

# **ARGUS 28**

## **Manual**

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## 1 Introduction

The ARGUS 28 is a compact all-in-one tester, which can be expanded in individual steps from a SHDSL tester all the way to a universal tester for E1, X.21, V.35, PRI, BRI and POTS interfaces.

### **ARGUS 28 expansion levels:**

- **Basic tester:** SHDSL both remote and central ends, WINplus
- **Options:**
  - SHDSL 4-wire interface
  - POTS interface
  - Packet 1: PRI and BRI, WINanalyse
  - Packet 2: E1/PRI, extended BERT, BERT nx64 kBit/s, MegaBERT, USB adapter
  - X.21 interface with X.21 cable
  - V.35 interface with V.35 cable
  - U-interface (4B3T)
  - U-interface (2B1Q)

The basic ARGUS 28 supports network operators particularly in the installation and setup of the 2-wire SHDSL systems. In this case, the ARGUS simulates both the network and the customer side of the SHDSL connection. Even the customer's terminal equipment can be included in the measurement process by simply connecting it to the output on the ARGUS 28, which then serves as a SHDSL modem.

With its rechargeable batteries and internal charger, the ARGUS is exceptionally well suited for use in field service. The intuitive menu operation combines convenient cursor keys and softkeys with a four-line backlit display.

Besides TE/NT simulation on BRI and PRI accesses, the ARGUS 28 also supports TE simulation on U interfaces (optional) and POTS as well as convenient BRI and PRI D-channel monitoring. The 16 megabytes of internal Flash memory enables the tester to record and save the monitoring data without requiring a connection to computer.

The Flash-ROM technology permits you to upgrade your ARGUS at any time by download software updates from a PC (free software updates are available at [www.argus.info](http://www.argus.info)).

If you use the ARGUS on a BRI or PRI interface in an ISDN system whose specifications deviate from the (DIN ETS 300 102) standard (e.g. some networked PBXs), you must take these manufacturer-specific modifications into account. In such cases, please contact the distributor of your ISDN PBX for assistance.

To test X.21/V.35 permanent circuits, you can connect the ARGUS to the X.21/V.35 network via the X.21/V.35 adapter.

As an option, a V5.x monitor is available for the ARGUS 28: This monitor can be used to record the V5.1 or V5.2 protocol, which can then be decoded in detail with the WINanalyse software.

The ARGUS Functions - Overview:

### **SHDSL test**

Displays the SHDSL connection's most important performance parameters

### **Bit error tests (BERT) for SHDSL**

Performs a BERT to a loopbox or in end-to-end operation. The ARGUS will, if needed, handle the loopbox function itself.

### **Listen/Talk mode (telephony) in TDM time slices**

Tests a permanent circuit using a telephone connection to a remote end in a selected time slice.

### **Protocol Recognition and B-Channel Test for ISDN Accesses**

After you select the operation mode, the ARGUS will automatically determine the protocol supported by the access under test and will then test the availability of the B-channels.

### **Telephone connections**

Can a telephone call be placed from this access to every other number and/or can this access receive a call?



**Service Tests**

Does the tested access support connections with the most important services, such as, ISDN telephone service, Group 4 - Facsimile or data transmission at 64 kbit/s etc.?

Additionally, 3 user-specific services can be saved in the ARGUS and tested on the access under test.

**Bit error tests (BERT) for E1, PRI, BRI, U-interface accesses**

Performs a BERT in an extended call to itself via a loopbox or in end-to-end operation. The ARGUS will, if needed, handle the loopbox function itself.

The integrated MegaBERT extends the bit error test on E1/PRI accesses to a full 2 Mbit/s bandwidth. Any distribution of time slots ( $n \times 64 \text{ kBit/s}$ ) may be used.

**Supplementary Services**

The ARGUS automatically tests the supplementary services made available by the exchange.

**Leased Line Tests – tests permanent circuits with BERT and speech****NT simulation of a BRI or a PRI access****D-channel monitoring on a Basic Rate Interface and on a Primary Rate Interface**

All of the D-channel signals are captured and passed to the serial interface. When passively monitoring, the ARGUS does not affect Layer 1.

**POTS (analog) Functionality**

Does the POTS access support call number transfer?

The ARGUS will display the charges, if the access supports this feature.

**Monitoring an analog line (passive listening-in)****CF Interrogation**

The ARGUS will check, whether a call diversion has been setup on the access under test. The ARGUS can setup or clear down call diversions in the exchange.

### **MSN interrogation (only on a BRI access)**

On a P-MP access using the DSS1 protocol, the ARGUS will determine the MSNs of the access under test.

### **X.21/V.35 Test**

The ARGUS will perform a bit error test on the X.21/V.35 access in accordance with the ITU guidelines G.821 and G.826.

### **The Access Acceptance Report**

When the ARGUS is linked to a PC via the serial interface, it is, as an example, possible - with the aid of WINplus - to create and print a comprehensive test report on the PC.

### **Testing Features with the Keypad**

Supports manual tests in the so-called keypad mode. If the network supports this feature, the user can send a command sequence and can then test service features in a dialog.

Should you have any further questions, please contact us:

#### **intec Gesellschaft für Informationstechnik mbH**

Rahmedestr. 90

D-58507 Lüdenscheid

Tel.: +49 (0) 2351 / 9070-0

Fax: +49 (0) 2351 / 9070-70

## 2 Safety Instructions

The ARGUS may only be used with the included accessories. Usage of other accessories may lead to erroneous measurements and may even cause damage to the ARGUS and the connected installation.

The ARGUS is only to be used in accordance with the instructions in this documentation. Any other usage may result in bodily injury and destruction of the ARGUS.

- To prevent electrical shocks or damage to the ARGUS, do not connect it to lines with voltages in excess of 100 V!
- Never attempt a measurement with the case open!
- The ARGUS is not watertight. Protect the ARGUS from exposure to water!
- Before replacing the battery(see page 16 Replacing the accumulators), disconnect all the test leads and switch the ARGUS off.  
Make certain that the polarity is correct when connecting the batteries!

### 3 Technical data

<p><b>Dimensions / Weight</b></p> <p>Height 229 mm</p> <p>Width 72 mm</p> <p>Depth 35 mm</p> <p>Weight 350 g (without batteries and protective case)</p> <p><b>Keypad</b></p> <p>21 Keys</p> <p><b>LCD display</b></p> <p>LCD display with switchable background lighting</p> <p>4 lines with 16 characters</p> <p><b>Memory</b></p> <p>EEPROM Non-volatile memory: 2048 Bytes</p> <p>Flash program memory: 1 Mbyte</p> <p>S-RAM: 256 Kbytes +128 Kbytes</p> <p>Data memory: 16 Mbyte (Flash)</p>	<p><b>Inputs / Outputs</b></p> <p>1 RJ-45 for BRI, PRI, U-interface (optional) or POTS</p> <p>1 jack for an external power supply</p> <p>1 RJ45 for connecting to an X.21 or V.35 network or a PC</p> <p>1 RJ -11 for SHDSL</p> <p><b>Temperature Ranges</b></p> <p>Ambient-temperature: 0 °C to +50 °C</p> <p>Operating temperature: -5 °C to +55 °C</p> <p><b>Power Supply</b></p> <p>3 NiMH accumulators or 9 V, plug-in power supply or BRI feed</p>
---	--

**4 Operation - a brief guide**



**Power Key:**



- Switch the ARGUS ON
- To start up again after a power down
- to switch on the display backlighting  
In battery mode to save power, the backlighting will switch off automatically after 5 seconds.
- To switch the ARGUS OFF  
(must be pressed somewhat longer)



**Confirmation key:**

- Select menu or continue



### Menu control:

- Open the menu list
- Scroll through lists
- Select a menu
- Select a function in an open menu



### Telephony

- Pickup or hang up
- Simplified overlap signalling: press the telephone key twice.



### Layer 1 measurement:

start the Layer 1 measurement  
(Level/Voltage)



### Number Pad:

- Entry of the digits 0...9 and of the special characters \*, # (e.g. the call number or numerical entry in a function)
- In special cases entry of alphanumeric characters
- Direct function call



### Softkeys:

The function of the 3 softkeys varies with the situation. The current function of each softkey is shown in the highlighted fourth line of the display.

**Connectors on the end:**

- **9 V-**

Connection for the external power supply.  
If the plug-in power supply is connected, the ARGUS will automatically disconnect the accumulators. In this case, the ARGUS will automatically recharge the accumulators (see page 190 Accu servicing).

- **Line**



Pin Assignment

3/4/5/6 **BRI**

7/8 **POTs**

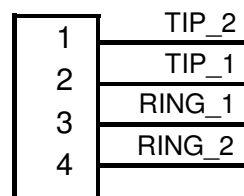
PIN assignment for **PRI**, see "Connection for a PRI network" on page 193.

- Connection for a BRI network
- Connection for a POTS (analog network)
- Connection for a PRI network

- **DSL**

- Connection for the SHDSL network

P110



WESTERN4SMD

Western 4 jack - SHDSL:

- |   |                |
|---|----------------|
| 1 | Line2 a (TIP)  |
| 2 | Line1 a (TIP)  |
| 3 | Line1 b (RING) |
| 4 | Line2 b (RING) |

- **X.21, V.35 / PC**

- Connection for the X.21 or V.35 adapter
- Connection to a PC via a serial cable
- Connection of a PC via the USB Adapter

### Replacing the accumulators

The battery compartment for the three accumulators (rechargeable batteries) is located on the back of the case. Unscrew the screws to remove the cover of the case and insert the accumulators in accordance with the polarity marking.



Use only NiMH accumulators.

The current state of the charge will (if the ARGUS is not connected to a power supply) be displayed graphically.

In the LCD display, a battery symbol will begin to blink, when there is still approximately 5 minutes reserve. During this period, it is possible that there may be audible interference and in rare cases even malfunctions (see “Accu servicing” on page 190.).

### Power Down

In accu/battery operation, if the ARGUS is idle for 15 minutes, it will automatically switch to the power-down mode (power-down).

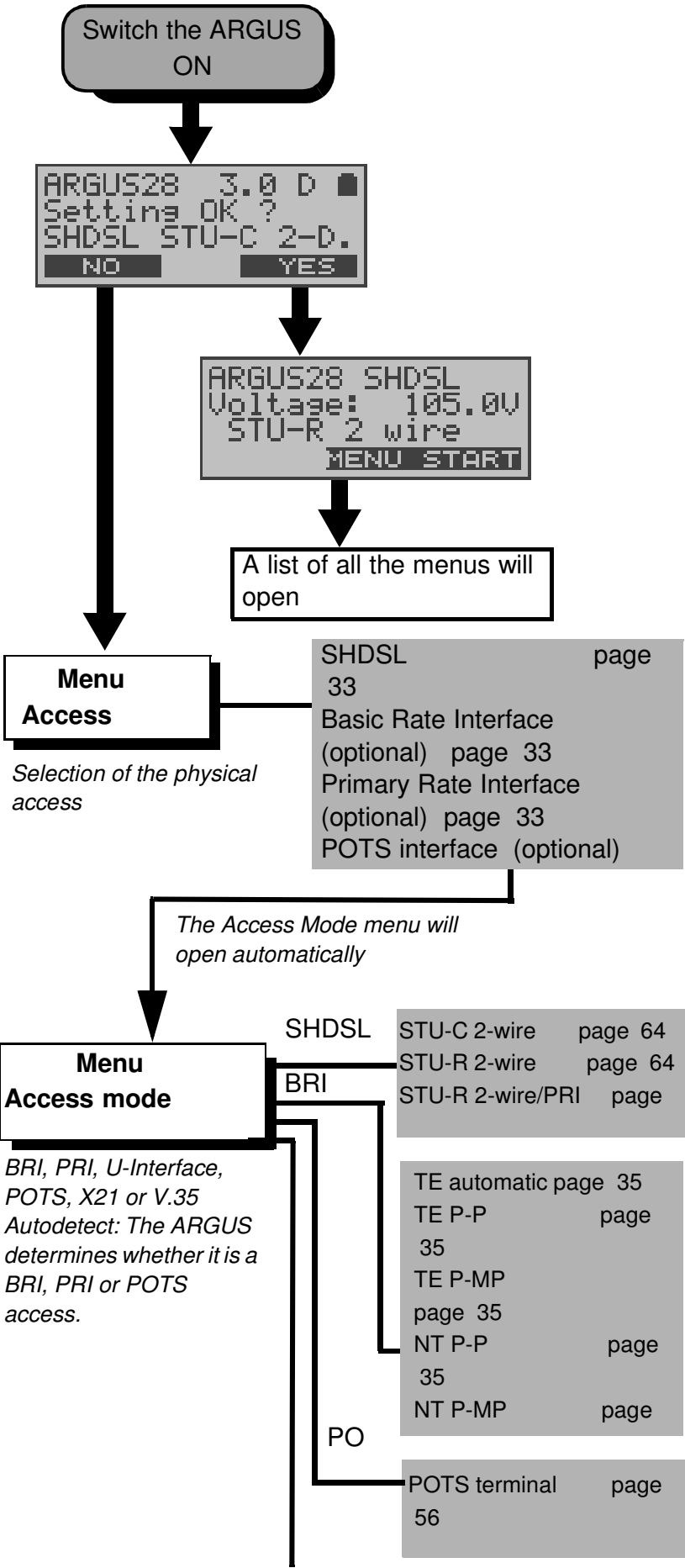
The ARGUS will remain in power-down mode until the Power-Key is pressed again.

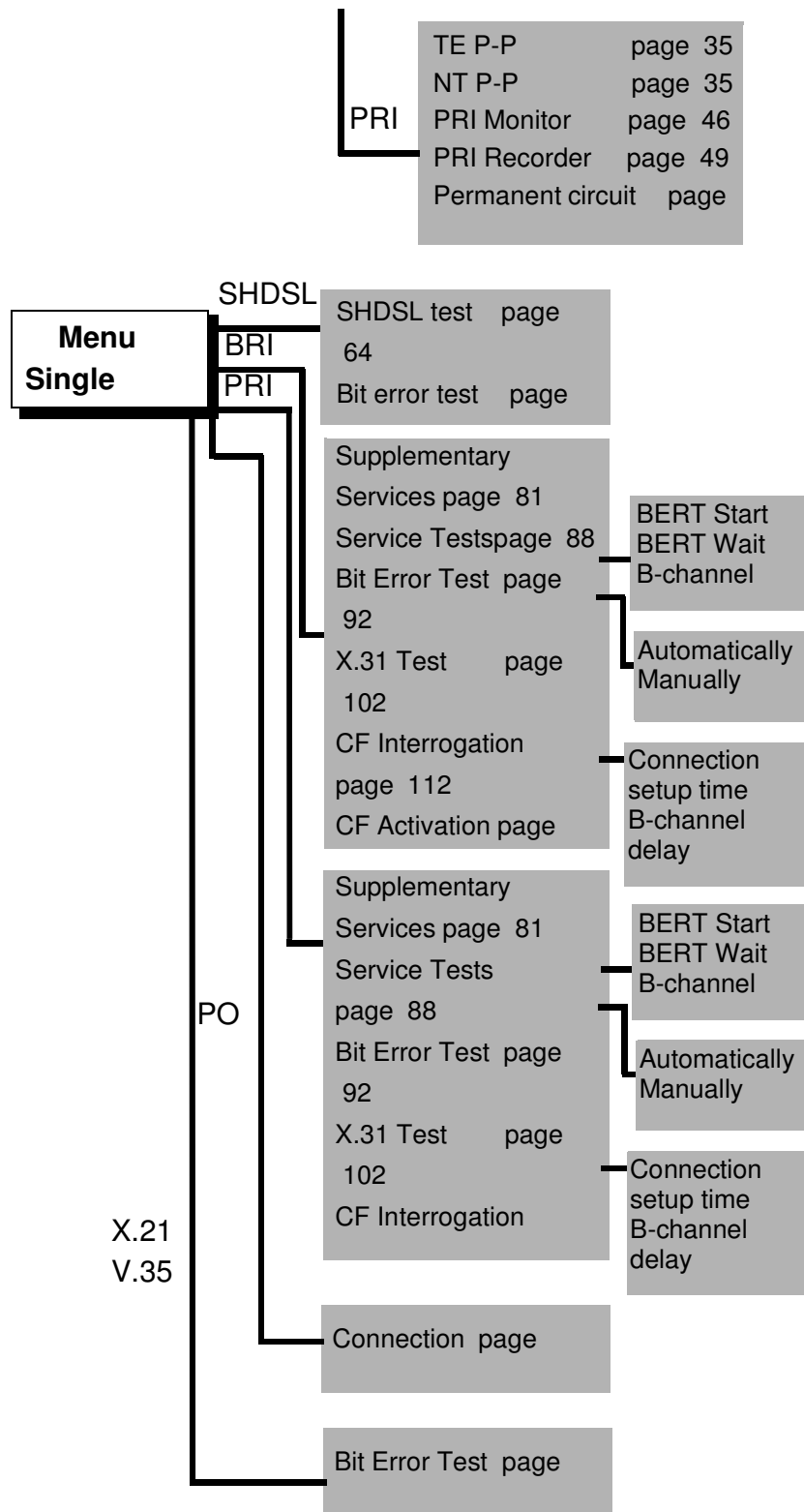
Reasonably enough, the ARGUS will **not** enter power-down mode during a test (e.g. Loopbox) or when it is in Trace mode.

As an alternative, it is possible to operate the ARGUS using the included power supply. If the ARGUS is connected to the plug-in power supply, it will automatically disconnect the accumulators and will - reasonably enough - not enter power-down mode.



5 Menu Hierarchy





**Menu Test Manager**

SHDSL, BRI, PRI

Start new one page 137

End all page

*Management of multiple, simultaneous and independent tests/connections*

**Menu  
Automatic Tests**

*The ARGUS will automatically execute the test sequence and save the results in its internal Flash*

Start	page 145
View	page 148
Test data to PC	page 150
Delete	page 151

**Menu  
Level Measuring**

BRI,

Remote end	page 153
other TE	page 153

PO

Polarity	page 155
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**Menu  
L1 status**

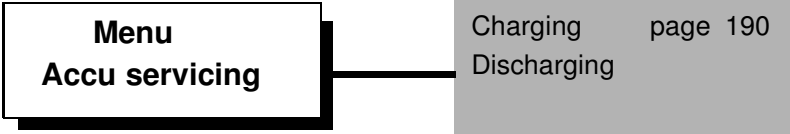
*The ARGUS displays the current status of Layer 1 on a BRI access (page 156) and the Layer 1 parameter on a PRI access (page 157).*

**Menu  
Settings**

*The ARGUS can be configured to suit your special requirements. The parameters are clearly organized in submenus (e.g. the SHDSL parameters are in the SHDSL submenu) The default (factory) settings can be restored by selecting "Reset".*

Trace/Remote	page 160
SHDSL config.	page 161
	- Spectrum
	- Clock/framing
	- Chan. selection
	- Power back off
	- EOC using
	- EOC mode
ISDN	page 163
	- L1 permanent?
	- Protocol
	- Alerting mode
	- Clock mode
	- BRI termination
	- PRI termination
	- Sensitivity
	- Sa5 bits
	- Sa6 bits
	- A bit
	- CRC4 mode
	- Call parameter

	<ul style="list-style-type: none"><li>- DTMF / Keypad</li><li>- Dest. no. MSN</li><li>- CUG Index</li></ul>
BERT 171	page
(time)	<ul style="list-style-type: none"><li>- BERT duration</li><li>- Error level</li><li>- HRX value</li><li>- Bit patt. BRI/U</li><li>- Bit patt. PRI</li><li>- Bit patt. SHDSL</li><li>- Bit patt. X.21</li></ul>
POTS 174	page
	<ul style="list-style-type: none"><li>- POTS dial</li><li>- POTS CLIP</li><li>- AOC pulse</li><li>- DTMF parameter</li><li>- FLASH time</li></ul>
X.31 profile 178	page
	<ul style="list-style-type: none"><li>- Packet number</li><li>- TEI</li><li>- LCN</li><li>- Packet size</li><li>- Agree PS</li><li>- Window size</li><li>- Agree WS</li><li>- Throughput</li><li>- Agree DS</li><li>- User data</li><li>- CUG</li><li>- CUG Index</li><li>- D bit</li><li>- Facilities</li><li>- Profile name</li></ul>
Device: page 182	
	<ul style="list-style-type: none"><li>- Menu language</li><li>- LCD contrast</li><li>- Date / Time</li><li>- Baud rate</li><li>- Alarm</li><li>- Feed</li><li>- Battery type</li></ul>

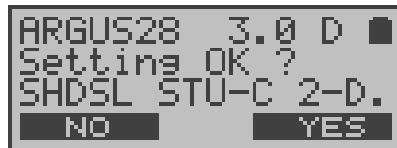




## 6 Start-Up

Using the included cable, connect the ARGUS to the access to be tested.

**Power Key:** Switch on the ARGUS.



The ARGUS displays the access and mode parameters which were last selected.

### Displayed in the first line:

The software version number: 2.9 (in the example)

Country code: u (=Great Britain), e (=Spain),

f (=France), . . .

The state of the accumulator charge (if it is not connected to the plug-in power supply)

### Displayed in the third line:

Type of access: SHDSL, optional: BRI, U-interface, PRI , POTS

or X.21 or V.35 test

Operation mode: STU-C 2-wire.  
(Access mode) STU-R 2-wire.  
STU-R/PRI

NT = NT Simulation

TE = TE Simulation

Perman.swit.

Monitor

Recorder

Terminal (only on a POTS (analog)

access)

Bus configuration: P-P = point-to-point

P-MP= point-to-multipoint

### Displayed in the fourth line:

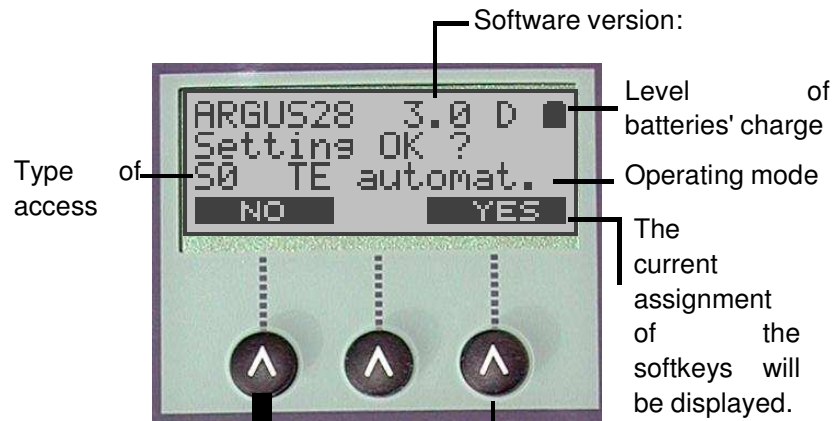
The fourth line displays the current assignment of the three softkeys below.

The ARGUS is in largest part operated with the two ↓ ↑ - Keys, the confirmation key ✓ and the three softkeys.

On the following pages, only the softkey's meaning in the

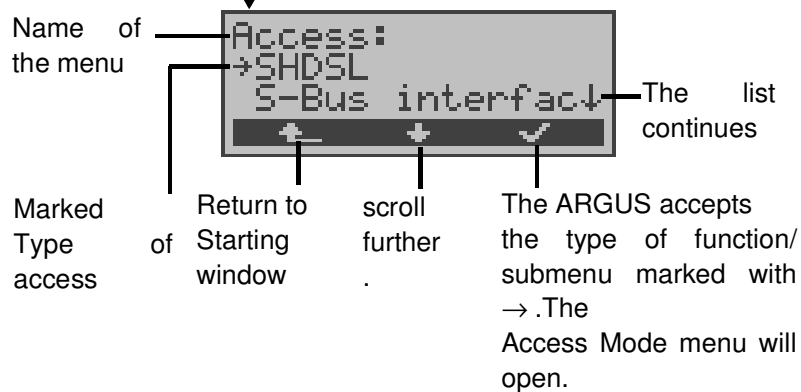
respective context is shown - enclosed in brackets <>, e.g. <NO>.

The <✓> softkey serves the same function as the ✓ confirmation key and the <↓> softkey performs the same function as the corresponding arrow key on the ARGUS keypad.



Activation of the displayed parameters. The ARGUS will begin the initialization phase and then show the status display (see Chap. page 30).

The displayed parameters will not be accepted.  
The Access menu will now open (Page 33):



Using the ↓ ↑-Keys or the <↓> softkey select the physical access corresponding to that of the access under test.

If **Automatic** is selected in this menu, the ARGUS will

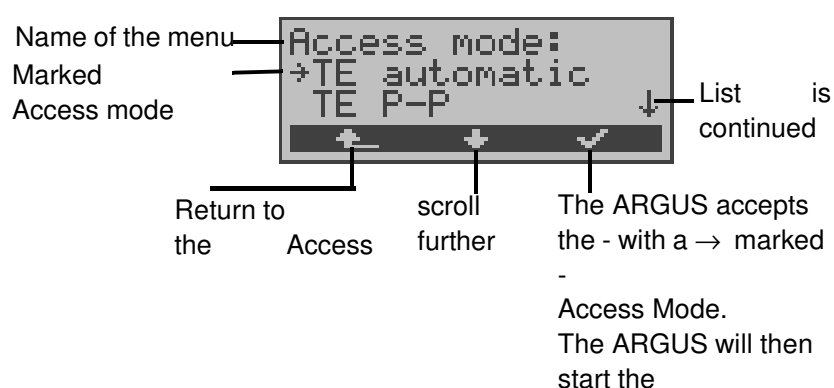


automatically determine the physical access (BRI, U-interface, PRI or POTS). In this case, the ARGUS sets the BRI access to TE-mode (see "Setting the Access Mode" on page 35).



In this case, the Access Mode menu will not open and consequently functions such as BRI Monitor, BRI Recorder and Permanent Circuit will not be available.

If SHDSL, BRI, POTS or PRI is selected, the **Access Mode**(see Chap. 8 page 35) **menu will open**.



### Initialization phase:

#### - Operation on a SHDSL access

```
ARGUS28 SHDSL
Voltage: 105.0V
STU-R 2 wire
MENU START
```

The ARGUS displays the access mode and the voltage on the SHDSL line.

#### - Operation on a BRI or U-interface access or operation as a BRI NT simulator:

Once the access and access mode parameters have been selected or accepted, Layer 1 will be setup. While Layer 1 is being setup, the L1 LED above the display will blink. If the ARGUS cannot setup Layer 1, it will display the message "No Net".

When the ARGUS is operated on a U-interface access, it can take up to 2.5 minutes to activate Layer 1.



The test found that it is a BRI multiple device access using the DSS1 protocol.

**Shown on the second line in the display:**

The availability of the B-channels:

B12 both channels are available  
B1- only B-channel 1 is available  
B-2- only B-channel 2 is available  
B-- no B-channel available



If only one B-channel is available, this can have an impact on the service check and the testing of the supplementary services.

