ARGUS 42
Manual

Version: 2.04 / **EN**

Important Notice:
Support for the ADSL interface - with various functions and tests - is always part of the basic package. Support for other interfaces and functions is optional (see the Options in the data sheet). Consequently, depending on the scope of the functions delivered, certain menu items may be hidden. As an example, the ISDN and POTS functions described in this manual require the optional **"ISDN and POTS interface"**.

1 Introduction

The ARGUS 42 provides support for setting up ADSL accesses. It supports measurement of the up and downstream line parameters and can, depending on the version, be used for both ADSL-over-POTS (analog) and ADSL-over-ISDN. In addition, it can be used as a POTs and ISDN tester. Thanks to its range of features, this single tester can handle all of the important customer interfaces. Besides the automatic test routines for the various types of access and protocols, the ARGUS 42 also measures the quality of the line as well as the maximum possible transmission speed and thus simplifies the job of correctly setting up an access.

Access tests can be saved in the ARGUS 42 and later transferred to a PC. The line parameters are presented on the display. Furthermore, the ARGUS 42 can be expanded with optional IP ping functions, a bridge mode and router mode to add support for testing Internet connections. With these options, network operators can use it to exchange data packets with the Internet provider to determine the transmission quality. In such a case, a download test is also available. Furthermore, the tester can also be used to run tests on Ethernet interfaces or to measure the resistance and capacitance on a subscriber's line as well as to detect certain frequencies on the line.

The ARGUS 42 can also be upgraded to a complete voice tester if desired. Using its handset, it is possible to set up voice calls to test and evaluate connections on not only POTS and ISDN, but now also for calls placed via VoIP. The test results will be shown in the display. In such cases, the ARGUS 42 determines the MOS value for the connection and evaluates it, as well as delivering other detailed measurements.
It is also possible to determine the Media Delivery Index (MDI) in accordance with RFC 4445.

Thanks to the intuitive, easily understood menu system, which permits among other things easy configuration and the storage of various profiles, it is simple to operate. It is also easy to connect a headset,

Furthermore, if you want to extend the ARGUS 42's operating time, you can use an additional battery pack. With the standard battery pack, the tester weighs 425 g.

Software updates can be downloaded to a PC free of charge and then loaded into the ARGUS at any time. They are available at http://www.argus.info/en/service.

An overview of some important ARGUS functions:

ADSL functions (ADSL, ADSL2 and ADSL2+: Annex A, B and M)

- **Synchronization with determination of the connection parameters and error counters**
- **PPP login plus ADSL bridge, ADSL router and PC replacement modes**

ADSL and Ethernet tests

- **ATM tests (for ADSL only)**
  - VPI/VCI scan
  - ATM OAM ping
  - ATM statistics
- **IP tests**
  - IP ping
  - Download tests HTTP
- **VoIP test**
  - Telephony function
  - Quality assessment (including MOS)
- **IPTV tests**
  - MDI analysis

ISDN functions

- Protocol recognition plus B-channel, service and bit error rate tests (BERT)
- Telephony function and an automatic supplementary services test
- CF and MSN queries
- Layer 1 tests and bus feed
- Testing features via the keypad

POTS functions

- Telephony function
- POTS (analog) functionality

  Tests CLIP and other Caller-ID services in accordance with ETSI 300 659/778.
- Monitoring a POTS line (high-impedance listening-in)
- POTS - voltage and polarity measurement

RC measurement with calculation of the line length and three wire test (TRG)

Measurement of the loop resistance and the capacitance of the open (voltage-free) line.

Access acceptance report

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

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.

- Before connecting the ARGUS to an access make certain that the voltages on the access are not high enough to be dangerous or outside the specified range of the ARGUS or its accessories. You must also taken into account the fact that the voltage may vary while the ARGUS is connected to the access.
- Regardless of the interface or access, use the ARGUS only for its intended purpose.
- Voltages in excess of 50 V AC or 120 V DC can cause mortal injury.
- Never attempt a measurement if the battery pack is not inserted or the accumulators are not in place!
- The ARGUS is not watertight. Protect the ARGUS from exposure to water!
- Before replacing the accumulators or the battery pack, disconnect all the test leads and switch the ARGUS off.
  CAUTION: Never remove the accumulators or the battery pack during operation.
- Unplug the power supply from the mains, once the ARGUS is switched off and will no longer be used (for example after recharging the accumulators)!
- The ARGUS may only be used by trained personnel.
- Do not operate the ARGUS on a power supply that has other specifications. The specifications are:
  (Input: 100 V to 240 V AC; 50/60 Hz; 0.18 A)
  (Output: 9 V DC; 0.56 A)
- Do not plug anything into the headset jack other than headsets approved by the manufacturer; the use of this jack for any other application (e.g. connection of a stereo system) is expressly prohibited.
- The electromagnetic compatibility of the ARGUS was checked in accordance with the regulations stated in our Declaration of Conformity.
  CAUTION: This tester is a Class A. product which may cause interference when operated in a residential area. In such case, the user must take appropriate measures.
- Do not plug anything into the serial jack (Ser.) except a USB serial adapter approved by the manufacturer; the use of this jack for any other application is expressly prohibited.

- The ARGUS battery pack may only be actively charged (Charge accus) or trickle charged (default setting: off) when the ambient temperature is between 0 °C (32 °F) and +40 °C (104 °F).
- If the ARGUS is operated under extreme conditions, it may have to automatically shutdown, terminate the current test and drop the connection in order to protect itself and the user. To ensure reliable long-term operation of the ARGUS, make certain that it is protected from excessive temperatures.
- Do not open the tester.
- In connection with the additional NiMH battery pack, please observe the following notes regarding safety and transport.

Return and environmentally acceptable disposal

The RoHS (EU Directive on the “Restriction of Hazardous Substances”) guidelines, which restrict the use of certain hazardous substances in electrical and electronic equipment, apply in eight of the ten categories of the WEEE (EU Directive on “Waste Electrical and Electronic Equipment”) guidelines. Devices which are in Category 9 “Monitoring and Control Instruments” are currently excluded from the scope of the Directive. The ARGUS products fall into Category 9 and are thus not subject to the RoHS guidelines. Nonetheless, we have voluntarily complied with all of the RoHS guidelines since 1 January 2007.

In compliance with WEEE (EU Directive on Waste of Electrical and Electronic Equipment) 2002/96/EU and the German Electrical and Electronic Equipment Act (ElektroG - Elektro- und Elektronikgerätegesetz), we began marking our testers in October 2005 with the following symbol:

() (DIN EN 50419).

In other words, the ARGUS and its accessories may not be disposed of in the household waste.
Regarding the return of old equipment, please contact our Service department.

2.1 Safety instructions regarding the add. NiMH battery pack

Protective features have been implemented to prevent harm if it is exposed to excessive pressure, short-circuits, dangerous reverse currents or other destructive influences.

The protective features of the battery pack may be harmed if the following instructions are not observed. In this case extremely high currents and voltages may result, which could lead to abnormal reactions, such as overheating and/or smoke. Furthermore, if the user does not observe and comply with these instructions both the performance and service life may suffer.

Safety Instructions and Warnings

1. Do not disassemble or short-circuit the battery pack.
2. The temperature of the battery pack may not exceed (> 55 °C (131 °F)).
3. Keep the battery pack dry - do not let it get wet or damp.
4. Do not charge the battery pack at temperatures below 0 °C (32 °F) or above +40 °C (104 °F).
5. The battery pack may only be charged using the associated ARGUS or a charger approved by intec.
6. Do not damage the battery pack with a sharp object.
7. Do not throw the battery pack or expose it to shocks or impacts.
8. If a battery pack is damaged or deformed, do not use it.
9. The contacts of battery pack are polarized (plus and minus). Make certain that the polarity of the battery pack is not reversed when it is inserted in the ARGUS or when the battery pack is connected to the charger.
10. The battery pack may only be connected to the associated ARGUS or charger in the intended manner.
11. The battery pack may not be directly connected to the output of a plug-in power supply, an automobile cigarette lighter or similar power source.
12. The battery pack may only be used together with an ARGUS.
13. The battery pack may not be connected to, or stored or transported with metallic objects.
14. Do not expose the battery pack to high electrostatic forces.
15. The battery pack may not be used in combination with primary (non-rechargeable) batteries, nor may it be charged or discharged together with other rechargeable batteries.
16. If the battery pack is still not properly charged when the charging time has elapsed, do not charge it again.
17. Do not expose the battery pack to excessive pressure.

18. If the battery pack emits an odor or heats up, becomes discolored or misshapen, or if there are any other indications of that it has malfunctioned while it is in use or being charged or while it stored, remove the battery pack from the ARGUS or charger immediately and do not use it again.
19. If the battery pack leaks acid, make certain that you do not get this acid in your eyes or on your skin. In event that you get this acid in your eyes or on your skin, rinse the affected area immediately with clean water. Do not rub the affected area. In either case, seek medical care immediately. Otherwise, permanent injury may result.
20. The battery pack must be kept out of reach of children.
21. Please read the manual and associated safety instructions before using the battery pack.
22. If you find that the battery pack emits an odor, or is rusty or appears to be in anything other perfect condition before you first use it, please contact intec to determine how to proceed.

