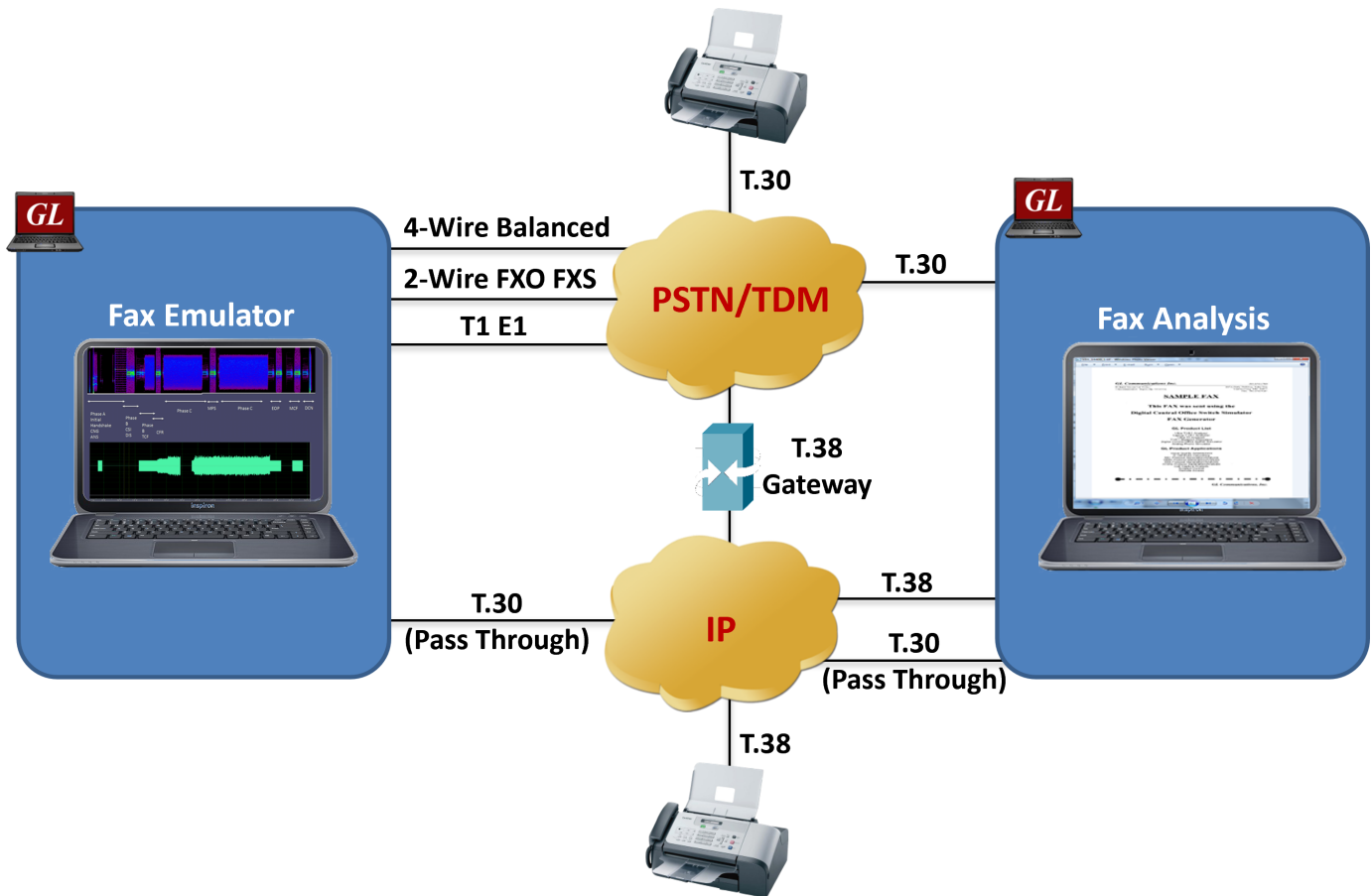


FAX & MODEM Testing



Fax Analysis

- Fax Capture, Decode, and Analysis using PacketScan™
- Call Capture and Analysis over 2-Wire and TDM Networks
- Fax Analysis (over 2-Wire, 4-Wire, and Packet Networks)
- Voice Recorder with DUAL UTA HD (over 2-Wire)
- Voice Band Analyzer and FaxScan™ (over 2-Wire, 4-Wire, and Packet Networks)

