

# **WG IBT-5**

## **Basic Rate Access**

### **ISDN Tester**

BN 7522/10, BN 7522/20 and BN 7522/70  
Series CE ...  
Software version 3.01

## **Operating Manual**

BN 7522/98.21

**Wandel & Goltermann**  
Communications Test Solutions



Please direct all inquiries to your local Wandel & Goltermann sales company. The addresses are given at the end of this handbook.

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## Prior warning!

An 'NT Simulation' option is now available. This option is compatible with IBT-5 instruments of the CE series or more recent equipped with software version 3.01 and an accu-pack.



**U and S<sub>0</sub> interfaces must not be connected simultaneously.**

**Disconnect the network interface before opening the instrument.**

Now that you have received your IBT-5, you should register your warranty.

**PLEASE FILL OUT THE WARRANTY FORM AT THE END OF THIS MANUAL AND FAX OR MAIL IT TO WANDEL & GOLTERMANN.**

This will help us to keep you informed about future instrument upgrades, etc.

# Introduction

With your purchase of the IBT-5, you have obtained an easy-to-use, robust and compact tool for intensive and daily measurement on the ISDN basic rate access. The IBT-5 is designed to reduce the time taken to install ISDN lines and equipment. As easy to use as a telephone, it also enables rapid diagnostics of the line under test. The IBT-5 is always ready for use thanks to its dual power supply mode. It can be powered from the tested access or through its rechargeable batteries.

You will see that the IBT-5 is a solid investment for the future. ISDN is subject to constant development; new protocols and applications (or simple improvements to existing IBT-5 features) can be loaded by an easy software update facility.

Additional information on the IBT-5 application or on other IBT family products can also be requested from your local representative. A list of these representatives is found at the end of this manual.

# 1. Product Description



**Fig. 1-1:** IBT-5 general overview

## 1.1 Keyboard

### 1.1.1 General key description

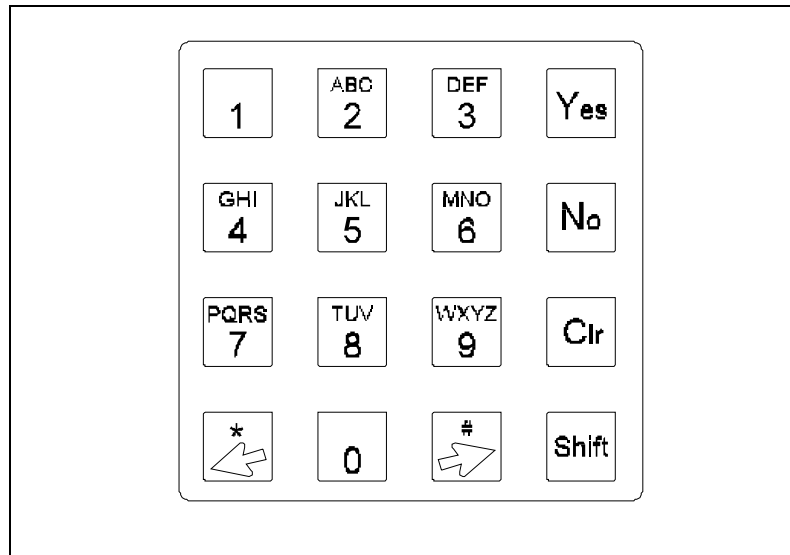


Fig. 1-2: Keyboard overview

### 1.1.2 Alphanumeric keys

Two types of action are available with these keys:

- Editing an ISDN address with the '0' to '9', '\*' and '#' keys,
- Entering a SPID (American protocols only: DMS-100, AT&T Custom and N-ISDN), an NUI, X.25 call data or name in the phone book with the '0' to '9', '\*', '#', A or Z and 'space' keys.

Alphabetical characters are available with the **Shift** key when entering an **NUI or X.25 call data** or directly when entering the names in the phone book. Each key has a relative timer in order to scroll the characters: if the **Shift** key and the alphanumeric key are maintained pressed, it scrolls through the number and the letters (circular scrolling). Release to select required number or letter.

### 1.1.3 The Yes key

This contextual key has the following actions:

- Switch on the instrument (when battery-operated),
- Enter a menu,
- Validate a choice,
- Give a positive answer,
- Validate a field or a parameter.

### 1.1.4 The No key

This contextual key has the following actions:

- Switch off the instrument (when battery-operated), **by pressing the key for 3 seconds**,
- Return to the previous user interaction,
- Unvalidate a choice,
- Give a negative answer,
- Interrupt a current measurement or a call and return to the last parameter entry.

### 1.1.5 The Clr key (Clear)

This contextual key has the following actions:

- Delete a character or all characters of a field when used with the **Shift** key,
- Return to the main menu,
- Interrupt a current measurement or a call,
- Unvalidate a choice.

### 1.1.6 The Shift key

This key enables access to the '#', '\*', 'space' (when used with the '1' key) and to the alphabetical characters. The activation of the **Shift** key is sequential and simultaneous.

The **Shift** key is used as a Recall function when simultaneously pressed with the **Yes** key. **It can also be used to activate or deactivate the backlighting of the screen if pressed simultaneously with the '0' key.**

### 1.1.7 The key

This key is used to scroll menus, parameters or values (left direction). If used simultaneously with the **Shift** key, it gives access to the '\*' key.

### 1.1.8 The key

This key is used to scroll menus, parameters or values (right direction). If used simultaneously with the **Shift** key, it gives to access to the '#' key.



## 1.2 Display

### 1.2.1 General description

All fields are displayed with a maximum size of 2 lines of 16 digits each.

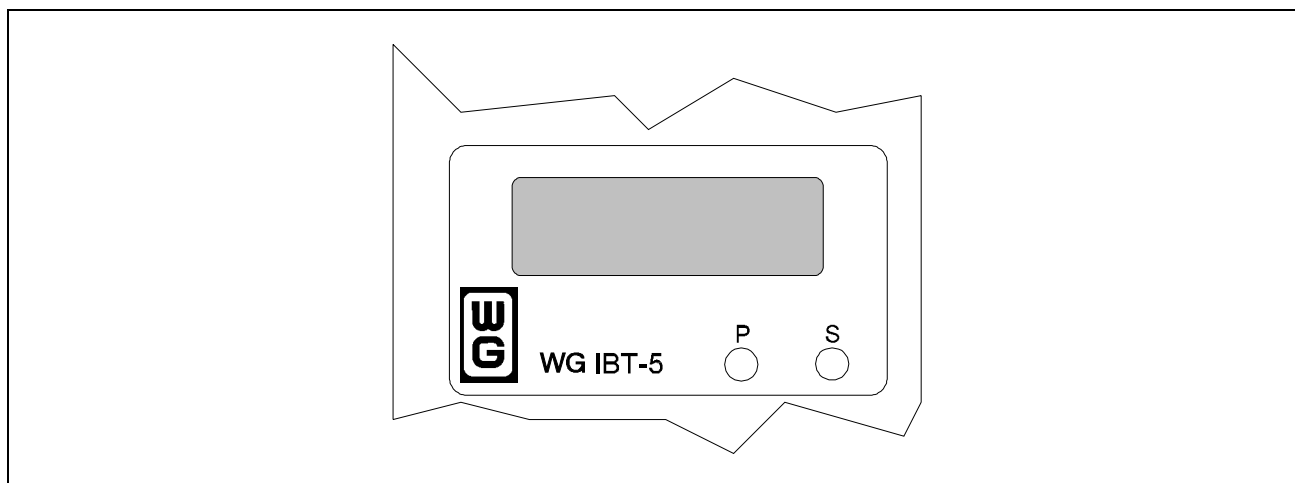


Fig. 1-3: User interface overview

Users can activate or deactivate the backlighting of the screen by simultaneously activating the **Shift** and '0' keys.

**Important note:** For reasons relating to power consumption, the backlight should not be activated in restricted mode (LED 'P' red).

When keying in an address, if the field length exceeds 15 digits, only the current part of the field is displayed.

For example if the 'Own Address' field is '12345678901234567890123456', the display indicates the following, depending on the location of the cursor:

The first digit is visible

OWN ADDRESS
12345678901234➔

The last digit is visible

OWN ADDRESS
←567890123456__

**Identifiers:**

'?'	indicates a question step field (answer by <b>Yes</b> or <b>No</b> ).
'!'	indicates that a message acknowledgement is expected, simply press the <b>Yes</b> key for acknowledgement.
'∞'	indicates a temporary status.
'←' and '→'	indicate a scrolling field.
'_'	indicates that the user has to fill in a field.

**1.2.2 Languages**

French, English, American English, German and Japanese are the languages available in this version. **To switch dynamically from one language to another on the IBT-5, type in the sequence '1 2 3' in the INFORMATION main menu and select the required language.** Other languages will be available in **future** versions. The documentation is also available in English, German and French (Operating manual and Quick User Guide).

## 1.3 Power supply

### 1.3.1 Operating mode

Three operating modes are available on the instrument:

- Connection to the network supplying power for the  $S_0$  and U interfaces. The IBT-5 functions without rechargeable batteries on this type of bus (normal and restricted mode).
- Connection to the network which does not provide the power supply at both  $S_0$  and U interfaces: the instrument is internally powered through batteries (option) and has an autonomy of at least 8 hours. The batteries can be recharged after and during measurements through a specific charger.
- Connection to an ISDN equipment with NT simulation (option): the instrument is powered by the accu-pack (option).

The instrument recognizes automatically if it is powered from the tested access or not.

The IBT-5 is compatible with PS1 and PS2.

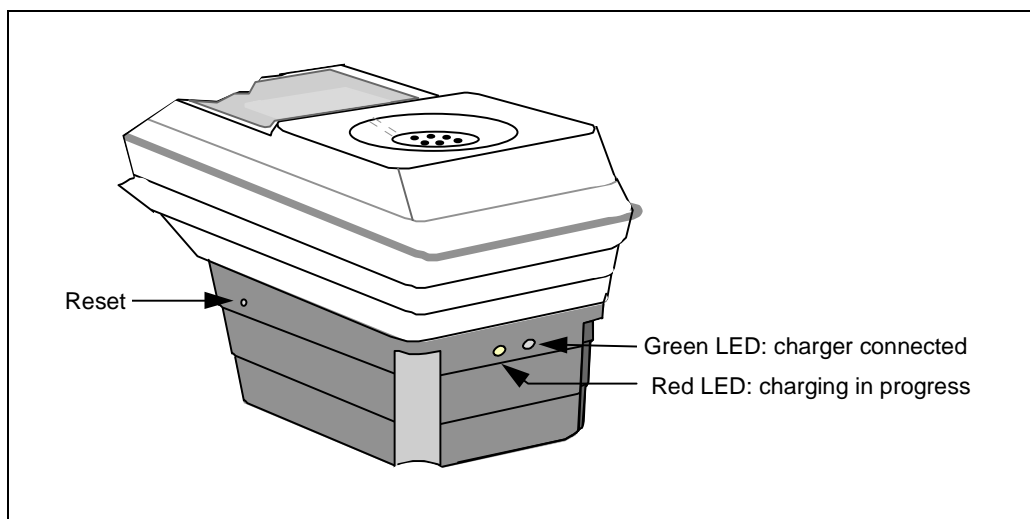
### 1.3.2 Recharging the batteries in the accu-pack

Users are informed of battery rundown half-an-hour before the automatic shutdown of the IBT-5. When the LEDs flash orange for 2 seconds in every 60, it means that the charger should be plugged in so that the test sequence in progress can be completed.

The LEDs on the rechargeable batteries inform the user when the charger is connected and when a voltage is present (green LED) and indicate the charging activity (red LED on: charging, red LED off: charging finished).

**Important:** After a full discharge (red LED off), the 'Reset' button on the rechargeable batteries in the accu-pack must be pressed with a pointed tool after connecting the charger (see figure 1-4).

As with any NiMH rechargeable battery, one or two charge and discharge cycle(s) should be run in order to achieve maximum operating time.



**Fig. 1-4:** Recharging the batteries

### 1.3.3 Battery characteristics

Autonomy .....8 hours minimum on the S interface

Recharging time .....3 hours maximum

Type of batteries..... NiMH / 1800 mAh

Emission ..... complies with EN 50081.1, Generic emission standard - Jan 1992

Immunity ..... complies with EN 50082.1, Generic immunity standard - Jan 1992

The charger/batteries interface operates on SELV (Safety Extra Low Voltage).

When using the external battery charger, the charger must be immediately identifiable and easily reached. The charger plug is used as a primary cut-out device.

## 1.4 Power on/Power off

Power on and power off procedures **depend on** the bus power supply and the instrument configuration (see table below).

