

# MAPS™ IUP Protocol Simulation (BRITISH TELECOM INTERCONNECT USER PART - BT IUP)

## Overview

GL's Message Automation & Protocol Simulation (MAPS™) for BT IUP protocol is an advanced simulator used to simulate UK specific SS7 IUP in BT networks. It is designed to simulate Incoming and Outgoing Networks via Interconnect route as defined by the PNO-ISC/INFO/004 (IUP) and TGS/SPEC/006 specifications. MAPS™ IUP functionality covers the UK variant of SS7 implementing MTP2, MTP3 protocol standards over TDM (T1/E1) transport layer.



Ready scripts are available supporting various protocol services including Basic (Telephony) Call Service protocol (IFAM, IAM, ACI, Bearer Establishment), Request Service protocol, Nodal End-to-End Data protocol, Enveloped ISUP Essential Service protocol, and ISDN Call Handling Service protocol.

The tester supports testing network elements, error tracking, regression testing, conformance testing, load testing/call generation and generation of high volumes of traffic. It is able to run pre-defined test scenarios against ISUP test objects in a controlled & deterministic manner.

The MAPS™ IUP supports powerful tools like Message Editor, Script Editor and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using ISUP messages and parameters. It gives the flexibility of modifying any message so that we can easily duplicate the messages generated by any node to resolve interoperability issues.

MAPS™ IUP Emulator design also supports TDM traffic such as Voice, Digits, Tones, IVR, FAX, across the SS7 IUP network.

MAPS™ IUP supports client-server functionality through Command Line Interface (CLI) such as the Python, and TCL (Tool Command Language) scripting tools. CLI provides the capability of remote operation, automation, and multi-site connectivity.

GL also provides an independent GUI based SS7 protocol analyzer for online capture and decode of the signaling in real-time both during tests and as a stand-alone tracer for live systems.

For more details, refer to <http://www.gl.com/bt-iup-interconnect-user-part-protocol-emulation-maps.html>

## Main Features

- IUP simulation over TDM (T1/E1)
- Multiple T1/E1 line interfaces supported
- Supported procedures include Basic Call Service protocol (IFAM, IAM, ACI, Bearer Establishment), Request Service protocol, Nodal End-to-End Data protocol, Enveloped ISUP Essential Service protocol, and ISDN Call Handling Service protocol.
- Supports generation & detection of TDM traffic - Auto Traffic Voice, Digits, Tones, IVR, FAX, Dynamic VF, and User-defined traffic
- User-friendly GUI for configuring the SS7 MTP Layers
- User-configured Circuit Mapping, i.e., defines Circuit Identification Codes (CIC) and map these CICs to Timeslots/Trunks in order to enable Voice/Data traffic
- Supports MTP2 and MTP3 protocol machine
- Supports client-server functionality through Command Line Interface (CLI) such as the Python, and TCL (requires additional license)



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Deployment of Products with Multiple Features and Protocols

Simulates Outgoing and Incoming Networks

Call Flow Customization with Message & Sequence Editors

Supports Basic Call Service, Nodal End-to-End Data, Enveloped ISUP Essential Service, and ISDN Call Handling Service

Auto and User-Defined TDM Traffic

Provides Fault Insertion, & Erroneous Call Flow Testing

Multiple MTP Links

Multiple T1/E1 Interfaces

TCL Client Support for Remote Operations

## Testbed Setup Configuration

Test Bed setup is provided to establish communication between MAPS™ IUP and the DUT. It includes configuration parameters to be set for point codes, link set ids, Circuit group and other parameter settings. Once the MTP layer is configured properly, IUP messages can be transmitted and received.

Default profile is used to configure MAPS™ IUP with end terminal parameters.