Fax Emulation

- Client Server Based Fax Emulator (over TDM Networks)
- Fax Emulation using VQuad™ DUAL UTA HD
- Fax Emulator using any GL's T1 E1 analyzer platform (over T1 E1 Networks) (over 2-Wire and 4-Wire)
- Fax Emulation using MAPS™ SIP (T.30 and T.38)



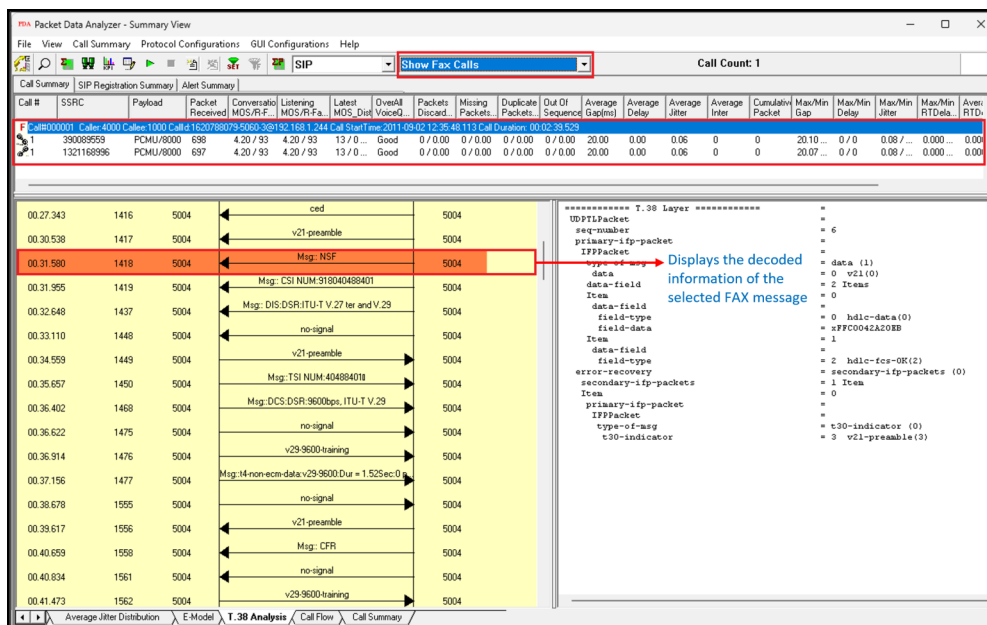
818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878, U.S.A
(Web) www.gl.com - (V) +1-301-670-4784 (F) +1-301-670-9187 - (E-Mail) info@gl.com

Fax Analysis

Fax Capture, Decode, and Analysis using PacketScan™ (over Packet Networks)

PacketScan™ software supports capturing and decoding of Fax (T.38 data) calls over VoIP. The fax decodes can be viewed in the form of T.38 call graph and call summary with decoded information for all T.38 messages received on the call. T.38 has been enhanced to reassemble the fragmented data and to identify the T.30 message from it. Identified T.30 message is displayed in the T.38 ladder diagram. The captured fax calls by PacketScan™ can also be analyzed using GL Insight™ by saving the fax calls directly in (*.PCAP) Ethereal file format.

For more details, refer to [PacketScan™](#) webpage.