Level evaluation only on a BRI access:

OK the level is in order  
<< the level is too low  
>> the level is too high  
-- no level

**Shown on the third line in the display:**

Access Mode:

NTs = NT Simulation Slave Mode  
NTm = NT Simulation Master Mode  
TEs = TE Simulation Slave Mode  
TEm = TE Simulation Master Mode  
(see page 165 Clock mode)

Bus configuration:

P-P: Point-to-Point  
P-MP: Point-to-Multipoint

It must be mentioned again, that the ARGUS only determines the general bus status once when switched on or when the ARGUS first connected.

On the other hand, the status of the protocol stacks for Layer 1, 2 and 3 will be continually monitored and displayed.

**- Operation on a PRI access**

As soon as Layer 1 is setup, LED L1 will light continuously. The ARGUS will automatically determine and display, whether or not the PRI access uses CRC4-monitoring. CRC4 monitoring can be switched on or off manually ((see page 167 CRC4 mode)).

The ARGUS will begin the automatic detection of the access configuration. After Layer 2 is setup, the L2 LED will also light.

The ARGUS will, regardless of the mode of operation (TE or NT mode), determine the D-channel protocol and attempt to setup Layer 3.

```
ARGUS28 PRI
TEs CRC4 A bit:+
MENU START
```

During this phase, the ARGUS displays the A bit of the remote side. Protocol detection is only possible when the A bit is not set (+). Afterwards, the B-channel

test will be started.

With the B-channel test, the ARGUS checks the availability of all 30 B-channels by placing an outgoing call on each B-channel one after the other. If the call can be setup, it is assumed that the B-channels are available from both ends.

If the connection is rejected with Cause 44 (see Appendix B), the B-channel will be assumed to be only available for incoming calls.

If the connection is rejected for any other cause, the B-channel will be identified as unavailable. In the case of a cause, which indicates that the B-channel is occupied, the connection will be tried up to two times and, if a connection can still not be setup, it will then be marked as unavailable.

```
ARGUS28 PRI
#####
TEs CRC4 DSS1
MENU RESTART
```

**Displayed in the first line:**

Type of access: PRI

**Displayed in the second line:**

Available B-channels: The light squares represent the available B-channels ordered in two blocks of 15. The upper row of squares represent the B-channels that are available for outgoing connections, the lower row represents those that can be used for incoming calls.  
 left: B-channel 1  
 right: B-channel 30

**Displayed in the third line:**

Operation mode: NTs = NT Simulation Slave Mode  
 (see page 165 Clock mode)  
 NTm = NT Simulation Master Mode  
 TEs = TE Simulation Slave Mode  
 TEm = TE Simulation Master Mode

Layer 1 mode: With (CRC) and without CRC4  
 (NoCRC)

D-channel protocol: Auto, 1TR6, DSS1, none,  
 BILINGUAL, CorNet-NQ  
 CorNetN , CorNetT, QSIG or VN4

**Test sample:**

```

ARGUS28 PRI
#####
TEs CRC4 DSS1
MENU RESTART

```

The test found that it is a PRI access using CRC4-monitoring and the DSS1 protocol. All 30 B-channels are available and can be used for outgoing or alternating connections.

The B-channel test cannot distinguish between alternating and exclusively "outgoing" B-channels.

```

ARGUS28 PRI
#####
NTmNoCRC DSS1
MENU RESTART

```

The ARGUS is in the NT-Simulation Master mode and is connected to a terminal using the DSS1 D-channel protocol without CRC4-monitoring. B-channel 11 is not available.



The first 10 B-channels are configured in the exchange as incoming channels only (seen from the viewpoint of the terminal), while B11-B30 can be used for outgoing or alternating connections.



The ARGUS is not properly connected (e.g. wrong cabling) or the network is not in order.

**- Operation on a POTS access**



The ARGUS displays the access type (POTS) and the line voltage when idle.

**ARGUS - Main menu**

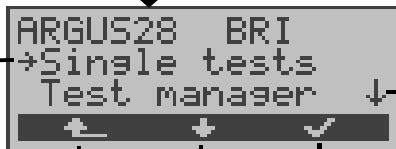
**Status display**



Repeat B-channel test

**Main Menu**

Marked Menu



The list continues ↓

Return to Status display

scroll further.

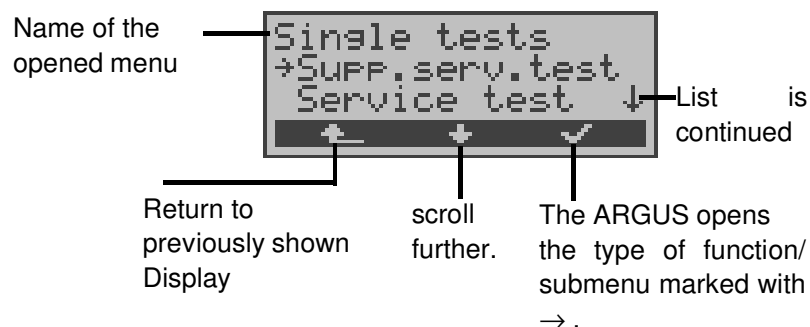
The ARGUS opens the - marked with a →

In the Main menu, you can scroll through the available menus with the < ↓ > key:

SHDSL access	PRI access	BRI access	POTS access
Single Tests	Single Tests	Single Tests	Single Tests
Test Manager	Test Manager	Test Manager	_____
Automat. Tests	Automat. Tests	Automat. Tests	Automat. Tests
_____	_____	Level Measuring	Level Measuring
_____	L1 Status	L1 Status	_____
Configuration	Configuration	Configuration	Configuration
Access	Access	Access	Access
Accu servicing	Accu servicing	Accu servicing	Accu servicing

U-interface	X.21 or V.35
Single Tests	Single Tests
Test Manager	_____
Automat. Tests	Automat. Tests
Level Measuring	_____
Configuration	Configuration
Access	Access
Accu servicing	Accu servicing

With the <✓>, you can open the menu currently marked with the → (in the example Single Tests).



**Using the numeric keys to start a function:**

Using the digit keys, you can start important ARGUS functions directly, regardless of the currently active menu level.

**SHDSL access:**

**Numeric key 6** Start Test Manager

**Numeric key 7** Open Speed-Dialing Memory

**Numeric key 9** Start Bit Error Rate Test (BERT)

**BRI access or PRI access:**

**Numeric key 2** Start Service check

**Numeric key 3** Start Supplemental Service Test

**Numeric key 4** Start Auto. Test

**Numeric key 6** Start Test Manager

**Numeric key 7** Open Speed-Dialing Memory

**Numeric key 8** Trace ON/OFF

**Numeric key 9** Start Bit Error Rate Test (BERT)



If a function is called where the ARGUS expects the entry of a digit, pressing a number key will be interpreted as the expected input.



## 7 Setting the type of access

If the parameters displayed at power on are not accepted, the Access menu will open automatically.

However, you can also open the Access menu at any time from the Main menu.

In the Access menu, the user must select the type of physical access to which the ARGUS is actually connected. When the ARGUS is restarted, the settings used last will be suggested as the default.

Status display

```
ARGUS28 BRI
B12   Level: OK
TEs P-MP DSS1
MENU RESTART
```

If you press the **<RESTART>** softkey, the B-channel test will be repeated.

**Open the Main menu**

```
ARGUS28 SHDSL
→Access
Accu servicin↓
← + ✓
```

Using the **<↓>** select the **Access** menu

The **Access** menu will open

```
Access:
→SHDSL
S-Bus interfac↓
← + ✓
```

Using the **<↓>** select the type of access (e.g. SHDSL)

Confirm the access

```
Access mode:
→STU-C 2 wire
STU-R 2 wire ↓
← + ✓
```

The **Access Mode** menu will open automatically.

The following applies for all displays: If you press the **< ↵ >**, the ARGUS will return to the previous display.

If **Automatic** is selected, a fully-automatic sequence will be started: The ARGUS will automatically determine the type of interface (BRI, PRI or POTS) and set the access to TE-mode.

## 7.1 Operation on a U-interface access

To test a U-interface access, the ARGUS is connected via the U-interface adapter to the U-interface access.

```
Access:
→S-Bus interface
PRI interface ↓
← + ✓
```

As the physical access, select **BRI** in the Access menu.

```
Access mode:
→TE automatic
TE P-P ↓
← + ✓
```

The Access Mode menu will open automatically: In the case of a U-interface access, you must choose - as Access Mode - TE Automatic, TE P-P, TE P-MP or permanent circuit.

### Connection to a U-interface access:



Connection to Line jack



Connection to the

### What the LED on the U-Interface Adapter indicates:

LED is red: not activated, e.g. cable not connected correctly

LED flashing (green/red) slowly - once per second: U-interface is activated; the ARGUS, however, is deactivated

LED flashing (green/red) quickly - twice per second: ARGUS is activated, U-interface is deactivated

LED is green: everything correct

## 8 Setting the Access Mode



The Access Mode menu is **not** selectable from the Main menu.

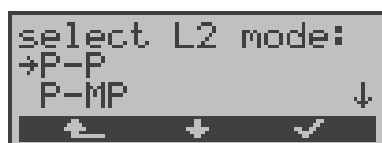
It opens automatically once the physical access is selected in the Access menu.

### 8.1 Operation on a BRI, U-Interface or PRI

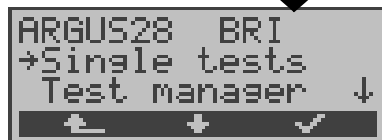
#### 8.1.1 TE-Simulation mode

##### TE automatic

On a BRI or U-interface access, the ARGUS will automatically determine the D-channel Layer 2 mode (PP or P-MP). If the ARGUS determines that the access supports both modes, the following Configuration menu will open:



Using the <↓>, select **L2 mode**



Confirm the selected **L2 mode**

The ARGUS will return to the Main menu.

##### TE P-P or TE P-MP

Afterwards, the access and the protocol stack will be initialized

in accordance with the selected setting.

When the ARGUS finds a PRI access, it will enter P-P mode.

The ARGUS will then jump to the Main menu.

#### 8.1.2 NT-Simulation mode

##### NT P-P or NT P-MP

Afterwards, the access and the protocol stack will be initialized

in accordance with the selected setting.

When the ARGUS finds a PRI access, it will enter P-P mode.

The ARGUS will then jump to the Main menu.

### 8.1.3 Permanent circuit

```
Access mode:
→Permanent swit.
-----↓
←      ↓      ✓
```

With the <↓>, select  
**Permanent switch.**

Access mode  
confirmed

```
ARGUS28 BRI
          Level: OK
LLs
      MENU START
```

The ARGUS is now switched to  
Permanent circuit mode (the  
display shows LL [Leased  
Line]) and will open the  
Status display.

Besides dial-up connections to any subscriber, ISDN also supports the use of permanent circuits switched to a specific remote location.

These permanent circuits are available after setting up Layer 1, in other words after synchronizing both terminals by exchanging HDLC-frames.


The location where the clock is generated can be selected (see page 165 Clock mode).

As a quick test of a permanent circuit, you can simply call the opposite end using a selected B-channel.

However, for a more revealing test of a permanent circuit, you should perform a bit error rate test.

Both ends of the permanent circuit must use the same channel.

### Telephony on permanent circuits

The function can be started with the -Key or via the **Phone / connec.** function in the **Single tests** menu (see Chap. 12 page 125).

After the B-channel for the permanent circuit is selected, the telephone connection will be setup automatically.

```
Permanent switch
Telephony B 01
Durat. 13:45:59
ABORT TM
```



```
ARGUS28 BRI
Level: OK
LLs
MENU START
```

The ARGUS displays the B-channel used (e.g. B01) and the duration of the permanent circuit.

Using the < **TM** > softkey: Start Test Manager(see Chap. 13 page 137)

**Terminate permanent circuit**

The ARGUS will open the Status display

### BERT on permanent circuits

A number of variations are possible in testing the permanent circuit with the bit error rate test.

In the simplest case, a B-channel loop will be set up at the remote end.

Start the BERT from the **Single tests** menu / **Bit error test** submenu / **BERT start** (see page 94 Start BERT). After selection of the channel to be tested (B-channel or D-channel), the ARGUS will send the test pattern, receive it back and evaluate it accordingly.

The displays and operation are, in largest part, similar to those of a BERT on a dial-up connection (see page 92 Bit error test), you simply need not enter call numbers or select a service.

In the case of a BRI access in end-to-end mode (on page 92 "Bit error test" and on page 100 "BERT wait"), it is also possible to run a BERT in the D-channel.

In this case, the channel select window will open:

**On a BRI access:**

```
Channel select
→B-channel(64k)
B-channel(128k↓
ABORT ↓ ✓
```

With the < ↓ > , select the channel

```
B channel select
Active B ch.: 2
Ch.available !
← DEL ✓
```

Selecting a B-channel (e.g 64k)

Enter the B-channel on the keypad. If you enter an \*, the ARGUS will choose any B-channel that is free.

```
BERT 2^15 1984k
00:24:12 2
synchron LOS: 0
ABORT TM ERROR
```

Confirm the selected channel and start the BERT.

The ARGUS will display

- the bit pattern (e.g. 2<sup>15</sup>)
- the channel / bit rate used (e.g. B02/1984k)
- the remaining test time in Hours: Minutes: Seconds (e.g. 00:24:12)
- the bit errors that have occurred (e.g. 2)
- Synchronicity of the bit pattern (synchron)
- the LOS-counter (e.g. 0)

BERT  
stop

Use the <ERROR> softkey to insert artificial bit errors to test the reliability of the BERT.

Use the <TM> softkey to Start Test Manager. see "Test Manager" on page 137

Once it is over, the ARGUS will display the results of the BERT (see "Start BERT" on page 94).

**On a PRI access:**

In the case of a PRI access in end-to-end mode (see “Bit error test” on page 92 and see “Start BERT” on page 94), a BERT can be run

- in the D-channel
- in all B-channels
- in all B-channels and in the D-channel (framed)
- in selected B-channels
- in all channels and time slot 0 (unframed)

The channel select mask will open.

In this mask you can choose from 3 predefined channel patterns:

- MegaBERT framed (default: all B-channels and the D-channel)
- MegaBERT unfr. (default: all B-channels, D-channel and time slice 0)
- B-chann. (1..30) (default: all B-channels)

All three channel patterns can be changed as needed and saved under any name desired.



When the parameters (see Page 187) are reset, the channel patterns are reset to their default settings.

```
Bit error test
→BERT start
BERT wait      ↓
←      ↓      ✓
```

With the < ↓ > select the channel pattern (e.g. B-chann. (1..30))

```
Channel select
→B chann. (1..30)
Selection      ↓
←      EDIT  ✓
```

To edit the channel pattern

```
Chan. selection:
|.....| TS0:-
|.....| frei
ABORT ALL ON
```

Edit the channel pattern see Page 41 Editing the selected channel pattern











## Loopbox with a permanent circuit

A loopbox can be setup for the permanent circuit by selecting in the **Single tests** menu / **Bit error test** submenu / the **B-channel LOOP** (see "B-channel loop" on page 101).

On a BRI access:

```
Channel select
→B-channel
All framed ↓
ABORT ↓ ✓
```



```
Permanent switch
Loopbox active01
Durat. 0:45:59
ABORT TM
```

Loopbox  
stop

The Channel select window will open.

When "B-channel" is selected, the Loopbox is setup for both B-channels. If "All framed" is selected, not only both B-channels but the D-channel will also be looped.

Activate loopbox

The ARGUS will display the channel used (B01) and the amount of time (h:min:sec) that the Loopbox has been active.

On a PRI access:

```
Channel select
→All framed
All unframed ↓
ABORT ↓ ✓
```

If **B-channel** is selected, the loopbox can be setup for B-channel 1 to 30.

If **All framed** is selected, not only both B-channels but the D-channel will also be looped.

If **All unframed** is selected, not only the B-channels and the D-channel but also time slot 0 will be looped.

## Switching from permanent circuit mode

```

ARGUS28 SHDSL
→Access
  Accu servicing↓
  ←  ↓  ✓

```

Using the < ↓ >, select the **Access** menu.



The Access menu will open

```

Access:
→S-Bus interface
  PRI interface ↓
  ←  ↓  ✓

```

Using the < ↓ >, select the desired access.



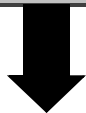
The Access mode menu will open.

```

Access mode:
→TE P-MP
  NT P-P ↓
  ←  ↓  ✓

```

Using the < ↓ >, select the desired Access mode (e.g. TE P-MP).



Confirm the selected access mode

```

ARGUS28 BRI
B12   Level: OK
TEs P-MP DSS1
      MENU RESTART

```

The ARGUS will open the Status display

### 8.1.4 BRI/PRI Monitor

The ARGUS accepts all of the D-channel signals from the BRI or PRI access and sends these D-channel signals over the serial interface to a PC, which must be running ARGUS WINplus or WINAnalyse. The bus and Layer 1 are not influenced by the monitoring.

#### Monitoring a BRI access

```
Access mode:
→Monitor
Recorder      ↓
←  ↓  ✓
```

Using the < ↓ >, select **Monitor**.

Confirm the selected access mode

```
ARGUS28 BRI
Level: OK
Monitor
MENU START
```

The ARGUS evaluates the level on the NT-side: OK, << (too low), >> (too high), \_ (no level)  
(Monitoring **not** yet active)

#### Start monitoring The Trace LED lights.

```
Monitoring
Signals:      25
Time:        00:02:59
ABORT LISTEN
```

The ARGUS displays the number of recorded signals (e.g. 25) and the recording time in h:min:sec.  
Select < ABORT > to stop monitoring.

#### Listening-in on voice data

```
B channel select.
Active B ch.: 2
Ch.available !
←  DEL  ✓
```

The B-channel select dialog will open.

Enter the B-channel. The ARGUS will switch the handset to this B-channel. It is now possible to listen to the voice data (in the direction Network --> User).

**Listening**

### Simultaneous call display while monitoring a BRI access

```
Monitoring
Signals:      52
Time:        00:04:16
ABORT LIST. CALL
```

While monitoring, the ARGUS will search all of the D-channels signals sent for a SETUP. If a SETUP is detected, the <CALL> softkey will be displayed.

Display the call parameters of the last SETUP received.

```
N -> U      FaxG3
125670      B01
to: 02351901720↓
← → SIGNAL
```

The ARGUS displays the call direction (**Net -> User**), the service (e.g. FaxG3), the own number (e.g. 125670), the channel used (e.g. B01) and the destination number (e.g. 02351 901729).

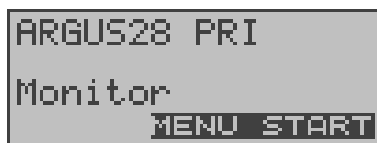
```
N -> U      FaxG3
TON: unknown
NP: unknown ↓
← → SIGNAL
```

Display of other parameters: Sub-address (SUB), User-User-Info (UII), DSP messages (if existent), Type of Number (T.O.N) , Numbering plan (NP).

```
Monitoring
Signals:      52
Time:        00:04:16
ABORT LIST. CALL
```

### **Monitoring a PRI access:**

Same procedure as when monitoring a BRI access



```
ARGUS28 PRI
Monitor
MENU START
```

ARGUS messages on a PRI access:

As soon as a change occurs, the ARGUS will send a time-stamped report of the following alarms/states to the PC, which will evaluate them:

- Signal
- FAS
- CRC4det
- A bit
- AIS

The ARGUS will check the following values and counters every second and, in the event of a change, will pass them on the PC:

- Sa5-bit (Rx)
- Sa6-bit (Rx)
- E-bit
- Ecnt
- CRC Err.
- Cod.Err.
- Fram.Err.

### **Display of the L1 Status in PRI Monitor mode**

The L1 status function is only available in PRI Monitor mode.

The Layer 1 alarms and messages are presented in several windows, which permit detailed statements regarding the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).

When the function is started, it will first automatically open the “L1 status TE” function, which shows the “TE-side parameter”. For a comprehensive explanation of the displayed information: see “The L1 status of a PRI access” on page 157.



```

ARGUS28 PRI
Monitor
MENU START

```

The ARGUS is in PRI Monitor mode  
(Monitoring is **not** active)

```

ARGUS26 PRI
→L1 status
Configuration ↓
←      ↓      ✓

```

With the <↓>, select  
**L1 status**.

```

L1 status 01:32
Signal = +
FAS      + ↓
ABORT NT RESET

```

Display of the "TE-side parameters"  
Use the ↓-Key to scroll through the display.

Press <NT> to switch to the "L1 status NT" function; the "NT-side parameters" will be displayed

Press <RESET> to reset the History function and all counters.

Press <ABORT> to quit the function and return to the menu list.

### 8.1.5 BRI/ PRI Recorder

In Recorder mode, the ARGUS passively monitors the connected BRI or PRI access.

The ARGUS records all of the D-channel signals sent in both directions without affecting the access or Layer 1.

Unlike in the Monitor mode, the recorded D-channel signals will be saved in the ARGUS's internal Flash memory and not sent to a PC.

The storage is organized as a ring buffer, i.e. as soon as the Flash memory is full, the ARGUS will automatically overwrite the oldest data.

Example on a BRI access:

```
Access mode:
*Recorder
Permanent swit↓
←   +   ✓
```

Select BRI Recorder (or PRI Recorder on a PRI access).

Start the Recorder function.

```
ARGUS28 BRI
          Level: OK
Recorder
MENU START
```

The ARGUS is now in Recorder mode (Monitoring is **not** yet active!) and will check the levels on the NT and TE sides of the BRI access. Displayed in the second line: Level on the NT-side (<< too low, >> too high, OK, \_\_\_ no level), level on TE-side (<< too low, >> too high, OK, \_\_\_ no level)

### Recording started

(The Trace LED flashes)

```
Recording
Signals:      120
Time:        0:03:21
ABORT LISTEN
```

The display shows the number of signals received and the duration of the recording in hours:minutes:seconds.

Using <LISTEN>, switch the speech path onto a B-channel. First the B-channel select dialog will open. After selecting a B-channel, it will be possible to listen to the voice data (in the direction Network ----> User) on this channel.

Quitting the active recording function. The ARGUS is then in the "Recorder" mode.

### Parallel call display while recording

The ARGUS searches all of the D-channel signals sent for a SETUP. If a SETUP is detected, the <CALL> softkey will be displayed.

Use <CALL> to display the call parameters of the last SETUP received. (see page 47 Simultaneous call display while monitoring a BRI access)

**Operation on a PRI access:**

Time Slot 16

```

Recording   TS16
Signals:    120
Time:       0:03:21
ABORT LISTEN

```

Use <LISTEN> to switch the ARGUS speech path onto a B-channel. First the B-channel select dialog will open. After selecting a B-channel, it will be possible to listen to the voice data (in the direction Network ----> User) on this channel.

Use <ABORT> to stop the active recording function. The ARGUS is then in the "Recorder" mode.

The ARGUS saves a timestamped report of any changes in the following alarms/states:

- Signal
- FAS
- CRC4det
- A bit
- AIS

The ARGUS will check the following values and counters every second and, in the event of a change, will save them:

- Sa5-Bit (Rx) / (Tx)
- Sa6-Bit (Rx) / (TX)
- E-Bit
- Ecnt
- CRC Err.
- CRC rel.
- Cod.Err.
- Cod.rel
- Frm.Err.

**8.1.5.1 Administration of the recorded data**

In the Recorder mode, several functions are available for

administration of the data saved in the Flash memory:

- PC load all
- PC load session
- Reset Flash
- Info Flash

### PC load all

With the **PC load all** function, all of the contents of the Flash memory will be downloaded via the serial interface to the PC, which must be running either WINplus or WINanalyse.

```
ARGUS28 PRI
Recorder
  MENU START
```

The ARGUS is in "Recorder" mode  
(Recording not active)

```
ARGUS28 PRI
→PC load all
PC load sessio↓
←  +  ✓
```

Using <↓>, select  
**PC load all.**

```
PC load all
45 % done
ABORT
```

**Start charging the accumulators**

Select < **ABORT** > to stop the transfer.

```
PC load session
Loading done
Delete flash?
ABORT  YES
```

After the data has been successfully transferred to the PC, the Flash memory contents can be deleted. Select < **YES** > to delete the Flash memory contents. Select < **ABORT**> to quit and **not** delete the Flash memory contents.

### PC load session

In the ARGUS, the storage in the internal Flash is organized

as a ring buffer, which can hold the data from a series of several sessions (i.e. independent trace recordings). At the start of each session, the date and time will be written in the ring buffer. The

**PC load session** function transfers all of the data session-by-session to the PC on which either WINplus or WINanalyse must be running. The time and date that the session was started will be displayed in WINplus/WINanalyse.

```
ARGUS28 PRI
Recorder
MENU START
```

The ARGUS is in "Recorder" mode  
(Recording not active)

```
ARGUS28 PRI
→PC load session
Internal decod↓
← ↓ ✓
```

Using <↓>, select **PC load session**.

```
PC load session
45 % done
ABORT
```

The loading of the individual sessions will start.

Select < **ABORT** > to stop the transfer.

```
PC load session
Session done
Another session?
ABORT CONT.
```

Multiple sessions can be transferred to the PC one after the other.

Press < **CONTINUE** > to load the next session to the PC.

```
PC load session
Loading done
Delete flash?
ABORT YES
```

After the data has been successfully transferred to the PC, the Flash memory contents can be deleted.

Select < **YES** > to delete the Flash memory contents.

Select < **ABORT** > to quit and **not** delete the Flash memory contents.

### Internal decoding

The ARGUS will decode the D-channel data stored in the Flash memory:

```
ARGUS28 PRI
→Internal decod.
Info flash ↓
← + ✓
```

Using the < ↓ >, select **Internal decod..**

```
Info Text
<SABME
>UA
ABORT + DECODE
```

Display the signals sent to the network ("**<**" in the example SABME) and to the user side ("**>**" in the example UA)  
Use the < ↓ > to scroll through the display.  
Press < **DECODE** > to display a detailed presentation (max. 3 levels).

### Info Flash

With this selection, you can read the status of the data in the Flash memory:

- The number of saved sessions
- Free memory in MB and in percent

```
ARGUS28 PRI
Recorder
MENU START
```

The ARGUS is in "Recorder" mode  
(Recording not active)

```
ARGUS28 PRI
→Info flash
Reset flash ↓
← + ✓
```

With the < ↓ >, select **Info Flash.**

**Display information on the status of the Flash memory.**

```
Info flash
Sessions: 45
Free:2.00MB 50%
←
```

Number of sessions stored (e.g 45) and free Flash memory in MB and percent.

Use < **←** > to return to the menu.

## Reset Flash

The **Reset Flash** function will delete the entire contents of the data Flash memory.

```
ARGUS28 PRI
Recorder
  MENU START
```

The ARGUS is in "Recorder" mode  
(Recording not active)

```
ARGUS28 PRI
→Reset flash
Automatic test↓
← + ✓
```

With the < ↓ >, select **Reset Flash**.

```
Reset flash
Delete flash?
ABORT YES
```

Select < **YES** > to delete the Flash memory contents. The procedure can take several seconds. The ARGUS will show the progress of the deletion as the percentage done.

**It is not possible to stop the process of deletion!**

Use < **ABORT** > to return to the previous menu; the contents of the Flash memory will **not** be deleted.

