

Easy Client Scripting and Batch Scripting

Shared Use of T1/E1 Test Gear via Multiple Clients

Central Client Access of Multiple Server Sites

Process Complex and Automated Tasks

Multi-Tasking Server Architecture

Real-time Monitoring

Network Management Applications

Digital Signal Processing Operations

Factory Test Automation

Windows Client/Server for T1/E1 Analyzer



GL's T1/E1 Server

Tx/Rx of Files and digits

w/CAS Simulator and Traffic and Classifier

DSP Operations

FDL / SA Bits Encode/ Decode

Emulation & Analysis of TRAU/HDLC
MLPPP/SS7/ISDN/MLFR Frames

MC Rx BERT

Pulse Mask Display

TCP/IP



Overview

GL's Windows Client / Server software provides the capability of remote operation, automation, and multi-site connectivity to the users of T1/E1 analysis cards. T1/E1 Cards in a server mode can be easily controlled through software clients at remote or local sites via TCP/IP sockets. Connectivity can be via Dial-Up, LAN, WAN, or more typically the Internet.

Server software runs multiple tasks simultaneously at the request of the client software. Server software runs under Windows 2000/XP/Vista. Platforms supported are -, Universal HD T1/E1 Cards and Portable USB T1/E1 Units.

For more details, visit http://www.gl.com/client_server.html.

Main Features

- Intrusive / Non-Intrusive T1/E1 Testing
- Performance monitoring and testing of multiple site locations from a single client
- Shared use of T1/E1 test equipment from multiple client locations
- Automated factory testing on production lines
- Simultaneous testing of high capacity T1/E1 systems through a single Client
- Integration of T1/E1 testing into more complex testing systems
- Collection of call records from remote locations based on signaling (SS7, CAS, ISDN)
- Digital Signal Processing operations on PCM timeslots
- Monitor, report, and record alarms at various sites every two seconds or as they occur
- Detect and report DTMF/MF/MFC-R2 digits on channels as they occur
- Perform BERT on selected timeslots involving multiple paths simultaneously
- Perform Active Voice Level monitoring as per ITU-T P.56
- Simulate Echo Canceller and model echo path
- TxRx functionality for HDLC, MLPPP, FDL, Multi-link Frame Relay, and TRAU protocols
- Perform complete ISDN switch and subscriber emulation
- Supports Real-time monitoring capability using GL's Network Surveillance System

Client applications that work with the Server are distributed freely and can be used as a template for more complex tasks. Clients can be written in C++, TCL, C#, and other easy to use scripting languages. Clients can be run under any OS, including UNIX, LINUX, and Windows.

In addition, Remote Protocol Analyzers (requires separate license) can be integrated with Windows Client Server to remotely analyze SS7, ISDN, GR303, V5.X, HDLC, and Frame relay protocols.



GL Communications Inc.

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GL Server & Client Functions

“Actions” are performed immediately in response to the “commands” from the clients. The Server informs the Client on tasks: started, status, complete. Typical tasks include BER testing, File/Digits/Protocol Frames playback and recording, Alarm monitoring, and so on.

Client programs communicate with the GL Server via TCP/IP-encapsulated commands and responses. Clients are compatible with any OS, including UNIX, Linux and Windows. Other environments commonly used for client development include Perl, MatLab, Visual Basic, and LabView.

Windows Client Server (WCS) Modules

WCS Module XX605 - Simplified Audio Client (SAC)

SAC is a client-server based application that provides an alternate & simple GUI to perform analog Tx/Rx and Digital T1 testing functionalities. SAC supports Analog operational mode featuring two VF interfaces per unit, with each VF interface providing independent Tx/Rx functionality. It includes spectral displays and in-built speakers for analyzing analog signals.

WCS Module XX610 - File based Record/Playback

- Simultaneously perform simultaneous and synchronous transmit and receive tasks on all the 4 ports (124 TS)
- Transmit / receive streams of various bandwidth (hyper channel, timeslot) with continuous / limited capture
- Allows broadcast file into multi timeslots

Sample Script ://Transmit only or Transmit and receive simultaneously on all the timeslots at a time on each of 4 ports
rx server file "rec1.ala" #1 :1..31 1000 ;
tx server file "qrss.ber" #2 :1..31;

WCS Module XX610 - Client Data Tx Rx

It provides the capability for "clients" to Tx Rx T1 E1 data to Server, that is users can Tx Rx files from the Client location (in case that the Server and Client are not on the same PC) directly to the server.