3 General Technical Data

Tester specifications:

Dimensions / Weight	**Inputs / Outputs**
Height: 229 mm (9.016 in), Width: 72 mm (2.835 in), Depth: 35 mm (1.378 in), Weight: 425 g (0.937 lb) (with accumulators, without the protective cover)	- RJ-45 (Line) for ADSL, U-interface, BRI S/T and POTS - Connector (PWR) for external Power supply - RJ-11 (Ser.) PC interface - RJ-45 10/100 Base-T (LAN) for bridge and router mode and Ethernet - Jack to connect a headset
Keypad 21 Keys	
LCD display	**Temperature ranges**
LCDdisplay with switchable Background lighting 4 lines with 16 characters	Temperature range - charging: 0 °C (32 °F) to +40 °C (104 °F) Operating Temperature: 0 °C (32 °F) to +50 °C (122 °F) Storage temperature: -20 °C (-4 °F) to +60 °C (140 °F) Humidity: up to 95 % relative humidity, non-condensing
	Power supply included NiMH standard accumulators or optional NiMH battery pack or 9 V/0.56 A ARGUS electronic plug-in power supply
	Other information ARGUS user safety tested in accordance with EN60950-1 RoHS conformity pursuant to the WEEE guidelines Quality management in accordance with DIN EN ISO 9001 The electromagnetic compatibility of the ARGUS was checked in accordance with the regulations stated in our Declaration of Conformity.

Supported Standards:

ADSL (Line):
ITU-T G.992.1, Annex A (ADSL)
ITU-T G.992.2, Annex A (G.lite)
ITU-T G.992.3, Annex A (ADSL2)
ITU-T G.992.5, Annex A (ADSL2+)
ITU-T G.992.1, Annex B (ADSL)
ITU-T G.992.3, Annex B (ADSL2)
ITU-T G.992.5, Annex B (ADSL2+)
ITU-T G.992.3, Annex M (ADSL2)
ITU-T G.992.5, Annex M (ADSL2+)
ANSI T1.413
ETSI TS 101 388 Annex C

RC test (Line):
Voltage measurement:
- DC voltage: up to +200 V max., precision ±2 %
- AC voltage: up to 120 V max., precision ±2 %
Resistance measurement: Precision for 100 Ω - 100 kΩ: ±4 %
Capacitance measurement: Precision for the range from 1 nF to 1 µF: ±5 %

ISDN BRI S/T (Line):
ITU-T I.430
ITU-T G.821
ITU-T X.31
ISDN U-interface (Line):
ANSI T1.601

Ethernet (LAN):
IEEE 802.3
- 10 Base-T
- 100 Base-T
Autonegotiation
Auto MDIX

Line:
DC voltage: +200 VDC maximum
AC voltage: 120 VAC maximum
at 50 or 60 Hz

4 Operating Instructions

Power Key:

- Switch the ARGUS ON
- To start up again after a power down
- To switch on the display backlighting
  In battery mode, to save power, the backlighting will switch off automatically after 5 seconds.
- To switch off the ARGUS - must be pressed somewhat longer
  If the ARGUS is connected to its power supply, the accumulators or battery pack will be automatically charged when the ARGUS is switched off (see page 187).

Confirmation key:

- Open menu
- Open the next display
- Start test
- Confirm the entry

Menu control:

- Scroll through displayed lines
- Select a menu
- Select a function or a test

Telephony:

ISDN or POTS

- Pickup or hang up
- Simplified overlap signaling, press the telephone key twice (ISDN only)

ADSL/Ethernet:

- The ARGUS opens the VoIP profiles see page 96.

Layer 1 Measurement:

- BRI S/T, U-interface access: Start the Layer 1 measurement (level/ voltage)
- ADSL access: Display the line parameters

Number pad:

- Entry of the digits 0....9, letters and special characters
- Direct function call

Softkeys:

- The function of the 3 softkeys varies with the situation. The current function of each softkey is shown in the bottom, highlighted line of the display.
  Common softkeys and their meaning:
  <MENU>: The main menu will open.
  <PROFILE>: Display the profile
  <PARAM.>: Access the parameter lists
  <START>: Setup a connection or start a test
  <STOP>: Clear down a connection or stop a test
  <RESET>: Reset a setting or a counter
  <DEL.>: Delete the character before the cursor
  <CONT.>: The ARGUS will open the next display.
  <INFOS>: Open additional connection information
  <12>ab>: Entry of the digits 0 to 9 plus * and #
  <ab>AB>: Entry of the lowercase characters and @, /,- and .
  <AB>12>: Entry of the uppercase characters and @, /,- and .
- You will find the other softkeys described at the relevant points in the manual.

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 angle brackets **< >**, e.g. **<ADSL>**.

The softkeys **<✓>**, **<↓>** and **<↑>** perform the same functions as the confirmation key and the arrow keys and on the ARGUS keypad.

Connections at bottom:

PWR

Connection for the external plug-in power supply.
If the plug-in power supply is connected, the ARGUS will disconnect the accumulators and, when it is switched off, the ARGUS will automatically recharge the accumulators (see page 187).

Line

ADSL connection	Pin assignment 7/8 (plus 4/5)
U-interface connection	Pin assignment 7/8 (plus 4/5)
BRI S/T connection	Pin assignment 4/5 and 3/6
POTS connection	Pin assignment 7/8 (plus 4/5)

Ser.

Serial interface to connect a PC

LAN

Connection to the PC's network card via patch cable (Access mode: ATU-R Bridge or ATU-R router). Connection to the Ethernet interface of the ADSL modem via a patch cable. (Ethernet connection)

Connectors at top:

Jack:

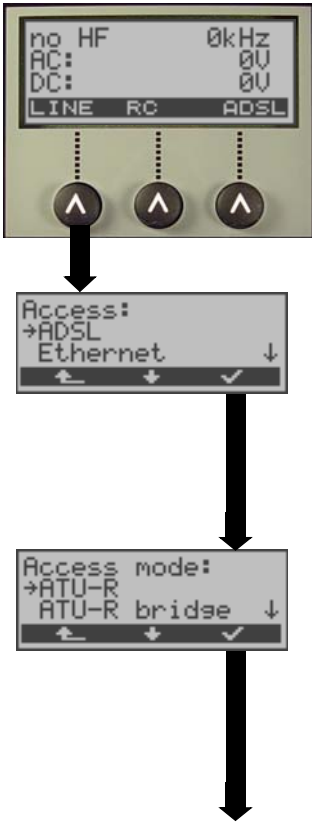
Connector for a headset
When an external headset is plugged into the ARGUS, it will automatically switch to headset operation and will return to the internal receiver when the external headset is unplugged.

Start-Up

Using the included cable, connect the ARGUS to the access to be tested. Press the -key to switch the ARGUS on. The ARGUS will first display the DC voltage (VDC) and AC voltage (VAC) on the 2-wire line (Line). As an option, the ARGUS will automatically check for a high-frequency signal (frequency displayed in kHz). The ARGUS will display different softkeys depending on the DC voltage found on the 2-wire line.

1. case:
no DC voltage on the line

Start-Up Display



<ADSL> press — The ARGUS will setup an ADSL connection, see page 48.

<LINE> press — The ARGUS opens the Access menu.

<RC> press — Start the Copper Test.

⚠ **To run the Copper Test, the line must be voltage-free (out of service)!**

The Access Menu:

<↓> or — to select the access.
The selected access will be marked in the display with an → (in the example, ADSL).

<✓> or ✓ — The ARGUS will use the marked type of access.

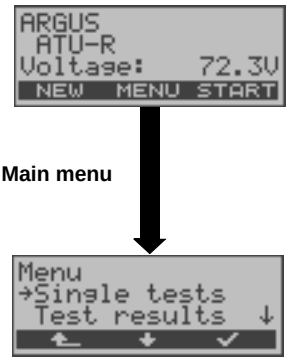
Access Mode Menu: .

<↓> or — Select the Access mode
The selected access mode will be marked in the display with an → (in the example, ATU-R).

<✓> or ✓ — The ARGUS will use the marked access mode.

<↑_> — To have the ARGUS return to the previous display.

ARGUS – State display



On an ADSL access, the ARGUS will display the DC voltage on the line and the active ADSL profile.

<MENU>	Open the Main menu
<START>	Setting up an ADSL connection, see page 48.
<NEW>	The ARGUS will open the Start-Up display. Hold the softkey depressed for 2 seconds.

All of the menus, which are available for the type of access under test, are listed in the Main menu.

<↓ > or 	to select a menu. The selected menu will be marked in the display with an → (in the example, Single tests)
< ✓ > or 	to have the ARGUS open the menu marked with the → (in the example, Test results).
< ↑ >	to return to the previous display (in this example, ARGUS State)

Menus available in the Main menu:

ADSL access	**BRI S/T or U-interface access**	**POTS access**	**Ethernet**
Single Tests	Single Tests	Connection	Single Tests
_____	Test Manager	Start Monitor	_____
Test results	Test results	Test results	Test results
Line status	Level measuring	Level measuring	_____
Level measuring	The L1 state (BRI only)	_____	_____
Configuration	Configuration	Configuration	Configuration
Access	Access	Access	Access
Accu Servicing	Accu Servicing	Accu Servicing	Accu Servicing
Help	Help	Help	Help

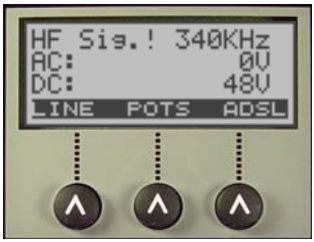
2. case:
DC voltage on the line equal to or greater than 60VDC

<LINE> The ARGUS opens the Access menu.

