ARGUS 3u plus/ 3u NT

Manual

Version: 1.0

1 Introduction

The ARGUS 3u installation tester makes installation work and trouble shooting on BRI and POTS accesses both safe and uncomplicated. Additionally, the ARGUS 3u also supports U-interface accesses. With its rechargeable batteries and internal charger, the ARGUS 3u is exceptionally well suited for use in the field. The intuitive menu operation combines convenient cursor keys and softkeys with a four-line backlit display.

Besides automatic access tests, service checks and supplementary services tests, the ARGUS 3u also supports among others physical measurements with evaluation, cabling tests, and bit error rate measurements

The ARGUS can be enhanced with the WINplus software package, which enables linking the ARGUS to a PC. WINplus can be used to load changes to the protocols or new functions into the ARGUS at any time (software updates free of charge at www.argus.info).

If you use the ARGUS on a BRI 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.

The ARGUS Functions - Overview:

Protocol Recognition and B-Channel Test for ISDN Accesses

After you select the operation mode, the ARGUS will automatically determine the protocol used 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 datatransmission 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)

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.

Supplementary Services

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

Leased Line Tests – tests permanent circuits with BERT and speech

POTS functionality *(does not apply for the 3u basic)*

Does the POTs access support call number transfer?

Monitoring a POTS access (passive listening-in)

(does not apply for the 3u basic)

Passive trace on a BRI access

Line Test *(optional)*

Checks the terminating resistors for the cabling of a four-wire bus.
Detects cabling problems (e.g. broken wires, short-circuits or crossed wires).

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.

Access Acceptance Reports (with optional WINplus)

When the ARGUS is linked to a PC via the serial interface, it is, as an example, possible 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:

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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 100V!

- Never attempt a measurement with the case open!

- The ARGUS is not watertight. Protect the ARGUS from exposure to water!

- Do not use batteries in the **ARGUS3u**; this tester is designed to be used with - and to automatically charge - accumulators (rechargeable batteries).
  (see page 133 Accu servicing)

3 Technical data

Dimensions* / *Weight

Height 229 mm

Width 72 mm

Depth 35 mm

Weight 350 g (without batteries and protective case)

Keypad

21 Keys

LCD display

LCD display with switchable background lighting

4 lines with 16 characters

Memory

EEPROM Non-volatile memory:
16 kBytes

Flash program memory: 2 Mbyte

S-RAM: 512 Kbytes

Inputs / Outputs

1 RJ45 for BRI, U-Interface or POTS access

1 jack for an external power supply

1 RJ45 for Line Test (optional) and serial transfer

Temperature Ranges

Ambient-temperature:

0 °C to +50 °C

Operating temperature:

-5 °C to +55 °C

Power Supply

9 V, plug-in power supply

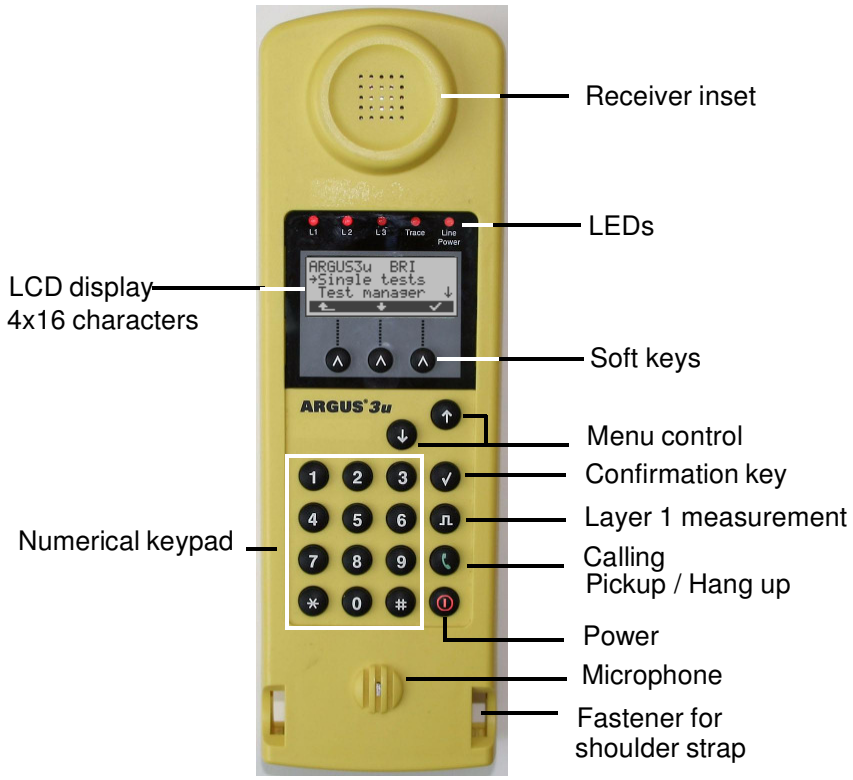
or

BRI feed

ARGUS 3u only:

3 Accumulators AA (Mignons) NiMH 1600mAh

4 Operation



Power Key:

- To switch the ARGUS ON/OFF
- 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)
  If it is turned off while the power supply is connected, the unit will begin to charge the accumulators. (s. Seite 133 Accu servicing)

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:

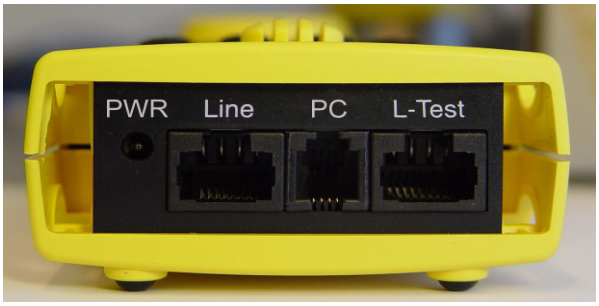
start the Layer 1 measurement (Level/Voltage)

Number Pad:
- Entry of the digits 0....9 and of the special characters *, # (e.g. the call number or numerical entry in a function)
- Direct function call (see Seite 25)

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. When the power supply is plugged into this connector, the rechargeable batteries will be disconnected.
  After it is switched off, the ARGUS will automatically recharge the accumulators(s. Seite 133 Accu servicing).

- **Line**

Pin Assignment
3/4/5/6 **BRI**
7/8**U-interface** and **POTS**

Connection for BRI lines
(TE simulation or monitoring)
Connection for a BRI terminal (NT-Simulation)
Connection for a POTS (analog network)
Connection for the U-interface network

- **L-Test**

  - Connection for the optional test adapter for line tests

- **Headset**

  - Connection for the Headset

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 (Seite 133).

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.

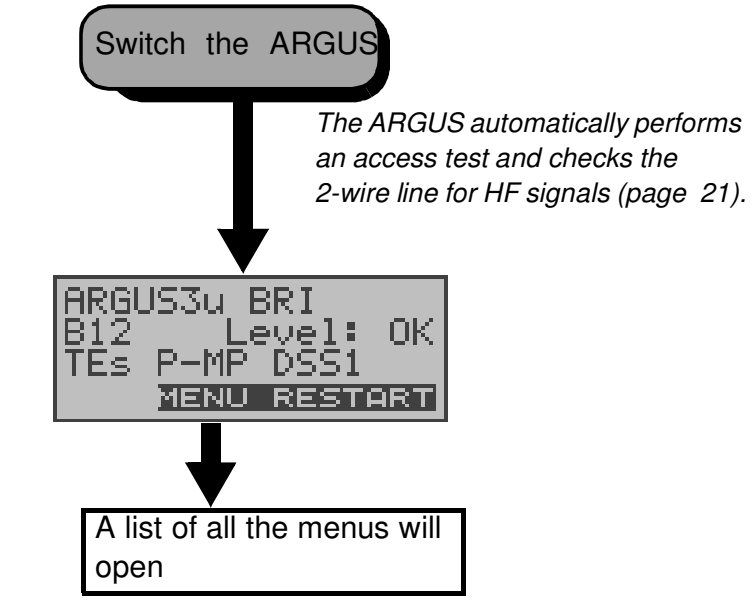
Reasonably enough, the ARGUS will **not** enter power-down mode during a test (e.g. Loopbox) or when it is in Trace mode.

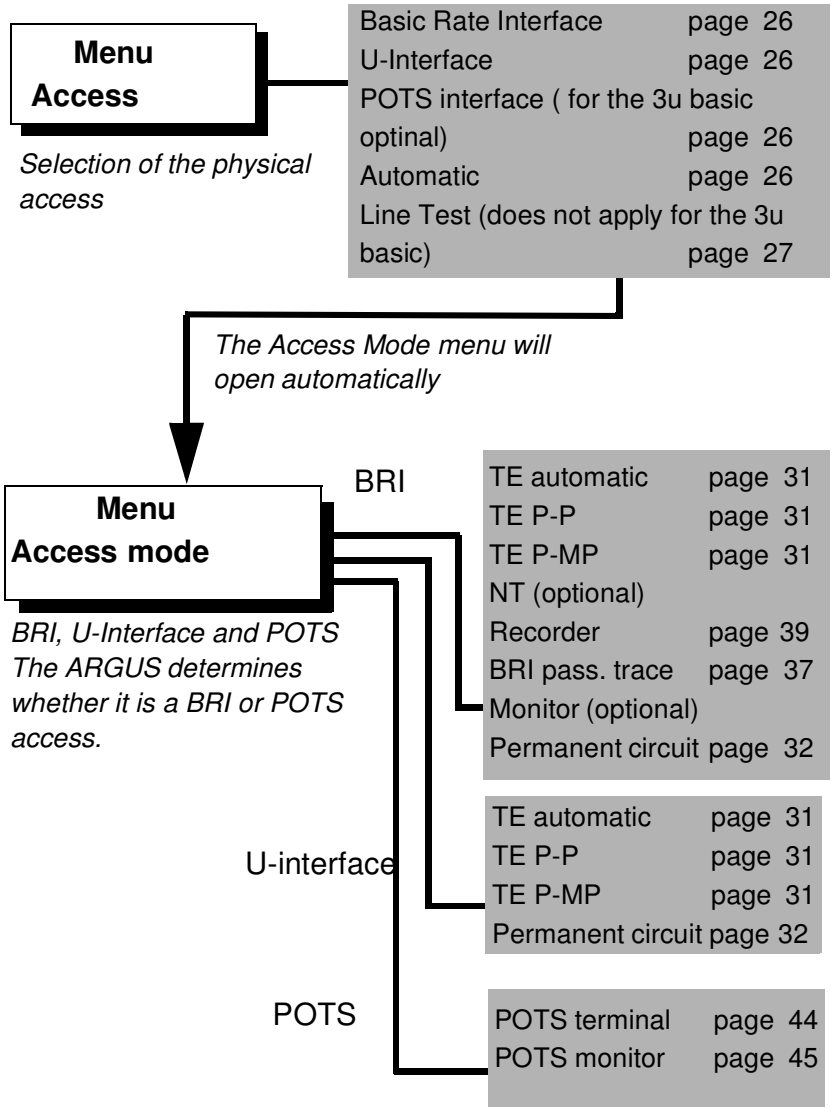
As an alternative, it is possible to operate the ARGUS using the included power supply. When the power supply is connected, the accumulators are automatically disconnected.

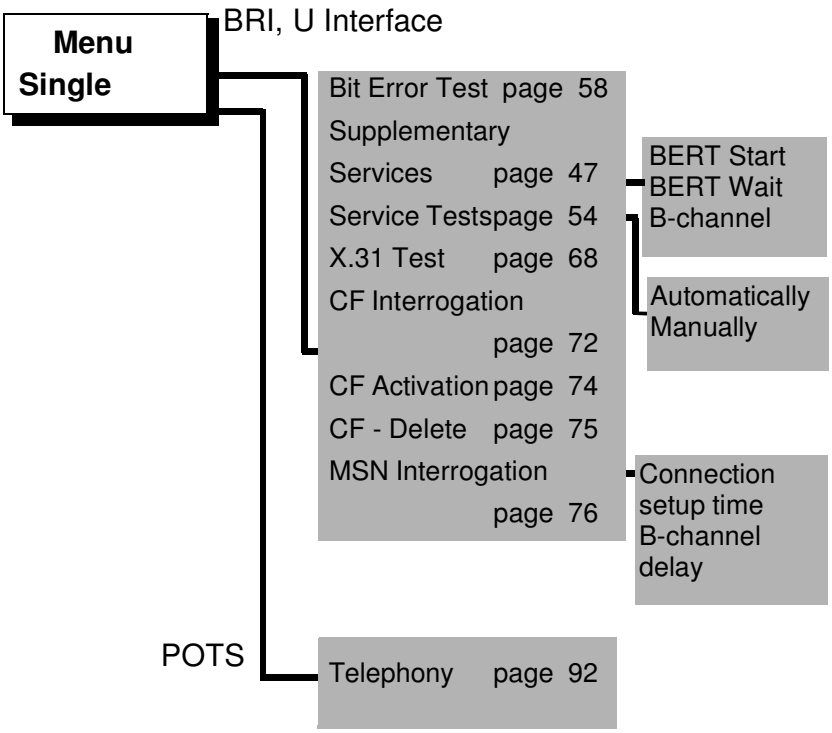
The ARGUS can also be powered from the BRI line. In this case, it does not need accumulators or the plug-in power supply.

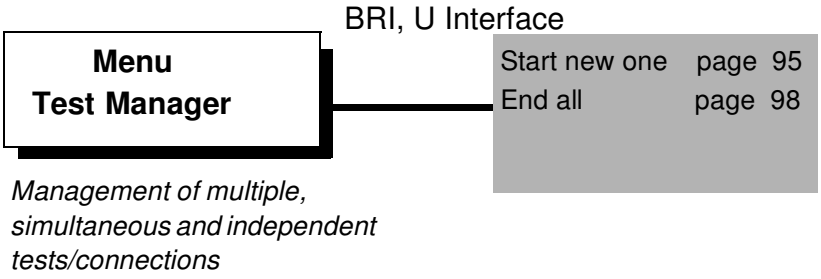
Whenever the ARGUS is powered from the plug-in power supply or the BRI line, the power-down mode is reasonably enough not active.

5 Menu Hierarchy

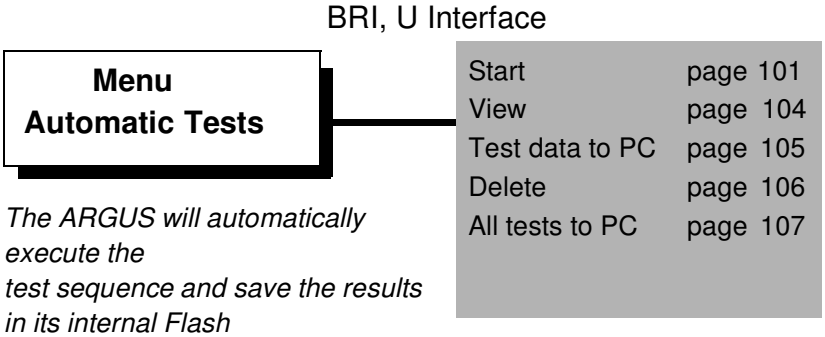




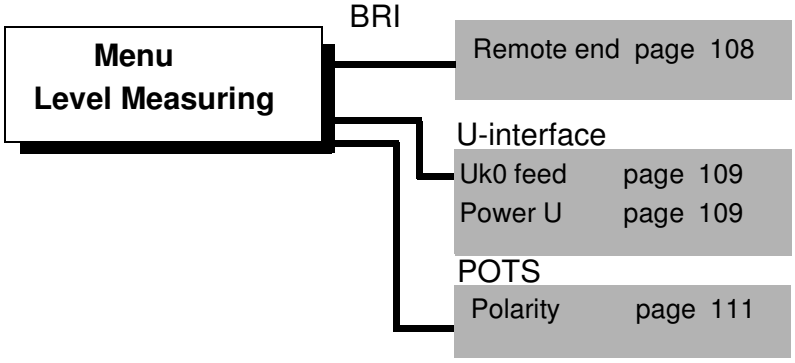




Management of multiple, simultaneous and independent tests/connections



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



Menu
L1 status

*The ARGUS displays the current status of Layer 1 on the BRI access*page 112.

Menu
Settings

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

Trace/Remote page 113

ISDN page 115
- Protocol
- Alerting mode
- BRI termination
- Call parameter
- Services
- Call accepted
- Voice coding
- DTMF / Keypad
- Dest. no. MSN
- CUG Index

BERT page 119
- BERT duration (time)
- Bit patt. BRI/U
- Error level
- HRX value

POTS page 122
- POTS dial
- POTS CLIP
- DTMF parameter
- FLASH time

X.31 page 125
- TEI
- LCN

ARGUS page 126
- Menu language
- LCD contrast
- Baud rate
- Handset
- Alarm
- Feed
- Battery type
- Software option

Menu
Accu servicing

6 Automatic Access Test

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

Power Key: Switch on the ARGUS.

The ARGUS automatically performs an access test (Automatic setting in the Access menu see Page 26). No manual entries are required. The

The access under test (BRI, U interface or POTS) can also be connected afterwards.

If the ARGUS finds a DC voltage on the 2-wire line (U-Interface or POTs), it will check whether there is a HF signal on the line.

With < **TE** >: determine the access

If the test fails or if you wish to provoke a specific error situation, you can manually select any interface in the *Access* menu later (see “Setting the type of access” on page 26).

Initializing the ARGUS :

- Operating the ARGUS on a BRI or U-Interface access:

The ARGUS will first setup Layer 1. While Layer 1 is being setup, LED L1 over 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.

As soon as Layer 1 is successfully setup, LED L1 will light continuously.

Once Layer 2 has been setup LED L2 will light.

If both modes (P-P / P-MP) are found when Layer 2 on the D-channel is checked, the mode must be selected manually (see Page 31).

If everything has been correctly detected, the ARGUS will display the successfully found access and access mode in the third line. Additionally, a qualitative assessment of the level will be displayed.
The ARGUS will automatically determine the protocol or use the manually selected protocol (see Page 116) . On a bilingual access, the ARGUS will use the DSS1 protocol.
LED L3 will light after the ARGUS has setup Layer 3.
At the same time the ARGUS will start the B-channel test. The results will be displayed on the ARGUS. If an error occurs in the B-channel test (e.g. access is not plugged-in), the ARGUS will - depending on the class of error - either repeat the initialization or show an error message (see ARGUS Error Messages Page 144).