Configuration	Power on	Power off
IBT-5 without batteries/ remote power supply available	Automatic when connected to the bus	Automatic when disconnected from the bus
IBT-5 battery-operated/ remote power supply available	Automatic when connected to the bus  <b>Manual: press the Yes key when disconnected from the bus</b>	Automatic once disconnected from the bus
IBT-5 with batteries/ remote power supply not available	Manual: press the <b>Yes</b> key	Manual: press the <b>No</b> key for 3 seconds

**Tab. 1-1:** Power on/off

The instrument is switched off automatically if not used for **5 minutes** and if the following conditions are fulfilled:

- Remote power supply **by bus** is not provided,
- The instrument is not in LOOP BOX mode,
- No call established **or no test in progress**.

**Important note:** The remote power supply has priority over the battery power supply, which means that the instrument uses the battery power supply (**accu-pack**) only if the remote power supply is not present (see paragraph 2.2.2.1 for more details).

## 1.5 Reset Procedures

The IBT-5 has a software reset procedure which retains the configuration if the **Yes** and **'0'** keys are pressed simultaneously.

To reset the configuration to the default values, the RESET field has to be validated in the CONFIGURATION menu.

## 1.6 LEDs

The IBT-5 has two LEDs located above the keyboard. The **Power supply LED** is marked with the letter 'P'; the LED relating to the L1 Status is marked with the letter 'S'. The LEDs have the following meanings:

Stimulus	LED 'P'	LED 'P' colour
No remote power detected	LED off	-
Remote power detected normal mode	LED on	Green
Remote power detected restricted mode	LED on	Red

**Tab. 1-2:** LED 'P' meaning

Stimulus	LED 'S'	LED 'S' colour
Layer 1 activation pending*	Slow blinking	Green
Layer 1 activated	LED on	Green
Alerting (incoming calls)	Blinking 1-1	1 Green-1 Red
Bit error alarm during a BER test	LED on for 3 seconds	Red

**Tab. 1-3:** LED 'S' meaning

**\* For the U interface:**

- Layer 1 is established on the U interface, not on the S interface.
- Some public switches do not provide instantaneous activation. In this case, the user must wait until the LED 'S' stops blinking before running a test (LED lit).
- In case of a defect, some public switches turn the remote power off and on, and ask for a loop. In this case, the IBT-5 provides the information via the red LED 'S' then restarts the activation process.

**For IBT-5s equipped with rechargeable batteries** (option possible from CC series onwards): If the LEDs flash orange for 2 seconds in every 60, the charger should be plugged in.

## 1.7 Buzzer

The buzzer is used to signal events to the user. These events are organized in three classes depending on their priority:

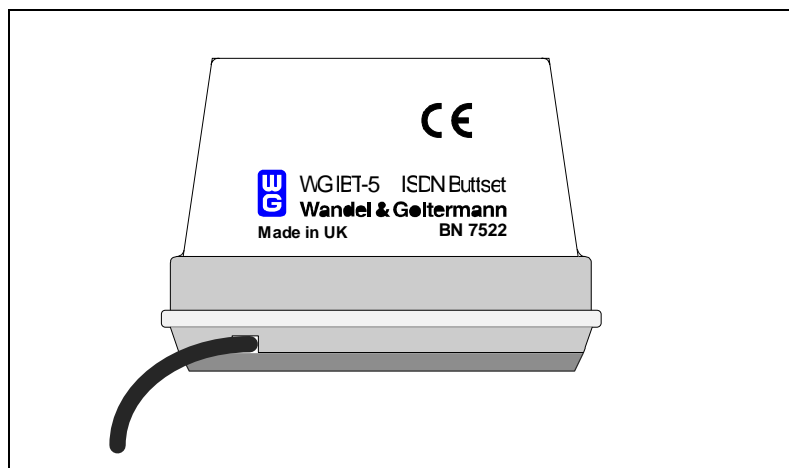
- 1**            Test errors: low-pitched long sound
- 2**            Key not allowed: low-pitched medium sound
- 3**            Ready state and validation acknowledgment: high-pitched brief sound

The SOUND SIGNS configuration parameter is used to select the event classes to be indicated by the buzzer.



## 1.8 Interfaces

### 1.8.1 IBT-5 / S<sub>0</sub> interface



**Fig. 1-5:** View of S<sub>0</sub> interface

In this configuration, the IBT-5 enables connection at the S<sub>0</sub> interface.

#### 1.8.1.1 External cable

The 1.5 m S<sub>0</sub> cable is terminated by a RJ-45 connector. This cable is connected to the instrument via an internal connector. To facilitate replacement of the external cable, the internal connector is accessed by a hatch and uses an original blocking system (registered Depaepe<sup>®</sup> system).

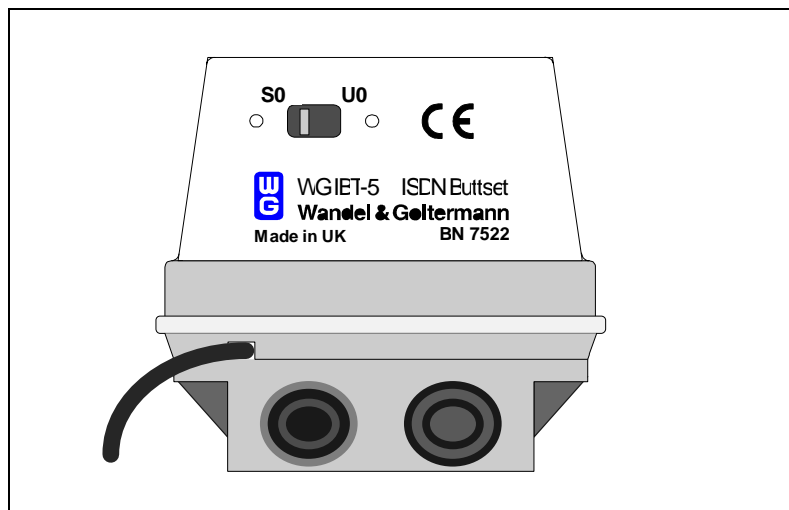
#### 1.8.1.2 Terminating resistor

The terminating resistor is switched through a configuration parameter (standard 100 Ohm or High impedance).

#### 1.8.1.3 S<sub>0</sub> Basic Rate Access characteristics

Electrical characteristics .....	To Rec. ITU-T I.430, ETS 300 012
Connection .....	1.5 meter cable with 1 RJ-45 male connector
Impedance .....	100 Ohm / high
Safety Declaration .....	SELV (ISDN Basic Rate Access)

## 1.8.2 IBT-5 / S<sub>0</sub> and U interfaces



**Fig. 1-6:** View of S<sub>0</sub> and U interfaces

In this configuration, the IBT-5 enables connection at the S<sub>0</sub> and U interfaces. [The IBT-5 is available in two versions for the U interface - 2B1Q or 4B3T line code.](#)

The S<sub>0</sub> interface is exactly the same as for the IBT-5 with S<sub>0</sub> interface only (see paragraph 1.8.1).

### 1.8.2.1 External cables

Besides the S<sub>0</sub> cable, this configuration gives the user two removable 1.5 meter U cables which are terminated by two pairs of banana connectors (male).

### 1.8.2.2 S<sub>0</sub> Basic Rate Access characteristics

See paragraph 1.8.1.3.

### 1.8.2.3 U Interface characteristics

Interface.....	2-wire
Line code .....	2B1Q or 4B3T
User bit rate .....	144 kbps
Connection .....	removable 1.5 meter cable with 2 pairs of banana connectors (male)
Safety Declaration .....	TNV (Telecom Network Voltage)

The IBT-5 conforms to the following layer 1 specifications:

- ANSI, T1.601-1991,
- CNET, Spécification Technique ST/LAA/ELR/DNP/822,
- CNET, Spécification Technique C32-11,
- ITU-T, Rec. G.961,
- ETSI, ETS 300 012,
- ETSI, ETR 080.



**U and S<sub>0</sub> interfaces must not be connected simultaneously.**

## 1.9 IBT-5 summary features

This instrument has terminal simulation features ([TE mode](#)) as described below.

When the IBT-5 includes the 'NT simulation' option, the device can simulate ISDN. This simulation is available for the following protocols: EDSS-1, 1TR6, 1TR67, Swissnet 3, VN3, VN4 and TPH1962.

### 1.9.1 Coding law

The IBT-5 offers a software switch between the A and  $\mu$  coding laws. These two non-linear compression functions are mostly used today in North America and Asia for [the](#)  $\mu$  coding law and in Europe for [the](#) A coding law (the default value is the A coding law).

### 1.9.2 Protocols

To operate on the network, the IBT-5 must be equipped with the protocol of the network to which the instrument is connected. Up to 4 protocols are available simultaneously on the IBT-5 [basic version](#).

The following protocols are available:

EDSS-1, 1TR6, VN3, VN4, Swissnet 2 and 3, BTNR191, TPH1962, NTT, Q.931, [QSIG](#), Telenokia, Televerket, V1, 1TR67, AT&T Custom, N-ISDN, DMS-100 functional, TN-1R6 and Cornet-T® (registered trademark of Siemens AG).

[It is possible to modify the list of protocols in the CONFIGURATION menu at all times. Simply enter the sequence '1 2 3' directly below the INFORMATION menu and follow the instructions. A maximum of 7 protocols will then be available.](#)

Due to the arrival of new protocols, this list is subject to changes. Please contact your local representative for information.

### 1.9.3 Interface

The IBT-5 can be connected to three main types of **logical** interface:

- The interface with automatic TEI allocation is the most common one.
- The interface with a fixed TEI (TEI = 0) is generally used to connect small PBXs to the network.
- The last interface is a permanent link. In this case, the interface no longer enables switching within the ISDN network. A permanent link exists between this interface and the remote interface.

The instrument enables you to select 'PMP (Dyn TEI)', 'PP (TEI=0)' and 'No Protocol' for a permanent link.

The autoconfiguration function is available through the 'Auto-Config.' value of the TEI parameter. In this case the IBT-5 automatically attempts to configure this parameter at startup.

### 1.9.4 Selection of U or S<sub>0</sub> interface

The external switch switches between U or S<sub>0</sub> interfaces.

### 1.9.5 DTMF

The IBT-5 can generate voice frequencies (DTMF, Dual Tone MultiFrequency). This function is available once a phone call is established (speech or Audio 3.1 kHz) **on incoming or outgoing calls**.

### 1.9.6 Self-call

By calling his own address (and sub-address if necessary), the user can perform a self-call in PHONE CALL, BIT ERR RATE or automatic TEST OF SERV modes. **Once the call has been accepted**, the self call is indicated by displaying both connected channels (2B).

The self-call function is not available when the IBT-5 is being used for NT simulation.

### 1.9.7 LOOP BOX mode

When used as a loopbox, the IBT-5 automatically accepts incoming calls and is also compatible with IBT family UUS (User to User Signalling) remote commands. This feature enables the IBT-5 to act like a loopbox at the U and S<sub>0</sub> interfaces (see paragraph 2.2.3.6 for more information).

### 1.9.8 PHONE CALL mode

The IBT-5 can be used like an ordinary telephone to send and receive calls. The instrument receives calls only in the MAIN MENU.

It authorises the testing of the Keypad facilities during call set-up. The Keypad data ('0' to '9', '\*', '#') is encoded in place of the called address in the SETUP.

In addition to charging information, the IBT-5 displays, for example, the calling number (even if the call has been transferred) or the reason for the non-display of the number.

### 1.9.9 PHONE-BOOK mode

This mode allows the user to store up to 6 addresses, which can be used in other menus by means of a phone book range number.

### 1.9.10 TEST OF SERV mode (Test of services)

#### 1.9.10.1 Test of Bearer Capability (BC) / teleservices (HLC & LLC)

The IBT-5 allows you to check which ISDN services are available on the access being tested. This is very important when commissioning ISDN Basic Rate Accesses, especially if the test is carried out on the user side of a PBX. ISDN is undergoing continuous development and many new services requiring testing will soon be arriving on the market. **New software supporting these new tests can be added to the IBT-5 at a later date by means of a software upgrade (see paragraph 1.9.13).**

Two types of test of services are available in the instrument:

- Manual test in the PHONE CALL menu: the following services are tested independently: Audio 3.1 kHz, Speech, Speech BC, Data BC etc.
- Automatic test of services with two modes (with and without charge), Audio 3.1 kHz, fax G4, speech, data (64K), data (56K), Teletext, Videotex etc.

In the 'Free of charge' mode, the service is considered as passed if the message SETUP ACK is received. Only the availability for outgoing calls is checked.

In the 'Charged' mode, the service is considered as passed if the message ALERTING or CONNECT is received. The availability of the service for both outgoing and incoming is checked.

In the automatic TEST OF SERV mode, the test is carried out in two steps, first the BC only and then the BC and HLC/LLC combined.

