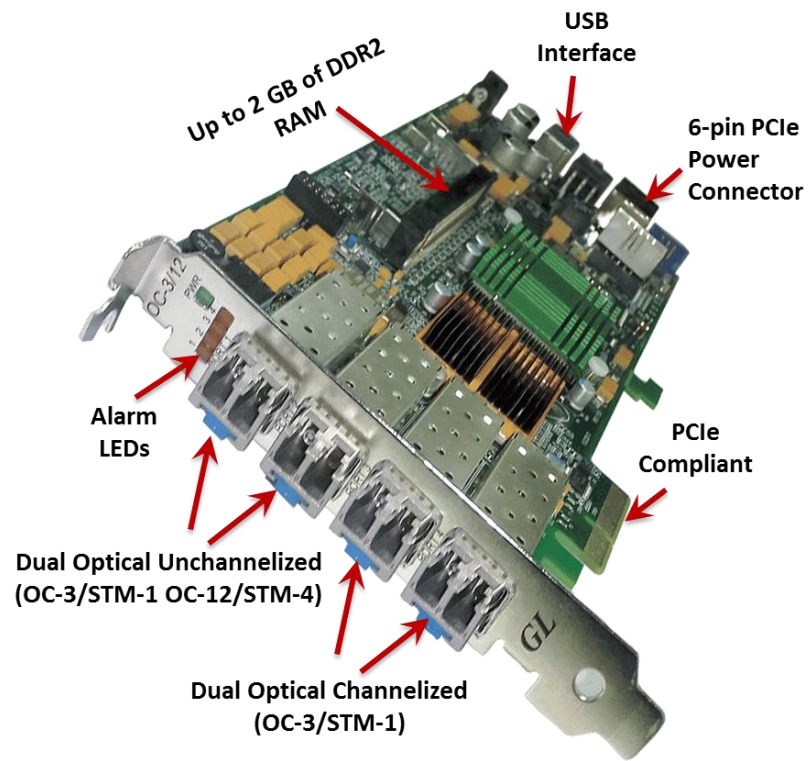
2U Rack T3 E3 Analyzer



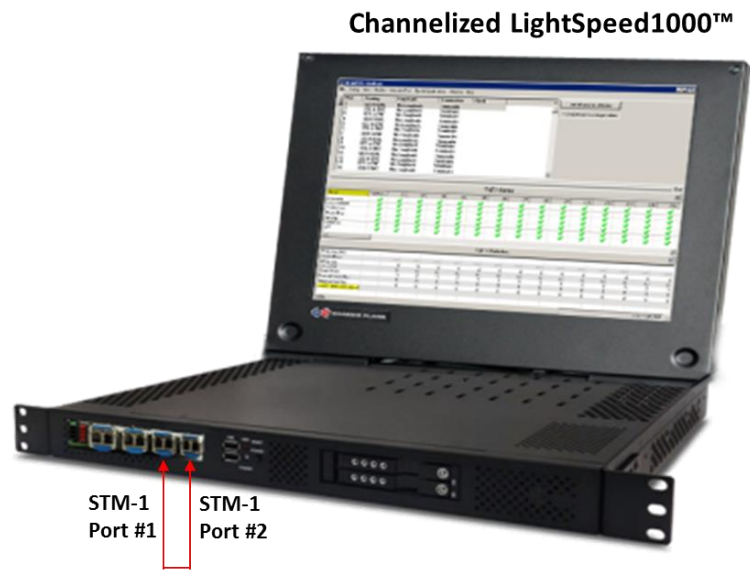
T3 T1 E3 E1 Multi-Tester Rackmount



Supported LightSpeed1000™ Platforms

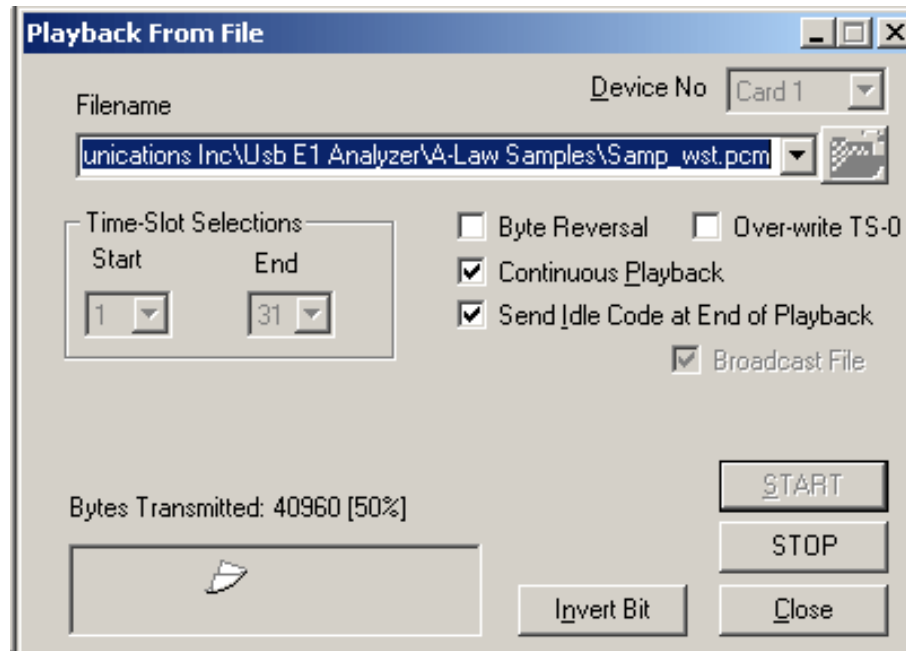


OC3 / OC12 PCIe Card LightSpeed1000™



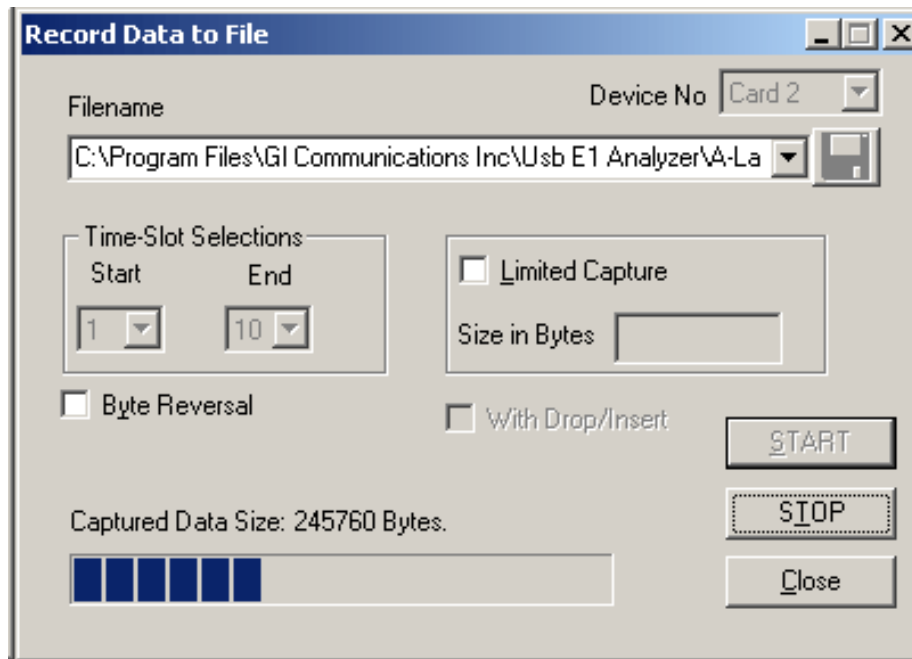
Optical Cable

Playback from File



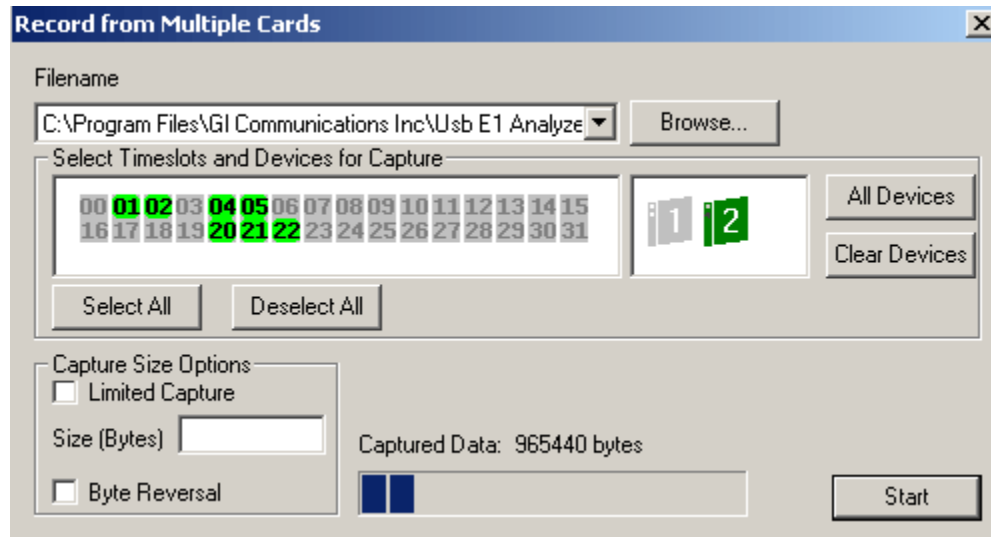
- Continuous transmission of data files (*.pcm or *.raw) on contiguous timeslots
- Repeated transmission of a single file without any data loss

Record Data to File



- Limited capture (specific number of bytes) to a file from all or selectable contiguous timeslots
- Synchronized capture, and capture in normal or reverse order

Record from Multiple Cards



- Capture data on non-contiguous timeslots
- Bytes may be captured in reverse or normal order
- Limited capture (specific number of bytes) to files from all or selected timeslots

Automated Record Playback

Task #	Tx/Rx	Card #	Timeslots	Capture/Transmit ...	Invert Bits	Reverse Bits	Continuous
7	Gl C...	1	1-3	120000	No	No	Yes
8	Gl C...	1	4-7	80352	No	No	Yes
9	Gl C...	1	10-14	129500	No	No	No

Task #	Status	Bytes Tx/Rx	Bytes Underru...
0	TERMINATED	36960	0
1	TERMINATED	79152	0
2	COMPLETED	80352	0
3	COMPLETED	129500	0
4	TERMINATED	58016	0
5	TERMINATED	25056	0
6	COMPLETED	129500	0
7			

- Permits to run several transmit or receive operation tasks synchronously
- Supports subchannel and multiple subchannel streams for transmission and reception

Filename: C:\Program Files\GL Communications Inc\Usb E File Selection

Transmit/Receive:
☒ Transmit
☐ Receive

Device Selection:
Card #1

Timeslot Selection:
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Select All DeSelect All

Tx/Rx Parameters:
Tx/Rx File Size (Bytes):

☐ Limited Capture/Transmit
☒ Continuous
☐ Invert Bits
☐ Reverse Bits
☐ Broadcast
☐ Start Immediately

Safe Margin (Bytes):
☒ Default
☐ User Defined

SubChannels:
☒ Subchannels
☐ Multiple SubChannel Streams

MSB(1) -> LSB(8):
DS0 Bits:
☒ 8
☐ 16
☐ 24
☐ 32
☐ 40
☐ 48
☐ 56

1 2 3 4 5 6 7 8

OK Cancel

Synchronous Trunk Record Playback

T1/E1 Record Playback

File Playback Record

Mission Name

☒ Limited Recording

Hour Minute Second

☐ Schedule Recording

Month Day Year Hour Min Sec

Countdown Time

☒ Select All Ports

Ports	Recorded Bytes	Recording File Path	Overrun Errors Count
<input checked="" type="checkbox"/> Port 1	<input type="text" value="1452672"/>	<input type="text" value="C:\Program Files (x86)\GL Communications Inc\Probe T1 Analyzer\"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/> Port 2	<input type="text" value="1453248"/>	<input type="text" value="C:\Program Files (x86)\GL Communications Inc\Probe T1 Analyzer\"/>	<input type="text" value="0"/>

- Synchronously Record and Playback live T1 E1 traffic on multiple T1 E1 trunks
- Record traffic on all 24 T1 channels (or all 32 E1 channels) for a specified duration or continuously

T1/E1 Record Playback

File Playback Record

Load Mission Mission Name - Test | Duration - 0:0:10
Clear Mission

☒ Select All Ports

Ports	File	Playedback ...	Un
<input checked="" type="checkbox"/> 1	Port_1_Test_130886300190640000.t1	1399776	0
<input checked="" type="checkbox"/> 2	Port_2_Test_130886300190640000.t1	1349784	0

Status: Playing 69% FFW/RW Duration

Start Time 10/06/2015 18:33:39 End Time 10/06/2015 18:33:49

Month Day Year Hour Min Sec Current Play Time

Month Day Year Hour Min Sec Jump To Time

User Defined Events

Name

☐ Event Time Month Day Year Hour Min Sec

☒ Slider Time

Events	Time
--------	------

Add
Delete
Clear
Jump To Event

T1 Demux

- Provides options to split the T1 file containing the T1 trunk traffic into 24 individual files containing each time slot traffic, and then recorded in “WAV” or “WAV and MP3” format at user-defined bit rates configuration

T1 To WAV/MP3 Demux (1.01)

INPUT

Mission Directory: ...

Channel Names: ...

OUTPUT

Output Directory: ...

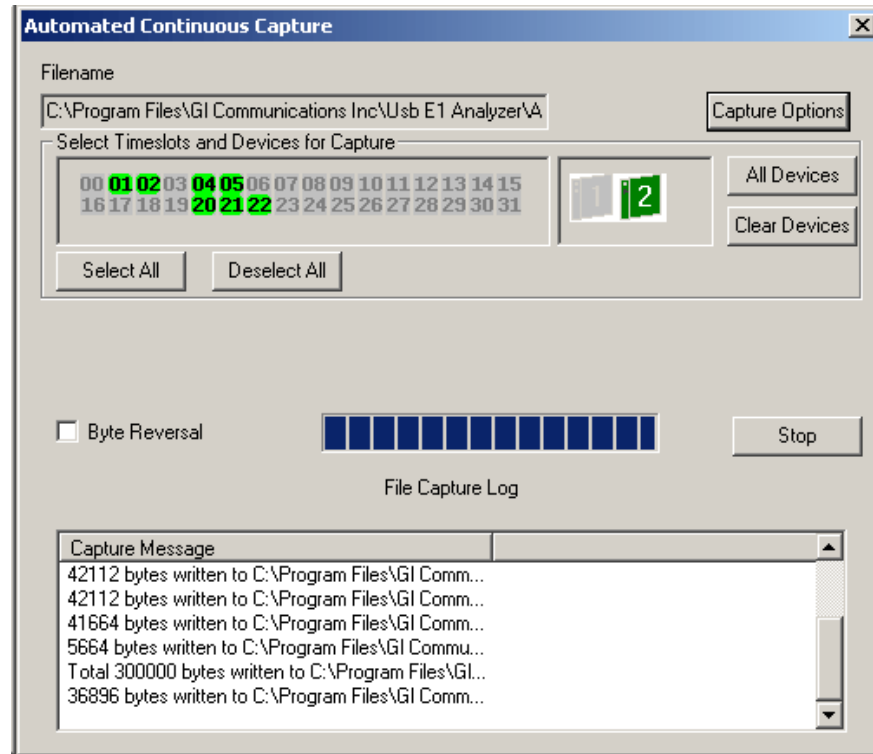
File Type: WAV AND MP3

Bit Rate (MP3): 64k

OK

Automated Continuous Capture

- Continuous capture of data (*.ala, *.ula, *.pcm, *.wav, *.ber) to different files
- Seamless chunks of data capture to files with specified size, or time limit

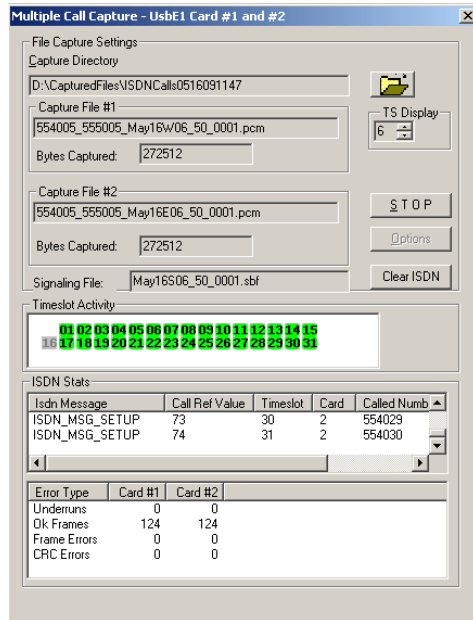


Call Capture and Analysis

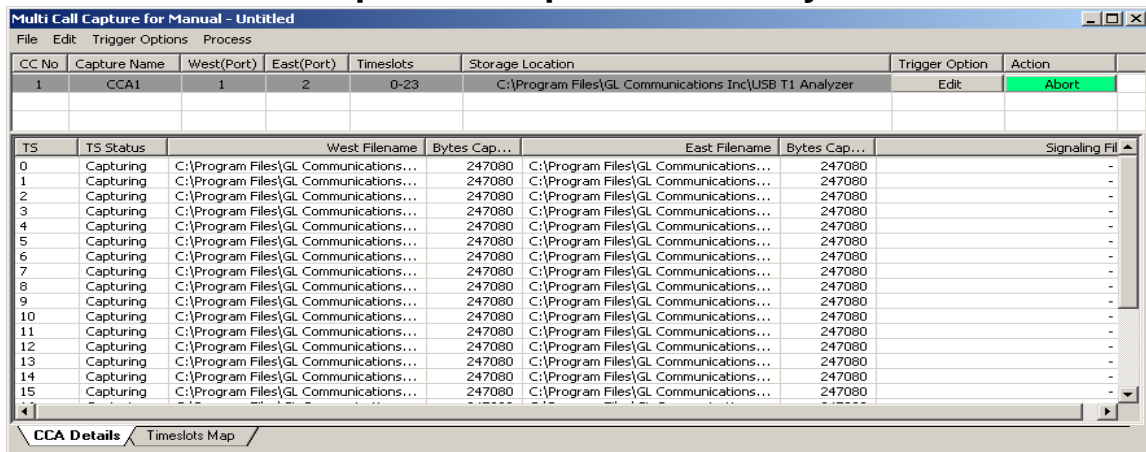
- Calls can be captured manually or captured automatically from both directions (east and west) of transmission using trigger action feature
- File naming conventions based on the types of capture (MFC-R2, Signaling, ISDN, SS7, Manual)
- The call capture application supports following types of triggers for auto capturing of call
 - Signaling based triggers - CAS -R1, wink start, MFC-R2
 - ISDN and SS7 message-based triggers
 - Traffic activated triggers –
 - Voice based on a minimum power level
 - Tones of specified frequency - Ring back tone, Dial tone, Busy tone, and DTMF digits
 - Fax traffic - V.32 / V.17, V.27, V.29
 - Modem traffic - V.22 forward/reverse channel, V.34 and V.90 uplink, Binary V.90 downlink, FSK
 - Any traffic based on any power level

Multiple Call Capture

Call Capture and Analysis



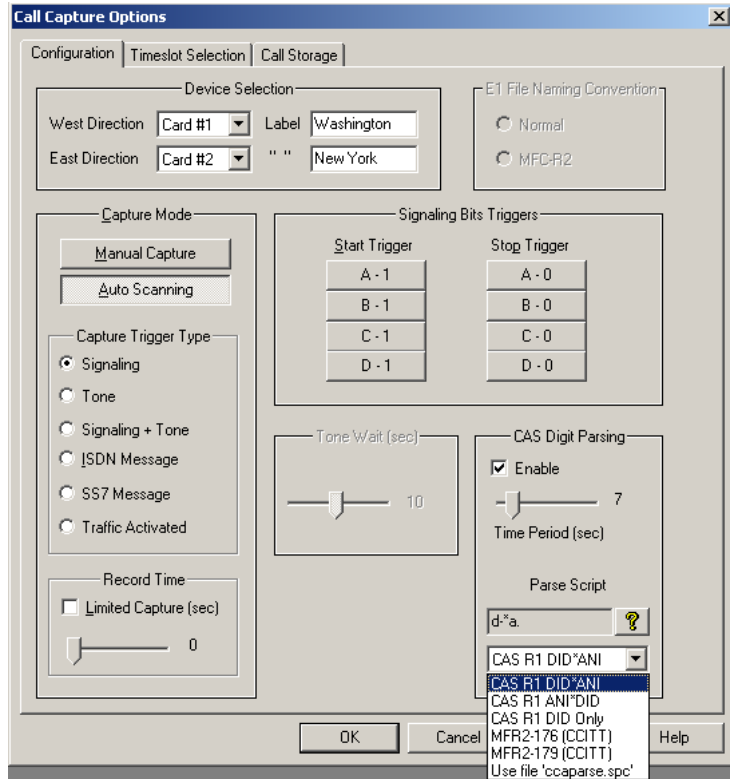
Multiple Call Capture and Analysis



- Used to record calls directly from T1/E1 lines
- Calls can be captured manually or captured automatically from both directions (east and west) of transmission using trigger action feature

Configuration

Call Capture and Analysis



Call Capture Options

Configuration | Timeslot Selection | Call Storage

Device Selection

West Direction: Card #1 Label: Washington
East Direction: Card #2 " " New York

E1 File Naming Convention

☐ Normal
☐ MFC-R2

Capture Mode

Capture Trigger Type

☒ Signaling
☐ Tone
☐ Signaling + Tone
☐ ISDN Message
☐ SS7 Message
☐ Traffic Activated

