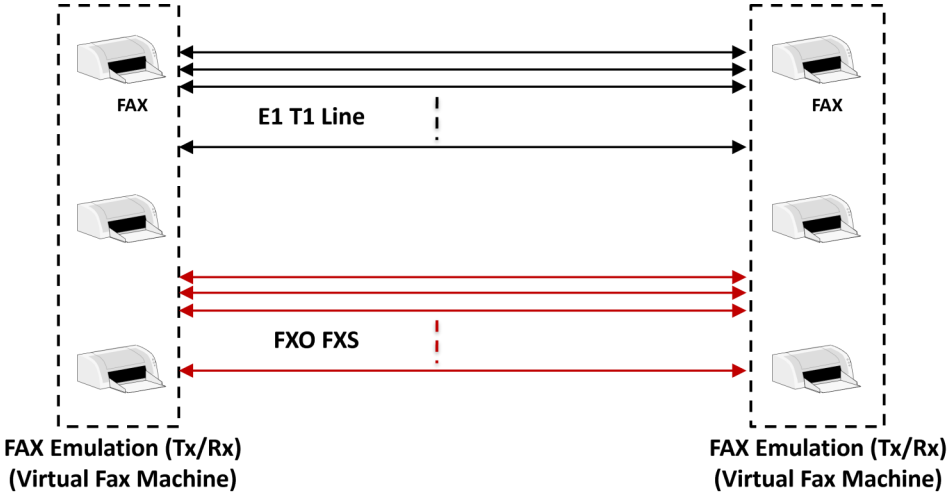
WCS based Fax Simulation over T1, E1, or Analog

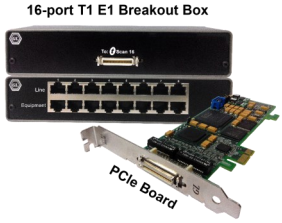


Dual T1 E1 Express (PCIe) Board

Quad / Octal T1 E1 PCIe Card

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

tScan16™ with
16-port T1 E1 Breakout Box



Overview

A fax (short for facsimile), is the transmission of scanned printed material (text or images) via voice grade telephone lines. High speed rates as high as 33.4 kbps (V.34 or Super Group 3) can be achieved over conventional telephone lines. When combined with compression schemes, many pages of print can be transmitted in minutes. When transmitted over regular telephone lines, a simple protocol called T.30 is used by both fax machines to negotiate transmission parameters and provide reliable transfer of scanned documents. Recently fax transmission is also possible over voice circuits that are packet based. This form of transmission usually demodulates the modulated signal back to the original scanned bits and then transmits them via packets to the distant end where they are re-modulated to be sent to the destination fax machine. This scheme is called T.38.

GL has recently introduced single and bulk (120's) call **Fax Simulator**. This software is capable of transmitting and receiving over many T1 E1 timeslots or through two-wire FXO and FXS lines. The software can emulate many “virtual fax machines” - both transmitter as well as receiver.

Fax Simulator can be used with any GL Protocol Emulation tools such as MAPS™ CAS emulator, MAPS™ APS Simulator, MAPS™ ISDN emulator, and MAPS™ SS7 emulator to simulate complete real time Fax calls.

GL also supports FaxScan™ (fax decoder/demodulator) software that processes 2-Wire or 4-Wire captures and analyzes voice band traffic files for fax traffic. The application operates either stand-alone from a batch file or as part of the GL’s Voice Band Analysis application to produce decoded fax image TIFF files and other transmission information.

For more information, please visit FAX Simulator webpage.

