ISDN Tester/Analyzer
for the Primary Rate Access

WG IBT-20

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For testing the primary rate access (30B+D)

Functions

- **TE and NT simulation**
- **Built-in tracer**
- **Services test, error measurements (G.821)**
- **Results storage**
- **High-impedance protocol analysis**
- **Windows™ PC Detailed Decoder**
- **Supplementary services test**
- **X.25 test in D and B channels**
- **ISDN and X.25 Multiple Calls**

The standard IBT-20 has three basic measurement modes: terminal (TE) simulation, network (NT) simulation and high-impedance BERT. All important accessories are included (carrying bag, measurement cables, charger, etc.).
The standard version of the IBT-20 is designed for use in installing primary rate accesses (TE mode) and PBXs (NT mode). Essential tests in such work, such as BERTs and a services test, are included in this version. There is also a built-in tracer mode.
Two software options are available, allowing powerful, high-impedance protocol analysis with detailed results analysis on a PC, or a complete test of the services offered: Supplementary services (CLIP, CLIR, MSN, etc.) and a test of the X.25 service in the B and D channels (as specified in ITU-T Rec. X.31).
Users can easily add on these two software options.

Applications

- **Installation of primary rate accesses**
- **Installation of PBXs**
- **Maintenance of primary rate accesses and PBXs**
- **Commissioning of ISDN accesses**

When installing a primary rate access, it is necessary to test the accessibility of the ISDN network, verify the availability of the basic services and check the quality of transmission. This is possible with the IBT-20's TE mode.
In case of access problems or if communications cannot be established, the IBT-20's tracer mode makes it easy to isolate the source of the problem (layer 1, 2 or 3) and the problem type (alarm, incorrect message, etc.).
When installing a PBX, it is necessary to test the basic services to ensure that the PBX is properly configured before connecting it to the network. The IBT-20's NT mode is useful for such verification work.
Teams in charge of maintaining ISDN equipment need an analyzer that can perform detailed decoding of the D-channel protocol in high-impedance mode. In order to keep track of any problems that are detected, it is useful to have PC-based software for exhaustive decoding and simplified archiving of measurement results. The IBT-20's maintenance option includes these features.
For network operators and end users who wish to qualify supplementary services and the X.25 service quickly and easily, there is a software option designed for use in commissioning.
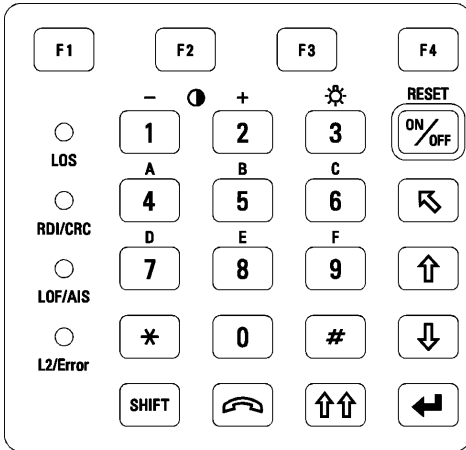
Fig. 1: Keypad

Fig. 2: IBT-20 connectors

User interface

The user interface is menu-based. Users make choices with function keys. Certain keys or key combinations provide quick access to frequently used menus. For example:

📞 Provides direct access to the Phone menu

SHIFT + F2: Provides direct access to test parameters

Four LEDs situated on the front panel provide an immediate indication of layer 1 and 2 problems (LOS, LOF, CRC, AIS).
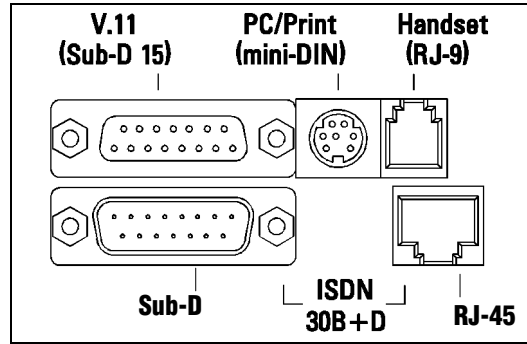
Connectors

The IBT-20 is equipped with two types of connector for making measurements on the primary rate access. **RJ-45** and **Sub-D** (15 pin) connectors are situated on the back of the instrument.