Signaling Bits Triggers

Start Trigger	Stop Trigger
A - 1	A - 0
B - 1	B - 0
C - 1	C - 0
D - 1	D - 0

Tone Wait (sec)

CAS Digit Parsing

☒ Enable
Time Period (sec)

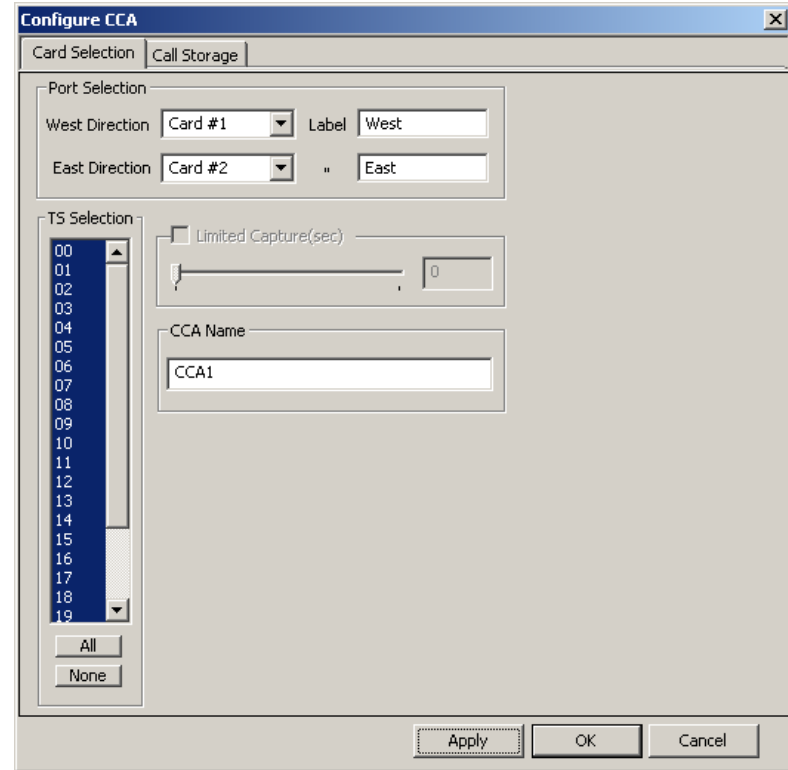
Parse Script

?
CAS R1 DID*ANI
CAS R1 ANI*DID
CAS R1 DID Only
MFR2-176 (CCITT)
MFR2-179 (CCITT)
Use file 'ccaparse.spc'

Record Time

☐ Limited Capture (sec)

Multiple Call Capture and Analysis



Configure CCA

Card Selection | Call Storage

Port Selection

West Direction: Card #1 Label: West
East Direction: Card #2 " " East

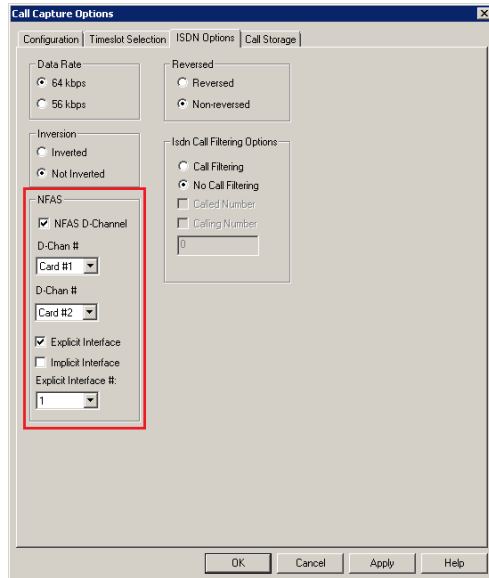
TS Selection

☐ Limited Capture(sec)

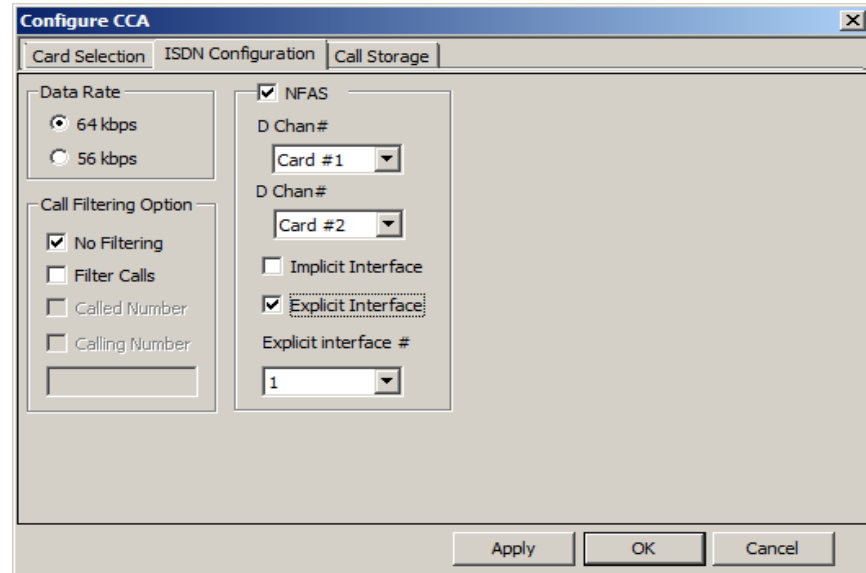
CCA Name

ISDN Call Triggering Options

Call Capture and Analysis



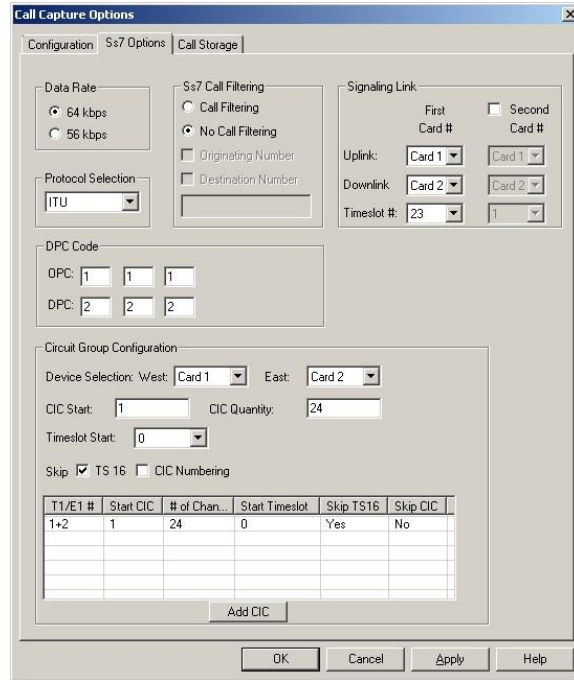
Multiple Call Capture and Analysis



- **NFAS D-Channel** - enables NFAS feature during ISDN call capturing on the trunk that contains the D-Channel or the signaling
- **Filtering** – capture ISDN messages with the called/calling number that matches the filtering criteria

SS7 Call Triggering Options

Call Capture and Analysis

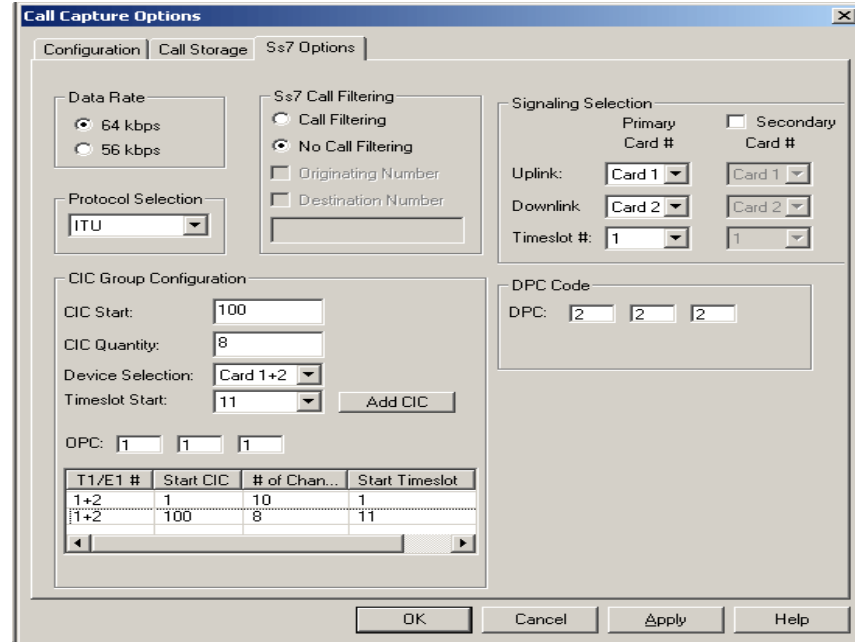


The 'Call Capture Options' dialog box is shown with the 'Call Storage' tab selected. It contains several configuration sections:

- Data Rate:** Radio buttons for 64 kbps (selected) and 56 kbps.
- Protocol Selection:** A dropdown menu set to 'ITU'.
- Ss7 Call Filtering:** Radio buttons for 'Call Filtering' (selected) and 'No Call Filtering'. Below are checkboxes for 'Originating Number' and 'Destination Number', both unchecked.
- Signaling Link:** A section with 'First Card #' and 'Second Card #' labels. Below are dropdowns for 'Uplink' (Card 1), 'Downlink' (Card 2), and 'Timeslot #' (23).
- DPC Code:** A section with three input fields for OPC (1, 1, 1) and three input fields for DPC (2, 2, 2).
- Circuit Group Configuration:** A section with 'Device Selection: West' (Card 1) and 'East' (Card 2). Below are input fields for 'CIC Start' (1) and 'CIC Quantity' (24), and a dropdown for 'Timeslot Start' (0). There are checkboxes for 'Skip TS 16' (checked) and 'CIC Numbering' (unchecked). A table is present with columns: T1/E1 #, Start CIC, # of Chan..., Start Timeslot, Skip TS16, and Skip CIC. The first row contains values: 1+2, 1, 24, 0, Yes, No. An 'Add CIC' button is at the bottom.

Buttons at the bottom: OK, Cancel, Apply, Help.

Multiple Call Capture and Analysis



The 'Call Capture Options' dialog box is shown with the 'Ss7 Options' tab selected. It contains several configuration sections:

- Data Rate:** Radio buttons for 64 kbps (selected) and 56 kbps.
- Protocol Selection:** A dropdown menu set to 'ITU'.
- Ss7 Call Filtering:** Radio buttons for 'Call Filtering' (selected) and 'No Call Filtering'. Below are checkboxes for 'Originating Number' and 'Destination Number', both unchecked.
- Signaling Selection:** A section with 'Primary Card #' and 'Secondary Card #' labels. Below are dropdowns for 'Uplink' (Card 1), 'Downlink' (Card 2), and 'Timeslot #' (1).
- CIC Group Configuration:** A section with input fields for 'CIC Start' (100) and 'CIC Quantity' (8), a dropdown for 'Device Selection' (Card 1+2), and a dropdown for 'Timeslot Start' (11). An 'Add CIC' button is present. Below is a table with columns: T1/E1 #, Start CIC, # of Chan..., and Start Timeslot. The first row contains values: 1+2, 1, 10, 1. The second row contains values: 1+2, 100, 8, 11.
- DPC Code:** A section with three input fields for DPC (2, 2, 2).

Buttons at the bottom: OK, Cancel, Apply, Help.

- Provides options to set SS7 parameters such as Data Rate, Call Filtering, Signaling Selection, and CIC (Circuit Identification Codes) Group Configuration

Traffic Activated Triggering Options

- Provides start traffic and stop traffic trigger options
- Triggers capturing on any of supported traffic, or to trigger on a specified power level
- Capture can be terminated either by specifying the silence parameters or specifying time of capture limit

The screenshot shows the 'Call Capture Options' dialog box with the 'Traffic Options' tab selected. The dialog is divided into two main sections: 'Start Traffic Triggers' and 'Stop Traffic Triggers'.

Start Traffic Triggers:

- ☐ V.22 bis forward channel
- ☐ V.22 bis reverse channel
- ☐ V.34 & V.90 Uplink
- ☐ V.29
- ☐ V.32 / V.17 > 2400bps
- ☐ V.27 ter @ 4800bps
- ☒ V.27 ter @ 2400 bps
- ☒ Voice -55.00 dBm
- ☐ Binary V.90 downlink
- ☐ FSK
- ☐ DTMF digits
- ☐ Dial tone
- ☐ Ringback
- ☐ Busy tone
- ☐ Any Traffic [] dBm

Stop Traffic Triggers:

Silence Parameters:

[120] seconds

Silence Threshold: [-55] dBm

Capture Limit:

[60] minutes

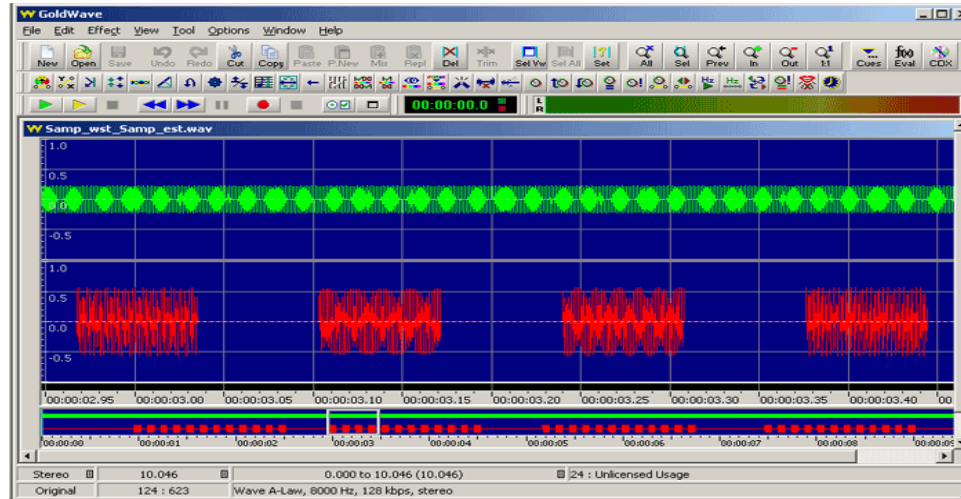
Traffic Algorithm:

- ☐ Linear
- ☐ Quadratic
- ☒ Hybrid (Recommended)
- ☐ Hybrid Filtered

Buttons at the bottom: OK, Cancel, Apply, Help.

View PCM File

Goldwave



- Goldwave software is used for viewing captured files

Call Data Records

- Compiles the output of CCA (Call Capture and Analysis) application and (optionally) VBA (Voice Band Analyzer) application and generates the following 2 types of reports –
 - Call Side Report - contains a single summary line for each call with inbound and outbound ports, channel #, time of seizure and release, and other summary information
 - Call Detail Report - contains a single summary line for each call with inbound and outbound ports, channel #, time of seizure and release, and other summary information

NRT Call Records

Probe ID	Call ID	Orig	Calling	Called	Start	Released	Duration	Rel Code	CRV	Data Rate
ATTCARD1	161207145618-23	Newyork(#2:22)	8556782122	7685612922	12/07/2016 15:09:12	12/07/2016 15:10:16	00:01:04	REL_COMPLETE	24	64k
ATTCARD1	161207145618-22	Newyork(#2:21)	8556782121	7685612921	12/07/2016 15:09:12	12/07/2016 15:10:16	00:01:04	REL_COMPLETE	23	64k
ATTCARD1	161207145618-21	Newyork(#2:20)	8556782120	7685612920	12/07/2016 15:09:12	12/07/2016 15:10:16	00:01:04	REL_COMPLETE	22	64k
ATTCARD1	161207145618-20	Newyork(#2:19)	8556782119	7685612919	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	21	64k
ATTCARD1	161207145618-19	Newyork(#2:18)	8556782118	7685612918	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	20	64k
ATTCARD1	161207145618-18	Newyork(#2:17)	8556782117	7685612917	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	19	64k
ATTCARD1	161207145618-17	Newyork(#2:16)	8556782116	7685612916	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	18	64k
ATTCARD1	161207145618-16	Newyork(#2:15)	8556782115	7685612915	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	17	64k
ATTCARD1	161207145618-15	Newyork(#2:14)	8556782114	7685612914	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	16	64k
ATTCARD1	161207145618-14	Newyork(#2:13)	8556782113	7685612913	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	15	64k
ATTCARD1	161207145618-13	Newyork(#2:12)	8556782112	7685612912	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	14	64k
ATTCARD1	161207145618-12	Newyork(#2:11)	8556782111	7685612911	12/07/2016 15:09:12	12/07/2016 15:10:15	00:01:03	REL_COMPLETE	13	64k
ATTCARD1	161207145618-11	Newyork(#2:10)	8556782110	7685612910	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	12	64k
ATTCARD1	161207145618-10	Newyork(#2:9)	8556782109	7685612909	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	11	64k
ATTCARD1	161207145618-9	Newyork(#2:8)	8556782108	7685612908	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	10	64k
ATTCARD1	161207145618-8	Newyork(#2:7)	8556782107	7685612907	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	9	64k
ATTCARD1	161207145618-7	Newyork(#2:6)	8556782106	7685612906	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	8	64k
ATTCARD1	161207145618-6	Newyork(#2:5)	8556782105	7685612905	12/07/2016 15:09:12	12/07/2016 15:10:14	00:01:02	REL_COMPLETE	7	64k
ATTCARD1	161207145618-5	Newyork(#2:4)	8556782104	7685612904	12/07/2016 15:09:12	12/07/2016 15:10:13	00:01:01	REL_COMPLETE	6	64k
ATTCARD1	161207145618-4	Newyork(#2:3)	8556782103	7685612903	12/07/2016 15:09:12	12/07/2016 15:10:13	00:01:01	REL_COMPLETE	5	64k
ATTCARD1	161207145618-3	Newyork(#2:2)	8556782102	7685612902	12/07/2016 15:09:12	12/07/2016 15:10:13	00:01:01	REL_COMPLETE	4	64k
ATTCARD1	161207145618-2	Newyork(#2:1)	8556782101	7685612901	12/07/2016 15:09:12	12/07/2016 15:10:13	00:01:01	REL_COMPLETE	3	64k
ATTCARD1	161207145618-1	Newyork(#2:0)	8556782100	7685612900	12/07/2016 15:09:12	12/07/2016 15:10:13	00:01:01	REL_COMPLETE	2	64k

Configure Run

Enable Logging
Clear Display

Running | ISDN Scanning directories...

Voiceband Analyzer

NRT Voiceband Analyzer - Vba1

Profiles Logging Help

	Input	File	Directory	Start	Elapsed	ASL	AF	RMS
Speech Level	L	S7L.ula	C:\Program Fil...	06/12/2007 15:22:48	175.000	-22.70...	48.890...	-25.6
	R	S7R.ULA	C:\Program Fil...	06/12/2007 15:22:46	175.000	-26.83...	68.196...	-28.4
Line Echo	L	S6L.ULA	C:\Program Fil...	06/12/2007 15:22:46	200.000	-22.87...	55.526...	-25.4
	R	S6R.ula	C:\Program Fil...	06/12/2007 15:22:46	200.000	-25.32...	40.734...	-29.2
Traffic Classifier	L	S5L.ula	C:\Program Fil...	05/09/2007 13:26:42	185.000	-24.94...	36.086...	-29.3
	R	S5R.ula	C:\Program Fil...	05/09/2007 13:26:56	185.000	-25.75...	40.959...	-29.6
FaxScan	L	S4L.ula	C:\Program Fil...	05/09/2007 13:26:20	190.000	-25.52...	35.426...	-30.0
	R	S4R.ula	C:\Program Fil...	05/09/2007 13:26:30	190.000	-22.80...	68.776...	-24.4
Tone Decoder	L	S3L.ula	C:\Program Fil...	05/09/2007 13:25:52	185.000	-25.33...	54.317...	-27.5
	R	S3R.ula	C:\Program Fil...	05/09/2007 13:26:06	185.000	-23.10...	40.540...	-27.0
Right-Click to Configure Each Module	L	S2L.ula	C:\Program Fil...	05/09/2007 13:25:28	190.000	-24.36...	37.295...	-28.6
	R	S2R.ula	C:\Program Fil...	05/09/2007 13:25:38	190.000	-26.94...	55.183...	-29.5
	L	S12L.ULA	C:\Program Fil...	07/16/2007 11:18:44	190.000	-42.52...	82.930...	-43.3
	R	S12R.ULA	C:\Program Fil...	07/16/2007 11:18:38	190.000	-22.80...	68.965...	-24.4
	L	S11L.ULA	C:\Program Fil...	06/13/2007 12:52:50	185.000	-24.94...	36.086...	-29.3
	R	S11R.ULA	C:\Program Fil...	06/13/2007 12:52:48	185.000	-42.58...	35.083...	-47.1
	L	S10L.ULA	C:\Program Fil...	06/13/2007 12:52:42	190.000	-34.24...	66.403...	-36.0
	R	S10R.ULA	C:\Program Fil...	06/13/2007 12:52:46	190.000	-22.80...	68.776...	-24.4
	L	S1L.ula	C:\Program Fil...	05/09/2007 13:25:04	200.000	-22.54...	50.707...	-25.4
	R	S1R.ula	C:\Program Fil...	05/09/2007 13:25:16	200.000	-25.32...	40.734...	-29.2

