

## General discription

ISDN CTG, a new generation call simulators, generates calls to check exchanges and public or private networks. As a Windows application, it is extremely user-friendly.

CTG V5.1 can be used to simulate call traffic at the V5.1 interface, in Access Network simulation mode and in public switch mode.

ISDN CTG supports the management of analogue, basic and primary rate ISDN access interfaces. The function of the two simulators are complementary. Because of this, the various features described in this document refer solely to ISDN CTG.

The Special features of ISDN CTG are described in seperate document.

### **ISDN CTG is an ideal tool for:**

- Assessing equipment performance
- Messuring call completion ratios
- Improving quality of service

## **FUNCTIONALITIES**

## **BENEFITS**

Modular architecture a mix of analogue ports (with caller ID function basic) access ports and primary rate access ports (user and network T2).

Friendly and intuitive use in Windows.

Test configuration backup.

Traffic flow configuration.

Measurement times accurate to  $\pm 1$  ms.

Generation, analysis, measurement of performance criteria.

Changing analysis

Results in ASCII format

Easy and quick programming of scenarios.

Predefined basic scenarios.

Assisted scenario programming, including all of level 3 (C language).

Interworking tests between analogue ports, basic and primary rate access ports.

Quick to learn and operate.

Easy to setup repititive tests.

Very close simulation of real-life environment.

Built to measure performance levels of exchanges under load conditions and networks

Essential to measuring transmission frequency attenuation, G.821 tests.

Verification of changing.

Analysis of results in in various desktop packages.

Test can be adapted quickly and easily.

Tests can be adapted quickly and easily.

Full adaptation to specifics tests including redefinition of: parameters, speech state machine, protocol and protocol message structure parameters.

## Modular and open ended architecture

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**Rack-mount configuration** The rack-mount configuration allows up to 16 interface boards to be installed (eight analogue and eight ISDN boards). The rack-mount version of CTG can be used to create large-scale configurations for running validation and production tests on public exchanges.

**Laptop configuration** The laptop version of CTG offers the same functionality as the rack-mount version. The only restriction is on the number of interface boards that can be installed (up to four).

**Interface board modularity:**

**Analogue :** 4 interfaces per board.

**BRI ports:** 2 or 16 interfaces per board, depending on the functions required on the B channels.

**PRI ports:** 1 or 2 ports for one interface depending on the functions required on the B channels.

**Typical configurations:**

- Up to 32 analogue ports or 8 PRI ports.
- 16 analogue ports 48 BRI ports and 4 PRI ports.

## Functionalities

ISDN CTG is designed on the basis on traffic flows (TF). Each traffic flow function as separate simulator, and is defined by:

- a Group of calling ports
- a group of called ports
- the calling and called scenario
- scenario settings
- traffic load

Each TF is therefore entirely independent of the others and taken together, they provide a traffic simulation that is very close to reality.

**Basic CTG principles: traffic flow** The traffic flows represents the cornerstone of CSG. By their nature, diversity and programmability, they can be used to create call sequences that very closely approximate to the reality of the object under test. Up to 12 different call streams can be set up in a single simulation.

Simulation events (faults system messages, operator messages) are returned, arranged by traffic flow, so that you can quickly determine which directions presenting problems

In addition to the ease with which interworking arrangements can be set up between ports of different types, you can also set up different level 3 protocols between calling and called parties. A simple click of the mouse lets you define the type of protocol to be used ( chosen from protocol libraries).

**Let yourself be tempted by the revolutionary concept of CTG traffic flows, and when you have acquired the taste, you will be permanently hooked.**

## Setting up a simulation

CTG's user-friendliness is such that your simulation configuration can be set quickly and easily. The configuration comprises all various settings needed to run a simulation, and it can be saved for subsequent use. Because of this, the use of saved configurations provides instantaneous access to a simulator ready to run the required simulation.

## Port configuration

The simulator's hardware is based on the automatic recognition of the interface boards installed. The following items can be modified:

- simulated access point (Z, S0, T0 or T2 interface), user or network
- point to point or point to multipoint simulation
- number and type of terminals simulated für passive buses (basic access)
- subscriber numbers, subaddresses, origin numbers
- clock operating mode
- level 2 and 3 protocol settings
- etc...

## Definition of traffic flows

Very intuitively, a traffic flow can:

- handle calling and called ports for complete simulation management
- handle only calling ports to generate calls to another simulator or an automatic line tester
- handle only called ports to receive calls von another simulator

The calling and called ports and the call programs used are selected when building the traffic flow.

The standard call programs supplied with CTG can be used to run tests between groups of calling and called channels of the same type and to run interworking tests.

## Call program settings

Each parameter in the scenario is defined. The setting for the simulator is set for each traffic flow.

In practice, the basic program provide all the parameters you need. Simply double-click the parameter you like to modify and CTG will display a screen matched to that parameter, containing all the optional settings (default, maximum and minimum settings, list of values etc.).

You can also redefine new specific call scenarios (in C), even as far as the complete definition of level 3 of the ISDN protocol.

## Definition of load and traffic type

The traffic load is defined for each traffic flow in terms of distribution and type.

- **Constant distribution:** in this mode, the simulator maintains "n" simultaneous calls at all times.
- **Programmed distribution:** the simulator maintains a load specific as a number of calls per hour. The call traffic is controlled by the value

entered by the operator. If the simulator cannot maintain the specific set point, the operator is notified by a message.