<ISDN> Set up Layers 1 to 3 for U-interface. Afterwards, the ARGUS will show the status display for the U-interface, see page 115.
In setting up the U-interface connection, the ARGUS will use the access and mode parameters last used.

<ADSL> Setting up an ADSL connection, see page 48.

3. case:
DC voltage on the line less than 60 VDC

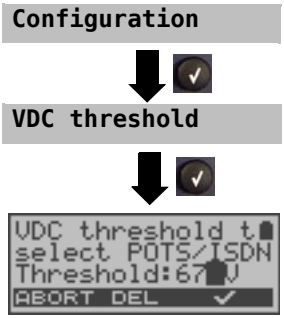


<LINE> The ARGUS opens the Access menu.

<POTS> The ARGUS will open the Status display. POTS accesses, see page 165.

<ADSL> Setting up an ADSL connection, see page 48.

Setting the VDC threshold



The user-definable DC threshold value (shown at the side) is used to determine which type of access is displayed on the softkey in the middle. If the voltage is less than this threshold, the ARGUS will show that the access is a POTS access.
Using the keypad, you can enter a value ranging from 0 V to 199 V. The default threshold voltage is 67 V.

Starting functions with the numeric keys/key combinations

Using the numeric keys, you can start important ARGUS functions/tests directly, regardless of the menu that the ARGUS is currently showing. 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.

The ARGUS will display the "assignment" of the numeric keys.

The assignment of functions to the numeric keys can also viewed on the ARGUS display. Open the Main menu and select "Help".

Operation on an ADSL or Ethernet access (Access mode: ATU-R)

Numeric key 2	Start a VPI/VCI scan
Numeric key 3	Start a Ping test
Numeric key 5	Start HTTP download
Numeric key 8	The ARGUS will open the Trace/remote menu
Numeric key 9	Start the MDI Analysis
	Display the Line status
	Start VoIP telephony

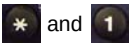
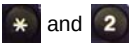
Operation on an ISDN Access

Numeric key 2	Start the service check
Numeric key 3	Start Supplementary Service test
Numeric key 4	Start Auto-Test
Numeric key 5	Send test results to a PC
Numeric key 6	Start the Test Manager
Numeric key 7	Open the Speed-Dialling Memory
Numeric key 8	The ARGUS will open the Trace/remote menu
Numeric key 9	BERT start
	Level measuring
	Call setup

Operation on a POTS Access

Numeric key 5	Send test results to a PC
Numeric key 7	Open the Speed-Dialling Memory
Numeric key 8	The ARGUS will open the Trace/remote settings menu
	Level measuring
	Call setup

In general the following assignments apply to all operating modes and access modes:

Numeric key 0	Display ARGUS Status
Numeric key 1	Show the “Function assignment” on the ARGUS display
One after the other	Display the available SW options
	
One after the other	Reset all the parameters to their default values.
	

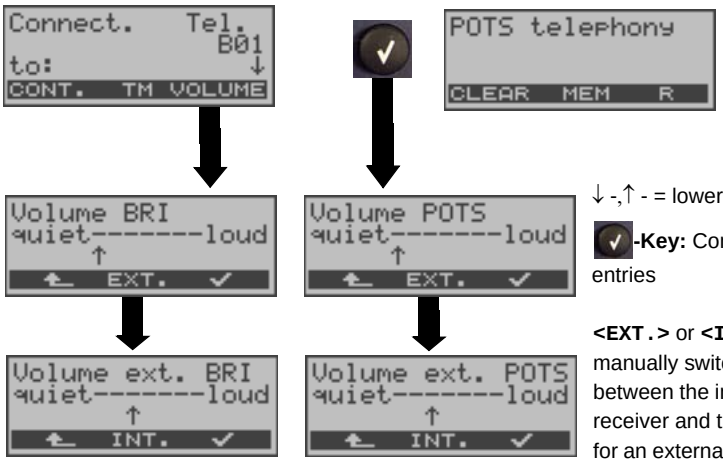
The speed-dialing memory with the call numbers, PPP user name, PPP password, IP addresses, Profile names, User-specific services, Keypad Infos and all of the test results stored in the ARGUS (e.g. Automatic test sequence on an ISDN access, ADSL test results etc.) will be deleted.

Set the volume of the (receiver/headset).

The volume of the receiver or headset can be set for **each type of access separately** during a connection by using the ✓-key. In the case of an ISDN connection, **<VOLUME>** softkey will also be shown.

ISDN connection (BRI S/T or U-interface)

POTS connection



↓ -,↑ - = lower, louder

✓**-Key:** Confirm entries

<EXT.> or **<INT.>** to manually switch between the integrated receiver and the jack for an external headset.

Manually switching between the internal receiver and the headset jack.

If the jack for an external **<EXT.>** headset is selected manually, the internal receiver **<INT.>** will be muted. This setting will be saved, until it is manually switched back to the internal receiver **<INT.>** or a headset is plugged in and then unplugged again.

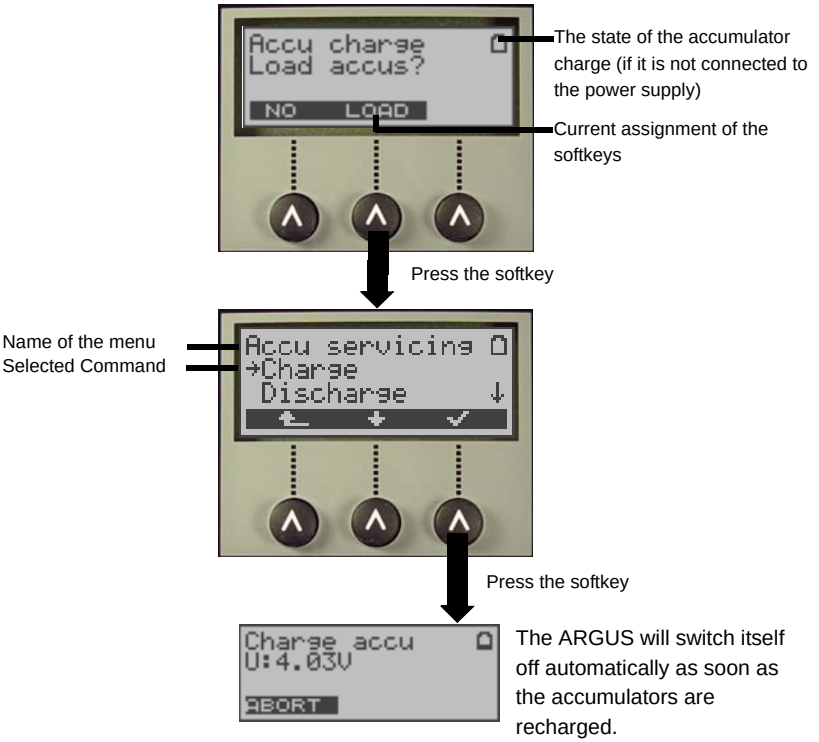
Automatic headset detection

When an external headset is plugged into the ARGUS, it will automatically switch to headset operation **<EXT.>** and will return to the internal receiver when the external headset is unplugged. In the meantime, you can switch between **<INT.>** and **<EXT.>** manually.

Charging the accumulators for the first time

The battery compartment for the three accumulators (rechargeable batteries) and the connector for the optional battery pack are 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 the accumulators included in the package. The battery pack is plugged into connector on the back of the case and fastened to it with a screw. With the ARGUS switched off, connect it to the supplied plug-in power supply.

Press the  -key to switch the ARGUS on. The following will be shown on the display:



The accumulators supplied must be fully charged and discharged three times (see page 187 Charge accus) before they will achieve their maximum capacity.