More Modules

Access Point #1: u-Law

E1 File

W1 File

Access Point #2: Select Data Format

E2 File

W2 File

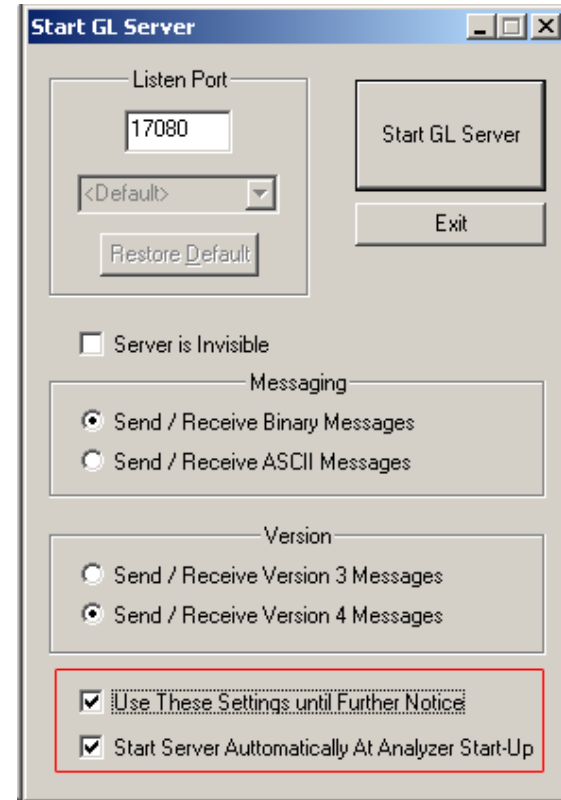
Ready Automatic Log: disabled Results: s7_vbs.csv / s7_vbe.csv 19-05-2015 17:46

Buttons: RUN, Setup, View Results, Clear Display

- VBA works in conjunction with GL's TDM, Packet, and Wireless non-intrusive capture products, such as T1 and E1 Call Capture and Analysis, PacketScan™, and PPP Analyzer products

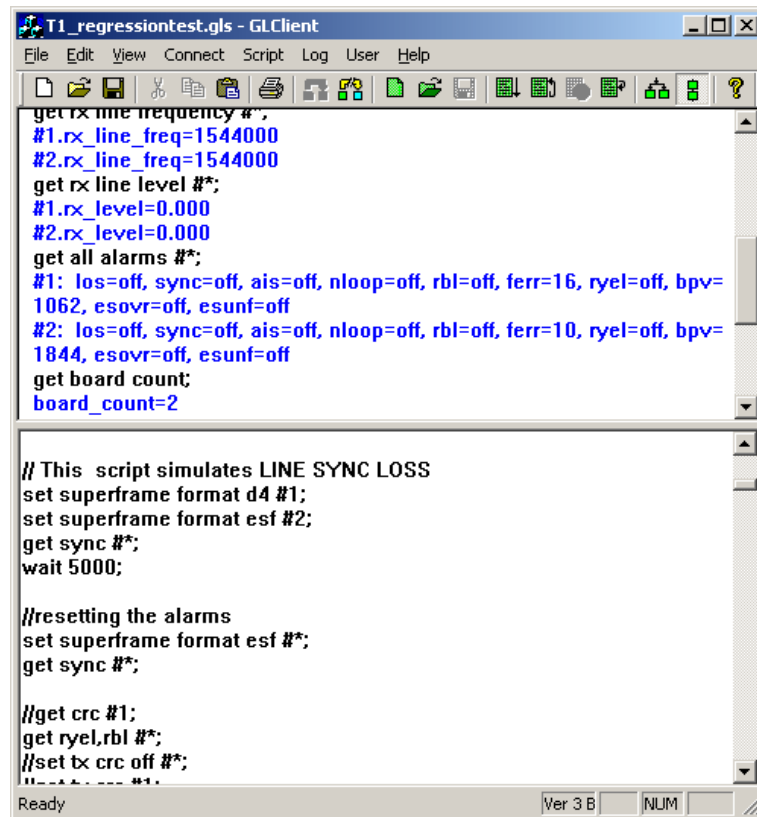
Connecting to the Server

- **Listen Port:** This is the TCP/IP port on which the server should listen for incoming connection requests from clients
- **Send / Receive Binary Messages:** Indicates that the server is to communicate with clients using binary messages
- **Send / Receive ASCII Messages:** Indicates that the server is to communicate with clients using ASCII (text-based) messages
- **Send / Receive Version 3 Messages:** Indicates that the server is to communicate with clients using version 3 messages
- **Send / Receive Version 4 Messages:** Indicates that the server is to communicate with clients using version 4 messages
- **Use these settings Until Further Notice:** This option to use the current configuration settings as default settings at analyzer startup
- **Start Server Automatically At analyzer Startup:** It will start the WCS server at analyzer startup by default



T1/E1 Client

- In the lower workspace area, the client users key in commands or load in commands from previously saved files
- The upper log area displays the script and the server responses



```
T1_regressiontest.gls - GLClient
File Edit View Connect Script Log User Help

get rx line frequency #*;
#1.rx_line_freq=1544000
#2.rx_line_freq=1544000
get rx line level #*;
#1.rx_level=0.000
#2.rx_level=0.000
get all alarms #*;
#1: los=off, sync=off, ais=off, nloop=off, rbl=off, ferr=16, ryel=off, bpv=
1062, esovr=off, esunf=off
#2: los=off, sync=off, ais=off, nloop=off, rbl=off, ferr=10, ryel=off, bpv=
1844, esovr=off, esunf=off
get board count;
board_count=2

// This script simulates LINE SYNC LOSS
set superframe format d4 #1;
set superframe format esf #2;
get sync #*;
wait 5000;

//resetting the alarms
set superframe format esf #*;
get sync #*;

//get crc #1;
get ryel,rbl #*;
//set tx crc off #*;
//----- #1;
```

Ready Ver 3 B NUM

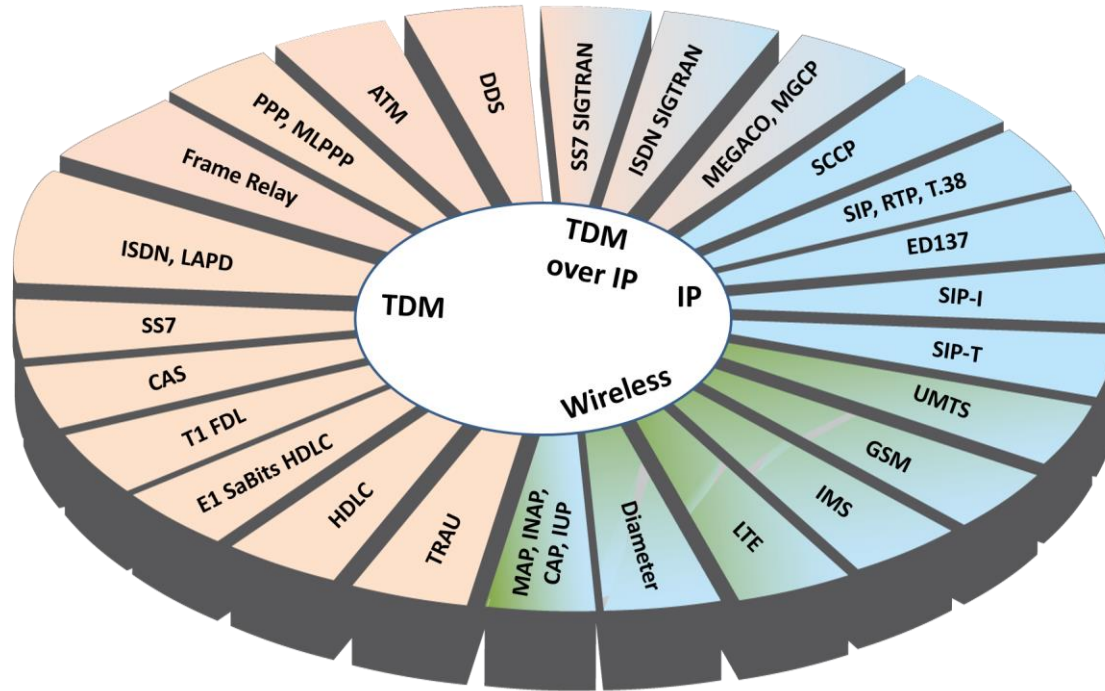
Features

Remote operation	✓
Automation	✓
Multi-site connectivity	✓
Simultaneous testing of high capacity T1/E1 systems through a single Client	✓
Integration of T1/E1 testing into more complex testing systems	✓
Intrusive / Non-Intrusive T1/E1 Testing	✓

Applications

- File based Record / Playback
- Transmit / Detect digits
- Channel Associated Signaling (CAS) Simulation
- FAX Simulation
- Jitter Measurement, Pulse Mask
- DSP Functionality
- Dynamic DSP Capability
- ISDN Emulation
- Multi-Channel HDLC Emulation and Analysis
- File based HDLC Record / Playback and Remote Record / Playback
- File based High Throughput HDLC Record / Playback
- PPP, MLPPP, and Multi-Channel (MC) Emulation and Analysis
- File based TRAU Record / Playback
- Multi-Channel TRAU Tx / Rx Emulation and Analysis
- File based HDLC Record / Playback over SA-bits
- File based Record / Playback over FDL
- Multi-link Frame Relay Emulation
- Inverse Multiplexing for ATM Emulation
- Multi-Channel BER Testing
- T1 E1 Traffic Classifier
- SS7 Decode Agent
- ISDN Decode Agent
- SS1 Protocol Emulation

Protocol Analysis



- GL Communications provides a host of protocol analyzers and simulators for testing a variety of protocols
- Analysis may be done both in real-time and off-line

Protocol Analysis and Emulation

- HDLC Analysis and Emulation
 - HDLC Analysis, Playback, Impairment, Tx and Rx Utility
 - Client –Server based HDLC Emulation modules
- ISDN Analysis and Emulation
 - ISDN Analysis
 - ISDN Emulator (GUI)
 - Client-Server based ISDN Emulation module
 - Scripted Emulator using MAPS™
- T1 Facility Data Link
 - Facility Data Link Analysis
 - Facility Data Link Playback
 - Client-Server based FDL Emulation module
- E1 Maintenance Data Link
 - E1 Maintenance Data Link Analysis and Playback
 - Client-Server based SaBits HDLC Emulation module
- TRAU Analysis and Emulation
 - TRAU Analysis, Traffic Playback, TRAU ToolBox
 - TRAU Tx/Rx Test (GUI Based)
 - Client-Server based TRAU Emulation modules
- Multilink PPP Analysis and Emulation
 - MLPPP Analysis
 - MC-MLPPP Emulator (GUI Based)
 - Client-Server based MLPPP Emulation module
 - Scripted Conformance Test Tool using MAPS™

Protocol Analysis and Emulation (Contd.)

- Multilink Frame Relay Analysis and Emulation
 - Frame Relay Analysis
 - Multilink Frame Relay Emulator (GUI Based)
 - Client-Server based MFR Emulation module
- ATM IMA Analysis and Emulation
 - ATM IMA Analysis
 - ATM IMA Emulator (GUI Based)
 - Client-Server based ATM IMA Emulation module
- CAS
 - Emulation using (GUI Based)
 - DTMF, MF, MFC-R2 Emulation using GUI and Client-server
 - Scripted Emulator using MAPS™
- SS7(C7) Analysis and Emulation
 - SS7 Analysis
 - Scripted ISUP Emulator using MAPS™
 - Scripted MAP Emulator using MAPS™
- GSM Analysis and Emulation
 - GSM Analysis
 - Scripted GSM A Emulator using MAPS™
 - Scripted GSM Abis Emulator using MAPS™
- SS1 Analysis and Emulation
 - SS1 Signaling Analysis
 - SS1 Emulator (Dialer)
- Other Protocol Analyzers
- GR-303, DDS, V5.X, GPRS, CDMA 2000, UMTS, DCME

Protocol Analysis

ISDN Protocol Analysis Q.93x 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	TSlot	SubCh	Frame#	TIME (Relative)	Len	Error	Message Type Q.93x	Call Reference Value Q.93x	Channel Number Q.93x	Called Number Q.93x
✓ 1	0		4	00:00:00.378362	46		SETUP	1538	6	6704784
✓ 2	0		5	00:00:00.379137	6					
✓ 2	0		6	00:00:00.379775	11		CALL PROCEEDING	1538		
✓ 1	0		7	00:00:00.380175	6					

Card1 TimeSlot=0 Frame=4 at 00:00:00.378362 OK Len=46 *** Right click to SHOW/HIDE layer

HDLC Frame Data + FCS

----- LAPD Layer -----

0000 C/R =1. Response(User) Command(Network)

0000 SAPI = 00000000.. (0)

0001 TEI = 00000000.. (0)

0002 Ctl =0 Information

Hex Dump of the Frame Data

Hex	ASCII
02 01 50 62 08 02 06 02 05 04 03 80 90 A3 18 03	Pb 03
A9 83 86 6C 08 80 35 35 35 36 30 30 30 70 08 80	0111 55556000p 0
36 37 30 34 37 38 34 7D 02 91 81 A1 14 4F	6704784} i O

Device #	Frame Count(Device #)
1	13973
total 1	13973
2	13973
total 2	13973

Call ID	Call Status	Calling Num	Called Num	Call Start Date & Time	Call Duration	Release Complete Cause	DevNo	TS	CRV	Interf
1	completed	5551000	5179641	2019-03-11 15:06:49.165250	00:00:00.541387	Normal call clearing	1	0	1794	
2	completed	5552000	1626921	2019-03-11 15:06:49.173825	00:00:00.574650	Normal call clearing	1	0	2050	
3	completed	5553000	8604110	2019-03-11 15:06:49.182400	00:00:00.566350	Normal call clearing	1	0	2306	
4	completed	5554000	9402951	2019-03-11 15:06:49.190887	00:00:00.559737	Normal call clearing	1	0	2562	
5	completed	5555000	8752706	2019-03-11 15:06:49.199575	00:00:00.552900	Normal call clearing	1	0	2818	

C:\Program Files\GL Communications Inc\U 27 946 Frames

Summary
view

Detail
view

Hex Dump
view

Statistics
view

Call trace
view

Key Features

- Consolidated GUI – Displays summary of all decodes, detail and hex-dump view of each frame, statistics view, and call detail record views
- Perform real-time / offline / remote analysis
- Supports various protocol standards for proper decode
- Capture options such as channel selection, CRC, bit reversion, bit inversion, scrambler and more for real-time capture
- Fine tune results with filtering and search capability
- Export decode results to ASCII or CSV files
- Any protocol field can be added to the summary view, filtering, and search features providing users more flexibility to monitor required protocol fields
- Trace File Saving Options
- Extensive statistics computation capabilities
- Call Detail Records for ISDN, Frame Relay, ATM, SS7, GR303, GSM, GPRS, CDMA, UMTS, and V5.x
- Network Monitoring
- Remote Access Capability
- Option to create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently
- Allows the user to create search/filter criteria automatically from the current screen selection

Packet Data Analysis (PPP Protocols)

PPP Protocol Analysis PPP

File View Capture Statistics Database Configure Help

0 GoTo

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 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					
✓ 2	1-31		6	00:00:10.082625	14					
✓ 1	1-31		7	00:00:10.083000	14					

Card1 TimeSlots=1-31 Frame=0 at 00:00:00.000000 OK Len=14
HDLC Frame Data + FCS

===== PPP Link Layer =====

Address = 11111111
Ctl = 00000001
Protocol = 11000000

===== Link Control Layer =====

Code = 00001000
Identifier = 172 (x0A)
Length = 8 (x0008)
Magic Number = 16541000

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

Traffic Analyzer - Summary View

File View Call Summary Settings Help

Sip Calls Show All Sessions

Call Summary Registration Summary Alert Summary

Call #	SSRC	Payload	Packet Received	Conversion MOS/R...	Listening MOS/R...	Packets Discard	Missing Packets	Duplicate Packets	Out Of Sequen...	Average Gap(ms)	Average Delay	Average Jitter	Average Inter-Arr...	Cumulative Packet...	Max/Min Gap	Max/Min Delay	Max/Min Jitter	Max/Min RTDelta	Average RTDelta	lupHdr CRC Pa...	lupPaylo CRC Pa...
Call#00000001 Caller:0011@192.168.1.70 Callee:0011@192.168.1.73 CallId GLPG-18536709201519579 Call StartTime:2015-06-18 10:21:46.121 Call Duration: 00:00:35.507																					
1	17918...	G726...	1906	2.07 / ...	2.07 / ...	0 / 0.00	241 / ...	658 / ...	0 / 0.00	20.00	0.00	18.00	7	-454	259.46...	110 / ...	36.85 ...	0.316 ...	0.259	0 / 0	0 / 0
1	17872...	G726...	1941	2.02 / ...	2.02 / ...	0 / 0.00	238 / ...	692 / ...	0 / 0.00	18.29	0.00	21.00	4	-324	259.94...	164 / ...	53.38 ...	0.318 ...	0.293	0 / 0	0 / 0
Call#00000002 Caller:0125@192.168.1.70 Callee:0125@192.168.1.73 CallId GLPG-18533109201519584 Call StartTime:2015-06-18 10:21:46.481 Call Duration: 00:00:30.428																					
2	17911...	EVRC...	1987	2.57 / ...	2.57 / ...	0 / 0.00	236 / ...	702 / ...	0 / 0.00	16.60	0.00	16.00	21	-393	62.34...	60 / 62	26.06 ...	0.269 ...	0.255	0 / 0	0 / 0
2	17934...	EVRC...	1963	2.07 / ...	2.07 / ...	83 / 3...	239 / ...	681 / ...	0 / 0.00	15.51	0.00	18.00	18	-411	224.58...	204 / ...	38.50 ...	0.000 ...	0.000	0 / 0	0 / 0
Call#00000003 Caller:0013@192.168.1.70 Callee:0013@192.168.1.73 CallId GLPG-18532509201519589 Call StartTime:2015-06-18 10:21:46.541 Call Duration: 00:00:32.269																					
3	17909...	G726...	2111	2.27 / ...	2.27 / ...	0 / 0.00	258 / ...	754 / ...	0 / 0.00	16.56	0.00	17.00	21	-475	64.01...	60 / 62	25.01 ...	0.252 ...	0.234	0 / 0	0 / 0
3	17934...	G726...	2089	1.93 / ...	1.93 / ...	81 / 3...	255 / ...	730 / ...	0 / 0.00	15.45	0.00	18.00	19	-416	224.68...	204 / ...	34.01 ...	0.245 ...	0.235	0 / 0	0 / 0
Call#00000004 Caller:0072@192.168.1.70 Callee:0072@192.168.1.73 CallId GLPG-18531709201519595 Call StartTime:2015-06-18 10:21:46.621 Call Duration: 00:00:31.055																					
4	17898...	AMR...	1358	4.04 / ...	4.04 / ...	0 / 0.00	0 / 0.00	0 / 0.00	0 / 0.00	22.90	0.00	0.00	0	0	177.69...	17 / 17	2.65 / ...	0.368 ...	0.276	0 / 0	0 / 0
4	17920...	AMR...	1353	3.69 / ...	3.69 / ...	38 / 2...	0 / 0.00	0 / 0.00	0 / 0.00	23.00	2.00	0	0	0	296.07...	196 / ...	34.91 ...	0.356 ...	0.356	0 / 0	0 / 0
Call#00000005 Caller:0128@192.168.1.70 Callee:0128@192.168.1.73 CallId GLPG-18529309201519601 Call StartTime:2015-06-18 10:21:46.841 Call Duration: 00:00:35.614																					
5	17909...	G726...	2089	1.93 / ...	1.93 / ...	81 / 3...	255 / ...	730 / ...	0 / 0.00	15.45	0.00	18.00	19	-416	224.68...	204 / ...	34.01 ...	0.245 ...	0.235	0 / 0	0 / 0

Active Calls

Print Save...