- **Burst mode distribution:** the simulator sends "n" calls, waits for a time "t" then repeats "n" calls and so on.
- **Directed type:** the first "calling" port will always call the first "called" port, and so on.
- **Mixed type:** a calling port will be linked in turn to the different called ports.

## Real time results

Results are summarized in an overview of calls in progress, in screens that show the number of calls made, in progress, completed and failed for each traffic flow, and the detail of the simulation events, providing the following information:

- level 1, level 2 and level 3 events and alarms
- system messages
- protocol trace messages
- protocol and test faults in the B channels

Each event is clearly identified:

- label with context
- time stamp (ms)
- traffic flow
- calling port
- called port
- service, TEI

## Result screening

A very comprehensive set of filters is supplied for a detailed and Simplified analysis of events.

## Analysis of results

Statistical processes can be viewed in table and graphic form so that clear and detailed reports can be produced. All results can be saved in ASCII format so that its analysis and output can be adapted to market-standard office packages like Excel.

## Other features

**Other features are available:**

- B channel or Analogue port monitoring
- Time measurement
- Ports can be disabled manually or automatically (based on number of faults)
- Simulation start and stop times can be deferred
- Simulations can be stopped when a specified number of completed or failed calls is reached
- Automatic simulation restart after mains outage with events
- and results restored.

## Applications

### Exchange validation

**Objective:** to check out the operation and performance claims of the exchange in defined traffic conditions during the development phase.

**Means:** one CTG simulator with T2 and Z and two basic access Ports.

**Tests run:** simultaneous interworking-mode calls between Z and S0, T0 and T2 interfaces at 72á000 calls per hour.

**Results obtained:**

- measure of set-up times
- errored call ratio
- event trace

### Network maintenance

**Objective:** to measure the quality of service provided by the Network in service.

**Means:** one CTG simulator with analogue and / or ISDN access Ports, and a number of line testers looping the speech path.

**Tests run:** CTG calls to the various looping line testers. One or two calls per hour.

**Results obtained:**

- measurement of set-up time

**G.821 tests on speech service:**

- frequency measurement
- attenuation level
- channel outage detection

## Technical specifications

|                               |   |
|-------------------------------|---|
| <b>CAPACITY</b>               | ISDN CTG supports up to sixteen boards (eight analogue boards, eight ISDN boards)<br><b>Analogue ports:</b> four interfaces per board<br><b>Basic rate access:</b> two or sixteen interfaces per board depending on the functions available on the B channels<br><b>Primary rate access:</b> one or two boards for one interface depending on the functions available on the B channels   |
| <b>PERFORMANCE</b>            | 90 simultaneous calls<br>180 simultaneous outgoing or incoming calls<br>68 ports handled simultaneously<br>72 000 calls per hour  |
| <b>CALL GENERATION MODE</b>   | Mixed or directed calls<br>Call distribution: <ul style="list-style-type: none"><li>• constant load</li><li>• programmed load (calls per hour)</li><li>• burst mode</li></ul>   |
| <b>TESTS AND MEASUREMENTS</b> | Frequency generation<br>Programming of one or two frequencies to within 1 Hz in the 300 Hz - 3400 Hz band, at a level of between 0 dBm and -33 dBm (minimum pulse width: 1 ms)<br>Frequency reception<br>Frequency measurement to $\pm 12$ Hz between 300 Hz and 3400 Hz<br>Attenuation measurement between 0 and - 33 dBm to $\pm 1$ dBm<br>Silence tests (up to -33 dBm)<br>Continuity tests (outages detected above 70 ms)<br>Tone detection (programmable interrupt rates, 70 ms minimum)<br>G.821 tests<br>Charging tests (c wire, 12-16 kHz metering pulse transmission)<br>Time measurement to $\pm 1$ ms<br>Routing tests<br>ISDN teleservice tests<br>Detection and transmission of voice messages |
| <b>PROGRAMMING</b>            | Predefined scenarios, Programming in C, Storage of test configurations  |
| <b>RESULTS</b>                | Real time display of events (graphic or numeric), Real time result filtering, Level 3 trace of protocol messages<br>Report printing, Exporting of results in ASCII format   |
| <b>PROTOCOLS</b>              | EDSS1, QSIG<br>In evolution : X25 in D channel and SS7 (ISUP)   |
| <b>SIMULATED INTERFACES</b>   | <b>Analogue ports:</b> 2 wire / 3 wire, Complex or real programmable impedances, Caller ID function<br><b>Basic rate access:</b><br>User S0, User / network T0, U (2B1Q), optional passive bus simulation<br><b>Primary rate access:</b><br>user /network T2, master, slave or external clock   |
| <b>PC CONFIGURATION</b>       | <b>Pentium</b> 400 MHz minimum, 128 Mbytes RAM minimum  |

**Laptop PC:** 43 cm x 25 cm x 32 cm - 10 kg

**Rack-mount PC:** 50 cm x 44 cm x 18 cm - 19 kg

## OPTIONS

S0 - U (2B1Q) 64 kbit /s basic access interface adapter

Help software for editing / modifying scenarios, including the complete definition of level 3 of the protocol

Custom scenario writing service