GLInsight™
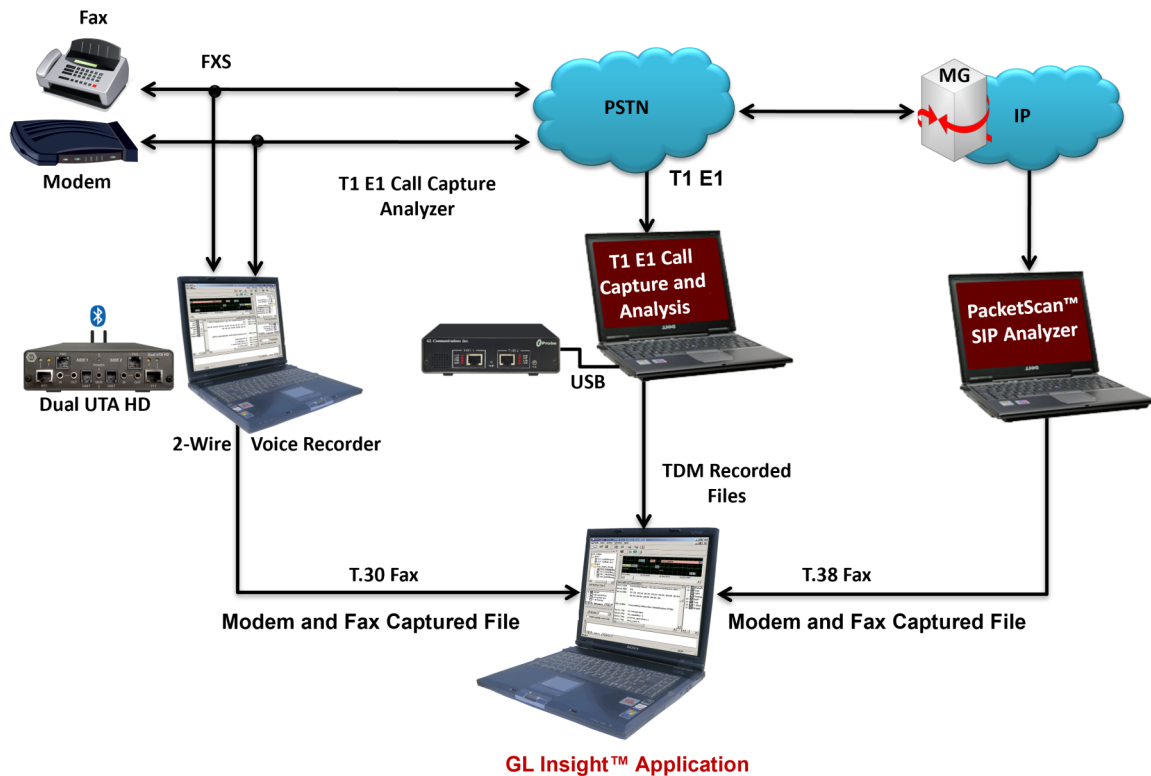
(An Expert System for Decoding and Analysis of Fax and Modem Communications Over PSTN or IP Networks)

GL Insight™ Application

Overview

GL Insight™ enables decoding and analysis of pre-recorded modem and fax transmissions. The transmission signals can be recorded from PSTN or IP media. It is a unique system used by developers of modem and fax technology often in interoperability labs. GL Insight™ can be used during the development and deployment phases of the products that support fax and modem transmission.

GL Insight™ receives the recorded modem or fax transmissions in one of the two ways: As raw signal files (PCM files) - in either mono or stereo format or as IP capture files - created by capturing devices or by software. GLInsight™ demodulates the raw transmissions and presents the decoded data in an easy to understand format. It produces extensive log files with all relevant debugging information for easy event tracing which in turn provides insight to potential sources of problems.

The raw files required for fax and modem analysis in the case of PSTN (2-wire or TDM) can be obtained using several hardware platforms: GL's tProbe™ T1E1 Analyzer with Call Capture Analysis (CCA) or GL's Dual UTA for 2-wire. Similarly for fax and modem analysis over IP, the captured files can be obtained using GL's PacketScan™ VoIP analyzer.

For more details, visit GLInsight™ : An Expert System for Decoding and Analysis of Fax and Modem Communications Over PSTN or IP Networks webpage.