The ARGUS will then idle in the Status display.

Status display example:

The ARGUS displays the type of access (BRI), the availability of the B-channels (B12), a level evaluation (OK),
the access mode (TEs), the bus configuration (P-MP) and the protocol (DSS1).
If you press the <**RESTART**> softkey, the B-channel test will be repeated.

Softkeys:

The current settings of the softkeys are displayed in the fourth line.
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.

In the example above, 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:
TEs = TE Simulation Slave Mode
TEm = TE Simulation Master Mode

Bus configuration:
P-P: Point-to-Point
P-MP: Point-to-Multipoint

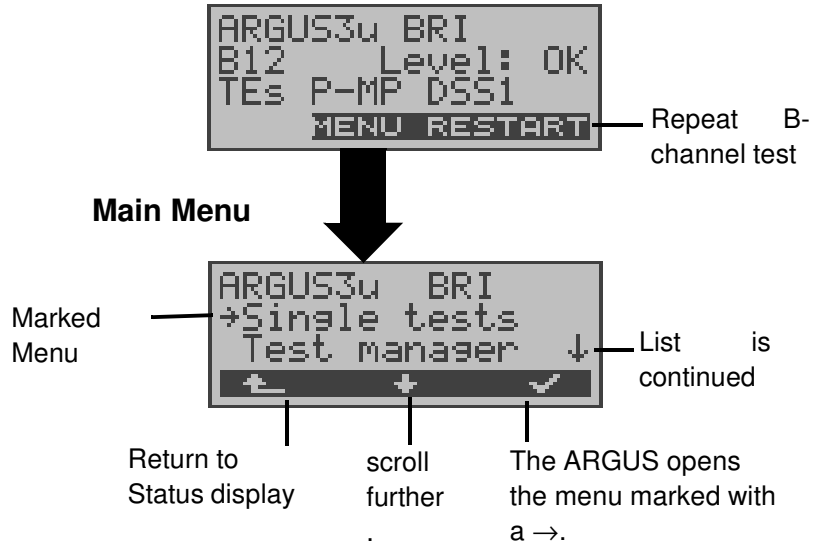
It must be mentioned again, that the ARGUS only determines the general bus status once when switched on or when the ARGUS first connected.
On the other hand, the status of the protocol stacks for Layer 1, 2 and 3 will be continually monitored and displayed.

- Operating the ARGUS on a POTS access (for ARGUS 3u basic optional)

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

ARGUS - Main menu

Status display

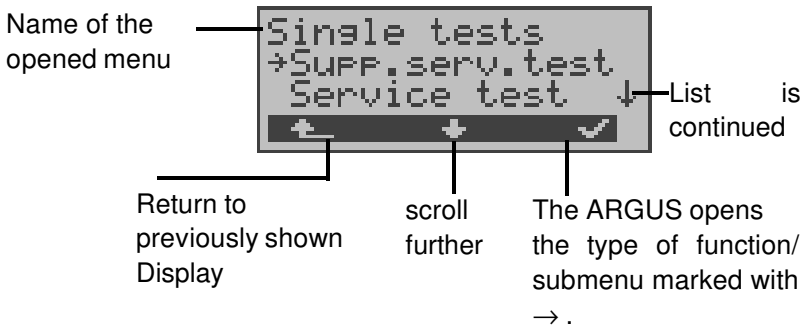


In the Main menu, you can scroll through the available menus with the <↓ > key:

BRI Access	**U-interface Access**	**POTS Access**
Single Tests	Single Tests	Single Tests
Test Manager	Test Manager	_____
Automat.Tests	Automat.Tests	Automat.Tests
Level	Level	Level
Measuring	Measuring	Measuring
L1 Status	_____	_____
Configuration	Configuration	Configuration
Access	Access	Access

Accu servicing 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 numeric keys, you can start important ARGUS functions directly, regardless of the currently active menu level:

Numeric key 2 Start Service Test
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)

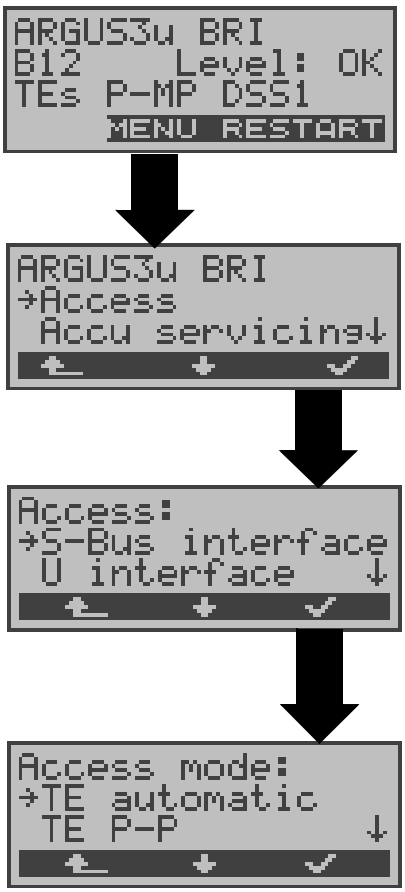
If a function is called where the ARGUS expects the entry of a digit, pressing a number key will be interpreted as the expected input.

7 Setting the type of access

In the Access menu, the user must select the type of physical access to which the ARGUS is actually connected.

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

Status display



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

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

The **Access** menu will open

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

Confirm the access

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.

7.1 Line Test

The ARGUS tests the terminating resistors for the cabling of a four-wire bus. Additionally, the test also detects errors in the cabling e.g. any broken wires, short-circuits and crossed wires.

Unplug the NT and all terminal equipment from the bus, before performing a line test!

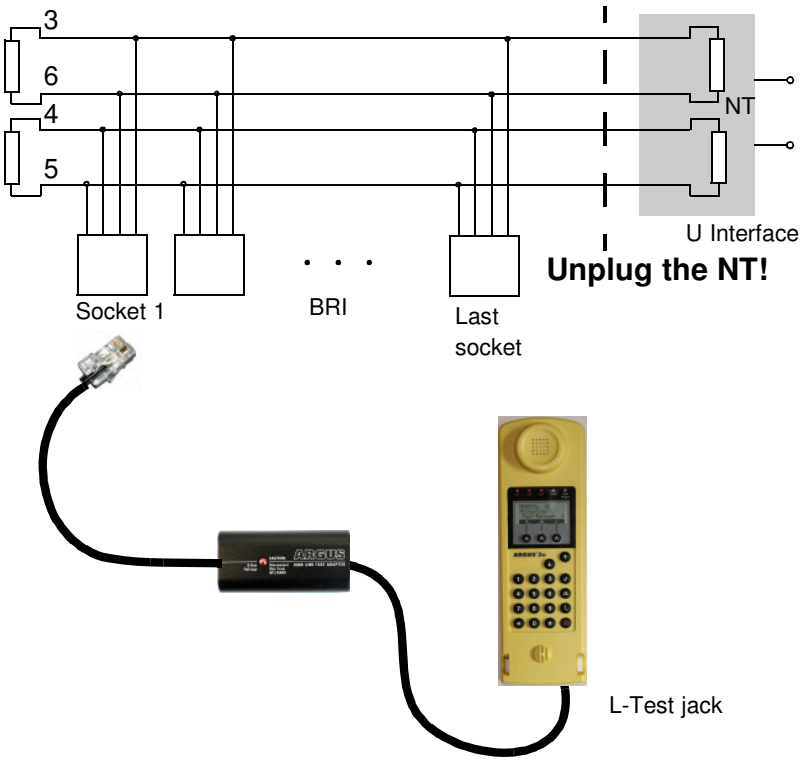
If the ARGUS detects an operator error (Line test on a fed bus), it will emit a continuous acoustic signal. In this case, to prevent the destruction of the ARGUS, the line test will **not** be started.

Test sequence:

To perform a thorough test of the lines, the test must be done in 2 steps.

First step:

Use the test adapter to connect the ARGUS to the lines to be tested. In this step, the ARGUS will determine whether or not there is a short circuit or a terminating resistor and whether there is a fault between the terminating resistor – if there is one – and the test adapter.

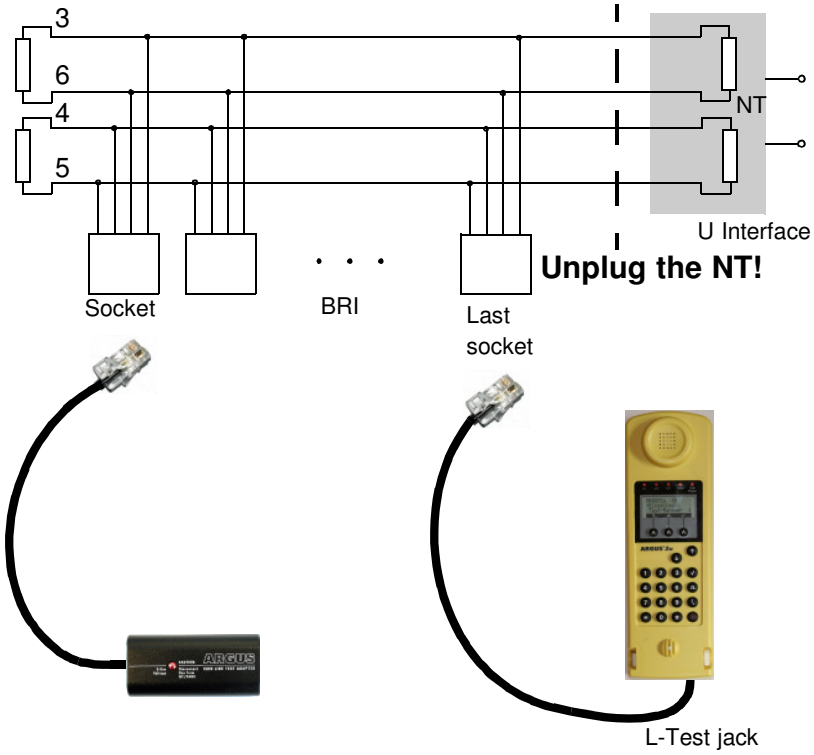


Possible test results:

- The ARGUS has detected a short-circuit: Clear the fault and repeat the test
- The ARGUS reports that the resistance is wrong: Repeat the test from another socket, if necessary remove the terminating resistor(s)
- The ARGUS reports that the line is OK: Continue test with step 2

Second step:

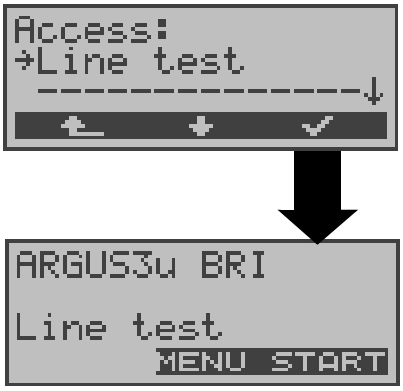
Connect the test adapter to the jack, which was tested as OK in the first step. Connect the ARGUS via its **L-Test** jack to the next socket on the bus.



Possible test results:

- The ARGUS reports broken connections or crossed wires: Clear the fault and repeat the test beginning with the first step.
- The ARGUS reports that the line is OK: Connect the ARGUS (L-Test jack) to each of the sockets on the bus one after the other.

Test steps on the ARGUS:

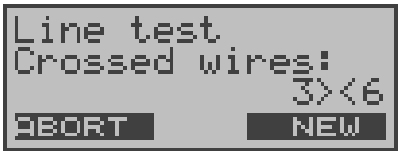


With the <↓>**, select** Line Test.

Start the Line Test

Sample test results – Line Test:

No errors occurred.



Wires 3 and 6 are crossed.

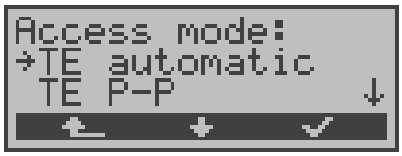
If the message “Crossed wires: Term. wrong”, the measurement conditions with respect to the location or complexity of the fault are unfavorable.
In this case, you should change the measurement conditions in the following manner:
Remove the terminating resistors from the bus and repeat the test.
Frequently it is enough to simply swap the test adapter and the ARGUS.

Comments about the test results:

- The bus can first be considered to be free of defects, when all of the sockets have been tested as OK.
- Short-circuits are reported as a resistance value < 10 **Ω**.
- Crossed wires and broken connections between the test adapter and the terminating resistor cannot be found.

- The displayed test results are either for just the bus lines between the ARGUS and the test adapter in the case of cross-wires and broken connections or for the entire bus in the event of short-circuits and terminations.

8 Select 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 or U-Interface access

8.1.1 TE-Simulation mode

TE automatic

On a BRI or U-interface access, the ARGUS will automatically determined 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**

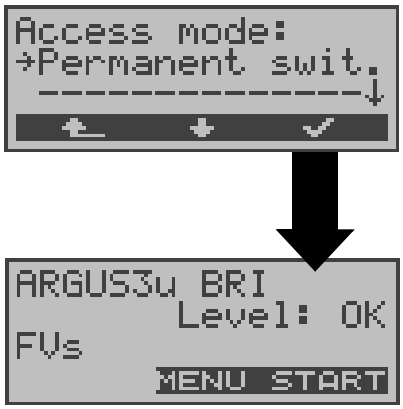
The ARGUS will return to the
Main menu.

TE P-P or TE P-MP

Afterwards, the access and the protocol stack will be initialized in accordance with the selected setting.

The ARGUS will then jump to the Main menu.

8.1.2 Permanent circuit



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

Access mode confirmed

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

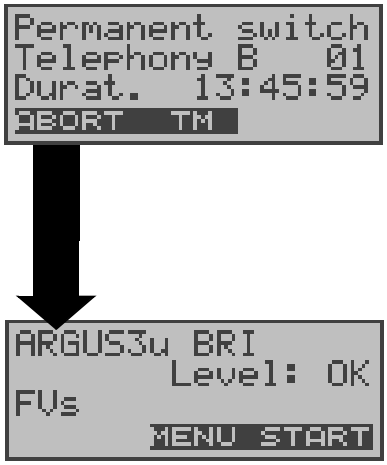
Besides dial-up connections to any subscriber, ISDN also supports the use of permanent circuits switched to a specific remote location.

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

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. 10 page 83).
After the B-channel for the permanent circuit is selected, the telephone connection will be setup automatically.



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 Page 94)

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 “Start BERT” on page 60).
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 58 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 (see “Bit error test” on page 58 and on page 66 “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:

With the **< ↓ >** , select the channel

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

Enter the B-channel on the keypad.
.

Confirm the selected channel and start the BERT.

The ARGUS will display
- the bit pattern (e.g. 2^15)
- 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)

.

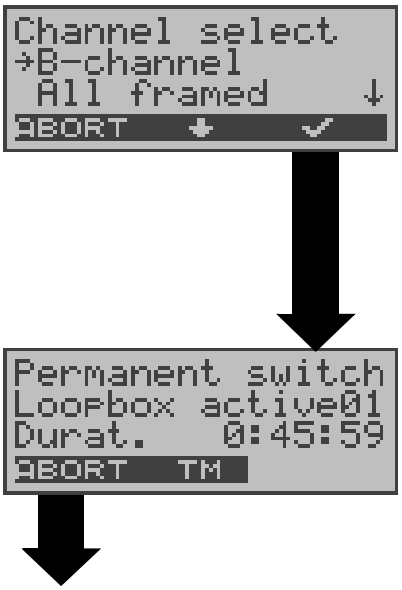
Use the **<ERROR >** softkey to insert artificial bit errors to test the reliability of the BERT.
Use the <**TM** > softkey to Start Test Manager (see Page 94).

Once it is over, the ARGUS will display the results of the BERT (see “Start BERT” on page 60).

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 67).

On a BRI



The Channel select window will open.

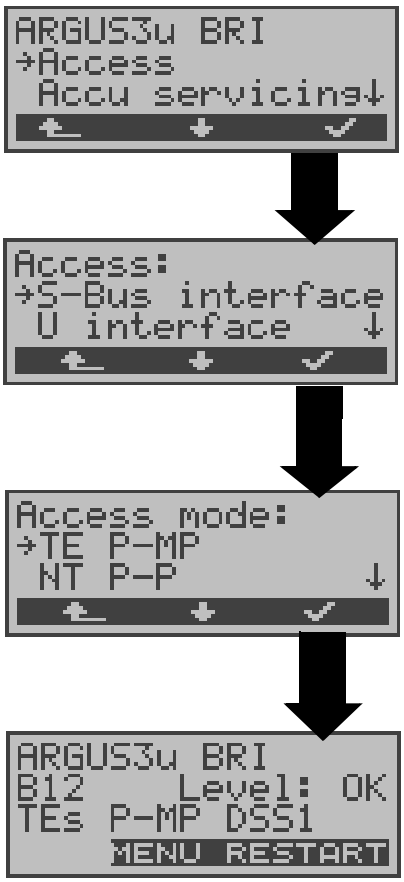
When "B-channel" is selected, the Loopbox is setup for both B-channels.
If "All framed" is selected, not only both B-channels but the D-channel will also be looped.

Activate loopbox

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

Loopbox stop

Switching from permanent circuit mode



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

The Access menu will open

Using the **<** ↓ **>**, select the desired access.

The Access mode menu will open.

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

Confirm the selected access mode

The ARGUS will open the Status display

8.1.3 BRI Passive Trace/Monitor (optional)

In the Pass.trace mode, the ARGUS passively monitors the connected BRI access (signals from the remote end and the signals it sent to the NT itself) .
The ARGUS sends the captured D-channel signals via the serial interface to the connected PC, which must be running either ARGUS WINplus or ARGUS WINAnalyse. Neither the S-Bus nor Layer 1 are influenced.
In Monitor mode, the ARGUS also monitors signals sent from other TEs to the NT.

With the <↓>, select **BRI pass. trace**.