Power Management

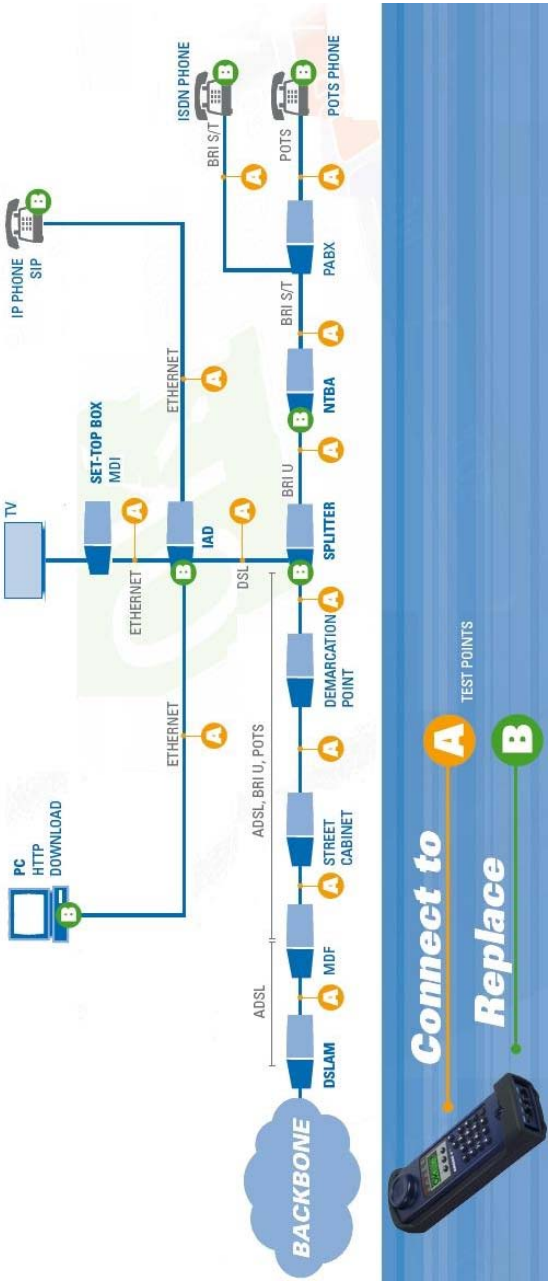
In accu/battery operation, if the ARGUS is idle for 5 minutes (default), it will automatically switch to the power-down mode (power-down). The ARGUS will remain in power-down mode until the Power-Key is pressed again. Reasonably enough, the ARGUS will not enter power-down mode during a test (e.g. Loopbox) or when it is in Trace mode.

As an alternative, it is possible to operate the ARGUS using the included power supply. If the ARGUS is connected to the plug-in power supply, it will automatically disconnect the accumulators and will not enter power-down mode. You should only operate the ARGUS with the accumulators installed. This will ensure among other things the uninterrupted operation of the real-time clock.

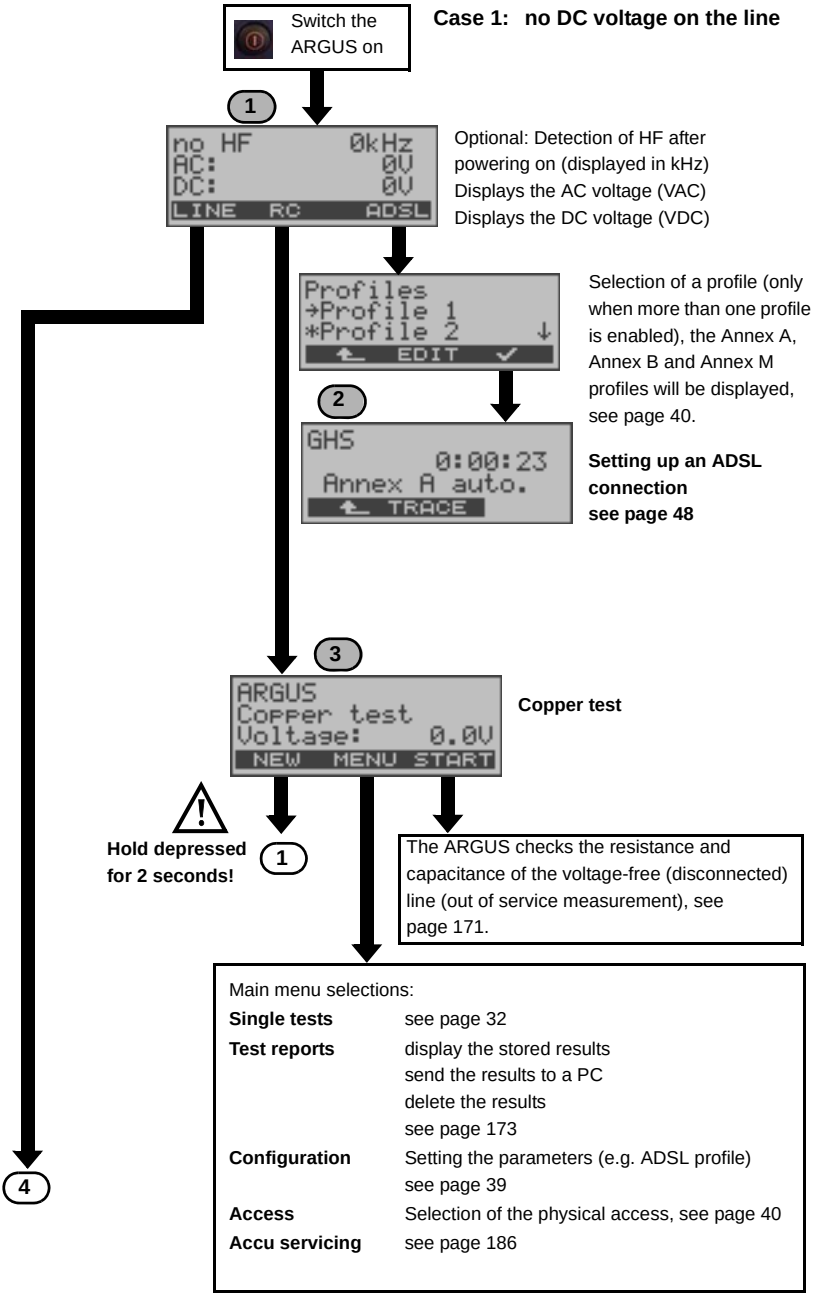
Power Management settings:
If desired, the settings recommended for the times may be changed. In this case, the settings for the automatic power-down and for the display lighting may be set separately. Settings under: "Menu\Configuration\Device\Power management"

Caution! If you change the recommended (default) settings, this may lead to shorter battery operation!

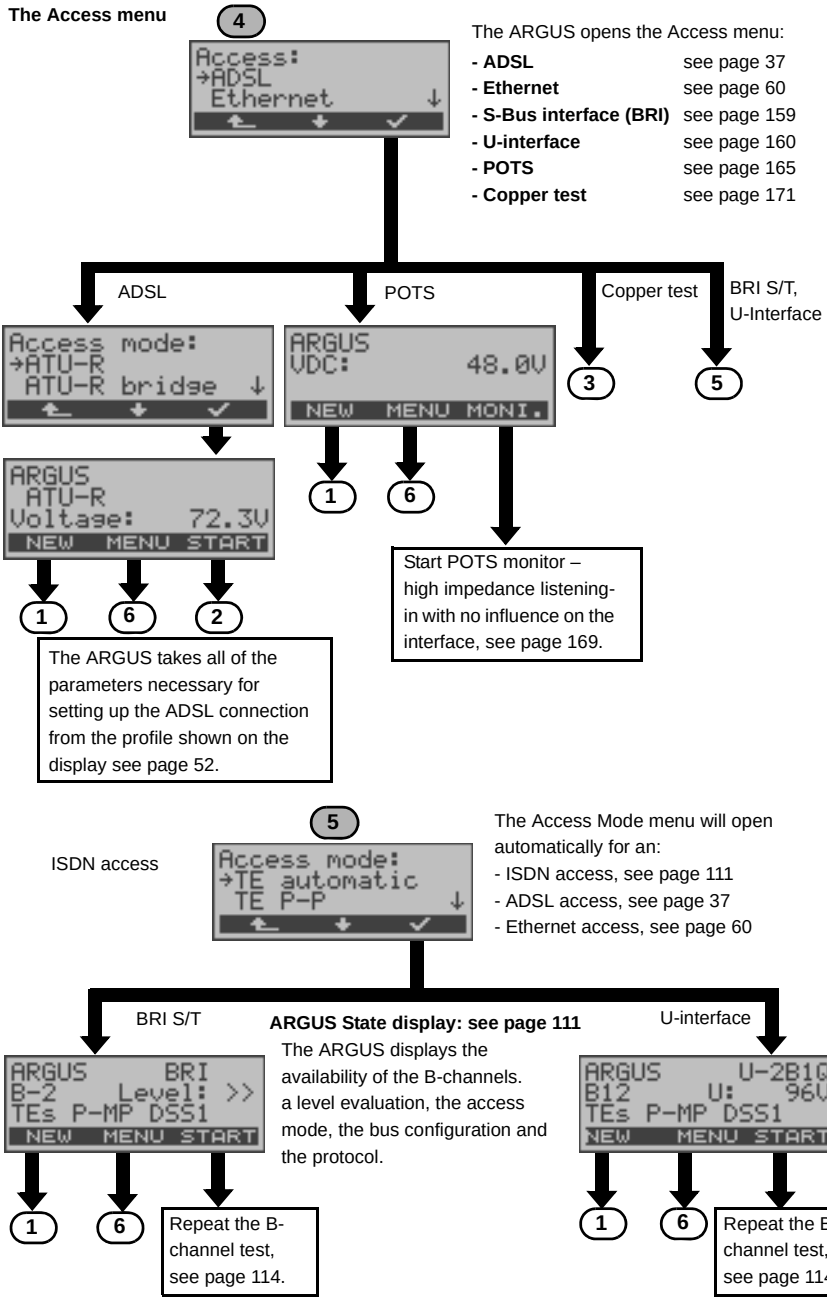
An Overview of the ARGUS Connections



5 Menu Hierarchy

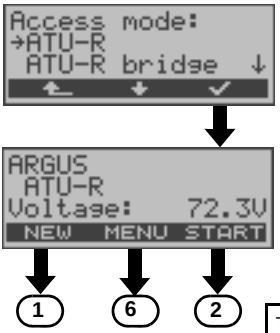


The Access menu



Access Mode Menu 5

ADSL access

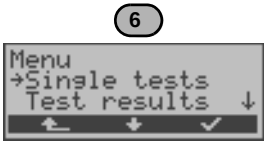


The Access mode menu will open automatically if an ADSL access is selected:

- ADSL see page 38

The ARGUS takes all of the parameters necessary for setting up the ADSL connection from the profile shown on the display (see page 52).