## 8.1 Operation on a POTS (analog) access

### 8.1.1 POTS terminal

```
Access:
→POTS interface
Automatic ↓
← ↑ ✓
```

Using the < ↓ >, select **POTS interface**.

Confirm the access

```
Access mode:
→POTS terminal
POTS monitor ↓
← ↑ ✓
```

Using the < ↓ >, select **POTS terminal**.

The Argus behaves like a POTS (analog) terminal.

```
ARGUS28 POTS
→Single tests
Test manager ↓
← ↑ ✓
```

The ARGUS will return to the Main menu.

### 8.1.2 POTS monitor

Essentially, the POTS (analog) monitor provides a high impedance tap that does not influence the interface. You can listen to the line with the integrated handset without having the ARGUS send on or otherwise influence the interface.

```
ARGUS28 POTS
Voltage: 55.0V
MENU START
```

The ARGUS displays the voltage level on the line when it is "on hook" (not busy).

#### Start monitoring

```
POTS mon. U: U
02351907070
DTMF: 2345678 ↓
ABORT DEL.
```

The ARGUS displays the voltage (when "off hook"), the number of the caller (when CLIP is supported) and the DTMF characters dialed by both telephone subscribers and the SMSs received (optional).

Any received DTMF-characters will be appended to the line, which will shift left for each character once it is.

**Monitoring stop**

full.



An incoming call will be signalled acoustically.

Press the < ↓ > -Key to display additional information, if available on the access (e.g. advice of charges).

Press < **DEL** > to clear the display.

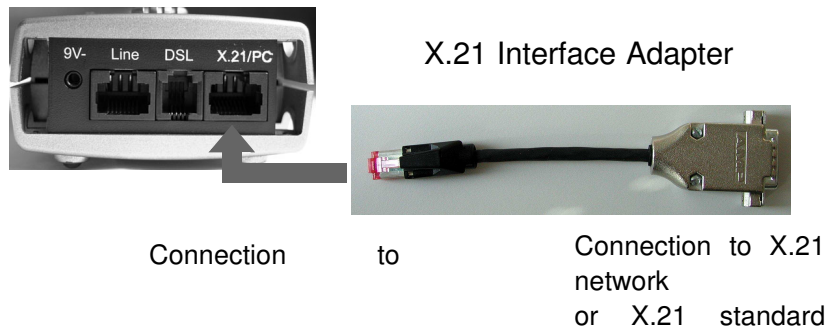
## 9 Operation on an X.21 or V.35 Access

The ARGUS will perform a bit error test on the X.21 or V.35 access in accordance with the ITU guidelines G.821 and G.826.

Besides the measurement results, the ARGUS will also display the X.21/V.35 data rate.

Use the adapter cable to connect the ARGUS to the X.21/V.35 network.

Example - on an X.21



Use the < ↓ > to select **X.21** .



## 9.1 Start BERT

The ARGUS will detect the clock of the X.21/V.35 permanent circuit, calculate the data rate and then automatically search for the channels used. On these channels, the ARGUS will send the test pattern (see page 172 Bit pattern BRI/U) selected, receive it again and evaluate it in accordance with the ITU guidelines G.821 and G.826 (loopbox required at the remote end).

```
ARGUS28
X.21 test
MENU START
```

Press **<START>** to start the **BERT**

```
BERT 2^15 1984k
15:45:42 3
synchron LOS: 0
ABORT RES. ERROR
```

Displays the bit pattern ( $2^{15}$ ), the X.21/V.35 data rate (1984 kBit ), the remaining test duration in h:min:sec (15:45:42), the number of bit errors that have occurred (3), the synchronicity of the bit pattern (synchron) and the LOS-counter.

Press **<RES.>** to restart the bit error test; the counters (e.g. number of bit errors) will be reset.

Press **<ERROR>** to inject an “artificially generated” bit error, which can demonstrate the reliability of the measurements in particular when running end-to-end tests.



When a bit error is detected, this will be signaled by a brief alarm (if the alarm is enabled); in the event that the synchronisation is lost, a constant alarm will sound.

The alarm bells can be switched off.  
(see page 184 Alarm bell).

The measurement time for the BERT can be set with the **BERT config.** function (see page 171 BERT - duration).

### 9.1.1 Display the test results

The ARGUS will display the following test results automatically after the test is completed:

- Bit pattern and X.21/V.35 data rate
- Transferred data in kBits (in the example 10309 kBits)
- Number of the bit errors that have occurred (in the example 10)
- Bit error rate (in the example  $9.7 \cdot 10^{-7}$  (= 0.00000097))

The evaluation of the results depends on the error threshold that you set ((see page 171 Error level)).

OK = bit error rate is less than the error threshold (set by the user) and NO = bit error rate is above the error threshold.

```
BERT 2^15 1984k
Result: 10309Kb
      10 9,7E-07 OK
MENU    MORE
```

Press **<MORE>** to display other characteristic values (in accordance with ITU-T G.821 and G.826) All values are given in percentages.

The ARGUS evaluates whether the test results satisfy the limits specified in the CCITT G.821/G.826 under consideration of the defined hypothetical reference connection HRX (display shows OK or NO).

(see page 92 Bit error test)

Press **<MENU>** to return to the BERT menu.

### 9.1.2 Saving the test results in the ARGUS

```
BERT 2^15 1984k
Result: 10309Kb
      10 9,7E-07 OK
MENU    MORE
```

Display of the results

Press the  -Key

```
Save
result?
YES    NO
```

Press **<YES>** to have the ARGUS save the results.

(see page 97 BERT - saving)

## **9.2 BERT wait**

In this mode, the BERT will wait for the BERT at the remote end which is necessary for an end-to-end test:  
see "BERT wait" on page 100.



## 10 SHDSL Tests

The ARGUS supports a variety of access types. Depending on the access mode selected (and the protocol), the following single tests are supported:

Access mode	Single Tests
<b>STU-C 2-wire</b> The ARGUS simulates the network side of the SHDSL connection (central office)	- SHDSL test - Bit error test - Connection
<b>STU-R 2-wire/PRI</b> Connection of the ARGUS to the SHDSL access (using the DSL jack) or to the PRI network (e.g. connection to a PBX system using the Line jack). The ARGUS replaces the SHDSL modem.	- SHDSL test
<b>STU-R 2-wire</b> The ARGUS simulates the user side of the SHDSL connection (remote).	- SHDSL test - Bit error test - Connection

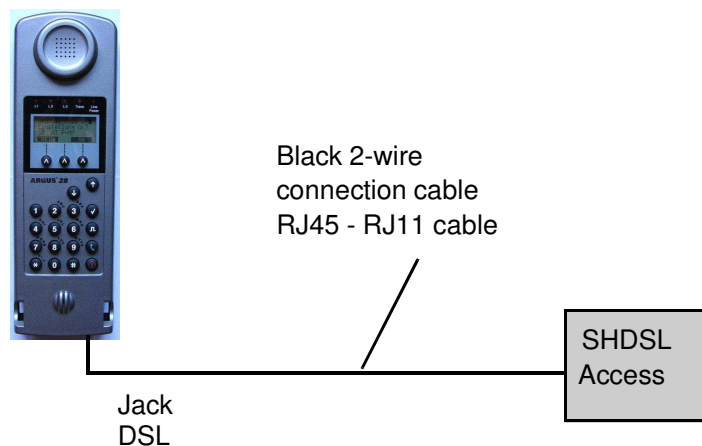
The ARGUS displays the results during the test.

If desired, the ARGUS will save the test results (even if the test is aborted) together with the date and time in its internal Flash memory.

The saved results can later be sent to a PC or viewed on the display.

## 10.1 - SHDSL Line Test

The ARGUS is connected directly to the SHDSL access via the SHDSL 2-wire connection cable.



### Setting the access mode:

```
ARGUS28 SHDSL
→Access
Accu servicina↓
← + ✓
```

In the Main menu, use the < ↓ > to select the **Access** menu.

```
Access:
→SHDSL
S-Bus interfact↓
← + ✓
```

Open the **Access** menu

Using the < ↓ >, select **SHDSL**.

The Access mode menu will open automatically.



```
Access mode:
→STU-C 2 wire
STU-R 2 wire ↓
← + ✓
```

Use < ↓ > to select the desired Access mode (**STU-C 2-wire**, **STU-R 2-wire** or **STU-R/PRI**).

The ARGUS will open the Status display

```
ARGUS28 SHDSL
Voltage: 105.0V
STU-R 2 wire
MENU START
```

The ARGUS will display the selected access mode (in the example: STU-R 2-wire) and the supply voltage on the SHDSL line.



**If the ARGUS is not yet active**, you must first select a test and start it. (see the next pages).

If you press the < ↶ >, the ARGUS will return to the previous display.

In the SHDSL line test, the ARGUS first sets up a SHDSL connection and then determines all the relevant performance parameters.

The ARGUS displays the performance parameters during the test and saves them in the internal FLASH memory when the test is finished or aborted.

### Parameter settings:

The following parameters can be configured for the test (see Page 161):

**SHDSL parameter:** Spectrum, Clock/framing, Channel selection, Power back off and EOC using

The ARGUS  
Status display

Press **Menu** to open the Main menu or **<START>** to begin the SHDSL line test

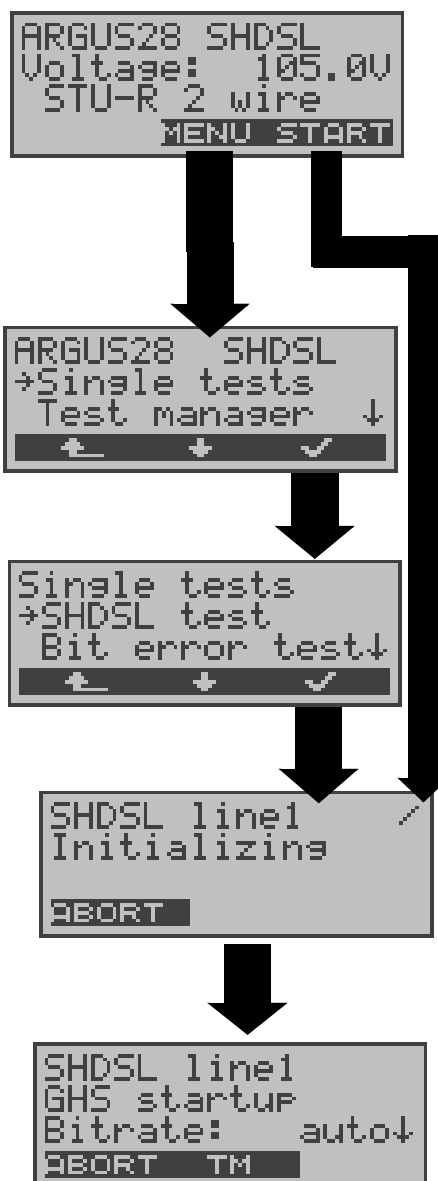
Using the **<↓>**, select the **Single tests** menu.

Open the Single tests menu

Using the **<↓>**, select **SHDSL test**.

Initialisation of the SHDSL software

The ARGUS synchronises itself with the remote end (in the example, with STU-C).



```
SHDSL line1
GHS transaction
Bitrate: auto↓
ABORT TM
```

The ARGUS will setup a SHDSL connection and display the associated "states" and bit rate.

```
SHDSL line1
Transmit SR
Bitrate: 2312kb↓
ABORT TM
```

```
SHDSL line1
Transmit TR
Bitrate: 2312kb↓
ABORT TM
```

etc. ....

```
SHDSL line1
GHS no comm.mode
Bitrate: 2312kb↓
ABORT TM
```

In the event of synchronisation problems, "no. comm. mode" will be displayed.


In this case, check the SHDSL parameters in regard to synchronisation with the remote end (see Page 161) Press < ABORT> to cancel the setup of the connection.

```
SHDSL line1
Data
Bitrate: 2312kb↓
ABORT TM MORE
```

**The SHDSL connection is setup.**



```
SHDSL line1
B channel: 36
Z channel: 1↓
ABORT TM MORE
```

Use the -Key : to scroll through. The ARGUS displays the bit rate, the B and Z-channels, the rep. count and the voltage on the SHDSL line.



```
SHDSL line1
Rep.Count: 0
Voltage: 0 ↓
ABORT TM MORE
```

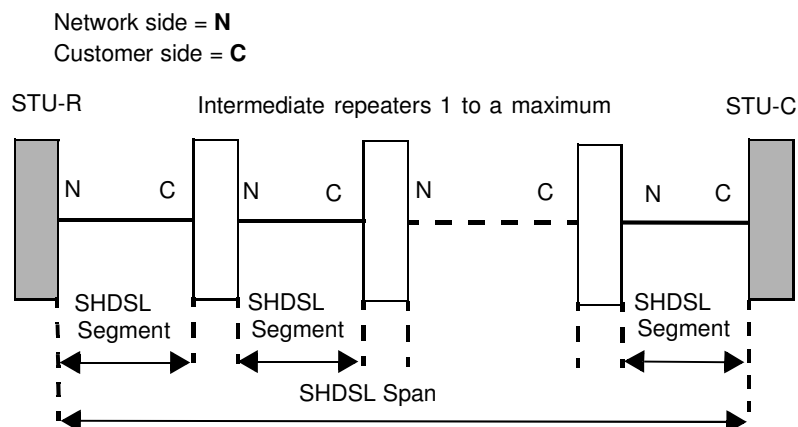
Press < TM > to open the Test Manager; you can then start a bit error test or setup a connection, see "Test Manager" on page 137



**Display of the performance parameters**

## Display of the performance parameters

The ARGUS displays the SHDSL line's performance parameters for the remote end (R) and the central office end (C) (see "SHDSL Span" in the illustration below) and for each SHDSL line segment (see "SHDSL Segment" in the illustration below); the parameter "EOC using" must be set to "on" see Page 162.



```

Param.  STU-R/-C
SNR margin [dB]:
R: +20 C: +12↓
← TM →


```

### SNR Margin

This value is given in dB and shows how much additional noise the transmission could take before the BER (Bit Error Rate) would exceed  $10^{-7}$ .

Press < → > to view the parameters of the next line segment. The parameters shown are those for the line segment currently indicated in the top line.

Press < ← > to scroll back.

Use the -Key to scroll through the performance parameters.

Use the < **TM** > softkey to start the Test Manager (Page 137).

```

Param.  STU-R/-C
Attenuation[dB]:
R:      0 C:      0↓
←      TM      →

```

**Attenuation (dB)**

Line attenuation in dB



```

Param.  STU-R/-C
Power [dB]:
R:      8 C:      8↓
←      TM      →

```

**Power (dBm)**

power based on 1mW



```

Param.  STU-R/-C
CRC count:
R:      0 C:     125↓
←      TM      →

```

**CRC Count****Cyclic Redundancy Check Counter**

Number of CRC6 checksum errors



```

Param.  STU-R/-C
LOSWS count:
R:      0 C:      0↓
←      TM      →

```

**Loss of Sync Defect****Word seconds**

Number of faulty sync words per second



```

Param.  STU-R/-C
ES count:
R:      0 C:      0↓
←      TM      →

```

**Errored Second Count (ES Count)**

Number of errored seconds (seconds with CRC errors)



```

Param.  STU-R/-C
SES count:
R:      0 C:      0↓
←      TM      →

```

**Several Error Second Count (SES Count)**

Number of seconds with more than 50 CRC errors



```

Param. STU-R/-C
US count:
R: 0 C: 0↓
← TM →

```

### Unavailable Second Count (US count)

Number of seconds in which no SHDSL connection was available.

Press < → > to scroll to the display of "SHDSL line 1"

```

SHDSL line1
Data
Bitrate: 2312kb↓
ABORT TM MORE

```

```

SHDSL line1
Save ?
NO YES

```

Press <YES> to have the ARGUS save the result in the first available record in the FLASH memory (see "Automatic Tests" on page 142).

### Storing the result

```

save as:
AMP_5
ABORT DEL Ⓜ>AB

```

Using the numeric keys enter the name under which the result should be saved (Default: AMP\_1, AMP\_2... or the call number of the access under test if the number has been entered into the speed-dialing memory)

**Use the softkey on the right** to shift the keypad (the softkey on the right assumes a different meaning when pressed):

< 12>**ab** > : entry of the digits 0 to 9 plus \* and #

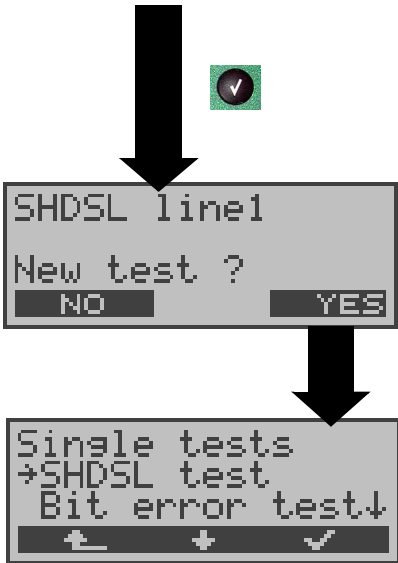
< **ab**>**AB** > : entry of the lowercase characters and @, /,- and . (e.g. to enter a "c" press the "2" on the keypad three times)

< **AB**>**12** > : entry of the uppercase characters and @, /,- and .

Use the ↑,↓-Keys to move the cursor to the right or left



Press < DEL > to delete the digit before the cursor.  
✓-Key: Store result  
< ABORT >: Result not stored



Press < YES > to start a new test without reinitialising the software and setting up the SHDSL connection again.

## 10.2 Displaying the stored results

(see “Automatic Tests” on page 142)

```
ARGUS28 SHDSL
→Automatic tests
  Configuration ↓
←  ↓  ✓
```

In the Main menu, use the <↓> to select **Automatic tests**.

```
Measure.report
→ 1 30.04. 14:45
  2 AMP_2 ↓
←  NAME  ✓
```

Use the <↓> -Key to select the record (e.g. AMP\_2) holding the saved test results.

```
Auto test No.: 2
→Display result
  Test data to P↓
←  ↓  ✓
```

Use the <↓> to select **Display result**.

```
Auto test No.: 2
Data
Bitrate: 2312kb↓
ABORT + CONT.
```

Display the test results  
Use the <↓> to scroll.

```
Auto test No.: 2
SNR margin [dB]:
C: +9 R: +9↓
ABORT + CONT.
```

Display the performance parameters

```
Auto test No.: 2
→Display result
  Test data to P↓
←  ↓  ✓
```

Close the results display.



### 10.3 Bit error test

The bit error rate test (BERT = Bit Error Rate Test) serves to check the transmission quality of the access circuit.

In the bit error test, the ARGUS sets up a SHDSL connection to a remote tester or places a call to itself, sends a standardized (quasi-) random number string and compares the received data with that which was sent. During the test, the ARGUS counts the bit errors and after the test is done it calculates the bit error rate and other parameters in accordance with the ITU guidelines G.821 and G.826.

Normally, the bit error rate during a 1 minute test should be less than  $10^{-7}$ .

However, if the test shows a higher bit error rate, it should be repeated with a measurement time of 15 minutes to increase its statistical precision.

The BERT can be performed in different ways:

#### **BERT with a loopbox**

A loopbox (e.g., another member of the ARGUS family of testers at the remote end) is required.

#### **BERT end-to-end**

This test requires a waiting remote tester such as an ARGUS in the **BERT wait mode**. A bit pattern is sent to this tester.

Independent of the received bit pattern, the remote tester uses the same algorithm to generate a bit-pattern that it sends back.

Therefore, both directions are tested independently.

### 10.3.1 BERT start

The following parameters are required for the BERT:

- **SHDSL parameter**

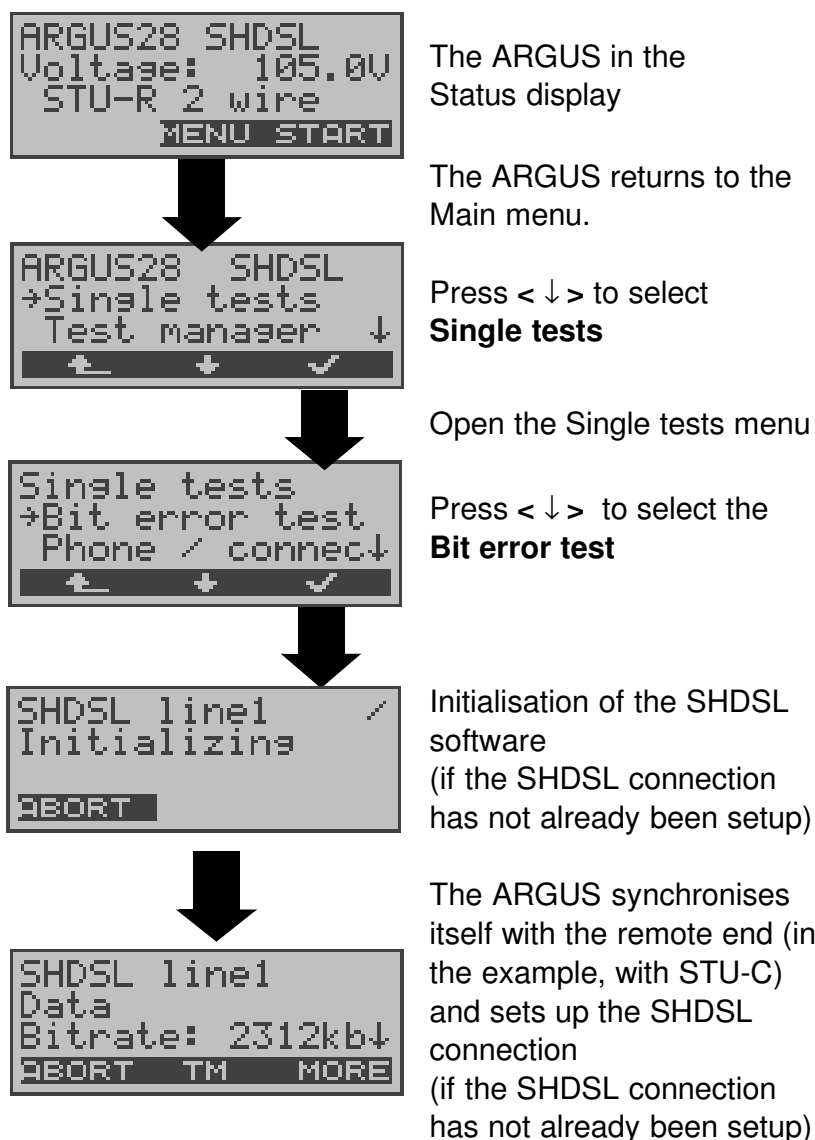
- **BERT parameters:**

**Duration of the BERT** (default setting = 1 minute)

**Error level:** If the bit error rate is greater than the error level value, the ARGUS will display a NO in the test result. If the bit error rate is less than the error level value, the ARGUS will display an OK (default setting  $10^{-06}$  )

**HRX value** in % (hypothetical reference connection see ITU-T G.821) (default setting = 15%)

**Bit pattern**, which will be sent during the test  
(default setting =  $2^{15}-1$ )



The ARGUS displays the available channels.

Selection of the B-channels used in the BERT.

```
BERT 2^15 2312k
00:00:25 0
synchron LOS: 0
ABORT TM ERROR
```

### Start BERT

After the ARGUS has setup the connection and synchronized the send and receive directions, it will display the bit pattern (e.g.  $2^{15}$ ), the data rate (e.g. 2312kB), the remaining test time in h:min:sec, the number of bit errors that have occurred (e.g. 0), the synchronicity of the bit pattern (synchronous or asynchronous) and the LOS-counter.

If you press < **ERROR** >, the ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).

Press < **TM** > to start the Test Manager (see “Test Manager” on page 137 )

Press < **ABORT** > to stop the BERT.

**0 -Key:** Restarts the bit error test. The test time and number of bit errors will be reset.



When a bit error is detected, this will be signaled by a brief alarm; in the event that the synchronisation is lost, a constant alarm will sound (see “Alarm bell” on page 184).

```
BERT 2^15 2312k
Result: 10309Kb
      10 9,7E-07 OK
MENU  TM  MORE
```

**The test results display:**

The bit pattern (e.g. 2<sup>15</sup>),  
 The data rate in kBits (e.g. 2312 kB), the transferred data in kBits (e.g. 10309 Kb)  
 The number of bit errors (e.g.10),  
 The bit error rate (e.g. 9.7E-07 = 9.7·10<sup>-7</sup> = 0.00000097),  
 The evaluation of the results depends on the error threshold (OK).

```
BERT 2^15 2312k
Result: 10309Kb
      10 9,7E-07 OK
MENU  TM  MORE
```

<MENU>: The ARGUS returns to the BERT menu.

Display of other characteristic values (in accordance with ITU-T G.821/G.826)  
 All values are given in percentages.

```
BERT 2^15 2312k
HRX G821: 15% OK
EFS : 93,75%↓
MENU  TM  SIMPLE
```

The ARGUS evaluates whether the test results satisfy the limits specified in the CCITT G.821/G.826 under consideration of the defined hypothetical reference connection (HRX). (see Page 96).

↓ -Key: Scroll



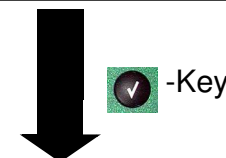
```
Save result?
YES      NO
```

**BERT - saving the result**

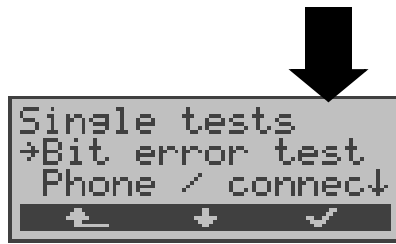
The ARGUS will save the result in the first available record in the FLASH memory (see "Automatic Tests" on page 142).

```
save as:
AMP_5
ABORT DEL 3b>AB
```

Save the test results see Page 70



```
SHDSL line1
New test ?
NO      YES
```



Another test can be started without reinitializing the SHDSL test software and setting up the SHDSL connection again.

Displaying the saved test results  
see "Displaying the stored results" on page 72

Note: kBit = Bit \* 1000  
KBit = Bit \* 1024

### 10.3.2 BERT wait

In BERT wait mode, the ARGUS will wait for the BERT at the remote end which is necessary for an end-to-end test:

```
Single tests
→Bit error test
Phone / connect↓
←  +  ✓
```

In the Single tests menu, use the < ↓ > to select **Bit error test**.

Open the Bit error test menu

```
Bit error test
→BERT wait
B channel loop↓
←  +  ✓
```

Using the < ↓ >, select **BERT wait**.

Activate "BERT wait"

```
BERT 2^15  2312k
00:00:25   0
synchron LOS: 0
ABORT TM ERROR
```

Using < ERROR > artificially generate a bit error. Press < **ABORT** > to stop the BERT.

```
BERT 2^15  2312k
Result:  10309Kb
        10 9,7E-07 OK
MENU  TM  MORE
```

After the test period has elapsed, the ARGUS will display the result of the BERT.

