# T1 E1 VF FXO/FXS and tProbe™ Datacom Analyzer

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# tProbe™ Units

- tProbe™ T1 E1 is an enhanced USB Based T1 and E1 solution that is capable of both T1 and E1 interfacing
- Available with Dual T1 or E1, FXO, FXS, DTE, and DCE interfaces
- Forward thinking hardware design for future daughter board expansion applications
- Connects to a PC via a USB 2.0 port
- Access it remotely

# Why the product is superior?

- Portable with advance test features such as Pulse Shape Analysis, Jitter Measurement and Analysis
- “Cross-port Through” Mode and “Cross-port Transmit” Mode – these settings make cabling with Drop/Insert and Fail-Safe Inline Monitoring very easy
- Enhanced VF Drop and VF Insert Capabilities (including 3.5mm or Bantam physical connection options)
- Improved circuitry for very accurate  Digital Line Level measurements
- Forward thinking hardware design for future daughter board expansion applications
- Available with Dual T1 or E1, FXO, FXS, DTE, and DCE interfaces

# What the unit does ?

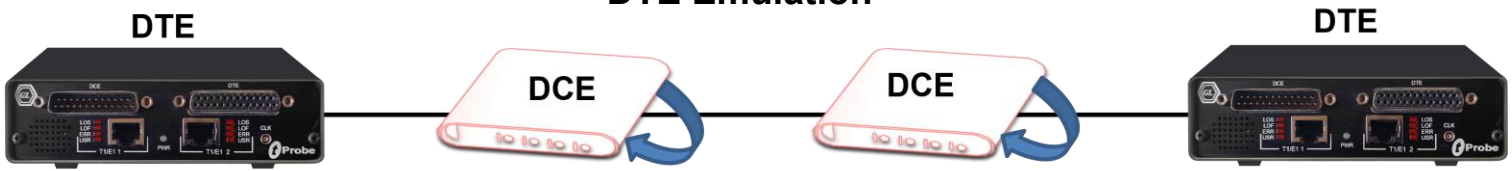
- Used for installation, test, and troubleshooting of T1 E1 lines - routine testing of errors, such as pulse testing, bit errors, frame errors, and bipolar violation
- Capability of T1 E1 PCM signal visualization, capture, storage, analysis, and emulation
- Includes BERT, voice band analysis, data, signaling,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

# tProbe™ Datacom Analyzer

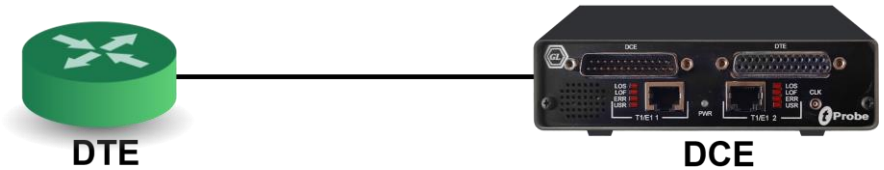
- Designed for the service installation, verification, and maintenance of data communications and telecommunication equipment
- Provides a software selectable interface to emulate DTE, DCE and monitor the Datacom lines for both synchronous (sync), and asynchronous (async) modes of operation
- Supported Line interfaces - V.35, RS-232, RS-449, RS-485, EIA-530 and EIA-530A
- Sync BER from 300 b/s to 16.384Mbps
- Async BER from 300 b/s to 115.2Kbps
- DTE or DCE emulation mode
- SYNC clock source and sense selection
- Frequency measurement

# Datacom Analyzer

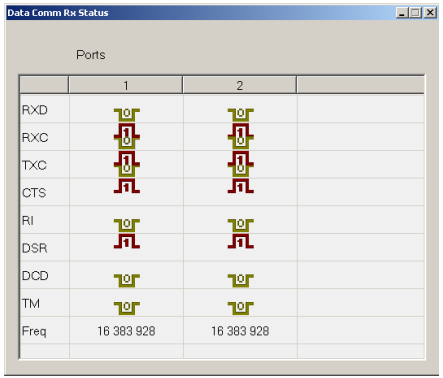
## DTE Emulation




## DCE Emulation




## Monitoring Datacom Lines

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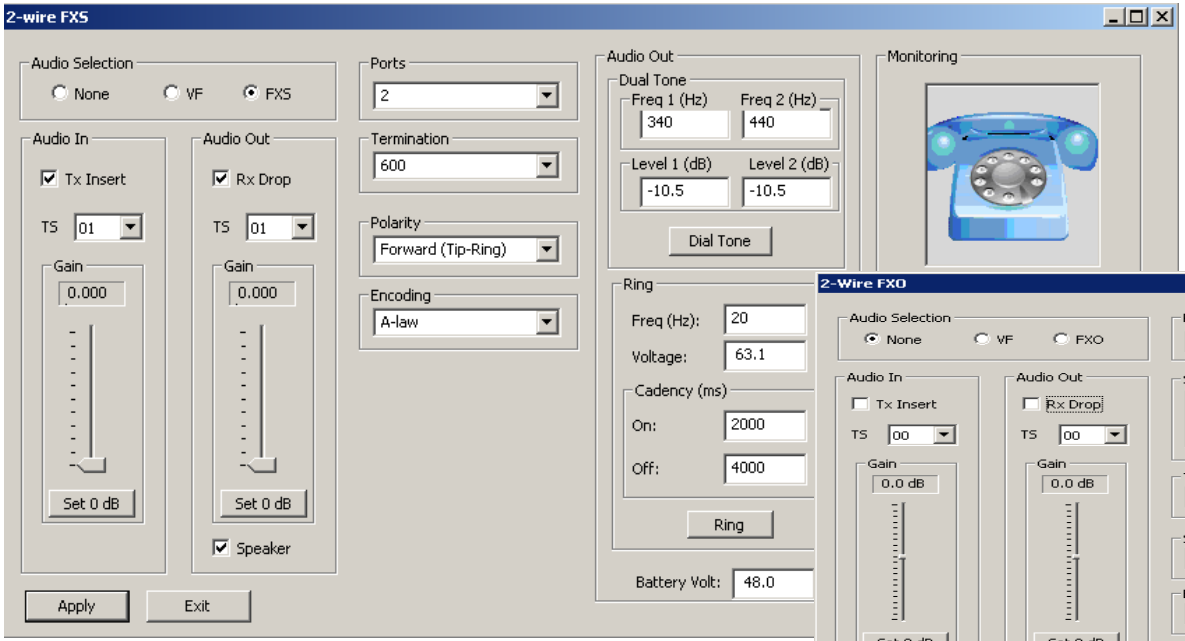
# 2-Wire FXO/FXS