#### 1.9.10.2 X.25 in D-channel test (option)

**The IBT-5 can be equipped with the 'Commissioning' option including the X.25 in D channel test. When this option is included in the IBT-5, the device simulates X.25 terminal equipment connected on the S<sub>0</sub> interface of the ISDN. Users must know the X.25 parameters of the equipment under test in order to validate them in the IBT-5. Access to the X.25 network via the D channel using the IBT-5 complies with the ITU-T X.31 standard, case B, with and without call presentation. The option is used to check the quality of the X.25 service by setting up a call and analysing the quality of reception of a previously-transmitted data packet. A self-call can also be run, as can Layer 2 and 3 tests. A test can also be run on data fields. These tests are also enabled during a call to a remote device implementing a loop (IBT family testers or another device capable of looping onto X.25 call packet recognition). When integrating the 'Commissioning' option, the IBT-5 provides a very quick means of diagnosing ISDN problems (the network supplies a**

Layer 2 frame service) or of diagnosing problems caused by the packet network undertaking the end-to-end transfer of X.25 packets (Layer 3).

#### **1.9.10.3 Supplementary services test for EDSS-1, SN3 and 1TR67 (option)**

The IBT-5 can be equipped with the 'Commissioning' option which includes the supplementary services test.

The IBT-5 can be used to test the following:

- calling addresses (CLIP and CLIR),
- connected addresses (COLP and COLR),
- sub-addressing (SUB),
- advice of charge (AOC),
- terminal portability (TP),
- hold (HOLD),
- call forwarding functions (CFU, CFB, CFNR),
- Closed User Group (CUG).

After activating the supplementary services to be tested (available on the network) in the CONFIGURATION menu, the IBT-5 simply runs an automatic test in order to validate the actual presence of these services from the access being tested.

#### **1.9.11 BIT ERR RATE mode (transmission quality test)**

The BIT ERR RATE mode is used to measure the transmission quality of ISDN connections (leased lines or switched circuits). Brief measurements are sufficient during maintenance and installation operations. The instrument performs a BER test with G.821 analysis (no slip detection) for both single call and self-call (available for 56 and 64 kbps). It is then possible to insert errors manually during a test in order to test the network's ability to support such errors.



### **1.9.12 NT Simulation mode (option for EDSS-1, 1TR6, 1TR67, Swissnet 3, VN3, VN4 and TPH1962)**

When the IBT-5 includes the 'NT Simulation' option, it can simulate ISDN at the  $S_0$  interface. This simulation is useful when commissioning ISDN equipment (e.g. a PBX). Before connecting up an ISDN PBX, a functional test must be carried out. Thanks to the IBT-5, it is possible to set up a call with the various terminals connected behind the PBX and perform very simple services and addressing schedule tests.

All the tests available for the 'Terminal' simulation can be used for the 'Network' simulation (NT Simulation) except the self-call function.

This operating mode requires the use of the NT cable adapter (S2500) and the accu-pack.

### **1.9.13 Interrogation, activation and deactivation of call forwardings**

By implementing the 'Generic Functional Protocol', the IBT-5 enables users to obtain the actual configuration of supplementary services relating to call forwarding unconditional (CFU), busy lines (CFB) or no-response (CFNR). In addition to interrogation, a user can activate and deactivate each call forwarding using the addressing and service criteria of his choice on a given access.

### **1.9.14 D-channel Trace**

The instrument displays the information of each protocol layer of the D channel and the causes of possible failure.

### 1.9.15 Software upgrade

The IBT-5 is a solid investment for the future. In order to cope with continuing developments in the world of ISDN, the IBT-5 integrates a quick, easy software upgrade facility. The upgrade enables you to obtain new protocols and applications and to take advantage of all new and improved functions. A user-friendly system provides for the exchange of the PROM.

**To upgrade your IBT-5, follow the instructions delivered with the upgrade kit.**

**Important note:** Disconnect the instrument from the network before proceeding with the upgrade and make sure that the jumper is correctly positioned (see figure 1-7).

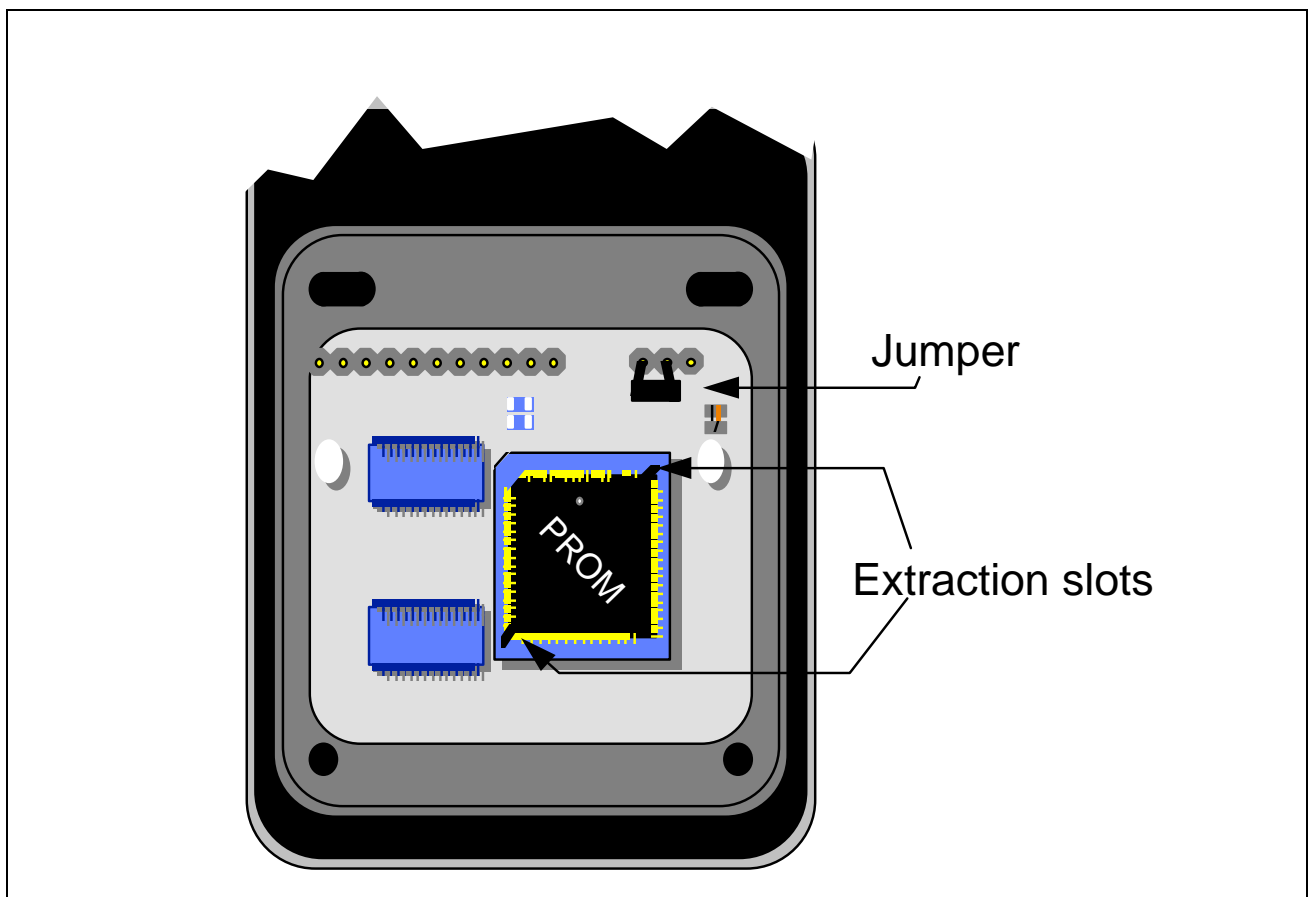


Fig. 1-7: Rear view and PROM location of the IBT-5



**Disconnect the network interface before opening the instrument.**

## 1.10 Accessories and options

### 1.10.1 Accessories

Accessories are available with the IBT-5 such as:

- Carrying bag,
- Quick User Guide,
- Operating manual,
- U cable (for U + S<sub>0</sub> version),
- NT adapter (when the 'NT simulation' option is requested).

### 1.10.2 Options

#### **Factory-installed options (to be ordered with the instrument)**

Accu-pack (rechargeable batteries and universal charger unit) .....	BN 7522/90.22
Commissioning .....	BN 7522/92.13
NT Simulation .....	BN 7522/92.15
Available from the CE series and software version 3.01 upwards	

#### **Upgrade options (to be installed later)**

Upgrade kit for the 'Commissioning' option .....	BN 7522/92.23
Upgrade kit for version 3.01 .....	BN 7522/92.30
Accu-pack upgrade kit .....	BN 7522/90.09
Compatible from the CC series and software version 2.01 upwards	

## 1.11 Compatibility

### 1.11.1 Electromagnetic compatibility

Emission .....	according to EN 50081-1
Immunity .....	according to EN 50082-1
Safety .....	according to EN 60950 (chapter 6 including EN 41003) ETS 300 047-2

### 1.11.2 Environmental conditions

Permitted ambient temperature (to ETS-300-019-1 Class 7.1)	
Nominal temperature range of use .....	-5°C to +50°C
Transport and storage temperature range.....	-25°C to +70°C
Humidity.....	20 to 80% r.h., <25 g/m <sup>3</sup> absolute

## 2. IBT-5 Use

### 2.1 Concept

The scrolling menus make the IBT-5 very simple to use. Whether **selecting a menu or parameter value, or running a test**, the IBT-5 has been ergonomically designed to make handling as easy and fast as possible.

Particular effort was put into making the IBT-5 as flexible as possible. This is why the IBT-5 offers an innovatory function i.e. configuration customization. It is no longer necessary to modify the values of parameters linked to various tests. Instead, the IBT-5 allows the user to choose the parameters for which the values can be modified just before starting a test. It is then possible to 'lock in' the parameter values considered to be 'set' and to keep modifiable those which will probably be subject to frequent change during the running of a test. The user only specifies the value of these modifiable parameters when running a test based on interactive parameters. This flexibility allows each IBT-5 user to customize his device depending on the different types of tests he may have to carry out.

The parameters and values related to the CONFIGURATION menu are as follows:

MODE*	TE			NT													
L3 PROTOCOL	EDSS-1**			BTNR191**		Swissnet 2**			...			Interactive					
OWN ADDRESS	27 digits max			for American protocols only										Interactive			
SPID**	30 char. max																
B CHANNEL	Bx (B1 or B2)			B1		B2										Interactive	
S0 IMPEDANCE	100 Ω			High													
TEI	PMP (TEI Dyn)			PP (TEI = 0)		No Protocol			Auto-Config.			Interactive					
X.25 PARAM***	Standard Profile			User Profile													
BERT DURATION	1 min		15 min		1 h		24 h		Infinite			Interactive					
SERV TEST MODE	Free of Charge			Charged												Interactive	
SUPP SERV TEST**	CLIP A D	CLIR A D	COLP A D	COLR A D	SUB A D	AOC A D	TP A D	HOLD A D	CFU A D	CFB A D	CFNR A D	CUG A D					
SERVICE	Speech		Audio 3.1 kHz		depends on the L3 protocol										Interactive		
LOOP BOX MODE	All Incom Call			WG Remote												Interactive	
CALLED ADDRESS	27 digits max			or phone book													
POWER SUPPLY	Net. Priority			Batt. Priority													
SOUND SIGNS	Full			All Errors												Test Errors	
USER-USER SIGN	Available			Not Available												Interactive	
CODING LAW	A Law			Mu Law													



Default values

For SUPP SERV TEST: A: test activated, D: test deactivated

\* Available only with the 'NT Simulation' option

\*\* According to the ordered configuration

\*\*\* Available only with the 'Commissioning' option

Fig. 2-1: Structure of the CONFIGURATION menu

## 2.2 CONFIGURATION menu

This menu contains the installation parameters and the customization menu parameters. It enables the user:

- To select a current value in a scrolling menu or to define a value according to parameter type. This value will be automatically taken into account in all corresponding menus or measurements.
- To indicate the interactive value: no intrinsic value is allocated to the parameter. The instrument automatically asks for the value when it is needed for a given measurement.

The modification of a parameter is stored in the permanent memory as soon as it is validated by the **Yes** key. When the configuration is modified, the **Clr** key is used to return to the previous value of the configuration parameter. Activate the key a second time to return to the MAIN MENU.

When the user switches the instrument off, the value which has been changed in the configuration retains its new value. The configuration can be returned to its initial setup at any time (default values for all the parameters) using the RESET function.

### 2.2.1 Instrument configuration parameters

The modification of an instrument configuration parameter is taken into account as soon as it has been validated by the **Yes** key.

#### 2.2.1.1 *TE / NT operating mode ('NT Simulation' option only)*

When the IBT-5 is equipped with the 'NT Simulation' option, it has two operating modes - TE (Terminal simulation) and NT (ISDN Network simulation for protocols EDSS-1, 1TR6, 1TR67, Swissnet3, VN3, VN4 and TPH 1962). The terminal simulation tests are run at interfaces  $S_0$  and U in TE mode. If the NT mode is selected, the user runs the tests for the IBT-5 connected to the  $S_0$  interface of an ISDN device by simulating the network (when operating in NT mode, the IBT-5 must be equipped with the accu-pack and NT S2500 adapter).

### 2.2.1.2 Power supply priority

Two operating modes are available on the IBT-5: through the network or from the rechargeable batteries. If both of them are available, the priority has to be defined. The SUPPLY parameter can be positioned on 'Net. priority' or 'Batt. priority'.