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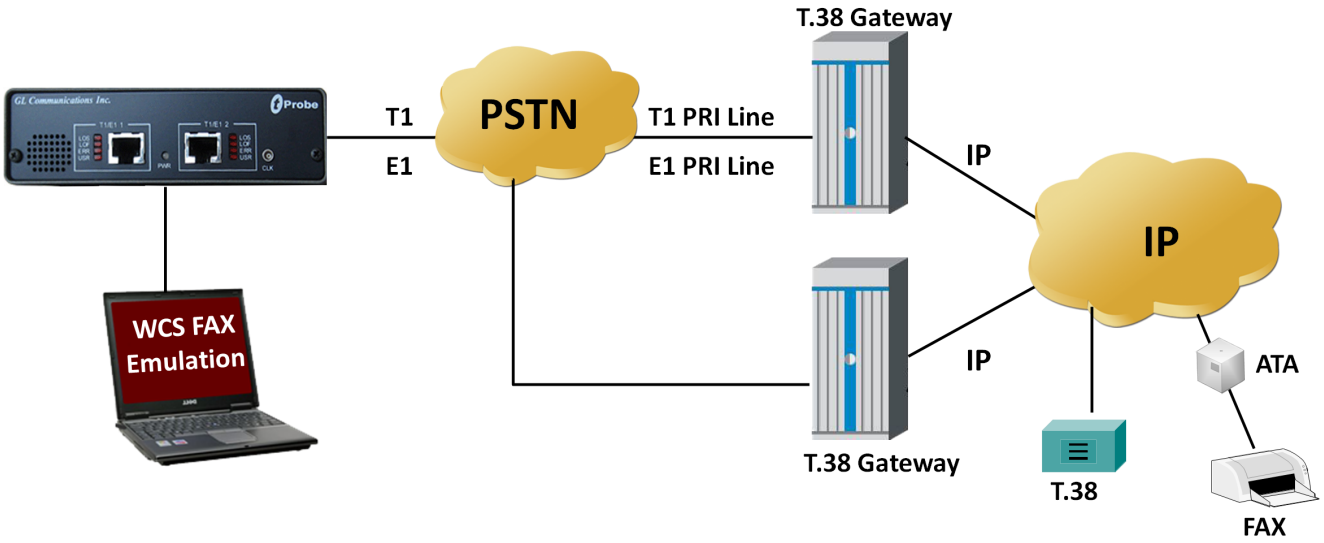
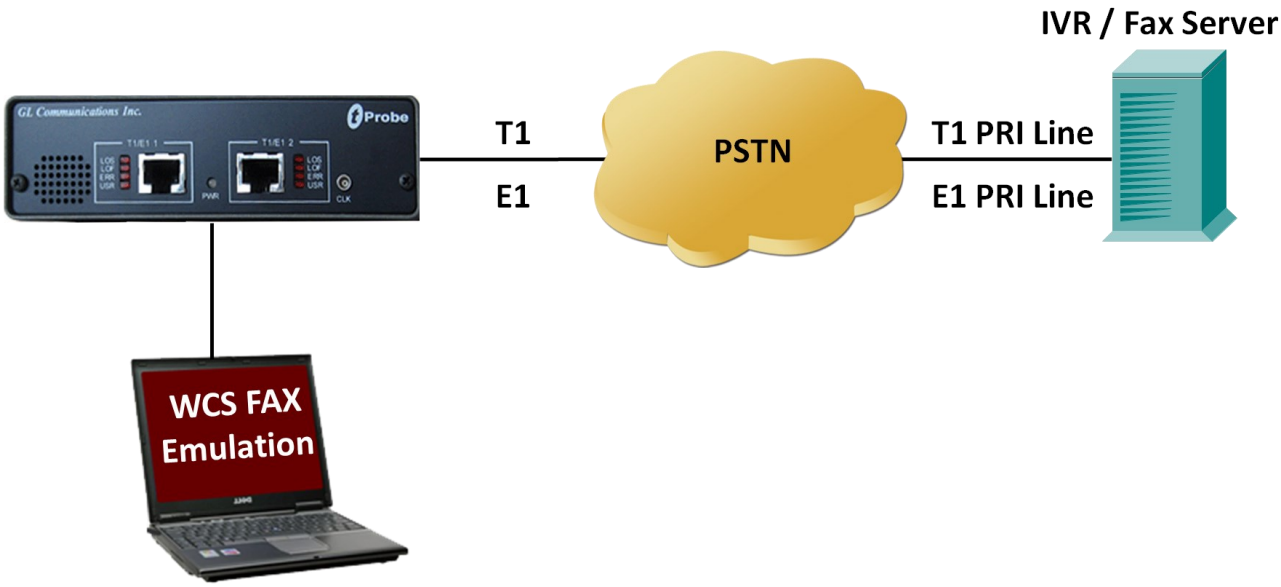
Fax Emulation Applications