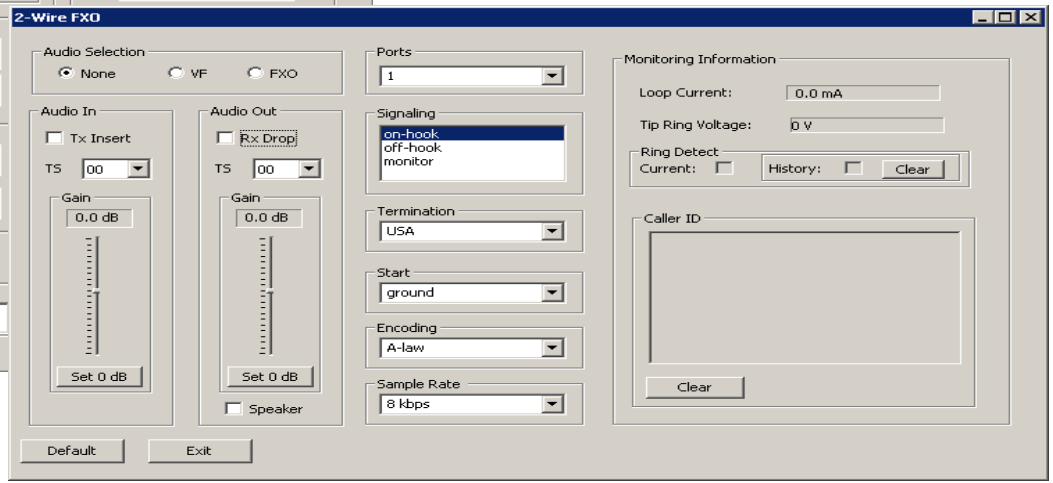
- FXO port on tProbe™ allows to simulate a two-wire FXO device such as a telephone or a fax machine
- FXO port  allows you to capture and analyze data from a two-wire telephone line, as well as to generate and transmit analog data onto that two-wire line
- The FXS port on tProbe™ emulates a two-wire FXS service such as a telephone wall jack
- This feature allows you to interface with an FXO device such as a telephone

# 2-Wire FXO/FXS (Contd.)

## 2-Wire FXS



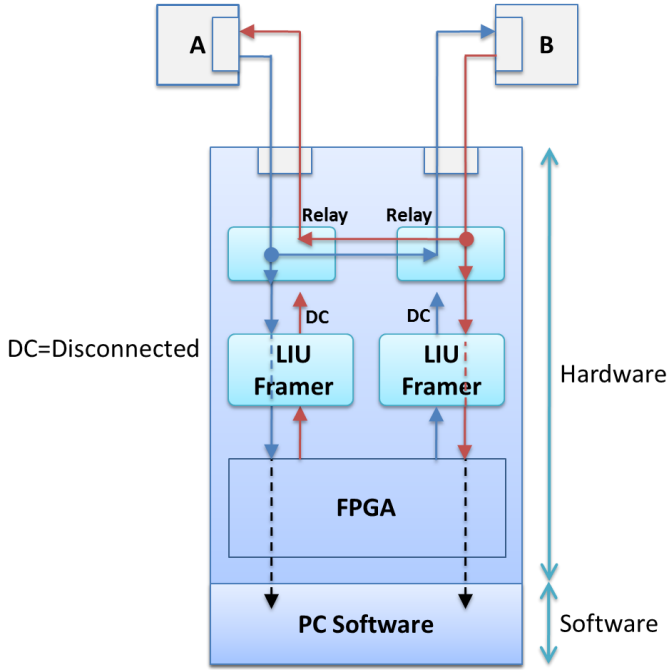

## 2-Wire FXO



# Benefits

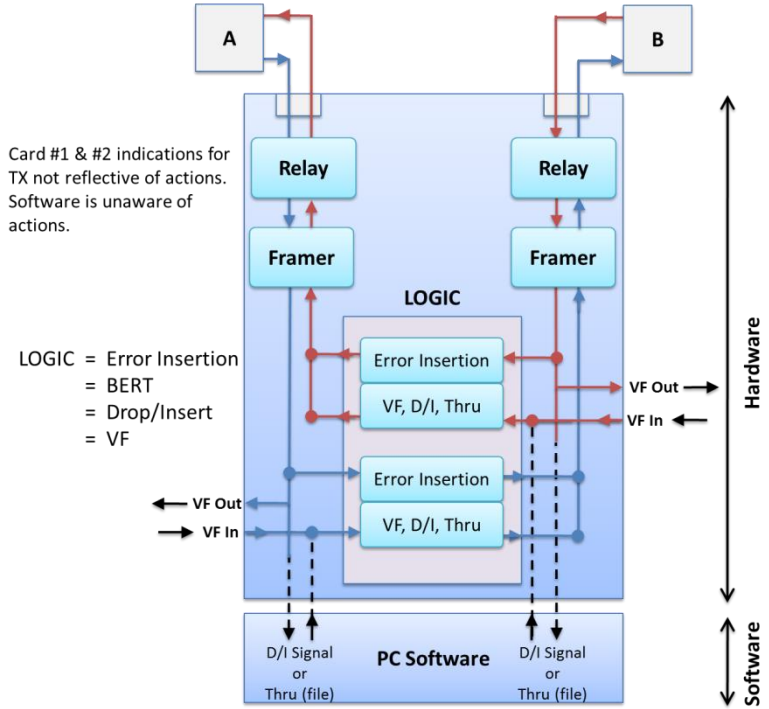
- Compatibility with Windows® 11 64-bit operating system and user-friendly real-time software
- Boards are significantly faster, and significantly more efficient
- CPU utilization with the newer boards is negligible
- Adjustable transmit clock frequency (+ / - 300ppm) for testing frequency lock sensitivity of T1 or E1 equipment
- Supports individual speakers per card
- VF Tx Gains for tProbe™ analyzer ranges from -12 dB to +59.5 dB in 0.5 dB steps
- VF Rx Gains for tProbe™ analyzer ranges from -63.5 dB to +9 dB in 0.5 dB steps
- VF Tx and Rx impedance is 135-, 150-, 600-, and 900-Ohm terminations, New High Impedance Monitor Termination (>25K Ohms), and Mic/HS impedance (Microphone Headset impedance is1K Ohms)

# Cross-port Through Mode




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

# Cross-port Transmit Mode




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

# T1 E1 Basic Software

- Board Configuration
- VF Options
- Monitoring Options
- Intrusive Testing
- Dual VF Tx Rx
- Windows Client / Server
  - Remote access to T1 E1 server
  - Clients - Python

- Configuration Options for T1, E1, Datacom, FXO, FXS
  - T1 E1 Configuration
  - Encoding Options – A-law, u-law, and Bit Inversion
  - URB Settings
  - WCS Configuration
  - 2-Wire FXO
  - 2-Wire FXS