WCS Module XX629 – ISDN Emulation

This is an optional client application that is used to perform various ISDN Emulation functions –

- Configuring the ISDN Layer parameters, Called/Calling Numbering Plan/Type, Simple NFAS setup for T1, and others
- Place call or accept call for each timeslot or for the whole trunk, Switch and Subscriber Emulation,

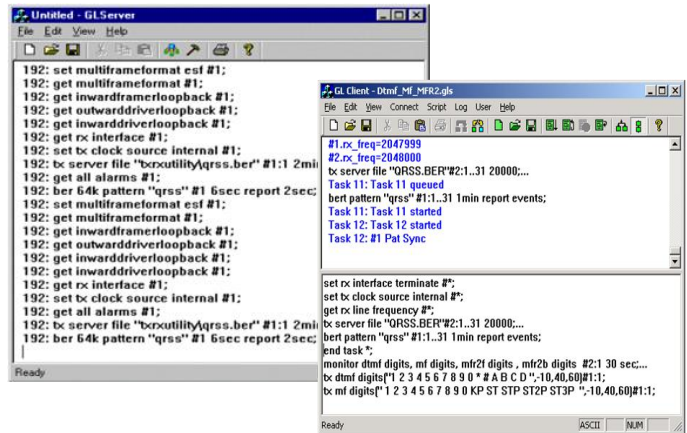
Sample script for ISDN Emulation:
inform task "SetISDNProt USA AT&T#4ESS Subscriber;
inform task "SetISDNProt USA AT&T#4ESS Switch #2";
inform task "StartDChan #1..2";// Start D Channel
inform task "PlaceCall 5551234 5551000 #1:1";
inform task "AnswerCall #2:1";

WCS Module XX620 - Transmit/Detect digits

- Transmit / Detect DTMF/MF/MFR2-f/MFR2-b digits on channels as they occur
- Cards / software have the ability to transmit and detect digits on all the timeslots

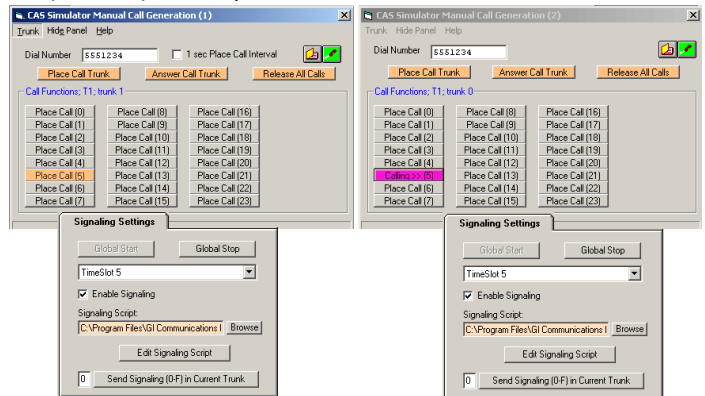
Sample script for Transmit/Detect digits:

```
monitor dtmf digits #1,2,3,4,5,6,7,8,9,10:1..31;...
tx dtmf digits ("1 2 3 4 5 6 7 8 9 0 *# a b c d",-10, 20,20)
#1,2:1..31;
tx dtmf digits ("1 2 3 4 5 6 7 8 9 0 *# a b c d",-10, 10,10)
#3,4:1..31;
tx dtmf digits ("1 2 3 4 5 6 7 8 9 0 *# a b c d",-10, 10,10)
#5,6:1..31;
tx dtmf digits ("1 2 3 4 5 6 7 8 9 0 *# a b c d",-10, 10,10)
#7,8:1..31;
tx dtmf digits ("1 2 3 4 5 6 7 8 9 0 *# a b c d",-10, 10,10)
#9,10:1..31;
```



WCS Module XX625 – Channel Associated Signaling Simulation

- This is an optional client application that simulates any user defined CAS protocol by providing signaling bit transitions and forward/backward frequency tones/digits
- Supported protocols include- E1 MFC-R2 (All variants, fully/semi compelled), E1 European Digital CAS (EUC), T1 Winkstart (R1 wink), T1 Loopstart, T1 Groundstart, & user-defined



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WCS Module XX012 - Jitter Measure and Pulse Mask

The Pulse Mask module can detect, monitor, and plot transmitted pulses using simple commands. Some of the supported commands are CheckPulseMask, validate pulse, & stop pulse mask validation. The Jitter measurement can be performed through commands. The tasks include monitoring jitter ranges, and getting jitter ranges on a specified port.