PacketScan™ FAX T.38 Call flow

Voice, Fax, Modem Capture, and Analysis using Call Capture and Analysis Software (over TDM and 2-Wire Networks)

The Call Capture and Analysis software can non-intrusively record calls directly from T1/E1 and Analog 2-Wire lines. Then the captures can be analyzed using other offline tools. Voice/ Fax / Modem traffic from the 2-Wire Analog interface.

- Fax traffic - V.32 / V.17, V.27, V.29
- Modem traffic - V.22 forward/reverse channel, V.34 & V.90 uplink, Binary V.90 downlink, FSK

For more details, refer to [T1 E1 Call Capture & Analysis Software](#) webpage.



Hardware for Fax Analysis over TDM and Analog

Fax Analysis

Fax and Modem Decode and Analysis using GL Insight™ (over 2-Wire, 4-Wire, and Packet Networks)

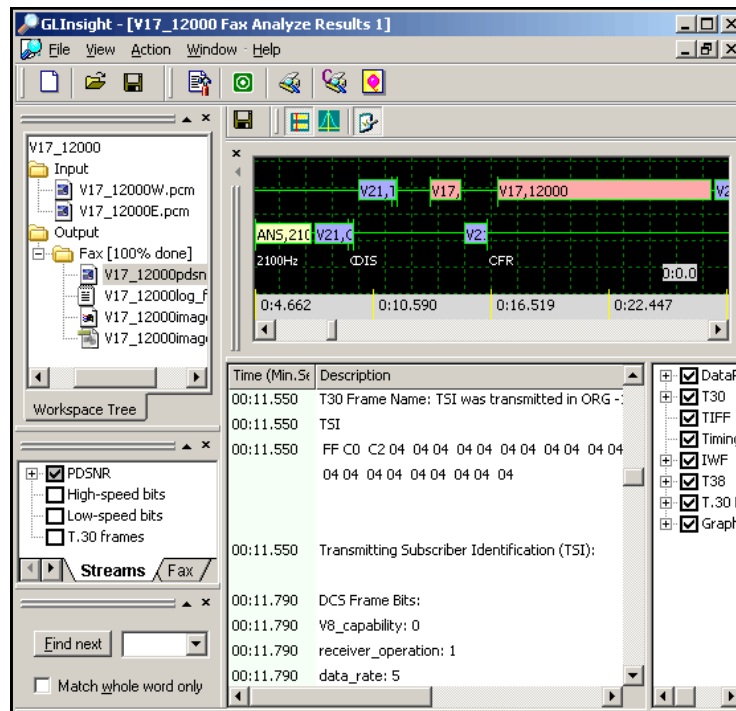
GL Insight™ enables decoding and analysis of pre-recorded modem and fax transmissions. The transmission signals can be recorded from PSTN or IP media.

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
- As IP capture files - created by capturing devices or by software

GL Insight™ 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.

For more details, refer to [GL Insight™](#) webpage.

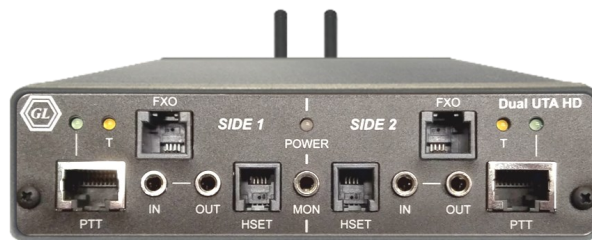


FAX Analysis using GL Insight™

2-Wire Voice, Fax, Modem Recorder with DUAL UTA HD

GL's Voice Recorder Software with Dual UTA HD offers a solution for Voice/ Fax / Modem traffic capture over a 2-Wire analog interface. One can non-intrusively 'tap' into the analog 2-Wire line via the RJ11 interface and capture the bi-directional voice. This Voice Recorder Software is primarily used in conjunction with Dual Universal Telephony Adapter (Dual UTA HD) hardware device to capture the voice/modem/fax data manually / automatically from the 2-Wire Analog interface.