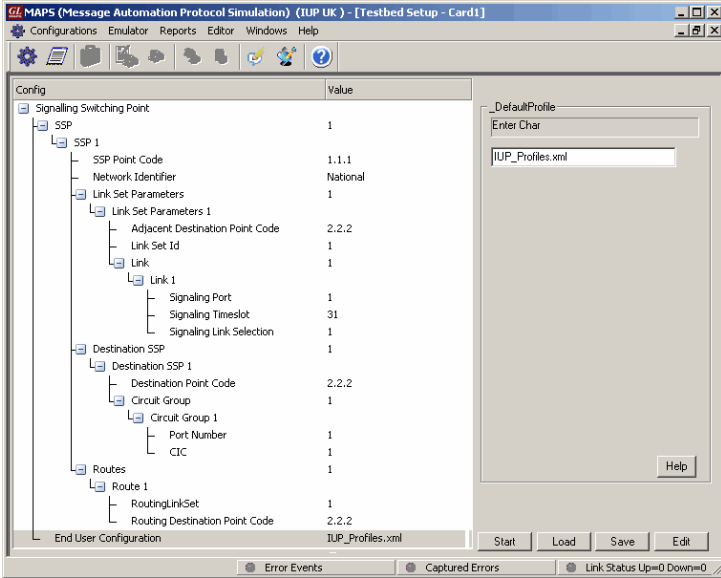
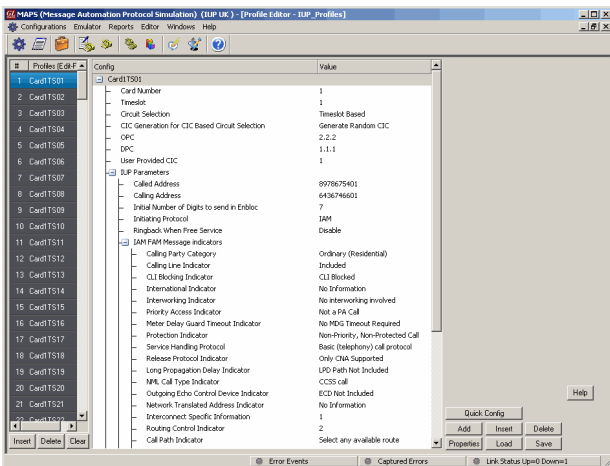


Figure: Testbed Setup Configuration

## Pre-processing Tools

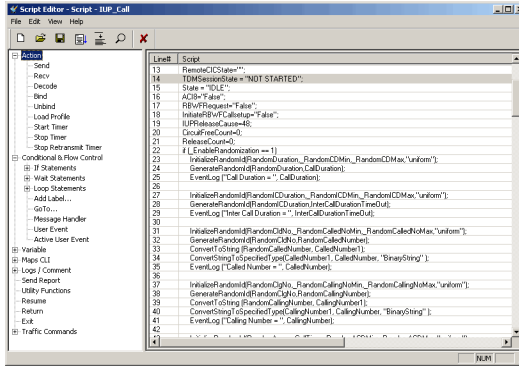
**Profile Editor** - This feature allows loading profile to edit the values of the variables using GUI, replacing the original value of the variables in the message template.

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. It includes protocol specific 'IUP\_Profiles.xml' and traffic specific 'TrafficProfile' configurations.

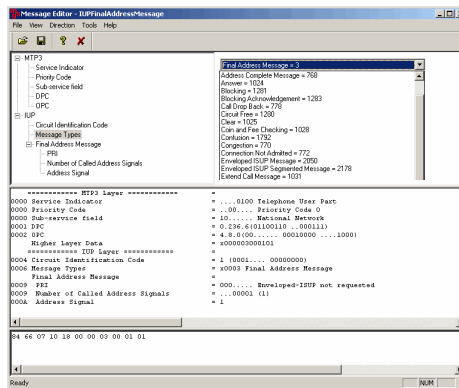


## Pre-processing Tools...

**Script Editor** - The script editor allows the user to create / edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions.



**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 parameters.



## Incoming Call Handler Configuration

Incoming Call Handler configuration is used to preset the script required to handle all possible IUP signaling and call control messages against particular message expected to arrive.

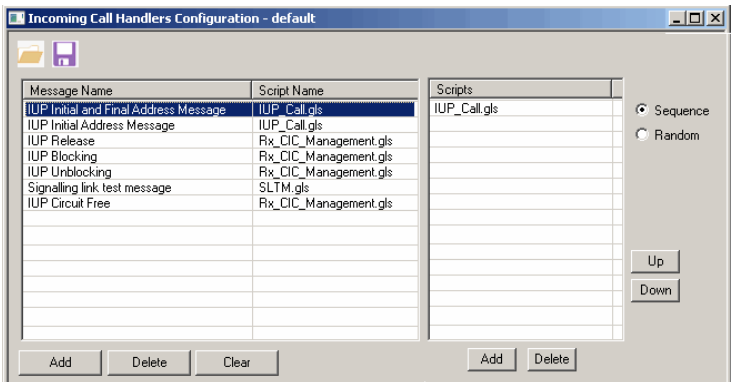


Figure: Incoming Call Handler Configuration



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## 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.