Press < **TM** > to start the Test Manager (Page 137)

```
Bit error test
→BERT wait
B channel loop↓
←  +  ✓
```

10.3.3 B-channel loop

B-channel loop mode is required in order to run a bit error test using a loopbox. All B-channels and Z-channels will be looped back.

```
Bit error test
→B channel loop
-----↓
←   ↓   ✓
```

Activate loopbox

```
Permanent switch
Loopbox active**
Durat.  0:45:50
ABORT TM
```

The ARGUS will display the amount of time (h:min:sec) that the loopbox has been active.

**Loopbox stop**

## 10.4 Telephony on permanent circuits

To test a permanent circuit, you can simply call the opposite end using a selected B-channel. Both ends of the permanent circuit must use the same B-channel.



The SHDSL parameter channel selection (see Page 162 ) may only be set to "auto", when the remote end sets the data rate.



A connection can only be setup at data rates less than or equal to 2048 kBits, i.e. the channel selection parameter may be set to a maximum of 32 B-channels.

```
Single tests
→Phone / connec.
-----↓
←  ↓  ✓
```

Use <↓> to select **Phone / connec.** in the Single test menu

or press the  -Key.

```
B channel select
Active B ch.: 2
Ch.available !
← DEL ✓
```

Use the ↓,↑ - keys to scroll through the available channels and to select one.

### Setup a permanent switch

The ARGUS displays the B-channel used (e.g. B01) and the duration of the permanent circuit.

Use the < **TM** > softkey to start the Test Manager (see "Test Manager" on page 137)

```
Permanent switch
Telephony B 01
Durat. 13:45:59
ABORT TM
```

**Terminate permanent circuit**

```
Single tests
→Phone / connec.
-----↓
←  ↓  ✓
```



## 11 Single Tests

### 11.1 Test the Supplementary Services

The ARGUS checks whether the access under test supports supplementary services in 1TR6 or DSS1 protocol.

#### 11.1.1 Suppl. Services Test on 1TR6

(only BRI or U-Interface)

```
ARGUS28 BRI
→Single tests
  Test manager ↓
┌───────────┴───────────┐
└───────────┬───────────┘
```

Using the < ↓ > in the Main menu, select the **Single tests** menu.

```
Single tests
→SUPP.serv.test
  Service test ↓
┌───────────┴───────────┐
└───────────┬───────────┘
```

The **Single tests** menu opens

Using the < ↓ >, select **Supp.serv.test**.

```
SUP.serv.req.1TR6
1TR6 SS test
ABORT
```

**Start test**

The test is running.

```
SUP.serv.req.1TR6
Sperre           +
AWS 1            - ↓
┌───────────┴───────────┐
└───────────┬───────────┘
```

The test results are displayed automatically:

+ = suppl. service supported

- = suppl. service not supported

Use < ↓ > to scroll through the test results

The ARGUS will return to the

<b>Sperre</b>	Blocking enabled for outgoing calls
<b>AWS1</b>	Call forwarding type 1 enabled (continuous)
<b>AWS2</b>	Call forwarding type 2 enabled (case by case)
<b>Anschluss GBG</b>	Access belongs to a Closed Users Group

## 11 Single Tests

---

<b>Geb.anzeige</b>	Advice of charge
<b>Rufnummern-Id</b>	Setup call number identifier - against malicious calls

## 11.1.2 Suppl.service interrogation in DSS1

```

Single tests
→SUPP.serv.test
Service test ↓
┌───────────┴───────────┘
└───┬───┘
    ↓

```

In the Single tests menu, using the < ↓ >, select **Supp.serv.test**.

```

Numbers
Own number
0235190700
┌───────────┴───────────┘
└───┬───┘
    ↓

```

Open the enter Numbers dialogue

Use the keypad to enter the "Own number" (the number of the access under test) (see "Saving Call Numbers" on page 185.). The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

```

Select service
→Tel.ISDN
Fax G3 ↓
┌───────────┴───────────┘
└───┬───┘
    ↓

```

Using the < ↓ >, select the service which should be used for the supplementary services test.

```

B channel select
Active B ch.: 2
Ch.available !
┌───────────┴───────────┘
└───┬───┘
    ↓

```

Confirm the service.

Enter the B-channel on the keypad. By default, the channel last used will be suggested. If you enter an \*, the ARGUS will choose any B-channel that is free.

```

SUPP. Serv. test
→TP test
HOLD test ↓
┌───────────┴───────────┘
└───┬───┘
    ↓

```

Confirm the B-channel

Use the < ↓ > to select the supplementary service (e.g. TP) that you want the ARGUS to check whether it is supported on the access under test.

```

SUPP. Serv. test
TP test +
-----
┌───────────┴───────────┘
└───┬───┘
    ↓


```

**Start test**

The ARGUS will display the results of the test once it is done:


+ = suppl. service supported  
 - = suppl. service not supported

Use the < ↓ > to scroll through the test results.

If you press the <  > , the ARGUS will return to the previous display (this applies for all displays).

Test	Comments
<b>TP</b>	The ARGUS tests the <b>TP</b> (Terminal Portability) supplementary service by making a self call.
<b>HOLD</b>	The ARGUS tests the <b>HOLD</b> supplementary service by making a self call.
<b>CLIP</b> ( <b>CLIP</b> , <b>CLIR</b> , <b>COLP</b> , <b>COLR</b> )	<p>In this test, the ARGUS checks whether the 4 supplementary services <b>CLIP</b>, <b>CLIR</b>, <b>COLP</b> and <b>COLR</b> are supported. To do so, the ARGUS will setup as many as three calls to itself.</p> <p><b>CLIP:</b> Will the calling subscriber's number be displayed at the called subscriber? (<b>t</b> = CLIP temporarily available <b>p</b> = CLIP permanently available)</p> <p><b>CLIR:</b> Will the display of the calling subscriber's number at the called subscriber be suppressed or is it possible to temporarily suppress the display? If the ARGUS displays an *, it is not possible to determine the availability of the service, since no CLIP has been setup. (<b>t</b> = CLIR temporarily available <b>p</b> = CLIR permanently available)</p> <p><b>COLP:</b> Will the call number of the subscriber who answered be displayed on the caller's phone?</p> <p><b>COLR:</b> Will the display of the call number of the subscriber who answered be suppressed on the caller's phone or is it possible to temporarily suppress the display? If the ARGUS displays an *, it is not possible to determine the availability of the service, since no COLP has been setup.</p> <p>The suppl. services pairs CLIP and CLIR as well as COLP and COLR will be tested. If CLIR or COLR is setup permanently, it is <b>not</b> possible to make a clear assessment.</p>
<b>DDI</b>	Can a caller directly dial in to an extension on the PBX access under test?
<b>MSN</b>	Is the supplemental service MSN available?



<p><b>CF</b> (<b>CFU</b>, <b>CFB</b>, <b>CFNR</b>)</p> 	<p>In this test, the ARGUS checks the 3 supplementary services <b>CFU</b>, <b>CFB</b> and <b>CFNR</b> one after the other to determine whether they are supported on the access under test.</p> <p><b>CFU</b>: Can this access immediately forward an incoming call?</p> <p><b>CFB</b>: Can this access forward an incoming call when it is busy; in other words does it support Call Forwarding Busy?</p> <p><b>CFNR</b>: Can this access forward an incoming call when it is not answered?</p> <p>The CF test attempts to setup a call diversion to the call number that is in the memory location for “remote call number 1” (see “Saving Call Numbers” on page 185). The CF test cannot be performed, if this location does not contain a valid call number to which it is possible to divert a call.</p>
<b>CW</b>	Does the access under test support call waiting?
<b>CCBS / CCBS-T</b> (on a P-P access)	Will the access under test automatically recall a remote subscriber, if the number called was busy?
<b>CCNR/ CCNR-T</b> (on a P-P access)	Will the access under test automatically recall a remote subscriber if the call was not answered?
<b>MCID</b>	Does the access tested allow identification of malicious callers (call tracing)?
<b>3pty</b>	Does the access under test support a three-party conference call? For this test, you need the assistance of a remote subscriber, whose call number must be entered.
<b>ECT</b>	Is an explicit call transfer supported by the access under test? For this test, you need the assistance of a remote subscriber, whose call number must be entered.

<b>AOC</b>	The ARGUS checks whether the charges can be sent to the access under test. The test uses a call to oneself to check both AOC-D (AOC during a call) and AOC-E (AOC at the end of a call).
<b>SUB</b>	A call is made to oneself and answered to check the transfer of the sub-address in both directions. Are sub-addresses supported on the access under test?
<b>UUS</b>	Does the access under test support the transfer of user data?
<b>CUG</b>	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.

## 11.1.3 Suppl. Services Tests – Error messages

```

SUPP. Serv. test
Error:          28
Wrong number   ↓
  
```

```

Single tests
→SUPP.serv.test
Service test  ↓
  
```

If an error occurs during the Supplementary Services Tests or if it is not possible to setup a call, the ARGUS will display the corresponding error code (e.g. 28).

Use < ↓ > to scroll through.

In the example, the error belongs to the error class "wrong or invalid number".

In the table below, you will find that this is an error from the network and that it reports that the call number was incomplete or in the wrong call number format (see "CAUSE-Messages – DSS1 Protocol" on page 198.).

Distributing the error codes into error classes:

Error class	Description	Cause		
		network) 1 TR6	(from DSS1	Cause ARGUS internal
A	No or another access	—	—	201,204,205, 210,220
B	Wrong or invalid number	53, 56	1,2,3,18,21 22,28,88	152,161,162, 199
C	One or more B-channels busy	10,33,59	17,34,47	—
D	Wrong service	3	49,57,58,63 65,70,79	—

For further information regarding error codes: "ARGUS Error Messages" on page 202, "CAUSE-Messages – DSS1 Protocol" on page 198 and "CAUSE-Messages – 1TR6 Protocol" on page 200.

## 11.2 Service check

The ARGUS checks, which of the following services are supported by the access under test:

<b>Service</b>	<b>Name in the ARGUS display / abbreviation</b>
Language	<b>Language / Lang</b>
Unrestricted Digital Information	<b>UDI 64kBit / UDI 64</b>
3.1 kHz Audio	<b>Tel.analog / Tel.</b>
7 kHz Audio	<b>7 kHz audio / 7 kHz</b>
Unrestricted Digital Information with tones / Display	<b>UDI+TA / UDI TA</b>
Telephony	<b>Tel.ISDN / Tel.</b>
Facsimile Group 2/3	<b>Fax G3 / FaxG3</b>
Facsimile Group 4 Class 1	<b>Fax G4 / FaxG4</b>
Teletex service basis and mixed mode and facsimile service Group 4 Classes II and III	<b>Mixed Mode / Mixed</b>
Teletex Service basis mode	<b>Teletex / Ttx64</b>
International inter working for Videotex	<b>Videotex</b>
Telex	<b>Telex</b>
OSI application according to X.200	<b>OSI</b>
7 kHz Telephony	<b>Tel.7kHz / Tel7k</b>
Video Telephony, first connection	<b>Videotel1.1 / Vid.1</b>
Video Telephony, second connection	<b>Videotel1.2 / Vid.2</b>
Three user-specific Services	<b>Userspec.1 / Userspec.2 / Userspec.3 /</b>
(see "Services" on page 168.)	

The test runs automatically.

For each service, the ARGUS will place a call to itself (to the access under test). However, the call will not be answered so no charges will be incurred.





**Test results:**

The ARGUS will display the results of the test once it is done.

Use the < ↓ > to scroll through the test results.

The ARGUS makes a distinction between outgoing calls (the first +, - or \*) and incoming calls (the second +, - or \*).

+ = Service supported

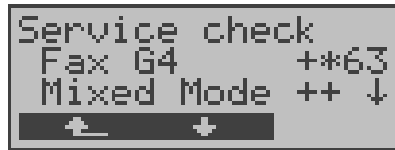
- = Service not supported

\* A definite statement cannot be given due to the adjacent error code.

**Interpreting the test****results:****Displayed****Description**

- + +    The self call functions OK or the remote end can take the call for this service
- + -    Call was sent successfully, however, it was rejected on the remote end due to missing authorization. (Error class D in a B-channel message e.g. in a SETUP\_ACK or CALL\_SENT)
- An outgoing call with this service is not possible (Error class D without a B-channel message)
- + \*    Call was sent successfully, the call back or call to the remote end failed (e.g., remote end busy or no B-channel available for the call back). (Error class B, C or E in a B-channel message)
- \*      Wrong number, no B-channel available or other error (Error class B, C or E without a B-channel message)

If the outgoing call is not successful, it is **not** possible to make a statement about an incoming call. Therefore, you will never see “- +” or “- \*” on the display.

**Example:**

```
Service check
Fax G4      ++63
Mixed Mode  ++ ↓
┌──────────┴──────────┐
└──────────┬──────────┘
```

For outgoing, the Fax G4 service is OK. No statement is possible about incoming. The error code 63 indicates the cause of the error which has occurred

(see tables in appendix).

In this case, it is recommended that you have someone place a call to the access under test using this service.

The Mixed Mode service is possible in both directions.

If an error of error class A occurs (see “Suppl. Services Tests – Error messages” on page 87.) the Service test will be aborted.

An error of any other error class will coded in decimal (in the example above 63), assigned to the respective service and then displayed.

### 11.3 Bit error test

The bit error rate test (BERT = Bit Error Rate Test) serves to check the transmission quality of the access circuit.

As a rule, the network operator will guarantee an average error rate of  $1 \times 10^{-7}$ , in other words in long-term operation 1 bit error in 10 million transmitted bits. A higher bit error rate will be especially noticeable in transmitting data.

The application program detects the errors in the data blocks transmitted and requests that the remote partner send them again, which reduces the effective throughput of the ISDN connection.

In the bit error test, the tester establishes an ISDN connection to a remote tester or places a call to itself, sends a standardized (quasi-) random number string and compares the received data with that which was sent. The individual bit errors are summed and depending on the test procedure and equipment evaluated in accordance with the ITU Guidelines G.821 and G.826.

During the test, the ARGUS counts the bit errors and after the test is done it calculates the bit error rate and other parameters in accordance with G.821 and G.826. Since the bit error test checks both B-channels in both directions at the same time, both B-channels are required.

As a rule, the quality of the network operator's access circuits is quite good. Therefore, no bit errors should occur in a 1-minute test.

However, if an error occurs, the test should be repeated with a measurement time of 15 minutes to achieve higher statistical precision. The access circuit is heavily distorted, if more than 10 bit errors occur within a test period of 15 minutes.

Contact the network operator or the supplier of the PBX equipment and ask them to test your access circuit.

The BERT can be performed in three different ways:

### 1. **BERT in an extended call to oneself**

A remote number is not needed, since the ISDN connection is setup to oneself. In this case, the ARGUS requires two B-channels for the test.

### 2. **BERT with a loopbox**

A loopbox (e.g., another member of the ARGUS family of testers at the remote end) is required.

The test uses one B-channel.

### 3. **BERT end-to-end**

This test requires a waiting remote tester such as an ARGUS in the **BERT wait mode** .(see Chap. 11.3.2 page 100) A bit pattern is sent to this tester.

Independent of the received bit pattern, the remote tester uses the same algorithm to generate a bit-pattern that it sends back.

Therefore, both directions are tested independently.

### 11.3.1 Start BERT

The following parameters are required for the BERT:

- **Duration of the BERT** (default setting = 1 minute)
- **Error level:** If the bit error rate exceeds this limit, the ARGUS will display the test result NO. If the bit error rate is less than this limit, the ARGUS will display an OK (default setting =  $10^{-05}$ )
- **HRX value** in % (hypothetical reference connection see ITU-T G.821) (default setting = 15%)
- **Bit pattern**, which will be sent during the test (default setting =  $2^{15}-1$ )

The parameters can be changed individually and saved (see "Configuration: BERT" on page 170.).

```
Single tests
→Bit error test
X.31 test ↓
← ↓ ✓
```

In the Single tests menu, use the < ↓ > to select **Bit error test**.

Open the Bit error test menu.

```
Bit error test
→BERT start
BERT wait ↓
← ↓ ✓
```

Use < ↓ > to select **BERT start**.

Open the enter Numbers dialogue

```
Numbers
Own number
0235190700
← DEL ✓
```

Enter your **Own number** to perform the BERT in an extended call to oneself (2 B-channels).

or a **remote number** for a BERT to a loopbox (1 B-channel) or end-to-end

Confirm the number

```
Select service
→Tel.ISDN
Fax G3 ↓
← ↓ ✓
```

Using the < ↓ >, select the service which should be used for the BERT.

Confirm the service.

```
B channel select
Active B ch.: 2
Ch.available !
← DEL ✓
```

Enter the B-channel on the keypad. If you enter an \*, the ARGUS will choose any B-channel that is free.

**BERT start**

```

BERT          B02
15:45:42
synchron LOS: 3
ABORT TM ERROR

```

After the ARGUS has setup the connection and synchronized the send and receive directions, it will display the bit pattern, the B-channel used (e.g. B02), the remaining test time in h:min:sec, the number of bit errors that have occurred (e.g. 3), the synchronicity of the bit pattern (synchronous or asynchronous) and the LOS-counter.

If you press < **ERROR** >, the ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).

Press < **TM** > to start the Test Manager (see "Test Manager" on page 137.)

Press < **ABORT** > to stop the BERT.

**0 -Key:** Restarts the bit error test. The test time and number of bit errors will be reset.



When a bit error is detected, this will be signaled by a brief alarm; in the event that the synchronisation is lost, a constant alarm will sound ((see page 184 Alarm bell)).

```
Call clearing
Active clearing
Loc.: user
CONT.
```

```
BERT 2^15 B02
Result: 10309Kb
      10 9,7E-07 OK
MENU TM MORE
```

```
BERT 2^15 B02
HRX G821: 15% OK
EFS : 93,75%↓
MENU TM SIMPLE
```

```
BERT 2^15 B02
Result: 10309Kb
      10 9,7E-07 OK
MENU TM MORE
```

After the test time is over, the ARGUS will display the cause and the location which initiated the disconnect.

If the test ran normally, the ARGUS will display "Active clearing" on this line. XXXXX

#### The test results display:

The bit pattern (e.g. 2<sup>15</sup>),  
 B-channel used (e.g. 02),  
 Transferred data in KBit (e.g. 10309 KB, K= 1024\* bits),  
 The number of bit errors (e.g.10),  
 The bit error rate (e.g. 9.7E-07 = 9.7·10<sup>-7</sup> = 0.00000097),  
 The evaluation of the results depends on the error threshold (OK).

Display of other characteristic values (in accordance with ITU-T G.821)

All values are given in percentages.  
 The ARGUS evaluates whether the test results satisfy the limits specified in the CCITT G.821/G.826 with consideration of the defined hypothetical reference connection HRX (displaying OK or NO).

↓ -Key: Scroll

<MENU>: The ARGUS returns to the BERT menu.

**HRX** Defines the hypothetical reference connection

**EFS** *Error Free Seconds*

All the seconds in which no error occurred.

**ES821** *Errored Seconds*

All the seconds in which one or more errors occurred.



**SES821 Severely Errored Seconds**

All the seconds in which the bit error rate is  $>10^{-3}$ .  
In one second, 64,000 bits are transferred, thus  
**BitError** $=10^{-3}$  equates to 64 bit errors.

**US Unavailable Seconds**

All the sequentially adjacent seconds (at least 9 sec)  
in which **BER** $>10^{-3}$ .

**AS Available Seconds**

All the sequentially adjacent seconds (at least 9 sec)  
in which **BER** $<10^{-3}$ .

**DM Degraded Minutes**

All the minutes in which the bit error rate is  $>10^{-6}$ . In  
one minute, 3,840,000 bits are transferred, thus a  
**BER**  $= 10^{-6}$  corresponds to 3.84 bit errors (3 errors =  
NO (no DMs), 4 errors = OK (DM)).

**LOS Loss of Synchronisation**

Synchronisation is lost at an error rate  $>$  or  $= 20\%$   
within a second. The absolute number of  
synchronisation losses will be shown.

**11.3.1.1 BERT - saving**

The ARGUS can store the results of several BERTs.

The ARGUS saves the results together with the date, time  
and call number of the access under test (if this number has  
been entered as the "own" number in the speed-dialing  
memory) under the next free record number (see "Automatic  
Tests" on page 142.).

If all of the records are used, the ARGUS will return to the  
Autom. Test dialog and request permission to overwrite the  
oldest test results.

```
BERT 2^15 B02
Result: 10309Kb
      10 9.7E-07 OK
MENU  TM  MORE
```

The ARGUS is displaying the result window.



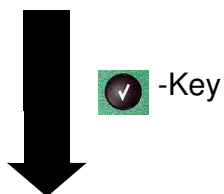
```
Save
result?
YES      NO
```

Press <YES> **BERT - saving**



```
save as:
AMP_5
ABORT DEL 3b>AB
```

Using the numeric keys enter the name under which the result should be saved (Default: AMP\_1, AMP\_2.... or the call number of the access under test if the number has been entered into the speed-dialing memory) see Page 70.



```
Bit error test
→BERT start
BERT wait ↓
← + ✓
```

### 11.3.1.2 Displaying the stored results

(see “Display Results” on page 148.)

```
ARGUS28 BRI
→Automatic tests
Level measurin↓
←  ↓  ✓
```

Use the < ↓ in the Main menu to select > **Automatic tests**.

```
Auto test
→ 1 24.12. 17:45
  2 31.12. 23:5↓
←  NAME  ✓
```

Use the < ↓ > to select the record with the saved BERT results.

```
Auto test No.: 2
→Display result
Test data to P↓
←  ↓  ✓
```

Using the < ↓, select the > **Display result**.

```
Auto test No.: 2
B12
BR P-MP TE DSS1
ABORT CONT.
```

The ARGUS will first display the status of the access under test.

**Display the stored results**

```
BERT 2^15 B02
Result: 10309Kb
10 9,7E-07 OK
MENU TM MORE
```

Use the ↓ -Key to scroll through the results.

**Quit the results display.**

```
Auto test No.: 2
→Display result
Test data to P↓
←  ↓  ✓
```

### 11.3.2 BERT wait

In **BERT wait** mode, the ARGUS will wait for the BERT at the remote end which is necessary for an end-to-end test:

```
Single tests
→Bit error test
X.31 test ↓
← + ✓
```

In the Single tests menu, use the < ↓ to select > **Bit error test**.

Open the Bit error test menu.

```
Bit error test
→BERT wait
B channel loop ↓
← + ✓
```

Using the < ↓, select > **BERT wait**.

```
BERT
Wait active
ABORT TM MENU
```

#### Activate "BERT wait"

The ARGUS first waits for a call and then sets up the connection.

During the connection, the received bit pattern will be evaluated and in addition another independent bit pattern will be sent.

If you press < **MENU** >, the ARGUS will return to the Main menu; the test "BERT wait" remains active. In the Main menu, if < **TM** > is pressed, the ARGUS will return to the display "BERT, Wait active", see Page 141.

< Press **TM** > to start the

**Operating  
mode  
BERT wait**

Test Manager (Page 137)

The ARGUS displays that will appear are the same as those in Chapter 11.3.1 Start BERT .

### 11.3.3 B-channel loop

B-channel loop mode is required in order to run a bit error test using a loopbox at the remote end as well as to test permanent circuits.

```
Bit error test
→B channel loop
-----↓
↑      +      ✓
```

Use the < ↓ to select > B-channel loop

**Activate the "B-channel LOOP"**

```
B-channel-LOOP
Wait active
ABORT  TM  MENU
```

The ARGUS will wait for a call. Any incoming call (regardless of the service) will be taken immediately.

The ARGUS will switch a loop back in the B-channel that is specified by the exchange and then send the received bit pattern back to the caller/sender.

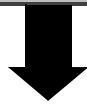
**Operating mode  
B-channel**

If you press < **MENU** >, **the** ARGUS will return to the Main menu; the test "B-channel-LOOP " remains active. In the Main menu, if < **TM** > is pressed, the ARGUS will return to "B-channel-LOOP, Wait active", see Page 141. From this menu, you can start a second B-channel loop connection (this is also possible using < **TM** >).

< **If you press TM** > the Test Manager will start.

If the ARGUS takes a call, it will open the B-LOOP connect. window, which is similar to the normal connection window:

```
B-channel-LOOP
235190700 B01
to: 907070 ↓
SHORT TM MENU
```



**B-channel loop  
Connection  
stop**  
Operating mode  
B-channel LOOP  
still active

The ARGUS will display the caller's number (e.g. 2351 90700) , the B-channel used (e.g. B01) and the number dialed (e.g. 907070).

↓ -Key: Display additional information (e.g. UUS...)

< **TM** >: Call the Test Manager

< **Menu:**> The ARGUS returns to the main menu.

### 11.4 X.31 Test

The ARGUS will either perform a “Manual X.31 Test” or an “Automatic X.31 Test”:

In the case of an automatic test, the ARGUS will first setup the D-channel connection and then begin setting up the X.31 connection. Afterwards, the ARGUS will automatically clear the connection and display the results.

In the case of a manual test, the ARGUS will setup a D-channel connection and an X.31 connection. The duration of this connection is determined by the user (or the opposing end). For the duration of the connection, the ARGUS will repeatedly send a predefined data packet. The ARGUS will count all of the data packets sent and received and will display (where possible) the contents of the data packets received.

Only for the X.31 option: The parameters in three different X.31 profiles can be configured and saved for the X.31 test (Page 178). Depending on the test variant, the ARGUS will retrieve and use the stored parameters. Values such as TEI and LCN will be shown as default values in the display.

#### 11.4.1 Automatic X.31-Test

There are three possible variants of the Automatic X.31 Test:

##### 1) D-channel

The “X.31 Automatic, D-channel” test consists of two steps:

*First step:* The ARGUS tests whether it is possible to access the X.25 service via the D-channel on the BRI access under test.

The ARGUS sequentially checks all the TEIs from 0 to 63. All the TEIs with which the X.31 service is possible on Layer 2, will be displayed.

*Second step:* For each TEI with which X.31 is possible on Layer 2, a CALL\_REQ packet will be sent and then the ARGUS will wait for an answer.

Beforehand, the ARGUS will request the entry of the X.25 access number, which will be saved in speed-dialling memory under **X.31 test number** ("Saving Call Numbers" on page 185).

With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default. For this purpose, append a "#" plus desired the LCN to the access number (default: LCN = 1).

```
Single tests
>X.31 test
  CF interrogat.↓
  ←  ↓  ✓
```

In the Single tests menu, use <↓ to select the > **X.31 test**. Open the X.31 test menu.

```
X.31 Profile
>.31 Profile 1
X.31 Profile 2 ↓
  ←  EDIT  ✓
```

Select the profile. Press <EDIT> to open the menu for editing the X.31 parameters in the profile (see Page 179).

```
X.31 test
>Automatically
  Manual ↓
  ←  ↓  ✓
```

Use < ↓ to select > **Automatically**. The X.31 automatic window will open

```
X.31 automatic
>D channel
  B chan. case A↓
  ←  ↓  ✓
```

Using the < ↓, **select the > D channel**.

Start test

```
X.31 test
TEI: 03 02 +
  ABORT
```

The test can take up to 4 minutes (a rotating bar will be displayed). Beginning on the left, the ARGUS will display the TEI currently being tested followed by the previously tested TEI and its result:

+ = X.31 is available for this TEI

- = X.31 is not available for this TEI

```
X.31 test
TEI:02++
TEI:03+- 13 67
  ABORT
```

After the test sequence is completed, the ARGUS will show whether the X.31 service is available for Layer 3 for the TEIs found in Step 1.