Counter Type Counters

Total Calls	1368
Active Calls	0
Completed Calls	1368
Purged Calls(cleared)	0
Failed Calls	0
Calls Per Second	7

Counter Type Counters

Total SIP Packets	7351
SIP Calls	1368
SIP Active Calls	0
SIP Completed Calls	1368
SIP Purged Calls	0

Active Calls Graph Average Jitter Distribution E-Model RTP Packets Graph T.38 Analysis Call Graph Call Summary

SIP / H323 / RTP / MEGACO

Key Features

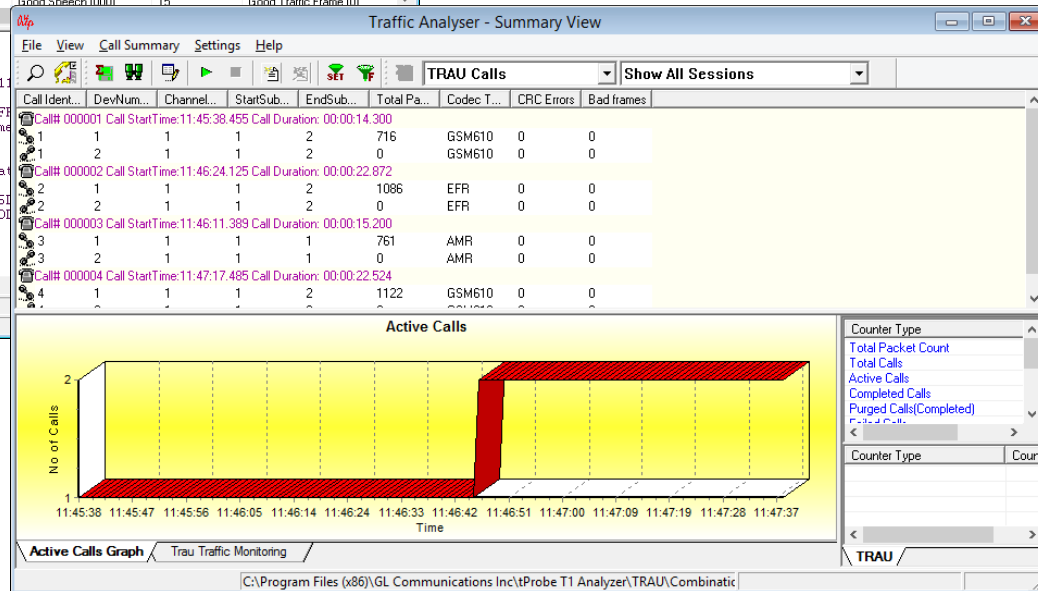
- Supported protocols - SIP (Session Initiation Protocol RFC 2543 and RFC 3261), Megaco RFC 3525, Megaco RFC 3015, MGCP, T.38, H323/H225, and RTP
- Full RTP Analysis with audio capture/playback supported for all common codecs
- Supports saving the selected calls from traffic analyzer into *.HDL or *.PCAP formats
- T.38 Analysis - User can decode T.38 frames received over VoIP calls and can have ladder diagram for T.38 traffic flow, reassemble the fragmented data and to identify the T.30 message from it
- Displays summary of signaling, audio, and video parameters of each call
- Video parameters such as Source/Destination Video Channels, Media Type, SSRC, Average Delay/Gap, Packet Counts, Media Delivery Index (MDI- (Delay Factor : Media Loss Rate), and Frame Rate are calculated are displayed for all video calls

Packet Data Analysis (TRAU Protocols)

TRAU Protocol Analysis TRAU										
Dev	TSlot	SubCh	Frame#	TIME (Relative)	Len	Error	Frame Type TRAU	Speech Classification TRAU	Time Alignment TRAU	Bad Frame Indicator-BFI (C12) TRAU
✓ 1	1	1-2	0	00:00:00.000000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	1	00:00:00.020000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	2	00:00:00.040000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	3	00:00:00.060000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	4	00:00:00.080000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	5	00:00:00.100000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	6	00:00:00.120000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	7	00:00:00.140000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	8	00:00:00.160000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	9	00:00:00.180000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)
✓ 1	1	1-2	10	00:00:00.200000	40		Uplink Full Rate Speech (FR - GSM 6.10)	Good Speech (000)	15	Good Traffic Frame (0)

Card1 TimeSlot=1 SubChannels=1-2 Frame=0 at 00:00:00.000000 OK Len=40
HDLC Frame Data + FCS
===== TRAU Layer =====
0000 Frame Sync = Valid Frame Sync (000000000000000011
Frame Direction = 00010 Uplink (User side) (00010)
0002 Frame Type = .00010.. Uplink Full Rate Speech (FR
0002 Time Alignment =00 0000.... No change in frame
Speech Classification = 000 Good Speech (000)
Bad Frame Indicator-BFI (C12) = 0 Good Traffic Frame (0)
0003 Silence Descriptor Frame-SID (C13-C14) =00.. n<2 (n=Number of bit deviat
0003 TAF (C15) =0 (0)
0004 Speech bits (D1-D260) = x33E2D844A14001D913693761A401DB15B5F
0004 Speech block (As output from codec) = xCC471B228502809BC896EC862580DBA8AD
0026 DTX indicator (C17) =0 DTX not applied
0027 Time Alignment =1111 (15)

Off-line Viewing C:\Program Files (x86)\GL Communications\3 685 Frames

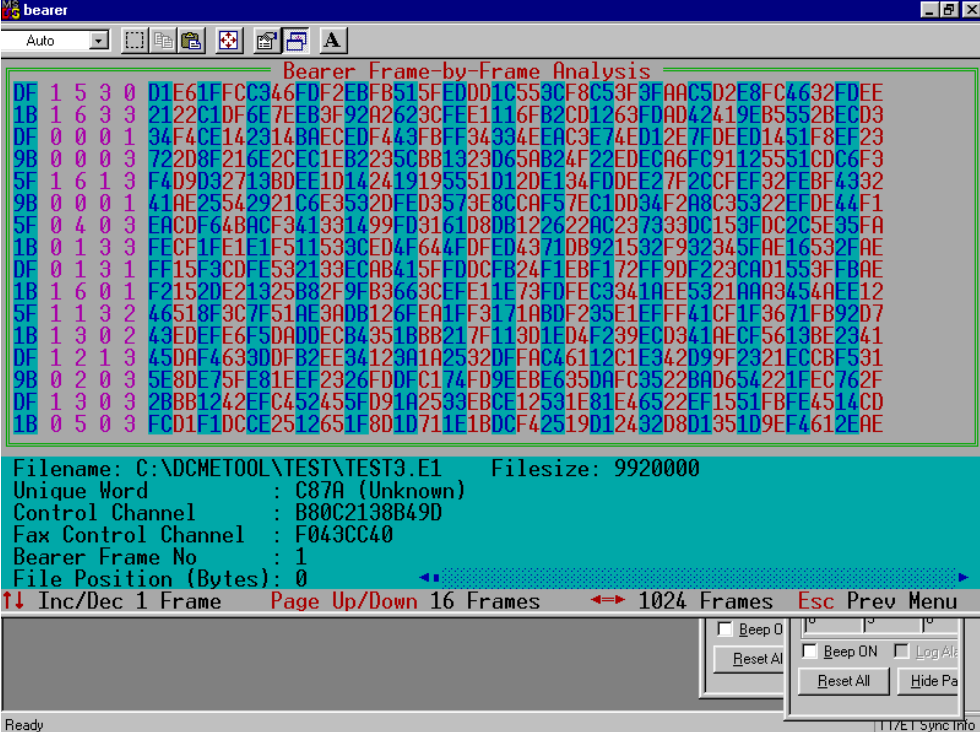


Key Features

- View summary of data transmission in each direction including call identity, device number, channel Number, start sub channel, end sub channel, total packets, codec type CRC errors and bad frames
- Split and compare the two sessions of a call in Detail View
- Includes separate statistical counts on total packets, calls, and captured frames, and so on
- Provides graphs to view active calls over the duration of the call and TRAU Traffic Monitoring to analyze and classify traffic types in a real-time GSM network
- Extracts speech data from TRAU frames, play the speech data on PC soundcard, or record voice to a file, after decompressing TRAU speech data to 16-bit linear PCM

DCME Analyzer

- Real-time and post processing of the DCME bearer signal
- Verification of channel mapping and implementation timing of the DCME protocol
- Bit level analysis and verification of facsimile data sub-multiplexing on DCME bearer



The screenshot displays the DCME Analyzer software interface. The main window is titled "bearer" and shows a "Bearer Frame-by-Frame Analysis" table. The table has columns for frame number, channel, and data. The data is displayed in hexadecimal format. Below the table, there is a section for file information: "Filename: C:\DCMETOOL\TEST\TEST3.E1", "Filesize: 9920000", "Unique Word: C87A (Unknown)", "Control Channel: B80C2138B49D", "Fax Control Channel: F043CC40", "Bearer Frame No: 1", and "File Position (Bytes): 0". At the bottom, there are controls for navigation and display, including "Inc/Dec 1 Frame", "Page Up/Down 16 Frames", "1024 Frames", and buttons for "Beep ON", "Reset All", "Log All", and "Hide Pa".

DF	1	5	3	0	D1E61FFCC346FD2EBFB515FEDDD1C553CF8C53F9FAAC5D2E8FC4632FDEE
1B	1	6	3	3	2122C1DF6E7EB3F92A2623CFEE1116FB2CD1263FDAD42419EB5552BEC03
DF	0	0	0	1	34F4CE142314BAECEDF443FBFF34334EEAC3E74ED12E7FDEED1451F8EF23
9B	0	0	0	3	722D8F216E2CEC1EB2235CBB1323D65AB24F22EDECA6FC91125551CDC6F3
5F	1	6	1	3	F4D9D327138DEE1D142419195551D12DE134FDDEE27F2CCFEF32FEBF4332
9B	0	0	0	1	41AE25542921C6E3532DFED3573E8CCAF57EC1DD34F2A8C35322EFDE44F1
5F	0	4	0	3	EACDF64BACF341331499FD3161D8DB122622AC237333DC153FDC2C5E95FA
1B	0	1	3	3	FECF1FE1E1F511533CED4F644FDFED4371DB921532F932345FAE16532FAE
DF	0	1	3	1	FF15F3CDFE532133ECAB415FFDDCFB24F1EBF172FF9DF223CAD1553FBFAE
1B	1	6	0	1	F2152DE21325B82F9FB3663CFE11E73DFEC3341AEE5321AA3454AEE12
5F	1	1	3	2	46518F3C7F51AE3ADB126FA1FF3171ABDF295E1EFFF41CF1F3671FB92D7
1B	1	3	0	2	43EDEFE6F5ADDEC84351BBB217F113D1ED4F239ECD341AECF5613BE2341
DF	1	2	1	3	45DAF4633D0FB2EE34123A1A2532DFFAC46112C1E342D99F2321ECCBF531
9B	0	2	0	3	5E8DE75FE81EEF2326FDDFC174FD9EEBE635DAFC9522BAD654221FEC762F
DF	1	3	0	3	2BBB1242EFC452455FD91A2533EBCE12531E81E46522EF1551FBFE4514CD
1B	0	5	0	3	EC01F1DCCE2512651F8D1D71E1BDC42519D12432D8D1351D9FE4612EAE

Filename: C:\DCMETOOL\TEST\TEST3.E1 Filesize: 9920000
Unique Word : C87A (Unknown)
Control Channel : B80C2138B49D
Fax Control Channel : F043CC40
Bearer Frame No : 1
File Position (Bytes): 0

↑↓ Inc/Dec 1 Frame Page Up/Down 16 Frames ⇐ 1024 Frames Esc Prev Menu

Beep ON Log All
Reset All Hide Pa

Ready T1/T2 Sync Info

DDS Protocol Analyzer

- Conventional Digital Signal Services (DDS) data channel may utilize multiple, all, or a fractional timeslot of the T1 line, with the transmission rates of 2.4 kbps, 4.8 kbps, 9.6 kbps, 19.2 kbps, and 56 kbps
- Users can capture and analyze DDS frames using either real-time or offline analyzers, and record all into a trace file

The screenshot displays the DDS Protocol Analysis DDS 64-bit application window. The main window has a menu bar (File, View, Capture, Statistics, Database, Configure, Help) and a toolbar. Below the toolbar is a table of captured frames with columns: Dev, TSlot, SubCh, Frame#, TIME (Date), Len, and Error. The table shows several frames, with Frame# 12655 selected. Below the table, the 'Frame Data' section shows the details for Card2 TimeSlot=7 Frame=12655 at 2017-11-28 09:23:26.971500 OK Len=411. The frame data is displayed in a hex dump format, showing the raw data bytes and their corresponding ASCII values. The hex dump is organized into two columns, with the left column showing the raw data bytes and the right column showing the ASCII values. The data is as follows:

Hex	ASCII
32 31 32 0D 41 34 2D 20 20 33 36 20 20 20 20 20	212 A4- 36
45 53 4E 3D 30 33 30 20 20 20 20 20 20 20 20	ESN=030
31 32 20 0D 28 39 30 33 29 20 37 35 37 2D 38 37	12 (903) 757-87
38 36 20 30 36 3A 33 33 20 30 37 2F 33 31 2F 32	86 06:33 07/31/2
30 31 37 0D 20 20 20 20 32 31 33 31 20 20 20 20	017 2131
20 20 20 0D 41 4C 50 49 4E 45 20 52 44 20 20	ALPINE RD
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20	
20 20 20 20 20 20 20 20 20 20 20 20 20 20 20	
20 28 39 30 33 29 20 37 35 37 2D 38 37 38 36 20	(903) 757-8786
42 55 53 4E 0D 4C 4F 4E 47 56 49 45 57 20 20 20	BUSN LONGVIEW

Running. Utilization 0.00% C:\Program Files (x86)\GL Comr Captured 12 696 frames

ISDN Analysis and Emulation

ISDN Protocol Analysis Q.93x

Frame#	TIME (Relative)	Len	E...	C/R	SAPI	TEI	CTL	P/F	N(S)	N(R)	F...	CRV	Message Type
177	00:00:47.382125	6			Response(User), Comma...	0	0	Supervisory	0	49	RR	25	ALERTING
178	00:00:47.482250	15			Response(User), Comma...	0	0	Information	0	49	30	26	CALL PROCEEDING
179	00:00:47.484250	16			Response(User), Comma...	0	0	Information	0	50	30	26	CALL PROCEEDING
180	00:00:47.504375	15			Response(User), Comma...	0	0	Information	0	51	30	26	ALERTING
181	00:00:47.506375	16			Response(User), Comma...	0	0	Information	0	52	30	27	CALL PROCEEDING
182	00:00:47.508500	15			Response(User), Comma...	0	0	Information	0	53	30	27	ALERTING
183	00:00:47.510500	16			Response(User), Comma...	0	0	Information	0	54	30	28	CALL PROCEEDING
184	00:00:47.512525	15			Response(User), Comma...	0	0	Information	0	55	30	28	ALERTING

Card1 TimeSlot=16 Frame=177 at 00:00:47.382125 OK Len=6
HDLC Frame Data + FCS
----- LAPD Layer -----
C/R
SAPI
TEI
Ct1
Supervisory Function
P/F
N(R)

Hex Dump of the Frame Data

02 01 01 62 B8 C6

Stopped

Untitled - GLClient

```

Task 1: TS#2:28,CallState=PROCEEDING
Task 1: TS#2:28,CallState=ALERTING
Task 1: TS#2:29,CallState=PROCEEDING
Task 1: TS#2:29,CallState=ALERTING
Task 1: TS#2:30,CallState=PROCEEDING
Task 1: TS#2:30,CallState=ALERTING
Task 1: TS#2:31,CallState=PROCEEDING
Task 1: TS#2:31,CallState=ALERTING
inform task "AnswerCall #1:1..31";
Task 1 informed
Task 1: TS#1:1,CallState=CONNECTED
Task 1: TS#1:2,CallState=CONNECTED
Task 1: TS#1:3,CallState=CONNECTED
Task 1: TS#1:4,CallState=CONNECTED
Task 1: TS#1:5,CallState=CONNECTED
Task 1: TS#1:6,CallState=CONNECTED

run task "ISDNsvr:ISDNsvr";
inform task "SetISDNProt EuroISDN Belgium Switch #1";
inform task "SetISDNProt EuroISDN Belgium Subscriber #2";
inform task "StartDChan #1..2";
inform task "PlaceCall 551234 5551000 #2:1..31";
inform task "AnswerCall #1:1..31";
inform task "DisconnectCall CAUSE_NORMAL_CLEAR #1:1..31";
inform task "StopDChan #1..2";
    
```

Ready Ver 4.8 NUM

ISDN Emulator

File Functions View

ISDN Setup

	Protocol	Variant	Protocol End
Stop T1:1	USA	AT&T #4ESS	Subscriber
Stop T1:2	USA	AT&T #4ESS	Switch

Link Down Link Up L1 Active

Call Management: Card #1 (T1) - Subscriber End

TimeSlot	Called Nr	Calling Nr
00. Connected	554000	555000
01. Connected	554001	555001
02. PlaceCall	554002	555002
03. Connected	554003	555003
04. Connected	554004	555004
05. PlaceCall	554005	555005
06. Connected	554006	555006
07. Connected	554007	555007
08. PlaceCall	554008	555008
09. Connected	554009	555009
10. Connected	554010	555010
11. Connected	554011	555011
12. Connected	554012	555012
13. Connected	554013	555013
14. Connected	554014	555014
15. Connected	554015	555015
16. Connected	554016	555016
17. Connected	554017	555017
18. Connected	554018	555018
19. Connected	554019	555019
20. PlaceCall	554020	555020
21. PlaceCall	554021	555021
22. PlaceCall	554022	555022
23. Unavail	554023	555023

Link Up USA AT&T #4ESS Subso

Call Management: Card #2 (T1) - Switch End

TimeSlot	Called Nr	Calling Nr	Last Cause	Release Cause
00. Connected	554000	555000		Normal clear
01. Connected	554001	555001		Normal clear
02. PlaceCall	554002	555002	Normal	Normal clear
03. Connected	554003	555003		Normal clear
04. Connected	554004	555004		Normal clear
05. PlaceCall	554005	555005	Normal	Normal clear
06. Connected	554006	555006		Normal clear
07. Connected	554007	555007		Normal clear
08. PlaceCall	554008	555008	Normal	Normal clear
09. Connected	554009	555009		Normal clear
10. Connected	554010	555010		Normal clear
11. Connected	554011	555011		Normal clear
12. Connected	554012	555012		Normal clear
13. Connected	554013	555013		Normal clear
14. Connected	554014	555014		Normal clear
15. Connected	554015	555015		Normal clear
16. Connected	554016	555016		Normal clear
17. Connected	554017	555017		Normal clear
18. Connected	554018	555018		Normal clear
19. Connected	554019	555019		Normal clear
20. PlaceCall	554020	555020	Normal	Normal clear
21. PlaceCall	554021	555021	Normal	Normal clear
22. PlaceCall	554022	555022	Normal	Normal clear
23. Unavail	554023	555023		Normal clear

Link Up USA AT&T #4ESS Switch Active Calls: 17

- Capture and analyze stream of frames on an ISDN PRI link
- Simulate Switch and Subscriber

HDLC Analysis and Emulation

The screenshot displays the HDLC Protocol Analysis X.25 software interface. The main window shows a list of captured frames with columns for Dev, TSlot, SubCh, Frame#, TIME (Relative), Len, and Error. Below the list, a detailed view of a frame is shown, including the HDLC Frame Data + FCS and the LAPB Layer structure. The LAPB Layer structure includes fields for Address, Ct1, N(S), P, and N(R). A hex dump of the frame data is also visible.

The 'Transmit HDLC' window is also shown, featuring a 'Time Slots' section with a list of slots and a 'Playback File' section with a file path. The 'Transmission On All Selected Cards' section includes a 'Start' button and a progress bar.

- Provides the capability to capture, and analyze HDLC data on a full duplex T1 or E1 line
- Supports decoding of frames with FCS of 16 bits and 32 bits, or none
- Captured frames can later be used for traffic simulation using HDLC Transmit/Receive/Playback application

MLPPP Analysis and Emulation

PPP Protocol Analysis PPP

Dev	TSlot	SubCh	Fram...	TIME (Relative)	Len	Error	PPP Laya...	LCP Code	IPCP Code
✓ 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	00:00:00.009200	14		Link Control	Echo-Reply	
✓ 2	1-31		4	00:00:00.009396	14		Link Control	Echo-Request	
✓ 2	1-31		5	00:00:00.0094625	14		Link Control	Echo-Reply	
✓ 2	1-31		6	00:00:00.009625	14		Link Control	Echo-Request	
✓ 1	1-31		7	00:00:00.009800	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 (x008)
Magic Number = 165410210 (-00DC102E)

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 Frames

MC-MLPPP Emulator

Simulation
MLPPP

Link Name	Action	LCP Status	NCP Status	Tx/Rx Status
#1:1-31	Close	Link UP	Link UP	Tx: Not Transmitting , Rx: Not Receiving
#2:1-31	Close	Link UP	Link UP	Tx: Not Transmitting , Rx: Not Receiving

Add Delete Open Close

LCP Configuration NCP Configuration Link Test Statistics HDLC Statistics Impairments

MC-MLPPP Emulator

Simulation
MLPPP

MC-MLPPP Options

Fragment Format Long Sequence
Maximum Receive Reconstructed Unit 1500
Endpoint Discriminator
Class Locally Assigned
Address 192.168.1.19
Maximum Differential Delay 250 ms

Multi-Class options
Suspendable classes 8
PPP in MLPPP
Protocol Field Compression
Address and Control Field Compression

NCP
Network Control Protocol IPCP
Ncp Over MLPPP

Options
Option type IP Address
IP Address
Peer IP Address

- Capable of generating and receiving MC-MLPPP/PPP traffic (with or without impairments)
- Supports LCP Echo Test at PPP and MLPPP level

TRAU Analysis and Emulation

TRAU Protocol Analysis TRAU

File View Capture Statistics Database Configure Help

Dev	TS...	Su...	Frame#	TIME (Relative)	Len	TRAU Fram...	TRAU Frame...	Frame Sy...	Speech Fra...	Time Ali...	CRC	RIF	AMRmode
2	1	1-2	3	00:00:00.060000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Valid CRC	Indicati...	Codec_Mode 5.15...
2	1	1-2	4	00:00:00.080000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Valid CRC	Indicati...	Codec_Mode 5.15...
2	1	1-2	5	00:00:00.100000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Valid CRC	Indicati...	Codec_Mode 5.15...
2	1	1-2	6	00:00:00.120000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Valid CRC	Indicati...	Codec_Mode 5.15...
2	1	1-2	7	00:00:00.140000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Valid CRC	Indicati...	Codec_Mode 5.15...
2	1	1-2	8	00:00:00.160000	40	Uplink (User)	Adaptive Mul...	Valid	Good Speech	No cha...	Invalid CRC	Indicati...	Codec_Mode 5.90...