In the particular case of this parameter, the value is taken into account when connecting the IBT-5.

### 2.2.1.3 Sound signs (buzzer)

The SOUND SIGNS configuration parameter is used to select the events to be indicated by the buzzer:

- No signal: 'No Sound',
- Test errors: 'Test errors',
- Key and test errors: 'All errors',
- All events: 'Full'.

### 2.2.1.4 $S_0$ interface impedance

The terminal resistance is selected by the S0 IMPEDANCE configuration parameter which can be positioned on '100  $\Omega$ ' or on 'High' (i.e. high impedance).

## 2.2.2 Protocol configuration parameters

All modifications of the protocol configuration parameters are taken into consideration as soon as they are validated by the **Yes** key. It is always possible to configure a parameter in 'Interactive' mode in order to select a value when the test is run. For incoming calls, if a parameter is in the 'Interactive' mode, it is the default value which is taken into account.

### 2.2.2.1 Voice coding law

The IBT-5 provides for two coding laws. The CODING LAW parameter can be positioned on 'A Law' or 'Mu Law'.



### 2.2.2.2 TEI management

The IBT-5 can be connected to three types of interface. The TEI parameter is used to select 'PMP (Dyn TEI)', 'PP (TEI = 0)' and 'No Protocol' in the case of a permanent link. The 'Auto Config.' value in the TEI parameter indicates that the IBT-5 is automatically attempting to configure this parameter when the device is powered up. If the network does not allow for TEI autoconfiguration, the default value is used. The user can interrupt the autoconfiguration by pressing the **Clr** key.

### 2.2.2.3 Layer 3 protocol

The IBT-5 handles **as standard** up to four different layer 3 protocols **which can be configured by means of the L3 PROTOCOL parameter (this does not apply to IBT-5's equipped with only one protocol)**. The interactive value is allowed if at least two protocols are available. **The values of the layer 3 protocol are as follows:** EDSS-1, 1TR6, VN3, VN4, Swissnet 2 and 3, BTNR191, TPH1962, NTT, Q.931, Telenokia, Televerket, **QSIG**, V1, 1TR67, AT&T Custom, N-ISDN, DMS-100 functional, TN1R6 and Cornet-T® (registered trademark of Siemens AG). **For users wishing a selection of protocols other than the protocols supplied by default, please read paragraph 2.8 'INFORMATION menu'.**

### 2.2.2.4 Service profile identifier (SPID) **(American protocols only)**

The SPID (Service Profile IDentifier) is widely used in Australia and in the United States, but not in Europe. The SPID parameter is only used by the following protocols: N-ISDN, AT&T Custom and DMS-100. The SPID is a parameter which is sent by a user (terminal) to the network. This allows the network to assign two identifiers known as the USID (User Service IDentifier) and TID (Terminal IDentifier) to the transmitting terminal. **The value can be entered in the SPID parameter.**

### 2.2.2.5 Address of the installation

**If required, the terminal address can be entered in the OWN ADDRESS parameter. The format is : address\*subaddress.**

For the 1TR6, TN1R6 and Swissnet 2 protocols, the extension value (EAZ) must be entered in the sub-address part of the own address. **Only the first figure in the sub-address** is taken into account. Its default value is '0'. Global calls are accepted.

### 2.2.2.6 User to user signalling availability

This parameter reflects the availability of the User to User Signalling (UUS) system to which the IBT-5 is connected. When the **USER-USER SIGN** configuration **parameter** indicates that the device is 'available', it always adds a specific UUS when establishing a call for a BERT. All Wandel & Goltermann IBT products automatically loop back on the receiving B channel when they recognise the specific WG UUS.

### 2.2.3 Test configuration parameters

A test configuration parameter is taken into account as soon as a test requiring this parameter is run. All the test configuration parameters give the choice of the interactive mode. In this case, the IBT-5 will prompt the user for this parameter value each time it is needed.

#### 2.2.3.1 B channel

The B CHANNEL parameter enables the user to select a channel using the values 'B1' or 'B2'. This precludes the use of any other channel. If preferred, the IBT-5 and network can select the channel to be used ('Bx' value).

#### 2.2.3.2 Services

The default value of the service used for telephony and the BER test is 'Speech'. The SERVICE parameter is used to select another service from among the ones available for the protocol being used. The list of these services depends on the protocol indicated in the configuration.

The same list is used during the automatic test of services and teleservices (see paragraph 2.6 'TEST OF SERV menu').

#### 2.2.3.3 BERT duration

The duration value for the test can be set to '1 min', '15 min', '1 h', '24 h' or 'infinite'. All five values can be configured using the BERT DURATION parameter.

### 2.2.3.4 Automatic test of services mode

In the 'Free of Charge' mode, the test result is supplied only after receiving the SETUP ACK. This means that no charge will be made for the test. In the 'Charged' mode, the test result is returned after receipt of CONNECT or ALERT. In this case, the test is charged. Both these values are accessible through the SERV TEST MODE parameter.

### 2.2.3.5 Supplementary services test for EDSS-1, SN3 and 1TR67 (option)

The CONFIGURATION menu is used to validate or invalidate the supplementary services which will be tested automatically from the 'Supp Serv' sub-menu. For each of the following supplementary services, the user can choose whether or not to test its availability on the network.

CLIP	Identification of calling party number on called party receiver
CLIR	Possibility for the calling party not to reveal his number to the called party
COLP	Identification of the connected number on the calling party receiver
COLR	Possibility for the called party not to reveal his number to the calling party
SUB	Called party sub-address
AOC	Advice Of Charge
TP	Terminal Portability
HOLD	Hold
CFU	Call Forwarding Unconditional
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CUG	Closed User Group

### 2.2.3.6 Loopbox mode

The LOOP BOX parameter is used to determine the conditions under which the IBT-5 will accept an incoming ISDN call in Loop box mode. It is possible to configure this parameter as 'All Incom Calls' (no selection) or as 'WG Remote' for a selection on a remote command WG in the incoming user-to-user signalling.

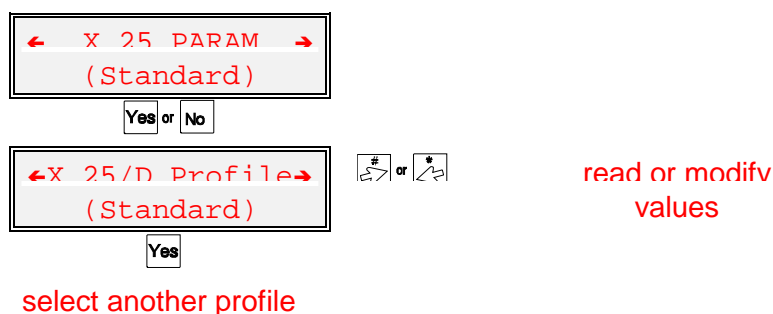
### 2.2.3.7 Called address

The address of the called party is defined as 'Interactive' by default so that it can be entered when the tests are run. This address can be configured in advance in the CALLED ADDRESS parameter (27 digits maximum).

When entering the address and sub-address, the format is: **address\*sub-address**.

### 2.2.3.8 X.25 parameters (option)

The IBT-5 manages X.25 parameter profiles. There is a standard profile by default with a parameter value that can be modified by the user. When the value of at least one of these parameters is modified by the user, the parameter used and displayed becomes a 'User' type parameter. The profile configuration is stored in the memory and presented for all X.25/D tests as long as the user does not choose to return to the 'Standard' profile.



The value of the parameters associated with a profile can be fixed or configured in the 'Interactive' mode so that the device can request it when the test is run.

The parameters and their configurable values are as follows:

X.25 parameters	Values					Standard Profile	
P3 PROTOCOL	CCITT X25	Transpac	Austpac	PVC	or	Interactive	CCITT X.25
OWN ADDRESS	15 digits max				or	Interactive	Empty
CALLED ADDRESS	15 digits max				or	Interactive	Interactive
TEI MODE VALUE	0 to 63		Auto		or	Interactive	1
FRAME WINDOW	1 to 7				or	Interactive	3
PACKET LENGTH	32	64	128	256	or	Interactive	128
PACKET WINDOW	1 to 7				or	Interactive	2
LCN	0 to 4095				or	Interactive	2
CUG	0 to 99				or	Interactive	empty
NUI	ASCII string, length: 27 char. max. (alphanumeric characters possible)				or	Interactive	empty
Facility	Hexa string, length: 32 char. max.				or	Interactive	empty
User Data	ASCII string, length: 10 char. max. (alphanumeric characters possible)				or	Interactive	empty

### 2.2.3.9 Exit and reset

In addition to the lines corresponding to the configuration parameters, the CONFIGURATION menu contains two specific commands:

- 'Exit !', used to quit the CONFIGURATION menu.
- 'Reset' (or 'RESET'), used to restore all the parameters to their original values depending on the initial configuration profile (factory-defined values). If 'Reset' appears in lower case letters, the configuration is already in its initial setting.

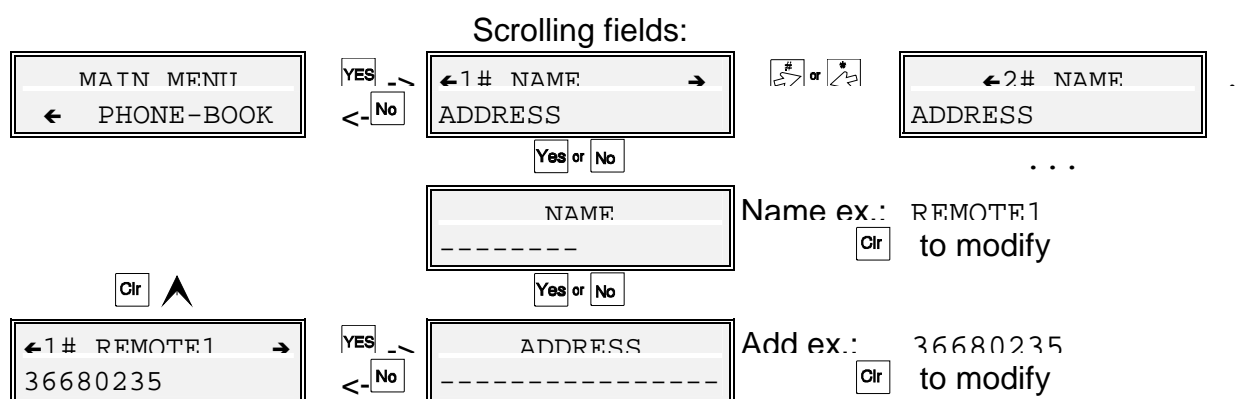
## 2.3 PHONE-BOOK menu

The PHONE-BOOK menu allows you to store up to 6 addresses, which can be used in other menus by means of the phone book range number.

The modification of a phone book item is stored in the permanent memory as soon as the two attributes (name, address) are validated by the **Yes** key.

The phone book display indicates the position range (n#), the name of the position with 8 alphanumeric characters and the position address and sub-address.

An initialized item is displayed as shown by the following figure. The item numbering (n#) recalls the escape sequence used to designate a phone book address in a test parameter.



The name consists of a string of up to 8 characters entered using letters only (no **Shift**). The address has a maximum of 27 digits.

The '1' key is also used like a space bar.

If the cursor is on the first position during the editing of the name and address of an item, the user can return to the previous values by pressing the **Clr** key. By pressing the **Clr** key again, the user returns to the MAIN MENU item. If the cursor is not on the first position, the **Clr** key deletes the last digit.

In addition to the items corresponding to the six addresses, the PHONE-BOOK menu has an EXIT item identical to the one in the CONFIGURATION menu.

## 2.4 PHONE CALL menu

### 2.4.1 Menu description

The user is able to implement a phone call very easily directly from the PHONE CALL menu. Before running a measurement, the user should select the value of the parameters to be positioned in 'Interactive' mode in the CONFIGURATION menu. The interactive parameters (CODING LAW, TEI, L3 PROTOCOL, SPID for American protocols only, OWN ADDRESS, B CHANNEL and PHONE SERVICE) are placed between the top of the PHONE CALL menu and the CALLED ADDRESS parameter which is the last parameter proposed.

#### Configuration parameters

The parameters set to 'Interactive' in the CONFIGURATION menu are suggested once the user enters the PHONE CALL menu.

MAIN MENU	
←	PHONE CALL
Yes or No	
CODING LAW	
←	A LAW
Yes or No	
CALLED ADDRESS	
Yes or No	
36680235	
CALLING ∞	
Yes or No	
36680235	
ALERTING ∞	
...	
36680235	
B1	Speech

Present if registered as  
Interactive in the  
CONFIGURATION menu

Add ex.: 36680235  
Clr to modify

Cld Add: 36680205  
on B1 (Connected)

When 'No Protocol' is selected in the TEI management parameter, the test connects the microphone and the earpiece to one of the two channels.