Main Features

- Enables demodulation and analysis of Data (Modem), Fax, Mobile Fax, Mobile Data, and VoIP transmissions over TDM and IP networks
- Device-independent communications analysis
- Offline analysis of TDM and IP captured files
- Mixed Fax-over-IP using T.38/G.711 and Fax-over-PSTN Cross Analysis
- Mixed Modem over IP (Using G.711) and Modem over PSTN Cross Analysis
- Time synchronization performed on PSTN and IP signals
- Cross analysis of two networks
- Provides bottom-up deep diagnosis of calls to solve interoperability issues
- Diagnoses physical and network layer problems
- Non-intrusive IP/TDM network diagnosis of high packet loss rate, high jitter, echo path, and echo canceller performance, to indicate possible locations of problems
- Supported on Windows operating system

Who Benefits from GLInsight™?

Equipment Developers (Gateways, RAS, Fax Servers, etc.)

- Provides bottom-up deep diagnosis of the call for example (fax): provide info from data pump layer up to tiff picture
- Helps solve interoperability issues
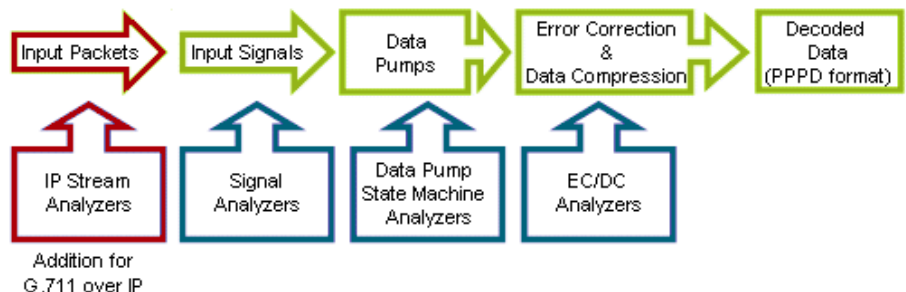- Diagnoses physical layer problems
- Diagnoses network layer problems

Service Providers (Mobile Operators, ISPs, WISPs, Carriers, and Operators)

- Non-intrusive IP network diagnosis
  - High packet loss rate
  - High jitter
- Non-intrusive TDM network diagnosis
  - Echo path
  - Echo canceller performance

Fax over IP - Analyzing using T.38
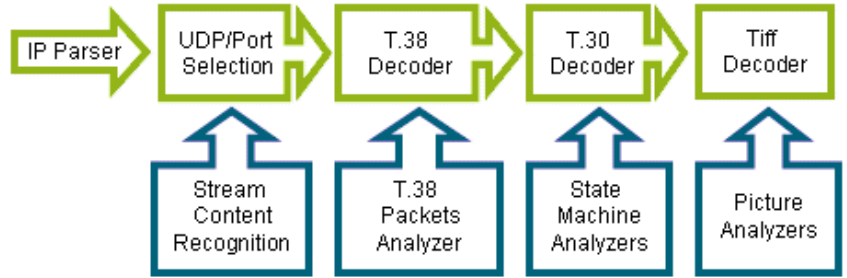
Analyzers

- T.38 Stream (IP Packets)
  - Packet loss and jitter analysis
  - Illegal packets
- T.30 Decoder
  - T.4/T.6 compression
  - T.4/T.6 incompatibility
  - Improper state flow analysis
  - ECM problems
  - TIFF creation