For more details, refer to Voice [2-Wire Voice/Data Capture using Dual UTA HD/ tProbe™](#) webpage.



Voice Recorder with Dual UTA HD

Fax Analysis

FaxScan™ (over 2-Wire, 4-Wire, and Packet Networks)

FaxScan™ is a command line fax decoder/demodulator application that processes 2-Wire or 4-Wire captures and analyzes voiceband traffic files for fax traffic. FaxScan™ application is used for processing captured files and produces the Fax TIF image and other transmission information. The application is available as FaxScan™ and FaxScanT38™. The FaxScan™ has two versions – one, as a stand-alone command-line fax analysis application and other, integrated as a module within GL's Voice Band Analyzer application. FaxScanT38™ is a stand-alone command-line fax analysis application for packet captures.

For more details, refer to [FaxScan™](#) webpage.

```

C:\Windows\system32\cmd.exe

C:\Program Files\GL Communications Inc\FaxScan>set CMX_DEU_TESTING=unittest\SIP

C:\Program Files\GL Communications Inc\FaxScan>mkdir unittest\SIP
A subdirectory or file unittest\SIP already exists.

C:\Program Files\GL Communications Inc\FaxScan>FaxScan.exe SIP -p -f vectors\SIP_vectors\rtp.pcap
Total Calls Discovered: 10

Call #1 ID: 3276745018@168.75.50.85
Wrote SIP ladder: unittest\SIP\rtp.pcap.CALL001.sip_ladder

Call #1 Segment #1 Media: PCM MULAW
Wrote fax ladder: unittest\SIP\rtp.pcap.CALL001_1.fax_ladder
Wrote TIFF image: unittest\SIP\rtp.pcap.CALL001_1.tif

Call #2 ID: 2843815460@168.75.50.85
Wrote SIP ladder: unittest\SIP\rtp.pcap.CALL002.sip_ladder

Call #2 Segment #1 Media: PCM MULAW
Wrote fax ladder: unittest\SIP\rtp.pcap.CALL002_1.fax_ladder
  
```

```

Fax554000_555000_nov15_00_2_2011_1115_121429.log - Notepad
File Edit Format View Help

Input File Set : C:\Documents and
Settings\Madhu\Desktop\Fax554000_555000_nov15_00_2_2011_1115_121429.pcm
Output TIFF file : C:\Documents and
Settings\Madhu\Desktop\Fax\Fax554000_555000_nov15_00_2_2011_1115_121429.tif

Summary session report:
FaxTap version: 2.2
Result: Success
Rate: RATE_V17_14400
Resolution: 204x98
Encoding: MH
Page Size: A4
Bad Lines: 0
Total Lines: 1076
Pages: 1
Total Bytes: 16203
TRN Signals: 1
Doc Name: C:\Documents and
Settings\Madhu\Desktop\Fax554000_555000_nov15_00_2_2011_1115_121429.pcm
Transmit SID:
Receive SID:
PCM Read: 264480

Frames
MCF: 1
TRN: 0
FTT: 0
CFR: 1
DCN: 1
PPR: 0
RTN: 0
RTP: 0
CTC: 0
CTR: 0
DIS: 1
DCS: 1
EOM: 0

Session synopsis: (timestamps in samples @ 8k)
[ 66480] Received CSI frame:

[0000] ff c0 02 04 04 04 04 04 04 04 04 04 04 04 04
[0010] 04 04 04 04 04 04 04 a4 f3

[ 68400] Received DIS frame:

[0000] ff c8 01 00 76 1e b3 71
  