Using the <↓>, scroll through

the results.

**Test results:**

TEI 02 = the first valid TEI value is 02.



- + + = Both test steps were successful
- + - = the first test step was successful, the second step not In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above: 13) and an associated diagnostic code (in the example: 67), if there is one (see "X.31 Test – Error messages" on page 203.).

If the X.31 service is not supported, the ARGUS will report "X.31 (D) n. impl."

## 2) B-Channel - Case A

For this X.31 test variant, the Argus requires the entry of a call number for the D-channel connection, a B-channel and the X.31 number with LCN; The ARGUS will use the number saved in profile as the default value (see Page 179) and the "X.31 test number" from the speed-dialling memory (see Page 185).

The ARGUS will first setup a D-channel connection and then attempt to set up a X.31 connection on the B-channel.



**B-Channel - Case B**

This test is identical with the “B chan. case A” test, except that it is not necessary to enter a D-channel call number.

The ARGUS will first setup a D-channel connection (via the service) and then attempt to set up a X.31 connection on the B-channel.

### 11.4.2 Manual X.31 Test

There are three possible variants of the Manual X.31 Test:

#### 1) D-channel

In this test variant, the ARGUS first requests a TEI, LCN and an X.31 number (The ARGUS uses the values stored in the profile as default values - see Page 179). If a " \*\* " is entered for the TEI, the ARGUS will automatically determine a TEI.

Using the first TEI with which X.31 is possible, the ARGUS will begin to setup a connection.

```
Single tests
>X.31 test
CF interrostat.↓
← ↓ ✓
```

In the Single tests menu,  
< use ↓ to select the >**X.31 test**

.  
Open the  
X.31 test menu.

```
X.31 Profile
>.31 Profile 1
X.31 Profile 2 ↓
← EDIT ✓
```

Select the profile.  
Press <EDIT> to open the  
menu for editing the X.31  
parameters in the profile  
(see Page 179).

```
X.31 test
>Manual
-----↓
← ↓ ✓
```

With the < ↓, select  
>**Manual**.

The  
X.31 manual window will  
open.

```
X.31 manual
>D channel
B chan. case A↓
← ↓ ✓
```

Using the < ↓, **select the > D channel**.

```
TEI:
  02
(** = automat.)
ABORT DEL ✓
```

The ARGUS displays the  
TEI stored in the selected  
profile.

You can edit the TEI from  
the keypad;

If you enter \*\*, the ARGUS  
will automatically determine  
a TEI.

< DEL >: Delete the TEI

```

LCN:
1
ABORT DEL ✓

```

The ARGUS displays the LCN stored in the profile. It is possible to edit the LCN from the keypad.

```

Numbers
X.31 test no.
08154711 ↓
← DEL ✓

```

Display of the X.31 number from in the speed-dialing memory. It can be edited from the keypad.

```

X.31 (D) Connect
LCN: 1 TEI: 2
026311000091258↓
ABORT HEX DATA

```

### Setup a X.31 connection

The ARGUS will display the LCN, TEI and X.31 number (e.g. 0263110 00091258).

<DATA> sends predefined data packets (The number depends on the parameter "Packet number" see Page 179)

↓-Key

```

X.31 (D) Connect
Package: 3: 15
COMBA NETWORK T↓
ABORT HEX DATA

```

The ARGUS will count the data packets sent and received and will display (where possible) the contents of the data packets received.

The ARGUS will display the number of packets sent (e.g. 3), the number of packets received (15) and their contents (in ASCII).

```

X.31 (D) Connect
Package: 3: 15
43 4F 4D 42 41 ↓
ABORT ASCII DATA

```

The contents of the received data packet (in hexadecimal)

The connection will be maintained until the user or the opposing end clears it. When the X.31 connection is cleared, the ARGUS will automatically clear the D-channel connection.

```

X.31 (D) test
save?
NO YES

```

The result can be saved.

```
save as:
AMP_5
ABORT DEL 3b>AB
```



✓-Key  
Save the result in the ARGUS

Using the numeric keys enter the name under which the result should be saved (Default: AMP\_1, AMP\_2.... or the call number of the access under test if the number has been entered into the speed-dialing memory)

Use the softkey on the right to control the entry of characters

(see Page 180)

For information on displaying the saved test results, see Page 149.

## 2) B-Channel - Case A

For this test variant, a D-channel call number and a X.31 number must be entered.

The ARGUS will first setup a D-channel connection.

```
X.31 (B) Connect
LCN: 1 TEI: 2
026311000091258↓
ABORT HEX DATA
```

Once the D-channel connection has been setup, the ARGUS will setup a X.31 connection via a B-channel: Use the <↓> to scroll.

```
X.31 (D) Abort
Cause: 0
Diag: 0
CONT.
```

If the X.31 connection cannot be setup, the ARGUS will automatically clear the D-channel connection. In this case, the ARGUS will display the X.31 cause and the associated diagnostic code (see Page 203).

Once a connection has been successfully setup, the ARGUS will send predefined data packets.

The ARGUS will count all of the data packets sent and received and will display (where possible) the contents of the data packets received.

For instructions, see “1) D-channel” on page 102.

**B-Channel - Case B**

This test is performed in the same way as the “B-Channel Case A” test, except that it is not necessary to enter a D-channel call number.

## 11.5 CF Interrogation

The ARGUS will check whether a call diversion has been setup in the exchange for the access under test (BRI or U-Interface).

The ARGUS will show the type of diversion (CFU, CFNR or CFB) and the call diversion's service. The display is limited to a maximum of 10 call diversions for all of the MSNs. The ARGUS will count any additionally setup call diversions.

Any call diversion setup in the exchange can be cleared with the ARGUS.

```
Single tests
→CF interrogat.
CF activation ↓
← ↓ ✓
```

In the Single tests menu, use the <↓> to select

### CF interrogat.

Start the **CF interrogation**;

The test can take several seconds.

```
CFU Spch 3/09
2351919658
14418 ↓
ABORT DEL NEW
```

The ARGUS displays the type (e.g. CFU) and service (e.g. Spch) of the call diversion, which in this example is the third of a total of nine found (3/09).

The number 2351919658 is diverted to 14418.

The ↓ -Key is used to scroll through the display.

Press < **NEW** > to repeat the CF interrogation.

```
CFU Spch 3/09
2351919658
Delete CF?
ABORT YES ALL
```

### Delete a call diversion

Security query

Press < **ALL** > to delete all call diversions.

The ARGUS will delete the displayed number in the exchange.

```
Diversion/s
deleted!
CONT.
```

If the call diversion cannot be cleared, the ARGUS will report: "Call diversion not changeable!".





Some PBXs or exchanges do not permit the use of the mechanism used (by the ARGUS) for the interrogation of the call diversions for all MSNs or they return a negative acknowledgement of the interrogation of call diversions, implying that no call diversions have been setup.

In the event of a negative acknowledgement, the ARGUS will, therefore, request that the **Own MSN** be entered.

The call diversion interrogation will be repeated **MSN-specific**.

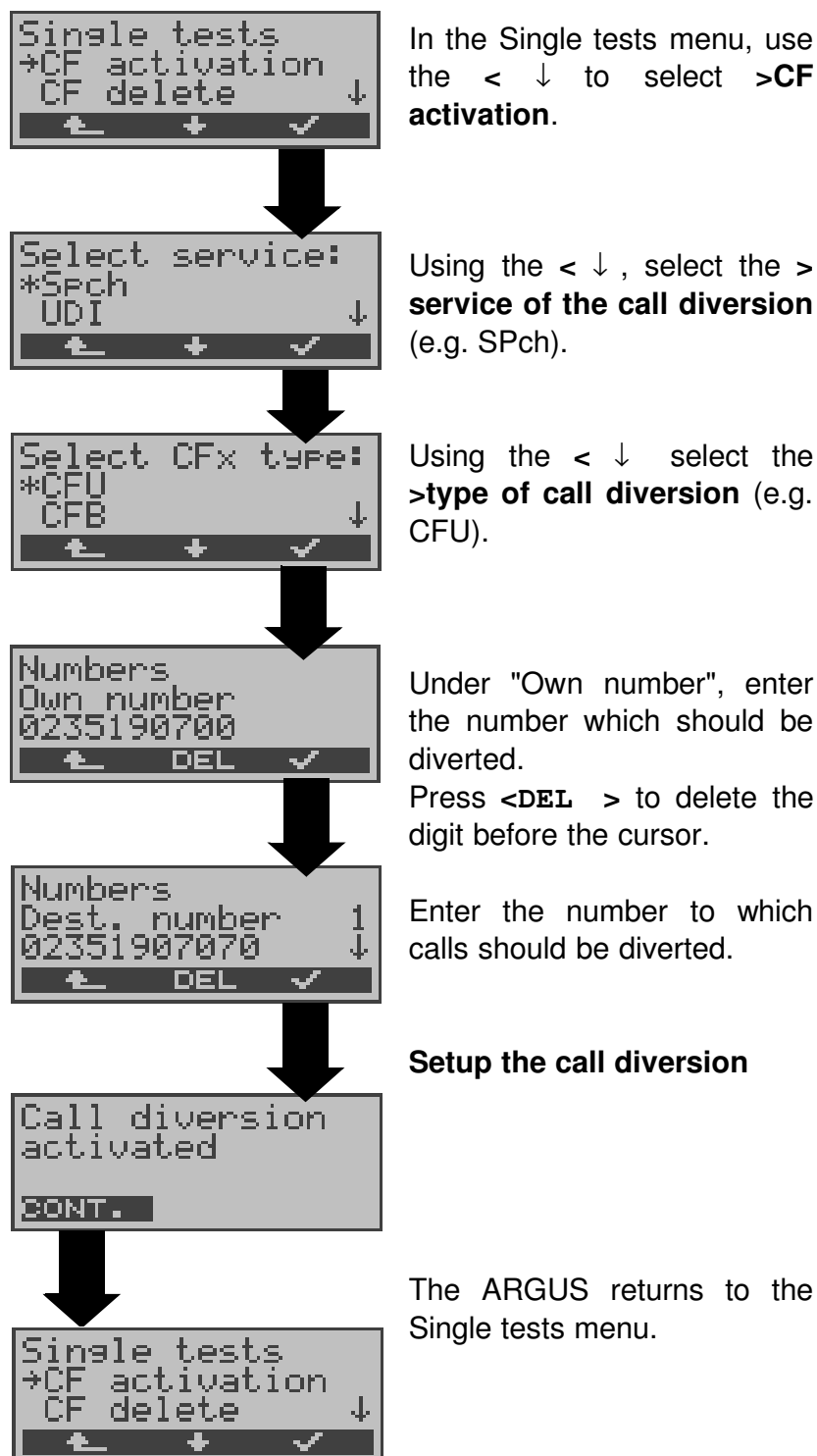
Naturally, in this case, the results of the interrogation of the call diversion only apply for the entered MSN and **not** for the entire access.

**Abbreviations used for the services and service groups on the display:**

<b>Basic Service</b>	<b>Abbreviation</b>
All services	<b>A11</b>
Voice (speech)	<b>Spch</b>
Unrestricted digital information	<b>UDI</b>
Audio 3.1 kHz	<b>A3k1H</b>
Audio 7 kHz	<b>A7khz</b>
Telephony 3.1 kHz	<b>Te131</b>
Teletext	<b>TTX</b>
Fax Group 4	<b>FaxG4</b>
Video syntax based	<b>ViSyB</b>
Video Telephony	<b>ViTel</b>
Telefax Groups 2/3	<b>FaxG3</b>
Telephony 7 kHz	<b>Te17</b>
UDI 64 kBit	<b>UDI</b>
Unknown Basic Service	<b>Unkno</b>

## 11.6 CF - Activation

Using the ARGUS, call diversions can be setup in the exchange (BRI or U-Interface).



## 11.7 CF - Delete

Using the ARGUS, call diversions can be deleted/cleared in the exchange (BRI or U-Interface).

```
Single tests
→CF delete
MSN interrogat↓
←  +  ✓
```

In the Single tests menu, use the <↓ to select > **CF delete**.

```
Select service:
*Spch
UDI ↓
←  +  ✓
```

Using the < ↓ , select the >**service of the call diversion** (e.g. SPch).

```
Select CFx type:
*CFU
CFB ↓
←  +  ✓
```

Using the < ↓ select the >**type of call diversion** (e.g. CFU).

```
Numbers
Own number
0235190700
←  DEL  ✓
```

Under "Own number", enter the diverted number which should be deleted.

Press <DEL > to delete the digit before the cursor.

**Delete a call diversion**

```
Diversion/s
deleted!
CONT.
```

```
Single tests
→CF delete
MSN interrogat↓
←  +  ✓
```

## 11.8 MSN Interrogation

(only on a BRI with DSS1)

On a P-MP access using the DSS1 protocol, the ARGUS will determine the MSNs of the access under test. It will display a maximum of 10 call numbers. Depending on the Type of Number (TON), the ARGUS will display the call numbers in different versions:

- only the MSN (without area code)
- with national area code without leading the “0”
- with country code without leading the “00”
- complete call number

In order to interrogate the MSNs, the access under test must support the supplementary service “Call Forwarding (CF)”.

```
Single tests
→MSN interrogat.
Phone / connect↓
←      ↓      ✓
```

In the Single tests menu, use the < ↓ to select > **MSN interrogat.**

### Start the MSN interrogation

```
MSN          1/03
      2351919658
TON:national ↓
←      ↓      NEW
```

In this example, the ARGUS displays the first MSN (2351919658) of a total of three found (1/03).

Using the < ↓>, scroll through the results.

Press < **NEW** > to repeat the MSN interrogation.



Due to differences in the protocol, some exchanges do not support MSN interrogation.

In this case, the ARGUS will report: MSN interrogation not possible!

## 11.9 Traffic generator (only on a PRI access)

The ARGUS will automatically setup as many as 30 connections and will display which B-channels on the PRI access are available for incoming and outgoing calls.

```
Single tests
+Traffic gen.
Time measuring↓
←  +  ✓
```

In the Single tests menu, Using the <↓>, select >**Traffic gen.**

```
Numbers
Dest. number  1
90700         ↓
←  DEL  ✓
```

The speed-dialing memory opens.

Use the <↓> to scroll to the desired number or enter the number on the keypad.

Press < DEL > to delete a digit.

```
Select service
+Tel.ISDN
Fax G3        ↓
←  +  ✓
```

With the <↓>, select the **service.**

```
B channels
Quantity:    20
Start with:  5
ABORT DEL  ✓
```

Enter the number of channels on which the ARGUS should setup connections.

Move to the lower line with the ↓ -Key: Enter the B-channel on which the first connection should be setup. All further connections will be setup on the sequentially following B-channels.

Press < DEL > to delete a digit.

```
Call intervall
length:     500 ms
ABORT DEL  ✓
```

Enter the call interval (pause between outgoing calls)

Valid values are between 100ms and 15000ms. If the call interval is too short, some exchanges will have problems handling the calls.

**Start test**

```
Traffic gen. 10/
#####
ABORT LIST
```

During the test the ARGUS will show the number of connections currently setup (in this example 10) and, as marked squares, the channels in use (for connections).

In the example, channels 5 to 14 are in use for outgoing connections (top row of squares).

```
Traffic gen. 14
B08: -> ALERT
B09: -> ALERT ↓
ABORT ↑ ↵
```

The display shows the connection currently setup (14) and the status of the respective connection on the individual B-channels.

Use the <↓> to scroll.

Stop test



**The test must be terminated manually by pressing <ABORT>.**

```
Traffic gen. 10/
#####
ABORT LIST
```

After the test is over, press <LIST> to have the ARGUS display the causes for clearing the connections on the individual B-channels (see Appendices B and C).

```
Traffic gen. 14
B08: -> DIS 0
B09: -> DIS 0↓
ABORT ↑ ↵
```

### 11.10 Time measuring

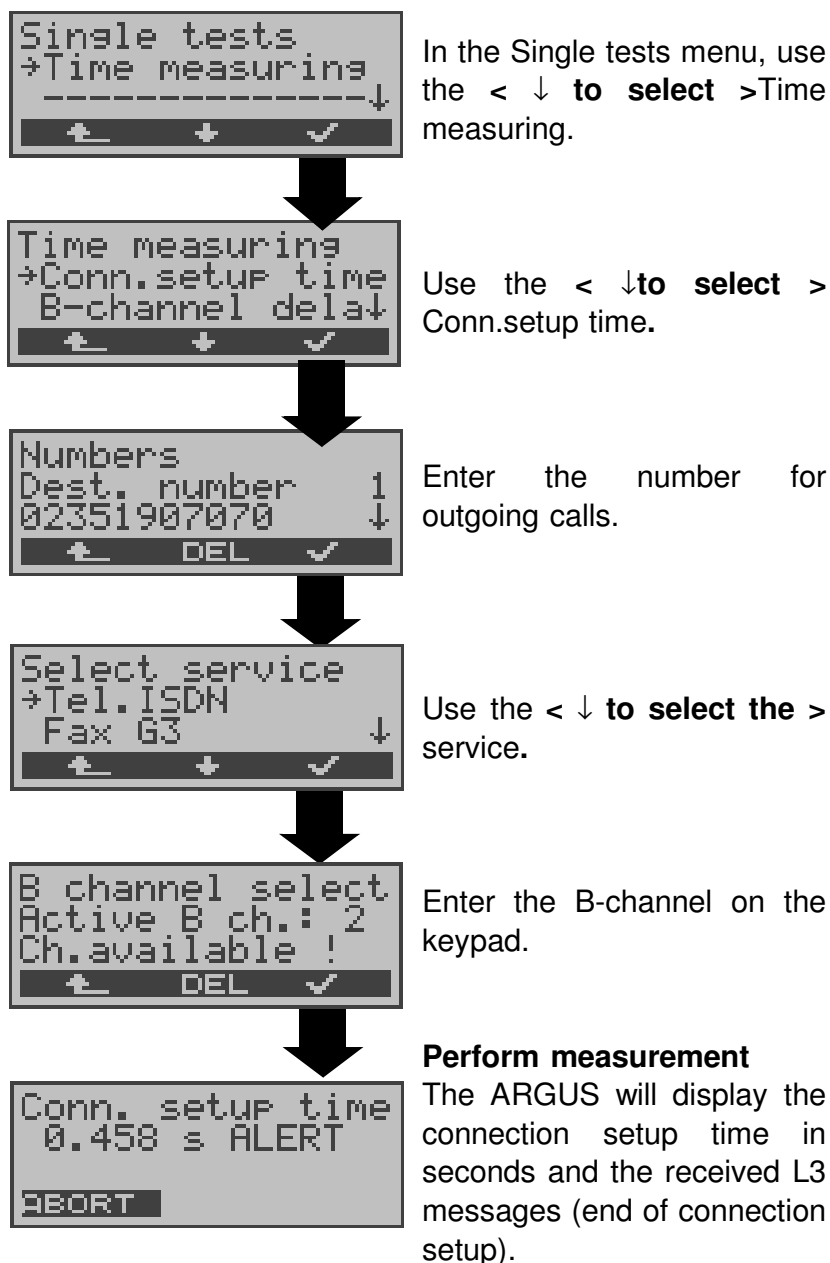
The ARGUS measures three different times:

- **Connection setup time**
- **Propagation time of the data and**
- **Transit time differential (interchannel delay) of the data in two B-channels.**

Time measurements on a BRI or U-Interface access are only possible in TE mode.

### 11.10.1 Connection setup time

The ARGUS places an outgoing call and measures the time between sending the SETUP and receiving the ALERT or CONN. The ARGUS disconnects automatically as soon as the measurement is completed.



If the ARGUS cannot perform the measurement (e.g. because the call number entered was wrong or no B-channel was free) the corresponding cause will be displayed.



### 11.10.2 Time measurement: B-channel delay

The ARGUS places a call to itself (self call) or to a remote loopbox and measures the propagation delay for the data in the selected B-channel.

The ARGUS disconnects automatically as soon as the measurement is completed.

```
Single tests
→Time measuring
-----↓
←  +  ✓
```

In the Single tests menu, use the < ↓ to select >Time measuring.

```
Time measuring
→B-channel delay
Interchan.dela↓
←  +  ✓
```

Use the < ↓ to choose > Interchan.dela.

```
Numbers
Own number
0235190700
← DEL ✓
```

Enter own number for self calls or remote number for connections to a remote loopbox.

```
Select service
→Tel.ISDN
Fax G3 ↓
←  +  ✓
```

Use the < ↓ to select the > service.

```
B channel select
Active B ch.: 2
Ch.available !
← DEL ✓
```

Enter the B-channel on the keypad.

#### Perform measurement

```
B-channel delay✓
avg: 0.63 ms
min: 0.63 ms ↓
ABORT +
```

The ARGUS displays the average (avg), the shortest (min) and the longest (max) B-channel delay in msec. as well as the average B-channel delay in bits (multiples

```

B-channel delay ✓
ava: 0,63 ms
min: 0,63 ms ↓
ABORT ↓

```

```

B-channel delay
max: 0,63 ms
bit: 40
ABORT ↓

```

```

Time measuring
→B-channel delay
Interchan.delat
← ↓ ✓

```

of the time required to send a bit at 64 kBit/s).

(The time for sending 1 bit at 64 kBit/s = approx. 15.26 µs.)

Use the <↓> to scroll.

The measurement will be repeated in cycles.

Press <ABORT> to stop the measurement.

The ARGUS will display the last measurement.

If the ARGUS cannot perform the measurement, e.g. because the call number entered was wrong or no B-channel was free, the corresponding cause will be displayed.

When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

### 11.10.3 Time measurement: Interchannel delay

The ARGUS establishes two separate connections to a remote loopbox. The loopbox sends the respective B-channel data back on the same channel. The ARGUS measures the propagation delay for the data on each of the B-channels and determines the difference between the two propagation delays (interchannel delay).

The ARGUS disconnects automatically as soon as the measurement is completed.

```

Single tests
→Time measuring
-----↓
←  +  ✓

```

In the Single tests menu, use the < ↓ to select >Time measuring.

```

Time measuring
→Interchan.delay
-----↓
←  +  ✓

```

Use the < ↓ to select >Interchan.delay.

```

Numbers
Dest. number 1
02351907070 ↓
←  DEL  ✓

```

Enter the remote number of the loopbox.

```

Select service
→Tel.ISDN
Fax G3 ↓
←  +  ✓

```

Use the < ↓ to select the >service.

```

interchan. dela✓
ave: 0.00 ms
min: 0.00 ms ↓
ABORT +

```

#### Perform measurement

The ARGUS displays the average (avg), the shortest (min) and the longest (max) interchannel delay in msec. as well as the average interchannel delay in bits (multiples of the time required to send a bit at 64 kBit/s) - it takes 15.26 µsec to send a bit at 64 kBit/s).

Use the < ↓ > to scroll.

The measurement will be repeated in cycles.

Press <ABORT> to stop the measurement.

```

interchan. delay
max: 0.00 ms
bit: 0
ABORT +

```

The ARGUS will display the last measurement.

```

Time measuring
→Interchan.delay
-----↓
←  +  ✓

```

## 11 Single Tests

---

If the ARGUS cannot perform the measurement (e.g. because the call number entered was wrong or no B-channel was free) the corresponding cause will be displayed.

When it is connected to a loopbox, if the ARGUS does not receive the data back within 13 seconds, it will display the message "No LOOP".

## 12 Connection

### 12.1 Setting up an ISDN connection

- a) The ARGUS can setup a connection for the following services:

<b>Service</b>	<b>Name in the ARGUS display / abbreviation</b>
Language	<b>Language / Lang</b>
Unrestricted Digital Information	<b>UDI 64kBit / UDI 64</b>
3.1 kHz Audio	<b>Tel.analog / Tel.</b>
7 kHz Audio	<b>7 kHz audio / 7 kHz</b>
Unrestricted Digital Information with tones / Display	<b>UDI+TA / UDI TA</b>
Telephony	<b>Tel.ISDN / Tel.</b>
Facsimile Group 2/3	<b>Fax G3 / FaxG3</b>
Facsimile Group 4 Class 1	<b>Fax G4 / FaxG4</b>
Teletex service basis and mixed mode and facsimile service Group 4 Classes II and III	<b>Mixed Mode / Mixed</b>
Teletex Service basis mode	<b>Teletex / Ttx64</b>
International inter working for Videotex	<b>Videotex / Vidtx</b>
Telex	<b>Telex / Telex</b>
OSI application according to X.200	<b>OSI / OSI</b>
7 kHz Telephony	<b>Tel.7kHz / Tel7k</b>
Video Telephony, first connection	<b>Videotel.1 / Vid.1</b>
Video Telephony, second connection	<b>Videotel.2 / Vid.2</b>

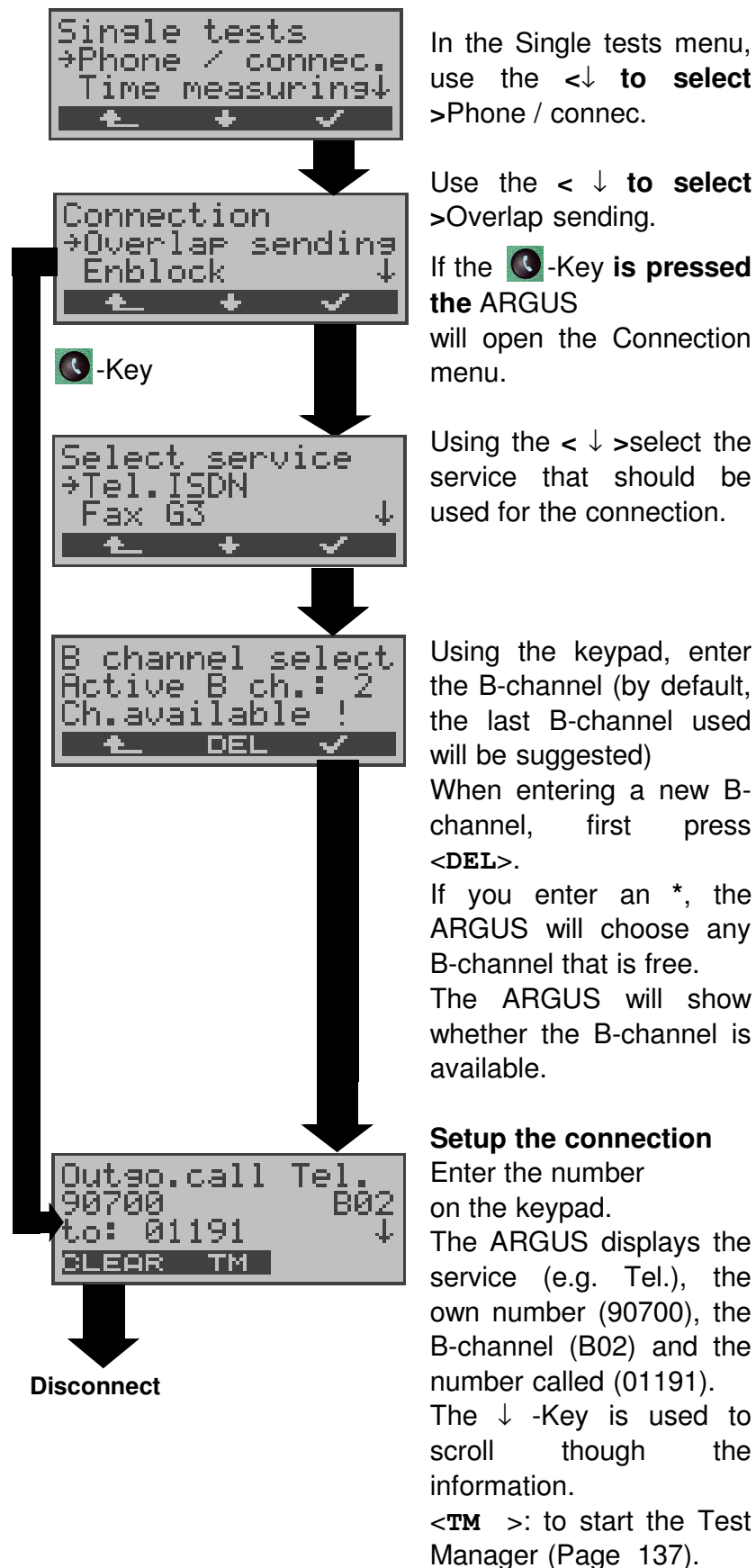
Additional three user-specific services (see "Services" on page 168.)