One **adapter cable** is provided with the standard instrument (specify type). The **V.11** connector is used to drop a channel (D or B).

A **mini-DIN** connector is used for the V.24 interface, which is provided to print data or export results to a PC. The telephone handset is connected via an **RJ-9** jack. NiCd cells are charged via a separate jack on the side.

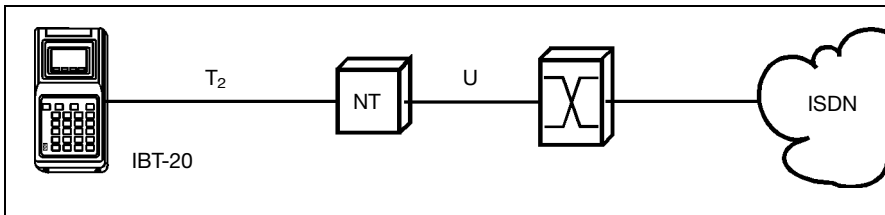## Measurement modes

TE mode

Fig. 3: TE mode (terminal simulation)
The IBT-20 can measure the bit error ratio (end-to-end measurement or simple and extended self-call) or perform a services test (terminal simulation). It is also possible to make measurements in framed (with or without CRC4) or unframed mode.
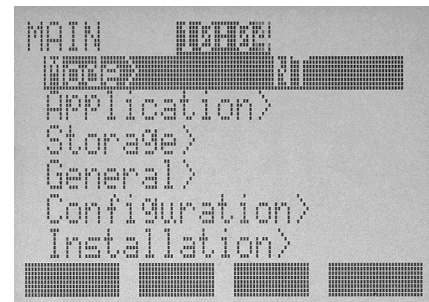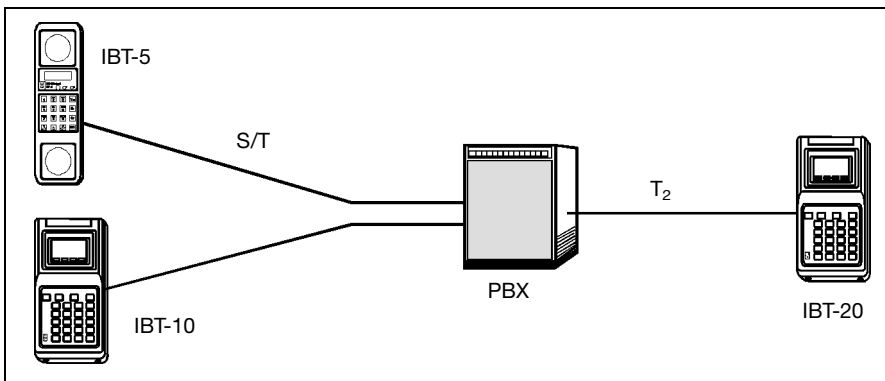
NT mode

Fig 4 : NT mode (network simulation)
This mode includes the services test and error measurement (end-to-end measurement). In both of these modes (TE and NT), the built-in tracer allows display of the D-channel protocol (layers 1, 2 and 3).

Maintenance and Commissioning software packages

These two packages are used to record measurement results.

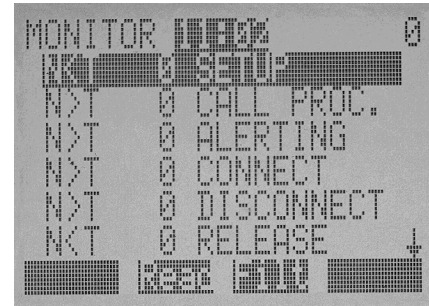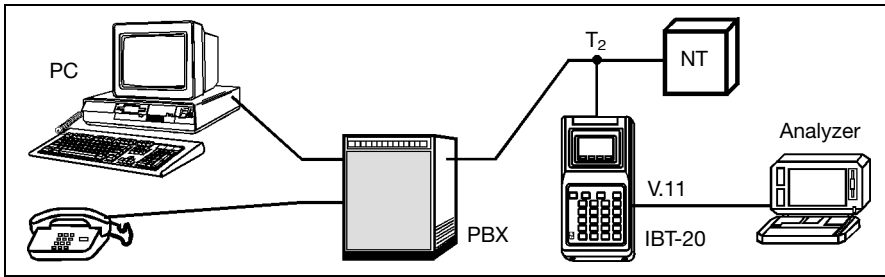## Maintenance package

1. Protocol analysis

Fig. 5: High-impedance analysis
The IBT-20 analyzes the D and X.25 protocols in high-impedance mode. One B channel can be dropped via the V.11 interface for data analysis (e.g. with DA-5). In high-impedance mode, the IBT-20 can also measure bit error rates (Hi-Z BERT mode).