## 2.4.2 Address field

The syntax for address and sub-address fields (calling and called addresses) is as follows:

CALLED ADDRESS 0299847040*256_
-----------------------------------

Maximum number of digits  
(incl. sub-address): 27

The '\*' is used to separate the sub-address from the address.

A decimal digit or a '#' are used to enter the PHONE CALL menu in direct mode. In this case, the first item in the phone book is suggested (if the phone book is initialized).

## 2.4.3 'Keypad' facilities

The IBT-5 enables the Keypad facilities to be tested when a call is set up. The Keypad information element ('0' to '9', '\*', '#') is encoded in place of the called party address in the SETUP. In order to transmit the Keypad information element, the user proceeds in exactly the same way as for a simple phone call. The Keypad characters should be preceded by '\*' in the field reserved for the called party address.

E.g.: Call forwarding to number 7055 if line engaged (EDSS-1 protocol only):

Activation message: '\*67\*7055#'. The syntax is as follows:

CALLED ADDR **67*7055#
---------------------------

Deactivation message: #67#. The syntax is as follows:

CALLED ADDR *#67#
----------------------

## 2.4.4 Overlap sending

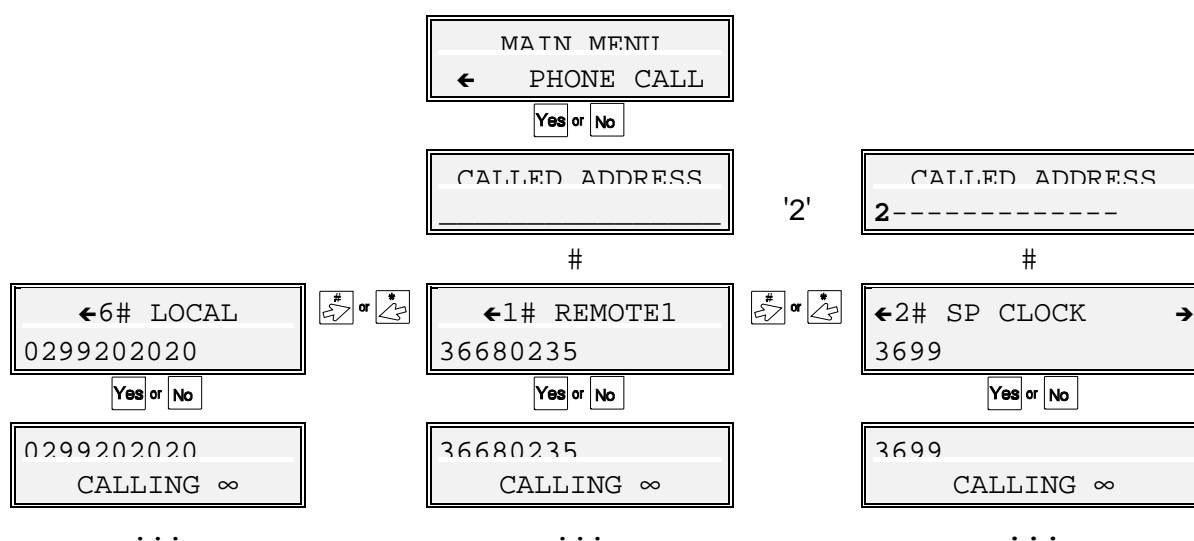
The default dialling procedure is 'en bloc'. To activate overlap dialling (overlap sending only) the user must validate an empty address once the address field is displayed. The IBT-5 sends a SETUP message and runs the overlap sending mode. The user can then dial the called address.



## 2.4.5 Use of the phone book

This procedure is available for any address parameter in all the tests.

During address editing, the phone book address is accessed by the '#' or 'n#' escape sequence where *n* is a phone book item number. The first or the designated phone book address is proposed, respectively. A phone book item is displayed in the following form:



The user can select another item by scrolling. He then validates the chosen address by the **Yes** key. This action returns to the address editing screen with the chosen address.

## 2.4.6 Recall procedure

In order to be available for the Recall feature, the parameters of a particular test are retained as long as the same test is processed. The values are lost if the CONFIGURATION or PHONE BOOK menu are used **but are stored from one test to the next.**

The Recall feature without user validation of parameter values is available by pressing the **Shift** and **Yes** keys.

### 2.4.7 Automatic self-call procedure

The self-call procedure is very simple: the user must set his own address and sub-address in the 'CALLED ADDRESS' field. Once the user has accepted the call, he can run the measurement. In this case, the B channel selected by the incoming call is set to loop back mode (Rx → Tx).

The IBT-5 displays:

<div>xxxxxxx</div> <div>2B      Speech BC</div>	Called address: xxxxxx on the two B channels (Connected)
---	---

### 2.4.8 Call accept conditions

An incoming call is presented if the IBT-5 is in a MAIN MENU position and if no other call has already been established. The following management rules are mandatory as regards the address and sub-address:

#### Address management

In the following array the sub-address is ignored.

Own address	Presented address	Call management
X	X	Presented
Empty	Any or empty	Presented
X	Y	Ignored

**Tab. 2-1:** Address management

#### Sub-address management

The sub-address is not taken in account in the Call accept conditions (with 1TR6 and TN1R6, the EAZ is considered).

## 2.4.9 DTMF (Dual Tone Multi Frequency) generation

Once the (incoming or outgoing) call has been set up, voice frequency (DTMF) generation is obtained by pressing '0' to '9', '#' and '\*' keys. Each key has its own relative DTMF frequency.

This function is available when a phone call is established (outgoing and incoming calls).

## 2.4.10 Trace information

Two types of trace information may be displayed. These fields will not display protocol frames or messages; they indicate only the interpretation of the traces. The first trace usually concerns the processing of the call. The second type of trace information corresponds to the call status (setup successful or not).

**Important:** The IBT-5 has a certain tolerance to Layer 1 interference on the S<sub>0</sub> interface. The screen displays an 'Interfer. on L1' message and the LED 'S' flashes to warn the user.

These fields may display the following information:

### Call status information

Trace	Display	Relative protocol events
Laver 1 failed:		Failure on Laver 1 establishment (INFO 4 not received from NT)
TEI error:		No TEI has been allocated by the network
Laver 2 failed:		Failure on Laver 2 establishment (UA not received from the network) May be due to a wrong setup of TFI management (PP instead of PMP)
L3 failure:		The message Release, Release conf or Disconnect has been received from the network with the Cause IE and the 'Location' 3 parameter

### Call progress information

Trace	Display	Relative protocol events
Overlan dialling	NTTM : _____	SETUP sent without called address
Progressing:	xxxxxxxx CALLING ∞	Outgoing call in progress (Layer 2 established) SETUP sent, possible reception of SETUP ACK, PROGRESS, CALL PROC.
Alerting:	xxxxxxxx ALERTING ∞	Outgoing call ALERTING received
Accept call ?:	ACCEPT CALL ? _____	Incoming Call SETUP received
Connected:	xxxxxxxx B1 SPEECH	Called Address: xxxxxxxx on B1 CONNECT ACK or CONNECT received

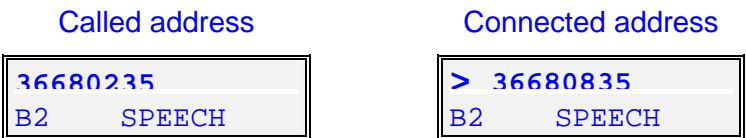
For L3 failure, the display indicates:

- on the first line: **L3 error: xxx/y**, where xxx is the decimal cause code and y the location parameter received from the network and expressed in hexadecimals (0 to A) (for the meaning, see Appendix 4).
- on the second line: the cause in characters.

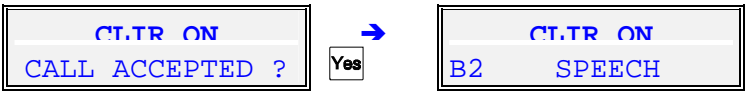
If a DISCONNECT message is received containing the 'InBand Tone available' information element, the IBT-5 authorises listening to the tone until the network or user interrupts the call.

2.4.11 Addressing information

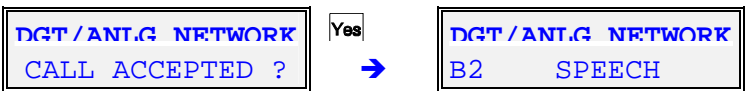
Once the outgoing call has been set up, the IBT-5 alternately displays the called address and the address of the remote equipment that is actually connected (if supplied by the network).



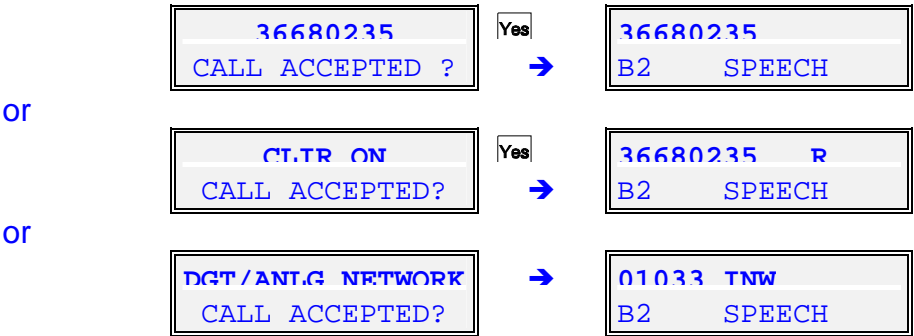
The IBT-5 can detect the reason for the non-display of the calling number. When the IBT-5 receives a call for which the calling number non-display option is activated (CLIR activated), the screen displays the following:



If the calling address is not available because of network interconnection (Digital/Analog), the IBT-5 displays the following:

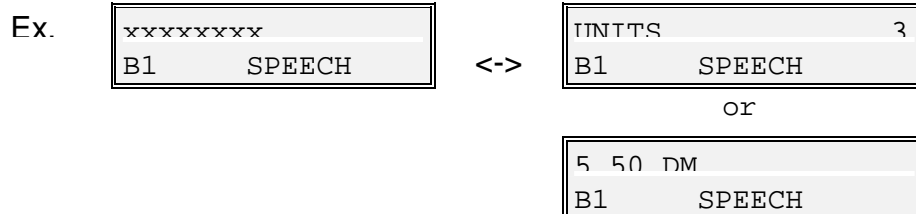


Some accesses subject to authorisation (fire brigade, emergency services etc.) always supply information regarding the calling address i.e. the number itself (even if the caller has requested non-display of his address or only part of the address in the case of Digital/Analog network interconnection). The IBT-5 displays all or some of the number and the information relating to the requested non-display of the address (the letter 'R' is displayed).



## 2.4.12 Advice of charge

During and at the end of calls, charging information may be viewed for the following protocols: EDSS-1, VN3, VN4, Swissnet 3, 1TR6, TN1R6 and 1TR67. Depending on the features of the network to which the IBT-5 is connected, the information is given either in units or in currency and displayed alternately with the called address.



When charging information is received at the end of the call, the IBT-5 displays a specific screen indicating the total cost of the call.

**Note:** This function is available only in **PHONE CALL** mode.

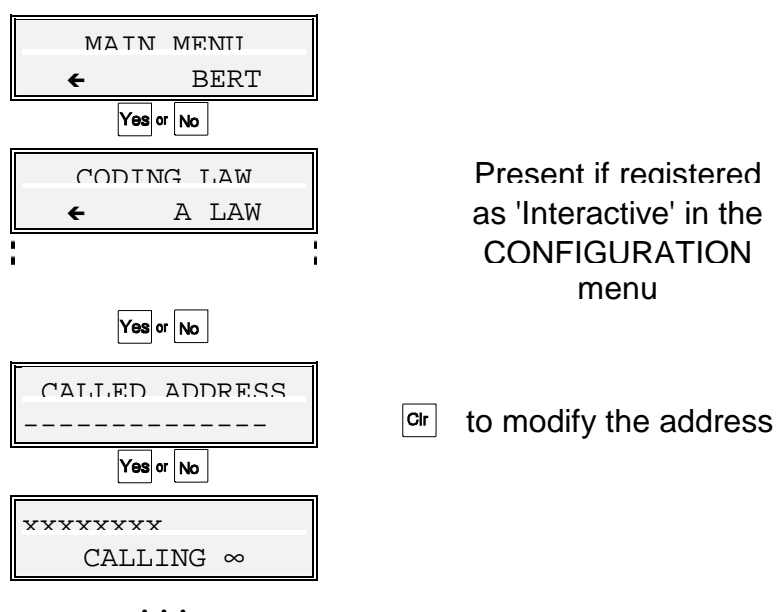
## 2.5 BIT ERR RATE menu

### 2.5.1 Menu description

This menu is used to perform a BER (Bit Error Rate) test. Errors can then be inserted manually during a test in order to test the network's ability to support them.

For the parameter set in 'Interactive' mode in the CONFIGURATION menu, the parameter(s) must be chosen by the user before the measurement is run. The interactive parameters (CODING LAW, TEI, L3 PROTOCOL, SPID for American protocols only, OWN ADDRESS, USER-USER SIGN, B CHANNEL, BERT BEARERCAP and BERT DURATION) are offered between the top of the BERT menu and the CALLED ADDRESS parameter which is the last one suggested.