# T1 E1 Basic Software (Contd.)

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

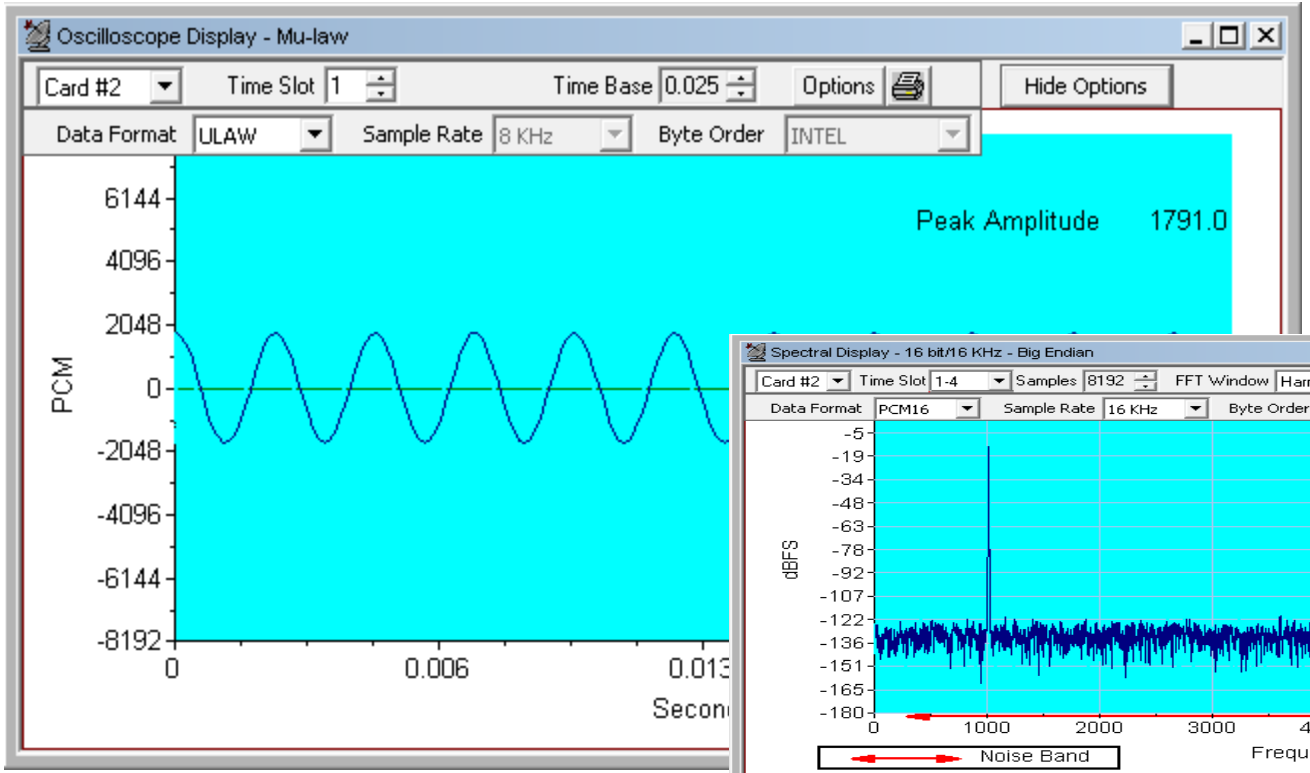
- Monitoring Features
  - ASCII Timeslot Display
  - Oscilloscope and Power Spectral
  - Audio Monitoring
  - Active Voice Level
  - Jitter Measurement
  - Pulse Mask Display
  - Capture Dialed Digits
  - Realtime Strip Chart
  - Realtime Multichannel Audio Bridge
  - Signaling Bit Transitions

# T1 E1 Basic Software (Contd.)

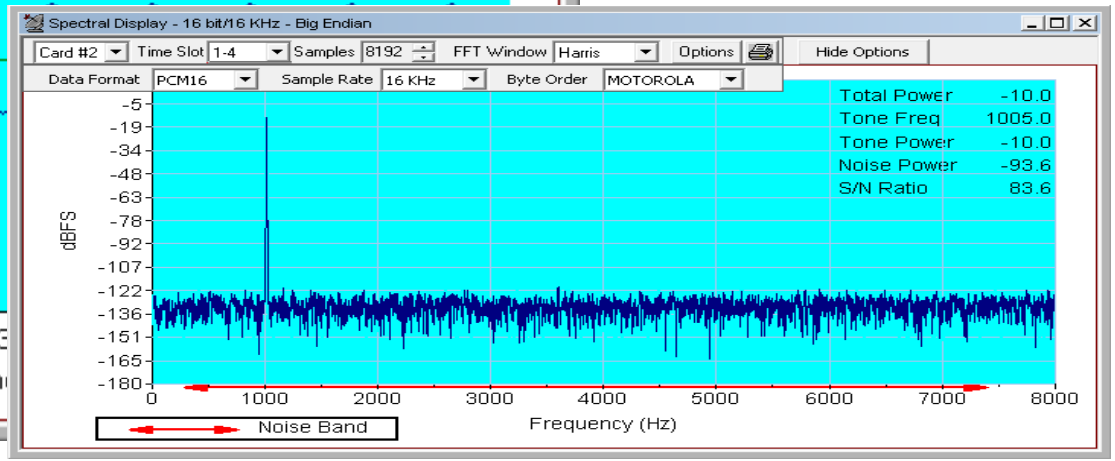
- Intrusive Tests
  - Bit Error Rate Test
  - Enhanced Bit Error Rate
  - ATM BERT
  - Transmit Tone
  - Transmit Gaussian Noise
  - Transmit Multiframe
  - Transmit Signaling Bits
  - Precision Delay Measurement
  - Rx-to-Tx Loop back
  - Error Insertion
  - Jitter Generation