- b) The integrated handset can be used as a phone during a telephone connection.
- c) When an ISDN connection is setup, pressing the number keys (0-9) or the \* or # will generate and send the corresponding DTMF tones.

## Procedure for an Outgoing Call (ISDN)

### 1) Overlap sending:

In overlap sending, the digits entered for the call number are sent individually.



```

Connect.   Tel.
90700     B02
to: 01191
CLEAR TM

```

The connection is setup using B-channel 2.



```

Connect.   Tel.
SUB:808076
to: 01191
CLEAR TM

```

The ARGUS will display additional information (if there is any)

The ARGUS displays the sub-address of the caller (808076) and the destination sub-address (01191).



```

Connect.   Tel.
UUI:HALLO
CLEAR TM

```

Display of the

- User-to-User Information
- Display Information
- Type of number (T.o.n.)
- Numbering Plan (NP)



```

Connect.   Tel.
AOC:
Units      24↓
CLEAR TM

```

- Advice of charges:  
If the charges are not given in units, rather directly as currency, the ARGUS will display the current charges in currency. If, in DSS1, the call charges are not provided in accordance with the ETS 300 182 standard, rather in the form of the information element DISPLAY (DSP), the ARGUS will display the DISPLAY message's character string.



```

Call clearing
Normal clearing
Loc.: user
CONT. TM

```

### Disconnect

The ARGUS displays the cause of the disconnect. (see page 132 Clearing down an ISDN connection)





**Note regarding the entry of the call number**

Separate the extension from the access number with a # (e.g. 02351 / 9070-20 is entered on the ARGUS as: 023519070 #20). For an outgoing call, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number, only the extension (DSS1-CGPN or 1TR6-OAD).

A '#' at the beginning of a call number is treated as a valid character. A '#' at the end of the own call number instructs the ARGUS to not send the caller's number for outgoing calls (CGPN or OAD).

**Simplified overlap signaling using the telephone key**

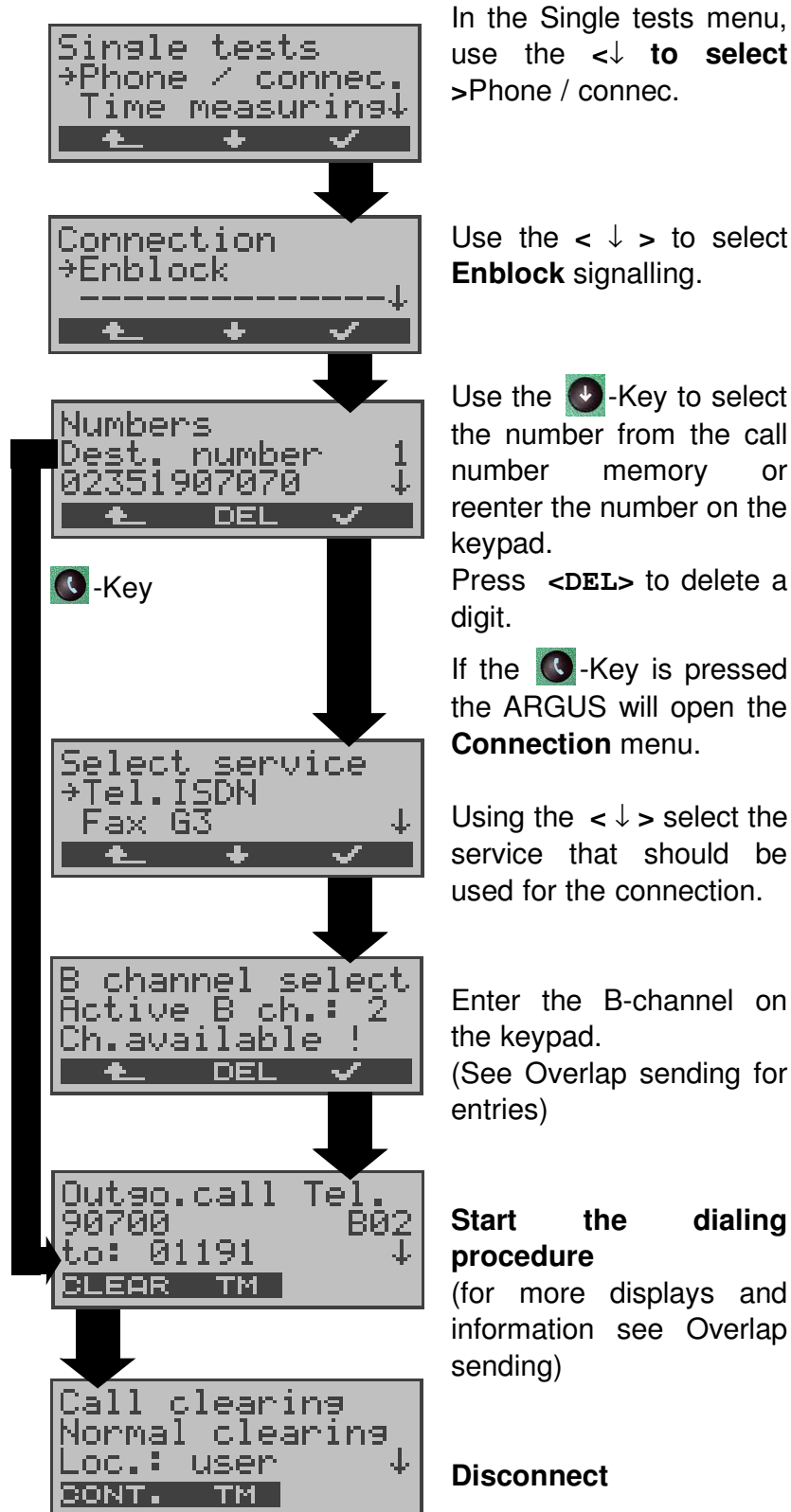
If you press the -Key, the ARGUS will open the Connection/Overlap window directly from any menu.

If you press the -Key again, you will hear the dial tone. Once you enter a call number, the connection will be setup.

## 2) Enblock

In en-bloc signalling, the ARGUS sends the entire dialing information in one block.

The number is dialed from the call number memory (see "Saving Call Numbers" on page 185.).



### Procedure for an Incoming Call (ISDN)

An incoming call can be taken at any time even when a test (e.g. BERT) is in process (see “Simultaneously Starting Several Tests” on page 138.).

The ARGUS will signal an incoming call with an audible tone and a message on the display.

On a P-MP access, you can use the **Call acceptance** (see “Call Acceptance” on page 169.) function to configure the ARGUS to only signal incoming calls which are addressed to the MSN that corresponds to your own call number. This function can only be used when your own call number has been entered into the ARGUS’s speed-dialing memory (see “Saving Call Numbers” on page 185.) and the incoming call has a destination MSN.


```
In.call Tel.
02351907070 B01
to: 90700 ↓
REJECT ACCEPT
```

Reject call

The ARGUS displays the service (Tel.), the number of the caller (02351907070), the B-channel used (B01) and the number called (90700).

The ARGUS will display the number called (DDI) completely, if the Alerting mode is set to manual

(see Page 164).

-Key: View additional information (if available)

#### Accepting call

```
Connect. Tel.
02351907070 B01
to: 90700 ↓
CLEAR TM
```

Use the < **TM** > softkey to start the Test Manager.

(see Page 137).

Use the < ↓ > to view additional information.

```
Call clearing
Normal clearing
Loc.: user ↓
CONT. TM
```

Clearing the connection

#### Charge information in NT mode:

In NT mode, the ARGUS will – for incoming calls – send advice of charges in accordance with DSS1 as units and as currency (in Euro).

## 12.2 Clearing down an ISDN connection

```

Connect. Tel.
02351907070 B01
to: 90700 ↓
CLEAR TM

```

To **clear down the connection**, press <CLEAR> or the Press the


-Key

```

Call clearing
Normal clearing
Loc.: user ↓
CONT. TM

```

The ARGUS will display the cause (see the table below) of the disconnect (e.g. Normal clearing) and the location where the cause occurred (e.g. subscriber).

-Key: View additional information (e.g. charges, if available)

< **TM** >: Open the Test Manager

```

Single tests
→Phone / connec.
Time measuring↓
← + ✓

```

The ARGUS returns to the Single tests menu.

The following causes are shown in clear text:

Cause	Display	Explanation
255	Active clearing	<i>Clearing User actively initiated the disconnection</i>
Long 0	Normal clearing	<i>Cause element with Long 0 is mostly used by 1TR6</i>
01	Unalloc. number	<i>"No access under this call number" is signaled</i>
16	Norm. clearing	<i>Normal disconnect</i>
17	User busy	<i>The number called is busy</i>
18	No user respond	<i>No answer from the number called</i>
19	Call.time XX	<i>Call time too long</i>
21	Call reject	<i>The call is actively rejected</i>
28	Wrong number	<i>Wrong call number format or call number is incomplete</i>

---

<b>31</b>	Norm. clearing	<i>Unspecified "normal class" (Dummy)</i>
<b>34</b>	No B-chan.avail.	<i>No circuit / B-channel available</i>
<b>44</b>	Req.chan.unavail	<i>Requested B-channel not available</i>
<b>50</b>	Req.fac.not subs	<i>Requested supplementary service (facility) not subscribed</i>
<b>57</b>	BC not authoriz.	<i>Requested bearer capability is not enabled</i>
<b>63</b>	Srv./opt.n.avail	<i>Unspecified for "Service not available" or "Option not available"</i>
<b>69</b>	Req.fac.not impl.	<i>Requested facility is not supported</i>
<b>88</b>	Incompat. Objectives	<i>Incompatible destination</i>
<b>102</b>	Timer expired	<i>Error handling routine started due to time-out</i>
<b>111</b>	Protocol error	<i>Unspecified for "protocol error class"</i>
<b>127</b>	Interworking err	<i>Unspecified for "interworking class"</i>

Other causes are not shown in clear text, rather as decimal codes (see Appendix B and C).



```

POTS telephony
to: 02351907070
-----
CLEAR MEM R

```

The ARGUS sends the complete dialing information together.



```


ARGUS28 POTS
→Single tests
Test manager ↓
← ↓ ✓

```

**Disconnect**



### **Simplified overlap signaling using the telephone key**

If you press the -Key, the ARGUS will open the POTS telephony window directly from any menu. Once the call number is entered, the call will be setup.

### **Procedure for an Incoming Call (POTS)**

The ARGUS signals an incoming call both audibly and on the display.

```

POTS call
02351907070
-----
ACCEPT
    
```

If the access supports CLIP, the ARGUS will display the number of the caller (see "POTS CLIP" on page 175).

Or press the



-Key

**Accepting call**

< R >: Generates a FLASH signal

```

POTS telephony
02351907070
CLEAR      R
    
```

**Disconnect**

```

ARGUS28  POTS
+Single tests
Test manager ↓
←      ↓      ✓
    
```



## 13 Test Manager

The ARGUS can simultaneously start full independent BRI access tests or “connections”.

As an example, a BERT can be run at the same time that you make a phone call. The individual tests or “connections” use resources.

All of the tests that have been started will be administered by the Test Manager. Using the Test Manager you can start new tests, switch between tests running in parallel or terminate all of the tests that are currently running.

```
ARGUS28 BRI
*Test manager
Automatic test↓
← + ✓
```

In the Main menu, use the < ↓ > to select the **Test Manager**.



**Open the Test Manager**

```
Tests -/00 B--
*Cancel all
Start new one ↓
← + ✓
```



If the ARGUS is in the Connections or Single tests menu (or in a test), the Test Manager can be opened using the **6** -Key or via the < **TM** > softkey.

## 13.1 Simultaneously Starting Several Tests

### Starting a new test or connection during an existing connection

```
Connect. Tel.
02351907070 B01
to: 90700 ↓
CLEAR TM
```

Example:

There is a connection on B-channel 1.

During this connection (or another test selected from the Single tests menu), the Test Manager can be started by pressing the **6**-Key or the < **TM** > softkey.

```
Tests -/01 B--
→Start new one
Outso. connect↓
← + ✓
```

The ARGUS displays the number of existing connections (-/01).

Use the < ↓ > to select **Start new one**.

The ARGUS returns to the main menu.

```
ARGUS28 BRI
→Single tests
Test manager ↓
← + ✓
```

Use the < ↓ > to select **Single tests**.

```
Single tests
→Bit error test
X.31 test ↓
← + ✓
```

In the Single tests menu, select the desired test (e.g. BERT) with the < ↓ >.

#### Start test

(Still connected)

For information on the operation of bit error tests, see Page 94

```
BERT B02
15:45:42 3
synchron LOS: 5
ABORT TM ERROR
```

The ARGUS opens to the Test Manager.

```
Tests 1/02 B01
→Outso. connect.
-----↓
← + ✓
```

Use the < ↓ to select > **Outgo.connect**.

The connection was started first (1/02), there are 2 connections / tests (1/02). The connection uses B-channel 1 (B01).

```

Connect. Tel.
02351907070 B01
to: 90700 ↓
CLEAR TM

```

The ARGUS will return to the Connection window.

If a test (or connection) is cancelled/cleared, the ARGUS will return to the Test Manager if there is another test (or connection) running in the background.



Some tests use so many resources that they cannot be run in every combination with other tests. In this case, the ARGUS will display the message "Test not possible at this time".

Test/ Connection	Number of times that this test/connection can be started at the same time	It is possible to change to another test
Incoming call	2	Yes
Outgoing call	2	Yes
BERT	2	Yes
LOOP	2	Yes
Service Tests	1	No
Suppl.serv.test	1	No
Time measurement	1	No
X.31 Test	1	No
CF Interrogation	1	No
Auto. Test	1 When the Auto. Test is running all of the resources are in use and no other tests or connections are possible	No
BRI level	1	No
POTS voltage	1	No

### Accepting an incoming call/connection when a test is running.

The ARGUS signals an incoming call both audibly and on the display (see Chap. 12.1 Setting up an ISDN connection page 125).

The incoming call can be accepted without influencing the currently running test. If either the **B-channel loop** or **BERT wait** function is active, the call will be accepted automatically.

The manner that multiple connections are handled is illustrated in the following example of "Accepting an incoming call during a BERT", but it is identical for all other tests.

```
In.call Tel.
02351907070 B01
to: 90700 ↓
REJECT ACCEPT
```

While running a BERT, the ARGUS displays information about an incoming call.

**<REJECT >**: To reject the incoming call. The ARGUS will return to the BERT.

#### Accept the incoming call

```
Connect. Tel.
02351907070 B01
to: 90700 ↓
CLEAR TM
```

The BERT will continue in the background.

or

**6**-Key

```
Tests 1/02 B02
→BERT outoains
Incom. connect↓
← ↓ ✓
```

Use the **< ↓** to select **>**  
**BERT outgoing.**

```
BERT B02
15:45:42
synchron LOS: 5
ABORT TM ERROR
```

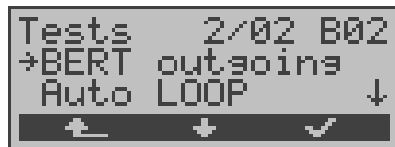
The ARGUS jumps to the BERT.

The connection is still active in the background, the handset is still switched to the connection.



If available, the internal handset will be assigned to the currently started (voice) connection. The assignment of the handset to a given connection is also retained in the background.

### 13.2 Switching Between Tests



Open the Test Manager.

Using the < ↓, **select the** > Test (Connection) that you wish to switch to.

If you press the < ✓ >, **the** ARGUS will open the selected test.

If you press the < ↶ >, the ARGUS will return to the place from which the Test Manager was called (e.g. to a test running parallel). If no other test is running, the ARGUS will, reasonably enough, return to the Main menu.

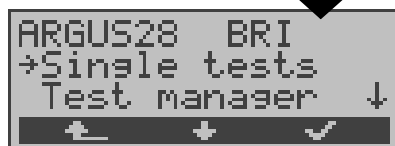
### 13.3 Cancel All



Open the Test Manager.

Using the < ↓, select > **Cancel all**.

The ARGUS will cancel all of the currently running tests/connections and then return to the Main menu.



### 14 Automatic Tests

The ARGUS performs an automatic test series and displays the test results.

Using the Intec software, WINplus or WINanalyse, the test results can also be saved on a PC, where they can be presented in a comprehensive measurement report and printed.

The ARGUS automatically performs the following sequence of tests:

#### **On a BRI or U interface access (ARGUS in TE mode)**

- Status
- Level Measuring
- Service Tests
- BERT in an extended call to oneself
- Test the Supplementary Services
- CF Interrogation (Call Diversions)
- MSN Interrogation
- X.31 test

#### **On a PRI access (ARGUS in TE mode)**

- Status
- Service Tests
- BERT in an extended call to oneself
- Test the Supplementary Services
- CF Interrogation (Call Diversions)
- X.31 test
- Read the L1 counter and measurement time

#### **On a BRI or U-interface permanent circuit**

- Status
- Level Measuring
- BERT in end-to-end mode (e.g. with a loopbox on the remote end)

#### **On a PRI permanent circuit**

- Status
- BERT in end-to-end mode (e.g. with a loopbox on the remote end)
- Read the L1 counter and measurement time

The ARGUS saves the test results together with the date



```
ARGUS28 BRI
B12 Level: OK
TEs P-MP DSS1
MENU RESTART
```



Start the automatic test

```
save as:
AMP_5
ABORT DEL 3b>AB
```

Use the keypad to enter the name under which the results should be saved (see Page 180).



Start the test series,  
see Page 145

If all of the records have been written, you must manually select a memory location (record).



## 14.1 Automatic Start test

The required parameters (e.g. BERT measurement time and error level, see Page 171 and Page 171) should be checked before the automatic test series is begun.

```
Auto test No.: 2
→Start
Display result↓
←  ↓  ✓
```

Use the < ↓ > to select **Start** (in the example, the new test is saved in record number 2).

### Enter

**Own number** - on accesses using the DSS1 protocol - also enter the **remote number**.

```
Numbers
Own number
0235190700
← DEL ✓
```

Use the < ↓ to select the > service.

(required for the suppl.serv.test)

```
Select service
→Tel.ISDN
Fax G3 ↓
←  ↓  ✓
```

### Start test

During the test series, the first three lines in the display will reflect the Single test currently being run.

To interrupt the test, press <ABORT>.

```
Service check ✓
7/16 Fax G3
ABORT
```

```
Auto test No.: 2
→Interrupt test
Stop cur. test↓
ABORT ↓ ✓
```

**Terminating the test (early):**

```
Service check  ✓
7/16 Fax G3
ABORT
```

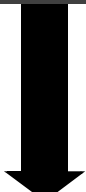
The ARGUS is running an automatic test.



```
Auto test No.: 2
>Interrupt test
>Stop cur. test↓
ABORT ↓ ✓
```

**Interrupting a test**

Use the < ↓ to select >Interrupt test. Press the < ABORT >softkey to restart the test.



```
Auto test No.: 2
>Start
Display result↓
← + ✓
```

**Stop test**



Any test results already determined will not be saved. Any "old" data stored under this data record number from a prior test will be retained.

**Skipping individual tests:**

```
Service check  ✓
7/16 Fax G3
ABORT
```

A single test can be skipped: In this example, the ARGUS is running a Service check.



```
Auto test No.: 2
>Stop cur. test
-----↓
ABORT ↓ ✓
```

**Interrupt the Service check**

Use < ↓ > to select **Stop cur. test**. Use < ABORT > continue the Service check



```
BERT B02
15:45:42 3
synchron LOS: 5
ABORT TM ERROR
```

**The ARGUS will skip the Service check.**

The next single test (e.g. BERT) will be started.

**Resuming a test:**

```
Service check ✓  
7/16 Fax G3  
ABORT
```

```
Auto test No.: 2  
→Continue test  
Interrupt test↓  
ABORT ↓ ✓
```

```
Service check ✓  
7/16 Fax G3  
ABORT
```

An interrupted Single test can be resumed:  
In this example, the ARGUS is running a Service check.

**Interrupting a test**

Use < ↓ > to select  
**Continue test.**

Press the < ABORT > softkey to restart the test.

The ARGUS repeats the “disturbed” single test (in the example: the Service check).

## 14.2 Display Results

Depending on the type of access under test, the ARGUS displays the results stored for the single tests in the following order:

For: **BRI or U-interface**

- State
- Level measuring
- Service Check
- BERT
- Suppl.serv.test
- X.31-Test
- CF Interrogation
- MSN Interrogation

**BRI or U-interface  
- Permanent circuit**

- State
- Level measuring
- BERT

For: **PRI**

- State
- Service Check
- BERT
- L1 counter
- Suppl.serv.test
- X.31-Test
- CF Interrogation

**PRI -permanent circuits**

- State
- BERT
- L1 counter
- Measurement time

## Displaying the saved test results

```

ARGUS28 BRI
→Automatic tests
Level measurin↓
←  ↓  ✓

```

In the Main menu, use the < ↓ > to select **Automatic tests**.

```

Auto test No.: 2
→ 1 AMP_1
  2 AMP_2 ↓
←  DATE  ✓

```

Use the < ↓ > -Key to select a stored test result.

(The ARGUS displays the name assigned by the user (default AMP\_1...) or the date and time (if you press < DATE>).

```

Auto test No.: 2
→Display result
Test data to P↓
←  ↓  ✓

```

Use the < ↓ > to select **Display result**.

```

Auto test No.: 2
B12
BR P-MP TE DSS1
ABORT CONT.

```

Display the test results  
The ARGUS will first display the status of the access under test.

```

Auto test No.: 2
Tel.ISDN  ++123
Fax G3    ++ ↓
ABORT ↑ CONT.

```

Display result of the next single test  
e.g. display Service check.  
Using the < ↓ > scroll through the results of the single tests.  
If you press < CONT. >, the ARGUS will display the results of the next single test.





## 14.5 Sending the results of all tests to a PC

The ARGUS will send the results of all of the tests to the PC at one time.

```
ARGUS28 BRI
→Automatic tests
Level measurin↓
←  ↓  ✓
```

In the Main menu, use the < ↓ > to select **Automatic tests**.

```
Auto test No.: 2
→ 1 24.12. 17:45
  2 31.12. 23:5↓
←  NAME  ✓
```

Use the < ↓ >-Key to select the record.

```
Auto test No.: 2
→All tests to PC
-----↓
←  ↓  ✓
```

Use the < ↓ > to select **All tests to PC**.

Start transfer of  
data to PC



## 15 Level Measuring

### 15.1 Level measuring on a BRI access

#### Level measurement – connected line

The ARGUS measures the level of the received useful signal. In TE mode, it also measures the phantom feed. The measurement will be updated continuously.

```
ARGUS28 BRI
→Level measuring
  Li status      ↓
┌───────────┴───────────┐
| ←           ↓           ✓ |
```

In the Main menu, use the < ↓ > to select **Level measuring**.

```
Level measuring
→Connected line
  Other TE      ↓
┌───────────┴───────────┐
| ←           ↓           ✓ |
```

Use the < ↓ > to select **Other TE**.

#### Start measurement

```
Level:  0,64V OK
Voltage: 38,2V  OK NORM
┌───────────┴───────────┐
| ABORT R>ON  NEW |
```

The ARGUS will display the level of the useful signal (e.g. 0.64 V) and the level of the feed (e.g. 38.2 V).

< R>ON >: add 100Ω resistor

< R>OFF >: remove 100Ω resistor

Press <NEW> to setup Layer 1 again - to ensure a reasonable measurement.

#### Measurement results:

- Evaluation of the useful signal level:

<< level is too low

>> level is too high

OK Level is in order (0.75V <sup>+20%</sup> <sub>-33%</sub> i.e. from 0.9 V to 0.5 V)

\_\_\_ no voltage

- Evaluation of the level of the feed

- Type of feed:

NORM Normal feed (40V <sup>+4.25%</sup> <sub>-13.75%</sub> i.e. from 41.7 V to 34.5 V)

REV\_ inverted phantom feed

NONE no feed

### Level measurement other TE

In TE mode, the ARGUS will measure the level of a terminal connected in parallel. In this case, the ARGUS is passive.

Layer 1 must be activated on the terminal.

The ARGUS updates its measurement continuously.



This measurement is only possible when the ARGUS is **not** supplied by the BRI.

```

ARGUS28 BRI
>Level measuring
  Li status      ↓
┌───────────┴───────────┐
|   ←   ↓   ✓   |
└───────────┬───────────┘

```

Use the < ↓ to select >Level measuring.

```

Level measuring
>Other TE
-----↓
┌───────────┴───────────┐
|   ←   ↓   ✓   |
└───────────┬───────────┘

```

Use the < ↓> to select **Other TE**.

```

Other TE
Level:  0,86V
┌───────────┴───────────┐
|  ABORT  R>ON  NEW  |
└───────────┬───────────┘

```

The ARGUS will display the level of the useful signal (in the example 0.86 V).

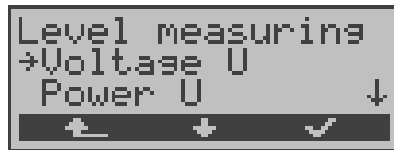
< **R>ON** >: add 100Ω resistor

< **R>OFF** >: remove 100Ω resistor

Press <NEW> to setup Layer 1 again - to ensure a reasonable measurement.

## 15.2 Voltage measurement on a U-interface

### Measurement of feed voltage on a U-interface



Use the <↓ > to select **Voltage U**.

#### Start measurement



The ARGUS will display the level of the feed voltage. The measurement will be updated continuously.

## 15.3 Voltage measurement on a POTS access

The ARGUS measures the voltage level in both the normal case and when the line is "busy" (trunk line).



In the Main menu, use the < ↓ > to select **>Level measuring**.