Confirm the selected access mode

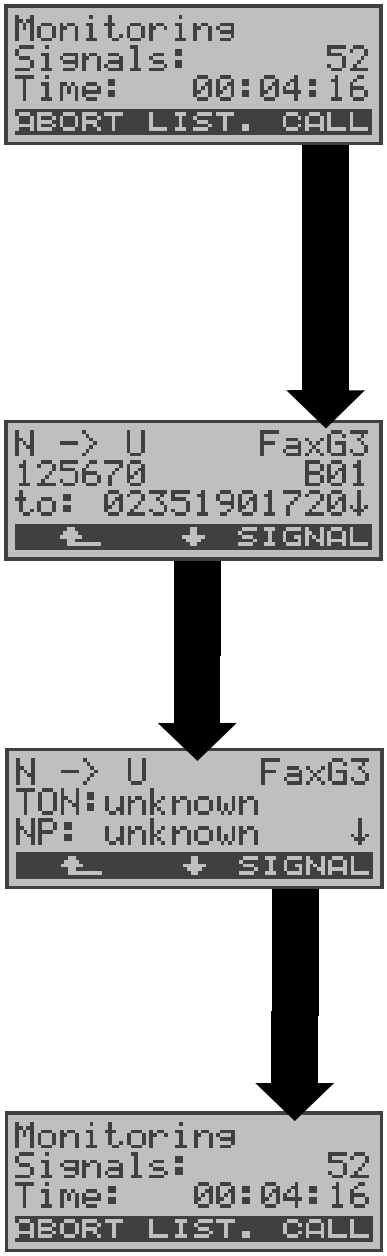
The ARGUS evaluates the level on the NT-side: OK, << (too low), >> (too high), _ (no level)
(Pass. trace not yet active)

Start recording
The Trace LED lights.

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

Select **< LISTEN >** : and the B-channel select dialog will open. After selecting a B-channel, it will be possible to listen to the voice data on this channel (in the direction Network -----> User).

Parallel call display in the BRI pass. trace mode



While in trace mode, 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.

The ARGUS displays the call direction (**N**et -> **U**ser), 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).

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

8.1.4 Recorder

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

The ARGUS records all D-channel signals from the remote end and the signals that it sent to the NT itself, without influencing the access or Layer 1.

Unlike in the BRI pass. trace 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.

With the **<↓>**, select **Recorder**

Start the Recorder function.

The ARGUS is now in Recorder mode (recording is **not** yet active!) and will check the levels on the NT side of the BRI access.
Level (**<<** to low, **>>** to high, OK, __ No level).

Recording started
(The Trace LED flashes)

The display shows the number of signals received and the duration of the recording in hours:mínutes: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 39).

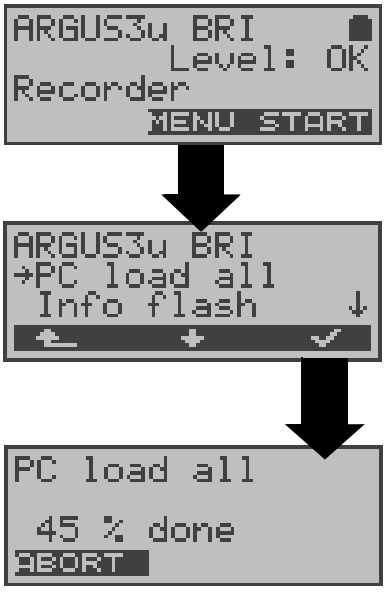
8.1.4.1 Administration of the recorded data

In the Recorder mode, several functions are available for administration of the data saved in the Flash memory:

- PC load all
- Info Flash
- Reset Flash

PC load all

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



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

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

Start charging the accumulators

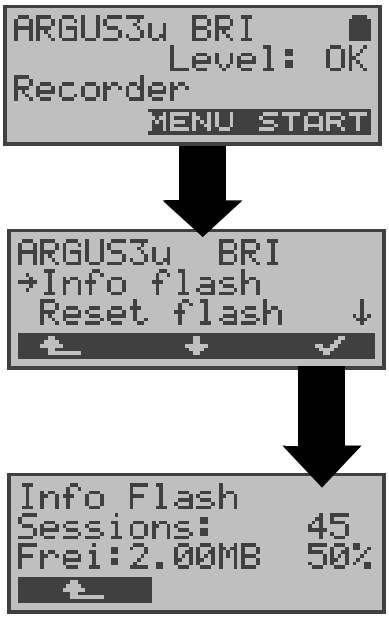
Select < **ABORT** >to stop the transfer.

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.

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



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

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

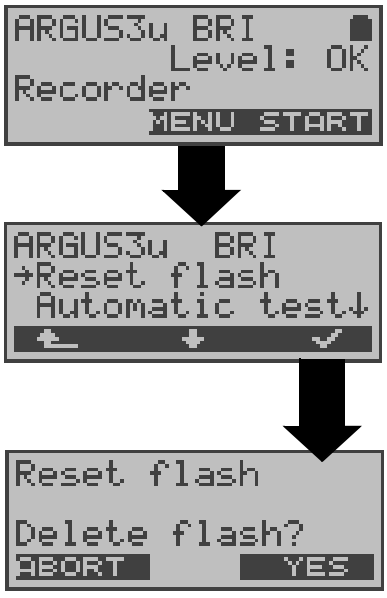
Display information on the status of the Flash memory.

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.



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

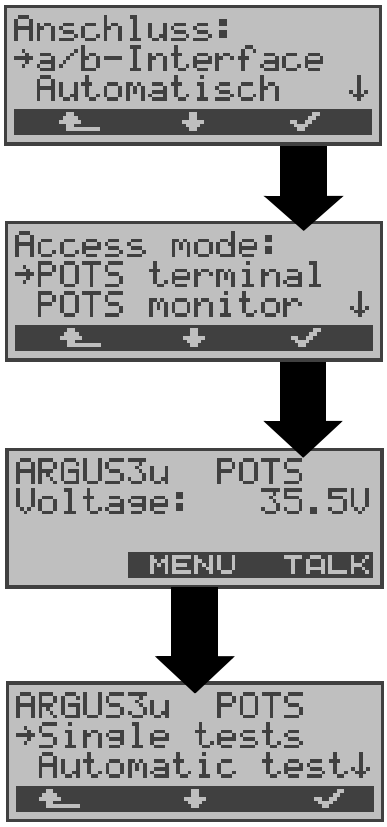
With the **< ↓ >**, select **Reset Flash**.

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



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

Confirm the access

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

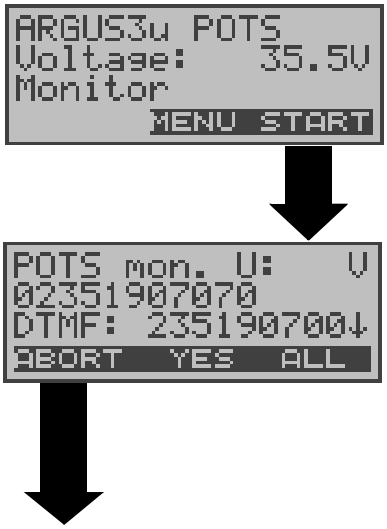
The Argus behaves like a POTS (analog) terminal.

Use the <**CALL**> softkey to setup a call (see Page 92).

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.



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

Start monitoring

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 full.

Monitoring stop

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.

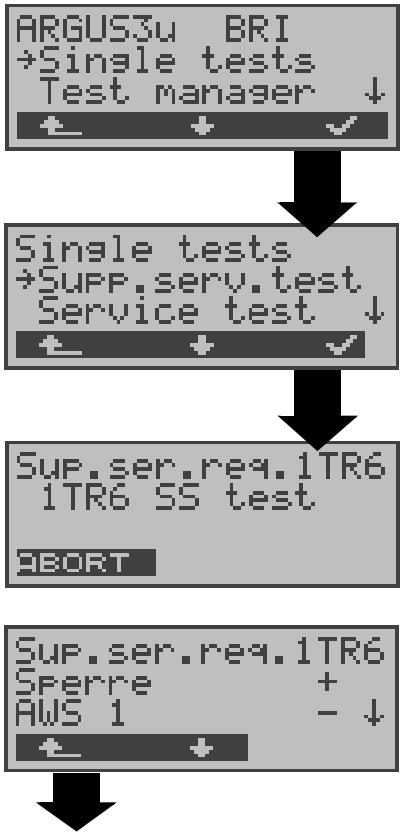
9 Single Tests

9.1 Test the Supplementary Services

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

9.1.1 Suppl. Services Test for 1TR6 Protocol

(only BRI or U-Interface)



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

The **Single tests** menu opens

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

Start test

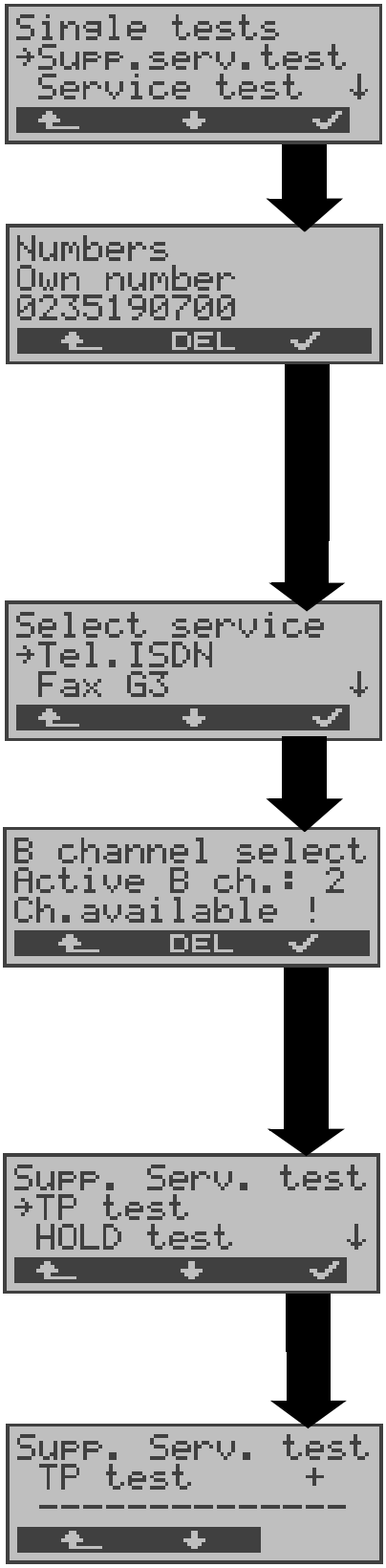
The test results are displayed automatically:
+ = suppl. service supported
- = suppl. service not supported
Use **<** ↓ **>** to scroll through the test results

The ARGUS will return to the

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

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

9.1.2 Suppl.service interrogation in DSS1



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

Use the keypad to enter the "Own number" or select if from the speed-dialing memory (the number of the access under test) (see “Saving Call Numbers” on page 129.). The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

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

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.

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.

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

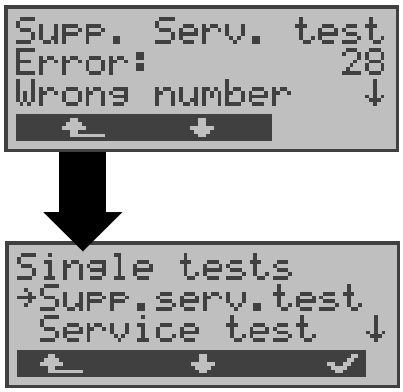
previous display (this applies for all displays).

Test	Comments
TP	The ARGUS tests the **TP** (Terminal Portability) supplementary service by making a self call.
HOLD	The ARGUS tests the **HOLD** supplementary service by making a self call.
CLIP **(CLIP, CLIR, COLP, COLR)** 	In this test, the ARGUS checks whether the 4 supplementary services **CLIP**,**CLIR**, **COLP** and **COLR** are supported. To do so, the ARGUS will setup as many as three calls to itself. **CLIP**: Will the calling subscriber's number be displayed at the called subscriber? (**t** = CLIP temporarily available **p** = CLIP permanently available) **CLIR:** 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. (**t** = CLIR temporarily available **p** = CLIR permanently available) **COLP:** Will the call number of the subscriber who answered be displayed on the caller's phone? **COLR:** 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. 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 **not** possible to make a clear assessment.
DDI	Can a caller directly dial in to an extension on the PBX access under test?
MSN	Is the supplemental service MSN available?

CF **(CFU, CFB, CFNR)** 	In this test, the ARGUS checks whether the 3 supplementary services **CFU**, **CFB** and **CFNR** are supported. **CFU:** Can this access immediately forward an incoming call? **CFB:** Can this access forward an incoming call when it is busy; in other words does it support Call Forwarding Busy? **CFNR:** Can this access forward an incoming call when it is not answered? 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 129). 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.
CW	Does the access under test support call waiting?
CCBS	Will the access under test automatically recall a remote subscriber, if the number called was busy?
CCNR	Will the access under test automatically recall a remote subscriber if the call was not answered?
MCID	Does the access tested allow identification of malicious callers (call tracing)?
3pty	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.
ECT	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.

AOC	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).
SUB	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?
UUS	Does the access under test support the transfer of user data?
CUG	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.

9.1.3 Suppl. Services Tests – Error messages



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 140.).

Distributing the error codes into error classes:

Error class	Description	Cause (from network) 1 TR6	Cause 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 144, “CAUSE-Messages – DSS1 Protocol” on page 140 and “CAUSE-Messages – 1TR6 Protocol” on page 142.

9.2 Service check

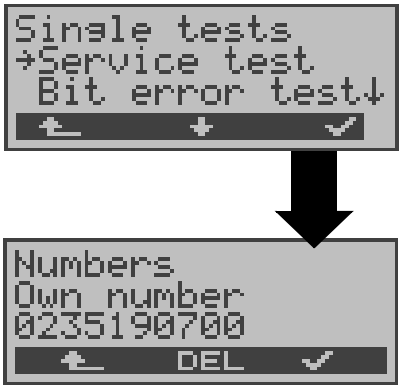
The ARGUS checks, which of the following services are supported by the access under test:

Service	Name in the ARGUS display / abbreviation
Language	**Language / Lang**
Unrestricted Digital Information	**UDI 64kBit / UDI 64**
3.1 kHz Audio	**Tel.analog / Tel.**
7 kHz Audio	**7 kHz audio / 7 kHz**
Unrestricted Digital Information with tones / Display	**UDI+TA / UDI TA**
Telephony	**Tel.ISDN / Tel.**
Facsimile Group 2/3	**Fax G3 / FaxG3**
Facsimile Group 4 Class 1	**Fax G4 / FaxG4**
Teletex service basis and mixed mode and facsimile service Group 4 Classes II and III	**Mixed Mode / Mixed**
Teletex Service basis mode	**Teletex / Ttx64**
International inter working for Videotex	**Videotex**
Telex	**Telex**
OSI application according to X.200	**OSI**
7 kHz Telephony	**Tel.7kHz / Tel7k**
Video Telephony, first connection	**Videotel.1 / Vid.1**
Video Telephony, second connection	**Videotel.2 / Vid.2**
Three user-specific Services (see “Services” on page 117.)	**Userspec.1 / Userspec.2 / Userspec.3 /**

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.



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

Enter the Own number of the access under test

There are PBXs that use separate call numbers for incoming and outgoing calls.
In this case, for the Service checks, you can enter a **"remote"** call number that corresponds to the "own" number that is not stored in the ARGUS.

If the Service check should extend outside of the local exchange, it is possible to perform the Service check in an **end-to-end mode**.
In this case, you **must** enter the remote call number for a second terminal device.

The ARGUS will then automatically check whether the remote terminal can accept the call under the various services – in other words, whether it is "compatible" with these services.

In the test results, the second part (second +, - or *) refers to the answer from the **remote** exchange.

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:

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 53.) 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.

9.3 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 1×10^{-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 Guideline G.821.

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.
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 page 66 BERT wait) 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.

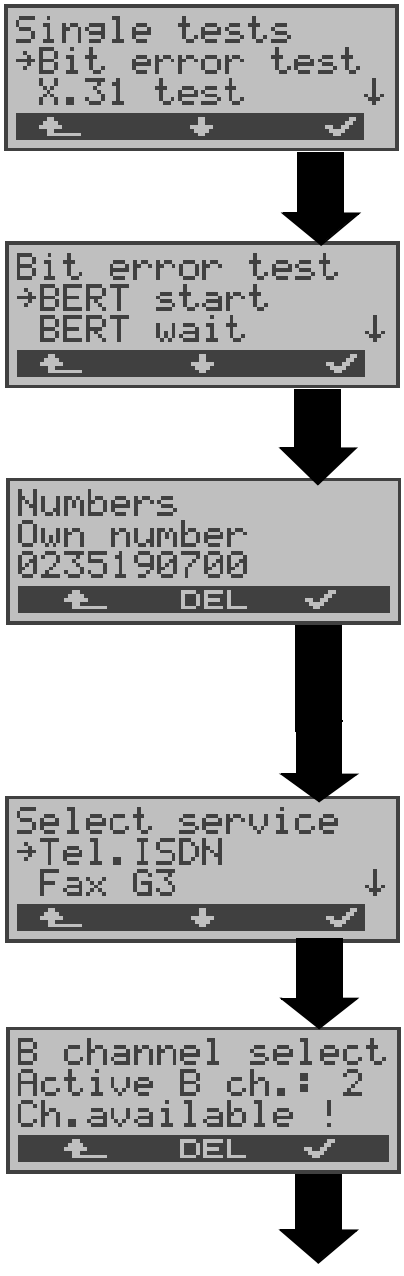
   Therefore, both directions are tested independently.

9.3.1 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 119.).



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

Use **<** ↓ **>** to select **BERT start**.

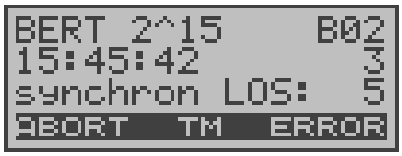
Enter your
Own number to perform the BERT in an extended call to oneself (two B-channels).
ora
remote number for a BERT to a loopbox (one B-channel) or end-to-end

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

Confirm the service.

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

BERT start



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 (e.g. 5).

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).

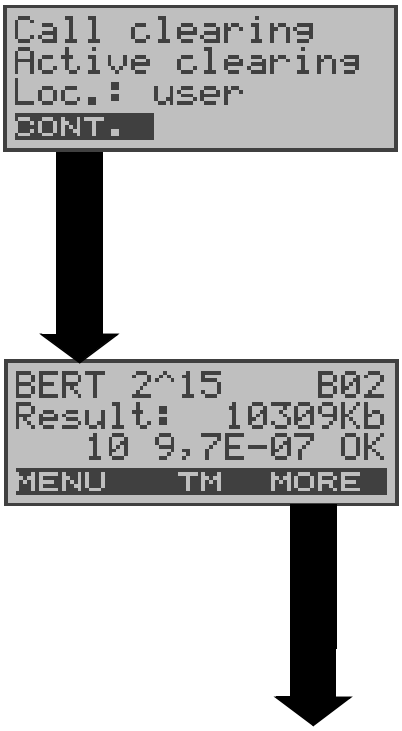
Press **< TM > to** start the Test Manager

(see “Test Manager” on page 94.)