# Monitoring Features

## Oscilloscope Display




## Spectral Display

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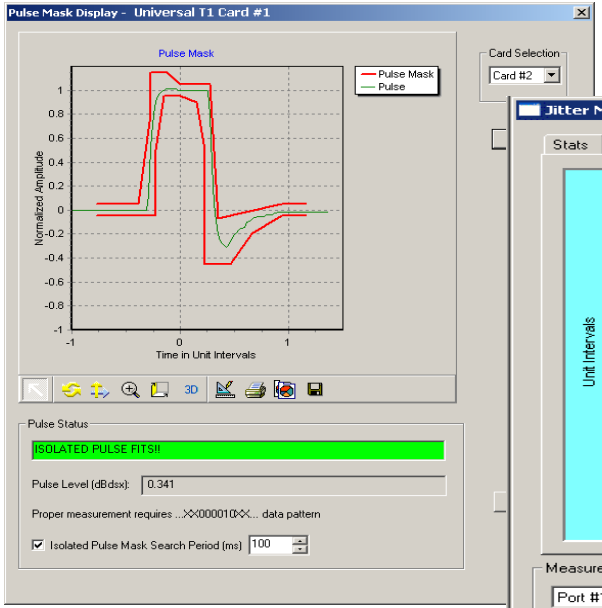
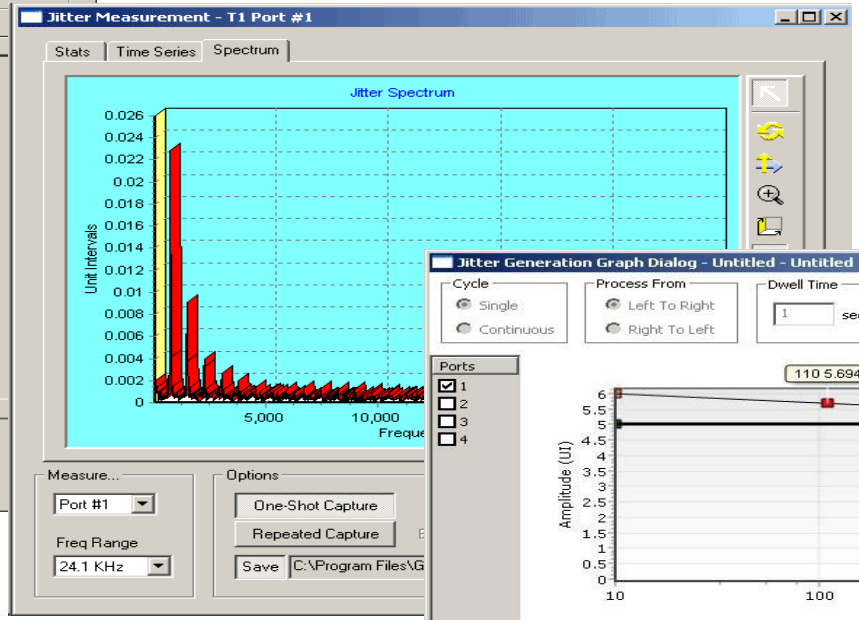
# Jitter Measurement and Pulse Mask

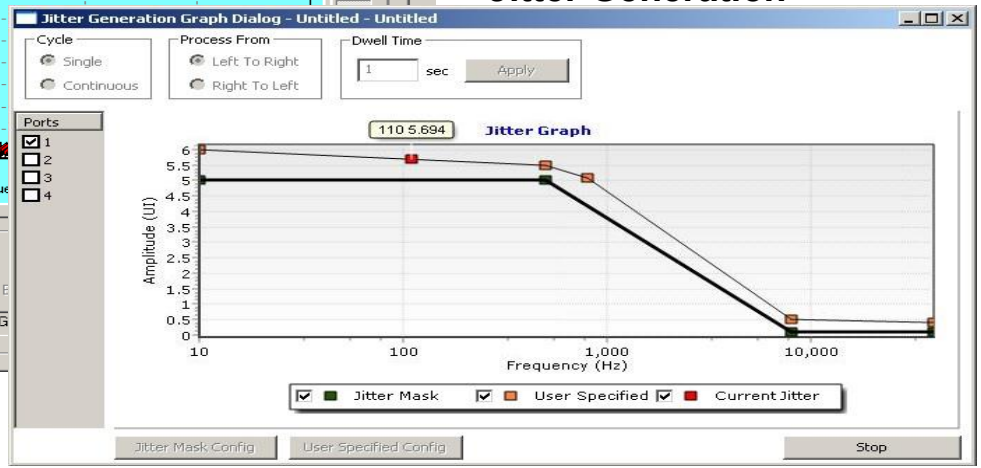
## Pulse Shape Display




## Jitter Measurement




## Jitter Generation

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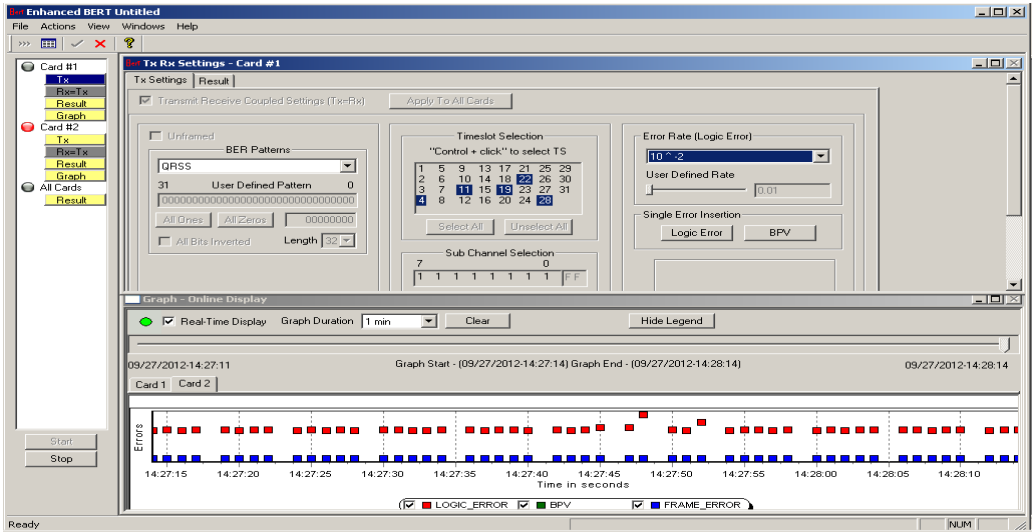
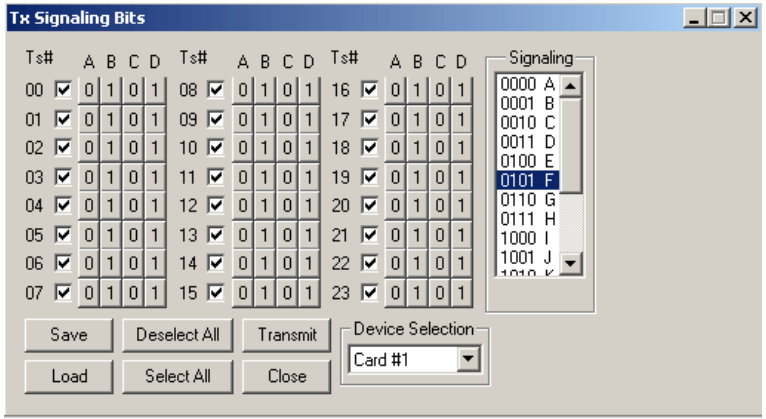
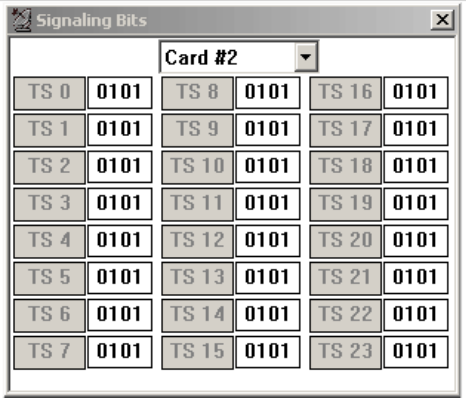
# Enhanced BERT and Tx Signaling BITS