Card2 TimeSlot=1 SubChannels=1-2 Frame=3 at 00:00:00.060000 OK Len=40

HDLC Frame Data + FCS

----- TRAU Layer -----

Frame Sync = Valid Frame Sync (0000000000)

Frame Direction = Uplink (User)

Frame Type (Full Rate, 16kbps, C1-C5) = .001110.. Adaptive Multi-Rate

Time Alignment (C6-C11) for TAC_AMR =00 0000.... No change

Hex Dump of the Frame Data

```

+-----+-----+-----+-----+-----+-----+-----+-----+
00 00 98 00 83 3F FF FF FF FF FF F3 B1 E1 EE 28  +-----+
87 AF F8 0E E8 F0 8F 75 F0 1E F5 FF FF FF FF FF  +-----+
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  +-----+

```

Device # Frame Count(Speech Frame Classification)

2	206
total 2	206

C:\Program Files\GL Communications Inc\U\206 Frames

WCS TRAU Emulator - Untitled

File Action Help

Sl no	Xn Rate	Device No	Channel No	Sub Channel	Direction	Codec Type	Status
0	16kbps	1	0	1-2	UpLink	EFR	Stop
1	16kbps	2	1	1-2	UpLink	EFR	Stop

Add Delete Start Stop

Action TimeAlignment Impairment TxRx Verification

TX params

Source Type: SEQNUM

Source Parameters

Order: MSB Length: 4

Start: 0 Increment: 1

Duration Spec

☒ Continuous transmission

☐ Limited frames: 100

☐ EOF

Start Tx

RX params

Sink Type: SEQNUM

Sink Parameters

Order: MSB Length: 4

Start: 0 Increment: 1

Duration Spec

☒ Continuous Reception

☐ Limited frames: 100

☐ EOF

Start Rx

Action TimeAlignment Impairment TxRx Verification

TA type: XT

TA Sequence

Delay/Advance: 6.500 msec

Interval for every TA: 10 frames

Repeat Sequence: 0 times

Transmit Frame with TA Delay/Advance

Apply

Action TimeAlignment Impairment TxRx Verification

☒ Enable

Impairment Duration

☐ Repeat: 1

☒ Continuous

Skip: 1

☐ OFFS: 1

Impairment Type

SYNC ERROR

Duplicate

CRC ERROR

AND

OR

XOR

Options

- Frames can be captured on the selected time slots (contiguous or non-contiguous), sub-channels or full bandwidth 32 or 24 channels
- Frames may also be captured based on bit inversion and user/network side options

Multilink Frame Relay Analysis

Frame Relay Protocol Analysis LAPF

File View Capture Statistics Database Call Detail Records Configure Help

Dev	TS...	Su...	Fra...	TIME (Relative)	Len	E	DLCI	DE	BECN	FECN	Sequ...	Sequ...
✓ 2	1-7		12...	00:00:17.0930...	20		56	0	0	0		
✓ 1	1-7		12...	00:00:17.0951...	20		40	0	0	0		
✓ 2	1-7		12...	00:00:17.0951...	20		40	0	0	0		
✓ 1	1-7		12...	00:00:17.0973...	16		0	0	0	0		
✓ 2	1-7		12...	00:00:17.0973...	16		0	0	0	0		
✓ 1	1-7		12...	00:00:17.0993...	20		56	0	0	0		
✓ 2	1-7		12...	00:00:17.0993...	20		56	0	0	0		

Card2 TimeSlots=1-7 Frame=12942 at 00:00:17.093000 OK Len=20
HDLC Frame Data + FCS
----- LAPF Layer -----
EA
C/R
DLCI
EA
DE
BECN
FECN
CRC

Hex Dump of the Frame Data

0C 81 03 CF 00 01 03 08 00 75 95 01 01 00 03 02
F1 00 F7 B8

Running. Utilization 15.52% C:\Temp.Hdl

MFR Emulator - MFR Simulation - Untitled

File Action Simulation Help

Server Connection Status ●

MFR Bundles	Status
1	UP
2	UP

Link View	Action	VC Statistics	Tx/Rx Verification	Bundle Config & Statistics
Link Name	Action	Status		
#1:1..31	Close	Up		

Open Close

ts Statistics HDLC Statistics

Flags between Hdcl frames 100

Protocol Capture Configuration

Save Load Default

Capture File Options
Card & Stream Selection
Capture Filter
Gui & Protocol Options

Bundle 1 Bundle 2

Add Bundle Delete Bundle

Add Link Delete Link

Card 1 Card 1 Card 1

Timeslot Selection

TS
21
22
23
24
25
26
27
28
29
30

ATS
Clear TS

Data Transmission Rate

Single Channel
☒ 64 kbps
☐ 56 kbps

Hyper-Channel
☐ Nx64 kbps
☐ Nx56 Kbps (bits 1-7)
☐ Nx56 Kbps (Bits 2-8)

CRC

Subchannels: 8-56 kbps
DS0 bits
☐ 8
☐ 16
☐ 24
☐ 32
☐ 40
☐ 48
☐ 56

1 2 3 4 5 6 7 8
All
None

Bit Inversion [1 <-> 0]
☐

Mfr Options
Maximum Differential Delay 250 ms

Octet Bit Reversion [MSB <-> LSB]
☐

Selected Links HC 1:1..10,HC 1:11..20,TS 1:21..30

Frame Relay Analysis

- Each MFR bundle is created by selecting groups of timeslots on various cards
- Supports reassembly and decoding of multiple MFR bundles simultaneously. Each MFR bundle will reassemble packets from FR links
- Streams can be captured on the selected time slots (contiguous or non-contiguous), sub-channels (fractional DS0 to DS1), hyper-channels($n \times 64$ kbps, or $n \times 56$ kbps), or full bandwidth (56kbps, or 64kbps)
- Frames may also be captured based on their FCS (16 bits, 32 bits, none), bit inversion, octet bit reversion, user/network side options
- Capture frames based on maximum differential delay
- Recorded trace file can then be analyzed offline, exported to ASCII file, or printed

ATM IMA Analysis and Emulation

- Supports 16 T1/E1 ports
- Support for Full or Fractional Timeslots for ATM Link
- Supports IMA Frame Length ranging from 32, 64, 128, or 256

The image displays two software windows. The top window, titled "ATM Protocol Analysis AAL2.5(UNI3.1)", shows a table of captured ATM frames. The bottom window, titled "IMA Emulator - IMA Simulation - Untitled", shows the configuration and status of an IMA simulation.

ATM Protocol Analysis AAL2.5(UNI3.1) Table:

Dev	TScout	Frame#	TIME (Relative)	Len	Error	VPI	VCI	PT	HEC	DSF	AAL Type	Frame Type
✓ 1	31	27	00:00:00.005956	53		100	200	0	210			ATM-Cell
✓ 1	31	28	00:00:00.005770	53		100	200	0	210			ATM-Cell
✓ 1	31	29	00:00:00.005983	53		100	200	0	210			ATM-Cell
✓ 1	31	30	00:00:00.006197	53		100	200	0	210			ATM-Cell
✓ 1	31	31	00:00:00.006411	53		100	200	0	210			ATM-Cell
✓ 1	31	32	00:00:00.006625	53		100	200	0	210			ATM-Cell
✓ 1	31	33	00:00:00.006838	53		100	200	0	210			ATM-Cell
✓ 1	21	24	00:00:00.007052	53		100	200	0	210			ATM-Cell

IMA Emulator - IMA Simulation - Untitled

Server Connection Status: ●

IMA Group	Status
1	None
2	None

Link View | Action | VC Statistics | Tx/Rx Verification | IMA Config & Statistics

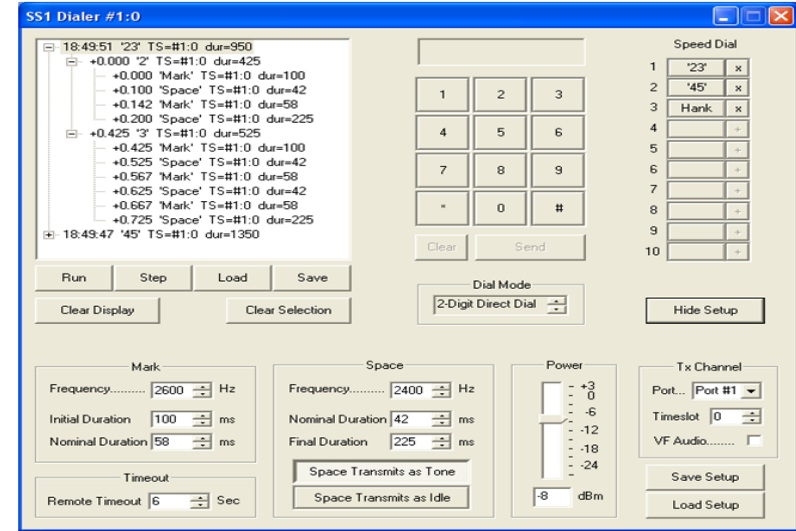
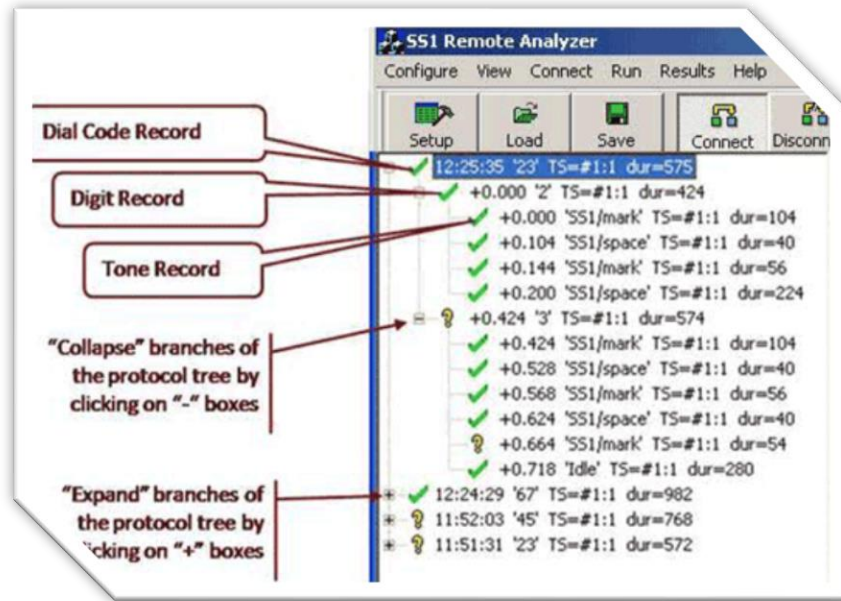
Link Name	Action	Status
#1:1..31	Open	Not In Group

Add | Delete | Open | Close

IMA Id: 3

Add | Delete | Open | Close

SS1 Signaling Analysis and Emulation



- Generate and introduce SS1 Dial Codes on Transmit Channels using SS1 Dialer
- Analyzer can capture either TDM or audio signals
- Analyzer can analyze either 2-digit or 3-digit dial codes
- Analyzer displays received dial codes, including the characteristics of the underlying tones

CAS Analysis and Simulator

CAS Protocol Analysis MFCR2 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

Dev	TSlot	SubCh	Frame#	TIME (Relative)	Len	Error	Event Type	Signal	CAS-MFCR2	Type	Digits	Tone Type
✓ 2	20		108	00:00:15.048000	2		Signal	1001 Idle Or ...				
✓ 2	21		109	00:00:15.048000	2		Signal	1000				
✓ 2	22		110	00:00:15.048000	2		Signal	1001 Idle Or ...				
✓ 2	23		111	00:00:15.048000	2		Signal	1010				
✓ 2	0		112	00:00:15.051000	2		Signal	0101 Answer				
✓ 2	1		113	00:00:15.051000	2		Signal	0100				

Card2 TimeSlot=20 Frame=108 at 00:00:15.048000 OK Len=2

Frame Data

```

===== CAS-MFCR2 Layer =====
0000 Event Type           = 00000001 Signal
0001 Signal               = ....1001 1001 Idle Or Clear Forward
    
```

Hex Dump of the Frame Data

```

01 09
    
```

Call ID	Call Status	Call Start Date & Time	Call Duration	DevNo	TS	Calling Number	Called Nu
0	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	0		
1	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	1		
2	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	2		
3	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	3		
4	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	4		
5	active	2018-03-27 15:39:21.555000	00:00:15.411000	2	5		

Running. Utilization 0.00%

C:\Program Files\GL Communic... Captured 1 233 frames

CAS Simulator T1; trunk 1

File Trunk Edit Manual Call Help

GL

Signaling Settings

Flash Hook

Global Start Global Stop

TimeSlot 0

Enable Signaling

Signaling Script: E:\Program Files\GL Communications Browse

Edit Signaling Script

0 Send Signaling (O-F) in Current Trunk

CAS Simulator Signaling Status

CAS Simulator Signaling Enabled

CAS Simulator Signaling Activated

Display Binary

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

Note: Right-click on timeslot to pop-up edit menu
Double-click on timeslot to start/stop

Events WCS Client Board Config

[49] (running) CMD monitor tones ("na.mtd", "dtmf.mtd", "qual40.mtd") #1:11;
go 0,1,0,1 #1:11;
[50] (done) CMD
[51] (running) CMD monitor signaling bits #1:12;
[52] (running) CMD monitor tones ("na.mtd", "dtmf.mtd", "qual40.mtd") #1:12;
go 0,1,0,1 #1:12;
[53] (done) CMD
[54] (running) CMD monitor signaling bits #1:13;
[55] (running) CMD monitor tones ("na.mtd", "dtmf.mtd", "qual40.mtd") #1:13;
go 0,1,0,1 #1:13;
[56] (done) CMD
[57] (running) CMD monitor signaling bits #1:14;
[58] (running) CMD monitor tones ("na.mtd", "dtmf.mtd", "qual40.mtd") #1:14;
go 0,1,0,1 #1:14;
[59] (done) CMD

IP Address: 192.168.1.58
Port: 17080
Message Type: Binary ASCII
Message Version: Version3 Version4
Disconnected
Send

T1 1:0 Call State: IDLE
Current Load Configuration:

- It is a method of signaling in telephone networks where each channel or timeslot carrying speech also carries with it the signaling and addressing to set up and tear down that same channel

Key Features

- Uses client-server technique and provides GUI as well as scripted CAS protocol simulation platform
- Network (NT) and Terminal (TE) - Side Support
- Implements ITU-T Signaling
- Called number and calling number identification
- Customized signaling for each channel through scripts

CAS Simulator

The screenshot displays the CAS Simulator software interface. The main window, titled "CAS Simulator T1; trunk 1", features a menu bar (File, Trunk, Edit, Manual Call, Help) and a toolbar with icons for GL, a trash can, a snowflake, and a red X. The interface is divided into several sections:

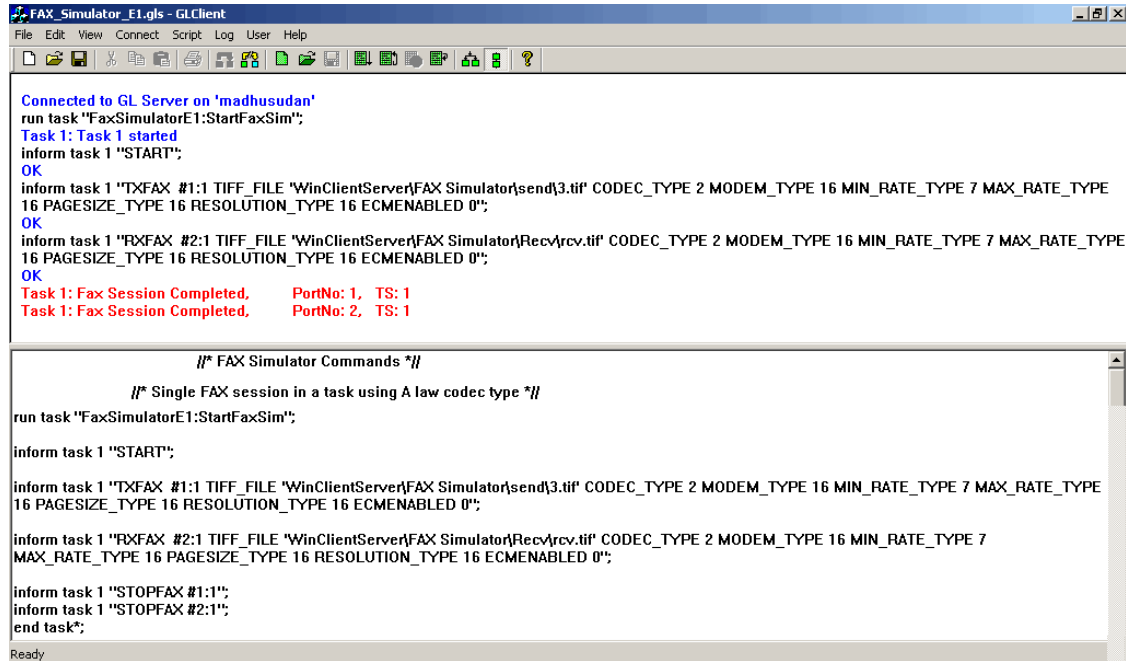
- Signaling Settings:** Includes buttons for "Global Start" and "Global Stop", a "TimeSlot 0" dropdown, a checked "Enable Signaling" checkbox, a "Signaling Script" field with a "Browse" button (showing "C:\Program Files\GL Communications I"), an "Edit Signaling Script" button, and a "Send Signaling (0-F) in Current Trunk" button with a "0" value.
- Flash Hook:** A tabbed section.
- CAS Simulator Signaling Status:** Displays a grid of 24 hex values (Hex F (0) to Hex 0 (23)) in green boxes. A note below states: "Note: Right-click on timeslot to pop-up edit menu. Double-click on timeslot to start/stop". A "Display Binary" button is also present.
- Events, WCS Client, Board Config:** Tabs at the bottom of the main window.

Two smaller windows, "CAS Simulator Manual Call Generation (1)" and "CAS Simulator Manual Call Generation (2)", are open below the main window. Both have a "Dial Number" field (5551234) and a "1 sec Place Call Interval" checkbox. They feature buttons for "Place Call Trunk", "Answer Call Trunk", and "Release All Calls".

Window (1) shows "Call Functions: T1; trunk 1" with a grid of 24 buttons. Buttons for timeslots 0-7 are yellow ("Disconnect"), 8-15 are grey ("Place Call"), and 16-23 are orange ("Calling >>").

Window (2) shows "Call Functions: T1; trunk 0" with a similar grid. Buttons for timeslots 0-7 are yellow ("Disconnect"), 8-15 are grey ("Place Call"), and 16-23 are pink ("Answer Call").

Fax Simulator



The screenshot shows a window titled "FAX Simulator E1.gls - GLClient" with a menu bar (File, Edit, View, Connect, Script, Log, User, Help) and a toolbar. The main text area displays the following log:

```
Connected to GL Server on 'madhusudan'
run task "FaxSimulatorE1:StartFaxSim";
Task 1: Task 1 started
inform task 1 "START";
OK
inform task 1 "TXFAX #1:1 TIFF_FILE 'WinClientServer\FAX Simulator\send\3.tif' CODEC_TYPE 2 MODEM_TYPE 16 MIN_RATE_TYPE 7 MAX_RATE_TYPE
16 PAGESIZE_TYPE 16 RESOLUTION_TYPE 16 ECMENABLED 0";
OK
inform task 1 "RXFAX #2:1 TIFF_FILE 'WinClientServer\FAX Simulator\Recv\rcv.tif' CODEC_TYPE 2 MODEM_TYPE 16 MIN_RATE_TYPE 7 MAX_RATE_TYPE
16 PAGESIZE_TYPE 16 RESOLUTION_TYPE 16 ECMENABLED 0";
OK
Task 1: Fax Session Completed, PortNo: 1, TS: 1
Task 1: Fax Session Completed, PortNo: 2, TS: 1
```

Below the log is a scrollable area containing the following commands:

```
/* FAX Simulator Commands */
/* Single FAX session in a task using A law codec type */
run task "FaxSimulatorE1:StartFaxSim";
inform task 1 "START";
inform task 1 "TXFAX #1:1 TIFF_FILE 'WinClientServer\FAX Simulator\send\3.tif' CODEC_TYPE 2 MODEM_TYPE 16 MIN_RATE_TYPE 7 MAX_RATE_TYPE
16 PAGESIZE_TYPE 16 RESOLUTION_TYPE 16 ECMENABLED 0";
inform task 1 "RXFAX #2:1 TIFF_FILE 'WinClientServer\FAX Simulator\Recv\rcv.tif' CODEC_TYPE 2 MODEM_TYPE 16 MIN_RATE_TYPE 7
MAX_RATE_TYPE 16 PAGESIZE_TYPE 16 RESOLUTION_TYPE 16 ECMENABLED 0";
inform task 1 "STOPFAX #1:1";
inform task 1 "STOPFAX #2:1";
end task;
```

The status bar at the bottom of the window shows "Ready".