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

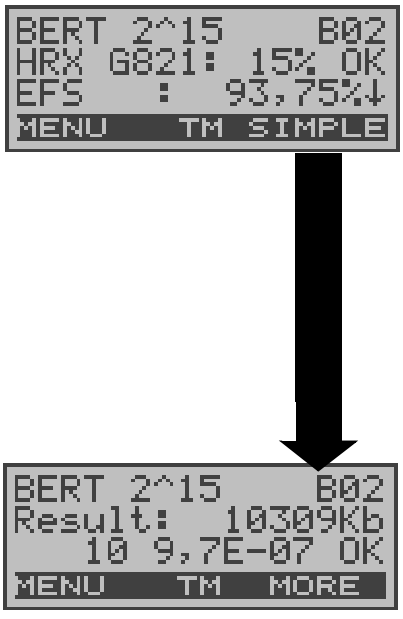
0 -Key: Restarts the bit error test. The test time and number of bit errors will be reset.

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 127 Alarm bell)).



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.

The test results display:
The bit pattern (e.g. 2^15),
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 = $9.7 \cdot 10^{-7}$ = 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 under consideration of the 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***
The number of seconds in which no error occurred.

ES821 ***Errored Seconds***
The number of seconds in which one or more errors occurred.

SES821 ***Severely Errored Seconds***

The number of seconds in which the bit error rate is $>10^{-3}$. In one second, 64,000 bits are transferred, thus **B**it**ER**ror=10^{-3} equates to 64 bit errors.

US ***Unavailable Seconds***

The number of sequentially adjacent seconds (at least 9 sec) in which **BER**>10^{-3}.

AS ***Available Seconds***

The number of sequentially adjacent seconds (at least 9 sec) in which **BER**<10^{-3}.

DM ***Degraded Minutes***

The number of 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)).

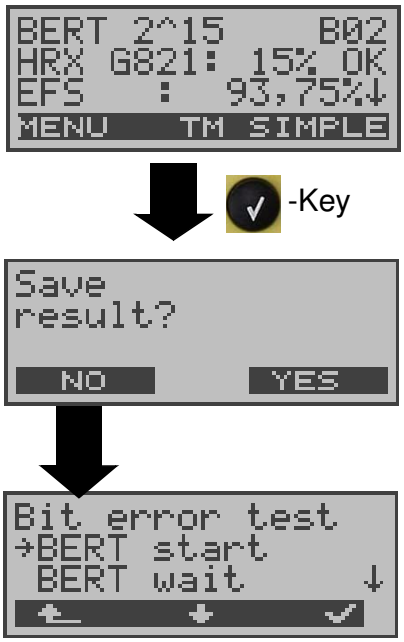
LOS ***Loss of Synchronisation***

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

9.3.1.1 BERT - saving

The ARGUS can store the results of several BERTs.

The ARGUS saves the results together with the date, time (if the network supplies the date and time) and the 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 Test” on page 99.). 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.

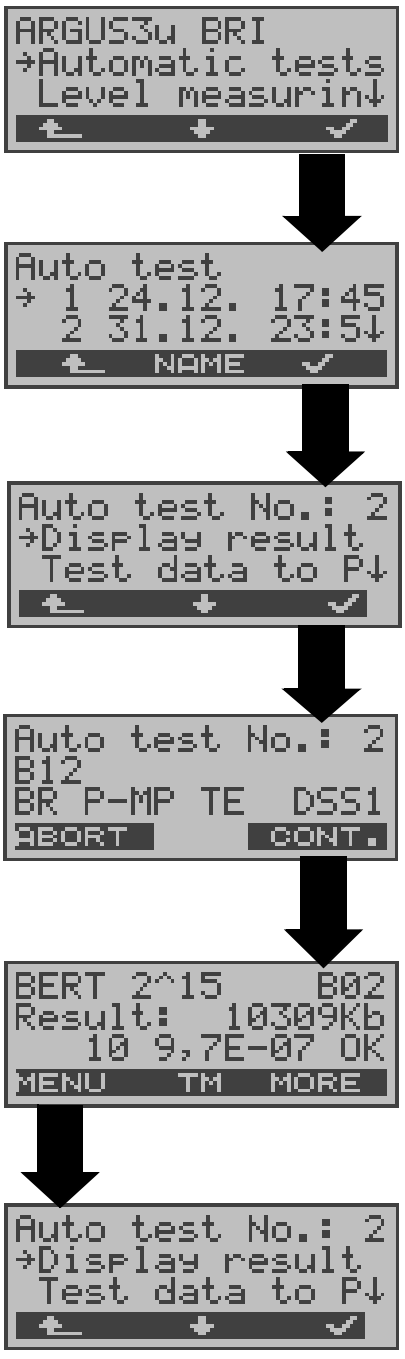


The ARGUS is displaying the result window.

Press **<YES>** **BERT - saving**

9.3.1.2 Display the saved BERT results

see “Display Results” on page 104.



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

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

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

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

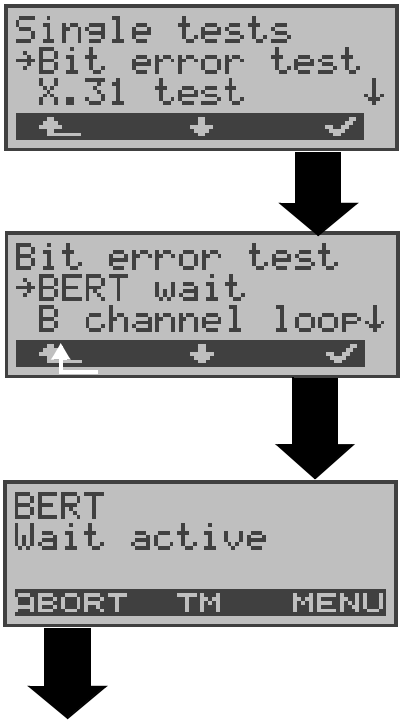
Display the stored results

Use the ↓ -Key to scroll through the results.

Quit the results display.

9.3.2 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:



Operating mode BERT wait

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

Open the Bit error test menu.

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

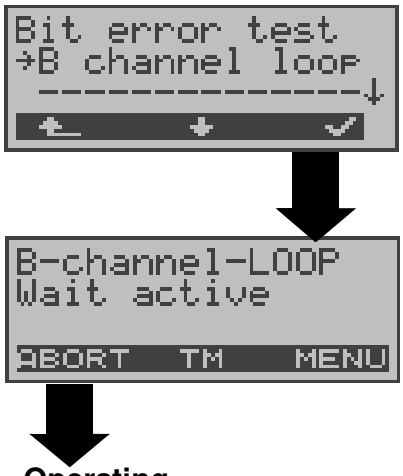
Activate "BERT wait“

The ARGUS first waits for a call and then sets up the connection.
During the connection, the received bit pattern will be evaluated and another 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 98.
< TM >: Calls the Test Manager (Page 94)

The ARGUS displays that will appear are the same as those in Chapter 9.3.1 Start BERT .

9.3.3 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.



Operating mode B-channel

Use the **< ↓ >** to select B-channel loop

.

Activate the "B-channel LOOP“

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.

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 98. From this menu, you can start a second B-channel loop connection (this is also possible using **< TM >**).
< TM >: Call the Test Manager

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 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.

9.4 X.31 Test

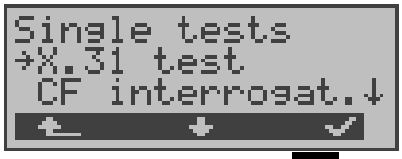
The ARGUS will either perform a “Manual X.31 Test” or an “Automatic X.31 Test”:
In the case of an automatic test, the ARGUS will first setup the D-channel connection and then begin setting up the X.31 connection. Afterwards, the ARGUS will automatically clear the connection and display the results.
In 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.

9.4.1 Automatic X.31-Test

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

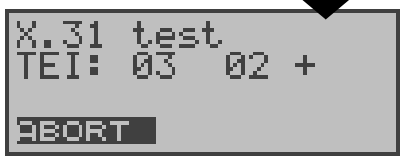
First step: The ARGUS tests whether it is possible to access the X.25 service via the D-channel on the BRI access under test.
The ARGUS sequentially checks all the TEIs from 0 to 63. All the TEIs with which the X.31 service is possible on Layer 2, will be displayed.

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 129).
With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.

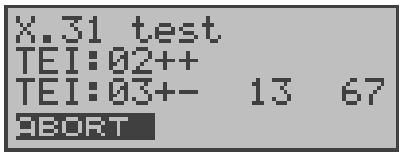


In the Single tests menu, use
< ↓ **>** to select the **X.31 test**.

Use **<** ↓ **>** to select **Automatically**.



Start test
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 one previously tested and its result:
+ = X.31 is available for this TEI
- = X.31 is not available for this TEI



Once the test has ended, 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.

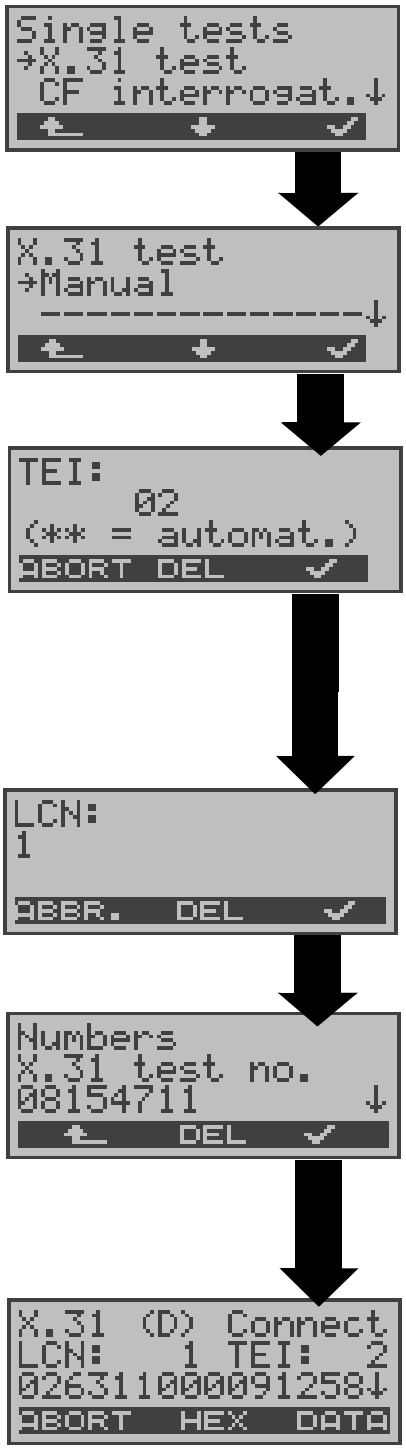
+ + = Both test steps were successful

+ - = 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 145.).

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

9.4.2 Manual X.31 Test

In this test variant, the ARGUS first requests a TEI, LCN and an X.31 number (The ARGUS uses the TEI and LCN values stored in the Configuration/X.31 as default values - seePage 125) and the call number saved as the X.31 number in the speed-dialing memory (see Page 129). 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.



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

With the **< ↓ >**, select **Manual**.

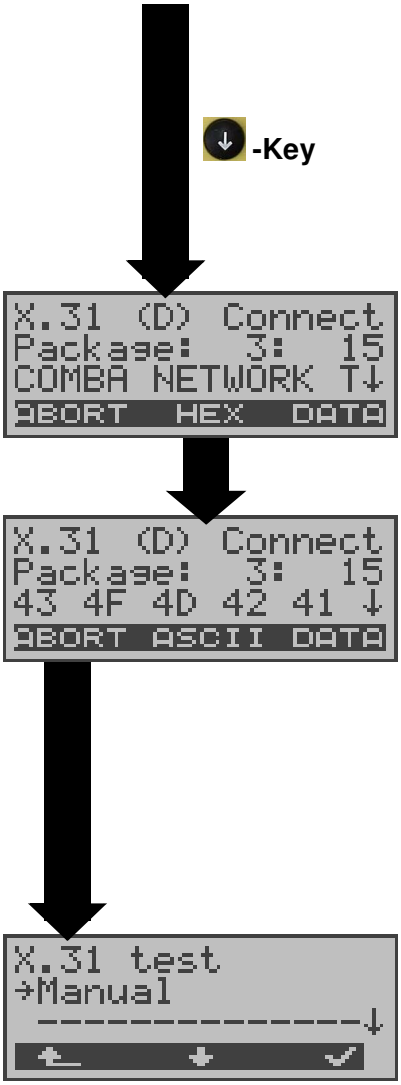
The ARGUS displays the stored TEI.
You can edit the TEI from the keypad; If you enter ******, the ARGUS will automatically determine a TEI.
< DEL >: Delete the TEI

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

Display of X.31 Number (see speed-dialing memory Page 129). It can be edited from the keypad.

Setup a X.31 connection

The ARGUS will display the LCN, TEI and X.31 number (e.g. 0263110 00091258).If you select <**DATA**>, predefined data packets will be sent.



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

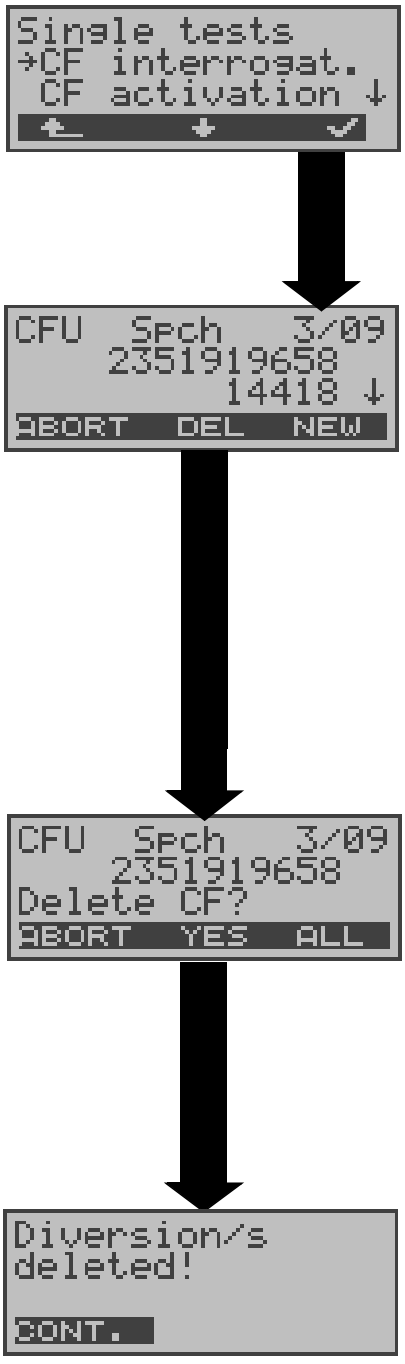
The ARGUS will display the number of packets sent (e.g. 3), the number of packets received (15) and their contents (in ASCII).

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.

9.5 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 type of diversion (CFU, CFNR or CFB) and the call diversion's service will be shown in the display. 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.
The ARGUS can clear any call diversion setup in the exchange.



In the Single tests menu, use the **<** ↓ **>** to select **CF interrogat.**
Start the
CF interrogation;
The test can take several seconds.

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

Delete a call diversion

Security query

Press **< ALL >** to delete all call diversions.
The ARGUS will delete the displayed number in the exchange.

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 acknowledgment of the interrogation of call diversions, implying that no call diversions have been setup.

In the event of a negative acknowledgment, 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:

Basic Service	Abbreviation
All services	**All**
Voice (speech)	**Spch**
Unrestricted digital information	**UDI**
Audio 3.1 kHz	**A3k1H**
Audio 7 kHz	**A7khz**
Telephony 3.1 kHz	**Tel31**
Teletext	**TTX**
Fax Group 4	**FaxG4**
Video syntax based	**ViSyB**
Video Telephony	**ViTel**
Telefax Groups 2/3	**FaxG3**
Telephony 7 kHz	**Tel7**
UDI 64 kBit	**UDI**
Unknown Basic Service	**Unkno**

9.6 CF - Activation

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

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

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

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

Under "Own number", enter the number which should be diverted.
Press **<DEL >** to delete the digit before the cursor.

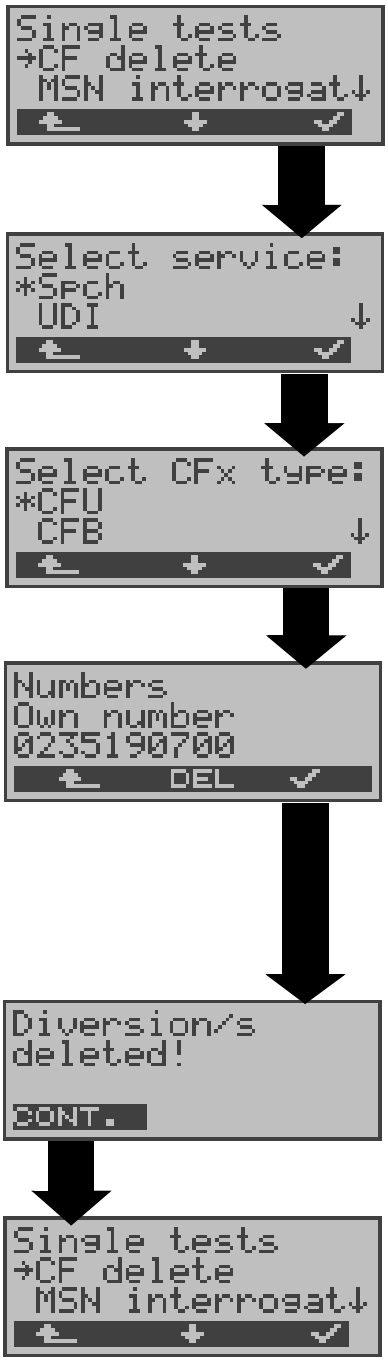
Enter the number to which calls should be diverted.

Setup the call diversion

The ARGUS returns to the Single tests menu.

9.7 CF - Delete

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



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

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

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

Under "Own number", enter the number which should no longer be diverted.
Press **<DEL >** to delete the digit before the cursor.