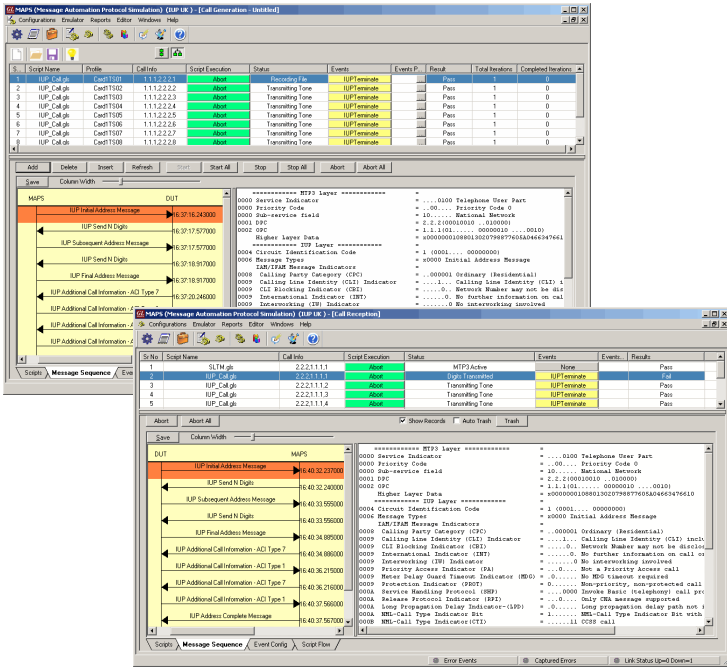


Figure: Call Generation & Call Reception

## Event Log

MAPS™ provides Events, Error Events, and Captured Errors log encountered during the progress of the call. The events are saved in the database which can be accessed via web interface.

Protocol specific signaling events and the traffic events are logged along with the Call Trace ID, Script Name, Script ID, and the Timestamp of the occurred event.

Date/Time	Call Trace Id	Script Name	Script Id	Captured Events
2013-11-16 16:36:13.643000			MTP2	Mp2LinkStatus: OutOfService:1
2013-11-16 16:36:13.717000			MTP2	Mp2LinkStatus: InAlignment:1
2013-11-16 16:36:35.167000			MTP2	Mp2LinkStatus: AlignedReady:1
2013-11-16 16:36:38.367000			MTP2	Mp2LinkStatus: InService:1
2013-11-16 16:37:02.299000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Initial Address Message Sent
2013-11-16 16:37:08.930000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	SAM Sent
2013-11-16 16:37:30.161000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	FAM Sent
2013-11-16 16:37:31.489000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	ACI Type Received
2013-11-16 16:37:41.499000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	ACI Type 1 with ICC 12 Response Sent
2013-11-16 16:37:52.819000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Address Complete Message Received
2013-11-16 16:37:52.819000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Transmission Phase Started
2013-11-16 16:37:57.838000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Release Received
2013-11-16 16:37:57.838000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Answer Message Received
2013-11-16 16:37:57.838000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Type Of Answer = Non-Chargeable
2013-11-16 16:37:45.038000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Release Received
2013-11-16 16:37:47.360000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Release Received
2013-11-16 16:37:47.360000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	CLF Sent
2013-11-16 16:37:47.363000	2.2.2.1.1.1	IFAM_OutGoingNw.gls	ProtoScriptId_663591904-5212-4196	Circuit Free Received

## MAPS™ IUP Call Flow Scenario

### Basic (Telephony) Service Handling Procedure

MAPS™ IUP is configured at Outgoing Network to initiate IUP Basic (Telephony) Call Protocol by sending IAM/IFAM to the Incoming Network.