For more information regarding the Menu Hierarchy please see the included detailed menu diagram. The current menu diagrams can also be found under www.argus.info/en/service

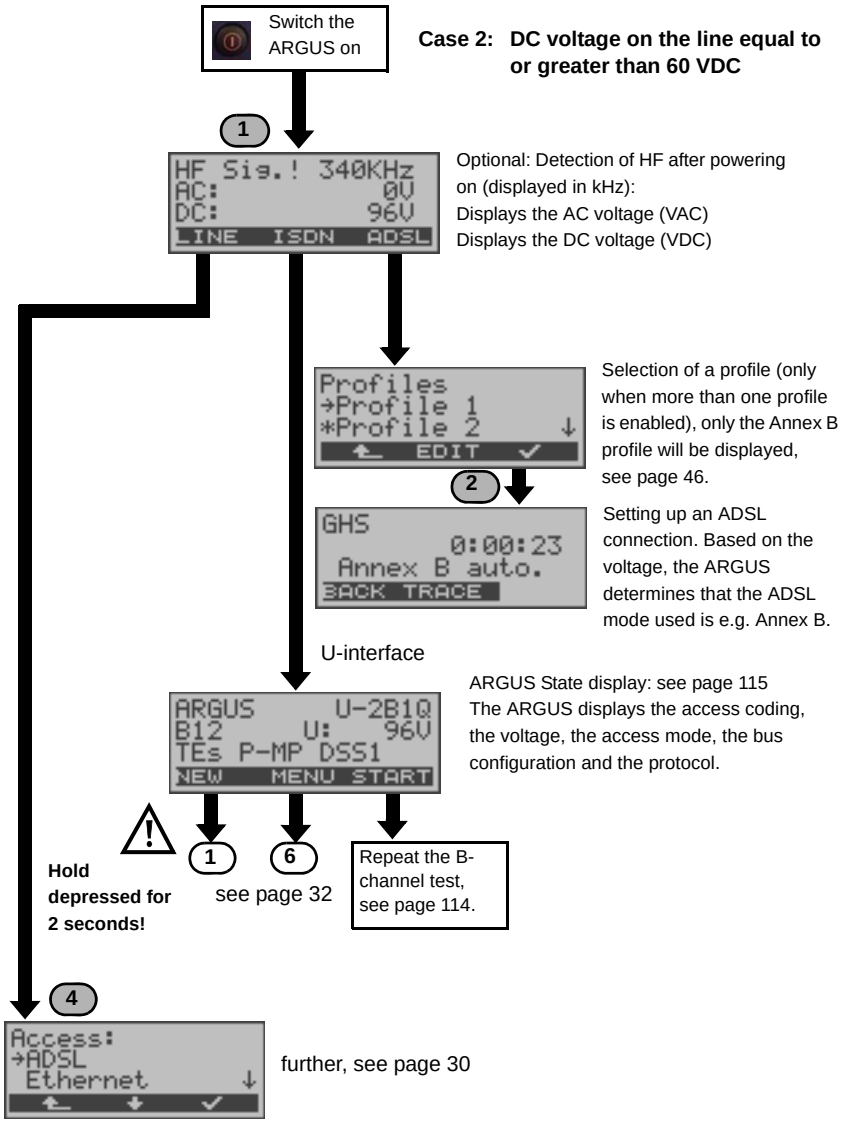


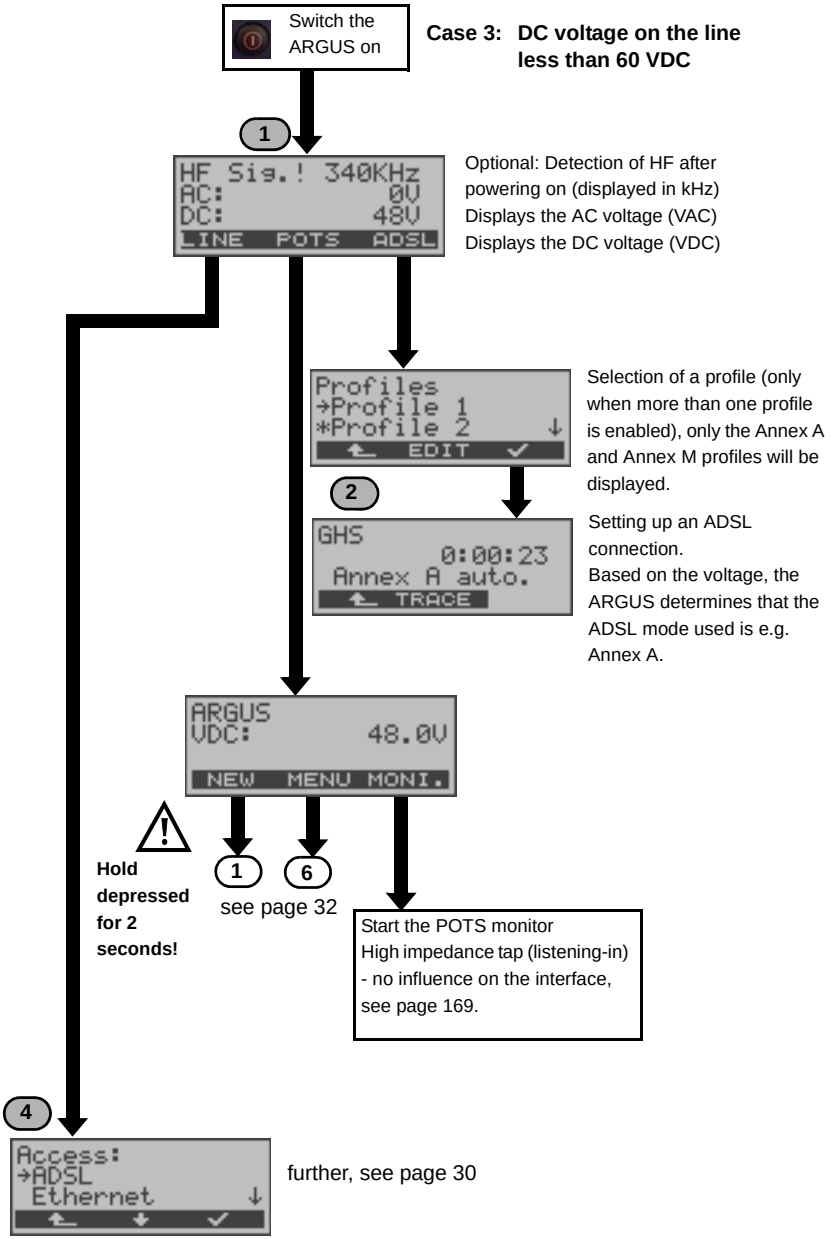
Main menu

Depending on the type of access selected, the Main menu will include not only the Access menu but also the following menus:

The Single Tests Menu			
BRI S/T / U-interface access	Bit error rate test	- BERT start - BERT wait - B-channel loop	see page 119
	Supplementary Services		see page 129
	Service tests		see page 133
	X.31 test	- Automatic - Manual	see page 136
	CF interrogation		see page 140
	CF activation		see page 142
	CF delete		see page 143
	Connection display		see page 145
ADSL access	IP ping		see page 81
	HTTP download		see page 90
	VPI / VCI Scan	ATU-R only	see page 75
	ATM OAM ping	ATU-R only	see page 78
	VoIP telephone		see page 95
	MDI analysis	ATU-R bridge and ATU-R router only	see page 105
Ethernet with protocol	Ping		see page 81
	HTTP download		see page 90
	VoIP telephone		see page 95
	MDI analysis		see page 105
The Test Manager Menu			
BRI S/T / U-interface access	Administration of tests or connections running in parallel	- Start new one - Stop all	see page 154
The Connection Menu			
POTS access	Setup a POTS connection		see page 168
The Start Monitor Menu			
POTS access	High impedance listening-in		see page 169

The Line Status Menu			
ADSL access	Display the ADSL connection parameters		see page 52
The Test Results Menu			
	Display and manage the saved test results	- View - Test data to PC - Delete - All to PC - Delete all	see page 173
	Run an automatic test series on an ISDN access	- Start (ISDN)	
The Level Measuring Menu			
	Measure the voltage and display the polarity on the access under test		see page 59
The L1 Status Menu			
BRI S/T access	Display the current Layer 1 status		see page 161
The Configuration Menu			
The ARGUS can be configured to suit special requirements. The parameters are organized in submenus (e.g. all the ADSL parameters are in the Profile submenu) The default (factory) settings can be restored by selecting “Reset”.			
	Trace / remote		see page 181
	Profile		see page 46
	ISDN parameters		see page 116
	BERT parameters		see page 120
	POTS parameters		see page 166
	VDC threshold		see page 22
	X.31 parameters		see page 136
	Device settings		see page 182
	Numbers		see page 184
	Reset		see page 184
The Access Menu			
	Selection of the physical access		see page 37
The Accu Servicing Menu			
	Discharging and recharging the accumulators		see page 187
The Help Menu			
	Show the keypad “Function assignment” on the ARGUS display.		see page 23