Sample Script for pulse detection and validation (E1)

```
run task "WcsPulseMaskE1:CheckPulseMask" #2 continuous;
inform task 1 "validate pulse";
inform task 1 "validate pulse dump";
wait 8000 msec;
end task 1;
```

Sample Script for jitter measurement

```
get jitter ranges #*;
monitor jitter range 8000 hz #1;
monitor jitter range 8000 hz #1 1 report 1 min;
monitor jitter range 1000 hz #1 24 report events cfg
"JitterMonitor.ini";
```

WCS Module XX626 - SS1 Signaling Analysis and Emulation

The SS1 Module generates and analyzes tone sequences that make up SS1 dial digits. Sequences of pulse and guard tones are detected, decoded, and assembled into their corresponding dial digits.

WCS Module XX630 - DSP Functionality

Scripted DSP commands provide the ability to specify a sequence of digital signal processing steps to be performed on incoming and/or outgoing timeslots. Visit <http://www.gl.com/dsp.html> for more details. List of some sample DSP scripts are as below -

- Transmit filtered tones and white noise
- Adding speech and noise to the receive data
- Double talk simulation for echo canceller testing
- Delay and attenuate the transmitted tone and more
- Dynamic and Static DSP operations

Sample Script transmits sum of white noise, tone, "qrss.ber" file

```
tx( dtmf digits ("1234567890*#abcd12345", -10, 50, 60),
#2:1..2,broadcast) 15 sec;
tx(sum(whitenoise(-10),tone(1000,-10),infile
("qrss.ber")),#1:1) 10 sec;
```

WCS Module XX631 – Dynamic DSP Capability

Scripted DSP commands provide the ability to perform dynamic or time-varying operations via schedules. A schedule is a CSV file specifies a sequence of digital signal processing steps to be performed at specified time offset for each operator on incoming and/or outgoing signals. Functions include Amplification/Attenuation, Delay, Filter, File Tx/Rx, Logical operations, Echo Cancel, and so on.

Sample script for Offline Amplification/Attenuation

```
outfile(atten(tone(642 hz, -10 dbm), 20 db),
"WinClientServer\DynDspOp\DynScaleDspOp.ala") 60 sec
cfg "WinClientServer\DynDspOp\DynDspOp.ini";
```

WCS Module XX634,XX640, XX641 for HDLC**Multi-Channel HDLC Emulation & Analysis and File based High Throughput HDLC Record/Playback (XX634)**

HDLC Record/Playback (HdlcHpio) module permits:

- Receive / transmit of HDLC streams of various bandwidths (hyper channel, timeslot, and multiple sub-channel streams per timeslot).

HDLC Emulation & Analysis (HdlcTerr) module permits:

- Transmission of memory generated sequences of fixed / variable length HDLC frames, HDL Trace file frames, various bandwidth streams, & introduce various impairments.

Sample Script to check for tx & rx operations with HdlcHpio

```
run task "HdlchpioE1:TxRx" #1..2:1;
inform task 1 "Rx 'C:\Ts.hdl' 500000 CONT TS ";
inform task 1 "Tx 'C:\10sec_1flags.hdl' EOF TS FLAGS 1";
inform task 1 "start";
query task 1;
stop task 1;
```

File based HDLC Record/Playback & Remote HDLC capture (XX640, XX641)

This module allows transmission/reception of HDL frames files located on the server and client.

This optional module allows:

- Displays the command syntax
- Transmitting /Receiving HDLC frames in HDL files located on the server / client.

Sample Script to generate proper hdlc frames with HdlcTerr

```
run task "HdlcTerrE1:Tx" using "FRAMES 1000 SEQNUM
MSB2 FLAGS 100" #1..2:31;
//run task "HdlcTerrE1:Tx" using "HC SEQNUM MSB2
FRAMES 1000 " #1..2:1..2;
//run task "HdlcTerrE1:Tx" using "SEQNUM MSB2 FRAMES
1000 " #1..2:1:1,2;
inform task 1 "start";query task 1;
```

WCS Module XX635, XX636 - PPP, MLPPP, & Multi-Channel (MC) MLPPP Emulation and Analysis

This optional client application can accomplish PPP, MLPPP, & Multi-Channel (MC) Emulation and Analysis. It displays the command syntax, sends and receives MLPPP frames with or without impairments, and logs the events.