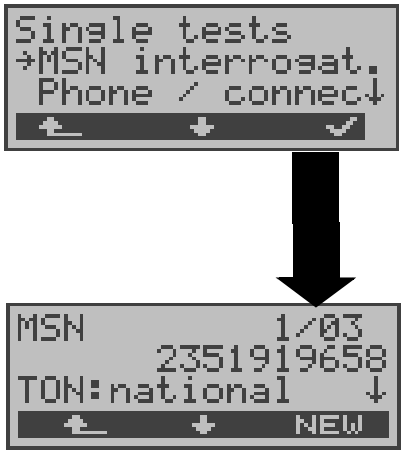
Delete a call diversion

9.8 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)”.



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

Start the MSN interrogation

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!

9.9 Time measuring

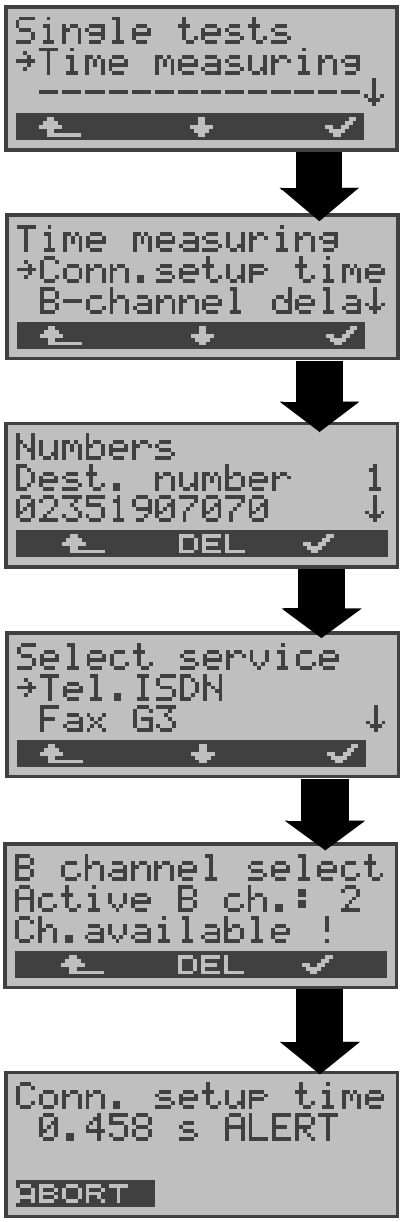
The ARGUS measures three different times:

- **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.

9.9.1 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.



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

Use the **<** ↓ **>** to select **Conn.setup time.**

Enter - or select from the speed-dialing memory - the call number for the outgoing call

Use the **<** ↓ **>** to select the service**.**

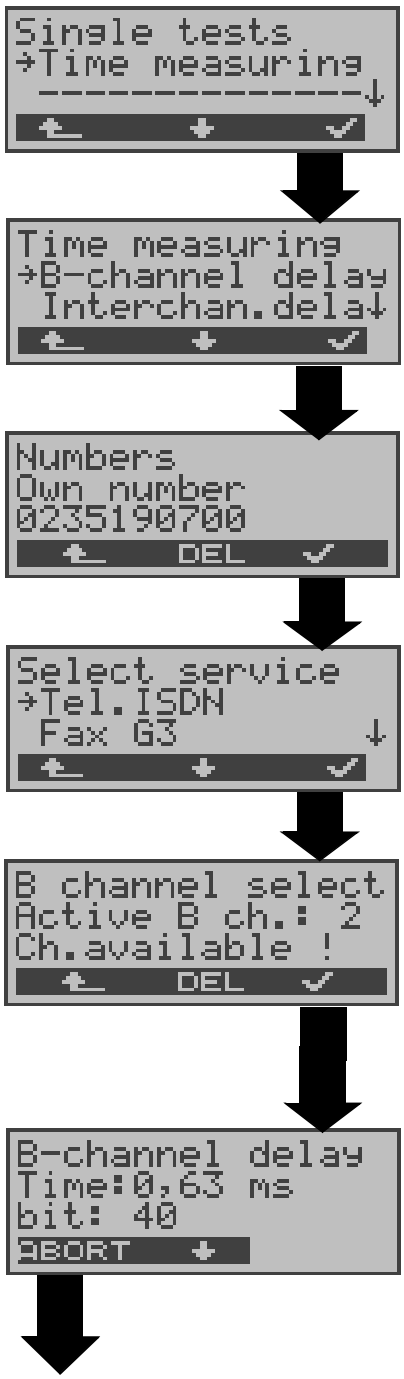
Enter the B-channel on the keypad.

Perform measurement

The ARGUS will display the connection setup time in seconds and the received L3 messages (end of connection setup).
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.

9.9.2 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.



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

Use the **<** ↓ **>** to choose **Interchan.dela.**

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

Use the **<** ↓ **>** to select the service**.**

Enter the B-channel on the keypad.

Perform measurement

The ARGUS displays the propagation delay in milliseconds and in bits (multiples 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.)

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

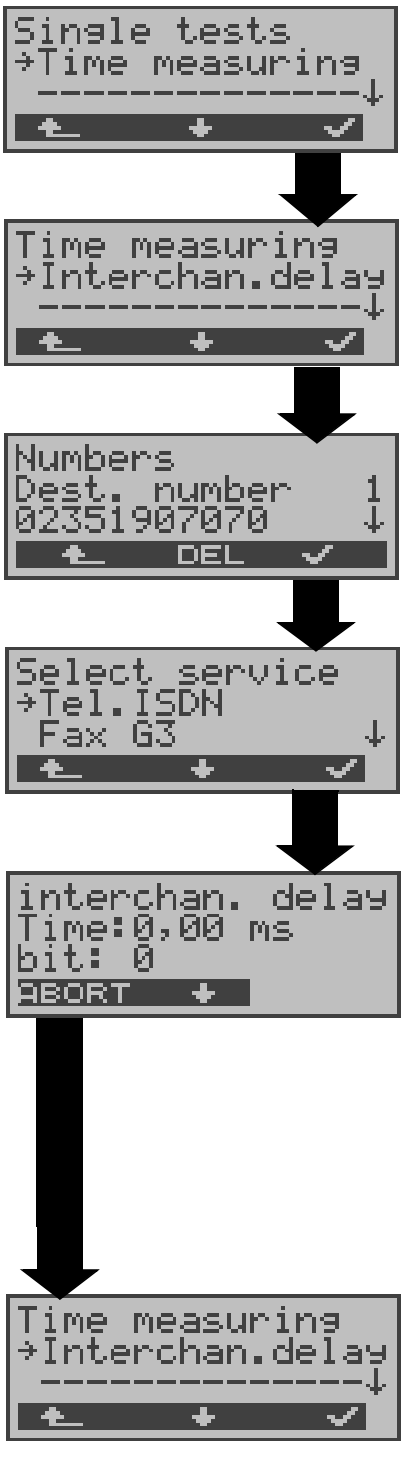
If the ARGUS cannot perform the measurement, e.g. because the call number entered was wrong or no B-channel was free, the corresponding cause will be displayed.

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”.

9.9.3 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.



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

Use the **<** ↓ **>** to select **Interchan.delay.**

Enter - or select from the speed-dialing memory - the call number of the loopbox

Use the **<** ↓ **>** to select the service**.**

Perform measurement

The ARGUS displays the propagation delay in milliseconds and in bits (multiples of the time required to send a bit at 64 kBit/s, it takes 15.26 µsec to send a bit).
The measurement will be repeated in cycles.

Press **<ABORT>** **to stop the 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”.

10 Connection

10.1 Setting up an ISDN connection

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

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

Additional three user-specific services (see “Services” on page 117.)

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 of the call number are sent individually.

In the Single tests menu, use the **<↓ >** to select **Phone / connec.**

Use the **< ↓ >** to select **Overlap sending.** If the -Key is pressed the ARGUS will open the **Connection menu.**

Using the < ↓ > select the service that should be used for the connection.

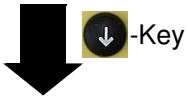
Using the keypad, enter the B-channel (by default, the last B-channel used will be suggested)
When entering a new B-channel, first press **<DEL>.**
If you enter an *, the ARGUS will choose any B-channel that is free.
The ARGUS will show whether the B-channel is available.

Setup the connection
Enter the number on the keypad.
The ARGUS displays the service (e.g. Tel.), the own number (90700), the B-channel (B02) and the number called (01191).
The ↓ -Key is used to scroll though the information.
<**TM** >: to start the Test Manager (Page 94).

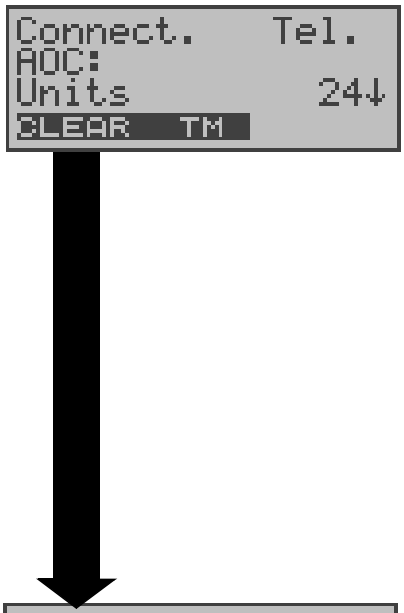
The connection is setup using B-channel 2.

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

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

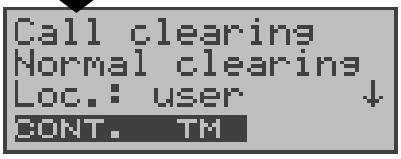


Display of the
- User-to-User Information
- Display Information
- Type of number (TON)
- Numbering Plan (NP)



- 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.

Disconnect



The ARGUS displays the cause of the disconnect.
(see page 90 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

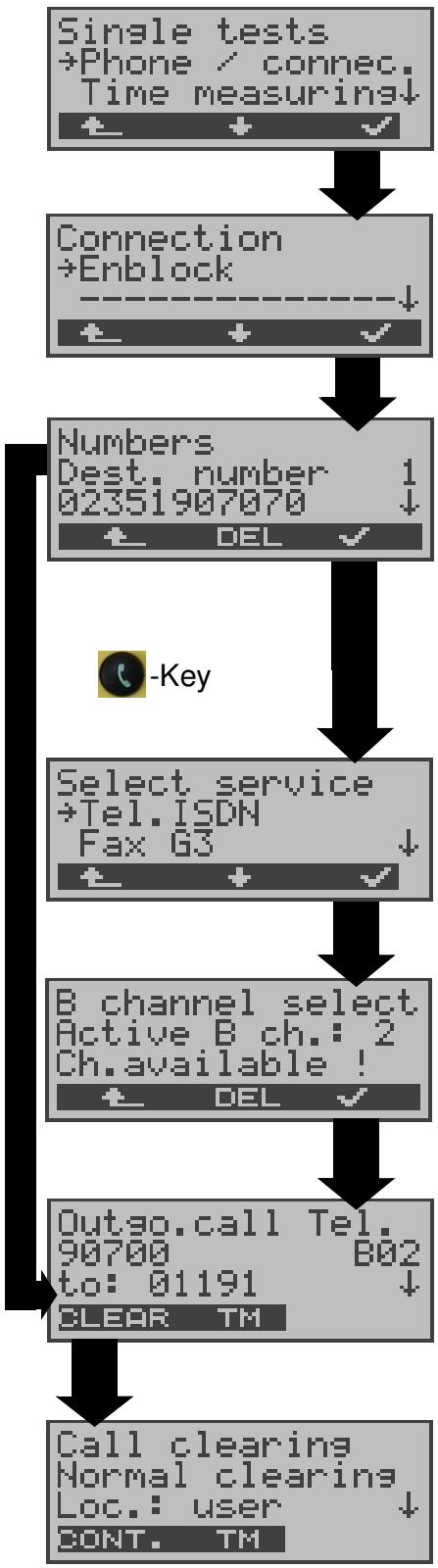
If you press the  -Key, the ARGUS will open the Connection/Overlap window directly regardless of the currently open menu.

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 129.).



In the Single tests menu, use the **<↓ >** to select **Phone** / **connec**.

Use the **< ↓ >** to select **Enblock signalling.**

Use the -Key to select the number from the call number memory or reenter the number on the keypad.
Press **<DEL>** to delete a digit.

If the -Key is pressed the ARGUS will open the Connection menu.

Using the **< ↓ >** select the service that should be used for the connection.

Enter the B-channel on the keypad.
(See Overlap sending for entries)

Start the dialing procedure
(for more displays and information see Overlap sending)

Disconnect

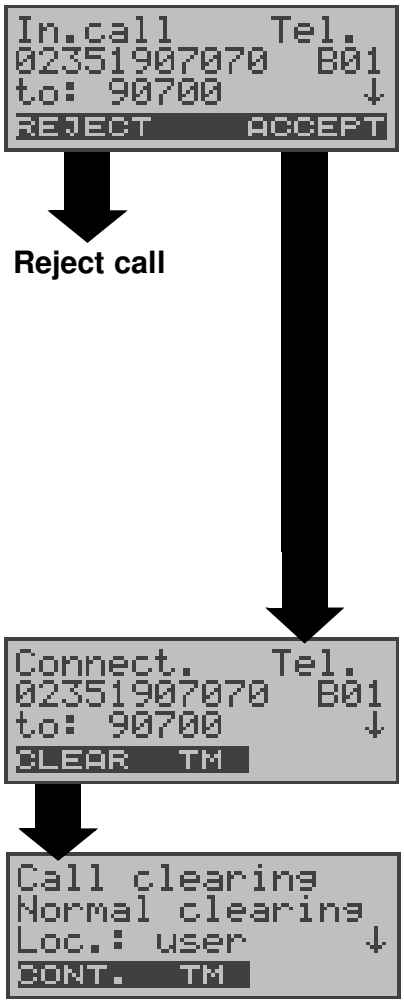
The ARGUS displays the cause of the disconnect. (see page 90 Clearing down an ISDN connection)

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 95.).

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 118.) 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 129.) and the incoming call has a destination MSN.



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 116).

↓-Key: View additional information (if available)

Accepting call

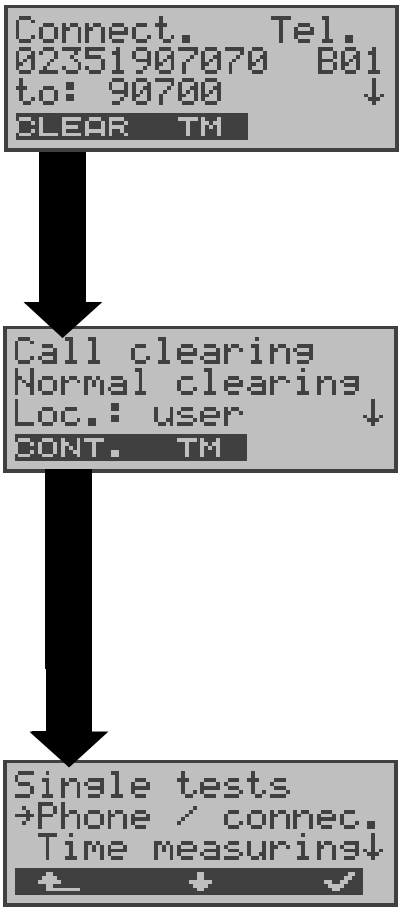
Use the < **TM** > softkey to start the Test Manager.
(see Page 94).
Use the **<** ↓ **>** to view additional information.

Clearing the connection

Charge information in NT mode (optional):

In NT mode, the ARGUS will – for incoming calls – send advice of charges in accordance with DSS1 as units and as currency (in euro).

10.2 Clearing down an ISDN connection



To **clear down the connection**, press <**CLEAR**> or the Press the

-Key

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

The ARGUS returns to the Single tests menu.

The following causes are shown in clear text:

Cause	Display	Explanation
255	Active clearing	*Clearing User actively initiated the disconnection*
Long 0	Normal clearing	*Cause element with Long 0 is mostly used by 1TR6*
01	Unalloc. number	*"No access under this call number" is signaled*
16	Norm. clearing	*Normal disconnect*
17	User busy	*The number called is busy*
18	No user respond	*No answer from the number called*
19	Call.time XX	*Call time too long*
21	Call reject	*The call is actively rejected*

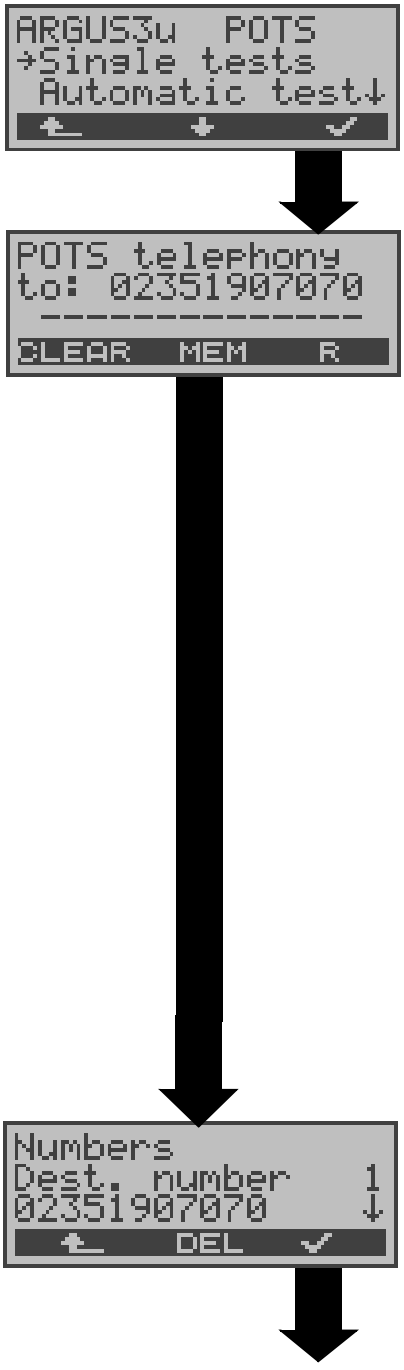
28	Wrong number	*Wrong call number format or call number is incomplete*
31	Norm. clearing	*Unspecified “normal class” (Dummy)*
34	No B-chan.avail.	*No circuit / B-channel available*
44	Req.chan.unavail	*Requested B-channel not available*
50	Req.fac.not subs	*Requested supplementary service (facility) not subscribed*
57	BC not authoriz.	*Requested bearer capability is not enabled*
63	Srv./opt.n.avail	*Unspecified for “Service not available” or “Option not available”*
69	Req.fac.not impl.	*Requested facility is not supported*
88	Incompat. Objectives	*Incompatible destination*
102	Timer expired	*Error handling routine started due to time-out*
111	Protocol error	*Unspecified for ”protocol error class”*
127	Interworking err	*Unspecified for “interworking class”*

Other causes are not shown in clear text, rather as decimal codes (see Appendix B and C).