◇ *GL Communications Inc.*

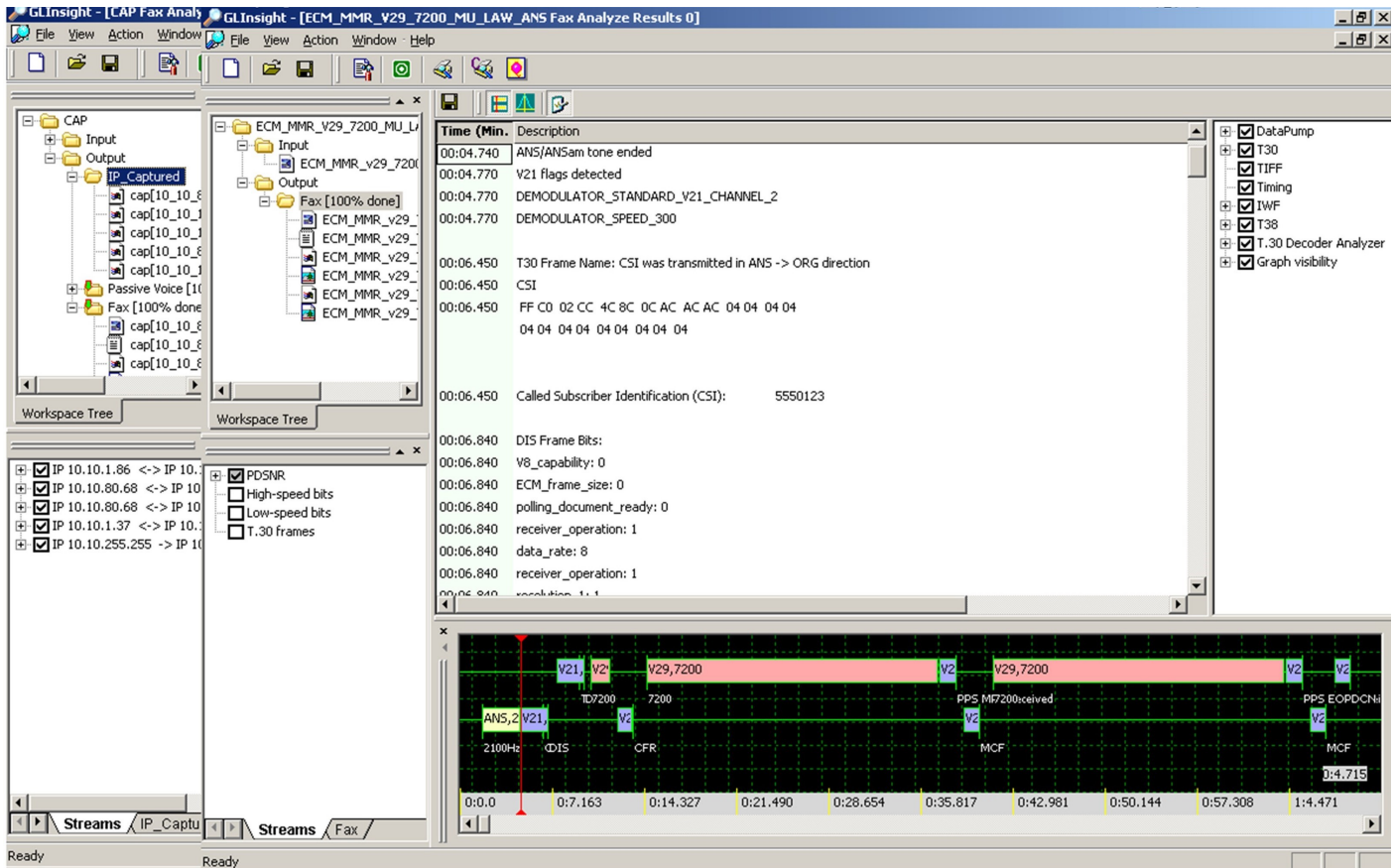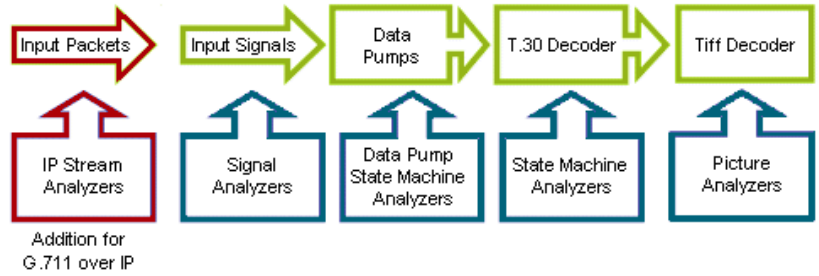# Fax over PSTN and IP - Analyzing using G.711

Analyzers

- IP Stream and Signal
  - Packet loss and jitter analysis
  - Improper use of Voice Activity Detector
  - Signal quality and discriminator
- Data Pump State Machine
  - Demodulation quality
  - Detailed phase info exchange
- T.30 Decoder
  - T.4/T.6 compression
  - T.4/T.6 incompatibility
  - Improper state flow analysis
  - ECM problems

GL Communications Inc.

Modem over PSTN and IP - Analyzing using G.711

- IP Stream and Signal
  - Packet loss and jitter analysis
  - Improper use of Voice Activity Detector
  - Input signal stability overflow and discriminator
- Data Pump State Machine
  - Demodulation
  - Detailed phase info exchange
  - Improper state flow and timeouts
- Error Correction Data Compression
  - Negotiation exchange
  - Improper state flow analysis

Input Packets → Input Signals → Data Pumps → T.30 Decoder → Tiff Decoder

IP Stream Analyzers | Signal Analyzers | Data Pump State Machine Analyzers | State Machine Analyzers | Picture Analyzers

Addition for G.711 over IP

GL Communications Inc.