## Enhanced BERT




## T1 E1 Basic Software

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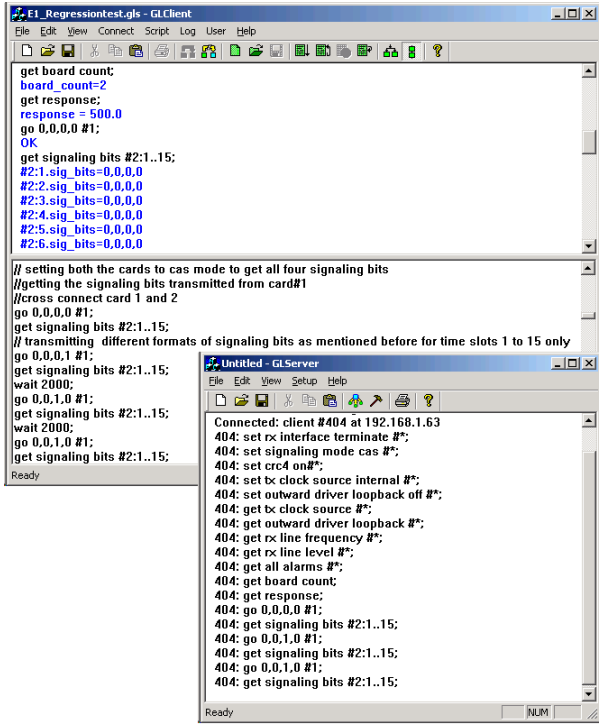
# Client Server




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

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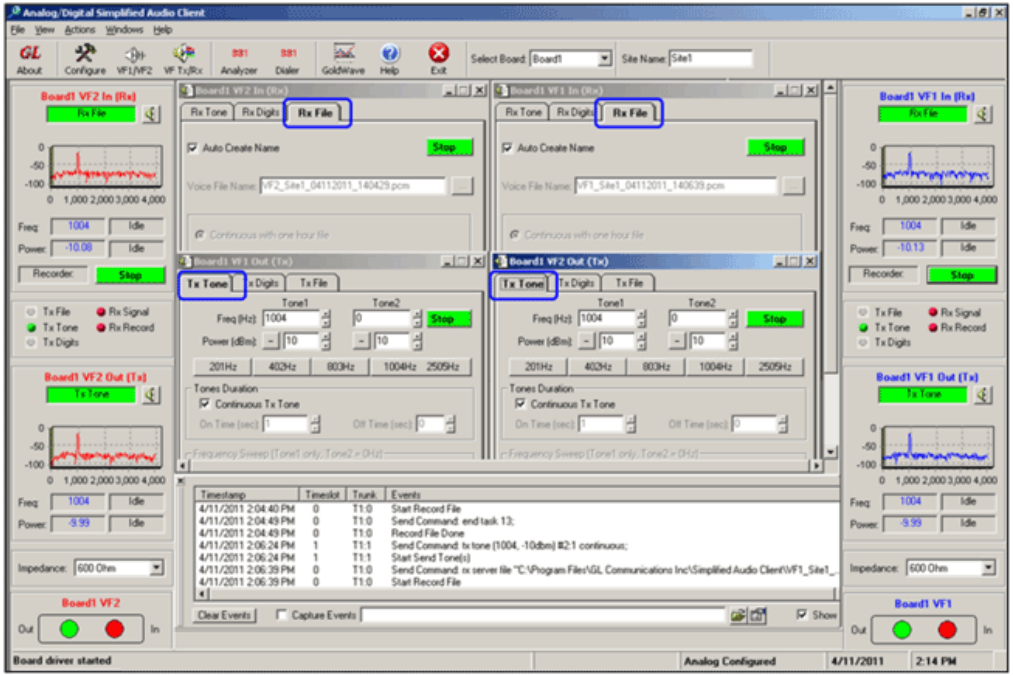
# Dual VF Tx/Rx




- Performs non-intrusive and intrusive VF audio monitoring, VF audio recording, and testing easily
- Provides an alternate and simple GUI as against the T1 E1 Analyzer applications in basic software to perform analog Tx/Rx functions

# T1 E1 Special Applications

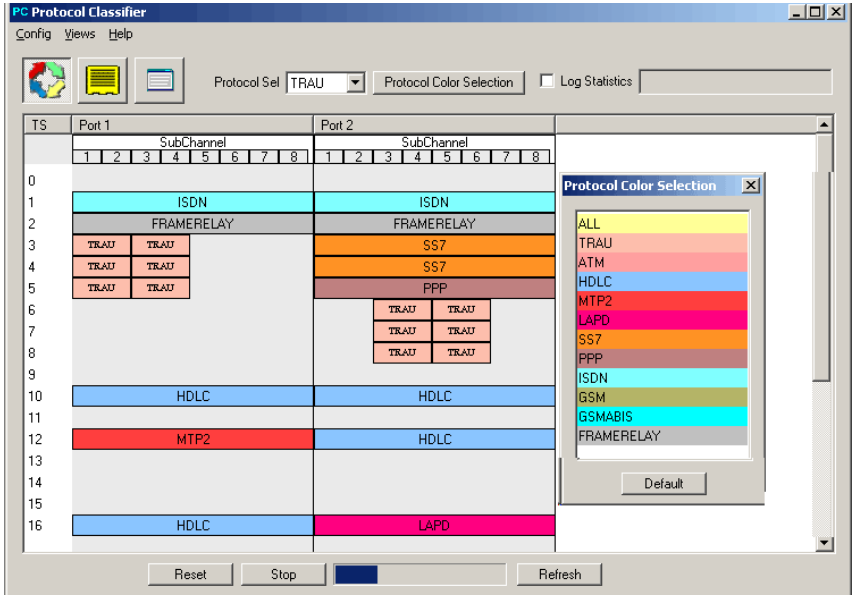
- Protocol Analysis
  - ISDN, HDLC, SS7, Frame Relay, TRAU, CDMA, DCME, T1 Facility Data Link,
  - E1 Maintenance Data Link, UMTS, PPP, ATM, GSM, V5.x, CAS, GPRS, GR303, SS1
- Protocol Emulation
  - ISDN, HDLC, MLPPP, MLPPP Conformance, CAS, TRAU, SS7
  - SS7 conformance suite, GSM A, GSM Abis, MAP, CAMEL, Frame Relay, ATM IMA, and SS1
- Capture, Analysis, and Emulation
  - BER, Playback
  - Manual and Automated Record/Playback files
  - Call Capture and Analysis (CCA)
  - Multiple Call Capture and Analysis