10.3 Operation on a POTS (analog) access

Procedure for an Outgoing Call (POTS)

The ARGUS sets up a connection to another terminal. If the terminal is a telephone, the handset integrated in the ARGUS can be used to hold a conversation.



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

Setup the connection
Enter the number on the keypad. Each of the number's digits will be dialed individually. The ARGUS will display the number dialed.
As soon as the remote party answers, a voice connection will be set up.
The ARGUS will display the charges, if the information is available on the access under test.

< R >: Generate a FLASH signal

< MEM >: Select the number from the call number memory or reenter the number on the keypad.

Use the **< ↓ >** to scroll.
Press **<DEL>** to delete a digit.
The last number dialed will always be used as the default - simplified last number redial.

The ARGUS sends the complete dialing information together.

Disconnect

Simplified overlap signaling using the telephone key

If you press the -Key, the ARGUS will open the POTS telephony window directly regardless of the currently open 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.

If the access supports CLIP, the ARGUS will display the number of the caller (see “POTS CLIP” on page 123).

Or press the -Key

Accepting call

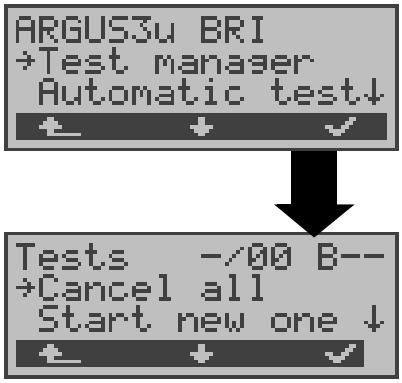
< R >: Generates a FLASH signal

Disconnect

11 Test Manager

The ARGUS can simultaneously start fully independent BRI or U-interface 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.



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

Open the Test Manager

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.

11.1 Simultaneously Starting Several Tests

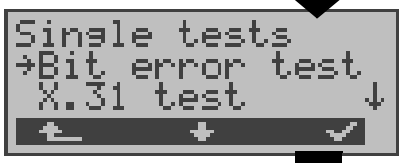
Starting a new test or connection during an existing connection

Example:
There is a connection on B-channel 1.

During this connection, the Test Manager can be started by pressing the 6-Key or the <**TM**> softkey.

The ARGUS displays the number of existing connections (-/**01**).
Use the **< ↓ >** to select **Start new one**.
The ARGUS returns to the main menu.

Use the **< ↓ >** to select **Single tests**.



Use the **< ↓ >** to select the desired test (e.g. bit error rate test) .

Start test
(Still connected)

For information on the operation of bit error tests, see Page 60

The ARGUS opens to the Test Manager.

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).

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.

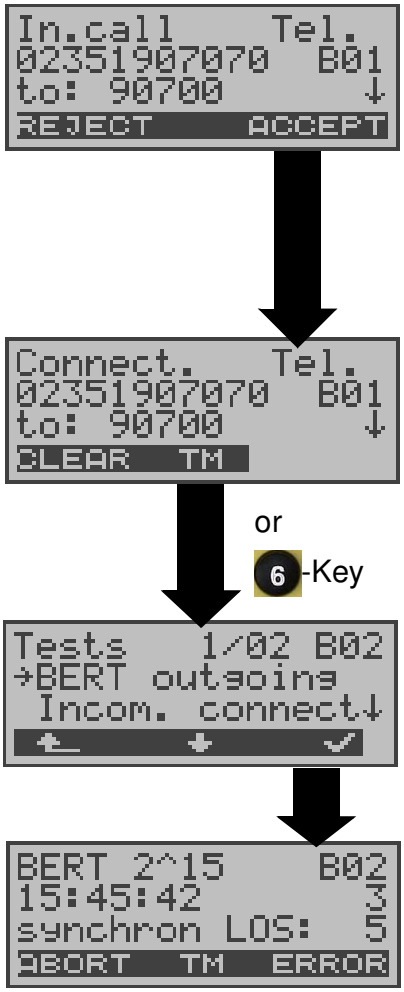
Some tests use so many resources that they cannot be run in every combination with other tests. In this case, the ARGUS will display the message “Test not possible at this time”.

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. 10.1 Setting up an ISDN connection page 83).
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.



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.

Accepting call

The BERT will continue in the background.

To switch to the BERT

Use the < ↓ > to select **BERT outgoing**.

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.

11.2 Switching Between Tests

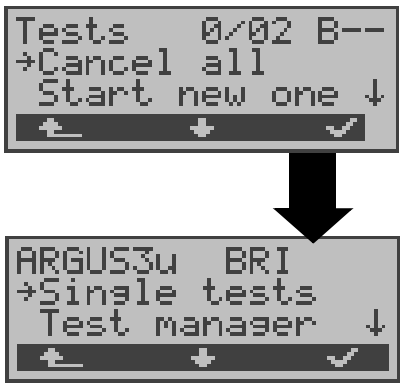
Open the Test Manager.

Using the <↓ >, select the **Test** (Connection) that you wish to switch to.
If you press the < ✓ >, the ARGUS will open the selected test.

With < ↑ >**:** The ARGUS will return to the point from which the Test Manager was called (e.g. to a test running in parallel). If no other test is running, the ARGUS will, reasonably enough, return to the Main menu.

11.3 Cancel All

Open the Test Manager.



Using the < ↓ >, select **Cancel all**.

The ARGUS will cancel all of the currently running tests and/or current connections and then return to the Main menu.

12 Automatic Test

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 BRI or U-interface permanent circuit

- Status
- Level Measuring
- BERT in end-to-end mode (e.g. with a loopbox on the remote end)

The ARGUS saves the test results together with the date and time (supplied by the exchange). Additionally, settings such as your own plus a remote call number will also be saved.

The test results are not lost when the ARGUS is switched off.

The ARGUS saves the results of multiple test series (records 1,2,3...).

Each function in the Automatic test menu refers to one of the test series saved as a record.

Therefore, the first step will open a dialog in which you must select the desired data record.

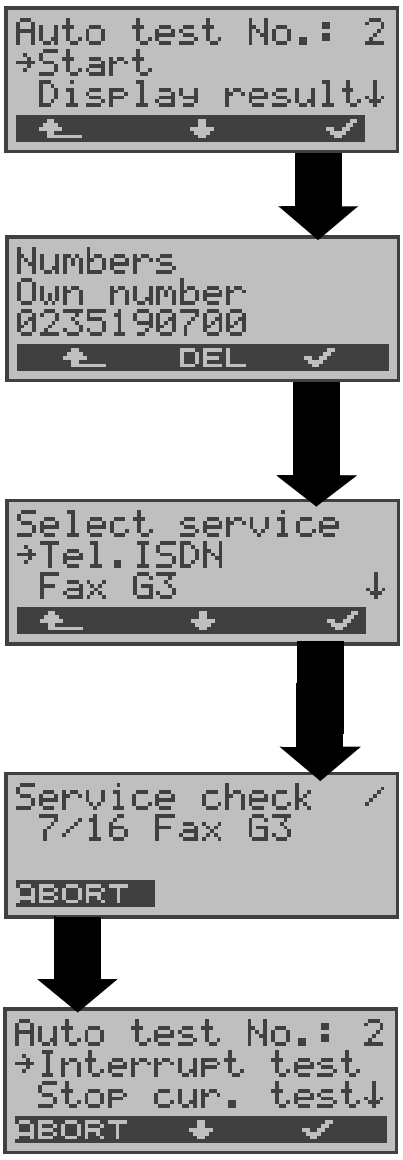
Use the **<↓>** to select **Automatic tests**.
or press 4 to start an automatic test series.

Use the **< ↓ >** -Key to select the record holding the saved test results.

Press < **NUMBER** > to display the number of the access under test
Empty records are labeled as "free".

12.1 Automatic Start test

You should check the required parameters (e.g. BERT measurement time and error level, see Page 120 and Page 120) before the automatic test series is begun.



Use the**<** ↓ **>** to select **Start** (in the example, the new test is saved in record number 2).

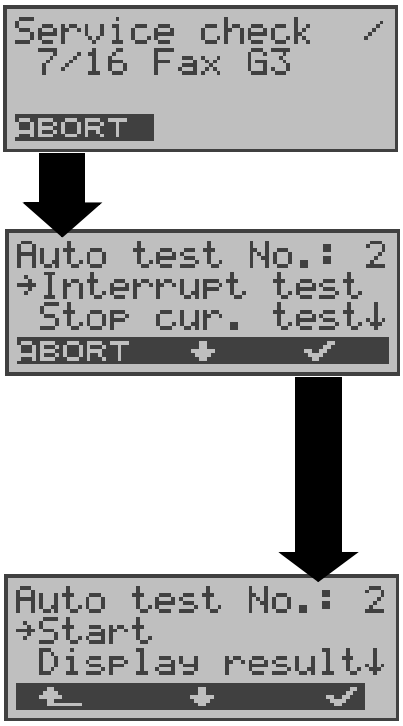
Enter Own number - on accesses using the DSS1 protocol - also enter a **remote number**.

Use the **<** ↓ **>** to select the service.
(needed for the suppl.serv.test)

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>**.

Terminating the test (early):



The ARGUS is running an automatic test.

Interrupting a test

Use the **< ↓ >** to select **Interrupt test**.
Press the **< ABORT>** softkey to restart the test.

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:

A single test can be skipped:
In this example, the ARGUS is running a Service check.

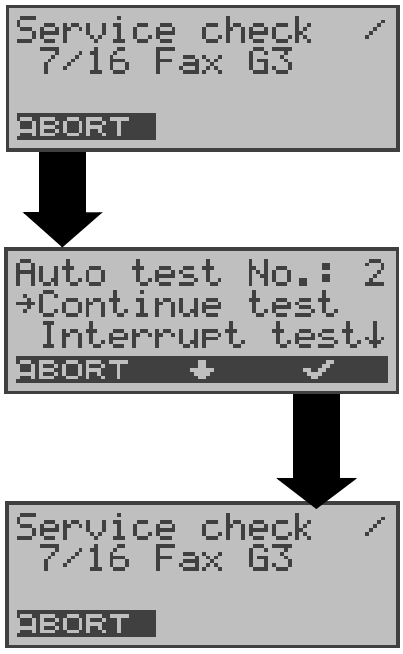
Interrupt the Service check

Use **< ↓ >** to select **Stop cur. test**
Use **< ABORT >** continue the Service check

The ARGUS will skip the Service check.

The next single test (e.g. BERT) will be started.

Resuming a test:



An interrupted Single test can be resumed:
In this example, the ARGUS is running a Service check.

Interrupting a test

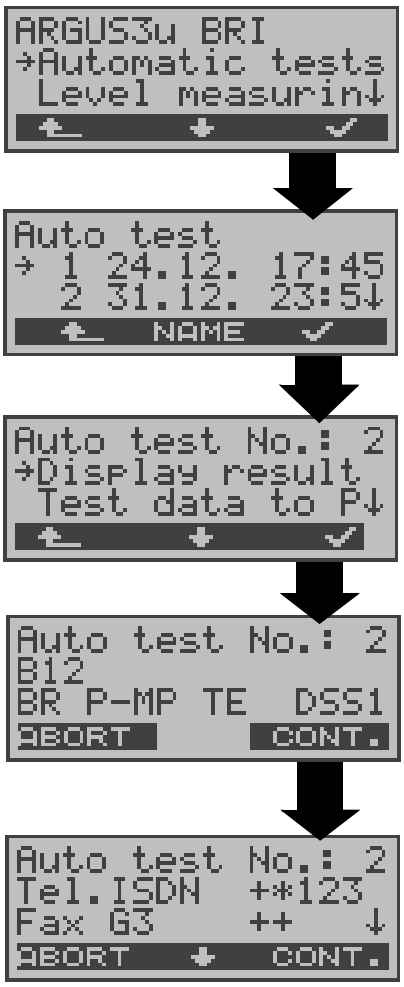
Use <↓> to select **Continue test**.
Press the **< ABORT >** softkey to restart the test.
The ARGUS repeats the "disturbed" single test (in the example: the Service check).

12.2 Display Results

The ARGUS displays the results stored for the single tests in the following order:

For: - **BRI or U-interface**	**- Permanent circuit**
- State	State
- Level measuring	Level measuring
- Service Check	BERT
- BERT	
- Suppl.serv.test	
- X.31-Test	
- CF Interrogation	
- MSN Interrogation	

Displaying the saved test results



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

Use the ↓-Key to select the stored record.

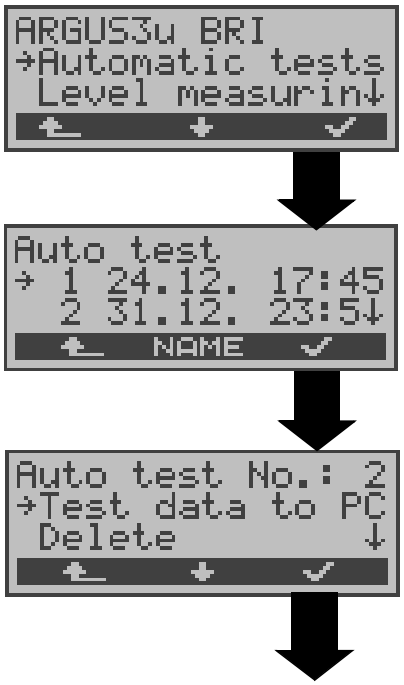
Use the **<** ↓ **>** to select **Display result**.

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

Display result of the next single test
e.g. display Service check.
Use the **<↓>** to scroll through the Single test results.
If you press **<CONT. >**, the ARGUS will display the results of the next single test.

12.3 Sending the results of a tests to a PC

To visualize and archive the test results on the PC, the data records can be transferred to the PC via the serial interface using the included cable (labeled as PC Interface) (connect the cable between the ARGUS “L-Test” jack ---- PC’s serial interface).
Connect the ARGUS to your PC and start the **ARGUS WINplus** program.

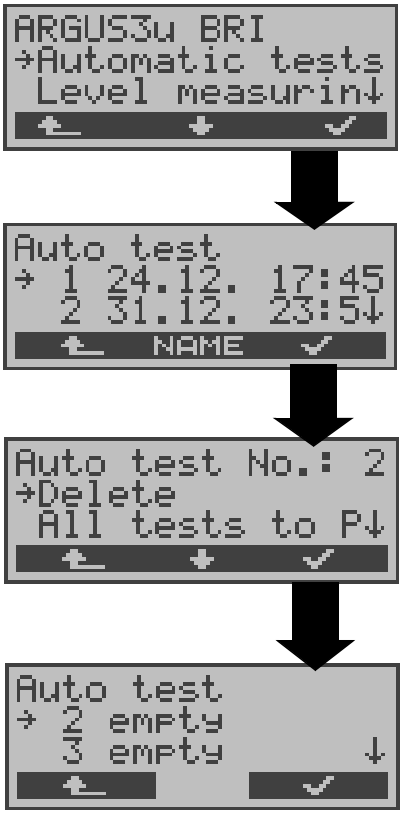


In the Main menu, use the **<** ↓ **>** to select **Automatic tests**.

Use the ↓-Key to select the record (e.g. No. 2).

Use the **<** ↓ **>** to select **Test data to PC**.

12.4 Deleting the results of a test



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

Use the ↓-Key to select the record (e.g. No. 2).

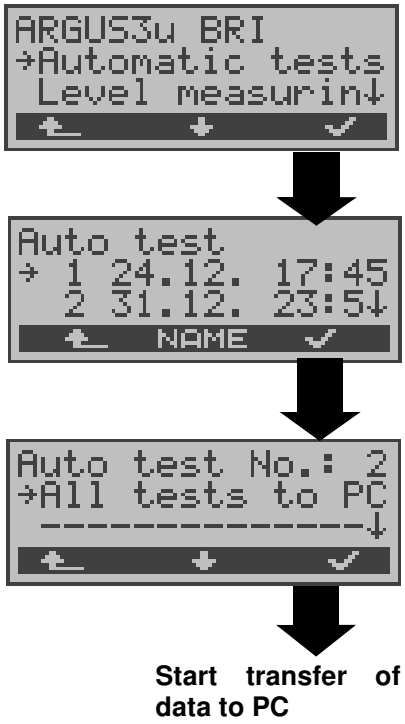
Use the **<** ↓ **>** to select **Delete**.

Delete record (No. 2)

For information on how to delete all **records**, please see on page 131 “Reset”.

12.5 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 (connection cable see Page 105).



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

Use the ↓-Key to select the record.

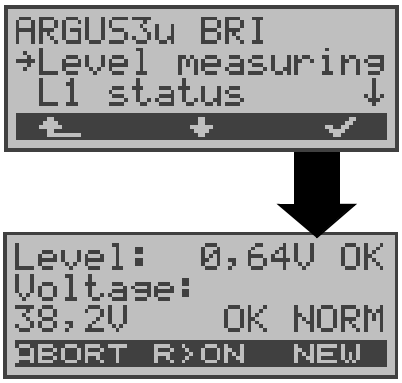
Use the < ↓ > to select **All tests to PC**.

13 Level Measuring

13.1 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.



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

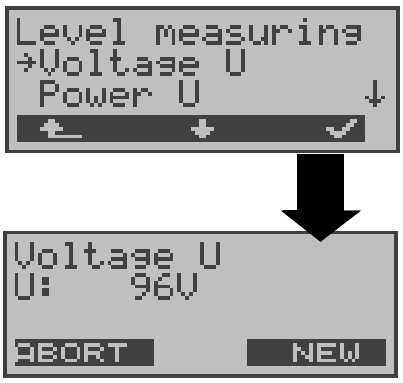
Start measurement

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 $^{+20\%}_{-33\%}$ 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 $^{+4.25\%}_{-13.75\%}$ i.e. from 41.7 V to 34.5 V)
  - REV_ inverted phantom feed
  - NONE no feed

13.2 Voltage measurement on a U-interface

Measurement of feed voltage on a U-interface



Use the <↓ > to select **Voltage U**.