```

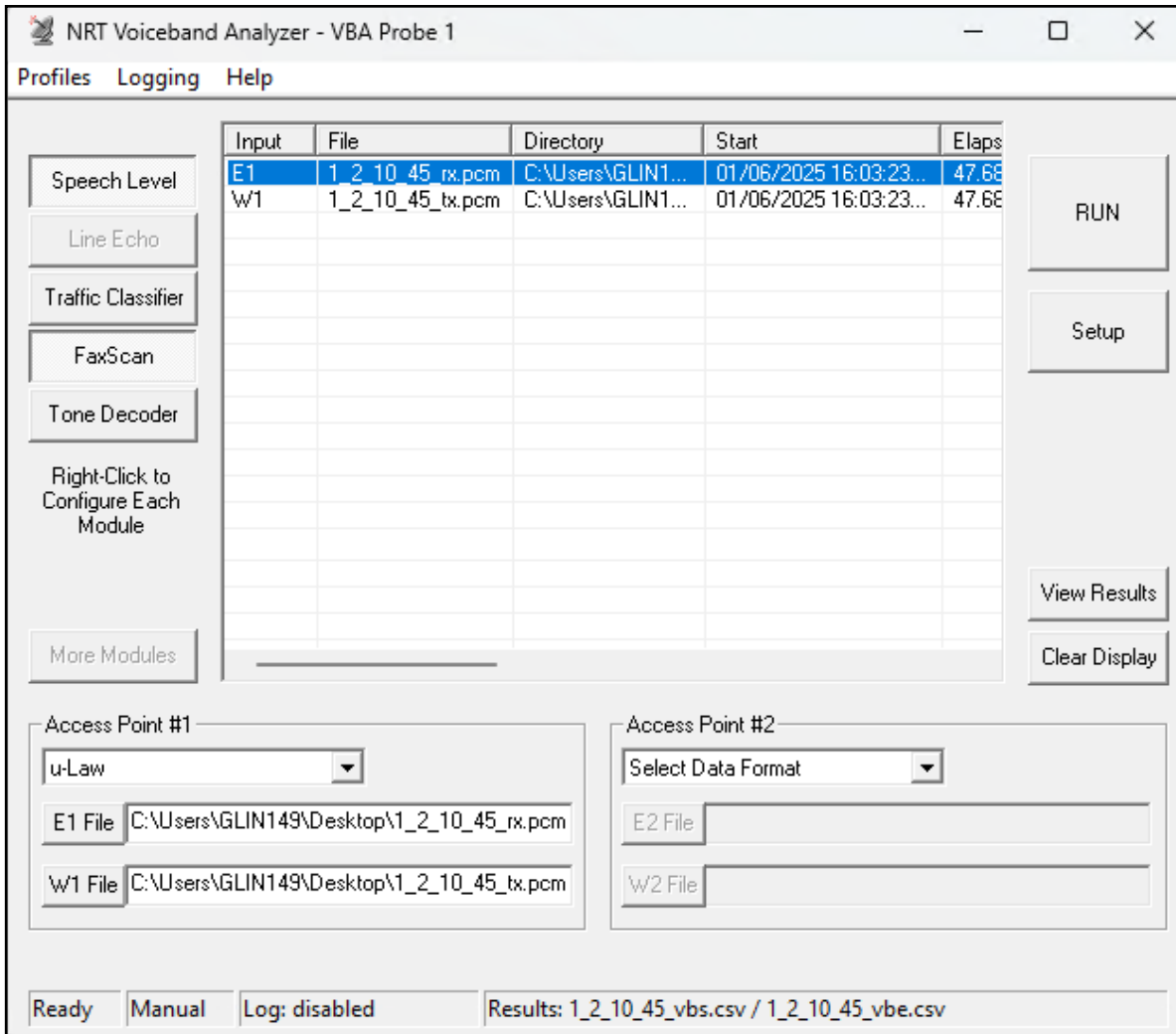
FaxScan™ Auto Batch File and Tiff Output

Fax Analysis

FaxScan™ with Voice Band Analyzer (over 2-Wire, 4-Wire, and Packet Networks)

The Voice Band Analyzer (VBA) FaxScan™ module (requires VBA038 license) can be used to analyze both 2-Wire and 4-Wire voiceband captures for Fax traffic and output fax signaling frames in a log file and fax image in TIFF format. The FaxScan™ module provides statistics for Fax traffic analysis including Fax Status, Standard, Data Rate, Resolution, Encoding, Page Size, Error Lines, Total Lines, Total Bytes, and Total Pages.