#### Start measurement



The ARGUS will display the polarity of the 2-wire POTS line (red plug "a"; black plug "b") as well as the "on hook" and "off hook" voltage levels. Press <NEW> to repeat the measurement.

## 16 L1 status

### 16.1 The L1 status of a BRI access

The ARGUS displays in TE mode the current status of Layer 1: which signal is received from the remote end (Rx) and which signal does the ARGUS send (Tx).

```
ARGUS28 BRI
>L1 status
  Configuration ↓
  ← ↓ ✓
```

Use the < ↓ to select > **L1 status**.

```
L1 status
TE: info 4
NT: info 3
ABORT NEW
```

The ARGUS displays the status of Layer 1 or of the signal, which is being sent (Info 0 ... Info 4).

Press <NEW> to setup Layer 1 again (if necessary).

## 16.2 The L1 status of a PRI access

The ARGUS displays the Layer 1 alarms and messages in several windows, which provide detailed information regarding the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).

```
ARGUS28 PRI
→L1 status
Configuration ↓
←      ↓      ✓
```

Use the < ↓ > to select >L1 status.

```
L1 status 03:15
Signal = +
FAS + ↓
ABORT x RESET
```

The ARGUS displays the time that has elapsed since the ARGUS was initially started or it was last reset in minutes and seconds (03:15).

The measurement time and all Layer 1 alarms and messages are updated continuously.

Use the < ↓ >-Key to scroll.

Use < x > to toggle the PRI relay for the Rx/Tx pin assignment to its other position; it will toggle regardless of the state that it was in before.

This function is only available with the L1 status menu, if there is currently no signal. The state of the relay will remain unchanged when you close the L1 status menu.

**Signal =** means that Rx/Tx are normal

**Signal x** means that Rx/Tx are inverted

Press <RESET> to reset the History function and all counters.

OK symbol: +


Error symbol: -

History symbol: ! this symbol means that regardless of the current Status (+ or -) an error has occurred during the measurement time.

**The meaning of the individual displays:**

- Signal:** On its receiving-side, the ARGUS has the correct signal sent from the remote end (access or terminal depending on the operation mode TE or NT simulation) and indicates this by a + . If Rx and Tx are connected normally a "=" will be shown after the signal; in the event that they are inverted (swapped) a " x" will be displayed.
- FAS:** (= **F**rame **A**lignment **S**ignal)  
Indicates whether the ARGUS could correctly synchronize with the incoming 2 Mbit data stream's alternating frame identification word or message word and the, perhaps present, CRC4-superframe structure.
- CRC4 det:** If CRC4-monitoring is active for the access or the terminal and the ARGUS is able to synchronize itself to the CRC4 superframe, it will indicate this by displaying "CRC det +".  
If "CRC det -" is displayed together with "Signal +" and "FAS +", this indicates that no CRC4 is active.  
To prevent power up effects (transients), we recommend that you set the display and counter to a defined initial state with a RESET.
- Code HDB3:** Displays the transmission code used (currently fixed to HDB3)
- noA-Bit:** With the A-Bit, the remote end can indicate whether the route on its receive-side is no longer available  
noA-Bit + means A=0: Idle state  
noA-Bit - means A=1: Return direction is not available
- noAIS:** (= **A**larm **I**ndication **S**ignal)  
AIS will be set if a component on the transmission line determines that the signal they have received is faulty (e.g., in the event, that they lose frame synchronization) and afterwards they will send a Time -1 (=AIS).  
noAIS = + : No AIS occurred.
- Sa5-Bit (Rx ,Tx):** The Sa5-bit (Rx) sent by the ARGUS can be set in the Configuration menu (see "Sa5 bits" on page 166. )

- 
- Sa6-Bit (Rx ,Tx):** The Sa6-bit (Rx) sent by the ARGUS can be set in the Configuration menu (see “Sa6 bits” on page 166. )
- E-Bit:** With the two E-Bits, E1 and E2, the remote end will report any CRC4-errors that it finds on its receive side in the first or second submultiframe (the E-Bit will be set to 0)  
 E-Bit11+ : if both E-Bits are set to 1, no error occurred  
 E-Bit11+! : A CRC4-error was found (indicated by the “!”), however the circuit is in largest part OK (see the E-Bit counter Ecnt or or CRC4 error counter CRCErr)
- Ecnt:** The E-Bit counter counts the reported E-Bit errors individually; in other word, all the cases in which a faulty CRC4 submultiframe was received (counts at a maximum of 1kHz).
- CRC Err:** The CRC4 error counter totals the number of CRC4 submultiframes in which errors were detected....
- CRC rel:** Gives the CRC4 error rate, in other words, the number of faulty CRC4 frames relative to the total number of CRC4 frames received.
- Code Err:** Counter for the detected HDB3 transmission code errors
- Code rel:** Transmission code - error rate
- Frm. Err:** Counter for faulty 2Mbit frames

When running MegaBERT unframed in permanent circuit mode, if the menu L1 status is opened (via the -Key or the Test Manager), the display will only show the parameters Signal and noAIS.

## 17 Configuration

The ARGUS can be configured to suit your special requirements. The default (factory) settings can be restored by selecting "Reset" (see page 187 Reset).

### 17.1 Trace/Remote

The ARGUS remains active and either saves the data from the D-channel (all of the D-channel messages sent to and received from the network) in its internal Flash memory or passes the data directly to the connected PC. The Remote function is optional.

```
ARGUS28 SHDSL
→Configuration
Access ↓
← ↓ ✓
```

In the Main menu, use the < ↓ > Select **Configuration**.

```
Configuration
→Trace/remote
SHDSL ↓
← ↓ ✓
```

Open the Configuration menu

Use the < ↓ > to select **Trace/remote**.

```
Trace mode
→Off
Auto PC sync. ↓
← ↓ ✓
```

Auto PC sync.: Even after it is switched on again, the ARGUS remains in Trace mode and passes D-channel data to the PC ("Trace" LED on continuously).

Manual PC sync.: The ARGUS is set to Trace mode and will pass D-channel data to the PC until it is switched off. When it is switched on again, it will not return to Trace mode.

```
Configuration
→Trace/remote
SHDSL ↓
← ↓ ✓
```

**Confirm the entry**

If the ARGUS cannot send the data to the PC without errors, the "Trace" LED will flash at 5Hz (5 times per sec). The currently active settings will be marked in the display with an \* .



## 17.2 Setting the SHDSL parameters

The operation is the same for all configurations and will be illustrated with a single example:

```
ARGUS28 SHDSL
→Configuration
Access ↓
┌───┴───┬───┴───┬───┴───┘
└───┬───┘ └───┬───┘ └───┬───┘
```

In the Main menu, use the < ↓ > to select **Configuration**.

```
Configuration
→SHDSL
ISDN ↓
┌───┴───┬───┴───┬───┴───┘
└───┬───┘ └───┬───┘ └───┬───┘
```

Open the Configuration menu  
Use the < ↓ > to select **SHDSL**.

```
SHDSL config.
→Spectrum
Clock/framing ↓
┌───┴───┬───┴───┬───┴───┘
└───┬───┘ └───┬───┘ └───┬───┘
```

The **SHDSL config.** menu will open.  
Use the < ↓ > to select, e.g. **Spectrum**.

```
Spectrum
*Annex A
Annex B ↓
┌───┴───┬───┴───┬───┴───┘
└───┬───┘ └───┬───┘ └───┬───┘
```

Use the < ↓ > to select the desired **Spectrum**.  
< ↶ >: The ARGUS will return to the SHDSL config. menu **without** making any changes.

```
SHDSL config.
→Spectrum
Clock/framing ↓
┌───┴───┬───┴───┬───┴───┘
└───┬───┘ └───┬───┘ └───┬───┘
```


**Confirm the entry**

**SHDSL settings:**


<b>Display Name on the ARGUS</b>	<b>Comment</b>
<b>Spectrum</b>	Annex A: American SHDSL standard Annex B: European SHDSL standard
<b>Clock/framing</b>	Choose between synchronous and plesiochronous mode.
<b>Channel selection</b>	Use the keypad to select the B and Z-channels. Up to 36 B-channels and up to 7 Z-channels can be selected. Maximum selections: - 36 B-channels and 1 Z-channel - 35 B-channels and 7 Z-channels If an * is entered for the B and Z-channels, the ARGUS will automatically determine the channel assignment.
<b>Power back off</b>	Setting to reduce the remote end's transmit power. The default value is 0dB, i.e. the maximum transmit power. The power can be reduced by a maximum of 30 dB.
<b>EOC using</b>	Using the EOC (Embedded Operations Channel) it is possible to transmit additional protocol commands. <b>on</b> (default setting): Display the performance parameters of the local (own) <b>and</b> remote ends. <b>active</b> : Display the performance parameters of the local (own) and remote ends, if the remote end supports the own query. <b>passive</b> : No display of the remote end's parameter (except for Alcatel). <b>off</b> : No display of the remote end's performance parameter.
<b>EOC mode</b>	Setting the EOC mode: ITU standard or QD2 Lite



## Settings in ISDN:

Display Name on the ARGUS	Comment
L1 permanent?	On a BRI connection in NT mode, Layer 1 (L1) is permanently active.
Protocol	As an alternative to automatic protocol determination (setting: Automatically), you can also set the Layer-3 D-channel protocol manually. The ARGUS will save the protocol setting permanently, i.e. it will use this protocol the next time that it is switched on.
Alerting mode	<p>You can specify whether, for an incoming call on a BRI point-to-point access, the ARGUS should only display the access number without extension or the complete number with extension.</p> <p>If it is set to <b>Manual</b>, the ARGUS will display the extension (An incoming call will be signaled. The ARGUS will send the Layer 3 message "Alert" when it accepts the call. The digits of the extension that have been sent by this point will be displayed.).</p> <p> An incoming call in the <b>Manual</b> mode must be answered within 20 seconds or it will be lost. Furthermore, you should not that the remote subscriber will not hear a ringing tone.</p> <p>If it is set to <b>Automatically</b>, the ARGUS will only display the access number without extension or, depending on the configuration of the access in the exchange, it may not display the number called at all.</p>

<b>Clock mode</b>	<p>This parameter sets where the clock will be generated in the case of a BRI or PRI access.</p> <p>You can either specify that the ARGUS generates the clock (is Master) or that it is the slave of a clock generated at the other end (Slave).</p> <p>Default setting:  NT mode: Master  TE mode / Permanent circuit: Slave</p> <p>This setting will not be saved permanently, rather only applies for the current measurement.</p>
<b>BRI termination</b>	<p>Independent of the operation mode (TE or NT), a terminating resistor can be switched-in on the BRI access. This setting will not be saved.</p> <p>Default setting:  NT mode: Terminating resistor switched-in  TE mode / Permanent circuit: no terminating resistor is switched in</p>
<b>PRI termination</b>	<p>Depending on the transmission technique (75 Ohm coaxial-cable or twisted-pair cable with an impedance of 120 Ohms) used, the PRI termination resistor must be selected accordingly.</p> <p>The default setting is country-specific and corresponds to the system most common in the respective country:  Germany, Austria, England,  Netherlands, France, ... :<b>120 Ohm</b>  Spain, Italy, Greece, ...:<b>75 Ohm</b></p>

<p><b>PRI haul mode</b></p>	<p>The ARGUS supports the setting of the haul mode (sensitivity) of the PRI access.</p> <p>By default, short haul will be suggested.</p> <p>Short haul: Normal sensitivity, i.e. signal reception with cable attenuation of up to ca. -10dB.</p> <p>Long haul: Increased sensitivity, i.e. signal reception with cable attenuation of up to ca. -35dB. This corresponds to a distance of 1600m with 22AWG twisted pair cable.</p> <p>When using greater sensitivity (Long haul mode) on longer lines, feedback on the line can cause faulty synchronization.</p>			
<p><b>Sa5 bits</b></p>	<p>The ARGUS can set the Sa5 bits on a PRI access.</p> <p>By default, the Sa5 bits are set to 0000.</p> <p> The Sa5 bits have no significance between an NTPM and a PBX system.</p> <p>This setting will not be saved permanently. If the ARGUS is switched off, the setting will be lost.</p> <table border="0" data-bbox="386 1547 1198 1682"> <tr> <td data-bbox="386 1547 582 1682"> <p>Sa5 Coding <b>0000</b> <b>1111</b></p> </td> <td data-bbox="582 1547 869 1682"> <p>Interpretation Network-&gt;Customer Direction code -----</p> </td> <td data-bbox="869 1547 1198 1682"> <p>Interpretation Customer -&gt; Network Ack. for loop command Direction code</p> </td> </tr> </table>	<p>Sa5 Coding <b>0000</b> <b>1111</b></p>	<p>Interpretation Network-&gt;Customer Direction code -----</p>	<p>Interpretation Customer -&gt; Network Ack. for loop command Direction code</p>
<p>Sa5 Coding <b>0000</b> <b>1111</b></p>	<p>Interpretation Network-&gt;Customer Direction code -----</p>	<p>Interpretation Customer -&gt; Network Ack. for loop command Direction code</p>		
<p><b>Sa6 bits</b></p>	<p>The ARGUS can set the Sa6 bits on a PRI access.</p> <p>By default, they are set to 0000.</p> <p>This setting will not be saved permanently</p>			

Sa6 Coding	Interpretation Network->Customer	Interpretation Customer -> Network
<b>0000</b>	Setting for normal operation (default)	Setting for normal operation, idle (default)
<b>1010</b>	Switches a loop in the NTPM. In permanent circuit mode a BERT can be run in a loop setup there xxxx. <b>Important:</b> The ARGUS must also be set to <b>permanent circuit</b> , even if it is connection for dialup connections xxxx.	_____
<b>1111</b>	Switches a loop in the LEPM. In permanent circuit mode a BERT can be run in a loop setup there xxxx. <b>Important:</b> The ARGUS must also be set to <b>permanent circuit</b> , even if it is connection for dialup connections xxxx.	AIS on U2 of the NTPM
<b>A bit</b>	Using the ARGUS, you can set the A bit on a PRI access. By default, A=0 (automatic). This setting will not be saved permanently	
<b>CRC4 mode</b>	CRC4 monitoring can be switched on or off manually. By default, CRC4 is set to automatic. This setting will not be saved permanently	

<b>Call parameter</b>	<p>Two different parameters can be set for (ISDN) calls generated on both the network-side (ARGUS in NT mode) and on the user-side (ARGUS in TE mode):</p> <p><b>1. Type of number (TON)</b> for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal</p> <p><b>Network-side: Net CGN TON / Net-CDN-TON</b></p> <p><b>User-side: User CGN TON / User CDN TON</b></p> <p><b>2. Numbering Plan</b> for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal</p> <p><b>Network-side: Net-CGN-NP/ Net-CDN-NP</b></p> <p><b>User-side: User CGN NP / User-CDN-NP</b></p> <p>Possible settings:</p> <p>For TON: unknown, international, national, network spec., subscriber, abbreviated.</p> <p>For NP: unknown, ISDN/telephony, data, telex, national stand., private</p>
<b>Services</b>	<p>Up to three user-specific services (user spec.1 to user spec.3) can entered and saved. For each "user spec. service", you must enter the info-elements BCAP, HLC and LLC in hexadecimal. To do so, use the keypad and the &lt; A . . F &gt; softkey (e.g. to enter a "C", press the softkey three times; for a "F", press it six times).</p>



<b>Call Acceptance</b>	<p>If the ARGUS is set to "only own MSN/DDI" and is in TE mode on a P-MP access, it will only signal those calls which placed to the MSN (on a P-P access the DDI) of the access under test.</p> <p>If set to "all MSN/DDI", the ARGUS signals all calls.</p> <p>Prerequisite:</p> <ul style="list-style-type: none"> <li>- the "own" number must be entered in the call number memory under "own number" (see "Saving Call Numbers" on page 185)</li> <li>- the incoming call must have a destination MSN</li> </ul> <p>The default setting is "all MSN/DDI". This setting will be saved permanently.</p>
<b>Voice coding</b>	<p>There are two options for coding voice data in a B-channel:</p> <ul style="list-style-type: none"> <li>- A-law (default)</li> <li>- <math>\mu</math>-law</li> </ul> <p>This parameter will be reset to the default setting when the ARGUS is switched off and back on again.</p>
<b>DTMF / Keypad</b>	DTMF or keypad setting
<b>Destination MSN</b>	A destination number can be entered, which the ARGUS will use for MSN interrogation (default: 0043).
<b>CUG Index</b>	Entry of the CUG index, which the ARGUS should use when testing the CUG (Closed User Group) service. Default: 148

## 17.4 Configuration: BERT

The operation is the same for all configurations and will be illustrated with a single example:

```
ARGUS28 SHDSL
→Configuration
Access ↓
← + ✓
```

In the Main menu, use the <↓> **Select** Configuration.

Open the Configuration menu

```
Configuration
→BERT
POTS ↓
← + ✓
```

Use the <↓> to select **BERT**.

```
BERT config.
→BERT time
Error level ↓
← + ✓
```

Open the **BERT config.** menu

Use the <↓> to select e.g. **BERT time**.

```
BERT time
00:12
ABORT DEL ✓
```

Use the keypad to enter the duration of the BERT.

<DEL>: Delete the digit before the cursor


<ABORT> : The ARGUS returns to the BERT config. menu without changing the settings.

```
BERT config.
→BERT time
Error level ↓
← + ✓
```

**Confirm entry**

The ARGUS will return to the BERT config. menu.

## Settings for the BERT:

Display Name on the ARGUS	Comment
<b>BERT duration</b>	<p data-bbox="676 353 1197 515">– You can use the keypad to enter measurement times ranging from 1 minute (default setting) to 99 hours and 59 minutes (= 99:59).</p> <p data-bbox="676 582 1197 873">            If the time is set to 00:00 (=BERT with unlimited measurement time), the BERT <b>will not</b> stop automatically. In this case, the user must terminate the BERT by pressing the &lt; <b>ABORT</b> &gt; softkey.         </p>
<b>Error level</b>	<p data-bbox="676 900 1197 1276">This is the level used to evaluate whether the BERT had an "acceptable" bit error rate. If the BERT has a bit error rate, which exceeds this error level, the ARGUS will display a "NO" as the test result. Using the keypad, this parameter can be set to any value from 01 (= <math>10^{-01}</math>) to 99 (= <math>10^{-99}</math>).</p> <p data-bbox="676 1332 1197 1590">The default threshold (error level) is <math>10^{-06}</math> (1E-06). That means that, in the event that the bit error rate is less than <math>10^{-06}</math> (one error in <math>10^6 = 1,000,000</math> sent bits), the bit error test will be evaluated as OK.</p>
<b>HRX value</b>	<p data-bbox="676 1617 1197 1778">The HRX setting (<b>H</b>ypothetical <b>R</b>eference <b>C</b>onnections ITU-T G.821): Using the keypad, you can enter a value ranging from 0 to 100 %.</p>

**Bit pattern BRI/U**

This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a BRI or U-interface access.

Several predefined bit patterns are available

(default setting =  $2^{15}-1$ ).

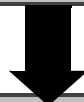
Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary.



To move the cursor right or left, use the  $\uparrow$ ,  $\downarrow$ -Keys.

<DEL>: Set the digit in front of the cursor to 0

Saving the bit pattern



<p><b>Bit pattern PRI</b></p>	<p>This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a PRI access. (see <b>Bit pattern S0/U0</b>) (default setting = <math>2^{15}-1</math>).</p>
<p><b>Bit pattern SHDSL</b></p>	<p>This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a SHDSL access. (see <b>Bit pattern S0/U0</b>) (default setting = <math>2^{15}-1</math>).</p>

---

<b>Bit x.21</b>	<b>pattern</b>	This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a X.21 or V.35 access. (see <b>Bit pattern S0/U0</b> ) (default setting = $2^{15}-1$ ).
---------------------	----------------	---

## 17.5 Configuration: POTS

The operation is the same for all configurations and will be illustrated with a single example:

```
ARGUS28 SHDSL
→Configuration
Access ↓
← ↓ ✓
```

In the Main menu, use the <↓>  
Select **Configuration**.

```
Configuration
→POTS
X.31 profile ↓
← ↓ ✓
```

Open the Configuration menu

Use the <↓> to select **POTS**.

```
POTS config.
→Dial mode
CLIP mode ↓
← ↓ ✓
```

**POTS configuration** menu

Using the <↓>, select a setting (e.g. **Dial mode**).

```
POTS dial mode
→Pulse mode
DTMF ↓
← ↓ ✓
```

Use the <↓>-Key to select the desired dialing mode (e.g. **Pulse mode**).

<←>: The ARGUS will return to the POTS config. menu without making any changes.

```
POTS config.
→Dial mode
CLIP mode ↓
← ↓ ✓
```

**Confirm selection**

**Settings on a POTS access:**

<b>Display on ARGUS</b>	<b>Comment</b>
<b>Analog dial mode</b>	Selection of the dialing mode: DTMF or pulse dialing
<b>POTS CLIP</b>	Select the transfer procedure used to pass the call number: <b>FSK:</b> CLIP via a procedure similar to a modem (for Germany and some other places in Europe) <b>DTMF:</b> CLIP via DTMF (for Scandinavia and the Netherlands)  The ARGUS will automatically detect that a CLIP was sent using DTMF with the polarity reversal and will set itself accordingly (e.g. Netherlands).
<b>AOC pulse</b>	Set the country-specific advice of charge pulse
<b>DTMF parameter</b>	Settings for the three parameters Level, Duration and Interval of the DTMF signals generated during POTS (analog) operation.
<b>Level</b>	Setting the DTMF level:  The level can take any value ranging from -21dB to +12 dB and can be raised (< ↑ > or ↑-Key) or lowered (↓ -Key) by 3 dB steps. Default setting: 0 dB

<b>Duration</b>	<p>Setting the DTMF time:</p> <p>The duration of the signal can take a value between 40ms and 1s (default: 80ms).</p> <p>The value can be raised or lowered using the ↑,↓-Keys:</p> <p>In the range 40 - 200ms in 10ms increments</p> <p>In the range 200 - 300ms in 20ms increments</p> <p>In the range 300 - 1000ms in 100ms increments</p> <p>When the upper limit is reached (1000ms), the softkey &lt; ↑ &gt; will automatically change to a &lt; ↓ &gt; and vice versa when the lower limit (40ms) is reached.</p>
<b>DTMF interval</b>	<p>Setting the interval between two DTMF characters:</p> <p>The duration of the signal can take a value between 40ms and 1s (default: 80ms).</p> <p>The value can be raised or lowered using the ↑,↓-Keys:</p> <p>In the range 40 - 200ms: in 10ms increments</p> <p>In the range 200 - 300ms: in 20ms increments</p> <p>In the range 300 - 1000ms: in 100ms increments</p> <p>When the upper limit is reached (1000ms), the softkey &lt; ↑ &gt; will automatically change to a &lt; ↓ &gt; and vice versa when the lower limit (40ms) is reached.</p>
<b>Reset to</b>	<p>Restores the default settings: Level = 0 dB, Time = 80 ms Interval = 80 ms</p>



<b>FLASH time</b>	<p>Sets the length of a FLASH.</p> <p>This setting is needed in order to use special features of a PBX.</p> <p>The FLASH time can take a value between 40ms and 1s.</p> <p>The value can be raised or lowered using the ↑,↓-Keys:</p> <p>In the range 40 - 200ms: in 10ms increments</p> <p>In the range 200 - 300ms in 20ms increments</p> <p>In the range 300 - 1000ms: in 100ms increments</p> <p>When the upper limit is reached (1000ms), the softkey &lt; ↑ &gt; will automatically change to a &lt; ↓ &gt; and vice versa when the lower limit (40ms) is reached.</p>
-------------------	--

## 17.6 Configuration: X.31 profile

The ARGUS stores all of the parameters the various X.31 test varieties in the X.31 profiles. Up to 3 user-defined X.31 profiles can be created. An X.31 profile must be selected before an X.31 test run. Only those parameters which are relevant will be used for the respective test situation.

```
ARGUS28 SHDSL
→Configuration
Access ↓
← + ✓
```

In the Main menu, use the <↓>  
Select **Configuration**.

```
Configuration
→X.31 profile
Device ↓
← + ✓
```

Open the Configuration menu

Use the <↓> to select **X.31 profile**.

```
X.31 Profile
→.31 Profile 1
X.31 Profile 2 ↓
← EDIT ✓
```

Use the <↓> to select a profile (e.g. X.31 profile 1).

```
X.31
→Packet number
TEI ↓
← + ✓
```

Edit profile 1

Use the <↓> to select e.g. Packet number.

```
Packet number:
1
ABORT DEL ✓
```

Using the keypad, enter the number of packets.

<↑>: The ARGUS will return to the X.31 menu without making any changes.

```
X.31
→Packet number
TEI ↓
← + ✓
```

**Confirm selection**

<b>Display on ARGUS</b>	<b>Comment</b>
<b>X.31 profile:</b>	
<b>Packet number</b>	Number of packets sent
<b>TEI</b>	Entry (from the keypad) of the TEIs to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI.
<b>LCN</b>	Entry (from the keypad) of the LCN to be used in the X.31 test.
<b>Packet size</b>	The size of the data packets
<b>Agree PS</b>	Agreement with the network side (DCE) regarding the data packet size. If the desired data packet size is larger than the default, this parameter should be set to <b>on</b> .
<b>Window size</b>	Window size of Layer 3
<b>Agree WS</b>	Negotiate between the terminal (DTE) and the network (DCE) an agreement regarding the window size.
<b>Throughput</b>	Data throughput in bits per second
<b>Agree DS</b>	Agreed data throughput

User data

Content of the user data:

- Format setting for the user data
- Entry of the ASCII data

There are three memory locations available.



Select one of the three available memory locations for the ASCII data (in this example, the first location 1/3)

Edit the value



Use the keypad to enter the ASCII data. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits):

< 12>ab > : entry of the digits 0 to 9 plus \* and #

< ab>AB > : entry of the lowercase characters and @, /,- and .

(e.g. to enter a "c" press the "2" on the keypad three times)

< AB>12 > : entry of the uppercase characters and @, /,- and .

To move the cursor right or left, use the ↑,↓-Keys.

Press < DEL > to delete the digit before the cursor.


< ABORT> : do **not** save ASCII data.

✓-Key


Save ASCII data

- Entry of the hex data:





↓



↓ **✓-Key**

**Save hex value**

Select one of the three available memory locations for the hex data (in this example, the first location 1/3)

Edit the value

Use the keypad to enter the hex value. To enter the values A...F, use the softkey <A..F> (e.g. to enter a C, press the softkey <A..F> three times). To enter multiple values (A...F) one after the other, confirm each digit with <OK>. Press <DEL> to delete the digit before the cursor.

<b>CUG</b>	Closed User Group: Yes No
<b>CUG Index</b>	Coding for Closed User Group
<b>D bit</b>	local: DCE acknowledges data packets, i.e. flow control on local DTE-DCE path end-to-end: DTE -DTE flow control
<b>Facilities</b>	Coding for various supplementary services
<b>Profile name</b>	Enter the profile names, which the ARGUS will later display.