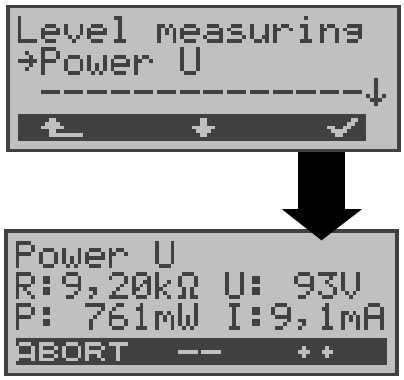
Start measurement

The ARGUS will display the level of the feed in volts.
The measurement will be updated continuously.

Measurement of the U-interface under load

The ARGUS measures the voltage on the U-interface under various selectable loads and also displays the calculated current and power.

From these values, it is possible to estimate the length of the line.



Use the <↓> to select **Power U**.

Start measurement

The ARGUS displays the switched-in load in kΩ, the measured voltage in Volts (should not >100V), the calculated power in mW and the calculated current in mA.
Use <**++**> to increase the load by one increment (the resistance is lowered)
Use <**--**> to decrease the load by one increment (the resistance is increased)

Step	Load / kΩ	Maximum Voltage / V
1	64	ca. 126.0 1)
2	28	ca. 126.0 1)
3	19	ca. 114.0 1)
4	14	ca. 114.0 1)
5	11	ca. 114.0 1)
6	9	ca. 109.4 2)
7	8	ca. 101.8 2)
8	7	ca. 94.6 2)
9	6	ca. 75.0 1)
10	5.5	ca. 75.0 1)
11	5	ca. 75.0 1)
12	4.5	ca. 75.0 1)
13	4.2	ca. 73.9 2)
14	3.9	ca. 71.2 2)
15	2.7	ca. 59.5 2)

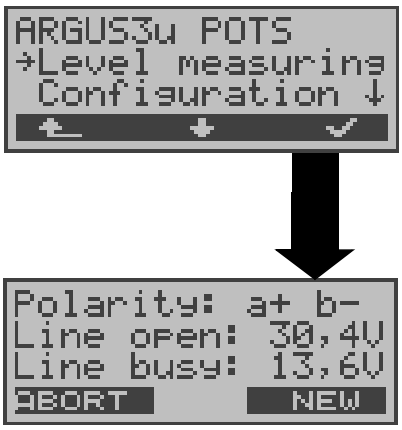
1) The voltage is limited by the power capacity of the individual components in the ARGUS

2) The voltage is limited by the maximum power (1300mW) of the U-interface

When switching the load levels, the power limitations of the components within the ARGUS and the maximum permissible power (1300mW) of the U-interface must be taken into consideration. Therefore, the ARGUS will only permit the load to be switched another increment when the specified voltage will not be exceeded.

13.3 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**.

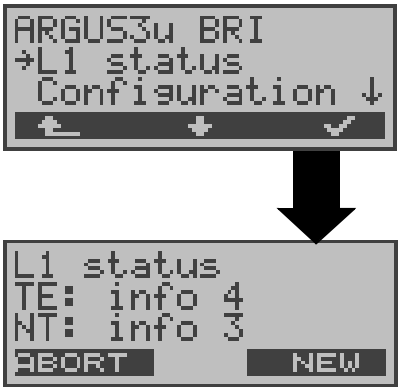
Start measurement

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.

14 L1 status

14.1 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).



Use the **<** ↓ **>** to select **L1 status**.

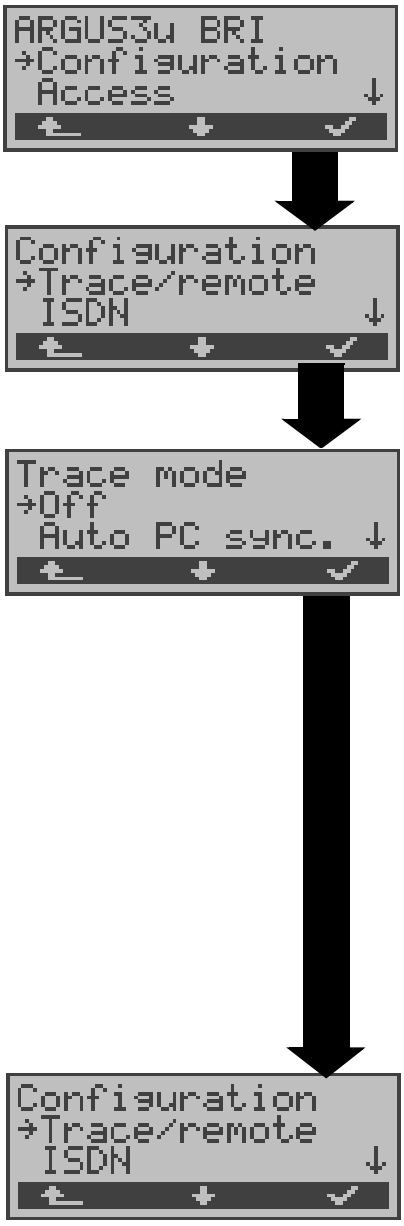
The ARGUS displays the status of Layer 1 or of the signal, which is currently being sent (Info 0 .... Info 4). Press **<NEW>** to setup Layer 1 again (if necessary).

15 Configuration

The ARGUS can be configured to suit your special requirements. The default (factory) settings can be restored by selecting "Reset“ (see page 131 Reset).

15.1 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.



In the Main menu, use the < ↓ >
Select **Configuration**.

Use the < ↓ > to select **Trace/remote**.

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.
Recording: the D-channel data is stored in the internal Flash memory (the "Trace" LED flashes slowly)

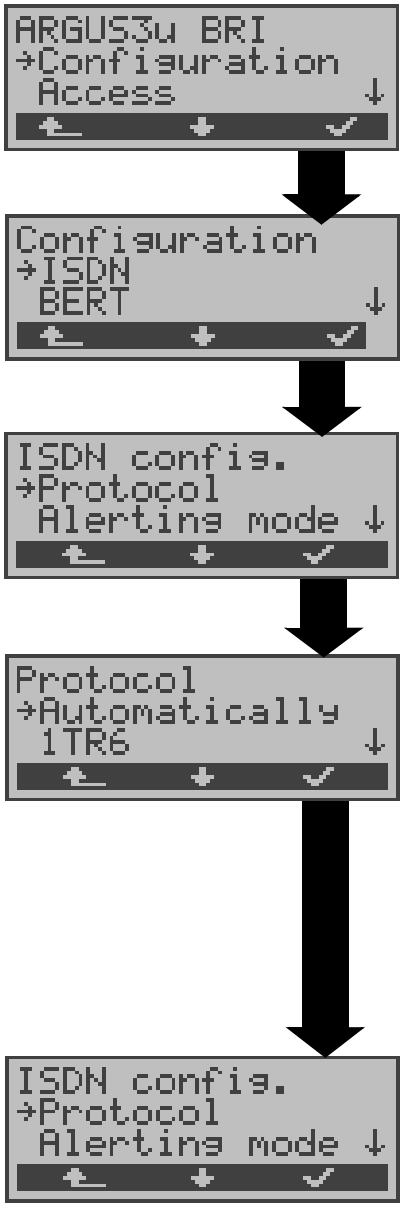
Confirm the entry

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 * .

The D-channel data saved in the Flash memory can be transferred to the PC in the “Recorder” mode ((see page 39 Recorder)).

15.2 Configuration: ISDN

The operation is the same for all configurations and will be illustrated with a single example:



In the Main menu, use the **<** ↓ **>** to Select **Configuration**.

Use the **<** ↓**>** to select **ISDN**.

Use the **<** ↓ **>** to select, e.g. **Protocol**.

Use the **<** ↓ **>** to select the setting for the protocol (e.g. Automatically).

: The ARGUS will return to ISDN config. menu **without** changing the settings.

Confirm the entry

The ARGUS will return to the ISDN config. menu.

Settings in ISDN:

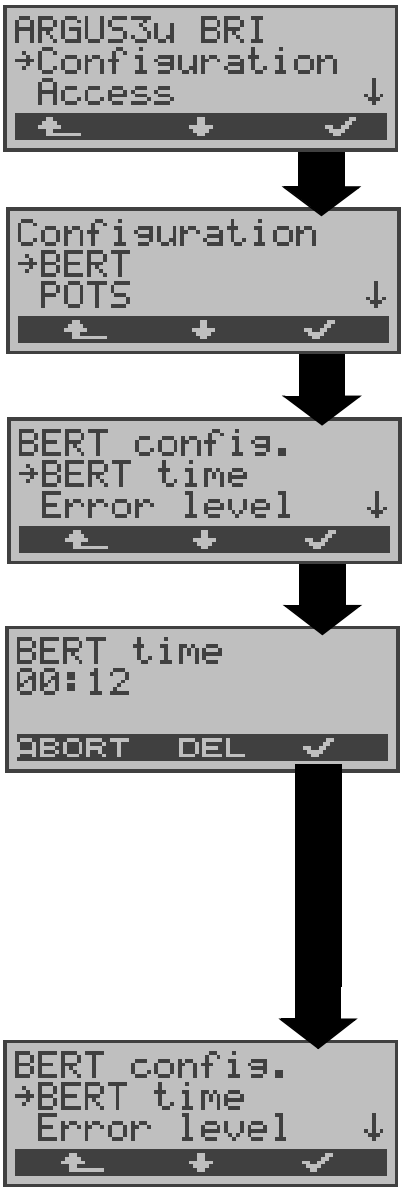
Display Name on the ARGUS	**Comment**
Protocol	As an alternative to automatic protocol determination (setting: Automatically), you can also set the Layer-3 D-channel protocol manually. The ARGUS will save the protocol setting permanently, i.e. it will use this protocol the next time that it is switched on.
Alerting mode	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. If it is set to "**Manual**", 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.).  An incoming call in the **Manual** 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. If it is set to **Automatically**, 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.

BRI termination	You can add terminating resistors to a BRI access. This setting will not be saved. Default setting: TE mode / Permanent circuit: no terminating resistor is switched in
Call parameter	On the user-side (ARGUS in TE mode), two different parameters can be set for a call setup (in ISDN): **1. Type of number** (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal **Network-side: Net CGN TON** / **Net-CDN-TON** **User-side: User CGN TON** / **User CDN TON** **2. N**umbering **P**lan for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal **Network-side: Net-CGN-NP**/ **Net-CDN-NP** **User-side: User CGN NP** / **User-CDN-NP** Possible settings: For TON: unknown, international, national, network spec., subscriber, abbreviated. For NP: unknown, ISDN/telephony, data, telex, national stand., private
Services	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 < A . . F > softkey (e.g. to enter a "C", press the softkey three times; for a "F", press it six times).

Call Acceptance	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. If set to "all MSN/DDI“, the ARGUS signals all calls. Prerequisite: - the "own" number must be entered in the call number memory under "own number“ (see “Saving Call Numbers” on page 129) - the incoming call must have a destination MSN The default setting is "all MSN/DDI“. This setting will be saved permanently.
Voice coding	There are two options for coding voice data in a B-channel: - A-law (default) - µ-law This parameter will be reset to the default setting when the ARGUS is switched off and back on again.
DTMF / Keypad	DTMF or keypad setting
Destination MSN	A destination number can be entered, which the ARGUS will use for MSN interrogation (default: 0043).
CUG Index	Entry of the CUG index, which the ARGUS should use when testing the CUG (Closed User Group) service. Default: 148

15.3 Configuration: BERT

The operation is the same for all configurations and will be illustrated with a single example:



In the Main menu, use the < ↓ >
Select Configuration.

Use the < ↓ > to select **BERT**.

Use the <↓ > to select e.g. **BERT time**.

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.

Confirm entry

The ARGUS will return to the BERT config. menu.

Settings for the BERT:

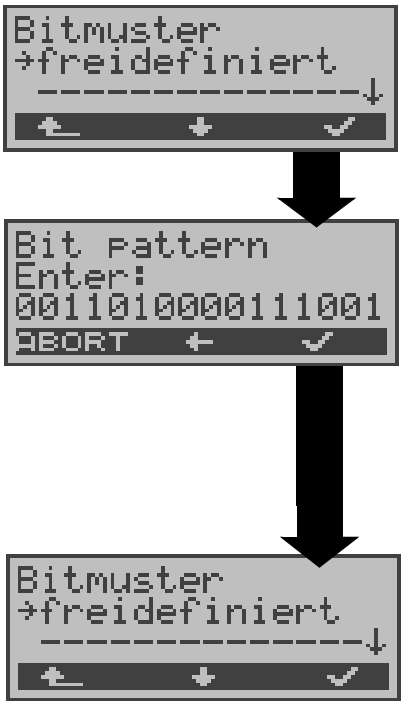
Display Name on the ARGUS	**Comment**
BERT – duration	You can use the keypad to enter measurement times ranging from 1 minute (default setting) to 99 hours and 59 minutes (= 99:59). ⚠ If the time is set to 00:00 (=BERT with unlimited measurement time), the BERT **will not** stop automatically. In this case, the user must terminate the BERT by pressing the < **ABORT**> softkey.
Error level	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 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is 10^{-06} (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^{6} = 1,000,000 sent bits), the bit error test will be evaluated as OK.
HRX value	The HRX setting (**H**ypothetical **R**eference **C**onnections, see the ITU-T G.821): Using the keypad, you can enter a value ranging from 0 to 100 %.

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).



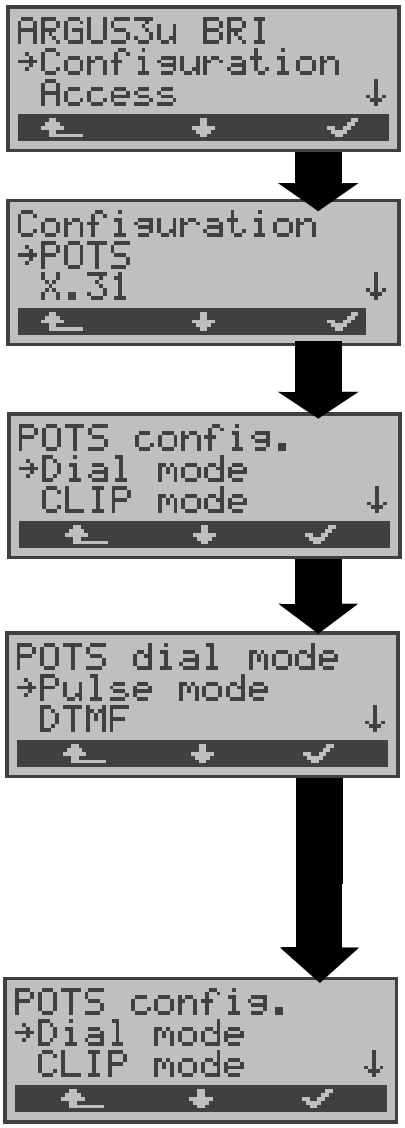
Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary from the keypad.

To move the cursor right or left, use the ↑,↓-Keys.
<**DEL**>: Set the digit in front of the cursor to 0

Saving the bit pattern

15.4 Configuration: POTS

The operation is the same for all configurations and will be illustrated with a single example:



In the Main menu, use the < ↓ >
Select Configuration.

Use the < ↓ > to select **POTS**.

Using the <↓>, select a setting (e.g **Dial mode**).

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.

Confirm selection

Settings on a POTS access:

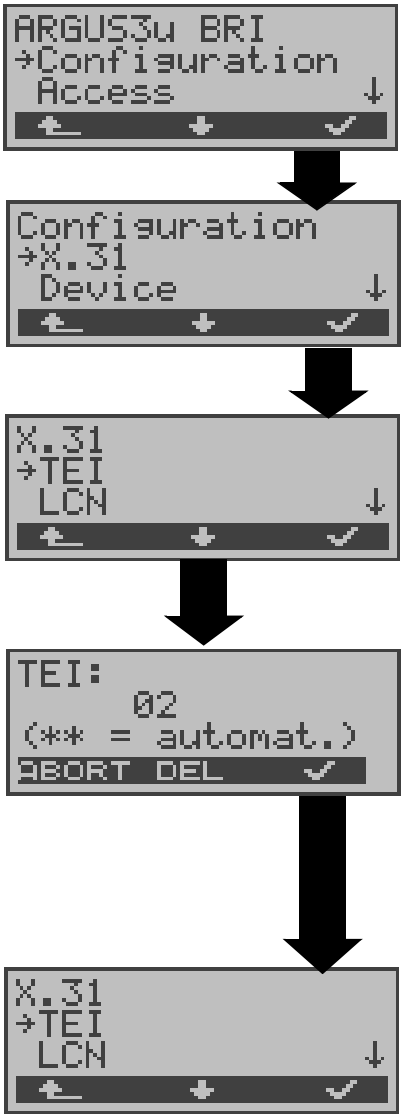
Display on ARGUS	**Comment**
Analog dial mode	Selection of the dialing mode: DTMF or pulse dialing

POTS CLIP	Select the transfer procedure used to pass the call number: **FSK:** CLIP via a procedure similar to a modem (for Germany and some other places in Europe) **DTMF**: 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).
DTMF parameter	Settings for the three parameters Level, Duration and Interval of the DTMF signals generated during POTS (analog) operation.
Level	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
Duration	Setting the DTMF time: The duration of the signal can take a value between 40ms and 1s (default: 80ms). The value can be raised or lowered using the ↑,↓-Keys: In the range 40 - 200ms in 10ms increments In the range 200 - 300ms in 20ms increments In the range 300 - 1000ms in 100ms increments When the upper limit is reached (1000ms), the softkey **<** ↑ **>** will automatically change to a **<** ↓ **>** and vice versa when the lower limit (40ms) is reached.

DTMF interval	Setting the interval between two DTMF characters: The duration of the signal can take a value between 40ms and 1s (default: 80ms). Raise or lower the value, using the ↑,↓-Keys: In the range 40 - 200ms: in 10ms increments In the range 200 - 300ms: in 20ms increments In the range 300 - 1000ms: in 100ms increments When the upper limit is reached (1000ms), the softkey **<** ↑ **>** will automatically change to a **<** ↓ **>** and vice versa when the lower limit (40ms) is reached.
Reset to	Restores the default settings: Level = 0 dB, Time = 80 ms Interval = 80 ms
FLASH time	Sets the length of a FLASH. This setting is needed in order to use special features of a PBX. The FLASH time can take a value between 40ms and 1s. The value can be raised or lowered using the ↑,↓-Keys: In the range 40 - 200ms: in 10ms increments In the range 200 - 300ms in 20ms increments In the range 300 - 1000ms: in 100ms increments When the upper limit is reached (1000ms), the softkey **<** ↑ **>** will automatically change to a **<** ↓ **>** and vice versa when the lower limit (40ms) is reached.