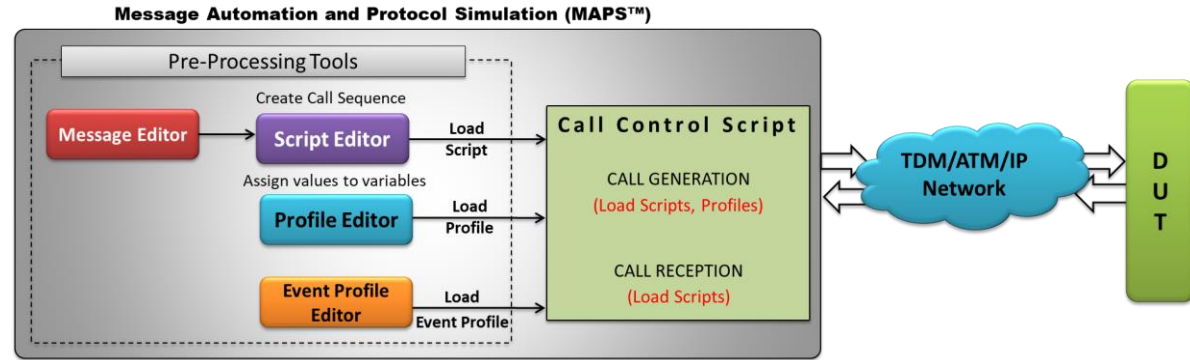
- High speed data transmission used for high transfer rates of High Speed (HS) fax page data (9600 to 14400 bps)
- High speed data transmission, fax page data (1200 to 2880 bps). Used for Sync/Async data transmission

MAPS™ – Script Based Emulation

- Script based protocol simulation and conformance test tool - covers solutions for both protocol simulation and protocol analysis
- Supports a variety of protocols such as ISUP, MAP, CAS, ISDN, MLPPP, GSM A, GSM Abis, etc.
- Includes various ready-to-use test plans and test cases to support the testing of a required real-time scenario
- Provides the unlimited ability to edit messages and control scenarios (message sequences)
- "Message sequences" are generated through scripts; Generate and respond to calls / messages
- Impairments can be applied to messages to simulate error conditions
- Supports transmission/detection of various TDM traffic such as, digits, voice file, single and dual tones

Working Principle

- The message templates form the backbone of MAPS™ application
- Message templates are created using an utility Message Editor with user-selected protocol fields and default values for each protocol field
- The protocol fields can be accessed by scripts as variables using import / export files
- Scripts comprises of sequence of commands that performs the required operation using pre-defined message templates
- Script Editor is another powerful utility of MAPS, in which sequences of message templates can be grouped together in an order to create call flow (scripts)



- Profile consists of values assigned to the variables. Profiles can be created using a utility called Profile Editor where the values can be assigned to the variables
- Event Profiles consists of values assigned to the variables during run-time. Event Profile Editor allows you to create Event Profiles for user-defined events in a script. The value in the profiles can be changed during script execution
- MAPS™ provides the ability to create any number of scripts to simulate a real-time scenario with MAPS™ and DUT

Supported Protocols

- MAPS™ – Script Based Emulation
- Testing binary based protocols over T1 E1
 - ISDN
 - SS7 (ISUP, INAP, MAP, CAP, IUP)
 - GSM A, Abis
 - MLPPP Conformance
 - CAS
- Testing protocols over IP
 - SIP, SIP-I
 - MEGACO, MGCP
 - ISDN SIGTRAN (ISDN over IP)
 - SS7 SIGTRAN (SS7 over IP)
 - GSMAoIP (GSM A over IP)
 - LTE (S1, eGTP)
 - UMTS (IuCS, IuH, IuPS)
 - UMTS GnGp

Call Generation

- Interactive GUI to view status, results, call information, total iterations to be done, and number of completed iterations
- Uses profiles to change the field values in the messages during the course of a call
- Events allow redirection of script execution on-the-go. The custom parameters in the events can also be changed during script execution using event profiles
- Impairments can be applied to messages to simulate error conditions
- Provides protocol trace with full message decoding, custom trace, and graphical ladder diagrams of call flow with time stamp while simulation is running
- Call flow graph allows to easily verify the messages exchanged between MAPS™ and DUT
- Support for Bulk Call Simulation with option to configure stress/load testing parameters such as Call per second (CPS), Busy hour call attempts (BHCA), Max Simultaneous Calls and Burst parameters
- Provides the associated captured events and error events during call simulation

Call Reception

- Once the calls are successfully established, the received call instances are displayed in the Call Reception window automatically
- Triggers the execution on reception of pre-defined messages. To receive calls, the scripts are configured against the messages to be received
- Provide the result of the test with detail protocol decode and ladder diagram

Call Generation and Reception (ISDN-Sigtran ITU)

MAPS (Message Automation Protocol Simulation) Subscriber (ISDN-SigTran ITU) - [Call Generation - Untitled]

Configurations Emulator Reports Editor Windows Help

Sr...	Script Name	Profile	Call Info	Script Execution	Status	Events	E...	Result	Total Iterations	Completed Iterations
1	Placecall.gls	Card1 TS01	1.1	Start	Call Released	None		Pass	1	1

Add Delete Insert Refresh Start Start All Stop Stop

Save Column Width

MAPS DUT

SETUP → 12:12:57.468000

CALL PROCEEDING ← 12:12:57.775000

ALERTING ← 12:12:57.778000

CONNECT ← 12:12:57.778000

CONNECT ACKNOWLEDGE → 12:12:57.781000

Digits Sent :: 1234567890 → 12:12:59.721000

DISCONNECT → 12:13:57.799000

RELEASE ← 12:13:57.810000

RELEASE COMPLETE → 12:13:57.812000

0000 Version = 00000001 Release 1.0
0002 Message Class = 00000101 Q.921/Q.931 Boundary Primitives Transport
0003 QPM Message Type = 00000001 Data Request Message
0004 Message Length = 84 (x00000054)
0008 Interface-Identifier Tag = x0001 Interface-Identifier(integer)-Id
000A Length = 8 (x0008)
000C Interface Identifier (integer) = 1 (x00000001)
0010 DLCI Tag = x0005 DLCI-Id
0012 Length = 8 (x0008)
0014 SAPI(Service Access Point Identifier) = 00000000.. (0)
0015 TEI(Terminal Endpoint Identifier) = 00000000.. (0)
0015 Ext =1 1
0018 Protocol Data Tag = x000E Protocol Data
001A Length = 60 (x003C)
001A ISD-PDU = x080200020504038080A31803A1838120060580313532346C0B
001C Protocol Discriminator = 00001000 Q.931/I.451 user-network call control mess
001D Call Reference Length = ...0010 2 Bytes
001E Call Reference Value = 2 (.00000000 00000010)
001E Call Reference Flag = 0..... FROM side that originated callref
0020 Message Type = 00000101 SETUP
0021 Bearer capability =
0022 IE Bearer Capability = 00000100 Bearer Capability IE Identifier

MAPS (Message Automation Protocol Simulation) Switch (ISDN-SigTran ITU) - [Call Reception]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Ev...	Results
1	Check_SCTP_Status.gls		Stop		None		Unknown
2	IUA.gls	1005	Stop	IUA Established	SendHeartbeat		Pass
3	IUAInterfaceMGMT.gls	1005.1.0	Stop	IUA Established	SendReleaseIndication		Unknown
4	Recvcall.gls	2.1	Completed	Call Released	None		Pass

Abort Abort All

☒ Show Records ☐ Auto Trash

Save Column Width

DUT MAPS

SETUP → 12:12:57.763000

CALL PROCEEDING ← 12:12:57.771000

ALERTING ← 12:12:57.774000

CONNECT ← 12:12:57.774000

CONNECT ACKNOWLEDGE → 12:12:57.954000

Digits Sent :: 1234567890 → 12:12:59.697000

DISCONNECT → 12:13:57.804000

RELEASE ← 12:13:57.805000

RELEASE COMPLETE → 12:13:57.817000

0000 Version = 00000001 Release 1.0
0002 Message Class = 00000101 Q.921/Q.931 Boundary Primitives Transport
0003 QPM Message Type = 00000001 Data Request Message
0004 Message Length = 84 (x00000054)
0008 Interface-Identifier Tag = x0001 Interface-Identifier(integer)-Id
000A Length = 8 (x0008)
000C Interface Identifier (integer) = 1 (x00000001)
0010 DLCI Tag = x0005 DLCI-Id
0012 Length = 8 (x0008)
0014 SAPI(Service Access Point Identifier) = 00000000.. (0)
0015 TEI(Terminal Endpoint Identifier) = 00000000.. (0)
0015 Ext =1 1
0018 Protocol Data Tag = x000E Protocol Data
001A Length = 60 (x003C)
001A ISD-PDU = x080200020504038080A31803A1838120060580313532346C0B
001C Protocol Discriminator = 00001000 Q.931/I.451 user-network call control mess
001D Call Reference Length = ...0010 2 Bytes
001E Call Reference Value = 2 (.00000000 00000010)
001E Call Reference Flag = 0..... FROM side that originated callref
0020 Message Type = 00000101 SETUP
0021 Bearer capability =
0022 IE Bearer Capability = 00000100 Bearer Capability IE Identifier

Scripts Message Sequence Event Config Script Flow Capture Events

Error Events Captured Errors Link Status Up=1 Down=0

Call Generation and Reception (ISUP Sigtran)

MAPS (Message Automation Protocol Simulation) (Isup-Sigtran ITU M3UA) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Ev...	Result	Total Iterations	Completed Iterations
1	Isup_Call.gls	Card1TS01	1.1.1.2.2.2.1	Stop	Transmitting File	Terminate Call		Pass	1	0

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width

MAPS DUT

Initial Address 18:51:53.797000

Address Complete 18:51:54.927000

Answer 18:51:54.927000

File Transmitted :: a-law samples\count10.pcm 18:52:15.117000

File Recorded :: MAPS\Recv Files\Isup\Feb6_E0101_1001.pcm 18:52:25.072000

Release 18:52:54.910000

Release Complete 18:52:55.485000

Scripts Message Sequence Event Config Script Flow

Init

----- MTP3 User Adaptation Layer -----

```
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 52 (x00000034)
Protocol Data = x0210 Transfer Protocol Data
```

MAPS (Message Automation Protocol Simulation) (Isup-Sigtran ITU M3UA) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Ev...	Results
1	Check_SCTP_Status.gls		Stop		None		Unknown
2	M3UA.gls	1	Stop	ASP Active	Send-ASPDown		Pass
3	Isup_Call.gls	2.2.2.1.1.1	Stop	Transmitting File	Terminate Call		Pass

Abort Abort All Show Records Auto Trash Trash

Save Column Width

DUT MAPS

Initial Address 18:51:54.643000

Address Complete 18:51:54.645000

Answer 18:51:54.646000

File Transmitted :: a-law samples\count10.pcm 18:52:14.706000

File Recorded :: MAPS\Recv Files\Isup\Feb6_W0201_1001 18:52:24.663000

Release 18:52:55.195000

Release Complete 18:52:55.196000

Scripts Message Sequence Event Config Script Flow

----- MTP3 User Adaptation Layer -----

```
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 52 (x00000034)
Protocol Data = x0210 Transfer Protocol Data
000A Length = 44 (x002C)
000E Tag = x0210 Transfer Protocol Data
000A Length = 44 (x002C)
000E Originating Point Code = 1.1.1.(.001000 00001001)
000E Destination Point Code = 2.2.2.(.010000 00010010)
0012 Service Indicator = .....0101 ISDN User Part
0014 Network Indicator = .....00 International network
0015 Message Priority = .....00 Priority Code 0
0016 Signalling Link Selection = 1 (x01)
Pdu = x0100010000000000020907041024567305200A07011165-
```

----- ISUP Layer -----

Initialisation Errors Error Events Captured Errors Link Status: Up=1 Down=0

Call Generation and Reception (INAPIP ITU)

MAPS (Message Automation Protocol Simulation) gsmSSF (INAPIP ITU M3UA) - [Call Generation - Default]

Sr No	Script Name	Profile	Call Info	Script Execution	Status
1	INAP_VoiceCall_Service_SSF.gls	MSProfile001	0x00000002	Start	Call Released from both side
2	INAP_VoiceCall_Service_SSF.gls	MSProfile002	0x00000003	Start	Call Released from
3	INAP_VoiceCall_Service_SSF.gls	MSProfile003	0x00000004	Start	Call Released from

Message Sequence Diagram (Left Window):

SSF (Service Switching Function) and SCF (Service Control Function) interaction:

- Initial DP: 12:55:06.234000
- Request Report BCSM Event: 12:55:06.253000
- Request Report BCSM Event: 12:55:06.253000
- Apply Charging: 12:55:06.256000
- Connect: 12:55:06.293000
- Event Report BCSM: 12:55:06.311000
- Event Report BCSM: 12:55:20.231000
- Apply Charging Report: 12:55:20.232000
- Release Call: 12:55:20.249000

MAPS (Message Automation Protocol Simulation) gsmSCF (INAPIP ITU M3UA) - [Call Reception]

Sr No	Script Name	Call Info	Script Execution	Status	Events	Results
1	Check_SCTP_Status.gls		Stop		None	Unknown
2	M3UA.gls	1	Stop		SendHeartbeat	Pass
3	SCMG.gls	1	Stop		Initiate SST	Pass
4	INAP_VoiceCall_Service_SCF.gls	0x00000002	Completed	ASP Active	None	Pass
5	INAP_VoiceCall_Service_SCF.gls	0x00000003	Completed	Subsystem-Allowed	None	Pass
6	INAP_VoiceCall_Service_SCF.gls	0x00000004	Completed	Call Released	None	Pass

Message Sequence Diagram (Right Window):

SSF (Service Switching Function) and SCF (Service Control Function) interaction:

- Initial DP: 12:55:06.243000
- Request Report BCSM Event: 12:55:06.245000
- Request Report BCSM Event: 12:55:06.246000
- Apply Charging: 12:55:06.247000
- Connect: 12:55:06.284000
- Event Report BCSM: 12:55:06.320000
- Event Report BCSM: 12:55:20.238000
- Apply Charging Report: 12:55:20.238000
- Release Call: 12:55:20.240000

MTS3 User Adaptation Layer (Right Window):

```
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 124 (x0000007C)
0008 Tag = x0210 Transfer Protocol Data
000A Length = 108 (x006C)
000E Originating Point Code = 3.3.3(.011000 00011011)
0012 Destination Point Code = 2.2.2(.010000 00010010)
0014 Service Indicator = .0011 SCCP
0015 Network Indicator = .0010 National Network
0016 Message Priority = .0000 Priority Code 0
0017 Signalling Link Selection = 1 (x01)
0018 Pdu = x0900031010D0B9312100C001100452351477504
0074 Routing Context = x0006 Routing Context
0076 Length = 8 (x0008)
0078 Routing Context Value = 1 (x00000001)
0018 Message Type = 00001001 MTP3 User Adaptation Layer
```

Call Generation and Reception (IUP)

MAPS (Message Automation Protocol Simulation) (IUP UK) - [Call Generation - Untitled]									
S...	Script Name	Profile	Call Info	Script Execution	Status	Recording File	Events	Events P...	Result
1	IUP_Call.gls	Card1TS01	1.1.1.2.2.1	Abort			IUPTerminate	Pass	1
2	IUP_Call.gls	Card1TS02	1.1.1.2.2.2	Abort			IUPTerminate	Pass	1
3	IUP_Call.gls	Card1TS03	1.1.1.2.2.3	Abort			IUPTerminate	Pass	1
4	IUP_Call.gls	Card1TS04	1.1.1.2.2.4	Abort			IUPTerminate	Pass	1
5	IUP_Call.gls	Card1TS05	1.1.1.2.2.5	Abort			IUPTerminate	Pass	1
6	IUP_Call.gls	Card1TS06	1.1.1.2.2.6	Abort			IUPTerminate	Pass	1
7	IUP_Call.gls	Card1TS07	1.1.1.2.2.7	Abort			IUPTerminate	Pass	1
8	IUP_Call.gls	Card1TS08	1.1.1.2.2.8	Abort			IUPTerminate	Pass	1

MAPS (Message Automation Protocol Simulation) (IUP UK) - [Call Generation - Untitled]									
Add	Delete	Insert	Refresh	Start	Start All	Stop	Stop All	Abort	Abort All
Save	Column Width								
MAPS	DUT								
IUP Initial Address Message	16:37:16.243000								
IUP Send N Digits	16:37:17.577000								
IUP Subsequent Address Message	16:37:17.577000								
IUP Send N Digits	16:37:18.917000								
IUP Final Address Message	16:37:18.917000								
IUP Additional Call Information - ACI Type 7	16:37:20.246000								
IUP Additional Call Information - ACI Type 7	16:37:20.246000								
IUP Additional Call Information - ACI Type 7	16:37:21.607000								
IUP Additional Call Information - ACI Type 1	16:37:21.608000								

MAPS (Message Automation Protocol Simulation) (IUP UK) - [Call Reception]									
Sr No	Script Name	Call Info	Script Execution	Status	MTP3 Active	Events	Events...	Results	Pass
1	SLTM.gls	2.2.2.1.1.1	Abort		MTP3 Active	None		Pass	
2	IUP_Call.gls	2.2.2.1.1.1	Abort		Digits Transmitted	IUPTerminate		Fail	
3	IUP_Call.gls	2.2.2.1.1.2	Abort		Transmitting Tone	IUPTerminate		Pass	
4	IUP_Call.gls	2.2.2.1.1.3	Abort		Transmitting Tone	IUPTerminate		Pass	
5	IUP_Call.gls	2.2.2.1.1.4	Abort		Transmitting Tone	IUPTerminate		Pass	

MAPS (Message Automation Protocol Simulation) (IUP UK) - [Call Reception]									
Save	Column Width								
DUT	MAPS								
IUP Initial Address Message	16:40:32.237000								
IUP Send N Digits	16:40:32.240000								
IUP Subsequent Address Message	16:40:33.555000								
IUP Send N Digits	16:40:33.556000								
IUP Final Address Message	16:40:34.885000								
IUP Additional Call Information - ACI Type 7	16:40:34.886000								
IUP Additional Call Information - ACI Type 1	16:40:36.215000								
IUP Additional Call Information - ACI Type 7	16:40:36.216000								
IUP Additional Call Information - ACI Type 1	16:40:37.566000								
IUP Address Complete Message	16:40:37.567000								

Error Events Captured Events Link Status Up=0 Down=1

Call Generation and Reception (GSMoIP)

MAPS (Message Automation Protocol Simulation) BSC (GsmAlp GSM900 M3UA) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status
1	GSMAlp_Call.gls	MSProfile0001	IMSI: 901700000000638.TMSI: 0x5B89F47F	Start	SCCP Connection Released
2	GSMAlp_Call.gls	MSProfile0002		Start	
3	GSMAlp_Call.gls	MSProfile0003		Start	
4	GSMAlp_Call.gls	MSProfile0004		Start	
5	GSMAlp_Call.gls	MSProfile0005		Start	

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width Show Latest

BSC MSC

LOCATION UPDATING REQUEST 13:17:18.64.8778

CC connection confirm 13:17:18.72.8052

AUTHENTICATION REQUEST 13:17:18.73.7872

AUTHENTICATION RESPONSE 13:17:18.74.4786

CIPHER MODE COMMAND 13:17:18.80.7523

CIPHER MODE COMPLETE 13:17:18.81.1548

LOCATION UPDATING ACCEPT 13:17:18.87.640

TMSI REALLOCATION COMPLETE 13:17:18.87.7809

CLEAR COMMAND 13:17:18.93.6649

CLEAR COMPLETE 13:17:18.94.1191

RLSD released 13:17:18.100.6053

RLC release complete 13:17:18.101.47

Find

0041 LAC
Mobile StationClassMark1
0043 RF powercapability
0043 AS/1
0043 ES IND
0043 Revision level
0044 Length of Mobile ID
0045 Type of identity
0045 Odd/Even Ind
0045 Identity
Mobile StationClassMark2 UMS
004D IE Identifier(MSC2)
004E Length Of Mobile Station Classmark2
004F RF powercapability
004F AS/1
004F ES IND
004F Revision level
0050 Frequency Capability (FC)
0050 VCS
0050 VBS
0050 SM capability
0050 SS Screening Ind
0050 PS capability
0051 AS/2
0051 AS/3
0051 CMSP
0051 SolSA
0051 UCS2

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events

MAPS (Message Automation Protocol Simulation) MSC (GsmAlp GSM900 M3UA) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events P...	Results
1	M3UA.gls		1001	Stop	ASP Active	SendHeartbeat		Pass
2	SCMG.gls			Stop	Subsystem-Allowed	Initiate SST		Pass
3	GSMAlp_Call.gls	MSProfile0001	IMSI: 901700000000638.TMSI: 0x5B89F47F	Completed	Call Released	None		Pass

Stop Stop All Abort Abort All Show Records Select Active Call Auto Trash Trash

Save Column Width Show Latest

BSC 0 MSC

LOCATION UPDATING REQUEST 13:17:18.68.1731

CC connection confirm 13:17:18.70.39

AUTHENTICATION REQUEST 13:17:18.71.94

AUTHENTICATION RESPONSE 13:17:18.77.797

CIPHER MODE COMMAND 13:17:18.77.6963

CIPHER MODE COMPLETE 13:17:18.83.4082

LOCATION UPDATING ACCEPT 13:17:18.84.1804

TMSI REALLOCATION COMPLETE 13:17:18.90.3566

CLEAR COMMAND 13:17:18.90.3418

CLEAR COMPLETE 13:17:18.97.3078

RLSD released 13:17:18.97.7487

RLC release complete

Find

===== MTP3 User Adaptation Layer =====

0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 84 (x00000054)
Protocol Data
0008 Tag = x0210 Transfer Protocol Data
000A Length = 75 (x0004B)
000E Originating Point Code
Point Code = 1.1.2(.001000 00001010)
Destination Point Code
Point Code = 2.2.1(.010000 00010001)
0012 Service Indicator =0011 SCCP
0014 Network Indicator =00 International network
0015 Message Priority =00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)
Parameter Padding = x00
===== SCCP Layer =====
0018 Message Type = 00000001 CR connection request
Mandatory Fixed Parameters
Source Local Reference Parameter = 3 (x000003)
0019 Protocol Class Parameter
Class =0010 Class 2
001C Message Handling (Class 0 and 1 only) = 0010..... Spare
001D Pointer to Mandatory Parameter = Param offset x02 (2)
001E Pointer to optional parameters = x06 (6)

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Events

Call Generation and Reception (GSM Abis)

MAPS (Message Automation Protocol Simulation) BTS (GsmAbis GSM900) - [Call Generation - Master Configuration]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Event...	Result	Total Iterations	Completed Iterations
1	BTS_MOC.gls	BTSProfile001	IMSI:404060000000001,TMSI...	Start	SMS Call Released	None		Pass	1	1
2	BTS_LUC.gls	BTSProfile002	IMSI:404060000000002,TMSI...	Start	Released Air Interface Resources	None		Pass	1	1

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width

MAPS DUT

MAPS	DUT
CHANnel ReQuereD	11:10:16.892000
Immediate Assignment	11:10:17.546000
LOCATION UPDATING REQUEST	11:10:17.566000
AUTHENTICATION REQUEST	11:10:17.898000
AUTHENTICATION RESPONSE	11:10:17.899000
CIPHERING MODE COMMAND	11:10:18.229000
CIPHERING MODE COMPLETE	11:10:18.230000
IDENTITY REQUEST	11:10:18.558000
IDENTITY RESPONSE	11:10:18.559000
LOCATION UPDATING ACCEPT	11:10:18.964000
TMSI REALLOCATION COMPLETE	