# T1 E1 Special Applications (Contd.)

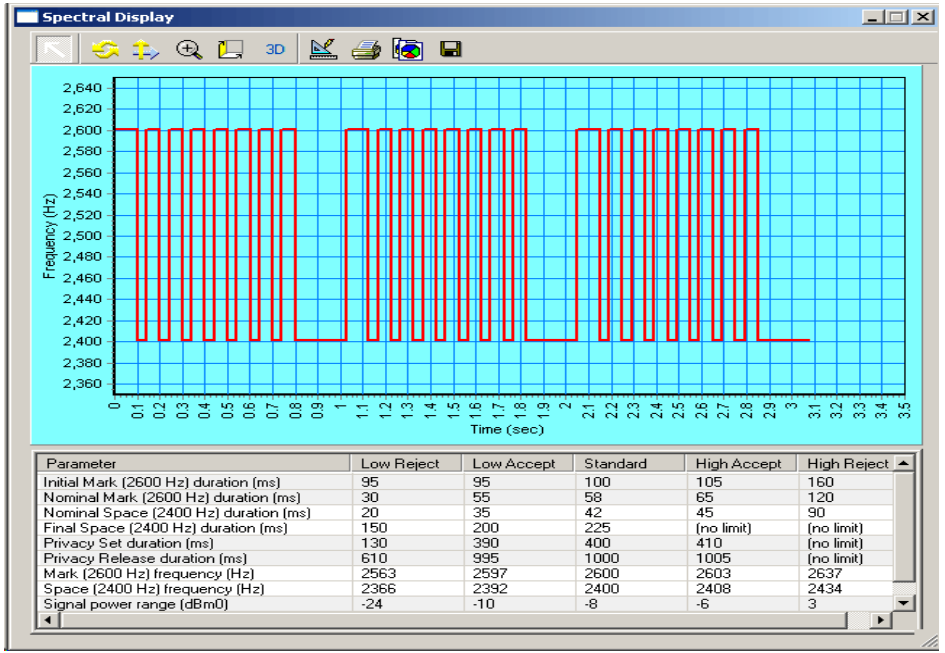
- Voice Band Analysis Software
  - Call Data Records (CDR)
  - Voice Band Analyzer (VBA)
- Fax  Emulation and Analysis
  - Fax Simulator
  - Fax Analysis using GLInsight ™ or FaxScan™
- Echo Cancellation Testing / Compliance
  - Manual
  - Semi-automated
  - Automated
- WCS Modules
  - Transmission/reception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

# Special Application

## Protocol Identifier




## SS1 Analyzer and Emulator

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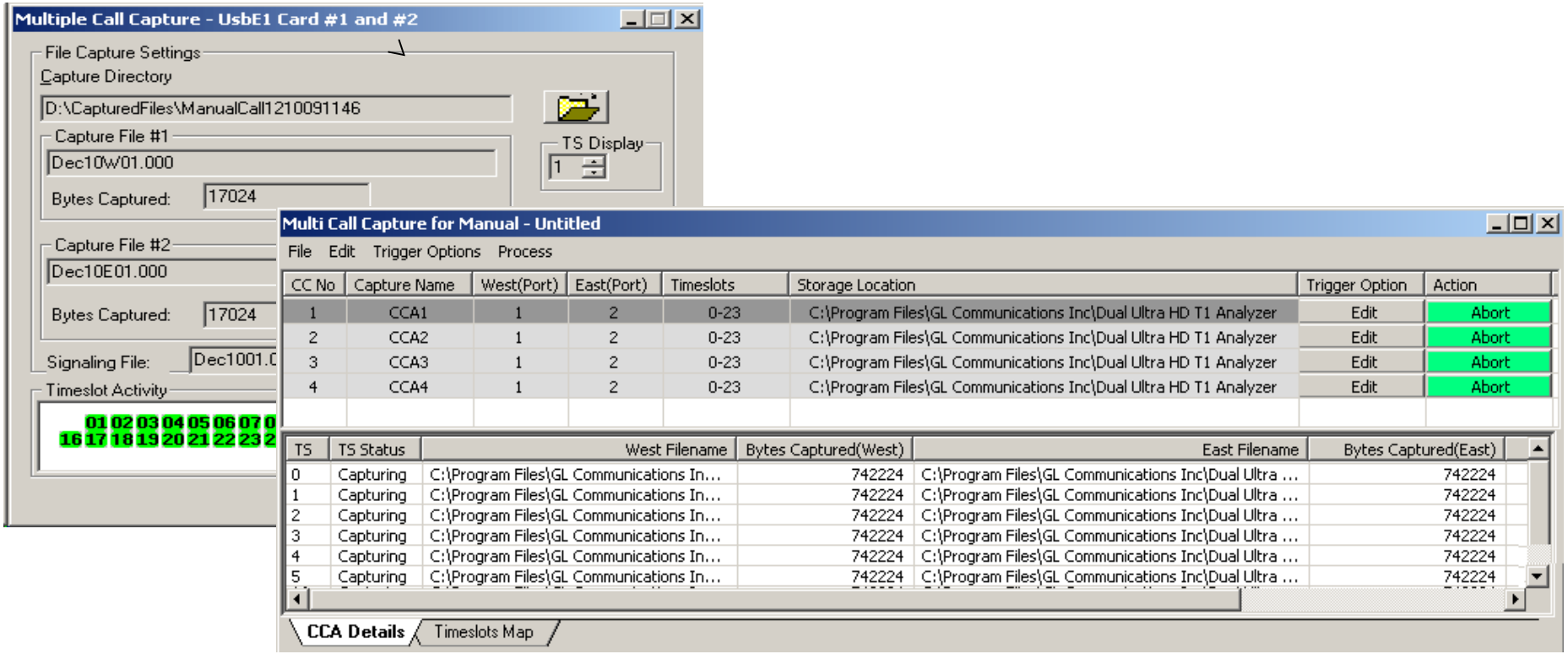
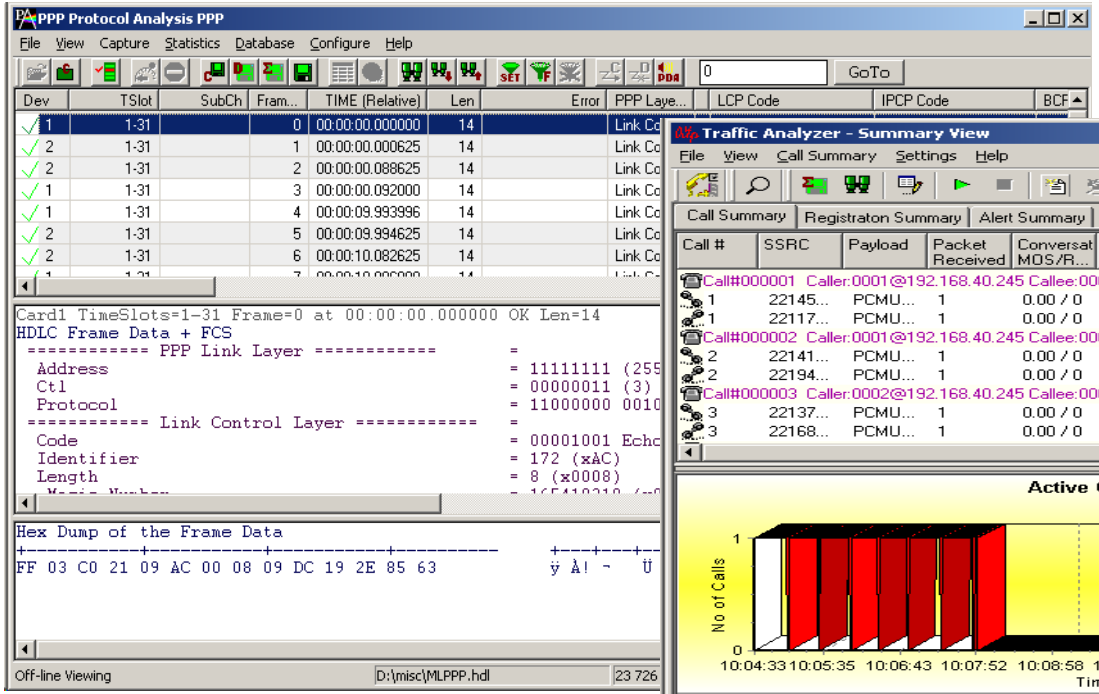
# Call Capture and Analysis