- Load Testing
- V.34 Testing
- High Speed / Low Speed
- Multiple Pages
- With or without ECM
- Alaw and ulaw
- Over T1 E1, PSTN, IP
- Output Tiff Image

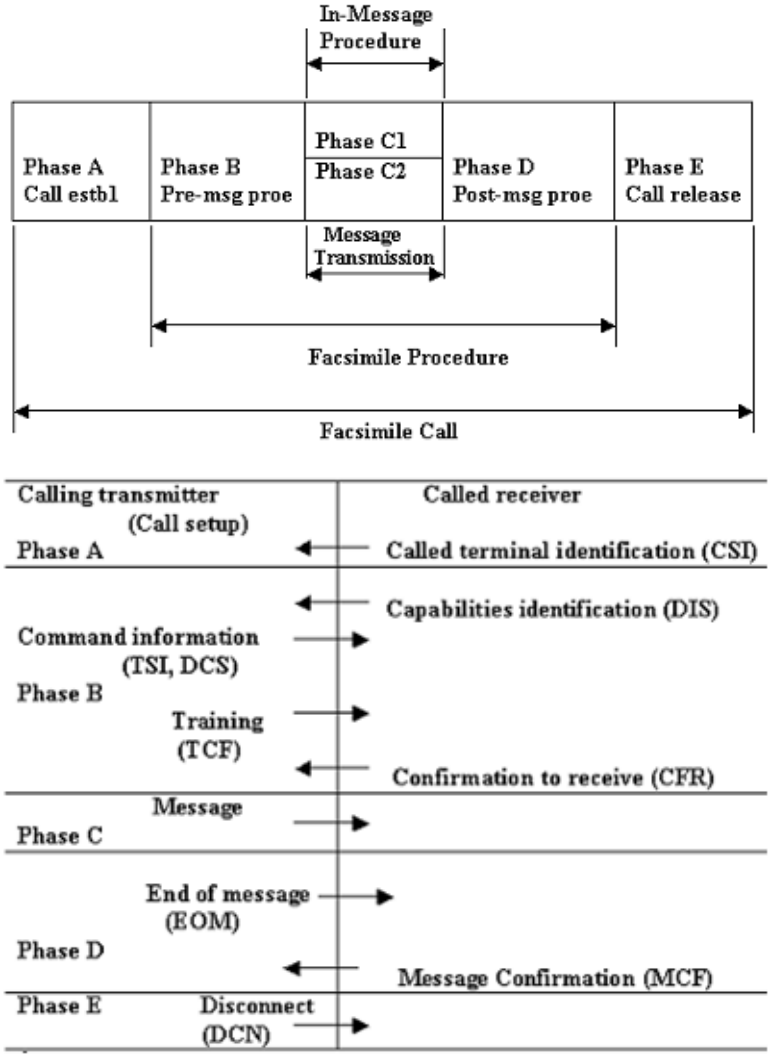


Testing Fax /IVR /T.38 Gateways over IP

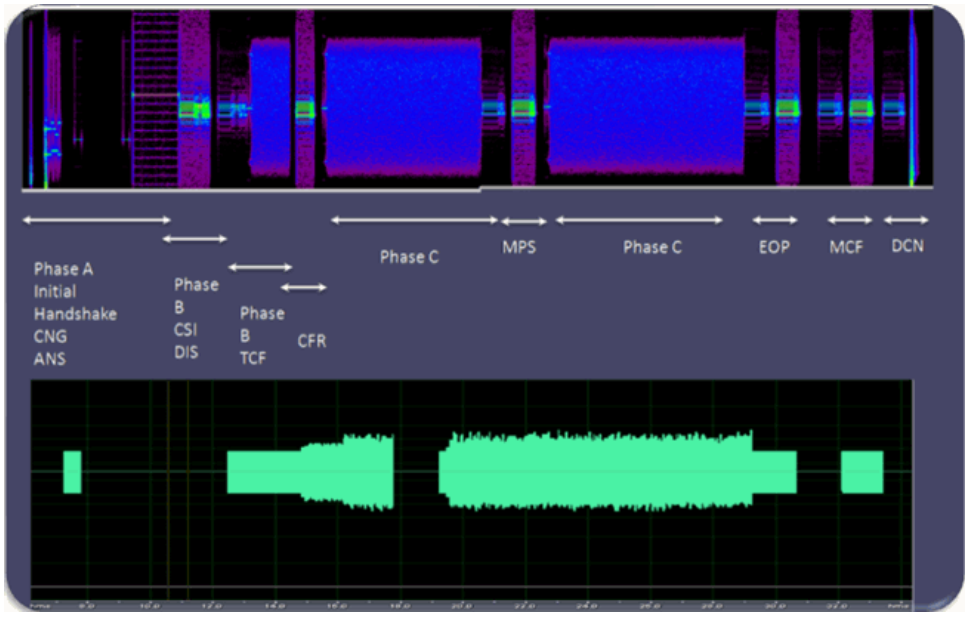


Testing Fax / IVR Servers over T1 /E1 Lines

Typical Fax Sessions



Typical Fax Phases



Spectrogram of Fax Sessions

Tx Fax Session

inform task 1 "TXFAX #1:1 TIFF_FILE 'C:\Tiff File\transmit.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1 RECORD_PCM TRUE ;

The above command transmits a tiff file named '**transmit.tif**' into timeslot 1 of port #1, the data encoding is Alaw, and the min data rate is 2400 bps, max data rate is set to 4800 bps, with ECM and record PCM option enabled.