Switch the ARGUS on
Case 2: DC voltage on the line equal to or greater than 60 VDC
1
HF Sig.! 340KHz
AC: 0V
DC: 96V
LINE ISDN ADSL
Optional: Detection of HF after powering on (displayed in kHz):
Displays the AC voltage (VAC)
Displays the DC voltage (VDC)
Profiles
→Profile 1
*Profile 2
EDIT
Selection of a profile (only when more than one profile is enabled), only the Annex B profile will be displayed, see page 46.
2
GHS
0:00:23
Annex B auto.
BACK TRACE
Setting up an ADSL connection. Based on the voltage, the ARGUS determines that the ADSL mode used is e.g. Annex B.
U-interface
ARGUS U-2B1Q
B12 U: 96V
TEs P-MP DSS1
NEW MENU START
ARGUS State display: see page 115
The ARGUS displays the access coding, the voltage, the access mode, the bus configuration and the protocol.
Hold depressed for 2 seconds!
1
see page 32
6
Repeat the B-channel test, see page 114.
4
Access:
→ADSL
Ethernet
further, see page 30


Switch the ARGUS on
Case 3: DC voltage on the line less than 60 VDC
1
HF Sig.! 340KHz
AC: 0V
DC: 48V
LINE POTS ADSL
Optional: Detection of HF after powering on (displayed in kHz)
Displays the AC voltage (VAC)
Displays the DC voltage (VDC)
Profiles
→Profile 1
*Profile 2
EDIT
Selection of a profile (only when more than one profile is enabled), only the Annex A and Annex M profiles will be displayed.
2
GHS
0:00:23
Annex A auto.
TRACE
Setting up an ADSL connection.
Based on the voltage, the ARGUS determines that the ADSL mode used is e.g. Annex A.
ARGUS
VDC: 48.0V
NEW MENU MONI.
Hold depressed for 2 seconds!
1
6
see page 32
Start the POTS monitor
High impedance tap (listening-in) - no influence on the interface, see page 169.
4
Access:
→ADSL
Ethernet
further, see page 30

6 Operation on an ADSL Access

The ARGUS supports the following types of access (access modes):

ATU-R Terminal mode (ADSL Transceiver Unit Remote) see page 47.
Connection of the ARGUS directly to the ADSL access (before or after the splitter). The ARGUS replaces both the modem and the PC.

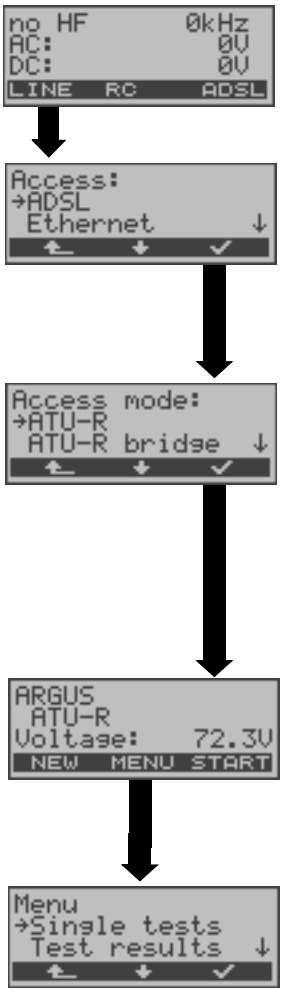
ATU-R Bridge Bridge mode (ADSL Transceiver Unit Remote Bridge) see page 54.
Insertion of the ARGUS between the ADSL access and the PC. The ARGUS replaces the ADSL modem.

ATU-R Router Router mode (ADSL Transceiver Unit Remote Router) see page 56.
Insertion of the ARGUS between the ADSL access and the PC. The ARGUS replaces both the ADSL modem and the router.

The individual tests record and store data. The user must comply with the statutory regulations governing the collection and storage of such data and his obligation to give notice in this connection.

6.1 Setting the ADSL Interface and Access Mode

Using the original ARGUS cable, connect the ARGUS to the access to be tested and then switch the ARGUS on.



The Access Menu

Select an ADSL (physical) interface.
The ADSL connection is not yet set up!

The Access mode menu is not selectable from the Main menu. It opens automatically once the ADSL physical access has been selected.
ATU-R see page 47
ATU-R Bridge see page 54
ATU-R Router see page 56

ARGUS State display

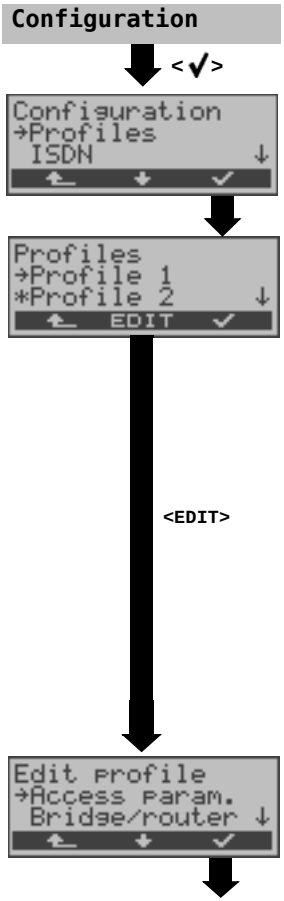
The ARGUS displays the access mode and the DC voltage on the access interface. The ADSL connection is not yet set up!

ARGUS Main menu

see page 32

6.2 ADSL Settings

The ARGUS stores all of the parameters required to run a test (determination of the ADSL connection parameters, ping test) on an ADSL access in a profile. Up to 10 user-defined profiles can be created. A profile must be selected before an ADSL test is run. Only those parameters which are relevant will be used for the respective test situation.
The default settings can be restored at any time (see page 184). The procedure for configuring a parameter is the same for all parameters and will be illustrated with a single example:



In the Main menu, select “Configuration”.

Select “Profile”.

Select the profile to be edited.
The currently selected profile is indicated by the → (in the example, Profile 1)

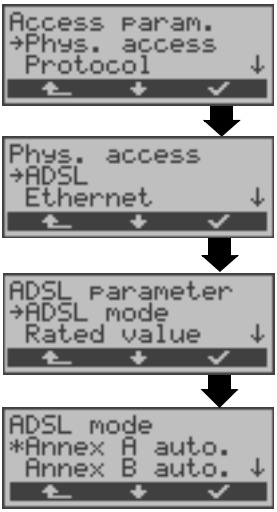
The ARGUS will use the parameters in the current profile when setting up the ADSL connection. The currently active profile is indicated by the ∗
(in the example: Profile 2)
Activating a profile:

<↓ > Select the profile

<✓> or The ARGUS will use the profile marked with the → as the current profile (the current profile will be marked with an ∗ in the display).

Open the selected profile for editing

e.g. select Access parameter



e.g. select Physical Access

e.g. select ADSL

e.g. select ADSL mode

Select the desired ADSL mode.

<✓> The ARGUS will now store this setting in the profile.

< ↵ > The ARGUS will return to the previous display without saving the selected setting.

Setting	Explanation
Access parameters	
Phys. access	
ADSL:	Access parameters for the ADSL connection
ADSL mode	Different ADSL modes can be selected depending on the national variant of the ARGUS. The selected ADSL mode must be compatible to ATU-C (network-side). If the ADSL mode “Annex A(B) Auto” is selected, the ARGUS will automatically determine the configuration of the DSLAM (G.DMT or ANSI) and set itself accordingly. Default setting: ***dependent on the national variant***
Rated values	Use the keypad to enter the upstream and downstream comparison values for the ATM bitrate [kbit/s]. If the current bitrates on the ADSL connection exceed the rated values, the ARGUS will display "OK“, otherwise it will display "FAIL“. Default setting: ***d: 0*** and ***u: 0***

ETSI support B	Option to support ETSI TS 101 388 (ETSI DTS-TM-06006) modes when ADSL mode Annex B auto is selected. Default setting: ***No***
DPBO support B	Option to support Downstream Power Back Off when ADSL Annex B mode is selected. Default setting: ***No***
Nokia support B	Option to support synchronization with an older Nokia DSLAM when ADSL Annex B mode is selected (when this access parameter is selected some ADSL parameters will not be shown correctly). Default setting: ***No***
INP support A	Option to support INP when ADSL Annex B mode is selected (when this access parameter is selected some ADSL parameters will not be shown correctly). Default setting: ***Yes***
Protocol:	Selection of the transfer protocol that the ARGUS should use for the test (e.g. for an IP test). Protocols for ADSL: PPPoE (PPPoEoA) - Point-to-Point Protocol over Ethernet PPPoA - Point-to-Point-Protocol over ATM EoA (IPoE, IPoEoA) - Ethernet over ATM IPoA - Internet Protocol over ATM Default setting: ***PPPoE***
ATM:	Settings for Asynchronous Transfer Mode
VPI / VCI	VPI: Enter Virtual Path Identifier VCI: Enter Virtual Channel Identifier Ranges: VPI: 0 to 127, VCI: 32 to 255 Default setting: ***VPI: 1*** and ***VCI: 32***
Encapsulation	Selection of the encapsulation of the packets to be sent (LLC or VC-MUX). Default setting: ***LLC***