Fax Over PSTN Decoding and Analysis

Supported Data Pumps and Protocols

- Data Pumps
  - V.34HD, V.17, V.33, V.29, V.27, V.21
- Protocols
  - T.30, T4/T6, T.85
- Signal Analyzers
  - Discriminator information.
  - Unstable signal detector.
  - Signal overflow detector.
  - No signal on single-sided information
- Data Pump State Machine Analyzers
  - Phase changes, data rates, symbol rate
  - Structures interchange (MP, Info) and complete connection parameters
  - PDSNR (post detection signal-to-noise ratio) improper quality drop detector
  - V.8 incompatibility indication
- T.30 Decoder Analyzers
  - Fax Phase changes, data rates
  - T.30 raw data
  - T.30 frames and information
  - T.4/T.6 page coding information
  - CRC error detector in V.21
  - Repetitive T.30 frames detector,
  - T.4/T.6 bad-line statistics
  - Suspicious ECM retransmission indication
  - ECM failure to correct error frames indication
  - Unexpected end of Fax indication
  - Improper T.30 protocol flow indication

Fax-Over-IP Decoding and Analysis (using G.711)

- IP Analysis Information
  - Packet loss detection
  - Jitter behavior analysis
  - SID (Silence Descriptor) detector to detect improper use of Voice Activity Detector while transferring data.
- Fax Analysis Information
  - Same as Fax over PSTN analysis
- Error Correction Data Compression
  - Negotiation exchange
  - Improper state flow analysis

GL Communications Inc.

Modem over PSTN and IP - Analyzing using G.711

- T.38 Packet Analyzers
  - Packet loss detection
  - Jitter behavior analysis
  - Bad packets indication
  - Packet collision detection
- T.30 Analyzers
  - Fax phase changes, data rates
  - T.30 raw data
  - T.30 frames and information
  - T.4/T.6 page coding information
  - Improper T.30 protocol indication
  - CRC error detector in V.21
  - Repetitive T.30 frames detector
  - T.4/T.6 bad-line statistics

Modem over PSTN Decoding and Analysis

- Supported Protocols
  - V.92 (Quick Connect and Modem-on-Hold supported, PCM-upstream not supported), V.90, V.34, V.32bis/V.32, V.22bis/V.22, V.21, V.23, Bell 103 / Bell 212
- Supported Start-up Protocols
  - V.8, V.8bis, V.8 short
- Supported Error Correction and Data Compression Protocols
  - V.42, V.42bis, V.44, MNP2-4, MNP5, V.14
- Signal Analyzers
  - Discriminator information
  - Improper Automode signal flow detector
  - Improper V.8 signal flow detector
  - Unstable signal level detector
  - Signal overflow detector
- Data Pump State Machine Analyzers
  - Modem phase changes, retrains, rate renegotiations, data rates, symbol rates
  - Internal phase states such as S, S' detection and all the Phase 2 sub-states
  - Structures interchange (MP, CP, Info) and complete connection parameters
  - Data-pump improper flow detector such as inconsistency of the signal with the standard
  - PDSNR (post detection signal-to-noise ratio) improper quality drop detector
  - Improper phase reversal detector
- Error Correction Data Compression Analyzers
  - Error-correction and data compression setup information including XID info
  - Error-correction frame statistics
  - Data compression negotiation
  - Error-Correction improper flow detector
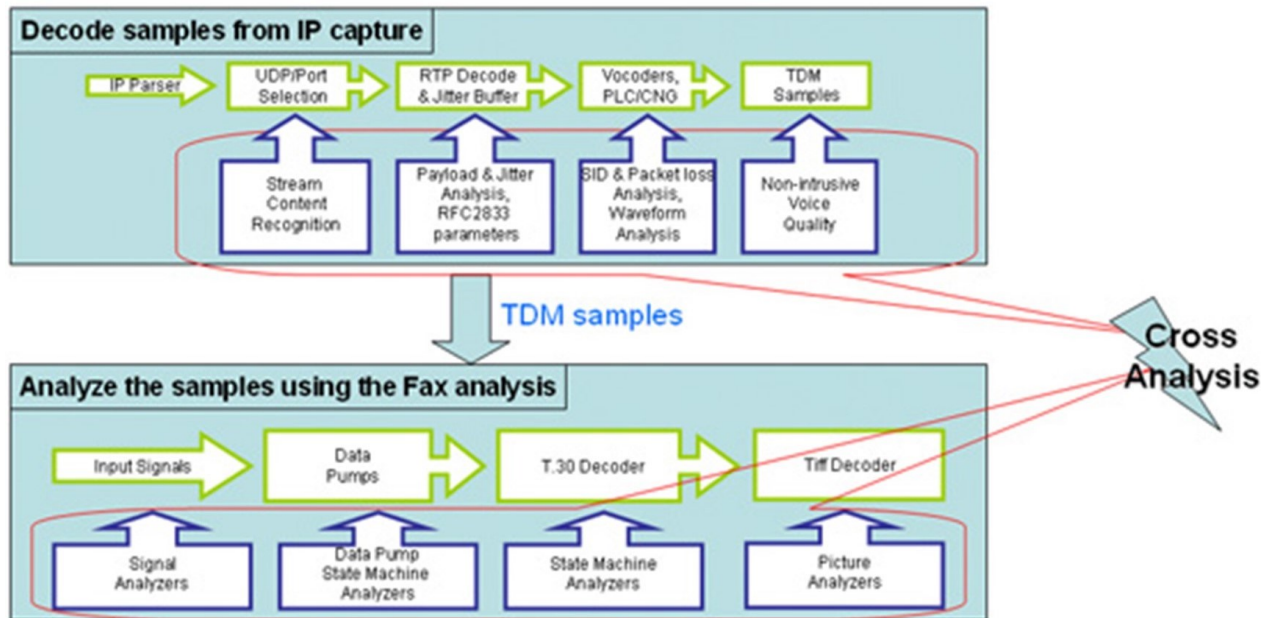
GL Communications Inc.