For more details, refer to [VBA FaxScan™](#) webpage.



FaxScan™ VBA Main Window

Fax Emulation

Client Server Based Fax Emulator (over TDM Networks)

WCS Fax module transmits the information as electrical signals through the T1/E1 (telephone system) where the contents (text or images) as a single fixed graphic image, converting it into a bitmap. The receiving end reconverts the coded image and creates a copy of the document.

Supporting Fax and Modem standards are T.30, V.17, V.27, V.29, V.33, and V.34.

Run task "FaxSimulatorT(E)1:Start FaxSim";

This task initiates the Fax Emulator Server. Fax Emulator Server runs as a task within GL Client Server Framework.

For more details, refer to [Windows Client/Server for T1 E1 Analysis](#) webpage.



Hardware for Fax Emulation over TDM and Analog

Fax Emulation using VQuad™ DUAL UTA HD

GL's VQuad™ software can send and receive up to 12 independent and simultaneous T.30 single or multiple page faxes using the Dual UTA HD hardware platform. The user can configure the transmit and receive fax rate from 2,400 bps to 33,600 bps with V.34 supported. Interfaces supported for fax generation include 2-Wire analog, 4-Wire balanced, and 4-Wire handset (RJ22). Fax emulation is fully automated using VQuad™ scripts and provides all pertinent real-time fax messaging with proper time sequences.

VQuad™ can automatically save the fax session (both East and West directions) to a PCM file. This file can be exported to GL Insight™ or GL Fax Demodulator/Decoder analysis software packages for further analysis of the fax session. GL's Fax Demodulator/Decoder can be configured for automated analysis.

For more details, refer to [Fax Emulation Using VQuad™](#) webpage.

Timestamp	Device Name	Duration(sec)	Message	Content	State	Mode
01/05/25 06:33:47.915	Side1	54.480	<< PPS-EOP		Post-Message Proc...	V17
01/05/25 06:33:48.100	Side2	54.860	Image RX End		In-Message Procedure	V17
01/05/25 06:33:49.471	Side2	56.220	>> PPS-EOP		Post-Message Proc...	V17
01/05/25 06:33:49.507	Side2	56.260	<< MCF		Post-Message Proc...	V17
01/05/25 06:33:50.952	Side1	57.520	>> MCF		Post-Message Proc...	V17
01/05/25 06:33:50.988	Side1	57.540	<< DCN		Call Released	V17
01/05/25 06:33:52.420	Side2	59.180	>> DCN		Call Released	V17
01/05/25 06:33:52.648	Side1	59.220	Send Successful	Successful	Fax Complete	V17
01/05/25 06:33:52.833	Side2	59.600	Receive Succe...	Successful	Fax Complete	V17

Show Events:

 Log to File: D:\FAX_Events.txt

Messages Summary Errors

 Auto scroll to show latest events

 Note. Delimit Log Information with Semicolon

 Open New Window Clear Status Clear Events

Side1: Success: 627, Failed: 0

 Side2: Success: 631, Failed: 0

 Side3: Success: 974, Failed: 0

 Side4: Success: 978, Failed: 0

Fax Events with VQuad™

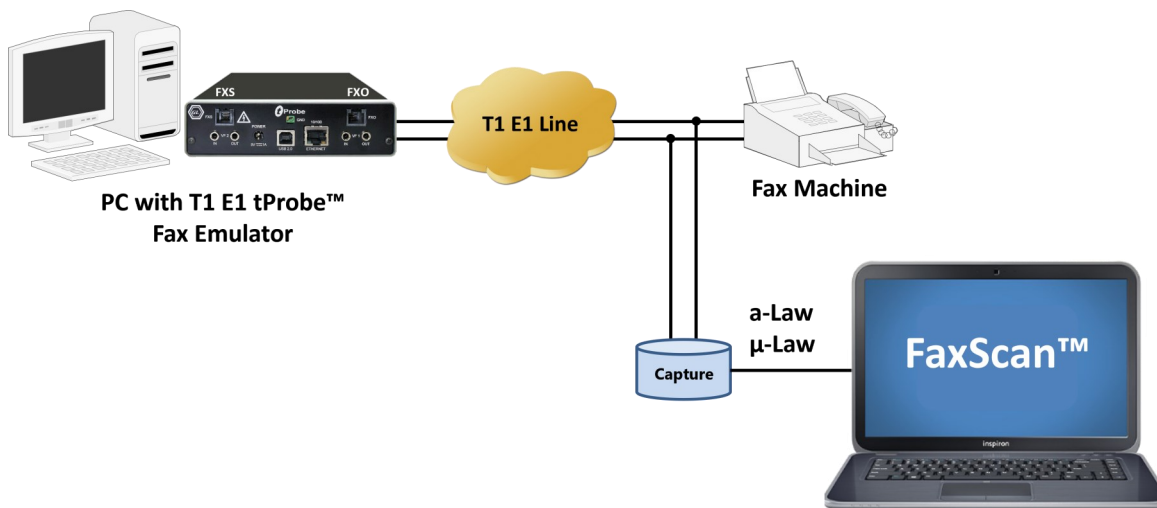
Fax Emulation

Fax Emulator using any GL's T1 E1 analyzer platform (over T1 E1 Networks) (over 2-Wire and 4-Wire)

GL has recently introduced single and bulk call Fax Emulator. This software is capable of transmitting and receiving over many T1 E1 timeslots or through two-wire FXO and FXS lines (tProbe™). The software can emulate many "virtual fax machines" – transmitter as well as receiver. All variations are supported.

Fax Emulator can be used with any GL Protocol Emulation tools such as [MAPS™ CAS](#) emulator, [MAPS™ APS](#) emulator, [MAPS™ ISDN](#) emulator, and [MAPS™ SS7](#) emulator to emulate complete real time Fax calls.

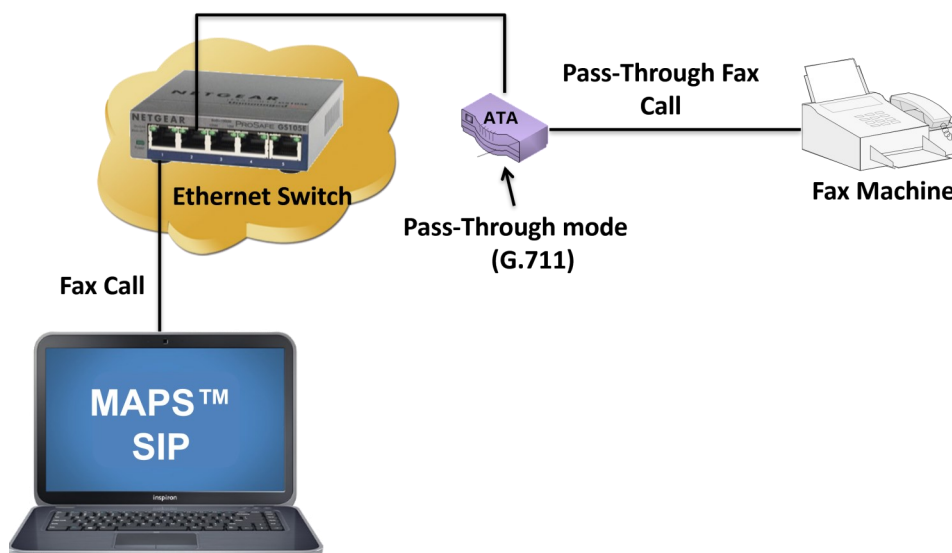
For more details, refer to [Fax Emulation and Analysis over T1 E1, & Analog](#) webpage.