2. Decoding software for Windows™
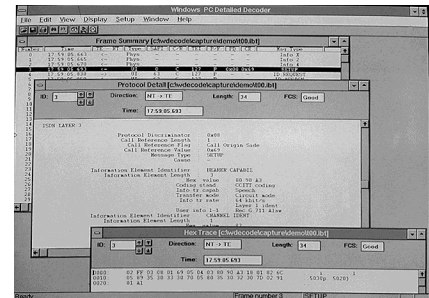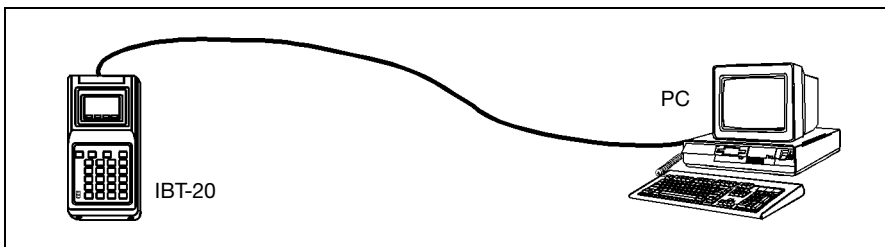
Fig. 6: Exporting results to a PC
Results can be stored and transferred to a PC for more detailed decoding. *Demonstration software* is available free from the WG Website (http://www.wg.com).

Commissioning package

1. Supplementary services test
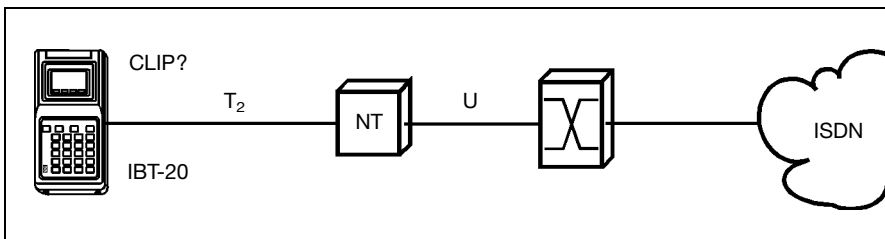
Fig. 7: Test of the CLIP supplementary service (example)
The IBT-20 automatically tests the supplementary services for protocols compatible with EDSS-1. An automatic test is also possible.

2. X.25 service test
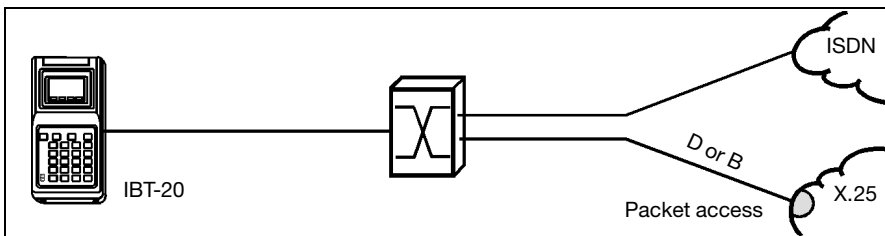
Fig. 8: IBT-20 simulating an X.25 terminal
The IBT-20 tests the accessibility and performance of the X.25 service in the B and D channels.