Modem-over-IP Decoding and Analysis

- IP Analysis Information
  - Packet loss detection
  - Jitter behavior analysis
  - SID (Silence Descriptor) detector to detect improper use of Voice Activity Detector while transferring data
  - RFC2833 support
- Modem Analysis Information
  - Same as Modem over PSTN analysis

Cross Analysis Decoding Scheme

When there is information about a call from both the PSTN and IP networks, GLInsight™ can plot both results on a single time scale to facilitate easier analysis of the problems and their causes.

- Identically Coded and Analyzed Info Categories
  - Mixed Fax-over-IP (using T.38) and Fax-over-PSTN Cross Analysis
  - Mixed Fax over IP (using G.711 pass-through) and Fax over PSTN Cross Analysis
  - Mixed Modem-over-IP (using G.711) and Modem-over-PSTN Cross Analysis
- Uniform Decoding and Analysis Schemes
  - A time synchronization process is performed on PSTN and IP signals
  - All information indicators from IP and PSTN sides are mixed on a single time scale to determine where on the timeline (IP or PSTN) problems started to occur

GL Communications Inc.

Buyer's Guide

Item No	Product Description
FXT001	GL Insight™ - Single Fax Analysis – TDM
FXT002	GL Insight - Single Fax Analysis - IP
MDT001	GL Insight - Single Modem Analysis - TDM
MDT002	GL Insight - Single Modem Analysis - IP

Item No	Related Software
SA048	Goldwave Software
XX031	Enhanced T1 E1 Call Capture/Analysis Software
PKV100	PacketScan™ (Online and Offline)
VQT035	Voice Recorder (FXO RJ11 Hardware Tap / 2-Wire Capture Software)

Item No	Related Hardware
PTE001	tProbe™ T1 E1 Base Unit
FTE001	QuadXpress T1 E1 Main Board (Quad Port– requires additional licenses)
ETE001	OctalXpress T1 E1 Main Board plus Daughter Board (Octal Port– requires additional licenses)
XTE001	Dual Express (PCIe) T1 E1 Boards
VQT010	VQuad™ Software (Stand Alone)
VQT251	Dual UTA HD Next generation Dual UTA with FXO Wideband support
VQT252	Dual UTA HD – Bluetooth Option
VQT461	Dual UTA HD Smartphone ACC Cable
VQT280	VQuad™ Probe HD (with Dual UTA HD)

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more details, visit GLInsight™ : An Expert System for Decoding and Analysis of Fax and Modem Communications Over PSTN or IP Networks webpage.

Document Number: FXT001-MDT001-01