The parameters set to 'Interactive' in the CONFIGURATION menu are suggested once the user has validated the BIT ERR RATE menu.



When '**No Protocol**' is selected in the TEI management parameter, the self-call is not available and the remote command is not sent.

When the channel is not fixed by the user (Bx value) B1 is chosen.

The WG remote loop back command is sent in the SETUP message if UUS is declared available.

For the call procedure structure, see the description in the 'Trace' paragraph of the PHONE CALL menu. If the connection is successful, the test is run automatically.

After the end of the first test, the connection is maintained during the reading of the results in order to be able to propose the same test again.

It is also possible to use the recall, self-call and phone book functions as described in the PHONE CALL menu.

The BER data is described below:

Display	Menu steps and meaning														
B1 WAITING PRBS	Error rate too high The loop is not connected														
B1 SYNCHRO	BER Information 1 Synchronization														
0299847040 B1 BERT	BER Information 2 Synchronization done, BER test running, no error occurs														
0299847040 1 Error Sent	BER Information 3 Manual insertion of a bit error														
R1 ERROR 1:00 ES=xx (or SES=xx)	BER Information 3 Synchronization done, BER test running, error occurs														
0299847040 B1 BERT	BER Information 4 BER test finished and no error is found														
R1 BERT ERROR 1 < error type>	BER Information 5 BER test finished and an error is found														
<table> <tr> <th>Error type or item</th><th>Meaning</th></tr> <tr> <td>EFS</td><td>Error Free Second (%)</td></tr> <tr> <td>ES</td><td>Errored Second (%)</td></tr> <tr> <td>SES</td><td>Severely Errored Second (%)</td></tr> <tr> <td>US</td><td>Unavailable Second (%)</td></tr> <tr> <td>BEC</td><td>Bit Error Count</td></tr> <tr> <td>BER</td><td>Bit Error Rate</td></tr> </table>		Error type or item	Meaning	EFS	Error Free Second (%)	ES	Errored Second (%)	SES	Severely Errored Second (%)	US	Unavailable Second (%)	BEC	Bit Error Count	BER	Bit Error Rate
Error type or item	Meaning														
EFS	Error Free Second (%)														
ES	Errored Second (%)														
SES	Severely Errored Second (%)														
US	Unavailable Second (%)														
BEC	Bit Error Count														
BER	Bit Error Rate														
BERT once again ?	Propose to run the test once again														

**Important:** BER information 3 has priority over BER information 2. BER information 3 consists of a real-time error counter.



The IBT-5 has a certain tolerance to Layer 1 interference on the  $S_0$  interface. The screen displays an 'Interfer. on L1' message and the LED 'S' flashes to warn the user.

### **2.5.2 Manual error insertion**

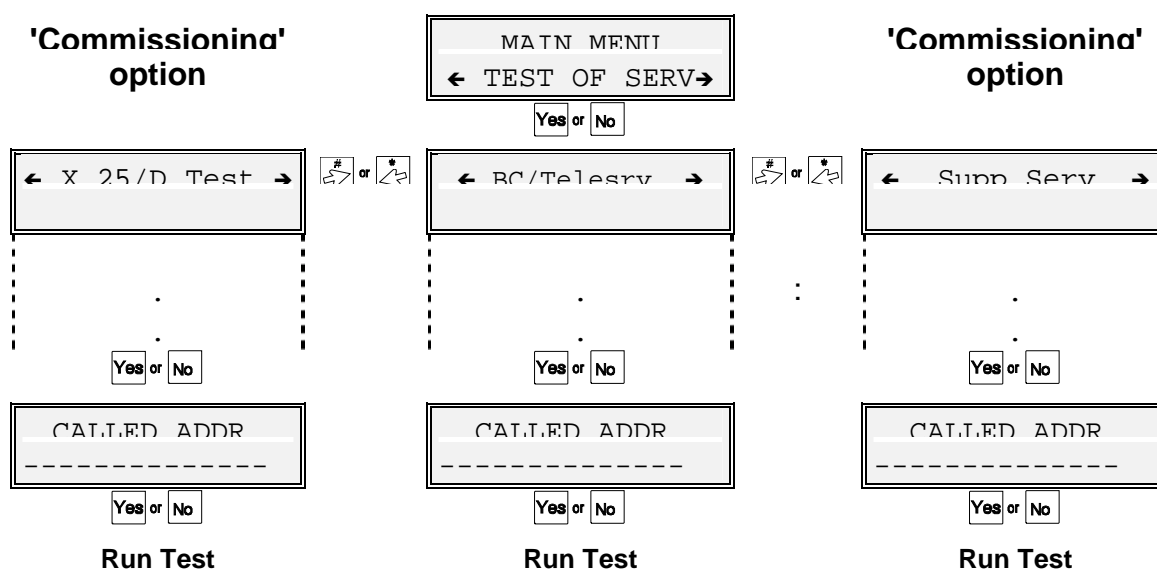
The IBT-5 enables the user to insert errors manually during a BERT by pressing the '0' key. The bit error is then displayed on the monitor.

## 2.6 TEST OF SERV menu (Test of services)

### 2.6.1 Menu description

In this menu, the IBT-5 can carry out three types of test:

- Test of Bearer Capability / teleservices HLC & LLC (standard version),
- X.25/D Channel test (instrument equipped with the 'Commissioning' option),
- Supplementary services test for EDSS-1, SN3 and TR67 (instrument equipped with the 'Commissioning' option).



#### 2.6.1.1 Test of Bearer Capability (BC) / teleservices (HLC & LLC)

The device can implement an automatic test of services and teleservices. In this menu, the bearer capability modes are tested, with the teleservices if necessary.

Before running a BC/Telesrv. test, the user selects the value of the parameter(s) positioned in 'Interactive' mode in the CONFIGURATION menu. The interactive parameters (CODING LAW, TEI, L3 PROTOCOL, SPID for American protocols only, OWN ADDRESS, B CHANNEL and SERV TEST MODE) are proposed between the top of the TEST OF SERV menu and the CALLED ADDRESS parameter which is the last one proposed.

The SERV TEST MODE parameter is used to select the type of test created. In 'Free of Charge' mode, the test results are returned after receipt of SETUP ACK. The test is not, therefore, charged. It is local and the called address does not have to be filled in. In 'Charged' mode, the test results are supplied after receipt of the CONNECT or ALERT messages.

It is also possible to use the recall, self-call and phone book functions as described in the PHONE CALL menu.

This test is not available when 'No protocol' is selected for the TEI management parameter.

For the call procedure structure, see the description in the 'Trace' paragraph of the PHONE CALL menu. If the connection is successful, the test is run automatically.

Automatic test of services is split into two parts: a Bearer Capability test followed by a teleservices test. At the end of the BC test, the instrument prompts the user to test the teleservices.

The results relating to the automatic test of services and teleservices are shown below (if the test fails, the IBT-5 displays directly the screen corresponding to the first error detected):

Display	Meaning
← Serv. Test OK EXIT !	All the services are available. The arrows are used to display the list of the tested services.
← Serv. Test NOK EXIT !	At least one of the services is not available. The arrows are used to display the status of each service.
← xxxxx Passed	xxxxx (service/teleservice) is available on the access.
← xxxxx FAIL Cause = XXX	xxxxx (service/teleservice) is not available on the access. For the meaning of the causes, see Appendix 1.
Teleservices ?	Teleservice test proposal.

### 2.6.1.2 X.25 in D channel test (option)

The device can run a functional test and a quality test for the X.25 in D channel service.

Before running an X.25 in D channel test, the user selects the value of the parameter(s) positioned in 'Interactive' mode in the CONFIGURATION menu (X.25/D Profile). The interactive X.25 parameters (P3 PROTOCOL, OWN ADDRESS, TEI MODE VALUE, FRAME WINDOW, PACKET LENGTH, PACKET WINDOW, LCN, CUG, NUI, Facility and User Data) are offered between the top of the X.25/D Test menu and the CALLED ADDRESS parameter which is the last parameter suggested. The called address may be the IBT-5's own address (self-call) or the address of a device capable of producing a loop.

Once the test has been run and the call set up, the IBT-5 sends a packet (the size can be configured in advance) and compares it to the incoming packet. The test is declared to have succeeded if the data packet is received within 3 seconds and does not include any errors.

The results displayed after an X.25/D test are shown below (if the test fails, the IBT-5 displays directly the screen corresponding to the error detected).

Display	Meaning
← X.25/D Test OK EXIT	X.25 connection set up Incoming and outgoing packets are identical.
← X.25/D Call Clear XX YY	X.25 connection failed: CLEAR packet received (XX, YY: hexa. values of Cause and Diag.).
← X.25/D Call Diag XX	X.25 connection failed: Diag. packet received (XX: hexa. value of Diagnostic).
← X.25/D Call → Passed	X.25 connection successful.
← Quality Test → Passed	Incoming and outgoing packets are identical.
← Quality Test → Not Possible	Packet could not be sent (access to an identifier) or packet sent has not been received (e.g: absorber).
← Quality Test → Failed	Incoming packet not identical to outgoing packet.
← X25/D Test NOK EXIT	X.25 connection or quality test failed

### 2.6.1.3 Supplementary services test for EDSS-1, SN3 and 1TR67 (option)

The IBT-5 can run service availability tests concerning the following:

- calling addresses (CLIP and CLIR),
- connected addresses (COLP and COLR),
- sub-addressing (SUB),
- Advice Of Charge (AOC),
- Terminal Portability (TP),
- Hold (HOLD),
- Call Forwarding functions (CFU, CFB, CFNR),
- Closed User Group (CUG).

After validating the supplementary services to be tested in the CONFIGURATION menu, the user runs the automatic test from the 'Supp Serv' sub-menu. If the supplementary services test requires the inputting of a value (CFx or CUG), the user is prompted to enter it just before the test is run.

The results displayed after a supplementary services test are shown below (example of the CLIR supplementary service). If one or more tests fail, the IBT-5 displays directly the screen corresponding to the first error detected.

Screen	Meaning
<div> <div>←</div> <div>CLIR</div> <div>Available</div> </div>	Supplementary service available
<div> <div>←</div> <div>CLIR</div> <div>Unavailable</div> </div>	Supplementary service not available
<div> <div>←</div> <div>CLIR</div> <div>FAIL Cause = XX</div> </div>	The test could not be run. The test requires a self-call (XX: hexadecimal value of cause)
<div> <div>←</div> <div>CLIR</div> <div>Inconclusive</div> </div>	The test provides no conclusions of service availability

In the case of the AOC test, the IBT-5 supplies the user with the type of charge information supplied by the network (Setup, During or End): AOC-S, D, E or the combination supported (SD, DE etc.).

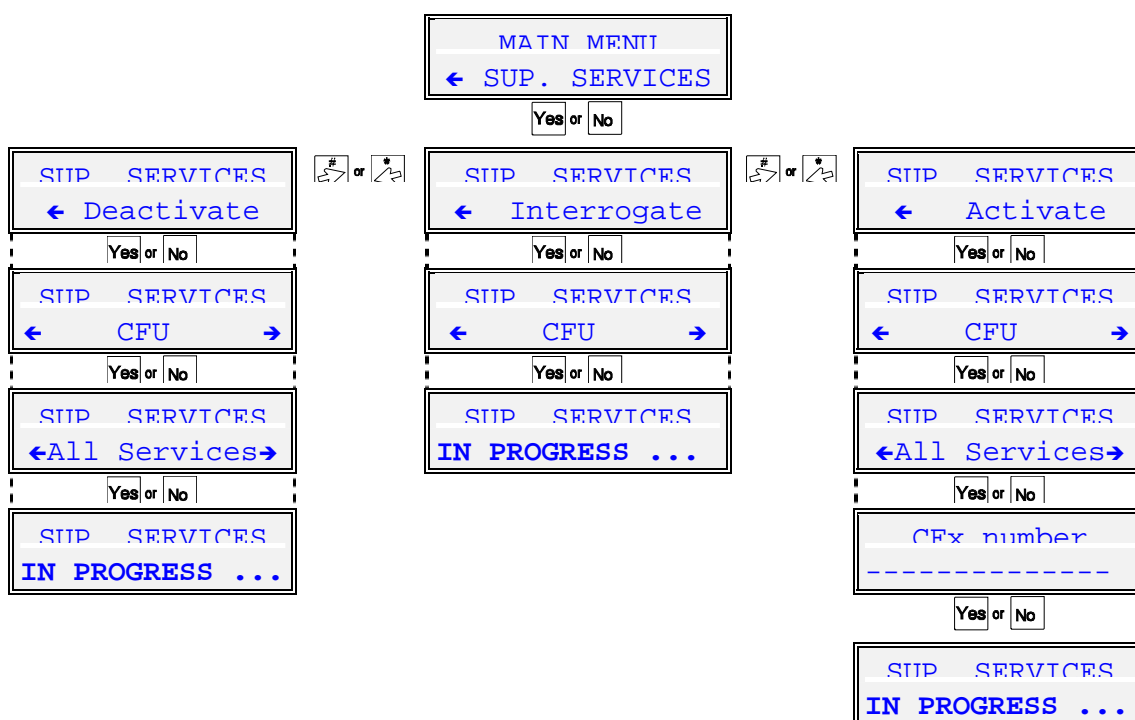
### 2.6.1.4 Interrogation, activation and deactivation of call forwardings for EDSS-1, SN3 and 1TR67 ('Commissioning' option)

The IBT-5 makes available the 'Generic Functional Protocol' in order to indicate access configuration with regard to the status of supplementary services CFU (Call Forwarding Unconditional), CFB (Call Forwarding when line Busy) and CFNR (Call Forwarding when No-Response). The IBT-5 can be used to activate or deactivate these supplementary services depending on the addresses and services required.