Multiple instances of fax calls can be generated simultaneously by repeating the above command on different port and timeslot pair.

Rx Fax Session

inform task 1 "RXFAX #2:1 TIFF_FILE 'C:\Tiff File\receive.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1 RECORD_PCM TRUE";

The above command starts the fax reception on E1 Port 2 timeslot 1, and saves the ***tiff*** image as 'receive.tif' file in the specified path, fax data encoding is set to Alaw, min data rate is 2400 bps with ECM and record PCM option enabled.

Multiple instances of fax calls can be generated simultaneously by repeating the above command on different port and timeslot pair.

Examples

run task "FaxSimulatorE1:StartFaxSim";

inform task 1 "START";

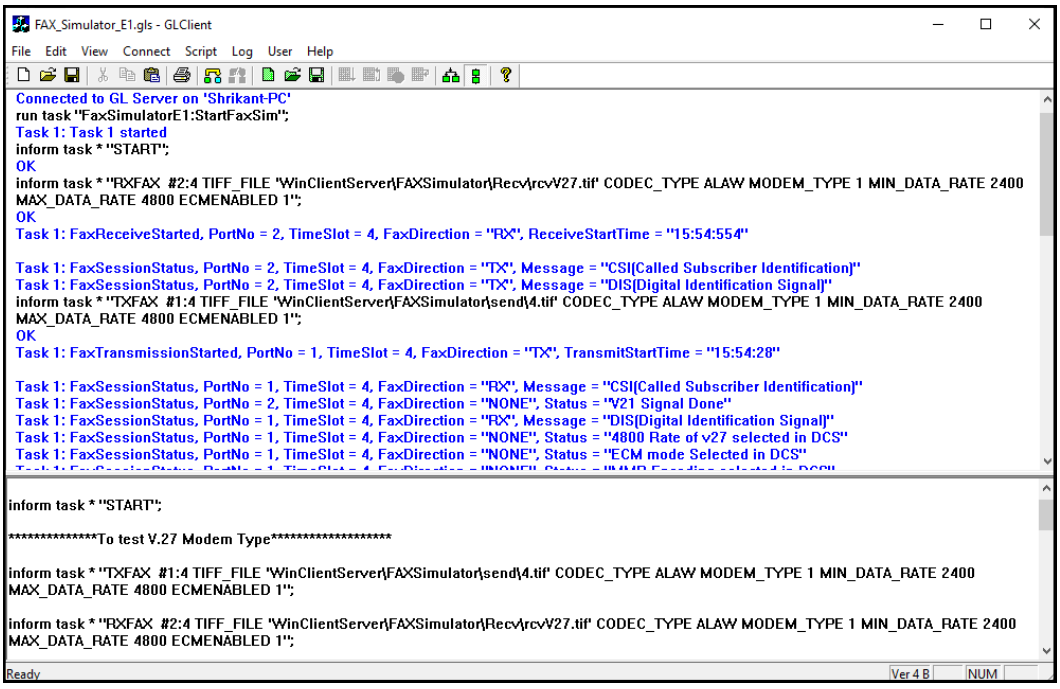
inform task 1 "TXFAX #1:1 TIFF_FILE 'C:\Tiff File\transmit.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1";