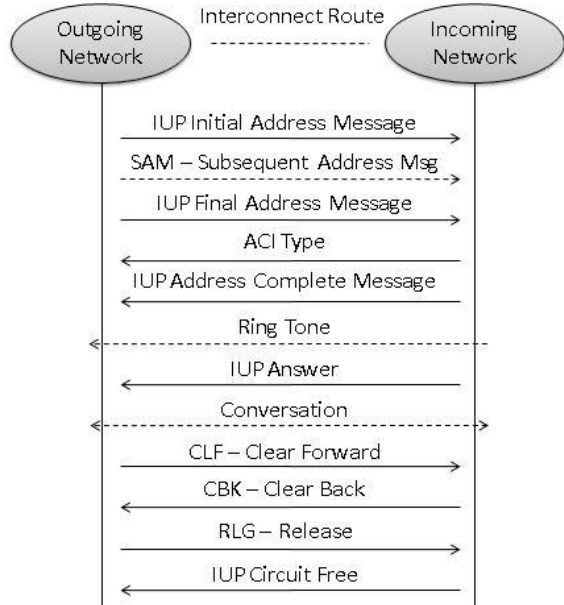


Figure: Basic (Telephony) Service Handling Procedure

Listed below are the supported IUP procedures by MAPS™ IUP–

- Bearer establishment
  - IFAM Protocol
  - IAM (SND) Protocol
  - IAM (SAD) Protocol
  - Subsequent Address Message (SAM)
  - Final Address Message (FAM)
- Call Establishment
  - IUP Basic Call Service: (Service Handling Protocol)
  - Request Service protocol (Service Handling Protocol 2)
  - SASUI Protocol (Supplementary Call Information)
  - ACI Protocol (Supplementary Call Information)
  - Nodal End-to-End Data Protocol (Service Handling Protocol 3)
  - ISDN Call Protocol (Service Handling Protocol 1)
  - Enveloped ISUP Essential (Service Handling Protocol 8)
- Call Supervision
  - Connection not completed – SUBSCRIBER ENGAGED or SUBSCRIBER OUT
- Call Release
  - Connection not completed – CNA procedures
  - Connection not completed – RELEASE procedures
  - Bearer Release Protocols

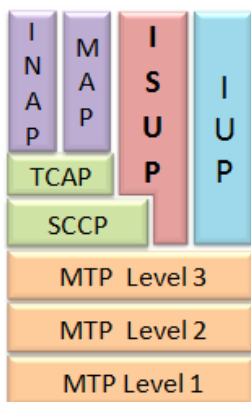


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## Supported Protocol and Specifications



Supported Protocols	Standard / Specification Used
IUP	ND1006:2007/05 TSG/SPEC/006 (IUP) ND1104:2004/11 PNO-ISC/INFO/004 (Proprietary Extensions to IUP) ND1301:2001/03 DPNSS (Digital Private Signaling System No 1 (DPNSS 1)) ISDN User Part (ISUP) UK - ND1007:2001/07 PNO-ISC/SPEC/007
MTP3 (UK)	ITU-T Recommendation Q.703
MTP2 (UK)	T-REC-Q.703-199607

## Buyer's Guide

[XX682](#) - MAPS™ IUP Emulator

[xx600](#), [xx610](#), [xx620](#) - TDM Traffic Options

## Related Software

[XX649](#) – MAPS™ SS7 Emulator

[XX694](#) - MAPS™ MAP (B, C, D, E, F, G, and H interfaces)

[XX647](#) – MAPS™ SS7 Conformance Test Suite (Test Scripts)

[PKS132](#) - MAPS™ MAP Emulation over IP

[XX648](#) – MAPS™ ISDN Emulator

[XX692](#) – MAPS™ GSM -A Interface Emulator

[XX693](#) – MAPS™ GSM- Abis Interface Emulator

[PKS130](#) - MAPS™ SIGTRAN (SS7 over IP)

[PKS135](#) - MAPS™ ISDN -SIGTRAN (ISDN over IP)

## Command Line Interface (CLI)

MAPS™ can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Supported clients include C++, TCL, Python and others.

The TCL "Outgoing\_Nw.tcl" script loads the CLI server script "IUP\_Call.gls" and the MAPS™ profile "Card1TS01" to remotely perform IUP signaling call generation and reception. MAPS™ CLI Server script can also handle traffic functionalities. Various supported traffic user events are send digits/file/tones, detect digits/file/tones, dial, originate call, terminate call, start and stop traffic and so on.

```

C:\Program Files (x86)\GL Communications Inc\USB E1 Analyzer\MAPS Tcl Client\tclsh05.exe
% load "mapscli.tcl"
% source Starttestbed.tcl
Connection Established

Test Bed Started
% Run Outgoing_Nw.tcl "Send_Digits" ""
Starting Placecall Script...
Script Started
Line 1 Placing Call...
IUP Call Initiated
Line 1 Waiting For Response...
IUP Address Complete Received
Line 1 Waiting For Call Connection...
IUP Call Connected
Sending Dtmf Digits from Line1...
TDM Digits Sent
Line 1 Waiting For Call Release...
IUP Release not Received
Line 1 IUP Releasing Call...
IUP Call Released
Script Stopped
%
  
```

## Buyer's Guide...

### Related Software...

[PKS120](#) - MAPS™ SIP

[PKS121](#) - MAPS™ SIP Conformance Test Suite (Test Scripts)

[PKS122](#) – MAPS™ MEGACO

[PKS123](#) – MAPS™ MEGACO Conformance Test Suite (Test Scripts)

[PKS124](#) - MAPS™ MGCP

[PKS125](#) - MAPS™ MGCP Conformance Test Suite (Test Scripts)

### 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

For complete list of MAPS™ products, refer to <http://www.gl.com/maps.html> webpage.



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