FAX Emulation and Analysis over TDM

T.30 Fax Emulation using MAPS™ SIP

MAPS™ SIP can initiate a typical SIP call to the ATA which is configured for Pass through fax mode. The ATA will initiate the call to the connected real time fax machine. Once the call is established, MAPS™ can transmit pre-recorded tiff image in pass-through mode to the fax machine at the other end. Similarly, fax generated from real fax machine can be recorded in the tiff format, and the fax call flow can be analysed in-detail for further troubleshooting. For more details, refer to [Fax Emulation over IP](#) webpage.



T.30 Pass Through Fax Emulation using MAPS™ SIP

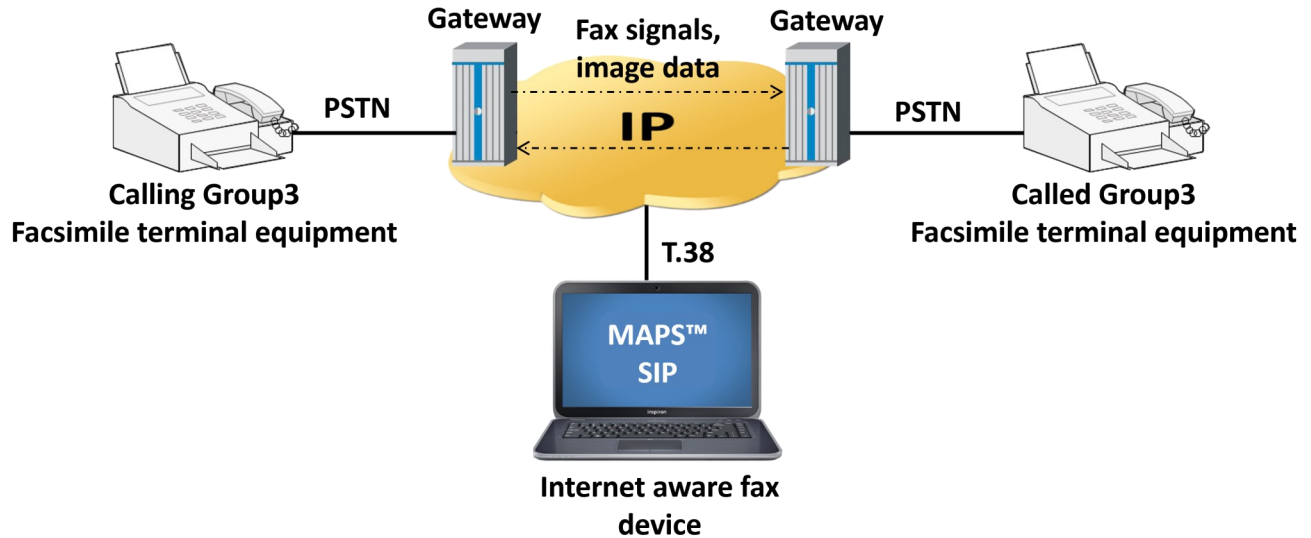
Fax Emulation

T.38 Fax Emulation using MAPS™ SIP

The fax call originating in PSTN network from Group3 Facsimile equipment, switches from analogue mode to digital mode between the gateways, and then again falls back to analogue mode in PSTN network at the receiving end. The T.38 Fax relay protocol is used to carry the fax control signals and image data between the gateways over the IP network.

MAPS™ SIP uses SIP signaling to establish sessions and adheres to standards such as ITU-T T.30, ITU-T T.38, ITU-T T.4, ITU-T V.8, and ITU-T T.6 during T.38 fax calls.

For more details, refer to [Fax Emulation over IP](#) webpage.



T.38 Fax Emulation using MAPS™ SIP