To question the status of the call forwarding configuration, select the main 'SUP. SERVICES' menu, validate 'Interrogation' and select CFU, CFB or CFNR.

To activate a call forwarding, select 'Activate' in the main 'SUP. SERVICES' menu. Having selected the required supplementary service (CFU, CFB, CFNR), select the service (or 'All Services') and the address to which the call is to be transferred (the address at which the forwarding is activated is the installation address configured in the CONFIGURATION menu. If this address has not been filled in, the forwarding will be activated for all the addresses called).

Deactivating call forwardings is performed in the same way as activation (but the IBT-5 does not ask for an address).



The results of the activations and deactivations may be as follows (example with CFU):

Screen	Meaning
CFU Activated	CFU supplementary service activated
CFU Deactivated	CFU supplementary service deactivated
CFx error Not available *	Supplementary service unavailable * the message may be: Inv.User Num: installation address error SupServIntNotAlw: unauthorised interaction ServNotProv: basic service not provided Res unavailable: resources not available Inv Div Nr: transfer address error Special Serv Nr: special service address DivSerUserNr: diversion to a user

The results of an interrogation may be as follows (example with CFU):

Screen	Meaning
CFU No Activation!	CFU supplementary service activated
<0102039999 >0102030000	Calls transferred (address 0102039999) to address <b>0102030000</b> for all services.
< Speech >0102030000	Calls transferred (all addresses) with <b>Speech</b> service to <b>0102030000</b> .
< All Calls > >0102030000	All calls transferred (all addresses and services) to <b>0102030000</b> .
< Speech.039999 >0102030000	Calls transferred (address 0102039999 /6 last digits displayed) with speech service to <b>0102030000</b> .

## 2.7 LOOP BOX menu

This menu is used to activate or deactivate the LOOP BOX mode. Two modes are offered: **ISDN LOOP BOX** and **X.25/D LOOP BOX**.

In **ISDN LOOP BOX** mode, it is possible to set the loop condition for the IBT-5 to 'All Incom Calls' or 'WG Remote' in addition to the 'Interactive' mode of the CONFIGURATION menu. If the 'Interactive' mode is stored in the CONFIGURATION menu, both modes are offered before the test is run. The other values offered before switching to loop mode concern TEI, L3 PROTOCOL, SPID for American protocols only, and OWN ADDRESS if the parameters are positioned in 'Interactive' mode in the CONFIGURATION menu. The IBT-5 automatically loops all the incoming calls as long as the user does not end the test by pressing the **Clr** (or **No**) key.

In **All Incom Calls** mode, the B channel selected by the incoming call is set to loop-back mode (Rx → Tx).

In **WG Remote** mode, the incoming call is accepted if the UUS contains the WG remote loop back command. The B channel selected by the incoming call is set to loop-back (Rx → Tx).

When 'No protocol' is selected in the TEI management parameter, the selected B channel is set in loop-back mode (Rx → Tx). When the user does not enter the channel (Bx value), B1 is selected.

In **ISDN LOOP BOX** mode, the IBT-5 displays the following:

2826
B1      Speech

In **X.25/D LOOP BOX** mode, the IBT-5 offers the user the parameters configured in interactive mode in the X.25/D profile of the CONFIGURATION menu before it is activated. The IBT-5 then loops back on all incoming calls automatically as long as the user does not end the test by pressing the **Clr** (or **No**) key.

In X.25/D LOOP BOX mode, the IBT-5 displays the following:

2826
Con. LCN: xx

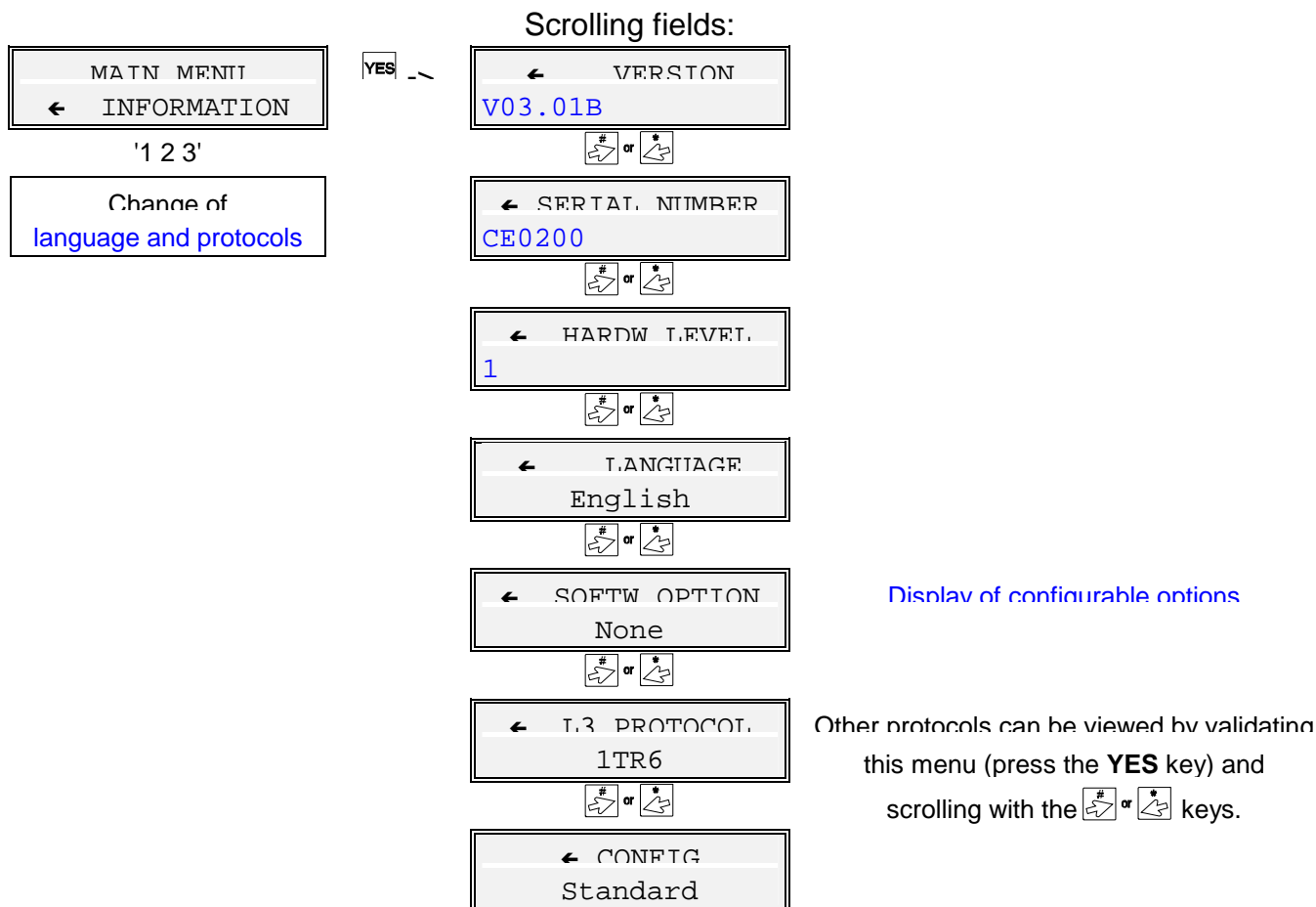
when XX is the logical channel number

In order for the IBT-5 to automatically restart in LOOP BOX mode (ISDN or X.25/D) after a disconnection/reconnection, none of the parameters should be in 'Interactive' mode.



## 2.8 INFORMATION menu

When activated by the **Yes** key from the MAIN MENU item, the INFORMATION menu allows the user to read the following information.



It is possible to switch from one language to another or modify the list of Level 3 ISDN protocols available in the CONFIGURATION menu by entering the sequence '1 2 3' directly in the MAIN MENU when INFORMATION is displayed. The menu then proposes LANGUAGE or L3 PROTOCOL. The user can select up to 7 protocols from among a total list of 19 currently available.

The information supplied concerns the following:

- software version and revision number,
- instrument serial number,
- hardware level,
- selected language,
- software options available on the IBT-5,
- protocols available on the IBT-5,
- initial configuration profile identifier.

## 2.9 'NT Simulation' option

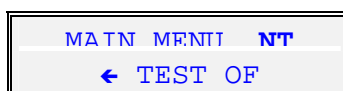
When equipped with the 'NT Simulation' option, the IBT-5 can simulate ISDN in order to enable testing of services, addresses or accessibility of terminals connected to a PBX prior to commissioning. NT simulation requires the following in order to function correctly:

- 'NT Simulation' option (BN 7522/92.15),
- accu-pack to power up the IBT-5 (BN 7522/90.22),
- IBT-5 hardware, with a serial number beginning with CExxxx (or above),
- NT adapter (BN S2500) connected between the RJ-45 socket in the IBT-5 and the network access on the ISDN equipment being tested.

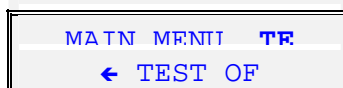
To configure the IBT-5 in NT simulation, select NT MODE in the CONFIGURATION menu. To return to the terminal simulation mode, select TE MODE in the CONFIGURATION menu.

When the IBT-5 is equipped with the 'NT Simulation' option, the screen indicates the current mode (NT or TE). In this case, each main screen displays the mode:

**NT mode**



**TE mode**



The protocols supported by the IBT-5 in NT mode are as follows: EDSS-1, 1TR6, 1TR67, Swissnet 3, VN3, VN4 and TPH 1962.

Apart from the self-call function, all the tests described in the above paragraphs can be performed in NT mode when applicable. In NT mode, the most frequently-used functions are phone call (with address / significant service parameters), automatic test of services or BER test.

## Appendix 1: Protocol-related causes

### Causes for the EDSS-1 protocol

Decimal Cause/val	IBT-5 Display	Meaning
1	UNALLOCATED NUMB	Unallocated (unassigned) number
2	NO ROUTE TO NETW	No route to specified transit network
3	NO ROUTE TO DEST	No route to destination
6	CHANNEL UNACCEPT	Channel unacceptable
7	CALL AWARDED	Call awarded and being delivered in an established channel
16	(nothing displayed)	Normal call clearing
17	USER BUSY	User busy
18	NO USER RESPONDG	No user responding
19	NO ANSWER < USER	No answer from user (user alerted)
21	CALL REJECTED	Call rejected
22	NUMBER CHANGED	Number changed
26	NON SEL USER CLR	Non-selected user clearing
27	DEST OUT OF ORDER	Destination out of order
28	INVALID NUM FORM	Invalid number format
29	FACILITY REJECT	Facility rejected
30	RESP TO STAT ENQ	Response to STATUS ENQUIRY
31	NORMAL:UNSPECIF.	Normal, unspecified
34	NO CHANNEL AVAIL	No circuit/channel available
38	NET OUT OF ORDER	Network out of order
41	TEMPORARY FAILUR	Temporary failure
42	NETWORK CONGEST	Switching equipment congestion
43	ACCESS INFO DISC	Access information discarded
44	REQ CHAN UNAVAIL	Requested circuit/channel not available
47	RESOURCE UNAVAIL	Ressources unavailable, unspecified
49	QOS UNAVAILABLE	Quality Of Service unavailable
50	REQ FAC NOT SUBS	Requested facility not subscribed
57	BEAR CAP UNAUTH	Bearer capability not authorized
58	UNAVAIL BEAR CAP	Bearer capability not presently available
63	UNAVAIL SERVICE	Service or option not available, unspecified
65	N-IMPLE BEAR CAP	Bearer capability not implemented
66	N-IMPLE CHAN TYP	Channel type not implemented
69	N-IMPLE FACILITY	Requested facility not implemented