MAC / VLAN:	MAC (Media Access Control) and VLAN (Virtual Local Area Network)	
MAC address	Display and selection of the MAC addresses. The first two MAC addresses cannot be changed. If the default MAC address is selected, the Argus will use its onw MAC address. If Dynamic MAC Address is select a different MAC address will be used for each synchronization. Default setting: ***Default MAC Address*** A third MAC address can be entered: Mark a line and then press **<Edit>**.	
	<Edit>	Enter the address in hexadecimal using the keypad and the softkeys **<A..F>** (e.g. to enter a “C” press the softkey three times or to enter an “F” six times, then finish up by pressing **<OK>** to confirm your entry). Default setting: ***00:00:00:00:00:00***
		Use the address. The new address is only saved temporarily and will not be available when the ARGUS is switched on again.
VLAN	Use VLAN:	Specifies whether or not VLAN should be used: yes or no. Default setting: ***No***
	ID:	Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device, which belongs to the VLAN with the ID = 1, can communicate with every other device in the same VLAN, but not with a device in other VLANs (one with an ID other than 1, i.e. 2). Range: from 0 to 4095 Default setting: ***0***
	Priority:	User - priority information: An eight-level (3 bits) priority can be assigned to each frame. In this manner, it is possible e.g. to give priority to forwarding voice data (in the case of VoIP), while HTTP data will be handled as a lower priority. Range: 0 to 7 Default setting: ***0***

PPP:	PPP (Point- to-Point Protocol) settings
User name	Entry of the user name assigned (by the network operator)  Use the keypad to enter the user name. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits), page 51.
Password	Entry of the password assigned by the network operator: (see above)
Set the IP	If “Yes”, the IP address entered as own IP address will be used for the connection. Default setting: ***No***
Activation delay	After setting up the PPP connection, the ARGUS will first wait until the period specified in the “activation delay” has elapsed before beginning a test. Range: 2 to 10 seconds Default setting: ***2***
IP:	Internet Protocol setting (for EoA)
IP address	Setting the assignment of the IP addresses Static IP: fixed IP addresses DHCP client: IP address assigned by the server (remote end) DHCP server: IP address assigned by the ARGUS DHCP auto: The ARGUS will check whether there is a DHCP server in the network. If yes, the IP address will be assigned by the server. Otherwise, the ARGUS will assign the address. Default setting: ***DHCP client***
Own IP address	own local IP address of the ARGUS Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
IP netmask	IP netmask Range: 0.0.0.0 to 255.255.255.255 Default setting: ***255.255.255.0*** (see RFC 3330 regarding assignment)
Gateway IP	Gateway IP address Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)

DNS server	DNS server 1 and DNS server 2 Entry of the IP address of the Domain Name System server Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
DHCP client	DHCP timeout (setting of how long to wait for the IP address): Range: 1 to 9999 seconds Default setting: ***20***
	DHCP vendor ID: - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP vendor ID in ASCII format Default setting: ***ARGUS***, operation see page 43 - HEX data: Enter the DHCP vendor ID in hexadecimal format For instructions, see MAC address page 42.
	DHCP vendor info: - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP vendor info in ASCII format Default setting: ***ARGUS***, operation see page 43. - HEX data: Enter the DHCP vendor info in hexadecimal format (for instructions, see MAC address) page 42.
	DHCP user class information - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP user class i. in ASCII format Default setting: ***ARGUS***, operation see page 43. - HEX data: Enter the DHCP user class information in hexadecimal format (for instructions, see MAC address) page 42.
	DHCP user-defined option (Create a user-defined DHCP option) - Option number Range: 0 to 255 Default setting: ***255 = off*** - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Entry of the DHCP userdef. option in ASCII format Default setting: ***ARGUS***, operation see page 43. - HEX data: Enter the DHCP user-defined option in hexadecimal format (for instructions, see MAC address) page 42.

DHCP server	Settings for the DHCP server: - Start and end IP addresses Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment) - Name of the domain, for information on the operation see page 43. - The period for which the IP addresses are reserved Range: 1 to 99999 hours Default setting: ***240***
Bridge / Router	
Ethernet	
Autonegotiation	On or off: If autonegotiation is enabled, a network card can independently determine the correct transmission speed and duplex setting for the Ethernet port to which it is connected and configure itself accordingly. In the case of Ethernet, autonegotiation is based on layer 1 of the OSI Model (in accordance with the IEEE 802.3u standard). Default setting: ***on***
IP:	
IP mode	Setting the assignment of the IP addresses Static IP: fixed IP addresses DHCP client: IP address assigned by the server (remote end) DHCP server: IP address assigned by the ARGUS DHCP auto: The ARGUS will check whether there is a DHCP server in the network. If yes, the IP address will be assigned by the server. Otherwise, the ARGUS will assign the address. Default setting: ***DHCP client***
Own IP address	own local IP address of the ARGUS Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
IP netmask	IP netmask Range: 0.0.0.0 to 255.255.255.255 Default setting: ***255.255.255.0*** (see RFC 3330 regarding assignment)

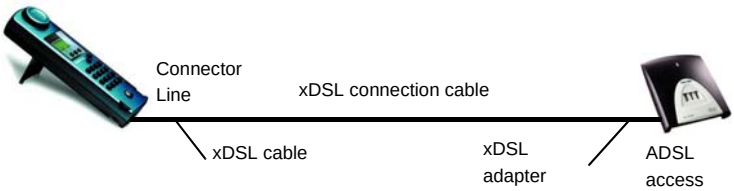
DHCP server	Settings for the DHCP server: - Start and end IP addresses Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment) - Name of the domain, for information on the operation see page 43 - The period for which the IP addresses are reserved Range: 1 to 99999 hours Default setting: ***240***
Test parameters	The test parameters are described in the chapters on IP tests, VoIP tests, and MDI analysis.
Data Log	Data Log on or off: This setting must be "on" in order to send a trace file to a PC, see page 173. Default setting: ***off***
Profile use	To set the profile to be used. Yes: use this profile and display it in the profile list.
Profile name	Enter the name of the profile

6.3 The ARGUS in the ATU-R Access Mode

6.3.1 Determining the ADSL connection parameter

Using the xDSL connection cable (consisting of the xDSL cable and the xDSL adapter), the ARGUS is connected directly to the ADSL access (either before or after the splitter). In this case, the ARGUS replaces both the modem and the PC.

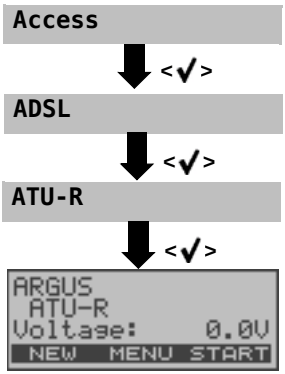
Use only the cable included in the package!



The ARGUS uses the access parameters stored in the profile when setting up the connection (see page 40).

The ARGUS may need a few seconds to record all of the parameters. To be certain that all of the parameters have been recorded, simply examine the Bits/Tone or SNR/Tone graphs. If the ARGUS can display these, it must have also recorded all of the rest of the parameters.
If the test is terminated too early (right after synchronization), it is possible that some of the important parameters will not be included in the test report.

Setting the ATU-R access mode:



The ARGUS - Main menu

The ADSL test is not yet started

Setting Up an ADSL Connection

The ARGUS will set up an ADSL connection and determine all of the relevant ADSL connection parameters. The ARGUS displays the connection parameters and saves them after the connection is cleared down if desired.

If an ADSL connection is set up directly after the ARGUS is switched on, the Access mode will always be set to “ATU-R”.

Setting up an ADSL connection from the Status display.
In this case, the access mode must first be selected in the Access mode menu (see page 38). In this example, “ATU-R”.

The ARGUS displays the profiles released for use (see page 46). The current profile will be released for use automatically. The display shown at the side will only appear if more than one profile has been released for use. If this is not the case, the ARGUS will immediately begin the initialization using the current profile’s parameters to set up the connection (the current profile is marked with an “*” in the Configuration menu).

<EDIT> Edit the profile marked with the → . The ARGUS opens the Configuration menu: In this menu, you can edit the parameters of the selected profile (see page 39).

The ARGUS will use the parameters in the profile marked with the → .
The currently active profile will only be marked with an * (not an →).

Initializing the hardware

The ARGUS synchronizes with the DSLAM (the “L1 Sync” LED will flash). The ARGUS will display the current modem state.

<STOP> Cancel setup

The ARGUS displays the current modem state, the setup time (in the example: 23 seconds) and the ADSL mode.

< ↑ > The ARGUS will return to the previous display

<TRACE> Command symbols:

- **<** = command sent from the ARGUS
- **>** = command sent from modem
- **-** = modem status

<TIME> Display showing when the commands arrive.

Once the connection has been setup (“L1 Sync” LED on constantly), the ARGUS will determine the ADSL connection parameters.

Connection successfully setup

Once the ADSL connection has been setup (“L1/Sync” LED on constantly), the ARGUS will determine and display the ADSL connection parameters.
Once the ARGUS has successfully synchronized, the error counters will be reset to zero.
After the ARGUS has synchronized, please leave it connected to the ADSL access for at least another 20 seconds since the ADSL connection parameters are first available to be stored in the ARGUS after this period of time.