inform task 1 "RXFAX #2:1 TIFF_FILE 'C:\Tiff File\receive.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1";

inform task 1 "STOPFAX #1:1";

inform task 1 "STOPFAX #2:1";

end task*;



Fax Simulator Examples

Test Scenarios for Fax Simulator

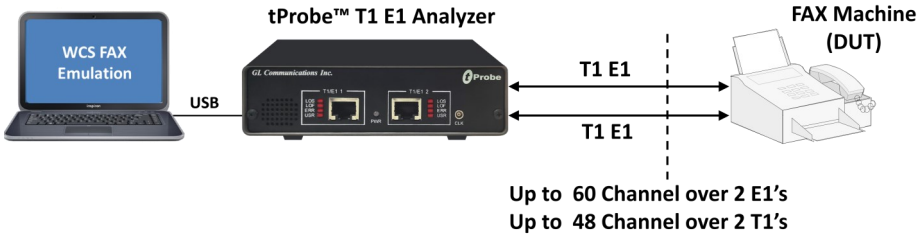
Fax Simulation between tProbe™ and MAPS™ ISDN/APS/FXO FXS (Over T1 E1)

run task "FaxSimulatorE1:StartFaxSim";

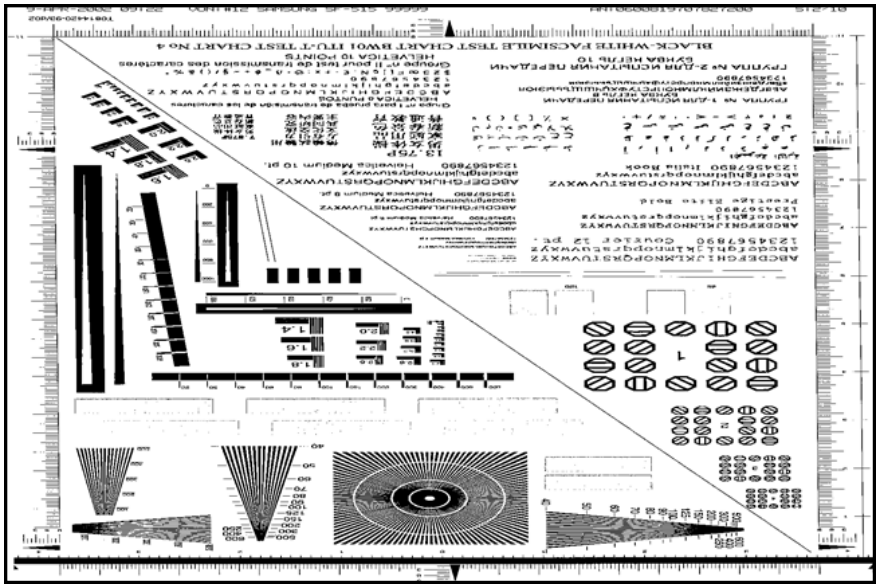
inform task 1 "START";

inform task 1 "TXFAX #1:1 TIFF_FILE 'WinClientServer\FAX Simulator\send\3.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1";