Scripts Message Sequence Event Config Script Flow

MAPS (Message Automation Protocol Simulation) BSC (GsmAbis GSM900) - [Call Reception]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events...	Results
1	BSC_MOC.gls		Completed		None		Pass
2	BSC_MOC.gls		Completed		None		Pass
3	BSC_MOC.gls	IMSI:404060000000002,TMSI:0...	Completed	Air Interface Resources Released	None		Pass

Abort Abort All

☒ Show Records ☐ Auto Trash Trash

Save Column Width

DUT MAPS

DUT	MAPS
CHANnel ReQuereD	11:11:40.287000
CHANnel ACTivation	11:11:40.288000
CHANnel ACTivation ACKnowledge	11:11:40.626000
Immediate Assignment	11:11:40.627000
LOCATION UPDATING REQUEST	11:11:40.978000
AUTHENTICATION REQUEST	11:11:40.981000
AUTHENTICATION RESPONSE	11:11:41.319000
CIPHERING MODE COMMAND	11:11:41.321000
CIPHERING MODE COMPLETE	11:11:41.659000
IDENTITY REQUEST	11:11:41.661000
IDENTITY RESPONSE	11:11:41.990000

Scripts Message Sequence Event Config Script Flow Capture Events

Error Events Captured Errors Link Status Up=1 Down=0

```
----- BTSM Layer -----
0000 T-bit
0000 Message Group
0001 Message Type
0002 IR Identifier (Ch No)
0003 Channel Type
0003 Time Slot #
0004 Request Reference
0004 IR Identifier (ReqRef)
0005 RA
0006 T3
0006 T1'
0007 T2
0008 Access Delay
0008 IR Identifier (AD)
0009 Access Delay
```

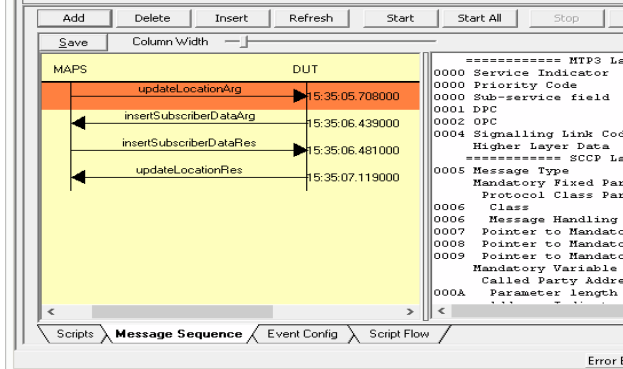
```
=
= .....0 Non-Transparent Message
= 0000110. Common Channel Mgmt
= 00010011 CHANnel ReQuereD
=
= 00000001 Channel number
= 10001... Uplink CCCH (RACH)
= .....000 (0)
=
= 00010011 Request Reference
= 00000101 (5)
= 5 (.....000 101.....)
= 00101... (5)
= ...00101 (5)
=
= 00010001 Access Delay
= 55 (x37)
```

Call Generation and Reception (MAP)

MAPS (Message Automation Protocol Simulation) MSC (MAP 3GPP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Windows Help

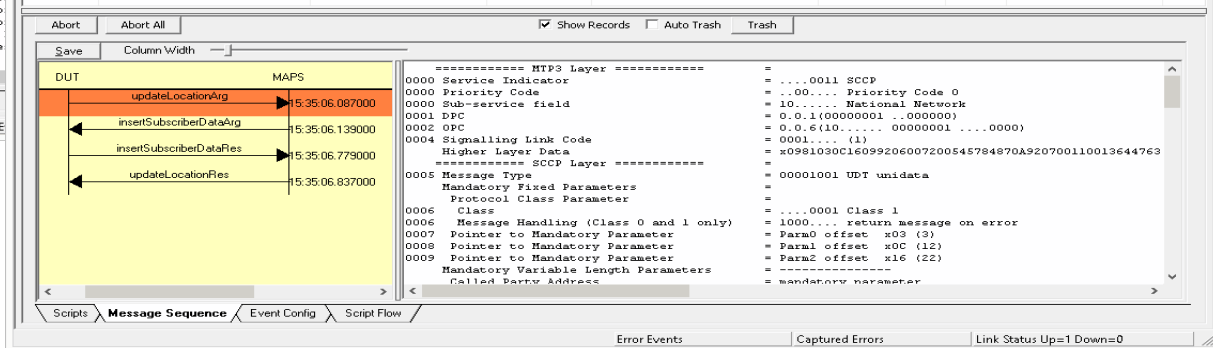
Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iteration
1	UpdateLocationArg_MSC_VLR.gls	MSProfile04	90170000000008	Start	Location Update Completed	None	Pass	1	1
2	SendAuthenticationInfoArg_VLR.gls	MSProfile05	90170000000006	Start	Authentication completed	None	Pass	1	1
3	AuthenticationFailureArg_MSC.gls	MSProfile06	90170000000006	Start	Authentication Failure Report Res...	None	Pass	1	1
4	processUnstructuredSS-RequestArg_M...	MSProfile07	0x00000005	Start	Process USSD Response Receiv...	None	Pass	1	1
5	ReadyForSMArg_VLR.gls	MSProfile08	90170000000006	Start	Ready For SMS	None	Pass	1	1
6	PurgeMSArg_MSC.gls	MSProfile09	90170000000006	Start	purge MS Response Received	None	Pass	1	1



MAPS (Message Automation Protocol Simulation) HLR (MAP 3GPP) - [Call Reception]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Results
1	SLTM.gls	0.0.1.0.0.6	Abort	MTP3 Active	Initiate SLTM	Pass
2	SCMG.gls	1	Abort	Subsystem Allowed	Initiate SST	Pass
3	UpdateLocationRes_HLR.gls		Completed		None	Pass
4	SendAuthenticationInfoRes_HLR.gls	901700000000627	Completed	Authentication Success	None	Pass
5	AuthenticationFailureReportRes_HLR.gls	901700000000628	Completed	Authentication Failure Report Response S...	None	Pass
6	processUnstructuredSS-RequestRes_H...	ProtScriptId_3174573-1543-4384	Completed	Process USSD Response Sent	None	Pass
7	readyForSMRes_HLR.gls	901700000000630	Completed	Ready For SMS	None	Pass
8	PurgeMSRes_HLR.gls	901700000000631	Completed	MS Purged	None	Pass



Call Generation and Reception (CAP)

MAPS (Message Automation Protocol Simulation) gsmSSF (CAMEL 3GPP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Event...	Result	Total Iterations	Completed Iterations
1	ApplyChargingGPRS_SSF.gls	MSProfile01	0x00000000	Start	Call Charging Report Sent	None	...	Pass	1	1
2	ApplyCharging_SSF.gls	MSProfile02	0x0000000F	Start	Call Released from both side	None	...	Pass	1	1
3	CamelSMS_SSF.gls	MSProfile03	0x0000000A	Start	Call Released from both side	None	...	Pass	1	1
4	BalanceCheck_SSF.gls	MSProfile04	0x00000012	Start	Call Released from both side	None	...	Pass	1	1
5	ConnectToResource_SSF.gls	MSProfile05	0x00000010	Start	Call Released from both side	None	...	Pass	1	1
6	EstablishTemporaryConnection_SSF.gls	MSProfile06	0x00000011	Start	Call Released from both side	None	...	Pass	1	1

Save Column Width Refresh Start Start All

MAPS DUT

initialDPGPRS 11:28:42.562000

requestReportGPRSEvent 11:28:43.162000

eventReportGPRS 11:28:43.173000

continueGPRS 11:28:43.183000

requestReportGPRSEvent 11:28:43.798000

applyChargingGPRS 11:28:43.810000

continueGPRS 11:28:43.832000

applyChargingReportGPRS 11:28:51.816000

applyChargingGPRS 11:28:52.407000

Scripts Message Sequence Event Config Script Flow

MAPS (Message Automation Protocol Simulation) gsmSCF (CAMEL 3GPP) - [Call Reception]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events...	Results
1	SLTM.gls	3.3.3.2.2.2	Abort	MTP3 Active	Initiate SLTM		Pass
2	SCMG.gls	1	Abort	Subsystem-Allowed	Initiate SST		Pass
3	ApplyChargingGPRS_SCF.gls		Completed		None		Pass
4	BalanceCheck_SCF.gls	0x00000003	Completed	CAMEL Transaction Complete	None		Pass
5	CamelSMS_SCF.gls	0x00000004	Completed	CAMEL Transaction Complete	None		Pass
6	BalanceCheck_SCF.gls	0x00000005	Completed	CAMEL Transaction Complete	None		Pass
7	BalanceCheck_SCF.gls	0x00000006	Abort	o Disconnect Reported	None		Unknown

Abort Abort All Show Records Auto Trash Trash

Save Column Width

DUT MAPS

initialDPGPRS 17:40:41.852000

requestReportGPRSEvent 17:40:41.922000

continueGPRS 17:40:41.961000

eventReportGPRS 17:40:42.587000

requestReportGPRSEvent 17:40:42.621000

applyChargingGPRS 17:40:42.642000

continueGPRS 17:40:42.645000

applyChargingReportGPRS 17:40:51.302000

applyChargingGPRS 17:40:51.305000

continueGPRS 17:40:51.307000

Scripts Message Sequence Event Config Script Flow

----- MTP3 Layer -----

0000 Service Indicator = ...0011 SCCP

0000 Priority Code = ...11.... Priority Code 3

0000 Sub-service field = 10.... National Network

0001 DPC = 3.3.3(00010111...011000)

0002 OPC = 2.2.2(10..... 00000100 ...0100)

0004 Signalling Link Code = 0001.... (1)

Higher Layer Data = x0900030R190B92933F11003141658575080B92923F11C

----- SCCP Layer -----

0005 Message Type = 00001001 UDT unidata

Mandatory Fixed Parameters

Protocol Class Parameter =

0006 Class = ...0000 Class 0

0006 Message Handling (Class 0 and 1 only) = 0000.... No Special Options

0007 Pointer to Mandatory Parameter = Param0 offset x03 (3)

0008 Pointer to Mandatory Parameter = Param1 offset x0E (14)

0009 Pointer to Mandatory Parameter = Param2 offset x19 (25)

Mandatory Variable length Parameters

Called Party Address

Parameter length = 11

Address Indicators =

000B Point Code Indicators =0 Address does not contain signalling p

000B SSN Indicators =1 Address contains subsystem number

000B Global Title Indicators = ..0100... Global title includes translation typ

Error Events Captured Errors Link Status Up=1 Down=0

Call Generation and Reception (MLPPP)

The image displays two screenshots of the MAPS (Message Automation Protocol Simulation) (MLPPP IETF) software interface, showing call generation and reception scenarios.

Top Screenshot: MAPS (Message Automation Protocol Simulation) (MLPPP IETF) - [Call Generation - CallGenDefault]

The interface shows a table of test results and a message sequence diagram.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	OpenStateTest.gls	MLPPPProfile01		Start	Opened	None	EventProfile.xml	Pass	1	1

The message sequence diagram shows the interaction between MAPS and DUT:

- MAPS sends Configure-Request to DUT at 16:30:34.289000.
- DUT sends Configure-Ack to MAPS at 16:30:36.721000.
- MAPS sends Configure-Request to DUT at 16:30:39.855000.
- DUT sends Configure-Ack to MAPS at 16:30:39.856000.

The log shows the PPP Link Layer messages:

```
===== PPP Link Layer =====
0000 Address Compression Choice = 1111.... No Address Compression
0000 Address = 11111111 Broadcast Address
0001 Ctl = 00000011 UnSequenced Frame
0002 Protocol = 00000011 UnSequenced Frame
=====
```

Bottom Screenshot: MAPS (Message Automation Protocol Simulation) (MLPPP IETF) - [Call Reception]

The interface shows a table of test results and a message sequence diagram.

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events...	Results
1	TestLoopBackUsingPeerMagicNumber.gls		Completed		None		Pass

The message sequence diagram shows the interaction between DUT and MAPS:

- DUT sends Configure-Request to MAPS at 18:32:49.251000.
- MAPS sends Configure-Ack to DUT at 18:32:49.252000.
- DUT sends Configure-Request to MAPS at 18:32:49.252000.
- MAPS sends Configure-Nak to DUT at 18:32:51.629000.

The log shows the PPP Link Layer messages:

```
===== PPP Link Layer =====
0000 Address Compression Choice = 1111.... No Address Compression
0000 Address = 11111111 Broadcast Address
0001 Ctl = 00000011 UnSequenced Frame
0002 Protocol = 00000011 UnSequenced Frame
=====
===== Link Control Layer =====
0004 Code Type = 00000011 Configure-Nak
0005 Identifier = 14 (x0E)
0006 Length = 14 (x000E)
0008 Magic-Number = 00000101 Magic-Number
0009 Length of Options = 6 (x06)
000A Magic-Number = 31698 (x00007BD2)
000E Max-Recv-Reconstructed-Unit = 00010001 Maximum-Receive-Reconstructed-Unit
000F Length of Options = 4 (x04)
0010 Maximum-Receive-Reconstructed-Unit = 1500 (x05DC)
=====
```


Call Generation and Reception (CAS)

MAPS (Message Automation Protocol Simulation) (CAS) - [Call Generation - Default-R1]

Configurations Emulator Reports Editor Windows Help

Script Name Profile Call Info Script Execution Status Events Events... Result Total Iterations Completed Iterations

S...	Script Name	Profile	Call Info	Script Execution	Status	Events	Events...	Result	Total Iterations	Completed Iterations
1	T1_R1_Place Call.gls	Card1TS00	1.0	Abort	Transmitting File	OutboundReleaseCall		Pass	1	0
2	T1_R1_Answer Call.gls	Card2TS00	2.0	Abort	Transmitting File	InboundReleaseCall		Pass	1	0
3	T1_R1_Reset Timeslots.gls			Start	Timeslots Restarted	None		Pass	1	1

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

☐ View Executing Line

Script Contents

```

//// MAPS CAS Emulator: R1 ////

//// Initialization ////
P="1, 1, 1, 1"; //P: Place //
A="1, 1, 1, 1"; //A: Answer //
PR="0, 0, 0, 0"; //PR: Place Release //
AR="0, 0, 0, 0"; //AR: Answer Release //
Idle="0, 0, 0, 0";
SeizureAck="0, 0, 0, 0";
WinkOn="1, 1, 1, 1";
WinkOff="0, 0, 0, 0";
    
```

Scripts Message Sequence Event Config Script Flow Capture Events Error Events

Events

Event Log Error Events Captured Events

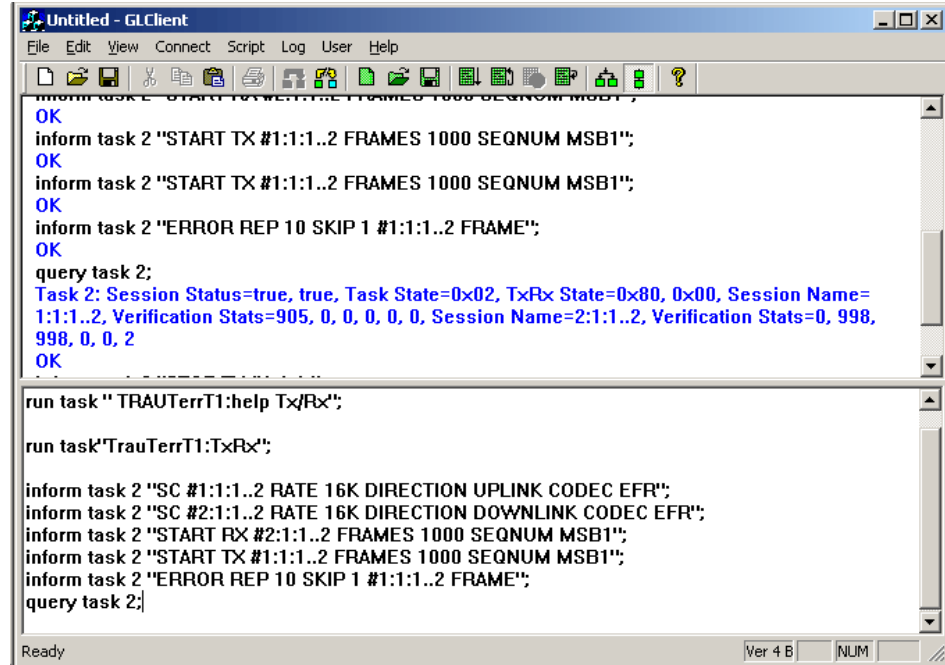
Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2014-8-27 12:57:21.596000	Timeslots Restarted		T1_FGD_Reset Timeslots.gls	CGProtScriptId_94501006-1989-3436
2014-8-27 12:57:49.862000	Timeslots Restarted		T1_R1_Reset Timeslots.gls	CGProtScriptId_94523274-1989-3436
2014-8-27 12:57:56.595000	P: Placing Call	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:56.611000	A: CASDetectedSignals = 0, 0, 0, 0	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:57:57.089000	A: CASDetectedSignals = 1, 1, 1, 1	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:57:57.089000	A: Seizure Detected	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:57:57.100000	P: CASDetectedSignals = 0, 0, 0, 0	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.102000	P: CASDetectedSignals = 1, 1, 1, 1	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.296000	A: Seizure Acknowledged	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:57:57.603000	P: CASDetectedSignals = 0, 0, 0, 0	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.603000	P: Seizure Acknowledged	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.603000	RndDialDigitsDID = 5551809	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.603000	RndDialDigitsANI = 4441809	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:57:57.603000	P: Dialing	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:58:02.096000	A: Digit Type=DTMF	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:02.096000	A: digit=5551809*4441809	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:02.096000	A: Alerting	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:05.188000	A: Call Connected	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:05.188000	RndFileSel = 7	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:05.188000	A: TxFileName: mu-law samples\kernyc...	2.0	T1_R1_Answer Call.gls	CGProtScriptId_94535323-1990-3436
2014-8-27 12:58:05.603000	P: CASDetectedSignals = 1, 1, 1, 1	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436
2014-8-27 12:58:05.603000	P: Remote User Answered Call	1.0	T1_R1_Place Call.gls	CGProtScriptId_94535819-1991-3436

Save Events

Clear ☐ Capture Events to file

Protocol Emulation using Client-Server Scripts

- Provides various modules for analysis and emulation of protocols such as CAS, SS7, ISDN, HDLC, Multilink PPP, TRAU, ATM IMA, and Multi-Link Frame Relay
- Best suited for remote script-based operations
- Easy control of T1/E1 servers through software clients via TCP/ IP / UDP



The screenshot shows the 'Untitled - GLClient' window. The menu bar includes File, Edit, View, Connect, Script, Log, User, and Help. The toolbar contains icons for file operations and protocol settings. The main text area contains the following script:

```
inform task 1 "START TX #1:1:1..2 FRAMES 1000 SEQNUM MSB1";
OK
inform task 2 "START TX #1:1:1..2 FRAMES 1000 SEQNUM MSB1";
OK
inform task 2 "START TX #1:1:1..2 FRAMES 1000 SEQNUM MSB1";
OK
inform task 2 "ERROR REP 10 SKIP 1 #1:1:1..2 FRAME";
OK
query task 2;
Task 2: Session Status=true, true, Task State=0x02, TxRx State=0x80, 0x00, Session Name=
1:1:1..2, Verification Stats=905, 0, 0, 0, 0, Session Name=2:1:1..2, Verification Stats=0, 998,
998, 0, 0, 2
OK
run task " TRAUerrT1:help Tx/Rx";

run task "TrauerrT1:TxRx";

inform task 2 "SC #1:1:1..2 RATE 16K DIRECTION UPLINK CODEC EFR";
inform task 2 "SC #2:1:1..2 RATE 16K DIRECTION DOWNLINK CODEC EFR";
inform task 2 "START RX #2:1:1..2 FRAMES 1000 SEQNUM MSB1";
inform task 2 "START TX #1:1:1..2 FRAMES 1000 SEQNUM MSB1";
inform task 2 "ERROR REP 10 SKIP 1 #1:1:1..2 FRAME";
query task 2;
```

The status bar at the bottom shows 'Ready' on the left and 'Ver 4 B' and 'NUM' on the right.