15.5 Configuration: X.31

The operation is the same for all configurations and will be illustrated with a single example:



In the Main menu, use the < ↓ > **Select** Configuration.

Use the < ↓ > to select **X.31**.

Use the < ↓ > to select e.g. TEI.

Enter the TEI on the keypad.

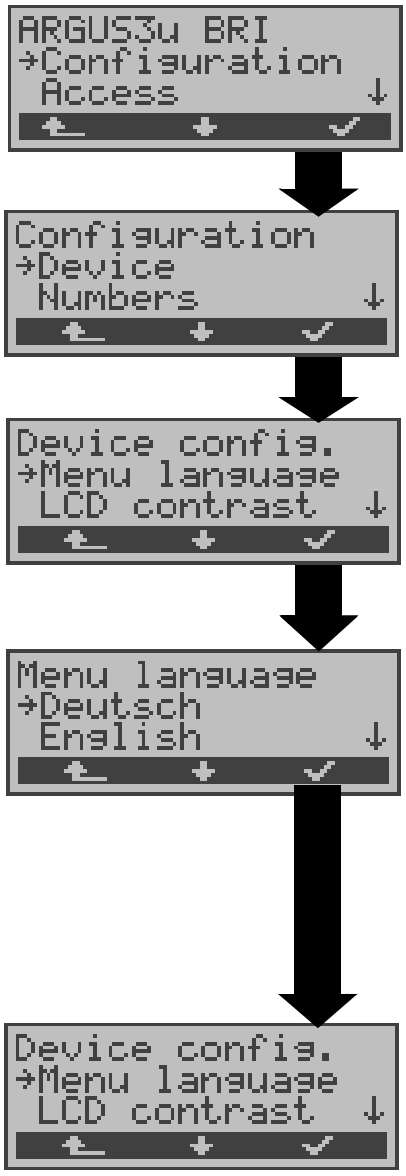
< ↵ **>**: The ARGUS will return to the X.31 menu without changing the TEI.

Change TEI

Display on ARGUS	**Comment**
TEI	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 in the X.31 test.
LCN	Entry (from the keypad) of the LCN to be used in the X.31 test.

15.6 Configuration: ARGUS

The operation is the same for all configurations and will be illustrated with a single example:



In the Main menu, use the < ↓ >
Select **Configuration**.

Use the < ↓ > to select **Device**
.

Using the < ↓ >, select a setting (e.g. Menu language).

Use the <↓> to select a language (e.g. Deutsch).

< ↰ **>**: The ARGUS will return to the Device config. menu without making any changes.

Confirm selection

Settings on the ARGUS:

Display on ARGUS	Comment
Menu language	Selection of the menu language
LCD contrast	Setting the display contrast (The contrast can be changed in 16 steps). 
	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.
Baud rate	Sets the maximum Baud rate to be used by the ARGUS to communicate with a PC.
Alarm bell	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.
Feed	In the "**only normal**" setting, the ARGUS will automatically draw its power from one of the following sources (in this order): 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: "**no line power**“)

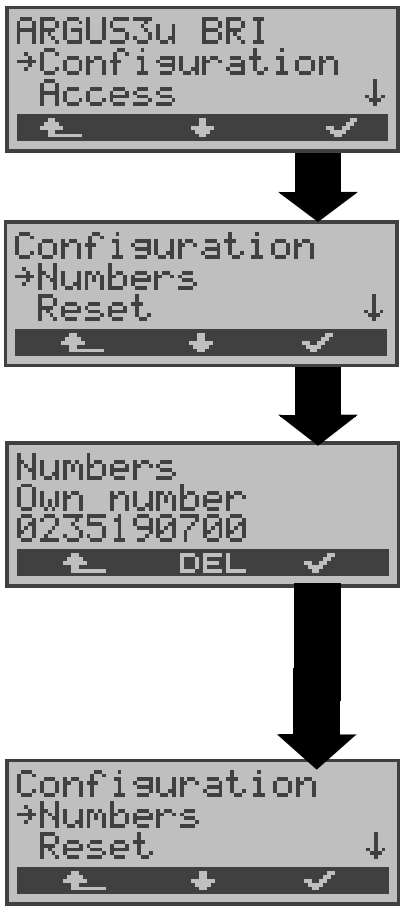
Battery type	Sets whether the ARGUS will be operated with batteries or accumulators (rechargeable batteries). If you select "Accu", the ARGUS will display the current level of charge of the accumulators (rechargeable batteries).
Software option	To enable a software option (e.g. additional functions), you must first enter a software key via the keypad.

15.7 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. 9.4 page 68).



In the Main menu, use the < ↓ > **Select** Configuration.

Use the <↓ > to select **Numbers**.

Enter the number of the access under test on the keypad.
Press < **DEL** > to delete the digit before the cursor.
Using the < ↓>-Key scroll through the speed-dialing memory.

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.

15.8 Reset

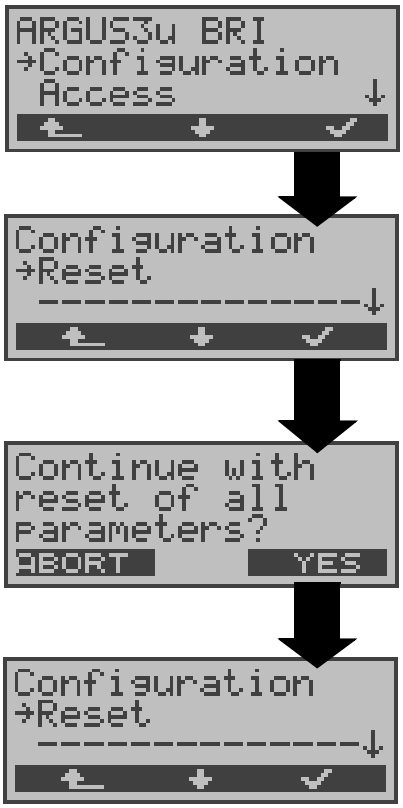
The ARGUS will reset all of the parameters to their default values.

The numbers in the speed-dialing memory and all of the test results stored in the ARGUS (e.g. BERT results or automatic test sequences) will be deleted.

The following settings are possible:

	Default
Trace/Remote	Off
BERT parameters	
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
ISDN parameters	
Protocol	Automatic
Alerting mode	Automatic
BRI termination	TE mode: on
Call acceptance	all MSN/DDI
Call parameter	depending on country version
Voice coding	A-Law
DTMF / Keypad	DTMF
Destination MSN	0043
CUG Index	148
POTS	
POTS dialing mode	DTMF
POTS CLIP	FSK
POTS FLASH time	80 ms
DTMF parameter	80ms/80ms/0dB
X.31	
TEI	** (automatically)
LCN	1
Device parameters	
Menu language	depending on country version

LCD contrast	Average value
Baud rate	57,600 Baud
Alarm bell	Off
Feed	only normal
Battery type	Power pack



In the Main menu, use the < ↓ >
Select Configuration.

Open the Configuration menu

Use the < ↓ > to select **Reset**.

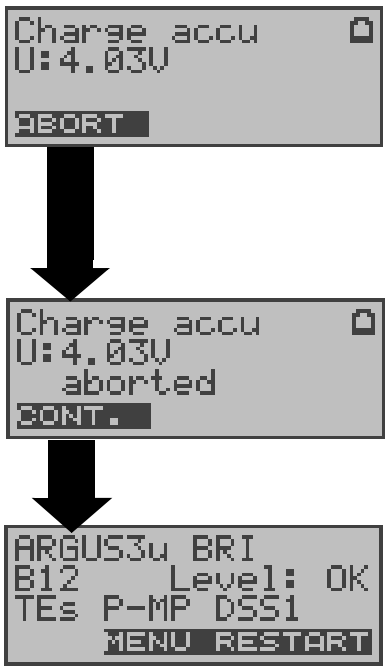
Security query

Reset to the default values

16 Accu servicing

16.1 Automatic recharging of the accumulators

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.

16.2 Manual accumulator servicing

(charging/discharging)

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 also recharged immediately - without being first discharged. 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 **Charging**.

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.

17 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	*free*	
Speed-dial number 8	*free*	
Speed-dial number 9	*free*	

18 Appendix

A) Acronyms

3PTY	Three party service / Three party conference
AI	Action Indicator
AOC	Advice of Charge
AOC-D	Advice of Charge Charging information during the call and at the end of the call
AOC-E	Advice of Charge Charging information at the end of the call
AWS	Call Forwarding (Anrufweiterschaltung)
BC	Bearer Capability
BER	Basic Encoding Rules / Bit Error Rate
BERT	Bit Error Rate Test
CALL PROC	CALL PROCeeding message
CCBS	Completion of Calls to Busy Subscriber
CCNR	Call Complete No Response Automatic Callback if the called party did not answer
CD	Call Deflection
CDPN	CalleD Party Number
CF	Call Forwarding
CFB	Call Forwarding Busy Forward calls when busy
CFNR	Call Forwarding No Reply Forward calls when no answer
CFU	Call Forwarding Unconditional Forward all calls
CGPN	CallinG Party Number
CLIP	Calling Line Identification Presentation Display caller's number
CLIR	Calling Line Identification Restriction Suppress display of the caller's number
COLP	Connected Line Identification Presentation Display the number of the party called
COLR	Connected Line Identification Restriction Suppress the display of the number of the party with whom one is connected
CONN	CONNect Message

CONN ACK	CONNect ACKnowledge Message
CR	Call Reference
CT	Call Transfer
CUG	Closed User Group
CW	Call Waiting Call waiting
DAD	Destination Address (1TR6)
DDI	Direct Dialling In Direct dialling in to an extension on a PBX
DISC	DISConnect Message
DM	Supplementary services (Dienstmerkmal)
DTMF	Dual Tone Multi Frequency
EAZ	Terminal Ident. No. (Endgeräteauswahlziffer - 1TR6)
ECT	Explicit Call Transfer Call transfer or directed call forwarding
E-DSS1	European Digital Subscriber Signalling System Number 1
GBG	Closed user group (CUG) (Geschlossene Benutzer Gruppe)
HLC	High Layer Compatibility
HOLD	Call Hold Hold
ISDN	Integrated Services Digital Network
INFO	INFOrmation Message
LAPD	Link Access Procedure for D-channels channels
LCN	Logical channel number Channel number in X.25
LLC	Low Layer Compatibility
MCID	Malicious Call Identification
MSN	Multiple Subscriber Number
NSF	Network Specific Facilities
NT	Network Termination
OAD	Origination Address (1TR6)
PD	Protocol Discriminator
REL	RELease Message
REL ACK	RELease ACKnowledge Message
REL COMPL	RELease COMPLete Message
SCI	Sending Complete Indication
SIN	Service Indicator (1TR6)
SUB	Sub-addressing / Sub-addressing is possible

SUSP	SUSPend Message
TE	TErminal, Terminal Equipment
TEI	Terminal Endpoint Identifier
TP	Terminal Portability Moving the terminal on the bus
UUS	User-to-User Signalling Transfer of user data

B) CAUSE-Messages – DSS1 Protocol

Dec.	Cause	Description
01	Unallocated (unassigned) number	No access under this call number
02	No route to specified transit network	Transit network not reachable
03	No route to destination	Wrong route or routing error
06	Channel unacceptable	B-channel for the sending system not acceptable
07	Call awarded and being delivered in an established channel	Call awarded and connected in an already existing channel (e.g., X.25 SVC)
16	Normal call clearing	Normal disconnect
17	User busy	The number called is busy
18	No user responding	No terminal equipment answered (Timer NT303 / NT310 time-out)
19	No answer from user (user alerted)	Call time too long
21	Call rejected	Call rejected (active)
22	Number changed	Call number has been changed
26	Non-selected user clearing	Incoming call not awarded to this terminal
27	Destination out of order	Destination / access out of order
28	Invalid number format (address incomplete)	Wrong call number format or call number incomplete
29	Facility rejected	The facility is not offered
30	Response to STATUS ENQUIRY	Response to status enquiry
31	Normal, unspecified	Unspecified for “normal class” (Dummy)
34	No circuit / channel available	No circuit / B-channel available
38	Network out of order	Network not operational
41	Temporary failure	Network is temporarily not operational
42	Switching equipment congestion	Switching equipment is overloaded
43	Access information discarded	Access information could not be transferred
44	Requested circuit / channel not available	Requested circuit / B-channel is not available
47	Resources unavailable, unspecified	Unspecified for “resource unavailable class” (Dummy)
49	Quality of service unavailable	The requested quality of service is not available
50	Requested facility not subscribed	Requested service attribute is not subscribed
57	Bearer capability not authorized	The requested bearer capability is not enabled
58	Bearer capability not presently available	The requested bearer capability is not currently available

63	Service or option not available	“Service unspecified or option not available class” (Dummy)
65	Bearer capability not implemented	Bearer capability is not supported
66	Channel type not implemented	Channel type is not supported
69	Requested facility not implemented	Requested facility is not supported
70	Only restricted digital information bearer capability is available	Only limited bearer capability is available
79	Service or option not implemented, service unspecified or option not implemented class” (Dummy)	Unspecified
81	Invalid call reference value	Invalid call reference value
82	Identified Channel does not exist	Requested channel is invalid
83	A suspended call exists, but this call identity does not	The call identity entered is the wrong one for the parked call
84	Call identity in use	The call identity is already in use
85	No call suspended	No call has been parked
86	Call having the requested call identity has been cleared	The parked call has been cleared
88	Incompatible destination	Incompatible destination
91	Invalid transit network selection	Invalid format for the transit network identifier
95	Invalid message, unspecified	Unspecified for “Invalid message class” (Dummy)
96	Mandatory information element is missing	Mandatory information element is missing
97	Message type non-existent or not implemented	This type of message is in this phase not permitted, not defined or not supported
98	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
99	Information element non-existent or not implemented	The content of the information element is in this phase not permitted, not defined or not supported
100	Invalid information element contents	Invalid content in information element
101	Message not compatible with call state	Message not valid in this phase
102	Recovery on timer expired	Error handling routine started due to time-out
111	Protocol error, unspecified	Unspecified for “protocol error class” (Dummy)
127	Interworking, unspecified	Unspecified for “interworking class” (Dummy)

C) CAUSE-Messages – 1TR6 Protocol

Dec.	Cause	Description
01	Invalid call reference value	Invalid call reference value
03	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.
07	Call identity does not exist	Unknown call identity
08	Call identity in use	Call identity is already assigned to a “suspended” connection.
10	No channel available	No further B-channel is free on the subscriber's access. (only significant locally)
16	Requested facility not implemented	The entered FAC-Code is unknown in this network.
17	Requested facility not subscribed	The requested facility is not available, because the initiating or the remote subscriber is not authorized.
32	Outgoing calls barred	Outgoing calls are not possible due to the barring
33	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.
34	Negative CUG comparison	Connection not possible due to negative CUG comparison
35	Non-existent CUG	This CUG (GBG) does not exist
37	Communication link as SPV not permitted	A connection is not possible, since for example, the RFNR-test was negative
53	Destination not obtainable	A connection cannot be made due to a wrong destination, service or supplementary services.
56	Number changed	Subscriber-B’s call number has changed.
57	Out of order	The remote terminal is not ready.
58	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).
59	User busy	Subscriber-B is busy
61	Incoming calls barred	Subscriber-B has blocked incoming calls or the requested service is not supported by Subscriber-B.

62	Call rejected	**To Subscriber-A:** 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.
89	Network congestion	Network congested, e.g., switching equipment congestion, no conference set free, ...
90	Remote user initiated	Rejected or disconnected by remote end (subscriber or exchange).
112	Local procedure error	**Sent in a REL** Disconnect due to local errors (e.g., not valid messages or parameters, time-out, ...). **Sent in a SUSP REJ** Due to another already active supplementary service, the connection may not be “suspended”. **Sent in a RES REJ** There is no “suspended” connection. **Sent in a FAC REJ** 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.
113	Remote procedure error	Caused by error at remote end.
114	Remote user suspended	Connection at the remote end is in the “hold” or “suspend” state.
115	Remote user resumed	Connection at the remote end is no longer in the “hold” or “suspend” or “conference” state.
127	User Info discarded locally	The message USER INFO is rejected locally. The cause is given in the message CON CON. Length entry (=0) 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.

D) ARGUS Error Messages

Fault Number	Fault Class	Cause.	Description
0	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.
1 to 127	B,C,D,E	Network	DSS1 or 1TR6 causes
150	E	ARGUS	An error occurred during the supplementary service test. Frequent cause: no response from network
152	B	ARGUS	The CF-Test was started with the wrong own number. .
153	E	ARGUS	no HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty)
154	E	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
161	B	ARGUS	The party called did not answer within the prescribed time (approx.10 sec)
162	B	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
163	E	ARGUS	The Auto-Test could not setup a connection and therefore the AOC/D supplementary service could not be tested.
170		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.
199	B	ARGUS	A call number was entered.
200		ARGUS	Internal error
201	A	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)

204	A	ARGUS	- Layer 2 connection was cleared-down - No response to SETUP (call setup) - Layer 2 connection could not be setup
205	A	ARGUS	Reestablish the Layer 2 Connection
206		ARGUS	The selected B-channel is already busy.
210	A	ARGUS	No response to the clear-down (REL sent, no REL_CMP/REL_ACK received from network)
220	A	ARGUS	Remote end signaled that it is in State 0.
245	E	ARGUS	Keypad sent via ESC, but no response was received from network
250	E	ARGUS	FACility was sent, but no response was received from network

X.31 Test – Error messages

X.31 Causes

0 to 255	Network	See ISO 8208: 1987(E) Table 5- Coding of the clearing cause field in clear indication packets, page 35
257	ARGUS	no response from network (for a CALL-REQUEST or CLEAR-REQUEST)
258	ARGUS	Unexpected or wrong answer from network (no CALL-CONNECTED or CLEAR-INDICATION as response to a CALL-REQUEST)
259	ARGUS	The network has indicated in a DIAGNOSTIC message that the logical channel is invalid. Origin: No (=1) or a wrong LCN was set.
512	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
65535	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