Primary rate access S/T (30B+D)
Electrical characteristics . . . . ITU-T Rec. I.431, ETS 300 011
Connectors . . . . RJ-45 (ISO 10173) and SUB-D (15 pin)
Mode . . . . high-impedance, 120 Ω and 75 Ω
Protocols . . . . EDSS-1, Q.931/Q.921, 1TR6, 1TR67, TPH 1856*, VN4, Swissnet 3, QSIG
* TE mode only

Serial interface . . . . mini-DIN
**Handset interface** RJ-9
Graphics screen . . . . 8 lines × 21 characters
Keypad . . . . 24 keys
Key size (in mm) . . . . .10 × 7

Indication of alarms (LOS, RAI, CRC, LOF, AIS, E bit, etc.) and errors (code, bit) via LED.

Results import/export . . . . .Kermit protocol
Bit rate . . . . 9600 bit/s

Standard version for installing ISDN lines and equipment

Telephone function
Choices . . . . address, sub-address, channel, service, self-call, loop command
Memory . . . . 10 numbers
Recall feature
Automatic call acceptance

BERT in TE, NT and high-impedance modes
(ITU-T Rec. G.821)
Test sequences for measuring error ratio
Pseudo-random bit sequences . . . . 2^{11}–1, 2^{15}–1 (inverted, non-inverted)
16-bit programmable word
Meas. duration . . . . 1 min, 15 min, programmable, infinite
Measurement . . . . conforms to ITU-T Rec. O.152
G.821 evaluation . . . . ES, SES, EFS, US, DM

Services test
BC (bearer capability), HLC/LLC (high-layer compatibility, low-layer compatibility)
pre-defined and/or user-defined
all types of BC and teleservices

Protocol analysis in TE or NT mode: Tracer
Analysis: layers 1, 2 and 3
Indication of direction of transmission

Filtering . . . . SAPI, TEI, CR, frame length, RR
Analysis resolution . . . . 1 ms

Transport
Carrying bag with room for IBT-20 and accessories (handset, charger, downloading cable, measurement cable and documentation).

General specifications

P o w e r . . . . NiCd cells
or dry batteries
Field life, NiCd cells . . . . approx. 6 hours
Powering from a.c. line/charger . . . . .yes
Charging time . . . . 9 hours

A m b i e n t   t e m p e r a t u r e
Nominal range, use . . . . 0 to +45 ℃
Limits range, use . . . . −5 to +50 ℃
Storage and transport . . . . −25 to +70 ℃

D i m e n s i o n s (w × h × d) in mm . . . . .105 × 60 × 200

W e i g h t , standard instrument . . . . approx. 1 kg

Options: Software packages

The File Management option is included in both packages.
Storage capacity . . . . up to 100 files
Capacity . . . . 1 MB

Maintenance package

Protocol analysis, high impedance
Analysis: layers 1, 2 and 3
Indication of direction of transmission
Filtering . . . . SAPI, TEI, CR, frame length, RR
Analysis resolution . . . . .1 ms

Windows™ PC Detailed Decoder
Detailed decoding of trace and monitor files.
All test types can be downloaded to a PC for better traceability.

Commissioning package

Test of supplementary services (EDSS1, 1TR67, SN3)
MSN, SUB, UUS, DDI, CLIP, CLIR, COLP, COLR, AOC, TP, HOLD, CUG, CFU, CFB, CFNR.

X.25 test (conforming to Rec. X.31, cases A and B)
X.25 call setup (SAPI = 16)
Quality measurements:
Transmission: packet loss, errors.
Protocols: D-channel tracer, statistics for layers 1, 2 and 3.
Access: D and B channels.

To be released soon:
Multiple Calls software
Up to 30 ISDN or X.25 calls simultaneously.

Ordering information

WG IBT-20 basic instrument　　　　**BN 7531/40**
(TE and NT simulation)
includes: NiCd cells, carrying bag and all accessories (handset, cables, documentation, etc.).

Software packages

Maintenance package　　　　BN 7531/92.12
includes: Protocol analysis, File Management option, Windows™ PC Detailed Decoder.

Commissioning package　　　　BN 7531/92.13
includes: File Management option, X.25 tests and supplementary services test for EDSS-1.

Complete package　　　　BN 7531/92.14
includes: Protocol analysis, File Management option, Windows™ PC Detailed Decoder, X.25 tests and supplementary services test for EDSS-1.

QSIG protocol　　　　BN 7531/91.33

Menu available in different languages:
English, French, German, Spanish

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Communications Test Solutions

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