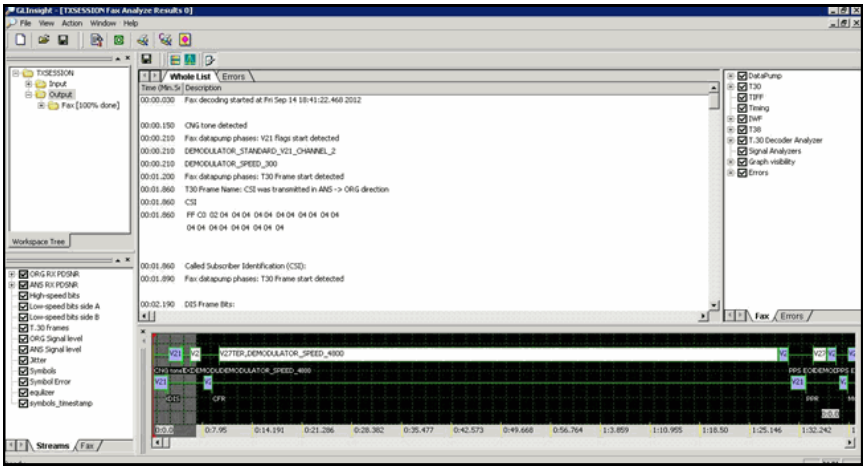
This command will transmit 3.tif file (sample file for Fax transmission) on the port 1 timeslot 1 with the minimum and maximum data rate set to 2400 and 4800.



Fax Simulator Examples



TIFF Output



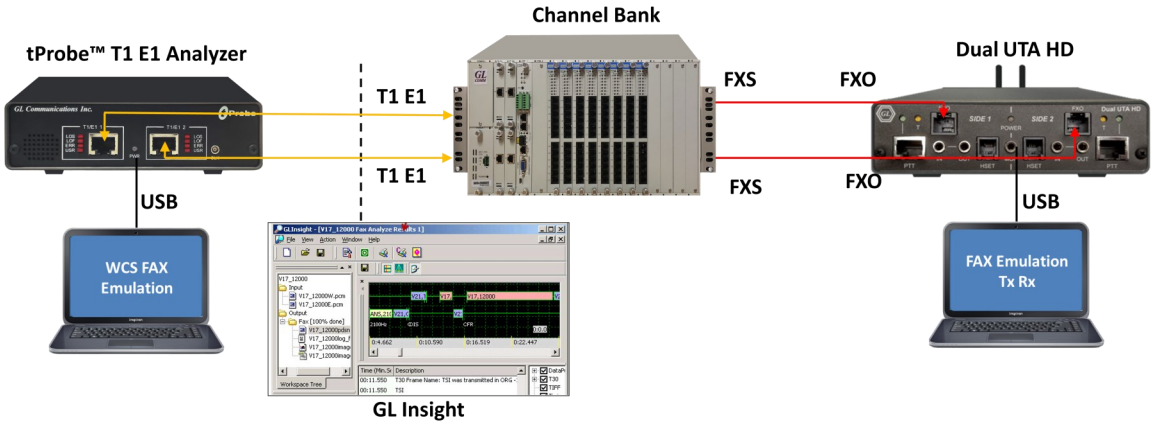
Analysis of PCM Files in GL Insight

Test Scenarios for Fax Simulator (*Contd.*)

Fax Simulator over T1 E1 to Analog Interface on Dual UTA (via Channel Bank)

inform task * "TXFAX #1:1 TIFF_FILE 'WinClientServer\FAXSimulator\send\1.tif' CODEC_TYPE ALAW MIN_DATA_RATE 7200 MAX_DATA_RATE 9600 ECMENABLED 1";

This command will transmit 1.tif file (sample file for Fax transmission) on the port 1 timeslot 1 with the minimum and maximum data rate set to 7200 and 9600.



Fax Simulator over T1 E1 on Dual UTA (via Channel Bank)

Fax Simulation over tProbe™ FXO

Scenario 1: Sending Fax from tProbe™ FXO Port to Fax Machine

run task "FaxSimulatorE1:StartFaxSim";

inform task * "START";

inform task * "TXFAX #2:1 TIFF_FILE 'WinClientServer\FAX Simulator\send\4.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1";

This command will transmit 4.tif file (sample file for Fax transmission) on the port 2 timeslot 1 with the minimum and maximum data rate set to 2400 and 4800.

