**MAPS™ ISDN and LAPD Simulator**

(Basic and Conformance Test Suite)

**Overview**

GL’s MAPS™ ISDN is an advanced protocol simulator/tester for ISDN simulation over TDM (T1 E1) and generates high volumes of ISDN traffic. The tester can simulate ISDN signaling as defined by the ITU-T, 5ESS, 4ESS, BELL, DMS-100, DMS-250, and QSIG ECMA standards. MAPS™ application can also emulate signaling as per Q.921, referred to as LAPD (Link Access Protocol - D Channel), a Data Link protocol used over ISDN’s D channel. MAPS™ ISDN can be configured to simulate ISDN calls on the trunks containing D-Channel using NFAS options.

With additional licensing MAPS™ ISDN Conformance Test Suite (# xx642) is also available to conform various ISDN and LAPD call states over T1 E1 as defined in the Q.931 and Q.921 standards.

MAPS™ emulates the ISDN network and generates high volumes of ISDN traffic. Using MAPS™ tool, users can place calls on a single or on all timeslots manually. Once the calls are established, the user may send/capture PCM voice files, send/detect DTMF/MF digits, and send/detect Tones. MAPS™ ISDN also incorporates the flexibility to modify ISDN and LAPD call parameters & message contents (arbitrary manipulation of messages, information elements and message sequence on the different protocols). It supports powerful utilities like Message Editor and Script Editor which allow to create new scenarios.

For more details, refer to [http://www.gl.com/maps-isdn.html](http://www.gl.com/maps-isdn.html).

**Main Features**

- Supports Switch and Subscriber conformance tests
- ISDN & LAPD simulation over TDM (T1 E1)
- Example scenarios supported in ISDN conformance Test Suite
  - Verification of Device behavior for valid, invalid and inopportune events in a given state
  - Verification of Bearer capability negotiation
  - Verification of device behavior for valid and invalid Information elements
  - Verification and Validation of protocol related timers
  - Sequence Number Verification in Lap-D
  - Verification of Re-Transmission of messages in a given state
- Multiple T1 E1 line interfaces supported
- Access to all ISDN Message Parameters such as Call Reference Value, Called Number, Calling Number, Release Cause, and more
- Provides various release cause codes such as rejected, no user response, user busy, congested, and so on to troubleshoot the problems in ISDN
- Send/receive traffic over established calls - PCM voice files, DTMF/MF digits, and tones
- Ability to generate high volumes of ISDN traffic
- Supports NFAS testing for T1 only
- Bulk Call Simulation for Performance testing, Load testing, Functional testing, and Regression testing of network elements

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Testbed Setup Configuration

Test Bed setup is provided to establish communication between MAPSTM ISDN and the DUT. It includes NFAS grouping and interface type settings, Primary D channel configurations with signaling ports and timeslots to transmit and receive ISDN messages. Default profile is used to configure end-user (Subscriber or Switch) parameters.

Pre-processing Tools

**PROFILE EDITOR** - This feature allows loading profile to edit the values of the variables using GUI, replacing the original value of the variables in the message template. An XML file defines a set of multiple profiles with varying parameter values that allow users to configure call instances in call generation and to receive calls.

Users can configure the traffic options for Auto traffic type or User-defined traffic type. Supported traffic configuration includes Send/Receive file, DTMF/MF digits, and Single/Dual tones.

**MESSAGE EDITOR** - With message editor, users can build a template for each protocol message type. The value for each field may be changed in the message template prior to testing. The protocol fields comprises of mandatory fixed parameters, mandatory variable parameters, and optional variable.
Call Generation and Reception
In call generation, MAPS™ is configured for the outgoing messages, while in call receive mode, it is configured to respond to incoming messages. Tests can be configured to run once, multiple iterations and continuously. Also, allows users to create multiple entries using quick configuration feature.

The editor allows to run the added scripts sequentially (order in which the scripts are added in the window) or randomly (any script from the list of added script as per the call flow requirements). The test scripts may be started manually or they can be automatically triggered by incoming messages.

Incoming Call Handler Configuration
The script configuration option is used to preset the script required to handle all possible ISDN signaling and call control messages against particular message expected to arrive. The answer script can also handle traffic over established calls.

Typical ISDN Call Signaling
MAPS™ ISDN can be configured to act as Caller (Subscriber) initiating the call by sending SETUP message to the DUT. MAPS™ ISDN can also be configured as Switch (DUT) at network end receiving calls and generating responses.

Typical LAPD Call Signaling
MAPS™ LAPD can be configured to act as Caller (Subscriber) initiating the signaling by sending SABME message to the DUT. MAPS™ LAPD application can also be configured on the network side as Switch receiving the calls and generating responses.
Supported Protocol Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>Standard / Specification Used</th>
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<tbody>
<tr>
<td>Q.921 (LAPD)</td>
<td>ITU-T Q.931</td>
</tr>
<tr>
<td>SR-4994</td>
<td>National ISDN PRI Standard</td>
</tr>
<tr>
<td>Q.931</td>
<td>ITU-T Q.931 / Q.932(Facility IE) / Q.955.3 (MLPP Procedures)</td>
</tr>
<tr>
<td>4ESS</td>
<td>ISDN PRI (TR-41449)</td>
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<tr>
<td>5ESS</td>
<td>ISDN PRI (Lucent Tech - 5ESS 2000)</td>
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<tr>
<td>BELL</td>
<td>ISDN PRI (Bell Core SR-NWT-002343)</td>
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<td>DMS-100</td>
<td>Nortel’s Switch DMS 100 NIS-A2111-1</td>
</tr>
<tr>
<td>DMS-250</td>
<td>Nortel’s Switch DMS 250 NIS-A2111-4</td>
</tr>
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Buyer's Guide

**XX648** – MAPS™ ISDN Emulator (requires xx610 and xx620 for traffic generation)

**XX642** - MAPS™ ISDN Conformance Emulator (requires xx648 and xx661)

**XX662** - MAPS™ LAPD Conformance Emulator (requires XX634)

**XX610, XX620** - TDM Traffic Options

Related Software

**XX661** - LAPD Server

**XX634** - High Throughput HDLC Tx/Rx Test

**XX610** - w/ Transmit and Receive File capability

**XX620** - w/ DTMF/MF/MFC-R2 + answer/place call capability

**XX100** - ISDN Analyser Software

**OLV100** - Offline/ Remote ISDN Analyzer Software

**PKV105** - SIGTRAN Analyzer (requires PKV100)

**PKS164** - MAPS™ UMTS – IuPS Interface Emulation

**PKS160** - MAPS™ UMTS – IuCs and Iuh Interface Emulation

**XX165** - T1 or E1 UMTS Protocol Analyzer

**LTS206** - OC-3 / STM-1 UMTS Protocol Analysis

**XX692** – MAPS™ GSM- A Interface Emulator

**XX693** – MAPS™ GSM - Abis Interface Emulator

Related Hardware

**HTE001** - Universal HD T1 or E1 PCI Cards

**UTE001** - USB based Dual T1 or E1 Laptop Analyzer

**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)

For complete list of MAPS™ products, refer to [http://www.gl.com/maps.html](http://www.gl.com/maps.html) webpage.

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