## Multiple Call Capture and Analysis

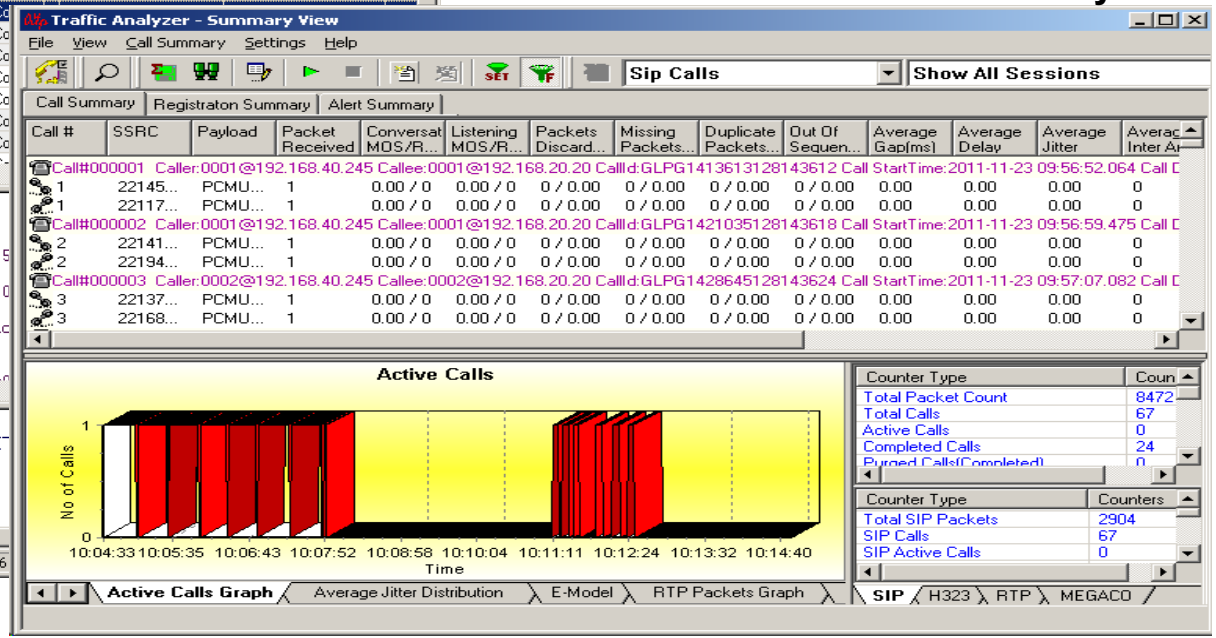


# Protocol Analysis

## PPP Protocol Analysis

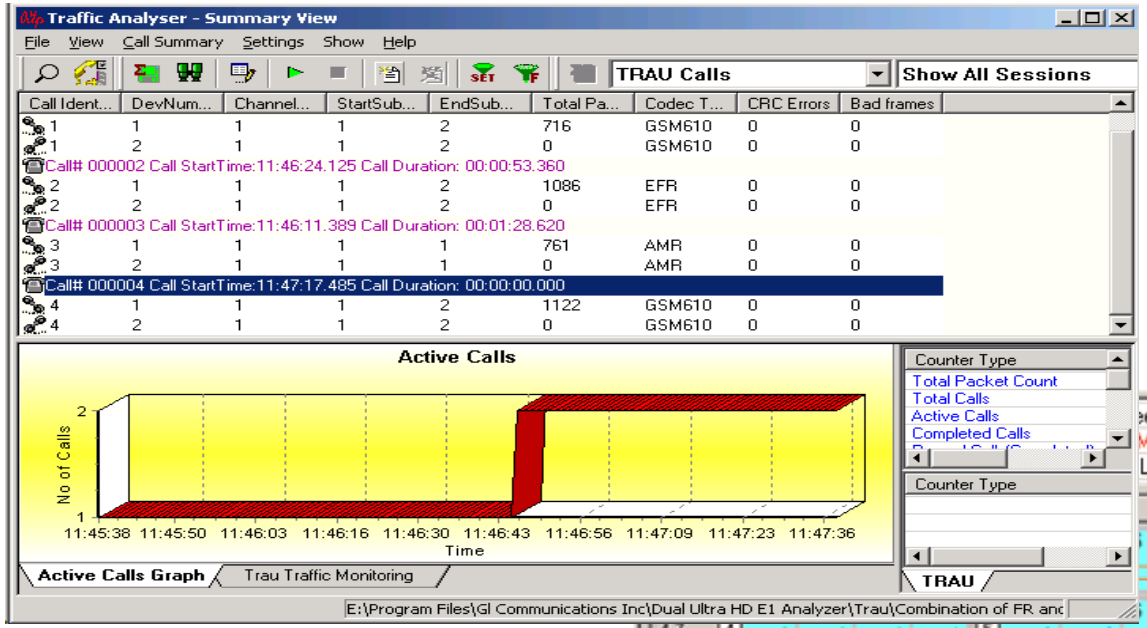



## PPP Packet Data Analysis

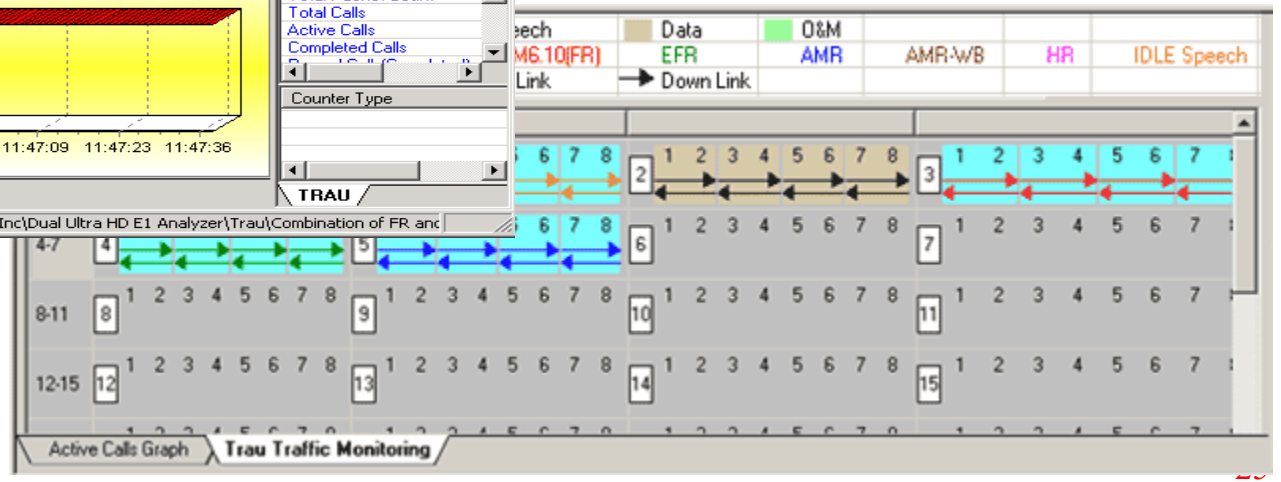


# Protocol Analysis (Contd.)