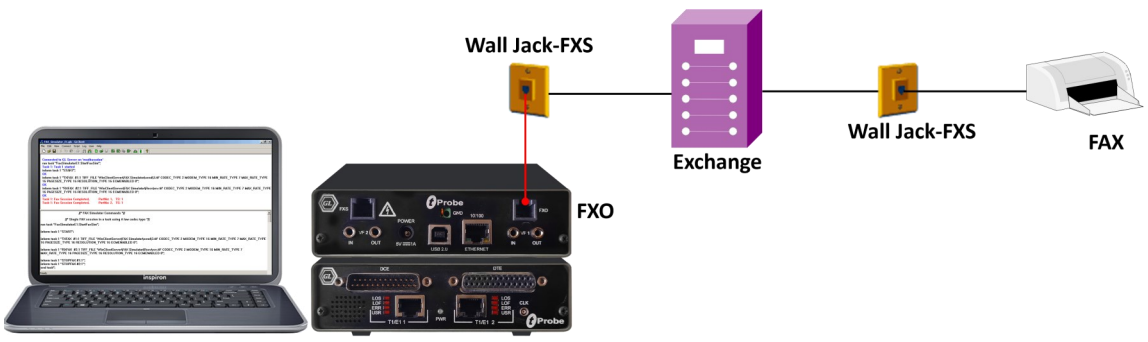
Scenario 2: Sending Fax from Fax Machine to tProbe™ FXO

run task "FaxSimulatorE1:StartFaxSim";

inform task * "START";

inform task * "RXFAX #2:1 TIFF_FILE 'WinClientServer\FAX Simulator\Recv\RCV.tif' CODEC_TYPE ALAW MIN_RATE_TYPE 2400 MAX_RATE_TYPE 4800 ECMENABLED 1";

This command will Receive the fax signal on port 2 timeslot 1 and save the image as RCV.tif.



Tx/Rx Fax over tProbe FXO

Fax and Modem Standards

Modem Standard	Description
V.17	a) Provision for half duplex operation at data signaling rates of: 14400 bps synchronous 12000 bps synchronous 9600 bps synchronous 7200 bps synchronous b) Quadrature amplitude modulation with synchronous line transmission at 2400 symbols per second c) Inclusion of data scramblers, adaptive equalizers and eight-state trellis coding d) Two sequences for training and synchronization: long train & resync
V.27	a) Use of data signaling rate of 4800 bits per second with 8-phase differentially encoded modulation as described in Recommendation V.27 b) Reduced rate capability at 2400 bits per second with 4-phase differentially encoded modulation as described in Recommendation V.26
V.29	a) Fallback rates of 7200 and 4800 bits per second b) Combined amplitude and phase modulation with synchronous mode of operation c) Inclusion of an automatic adaptive equalizer
V.34	a) half-duplex modes of operation are used for fax b) Quadrature Amplitude Modulation (QAM) for each channel with synchronous line transmission at selectable symbol rates including the mandatory rates of 2400, 3000, and 3200 symbols/s and the optional rates of 2743, 2800 and 3429 symbols/s c) Trellis coding for all data signaling rates d) Adaptive techniques that enable the modem to achieve close to the maximum data signaling rate the channel can support on each connection e) Exchange of rate sequences during start-up to establish the data signaling rate

Buyer's Guide

Item No	Product Description
XXFT0	WCS Fax Simulator. Requires one of the licenses below:
XXFT2	2 Fax ports licenses
XXFT3	8 Fax ports licenses
XXFT4	30 Fax ports licenses
XXFT5	60 Fax ports licenses
XXFT6	120 Fax ports licenses

Item No	Related Software
VQT022	VQuad™ Fax Emulation (2 simultaneous ports)
VQT022a	VQuad™ Fax Emulation (8 simultaneous ports)
FXT001	GL Insight - Single Fax Analysis - TDM
FXT002	GL Insight - Single Fax Analysis - IP
VBA038	FaxScan™ for PCM
PKV104	FaxScan™ for SIP and Fax over IP (T.38)
XX651	MAPS™ CAS Emulator
XX649	MAPS™ SS7 Emulator
XX648	MAPS™ ISDN Emulator

Item No	Related Hardware
VQT241	Dual Universal Telephony Adapter (UTA)
FTE001	QuadXpress T1 E1 Main Board (Quad Port– requires additional licenses)
ETE001	QuadXpress T1 E1 Daughter Board (requires FTE001)
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer with Basic Analyzer Software
XTE001	Dual T1 E1 Express (PCIe) Boards

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

For more information, please visit FAX Simulator webpage.

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