Decimal Cause/val	IBT-5 Display	Meaning
70	ONLY RESTR.BEAR	Only restricted digital information bearer capability is available
79	N-IMPLE SERV/OPT	Service or option not implemented, unspecified
81	INVALID CALL REF	Invalid call reference value
82	N-EXIST CHANNEL	Identified channel does not exist
83	N-EXIST CALL ID	A suspended call exists, but this call identity does not exist
84	CALL ID IN USE	Call identity in use
85	NO CALL SUSPENDDD	No call suspended
86	CALL ALR CLEARED	Call having the requested call identity has been cleared
87	USR NOT MEMB CUG	User not member of Closed User Group
88	INCOMPATIB.DEST	Incompatible destination
90 *	DEST.ADDR.MISS	Destination address missing
91	INVA TRANSIT NET	Invalid transit network selection
95	INVALID MESSAGE	Invalid message, unspecified
96	MANDAT INFO MISS	Mandatory information element is missing
97	N-EXIST MSG TYPE	Message type non-existent or not implemented
98	N-IMPL MSG TYPE	Message not implemented with call state or message type non-existent or not implemented
99	N-EXIST INFO ELT	Information element non-existent or not implemented
100	INVALID INFO ELT	Invalid information element contents
101	INCOMPATIBLE MSG	Message not compatible with call state
102	RECOVERY ON TIMR	Recovery on timer expiry
111	PROTOCOL ERROR	Protocol error, unspecified
127	INTERWORKING	Interworking, unspecified
Others	Unknown Cause	

\* BTNR191 only

**Causes for 1TR6, TN1R6 protocols**

Decimal Cause/val	IBT-5 Display	Meaning
00	(nothing displayed)	
01	INVALID CALL REF	Invalid call reference value
02	N-IMPLE MSG TYPE	Message not implemented
03	N-IMPLE BEAR CAP	Bearer service not implemented
04	N-IMPL CONN TYPE	Connection type not implemented
05	N-IMPLE CHAN TYP	Channel type not implemented
06	N-EXIST CHANNEL	Identified channel does not exist
07	N-EXIST CALL ID	Call identity does not exist
08	CALL ID IN USE	Call identity in use
09	OVERLAP UNAUTH	Overlap sending not allowed
10	NO CHANNEL AVAIL	No channel available
11	(nothing displayed)	Normal call clearing
12	CIRC OPERATIONAL	Operational circuit
15	(nothing displayed)	Normal call clearing
16	N-IMPLE FACILITY	Requested facility not implemented
17	REQ FAC NOT SUBS	Requested facility not subscribed
18	NORMAL:UNSPECIF.	Normal unspecified
20	INVA TRANSIT NET	Invalid transit network selection
21	UNAVAIL SERVICE	Unavailable service
22	DEST OUT OF ORDR	Out of order (user)
23	DEGRADED SERVICE	Degraded service
24	NET OUT OF ORDER	Network out of order
28	NETWORK CONGEST	Network congestion
29	UUS DISCARDED	User info discarded
30	RESOURCE UNAVAIL	Network resource not available
31	ONLY RESTR. BEAR	Only restricted digital information bearer capability is available
32	OUTG CALL BARRED	Outgoing call barred
33	USER ACCESS BUSY	User access busy
34	NEGATIV CUG EXPR	Negative CUG comparison
35	NON EXISTENT CUG	Non-existent closed user group
37	N-IMPLE SERV/OPT	Service not implemented
38	INVALID DIGIT	Invalid digit (Overlap sending)
39	MANDAT INFO MISS	Mandatory Info element missing
40	N-EXIST MSG TYPE	Invalid message

Decimal Cause/val	IBT-5 Display	Meaning
41	INCOMPATIBLE MSG	Message not compatible with call state
42	N-EXIST INFO ELT	Non-existent information element
43	INVALID INFO ELT	Invalid information element contents
45	PROTOCOL ERROR	Protocol error
46	INTERWORKING	Internetworking
47	INVALID NUM FORM	Invalid number format
48	NO ORIG R-CHARGG	Not used
49	NO DEST R-CHARGG	Not used
50	R-CHARGG REJECT	Not used
51	INCOMPATIB. DEST	Incompatible destination
52	N-EXIST ABR ADDR	Non-existent abbreviated address entry
53	DEST N-ACCESSIBL	Destination not obtainable
54	DEST ADD MISSING	Destination address missing and direct call not subscribed
56	NUMBER CHANGED	Number changed
57	DEST OUT OF ORDR	Out of order
58	NO USER RESPONDG	No user responding
59	USER BUSY	User busy
61	INCO CALL BARRED	Incoming calls barred
62	CALL REJECTED	Call rejected
64	DEGRADED SERVICE	Degraded service
88	INCOMPATIB. DEST	Incompatible destination
89	NETWORK CONGEST	Network congestion
90	R-USER INITIATED	Remote user initiated
96	MANDAT INFO MISS	Mandatory information element missing
100	INVALID INFO ELT	Invalid information element contents
112	LOCAL PROC ERROR	Local procedure error
113	REMOTE PROC ERR	Remote procedure error
114	REMOTE USER SUSP	Remote user suspend
115	REMOTE USER RESU	Remote user resume
127	UUS LOCALLY DISC	User info discarded locally
Others	Unknown Cause	

## Appendix 2: List of available services and teleservices

### List of available services and teleservices (except for 1TR6, TN1R6, 1TR67 and Swissnet 3)

Services
Speech BC
Audio 3.1 kHz
Data 64 BC
Data 56 BC
Teleservices
Speech
Data 64
Fax G3
Fax G4
Teletext
Videotext

### List of available services and teleservices for 1TR6 and TN1R6

Services
Sprache (speech)
Audio 3.1 kHz
Daten (data 64)
Ton 3.1 kHz (audio)
Teleservices
Fax G3
Fax G4
Teletext
Btx
X21 Uc19
X25 Uc 13
Mixed
Fernwirken (remote)
Grafik
Bild (image)

**List of available services and teleservices for 1TR67**

<b>Services</b>
Speech BC
Audio 3.1 kHz BC
Audio 7 kHz BC
Data 64
<b>Teleservices</b>
Speech
X25 / B
Audio 7 kHz
Fax G3
Fax G4
BTX 64
BTX New
X21 UC19
Teletext
Bild 3.1 kHz
Bild
Data 56

**List of available services and teleservices for Swissnet 3**

<b>Services</b>
Speech BC
Audio 3.1 kHz
Data 64
Data 56 BC
Data 64 Rest BC
Audio 3.1 kHz PI
<b>Teleservices</b>
Speech
Audio 7 kHz
Fax G3
Fax G4
Teletext
Videotext
Videotel NFb



## Appendix 3: List of X.25 causes and diagnostics

<b>Cause 00 (DTE)</b>	<b>Hex</b>	<b>Dec</b>
CLR command	\$80	128
Clear due to a X.29 invitation to CLR message	\$81	129
Clear due to a X.29 reselection message	\$82	130
Outgoing call timeout	\$85	133
Idle timer (VIDEOTEX)	\$86	134
Reception of CNX/FIN (VIDEOTEX)	\$87	135
Level 1 disconnected on a PAD line	\$89	137
<b>Cause 01 (busy - OCC)</b>	<b>Hex</b>	<b>Dec</b>
Routing impossible: no more logical channels free		
Routing impossible: call collision	\$48	72
Routing impossible: PAD line does not accept the call	\$90	144
<b>Cause 03 (invalid facility request - INV)</b>	<b>Hex</b>	<b>Dec</b>
Facility code not allowed (facility not subscribed or inexistent)	\$41	65
Invalid facility parameter or facility combination	\$42	66
Code or additional service parameter for specified DTE not allowed by the CCITT not allowed or invalid	\$4D	77
<b>Cause 05 (network incident - NC)</b>	<b>Hex</b>	<b>Dec</b>
Invalid packet type for state r1	\$11	17
Invalid packet type for state p1	\$14	20
Invalid packet type for state p2	\$15	21
Invalid packet type for state p3	\$16	22
Invalid packet type for state p4	\$17	23
Invalid packet type for state p6	\$19	25
Unknown packet type	\$21	33
Outgoing calls barred	\$22	34
Invalid logical channel (following DIAGNOSTIC packet reception)	\$24	36
Packet too short	\$26	38
Packet too long	\$27	39
Restart or restart confirmation on logical channel other than 0	\$29	41
D bit not supported	\$28	40
Fast select with restriction on response requested	\$2A	42
Call timer T11 timeout	\$31	49
Clear timer T13 timeout	\$32	50
Reset timer T12 timeout	\$33	51
Facility code not allowed	\$41	65
Incorrect facility parameter or combination of parameters	\$42	66
Called address invalid (digit not DCB)	\$43	67
Calling address invalid (digit not DCB)	\$44	68
Facility field length incorrect	\$45	69
Incoming calls barred	\$46	70
Routing impossible: no logical channels available	\$47	71
Routing impossible: call collision	\$48	72
Repeated facility	\$49	73

Code or facility parameter (as specified by CCITT) of DTE not allowed	\$4D	77
Mandatory facility not present (NUI)	\$4C	76
RDM or DISC frame received	\$B1	177
No response to N2 I frames	\$B2	178
Invalid F bit received	\$B3	179
FRMR received	\$B4	180
Level 2 reset after reception of a FRMR frame	\$B5	181
Level 2 reset	\$B6	182
Telephone number busy	\$B8	184
Telephone call collision	\$B9	185
Telephone communication cleared	\$BA	186
Level 2 not set up	\$BB	187
Telephone call cancelled	\$BC	188
Telephone call forbidden	\$BD	189
Answering tone not detected	\$BE	190
Telephone call delayed	\$BF	191
T0 timeout for PSTN call	\$C0	192

<b>Cause 09 (out of order - DER)</b>	<b>Hex</b>	<b>Dec</b>
Level 1 disconnected	\$B0	176
Received DM or DISC frame	\$B1	177
No response to N2 I frames	\$B2	178
Invalid F bit	\$B3	179
FRMR received	\$B4	180
Level 2 reset after reception of a FRMR frame	\$B5	181
Level 2 reset	\$B6	182
Telephone call broken	\$BA	186
Level 2 not set up	\$BB	187
Telephone call cancelled	\$BC	188
Answering tone not detected	\$BE	190
Telephone call delayed	\$BF	191
T0 timeout for PSTN call	\$C0	192
LAPX disconnection	\$C1	193

<b>Cause 0B (access barred - NA)</b>	<b>Hex</b>	<b>Dec</b>
Incoming calls barred	\$46	70
Answering tone not detected	\$BE	190
Confidentiality not respected on outgoing line	\$F5	245
Access to the public network not allowed	\$F8	248

<b>Cause 0D (not obtainable - NP)</b>	<b>Hex</b>	<b>Dec</b>
Unknown number (number not in numbering scheme)	\$F0	240

<b>Cause 11 (remote procedure error - RPE)</b>	<b>Hex</b>	<b>Dec</b>
Invalid packet type for state r1	\$11	17
invalid packet type for state p2	\$15	21
Invalid packet type for state p3	\$16	22
Invalid packet type for state p4	\$17	23
Unknown packet type	\$21	33
Invalid logical	\$24	36
Packet too short	\$26	38
Packet too long	\$27	39
Restart or restart confirmation on logical channel other than 000	\$29	41

Call confirmation invalid	\$2A	42
Clear packet timer timeout	\$32	50
Reset packet timer timeout	\$33	51
Restart packet timer timeout	\$34	52
Invalid called address	\$43	67
Invalid calling address	\$44	68
Facility field length incorrect	\$45	69
Facility code repeated	\$49	73
<b>Cause 13 (local procedure error - ERR)</b>	<b>Hex</b>	<b>Deci</b>
Invalid packet type for state r1	\$11	17
Invalid packet type for state p1	\$14	20
Invalid packet type for state p2	\$15	21
Invalid packet type for state p3	\$16	22
Invalid packet type for state p4	\$17	23
Invalid packet type for state p6	\$19	25
Unknown packet type	\$21	33
Outgoing calls barred	\$22	34
Packet too short	\$26	38
Packet too long	\$27	39
Restart or restart confirmation on logical channel other than 0	\$29	41
Call confirmation invalid	\$2A	42
Clear packet timer timeout	\$32	50
Reset packet timer timeout	\$33	51
Restart packet timer timeout	\$34	52
Invalid called address	\$43	67
Invalid calling address	\$44	68
Facility field length incorrect	\$45	69
Facility code repeated	\$49	73
Facility mandatory and not present	\$4C	76
<b>Cause 19 (reverse charging acceptance not subscribed)</b>	<b>Hex</b>	<b>Dec</b>
Reverse charging acceptance not subscribed on outgoing line	\$00	0
<b>Cause 21 (destination incompatible)</b>	<b>Hex</b>	<b>Dec</b>
D bit not supported	\$28	40
Impossible to negotiate packet size	\$D9	217
<b>Cause 29 (fast select not subscribed)</b>	<b>Hex</b>	<b>Dec</b>
Fast-select not subscribed	\$00	0

## Appendix 4: Values of the 'Location' parameter for the EDSS-1 protocol

Value (Hexa)	Meaning
0	User
1	Private network serving the local user
2	Public network serving the local user
3	Transit network
4	Private network serving the remote user
5	Public network serving the remote user
7	International network
A	Network beyond interworking point