Sample Script for MLPPPTerr is as shown below:

```
run task "MLPPPTerrE1:Tx" using " EOF
HDLFILE 'c:test.hdl' SHORTSEQNUM";
inform task 1 "TS #1:1.10 MRU 128";
inform task 1 "TS #1:11.20 MRU 215";
inform task 1 "start"; // start transmission
end task 1; // explicitly end the task;
```



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WCS Modules XX645, XX646 for TRAU

File based TRAU Record/Playback (XX645)

This WCS module supports TRAU Traffic Capture/Playback, with additional TRAU broadcasting transmission and multiple receive features per task.

Multi-Channel TRAU Tx/Rx Emulation & Analysis (XX646)

This is (TrauTerr) is a high performance, high precision and high flexibility Windows Client Server (WCS) error-testing task for TRAU. The frames are generated based on the codec type, impairments and time alignment (if specified) and transmitted through the 16 or 8 kbps channels. The module allows:

- Displays the command syntax,
- Sends TRAU frames with or without impairments, & time alignment
- Receives TRAU frames and logs the errors

Sample Script for receiving TRAU frames into an hdl file

//For T1 Card:

```
run task "TrauFuncT1:RxFile" using "trau.hdl 10000000
CONT 16K SC:FF UPLINK " #1:23;
```

//For E1 Card:

```
run task "TrauFuncE1:RxFile" using "trau.hdl 10000000
CONT 16K SC:FF UPLINK " #1:23;
```

//This will receive 4 streams of 16Kbps each on TS 23 cards 1 continuously.

Sample Script for Trau Tx TRAU frames using 16kbps for GSM6.10

```
run task "TRAUTerrE1:TxRx";
inform task 1 "SC #1:1:1..2 RATE 16K DIRECTION UPLINK
CODEC GSM610";
inform task 1 "START TX #1:1:1..2 FRAMES 100 SEQNUM
MSB4";
```

WCS Module XX665 - File based HDLC Record/Playback over Sa-bits (E1 Maintenance Data Link)

The File based HDLC Record/Playback over SAbits (SaBitsFunc) module is an optional application that allows receive and transmit of HDLC frames in *.hdl file format.

Sample Script for E1 Maintenance Data Link:

//Transmission of first three frames on card 1 with 1000 flags between frames

```
run task "SaBitsFuncE1:SaBitsTxFile" using "'c:\data
files\test.hdl' CONT" #1;
```

//Continuously transmit file c:\data files\test.hdl'

WCS Module XX655 - Multi-link Frame Relay Emulation

Automated testing of FR and MFR can be accomplished using client-server based Multi-link Frame Relay Emulation module. The MFR Emulation module is an optional application that displays the command syntax, sends and receives FR and MFR frames with or without impairments.

Sample Script for creating links is shown below:

```
run task "MFREmulatorE1:TxRx";
inform task 1 "SIMULATION FR";
inform task 1 "HC #1:1..31 FLAGS 100";
inform task 1 "ACTIVATE HC #1:1..31";
inform task 1 "CREATE VC HC #1:1..31 DLCI 1 FRAG
FORMAT END TO END FRAGSIZE 256";
inform task 1 "Tx: HC #1:1..31 DLCI 1 CONT FIXLEN 1500
SEQNUM MSB4";
inform task 1 "START TX HC #1:1..31 DLCI 1";
query task 1;
end task 1;
```

The screenshot shows the FrameRelay_E1 GUI with a command window. The output displays the execution of the sample script, including the creation of VC, activation of HC, and transmission of frames. The status window shows simulation details such as HDLC Stats, Virtual Channel Stats, and Frame Relay Stats.

WCS Module XX654 - Inverse Multiplexing over ATM

Inverse Multiplexing for ATM (IMA) can be emulated on up to 16 T1/E1 lines using GL's client-server based IMA Emulation software module. All the operations that are performed using GUI can also be performed in CLI making it suitable for automated testing.

Sample Script for sending sequence number traffic:

```
run task "AtmImaServerT1:StartAtmIma";
inform task 1 "ENABLE ICP";
inform task 1 "CONFIG: IMAID 1 IMAFRAMELEN 128
SYMMETRYMODE 0";
inform task 1 "ADDLINK: HC #1:0..23 LINKID 0";
inform task 1 "ADDLINK: HC #2:0..23 LINKID 1";
inform task 1 "START";
inform task 1 "Rx: VPI 100 VCI 200 AALTYPE 5 CONT FIXLEN
1500 SEQNUM LSB4 0 1";
inform task 1 "Tx: VPI 100 VCI 200 AALTYPE 5 CONT FIXLEN
1500 SEQNUM LSB4 0 1";
query task 1;
end task 1;
```



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WCS Module XX660 - File based Record/Playback over FDL

The File based Record/Playback over FDL (FdIFunc) module is an optional application that allows to receive and transmit HDLC frames and signals in *.hdl file format over facility data link (FDL).