## 17.7 Configuration: ARGUS

The operation is the same for all configurations and will be illustrated with a single example:

```
ARGUS28 SHDSL
→Configuration
Access ↓
← → ✓
```

In the Main menu, use the <↓>  
Select **Configuration**.

```
Configuration
→Device
Numbers ↓
← → ✓
```

Open the Configuration menu

Use the <↓> to select **Device**

```
Device config.
→Menu language
LCD contrast ↓
← → ✓
```

The **Device config.**

menu will open.

Using the <↓>, select a setting (e.g. Menu language).

```
Menu language
→Deutsch
English ↓
← → ✓
```



Use the <↓> to select a language (e.g. Deutsch).

<↑>: The ARGUS will return to the Device config. menu without making any changes.

```
Device config.
→Menu language
LCD contrast ↓
← → ✓
```

**Confirm selection**

**Settings on the ARGUS:**

<b>Display on ARGUS</b>	<b>Comment</b>
<b>Menu language</b>	Selection of the menu language
<b>LCD contrast</b>	<p>Setting the display contrast (The contrast can be changed in 16 steps).</p> 
	<p>The contrast can be increased or decreased using the ↑,↓-Keys: The display shows a vertical arrow, which shows the current setting on a scale from low to high contrast.</p>
<b>Enter date / time</b>	<p>Enter the date and time. (Initialisation of the internal clock) via the keypad.</p>  <p>Use the ↓ -Key to scroll to the next line.</p> <p>The entered time will be continuously updated by the ARGUS's real time clock as long as the power is not interrupted.</p> <p>When the power is interrupted (the ARGUS switched off without batteries), the clock will run a few more weeks on its internal supply.</p> <p>If the backup supply is exhausted, the time will be undefined and must be set again.</p>
<b>Baud rate</b>	Sets the maximum Baud rate to be used by the ARGUS to communicate with a PC.

<b>Alarm bell</b>	The ARGUS signals with an alarm in a variety of situations, e.g. when a bit error occurs in a BERT. When this parameter is set to "off", all audible alarms are suppressed.
<b>Feed</b>	The ARGUS will automatically draw its power from one of the following sources (setting: " <b>only normal</b> "):: power supply, BRI network or accumulators. On some accesses, powering the ARGUS from the BRI line may lead to trouble. Therefore, you can switch off the option for feed from the BRI network. (setting: " <b>no line power</b> ")
<b>Battery type</b>	Sets whether the ARGUS will be operated with batteries or accumulators (rechargeable batteries). If you select "Accu", the ARGUS will display the current level of charge of the accumulators (rechargeable batteries).
<b>Software option</b>	To enable a software option (e.g. additional functions), you must first enter a software key via the keypad.



## 17.8 Saving Call Numbers

Ten call numbers with a maximum of 24-places can be entered in the speed-dialing memory.



The first speed-dial number **must** be the **own** call number of the access under test (this is especially important for the automatic Service test).

In the *Remote No.1-8* memory locations, you can save remote call numbers. In the memory location *X.31 test number*, the ARGUS expects the entry of the X.25 access number for the X.31 test (see Chap. 11.4 page 102).

```
ARGUS28 SHDSL
→Configuration
Access
```

In the Main menu, use the <↓> to select **Configuration**.

```
Configuration
→Numbers
Reset
```

Open the Configuration menu

Use the <↓> to select **Numbers**.

```
Numbers
Own number
806790
```

Using the keypad, enter the number of the access under test.

Press < DEL > to delete the digit before the cursor.

Using the <↓>-Key scroll through the speed-dialing memory.

```
Configuration
→Numbers
Reset
```

**Save the call number.**

When entering an own call number with an extension (operation of the ARGUS on a PBX access), observe the following:

The extension is separated from the access number by a #.

For outgoing calls, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number (DSS1-CGPN or 1TR6-OAD), only the

number after the #, in other words the extension. A "#" at the beginning of a call number is treated as a valid character.

Example:

02351/9970-45 is entered as 023519970#45



If the "# " is at the end of a number, when the number is later dialed it will be done without CGPN or OAD. This is important for some PBXs.

## 17.9 Reset

The ARGUS resets all parameters and the channel patterns for the BERT on permanent circuits on PRI accesses (see Page 40 ) to their default values.



The numbers in the speed-dialing memory and all of the test results stored in the ARGUS (e.g. SHDSL results or automatic test sequences) will be deleted.

The following settings are possible:

	<b>Default</b>
Trace/Remote	Off
<b>SHDSL parameters</b>	
Spectrum	Annex B
Clock/framing	Synchronous
Channel selection	automatically (*,*)
Power back off	0 db
EOC using	on
EOC mode	ITU Standard
<b>BERT parameters</b>	
BERT time	1 min
BERT error level	$10^{-06}$
BERT bit pattern (all accesses)	$2^{15}-1$
BERT-HRX	15%
Bit pattern "freely- defined"	0000000000000000
<b>ISDN parameters</b>	
L1 permanent?	no            only for BRI NT
Protocol	Automatic
Alerting mode	Automatic
BRI termination	TE mode: on NT mode: off
PRI termination	75 Ohm
PRI haul mode	short haul
Sa5 bits	0000
Setting the Sa6 Bits	0000
A bit	A=0 (automatically)
CRC4 mode	CRC4 automat.
Call acceptance	all MSN/DDI

Call parameter	depending on country version
Clock mode	TE mode: Slave NT mode, Permanent circuit: Master
Voice coding	A-Law
DTMF / Keypad	DTMF
Destination MSN	0043
CUG Index	148

### **POTS**

POTS dialing mode	DTMF
POTS CLIP	FSK
POTS AOC pulse	depending on country version
POTS FLASH time	80 ms
DTMF parameter	80ms/80ms/0dB

### **X.31 profile**

Packet number	10
TEI	** (automatically)
LCN	1
Packet size	128 Bytes
Agree PS	No
Window size	2 Packets
Agree WS	No
Throughput	1200 bit/s
Agree DS	No
User data:	
Format	ASCII
ASCII data	Echo
Hex data	1/3: 01 00 00 00 45 43 48 4F 2/3: 01 00 00 00 30 30 47 47
CUG	No
CUG Index	1
D bit	Local
Profile name	X.31 profile 1

### **Device parameters**

Menu language	depending on country version
LCD contrast	Average value
Enter date / time	1.1.2000 / 12:00
Baud rate	57,600 Baud
Alarm bell	Off
Feed	only normal
Battery type	Power pack

```
ARGUS28 SHDSL
*Configuration
Access
┌───┴───┐
└───┬───┘
```

In the Main menu, use the  
<↓>  
Select **Configuration**.

```
Configuration
*Reset
-----┬───┘
┌───┴───┐
└───┬───┘
```

Open the Configuration  
menu

```
Continue with
reset of all
parameters?
ABORT  YES
```

Use the < ↓ > to select  
**Reset**.

Security query

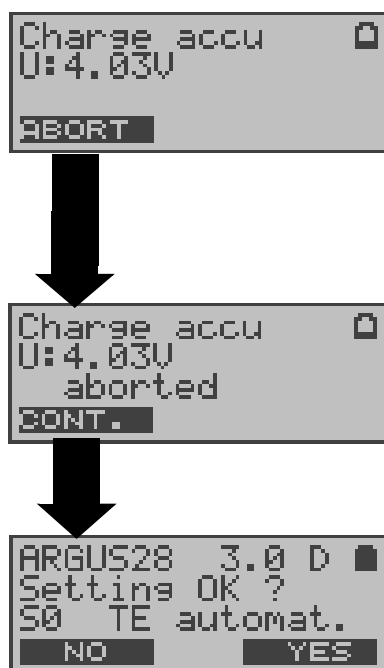
```
Configuration
*Reset
-----┬───┘
┌───┴───┐
└───┬───┘
```

Reset to the  
default values

## 18 Accu servicing

### Automatic charging of the accumulators after the ARGUS has been switched off

The ARGUS automatically recharges the accumulators, if the ARGUS is connected to the plug-in power supply and the accumulator voltage is less than 3.90 volts (only use the supplied accumulators).



The LED "Line Power" flashes while the accumulators are recharging.

If you press and hold the power switch, the ARGUS will switch off before the accumulators are recharged. Otherwise, the ARGUS will switch itself off automatically as soon as the accumulators are recharged.

### Accu servicing

The ARGUS will display the current charge of the accumulators, if no power supply is connected.

When the power supply is connected, the accumulators in the ARGUS can be completely discharged or immediately (without being first discharged) recharged. The discharge procedure takes up to 6 hours. The ARGUS will automatically begin recharging the accumulators after a break of about 30 minutes (depending on the capacity of the accumulators, it can take up to 7 hours to recharge them).



In the Main menu, use the <↓> select **Accu servicing**.



Open the **Accu servicing** menu

Use the <↓> to select, for example, **Charge**.



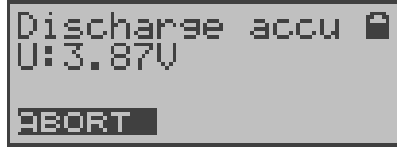
Start charging the accumulators (the plug-in power supply must be connected)

The ARGUS will display the level of the charge and the

voltage while charging the accumulators.

**Discharging the accumulators**

The accumulators will first be fully discharged and then - after a brief pause - automatically recharged.




## 19 Testing Features with the Keypad

This feature is only relevant for a BRI access!

Some network operators do not support the standard DSS1 features, rather they expect the user to control the network via so-called keypad command sequences.

In these cases, the desired facility is usually activated by entering a series of characters and then sending these characters within a DSS1-specific protocol element. These so-called Keypad-Elements are imbedded in a SETUP message.

An outgoing call containing a keypad message is placed from the ARGUS by pressing the -Key.

To distinguish the call from a normal call, the first character sent is the '#'. Each step is acknowledged either acoustically (handset) or via special protocol elements (cause). These causes are displayed by the ARGUS.

To simplify the use of these functions, you can use the ARGUS's speed-dialing memory.

### An example for an application:

Speed-dial number 0	4711	own number of the access under test
Speed-dial number 1	124527	tel. no. of own company
Speed-dial number 2	*67#	Code for activating CFB
Speed-dial number 3	##67#	Code for deactivating CFB
Speed-dial number 4	*#67#	Code for querying CFB (interrogation)
Speed-dial number 5	*#21#	Code for querying CFU (interrogation)
Speed-dial number 6	*#61#	Code for querying CFNR(interrogation)
Speed-dial number 7		<i>free</i>
Speed-dial number 8		<i>free</i>
Speed-dial number 9		<i>free</i>



## 20 Connection for a PRI network

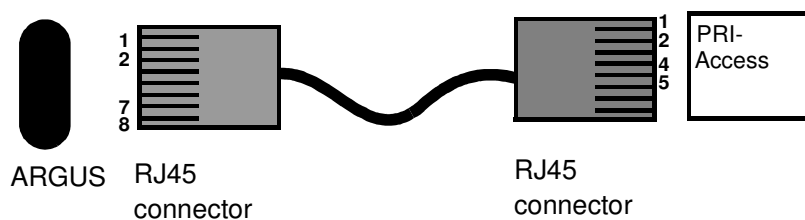
Since there is no commonly accepted standard for the connections in the 2 Mbit sector, you will be confronted with different forms of connectors depending on the type of terminal and the network termination used.

The ARGUS changes the connector pin assignments automatically in accordance with the mode, TE or NT.

Additionally, it is also possible to change the pin assignments manually in the L1-Status menu.

### 20.1 ARGUS connector Pin Assignments

In TE mode, the ARGUS sends on lines 4 and 5, in NT-Mode on 1 and 2 (see illustration). An adapter cable, which is suitable for the respective ISDN network/system, can be connected using the RJ45-RJ45 adapter.



PIN		PIN		Function
				NT TE
1		1		Tx Rx
8		2		Tx Rx
2		4		Rx Tx
7		5		Rx Tx

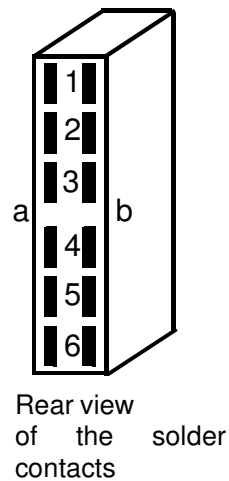
## 20.2 Connection to DTAG NTPM

An optional RJ45-to-splitting-plug adapter cable is available to permit connecting the ARGUS to the test jack on the front of the NTPM from “Deutsche Telekom AG (DTAG)”.

## 20.3 The ARGUS 28 as Terminal

Use the RJ45 coupling to connect the RJ45-to-splitting-plug cable to the ARGUS access cable. First switch the ARGUS ON and afterwards plug the ARGUS into the NTPM.

Once you have selected the **TE simulation** mode, the ARGUS will serve as a PRI terminal.



Splitting plug pin assignment:

### The ARGUS in TE Mode

1b	Receive NT (Rx)
2b	Receive NT (Rx)
5b	Send NT (Tx)
6b	Send NT (Tx)

### The ARGUS in NT Mode

PIN	Function
1a	Send TE (Rx)
2a	Send TE (Rx)
5a	Receive TE (Tx)
6a	Receive TE (Tx)

---

## 21 Appendix

### A) Acronyms

<b>3PTY</b>	Three party service / Three party conference
<b>AI</b>	Action Indicator
<b>AOC</b>	Advice of Charge
<b>AOC-D</b>	Advice of Charge Charging information during the call and at the end of the call
<b>AOC-E</b>	Advice of Charge Charging information at the end of the call
<b>AWS</b>	Call Forwarding (Anrufweiserschaltung)
<b>BC</b>	Bearer Capability
<b>BER</b>	Basic Encoding Rules / Bit Error Rate
<b>BERT</b>	Bit Error Rate Test
<b>CALL PROC</b>	CALL PROCeeding message
<b>CCBS</b>	Completion of Calls to Busy Subscriber
<b>CCNR</b>	Call Complete No Response Automatic Callback if the called party did not answer
<b>CD</b>	Call Deflection
<b>CDPN</b>	CalleD Party Number
<b>CF</b>	Call Forwarding
<b>CFB</b>	Call Forwarding Busy Forward calls when busy
<b>CFNR</b>	Call Forwarding No Reply Forward calls when no answer
<b>CFU</b>	Call Forwarding Unconditional Forward all calls
<b>CGPN</b>	CallinG Party Number
<b>CLIP</b>	Calling Line Identification Presentation Display caller's number
<b>CLIR</b>	Calling Line Identification Restriction Suppress display of the caller's number
<b>COLP</b>	Connected Line Identification Presentation Display the number of the party called
<b>COLR</b>	Connected Line Identification Restriction Suppress the display of the number of the party with whom one is connected
<b>CONN</b>	CONNect Message

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<b>CONN ACK</b>	CONNect ACKnowledge Message
<b>CR</b>	Call Reference
<b>CT</b>	Call Transfer
<b>CUG</b>	Closed User Group
<b>CW</b>	Call Waiting Call waiting
<b>DAD</b>	Destination Address (1TR6)
<b>DDI</b>	Direct Dialling In Direct dialling in to an extension on a PBX
<b>DISC</b>	DISConnect Message
<b>DM</b>	Supplementary services (Dienstmerkmal)
<b>DTMF</b>	Dual Tone Multi Frequency
<b>EAZ</b>	Terminal Ident. No. (Endgeräteaustwahlziffer - 1TR6)
<b>ECT</b>	Explicit Call Transfer Call transfer or directed call forwarding
<b>E-DSS1</b>	European Digital Subscriber Signalling System Number 1
<b>GBG</b>	Closed user group (CUG) (Geschlossene Benutzer Gruppe)
<b>HLC</b>	High Layer Compatibility
<b>HOLD</b>	Call Hold Hold
<b>ISDN</b>	Integrated Services Digital Network
<b>INFO</b>	INFORmation Message
<b>LAPD</b>	Link Access Procedure for D-channels channels
<b>LCN</b>	Logical channel number Channel number in X.25
<b>LLC</b>	Low Layer Compatibility
<b>MCID</b>	Malicious Call Identification
<b>MSN</b>	Multiple Subscriber Number
<b>NSF</b>	Network Specific Facilities
<b>NT</b>	Network Termination
<b>OAD</b>	Origination Address (1TR6)
<b>PD</b>	Protocol Discriminator
<b>REL</b>	RELease Message
<b>REL ACK</b>	RELease ACKnowledge Message
<b>REL COMPL</b>	RELease COMPLete Message
<b>SCI</b>	Sending Complete Indication
<b>SIN</b>	Service Indicator (1TR6)
<b>SUB</b>	Sub-addressing / Sub-addressing is possible

<b>SUSP</b>	SUSPend Message
<b>TE</b>	TErminAl, TErminAl Equipment
<b>TEI</b>	TErminAl Endpoint Identifier
<b>TP</b>	TErminAl Portability Moving the terminal on the bus
<b>UUS</b>	User-to-User Signalling Transfer of user data

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## B) CAUSE-Messages – DSS1 Protocol

<b>Dec. Cause</b>	<b>Description</b>
<b>01</b> Unallocated (unassigned) number	No access under this call number
<b>02</b> No route to specified transit network	Transit network not reachable
<b>03</b> No route to destination	Wrong route or routing error
<b>06</b> Channel unacceptable	B-channel for the sending system not acceptable
<b>07</b> Call awarded and being delivered in an established channel	Call awarded and connected in an already existing channel (e.g., X.25 SVC)
<b>16</b> Normal call clearing	Normal disconnect
<b>17</b> User busy	The number called is busy
<b>18</b> No user responding	No terminal equipment answered (Timer NT303 / NT310 time-out)
<b>19</b> No answer from user (user alerted)	Call time too long
<b>21</b> Call rejected	Call rejected (active)
<b>22</b> Number changed	Call number has been changed
<b>26</b> Non-selected user clearing	Incoming call not awarded to this terminal
<b>27</b> Destination out of order	Destination / access out of order
<b>28</b> Invalid number format (address incomplete)	Wrong call number format or call number incomplete
<b>29</b> Facility rejected	The facility is not offered
<b>30</b> Response to STATUS ENQUIRY	Response to status enquiry
<b>31</b> Normal, unspecified	Unspecified for "normal class" (Dummy)
<b>34</b> No circuit / channel available	No circuit / B-channel available
<b>38</b> Network out of order	Network not operational
<b>41</b> Temporary failure	Network is temporarily not operational
<b>42</b> Switching equipment congestion	Switching equipment is overloaded
<b>43</b> Access information discarded	Access information could not be transferred
<b>44</b> Requested circuit / channel not available	Requested circuit / B-channel is not available
<b>47</b> Resources unavailable, unspecified	Unspecified for "resource unavailable class" (Dummy)
<b>49</b> Quality of service unavailable	The requested quality of service is not available
<b>50</b> Requested facility not subscribed	Requested service attribute is not subscribed
<b>57</b> Bearer capability not authorized	The requested bearer capability is not enabled
<b>58</b> Bearer capability not presently available	The requested bearer capability is not currently available

---

<b>63</b>	Service or option not available	"Service unspecified or option not available class" (Dummy)
<b>65</b>	Bearer capability not implemented	Bearer capability is not supported
<b>66</b>	Channel type not implemented	Channel type is not supported
<b>69</b>	Requested facility not implemented	Requested facility is not supported
<b>70</b>	Only restricted digital information bearer capability is available	Only limited bearer capability is available
<b>79</b>	Service or option not implemented, service unspecified or option not implemented class" (Dummy)	Unspecified
<b>81</b>	Invalid call reference value	Invalid call reference value
<b>82</b>	Identified Channel does not exist	Requested channel is invalid
<b>83</b>	A suspended call exists, but this call identity does not	The call identity entered is the wrong one for the parked call
<b>84</b>	Call identity in use	The call identity is already in use
<b>85</b>	No call suspended	No call has been parked
<b>86</b>	Call having the requested call identity has been cleared	The parked call has been cleared
<b>88</b>	Incompatible destination	Incompatible destination
<b>91</b>	Invalid transit network selection	Invalid format for the transit network identifier
<b>95</b>	Invalid message, unspecified	Unspecified for "Invalid message class" (Dummy)
<b>96</b>	Mandatory information element is missing	Mandatory information element is missing
<b>97</b>	Message type non-existent or not implemented	This type of message is in this phase not permitted, not defined or not supported
<b>98</b>	Message not compatible with call state or message type non-existent or not implemented	The content of the message is in this phase not permitted, not defined or not supported
<b>99</b>	Information element non-existent or not implemented	The content of the information element is in this phase not permitted, not defined or not supported
<b>100</b>	Invalid information element contents	Invalid content in information element
<b>101</b>	Message not compatible with call state	Message not valid in this phase
<b>102</b>	Recovery on timer expired	Error handling routine started due to time-out
<b>111</b>	Protocol error, unspecified	Unspecified for "protocol error class" (Dummy)
<b>127</b>	Interworking, unspecified	Unspecified for "interworking class" (Dummy)

## C) CAUSE-Messages – 1TR6 Protocol

<b>Dec. Cause</b>	<b>Description</b>
<b>01</b> Invalid call reference value	Invalid call reference value
<b>03</b> Bearer service not implemented	The service is not available in the central office or at another location in the network or the service has not been subscribed.
<b>07</b> Call identity does not exist	Unknown call identity
<b>08</b> Call identity in use	Call identity is already assigned to a "suspended" connection.
<b>10</b> No channel available	No further B-channel is free on the subscriber's access. (only significant locally)
<b>16</b> Requested facility not implemented	The entered FAC-Code is unknown in this network.
<b>17</b> Requested facility not subscribed	The requested facility is not available, because the initiating or the remote subscriber is not authorized.
<b>32</b> Outgoing calls barred	Outgoing calls are not possible due to the barring
<b>33</b> User access busy	If the sum of the number of free B-channels, the number of occupied B-channels, the number of awarded B-channels and the number of calls without B-channel assignment equals four, new incoming calls will be cleared from the network. The calling subscriber receives a DISC with the cause "user access busy"(= first busy) and a busy signal.
<b>34</b> Negative CUG comparison	Connection not possible due to negative CUG comparison
<b>35</b> Non-existent CUG	This CUG (GBG) does not exist
<b>37</b> Communication link as SPV not permitted	A connection is not possible, since for example, the RFNR-test was negative
<b>53</b> Destination not obtainable	A connection cannot be made due to a wrong destination, service or supplementary services.
<b>56</b> Number changed	Subscriber-B's call number has changed.
<b>57</b> Out of order	The remote terminal is not ready.
<b>58</b> No user responding	No terminal has answered the incoming SETUP or the subscriber call was disconnected, it is assumed that someone is present (Time-out for ringing T3AA).
<b>59</b> User busy	Subscriber-B is busy
<b>61</b> Incoming calls barred	Subscriber-B has blocked incoming calls or the requested service is not supported by Subscriber-B.



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<b>62</b>	Call rejected	<p><b>To Subscriber-A:</b> The requested connection is actively rejected by Subscriber-B (by sending a DISC as answer to the incoming SETUP). Another terminal is in the setup phase with the incoming call: The call has already been accepted by another terminal on the bus.</p>
<b>89</b>	Network congestion	Network congested, e.g., switching equipment congestion, no conference set free, ...
<b>90</b>	Remote user initiated	Rejected or disconnected by remote end (subscriber or exchange).
<b>112</b>	Local procedure error	<p><b>Sent in a REL</b> Disconnect due to local errors (e.g., not valid messages or parameters, timeout, ...).</p> <p><b>Sent in a SUSP REJ</b> Due to another already active supplementary service, the connection may not be "suspended".</p> <p><b>Sent in a RES REJ</b> There is no "suspended" connection.</p> <p><b>Sent in a FAC REJ</b> No further supplementary service request is possible, since there is still one being processed or the supplementary service requested is not available in the current state of the connection.</p>
<b>113</b>	Remote procedure error	Caused by error at remote end.
<b>114</b>	Remote user suspended	Connection at the remote end is in the "hold" or "suspend" state.
<b>115</b>	Remote user resumed	Connection at the remote end is no longer in the "hold" or "suspend" or "conference" state.
<b>127</b>	User Info discarded locally	<p>The message USER INFO is rejected locally. The cause is given in the message CON CON.</p> <p>Length entry (=0)</p> <p>Normal disconnect (e.g., in REL as answer to a DISC from subscriber or a change of service in a DISC): Command to the terminal to release the B-channel.</p>

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**D) ARGUS Error Messages**

<b>Fault Number</b>	<b>Fault Class</b>	<b>Cause</b>	<b>Description</b>
<b>0</b>	E	Network	The network is not in a state defined for DSS1 or 1TR6. It may be that this state is normal for a PBX.
<b>1 to 127</b>	B,C,D,E	Network	DSS1 or 1TR6 causes
<b>150</b>	E	ARGUS	An error occurred during the supplementary service test. Frequent cause: no response from network
<b>152</b>	B	ARGUS	The CF-Test was started with the wrong own number.
<b>153</b>	E	ARGUS	no HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty)
<b>154</b>	E	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
<b>161</b>	B	ARGUS	The party called did not answer within the prescribed time (approx.10 sec.)
<b>162</b>	B	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
<b>163</b>	E	ARGUS	The Auto-Test could not setup a connection and therefore the AOC/D supplementary service could not be tested.
<b>170</b>		ARGUS	During the Suppl.services test, a call came in without a B-channel (call waiting). Therefore, it was not possible to accept the call and test.
<b>199</b>	B	ARGUS	A call number was entered.
<b>200</b>		ARGUS	Internal error
<b>201</b>	A	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)

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<b>204</b>	A	ARGUS	- Layer 2 connection was cleared-down - No response to SETUP (call setup) - Layer 2 connection could not be setup
<b>205</b>	A	ARGUS	Reestablish the Layer 2 Connection
<b>206</b>		ARGUS	The selected B-channel is already busy.
<b>210</b>	A	ARGUS	No response to the clear-down (REL sent, no REL_CMP/REL_ACK received from network)
<b>220</b>	A	ARGUS	Remote end signaled that it is in State 0.
<b>245</b>	E	ARGUS	Keypad sent via ESC, but no response was received from network
<b>250</b>	E	ARGUS	FACility was sent, but no response was received from network

### X.31 Test – Error messages

#### X.31 Causes

<b>0 to 255</b>	Network	See ISO 8208: 1987(E) Table 5- Coding of the clearing cause field in clear indication packets, page 35
<b>257</b>	ARGUS	no response from network (for a CALL-REQUEST or CLEAR-REQUEST)
<b>258</b>	ARGUS	Unexpected or wrong answer from network (no CALL-CONNECTED or CLEAR-INDICATION as response to a CALL-REQUEST)
<b>259</b>	ARGUS	The network has indicated in a DIAGNOSTIC message that the logical channel is invalid. Origin: No (=1) or a wrong LCN was set.
<b>512</b>	ARGUS	It was not possible to determine an internal or external cause. Origin: Layer 2 could not be setup or remote end does not support X.31
<b>65535</b>	ARGUS	X.31 Layer 3 test was not performed. The error can only occur in a test log.

**X.31 Diagnostic (only for a cause less than 256)**

**0 to 255** Network See ISO 8208: 1987(E)  
Figure 14A page 121  
Figure 14B page 123 et seq.  
And/or  
CCITT Recommendation X.25, Annex E