## TRAU Packet Data Analysis - Active Calls Graphs




## TRAU Traffic Monitoring

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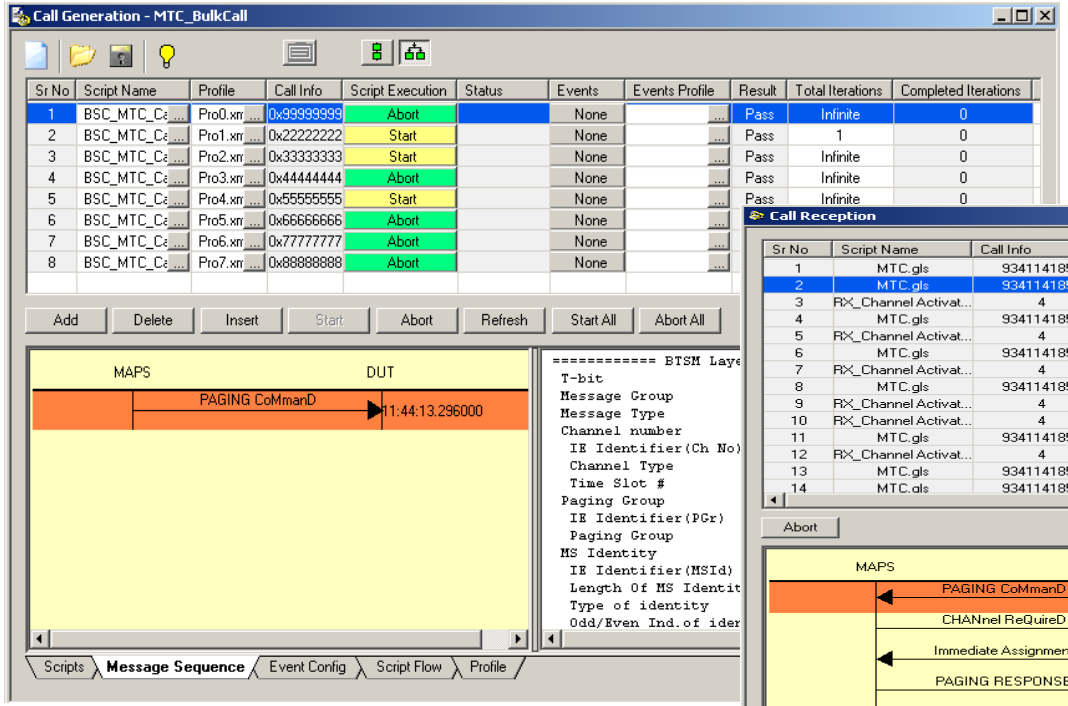
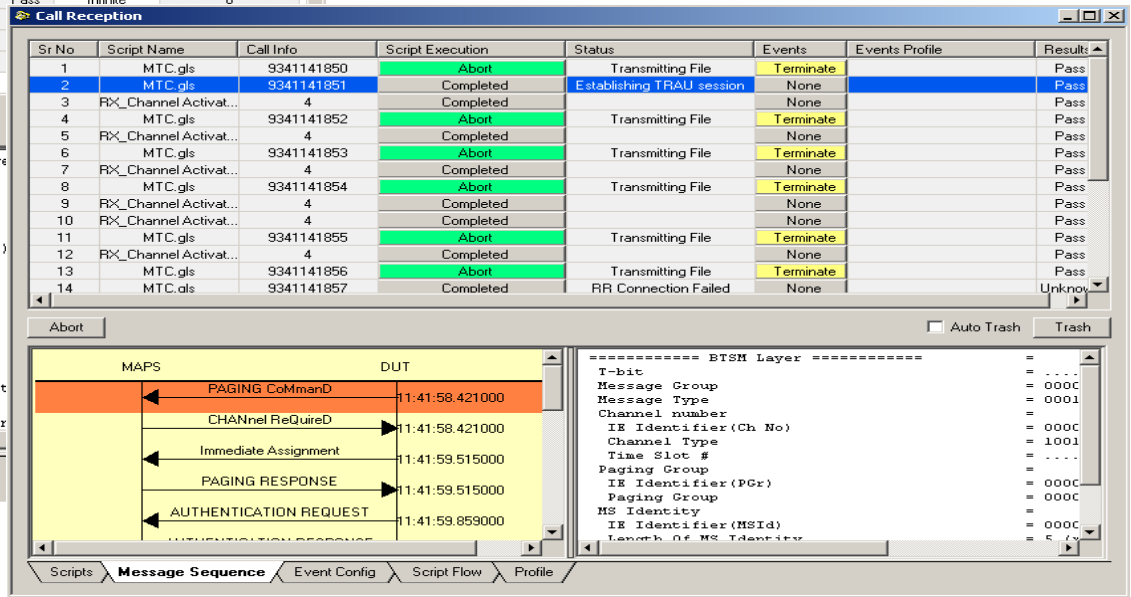
# Protocol Emulation

## GSM Call Generation




## GSM Call Reception

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# Thank you