Sample Script for Transmitting and Receiving HDLC frames and signals over FDL using HDL file:

```
run task "FdIFuncT1:FdITxFile" using "'c:\data files\test.hdl'
CONT 4096 " #1 continuous;
```

//Continuously transmit file c:\data files\test.hdl' on card 1 with 4096 signal repetition for each signal in the HDL file.

```
run task "FdIFuncT1:FdIRxFile" using "'c:\test.hdl' 1000000
100000" #1 continuous;
```

//receive into file c:\test.hdl (allocate 10MB disk space for the file) up to 100000 frames on card 1.

WCS Module XX670 - Multi-Channel BER Testing

Multi-channel BER Testing server function allows the user to take advantage of the more advanced features of the HD boards.

- Supports transmit and receive of *.ber files,
- Bit inversion on Rx pattern,
- Logic errors insertion for Tx and Rx patterns

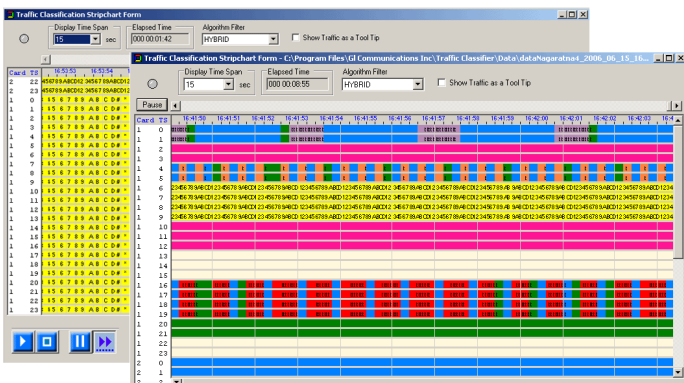
*Sample Script for Multiple channels-single stream N*64Kbps (N=5 in this case)*

```
bert 64k pattern "qrss" #1: 1..5 continuous;
run task "BerFuncE1:RxFile" using "'c:\qrss.ber' LOG
'c:\qrss.log' HC " #2:1..5;
query task 1;
end task 1;
```

WCS Module XX680 - Traffic Classifier

Traffic Classifier is an application that can analyze the traffics such as voice, fax, data, and tones (dial tone, ring-back tone, busy tone, so on) and also identify dialing digits and other events happening on a T1/E1 network.

- Ability to non-intrusively monitor the traffic on a T1 / E1 line in real-time and offline modes
- Codecs supported - μ -law, A-law, and linear



WCS Modules for MAPS™

XX649 - Scripted ISUP Simulator (MAPS™ SS7)

MAPS™ SS7 can simulate Service Switching Point (SSP) and ISUP signaling specification as defined by the ITU-T standards. It supports testing network elements, error tracking, regression & conformance testing, load testing, and generation of high volumes of ISUP traffic.

XX647 Scripted ISUP Conformance Testing (MAPS™ SS7 Conformance)

Suitable for conformance tests and functional tests, where test objects can be accurately, reliably and comfortably validated for compliance with ITU-T standard Q.761-764 and Q.784.

XX649 - Scripted MAP Simulator (MAPS™ MAP)

MAPS™ MAP (Mobile Application Part) can simulate various MAP signaling interfaces (C, D, E, F, H, and G) and Packet-switched interfaces such as Gc, Gr, Gf, Gd) in GSM/UMTS networks as defined by 3GPP standards.

XX648 - Scripted ISDN Simulator (MAPS™ ISDN)

MAPS™ ISDN can simulate ISDN signaling as defined by the ITU-T standards. Currently it is used to perform testing using ISDN protocol messages over T1/E1, and offers a complete solution for testing, troubleshooting, and maintenance of devices and networks implementing PRI ISDN.

XX651 - Scripted CAS Simulator (MAPS™ CAS)

MAPS™ CAS (Channel Associated Signaling) simulates CAS signaling over TDM (T1 E1) with the ready scripts on a single or on all timeslots. Calls are established, once the signaling information such as the signaling bits, MF, DTMF, or tones are detected. Optional client application simulating all CAS protocols, including wink-start, loop-start, ground start, R1, MFC-R2, etc.