Measure Loop Delay/ERL

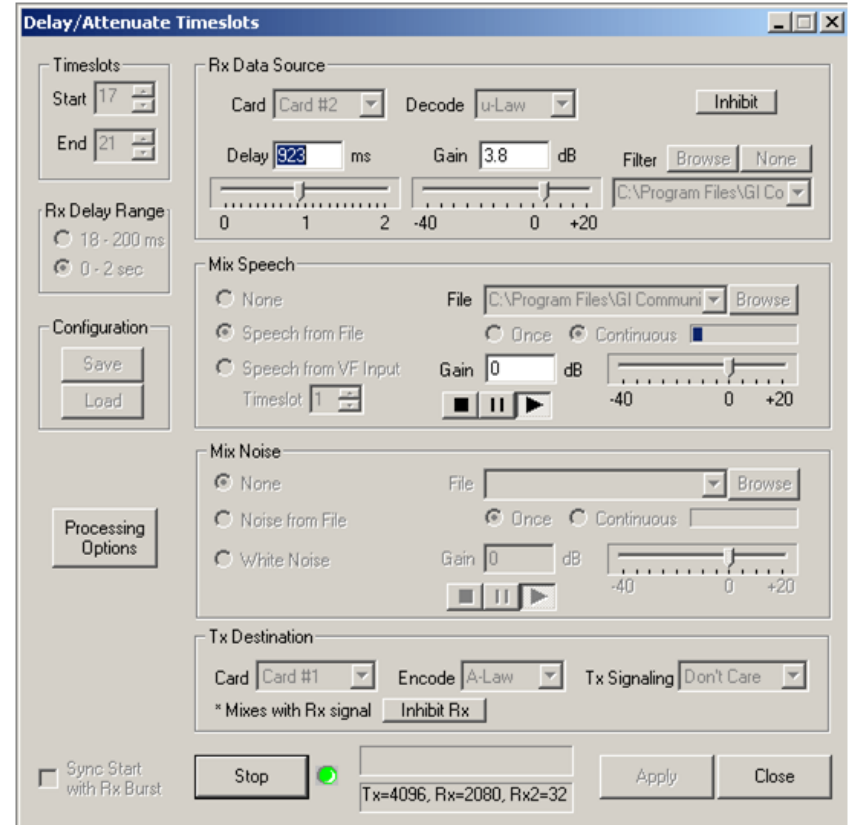
- Capability to measure and display loop delay and echo return loss (ERL) on one or more time slots
- Non- Intrusive and Intrusive modes of operations

The screenshot shows a software window titled "Delay/ERL". At the top, there are two dropdown menus for "Original Data" and "Return Data", both set to "Card #1". Below these are four columns of data, each with a header "Delay ERL". The first column (slots 0-7) shows "173 -15.4" for slots 4-7. The second column (slots 8-15) shows "173 -15.4" for slots 10-13. The third column (slots 16-23) shows "173 -15.4" for slots 17-21. The fourth column (slots 24-31) shows "173 -15.4" for slots 25-28. Below the data tables are buttons for "Select All Timeslots", "Deselect All Timeslots", and a "Refresh (Sec)" dropdown set to "1". A "Parameters" section contains input fields for "Delay: Minimum 0 ms", "Delay: Maximum 200 ms", "ERL: Minimum 6 dB", and "ERL: Maximum 60 dB". An "Original Data Source" section has radio buttons for "E1 Input", "Gaussian Noise", and "File". The "File" option is selected, with a text field showing "A-Law Samples\2x2lcq1a.pcm". A "Stop" button is at the bottom right.

Delay ERL		Delay ERL		Delay ERL		Delay ERL	
0	...	8	...	16	...	24	...
1	...	9	...	17	173 -15.4	25	173 -15.4
2	...	10	173 -15.4	18	173 -15.4	26	173 -15.4
3	...	11	173 -15.4	19	173 -15.4	27	173 -15.4
4	173 -15.4	12	173 -15.4	20	173 -15.4	28	173 -15.4
5	173 -15.4	13	...	21	173 -15.4	29	...
6	173 -15.4	14	...	22	...	30	...
7	173 -15.4	15	...	23	...	31	...

Delay Attenuate Timeslots

- Apply delay, attenuation, and/or filtering to a received signal on any number of timeslots
- Mix in additional signals (Speech and/or Noise) from a number of sources (Files, VF input, internal generation)



Delay Attenuate - Single Channel

Delay/ERL

Original Data: Card #1 Return Data: Card #2

Delay ERL		Delay ERL		Delay ERL		Delay ERL	
0	...	8	...	16	...	24	...
1	46 -12.5	9	...	17	...	25	...
2	...	10	...	18	...	26	...
3	...	11	...	19	...	27	...
4	...	12	...	20	...	28	...
5	...	13	...	21	...	29	...
6	...	14	...	22	...	30	...
7	...	15	...	23	...	31	...

Select All Timeslots Deselect All Timeslots Refresh (Sec) 1

Parameters

Delay: Minimum 10 ms Maximum 96 ms
ERL: Minimum 12 dB Maximum 60 dB

Original Data Source

☐ E1 Input ☐ Only when Off Hook
☐ Gaussian Noise -10 dBm Signaling Don't Care
☒ File A-Law Samples\Samp_est.pcm

Stop

Delay/Attenuate - Single Timeslot

☒ Process Receive Signal Data

Card Card #2 Timeslot 0 Decode A-Law

Delay 10.000 ms Gain -12.0 dB

Filter: Disable Filter Type CSS/Tone

☒ Add Speech From VF Input

Use the "Insert" and "Gain" controls, on the Tx section of the VF toolbar to add speech from VF input

☐ Add Application Data

Timeslot 1

Tx Destination

Card Card #2 Timeslot 1 Encode u-Law

Capture To Receive Buffer

Configuration

Save Load Stop Apply Close

Diagram:

Rx Signal #2:0

10.000 Delay

A-Law Decode

-12.0 Gain

VF Input

Appl. Data

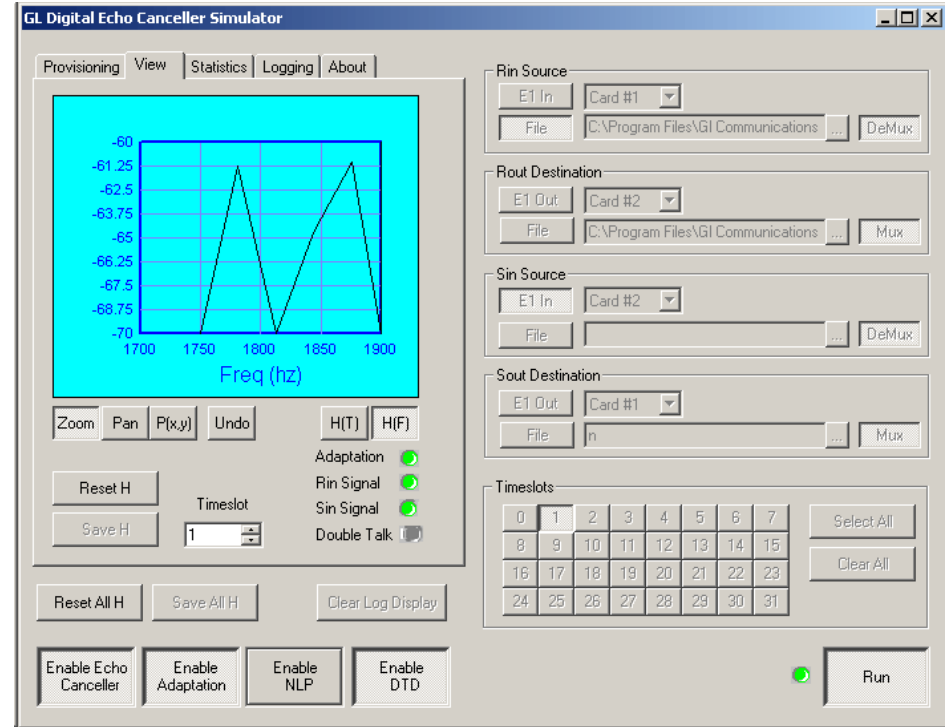
u-Law Encode

Tx Signal #2:1

- Transmission of data, voice or file on single timeslot
- Receive and transmit on only one of the boards; launch multiple instances to work on a second card

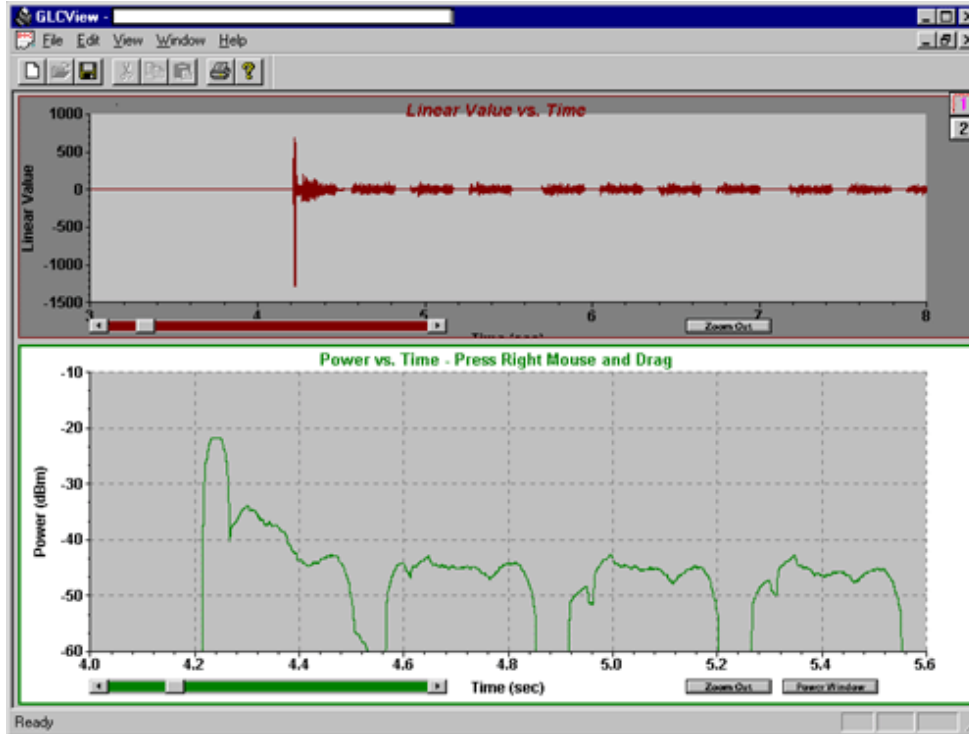
DEC Simulator

- Supports bidirectional voice traffic between the two ends of a connection
- Interfaces directly with A-Law or μ -Law encoded signals
- Continuous reporting of echo path delay, ERL, and dispersion



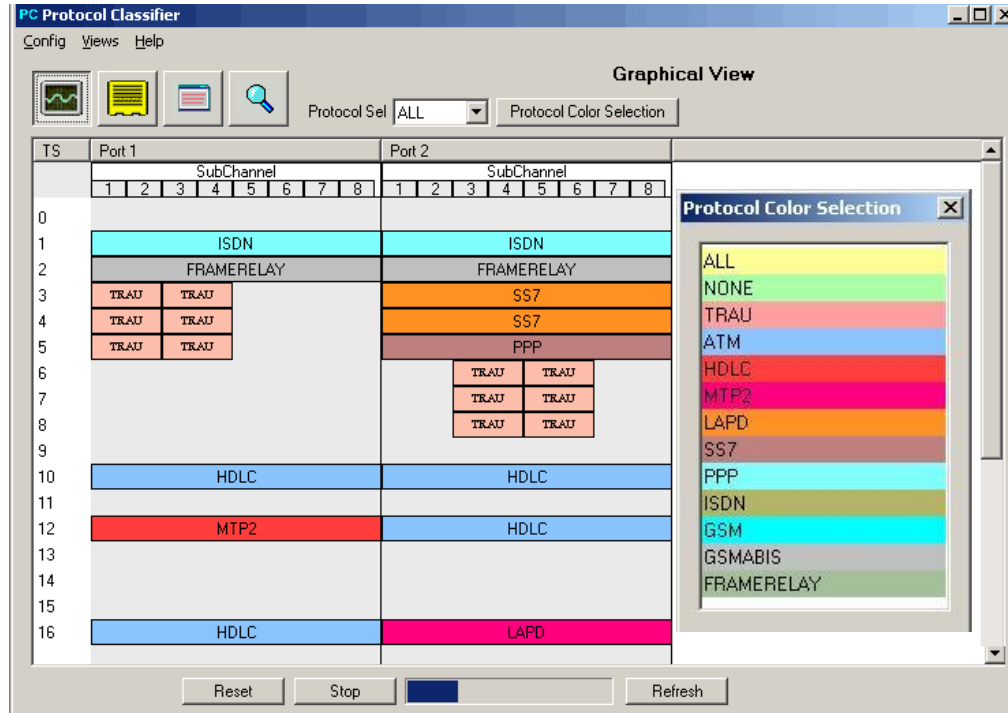
GLC View

- View pre-captured raw data files



Protocol Identifier

- Classifies frames into different protocols based on signaling over unknown T1/E1 lines



Multichannel BERT

- Measures the correctness of data transmitted and received on T1/E1 lines according to the repetitive pattern file
- Works real-time with data currently being received on T1/E1 lines, or off-line with a data stream that has been captured

Bit Error Rate Test

Total Info Summary	All Sync Status	Sync Ch Count	Error Ch Count	Logic Error Count	Test Start	Test Duration
All channels ->	All SYNC	48	0	0	18:06:05	00:00:34

Right click to insert errors or resize columns

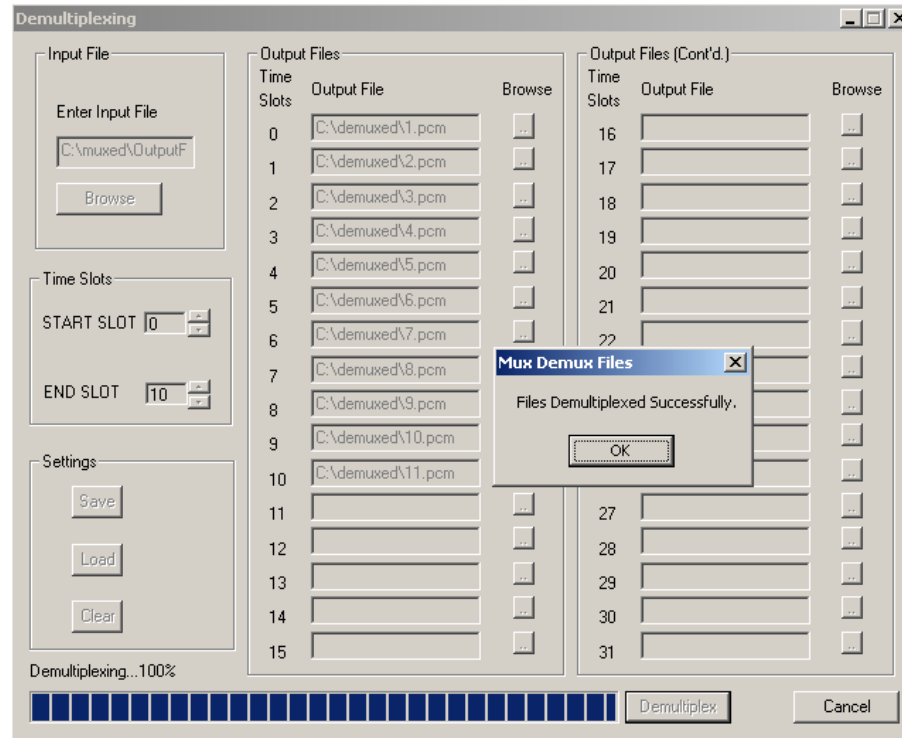
Dev	TS	SCh	Average Bit Error Rate	Current Bit Error Rate	Error Status	SyncLoss Count	Error Count	Error Free Seconds	Error Seconds	SyncLoss Seconds	Severely Err Seconds	Available Seconds	Unavailable Seconds
1	0		0	0	SYNC	0	0	34	0	0	0	34	0
1	1		0	0	SYNC	0	0	34	0	0	0	34	0
1	2		0	0	SYNC	0	0	34	0	0	0	34	0
1	3		0	0	SYNC	0	0	34	0	0	0	34	0
1	4		0	0	SYNC	0	0	34	0	0	0	34	0
1	5		0	0	SYNC	0	0	34	0	0	0	34	0
1	6		0	0	SYNC	0	0	34	0	0	0	34	0
1	7		0	0	SYNC	0	0	34	0	0	0	34	0
1	8		0	0	SYNC	0	0	34	0	0	0	34	0
1	9		0	0	SYNC	0	0	34	0	0	0	34	0
1	10		0	0	SYNC	0	0	34	0	0	0	34	0
1	11		0	0	SYNC	0	0	34	0	0	0	34	0
1	12		0	0	SYNC	0	0	34	0	0	0	34	0
1	13		0	0	SYNC	0	0	34	0	0	0	34	0
1	14		0	0	SYNC	0	0	34	0	0	0	34	0
1	15		0	0	SYNC	0	0	34	0	0	0	34	0
1	16		0	0	SYNC	0	0	34	0	0	0	34	0
1	17		0	0	SYNC	0	0	34	0	0	0	34	0
1	18		0	0	SYNC	0	0	34	0	0	0	34	0
1	19		0	0	SYNC	0	0	34	0	0	0	34	0

Rx,Tx, or Both: Rx & Tx Pattern: QRSS Tx Underrun Count: 0

Time Slots: Start Stop User File Data From File Reset Log Configuration: Save Load Bit Shift Subchan: User Pattern Exit

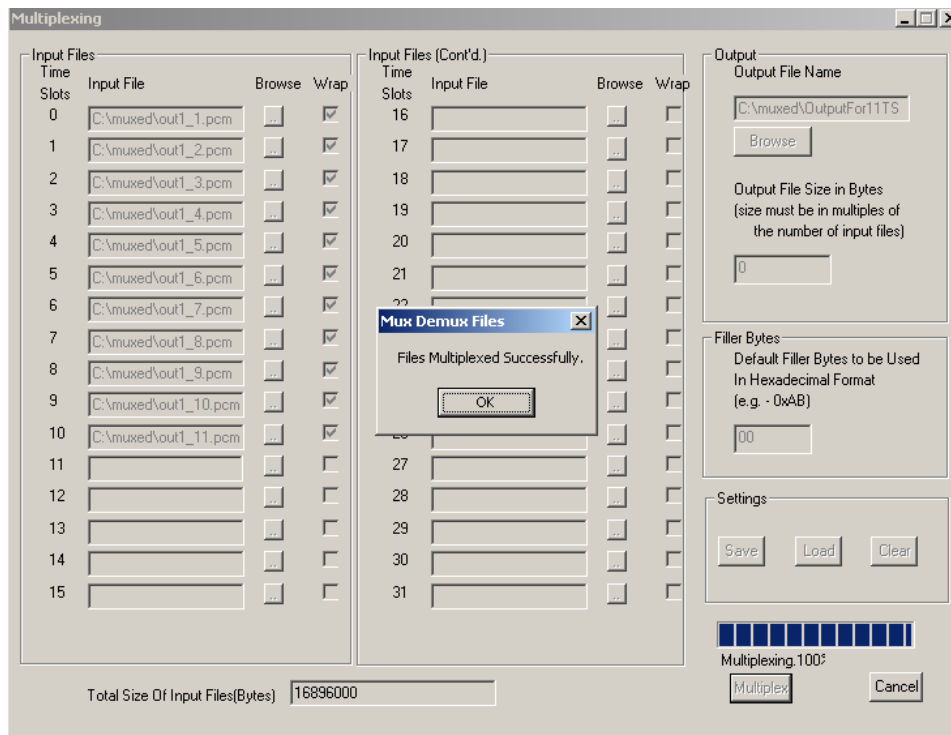
Multiplex / Demultiplex

- De-multiplex one aggregate file into individual timeslots



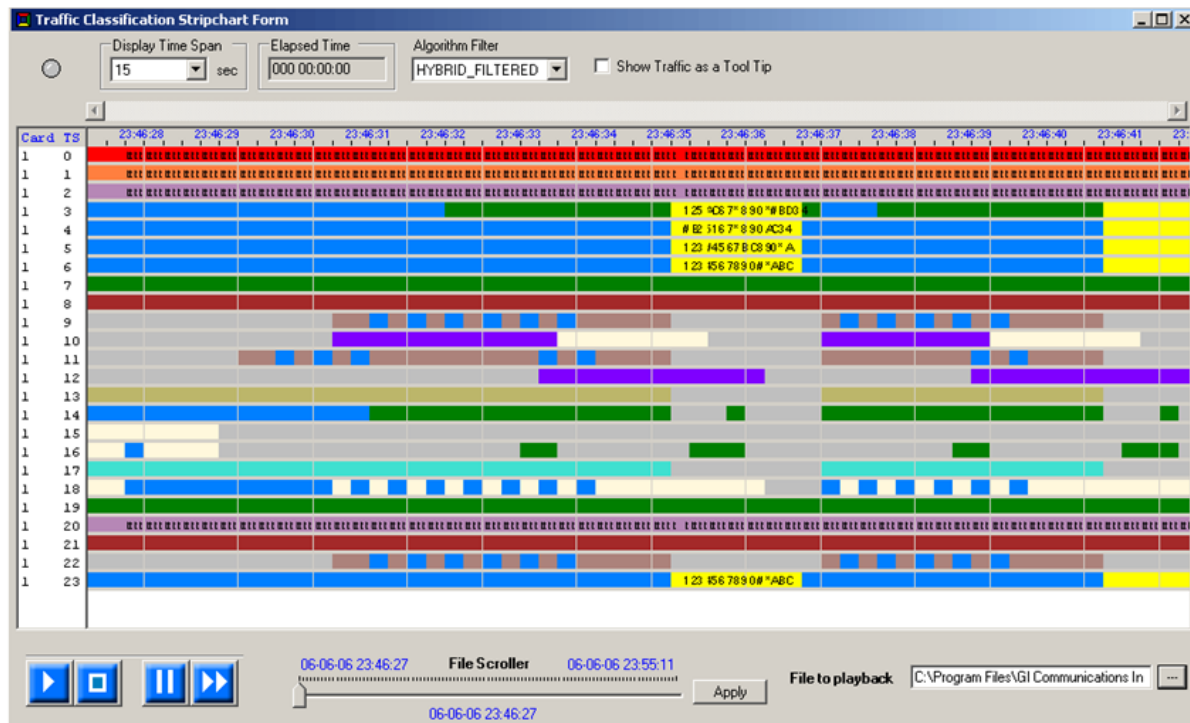
Multiplex / Demultiplex (Contd.)

- Multiplex files on different timeslots (up to 32 files) into one aggregate output file



Traffic Classifier

- Traffic Classifier is an application that can analyze the traffic on a T1 or E1 line
- It can analyze and classify various traffics such as voice, fax, data, tones (dial tone, ring-back tone, busy tone etc) as well as identify dialing digits and other events happening on a T1/E1 network



Thank you