XX652 - Scripted MLPPP Conformance Testing (MAPS™ MLPPP)

MAPS™ MLPPP Emulator can simulate a complete PPP/MLPPP link (over T1/E1) between two peers (Router or a Switch), with MLPPP signaling conforming to IETF specifications.

XX692 - Scripted GSM A Simulator (MAPS™ GSM A)

MAPS™ GSM A can simulate BSSMAP and DTAP messages and signaling specification as defined by 3GPP standards. The tester supports testing network elements MSC and BSS, Error tracking, regression testing, conformance testing, load testing/call generation and generation of high volumes of GSM traffic.

XX693 - Scripted GSM Abis Simulator (MAPS™ GSM Abis)

MAPS™ GSM Abis can simulate BTSM messages and signaling specification as defined by 3GPP standards. Supports testing BTS and BSC, error tracking, regression / conformance / load testing, and generation of high volumes of GSM traffic.



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WCS Module XX690 - SS7 Decode Agent

A console client application that monitors SS7 Links, decodes multiple SS7 protocol standards, filters user-specified protocol parameters, builds CDRs, and streams over TCP/IP to remote site.

WCS Module XX691 - ISDN Decode Agent

A console client application that monitors ISDN Links, decodes multiple ISDN protocol standards, filters user-specified protocol parameters, builds CDRs, & streams over TCP/IP to remote site.

WCS Basic Modules**WCS Error Insertion Module**

A client application used to introduce single, fixed, automatic, and random error such as Logical, MF, BPV, CRC, Framing, and National etc into the incoming bit streams.

The WCS commands supports Bulk delay to apply delay on the entire T1/E1 trunk (applicable to USB Analyzer units only).

WCS WaitSigBits Module

WaitSigBits is a DLL that waits for a specified signaling bits pattern to appear on a specified timeslot before terminating.

Sample scripts for bulk delay insertion for USB or Universal only
run task "waitsigbitst1" using "1,0,0,1" #1:1;

//Instructs the server to monitor signaling bits on port #1 timeslot 1
//for the signaling bit pattern 1,0,0,1. The task waits indefinitely
//for the signaling bits to arrive. The default response time is used.

WCS Precision Delay Measurement Module

PrecDelayMeas is a DLL that performs precision delay measurement on a digital system.

Sample scripts for bulk delay insertion for USB or Universal only
run task "PrecDelayMeasE1" #1;

//Instructs the server to conduct the precision delay measurement
function on card #1.

run task "PrecDelayMeasT1" using "56k" #2:0..11 10 sec;
//Instructs the server to conduct the precision delay measurement
//function on card #2, timeslots 0 through 11 inclusive. The task
//times out in 10 seconds if the measurement is unsuccessful.

Buyer's Guide

[XX600](#) - Windows Client Server

Optional Modules

[XX605](#) - Simplified Audio Client

[XX610](#) - File based Record/Playback

[XX620](#) - Transmit/Detect digits

[XX625](#) - Channel Associated Signaling (CAS) Simulation

[XX626](#) - SS1 Signaling Analysis

[XX630](#) - DSP Functionality

[XX631](#) - Dynamic DSP Capability

[XX629](#) - ISDN Emulation

[XX634](#) - Multi-Channel HDLC Emulation and Analysis & File based High Throughput HDLC Record/Playback

[XX635](#) - PPP Emulation and Analysis

[XX636](#) - MC-MLPPP Emulation and Analysis

[XX640](#) - File based HDLC Record/Playback

[XX641](#) - File based HDLC Remote Record/Playback

[XX643](#) - MTP2 Emulation

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[XX646](#) - Multi-Channel TRAU Tx/Rx Emulation and Analysis

[XX650](#) - File based HDLC Record/Playback over SA-bits

[XX655](#) - MFR Emulation

[XX660](#) - File based Record/Playback over FDL

[XX670](#) - Multi-Channel BER Testing

[XX680](#) - Traffic Classifier

[XX690](#) - Console based SS7 Protocol Decode Agent

[XX691](#) - Console based ISDN Protocol Decode Agent

[XX019](#) - Tx/Rx File Utility

[XX020](#) - Record and Playback of Files

[XX030](#) - Call Capture and Analysis

[XX068](#) - Semi-Automated & Scripted Echo Celler Testing Suite

Related Hardware

[PTE001](#) - tProbe™ Dual T1 E1 Laptop Analyzer

[HTE001](#) - Universal T1/E1 Card

[UTE001](#) - Portable USB based Dual T1 or E1 Laptop Analyzer

Visit http://www.gl.com/client_server.html for complete WCS Buyer's Guide list.



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