Display of the downstream and upstream bit rates.
The ARGUS will display an OK if the bit rate achieved is greater than the target value set (see page 40). Otherwise, it will display a FAIL.

<MENU>	The ARGUS will open the Main menu.
<STOP>	Clear down the ADSL connection

The ARGUS will display the ADSL mode, the duration of the connection (Elapsed) and the ADSL connection parameters.

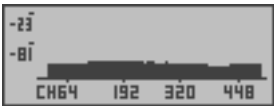
↓ -, ↑ - Keys	Display the ADSL connection parameter see table page 52.
<TRACE>	Display the commands and modem state.
0	Reset the error counters: FEC, CRC, HEC CAUTION: Once showtime has been reached, the ARGUS will automatically reset the error counters.

Display bit distribution
e.g. bits transported per carrier frequency (tone).
y-axis: bits per carrier frequency (tone)
x-axis: tones (carrier frequencies)
Based on the bit distribution, it is possible to detect line disturbances (e.g. HDB3, HDSL, RF etc.)

Press any softkey

Display of the signal-to-noise ratio for each tone
y-axis: SNR in dB
x-axis: tones (carrier frequencies)
Shows interference or noise by frequency.

Press any softkey



Display of the quiet level noise (QLN) for each tone The QLN is measured once before synchronization (it is not checked continuously) and can be examined after synchronization.
y-axis: QLN in dBm/Hz
x-axis: tones (carrier frequencies)
Detection of disturbances on the line.

Press any softkey

Close the results display.

Clear down the ADSL connection.

<IP>PC>:
The ARGUS will send the trace file to the connected PC, which must be running WINplus or WINanalyse. The data will be saved in the "*.log" format and can be renamed to "*.pcap" and decoded with a freeware program (such as Wireshark). The setting “Data Log” must be set to “on”. In bridge and router mode, two log files will be loaded to the PC, one for the WAN and one for the LAN side.

Save the results (see page 173).

The ARGUS will save the test results in the first free record. This record can be assigned any name (default: AMP_1, AMP_2, AMP_3, etc. or the call number of the access under test if the number has been entered into the speed-dialling memory, see page 185). If all of the records have been written, you must manually select a memory location (record).
A record name can be entered using the numeric keypad. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad:

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of the lowercase characters and @, /,-, . (e.g. to enter a "c“ press the "2" on the keypad three times).
<AB>12>	Entry of the uppercase characters and @, /,-, .
<DEL>	Delete the character before the cursor
↓ -,↑ - Keys	Move the cursor
<START>	Set up an ADSL connection again

The ARGUS will determine the following ADSL connection parameters downstream (d:) and upstream (u:):

ADSL Connection Parameters	
Latency mode	Depending on the configuration of the DSLAM, the ARGUS will display either Interleaved or Fast mode.
Target value comparison	The target value, which was set for the bit rate, is compared with the rate actually achieved (see page 40).
ATM	The actual useable ATM bitrate in kbit/s.
Attain. ATM	This is the theoretically attainable bitrate in kbit/s.
Rel.capacity	Utilization of the line as a percentage.
Attenuation	The line's attenuation in dB over its entire length.
Output PWR	Output power in dBm.
SNR margin	The signal-to-noise margin in dB; the SNR margin is a measure of how much additional noise the transmission can withstand and still achieve a BER (Bit Error Rate) of 10^{-7}.
Interl. Depth	The interleave depth in bytes Interleaving is a procedure that arranges the data transmitted in a non-contiguous order and is used to protect the data transmission against impulse noise (burst errors).
INP	The Impulse Noise Protection (INP) is an indicator of the quality of the protective mechanism as far as impulse noise is concerned. The number of DMT symbols, which can be completely distorted in succession, without an error occurring on the higher layers.
Interleave Delay	This is the delay (in ms) caused by interleaving the data blocks.
FEC Forward Error Correction	The FEC shows the number of transmission errors corrected using the ATM cell checkbytes. In upstream (far) and downstream (near): f (far): Errors that the DSLAM has detected and informed the ARGUS. n (near): Errors which were detected by the ARGUS in the blocks it received.

CRC Cyclic Redundancy Check	The super-frame checksum sent from the opposing end does not match the one calculated locally. Possible cause: Fault on the line. In upstream (far) and downstream (near): f (far): Errors that the DSLAM has detected and informed the ARGUS. n (near): Errors which were detected by the ARGUS in the blocks it received.
HEC Header Error Checksum	The HEC shows the number of ATM cells with bad header checksums. In upstream (far) and downstream (near): f (far): Errors that the DSLAM has detected and informed the ARGUS. n (near): Errors which were detected by the ARGUS in the blocks it received.
Err. Count. Reset	Shows how often the error counters have been reset.
Resync	Number of times that the ARGUS has been resynchronized.
Vendor far	The manufacturer of the ATU-C side shown as hexadecimal number.
Version	Vendor Specific Information, generally shows the version of the software running at the ATU-C (DSLAM) end.

6.3.2 Tests in ATU-R Access Mode

Depending on the protocol, the following ADSL tests are supported:

ATM tests, see page 75
- VPI/VCI scan
- ATM OAM ping

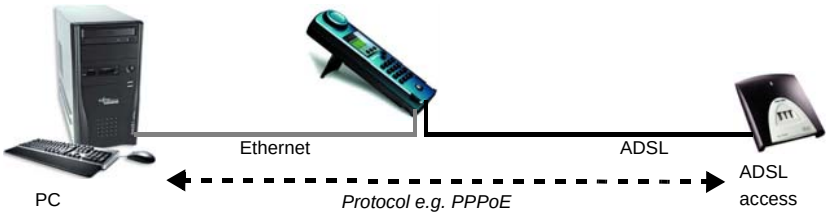
IP tests, see page 81
- IP ping
- HTTP download

VoIP tests, see page 95
- VoIP telephony

IPTV tests, see page 105
- MDI analysis

6.4 The ARGUS in the ATU-R Bridge Access Mode

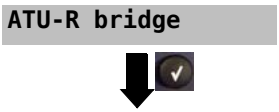
In Bridge mode, the ARGUS acts like an ADSL modem, i.e. the ARGUS passively passes all packets from the Ethernet interface to the ADSL access (and vice versa). In this case, the PC is responsible for setting up the connection.



Setting the parameters:

In addition to the physical parameters, Bridge mode also requires that the two following ATM parameters (connection parameters):
- VPI / VCI (page 41)
- Encapsulation (page 41)

ADSL connection in Bridge mode:



In the Access mode menu, select "ATU-R Bridge".

Set up an ADSL connection.

The ARGUS will display the profiles released for use. The current profile will be released for use automatically. The display shown at the side will only appear if more than one profile has been released for use. If this is not the case, the ARGUS will immediately begin the initialization using the current profile's parameters to set up the connection (the current profile is marked with an "*" in the Configuration menu).

<**EDIT**> Edit the profile marked with the → . Open the Main menu. In this menu, you can edit the parameters of the selected profile see page 39.

The ARGUS will use the parameters in the profile marked with the → .
The currently active profile will only be marked with an * (not an →).

The ARGUS will first synchronize itself with the DSLAM. Afterwards, it will initialise the software.
While the ARGUS is attempting to set up the ADSL connection, the "L1 Sync" LED will flash.

Once the connection has been setup ("L1 Sync" LED on constantly), the ARGUS will determine the ADSL connection parameters.
The ARGUS display how long it has been in Bridge mode.

<STAT.> Display the statistics.

<PHYS.> Display the physical parameter.

Displayed when the ADSL connection has been set up: ADSL mode and duration of the ADSL connection

Display the ADSL connection parameter (see the table on page 52).

<ADSL> ADSL connection parameter.

<ETH> Display the Ethernet Phys. Parameters.

<TRACE> Display the commands and modem state.

<GRAPH> Bit distribution display: Display of the signal-to-noise ratio for each tone.
Display of the quiet level noise (QLN) for each tone.

When the connection is being cleared down, you will be prompted as to whether the results should be saved (see page 50).

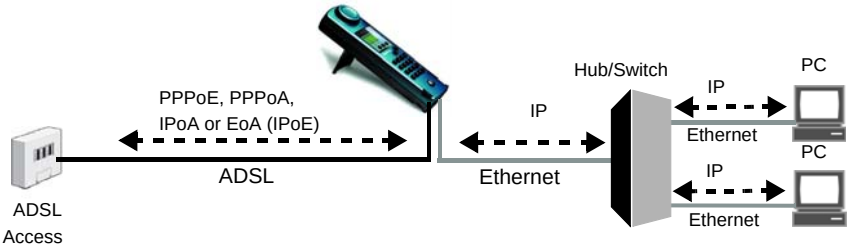
6.4.1 Tests in ATU-R bridge access mode

IPTV tests, see page 105 - MDI analysis

6.5 The ARGUS in the ATU-R Router Access Mode

Connect the ARGUS to the ADSL access using the xDSL cable and to the PC with a patch cable.
In router mode, the ARGUS replaces not only the modem but also the router. In this case, several PCs (connected via a hub/switch) can access the connection via a network connection. The network IP addresses can either be assigned statically or the ARGUS can serve as a DHCP server and assign IP addresses to the connected PCs.

The ARGUS does not have a firewall!



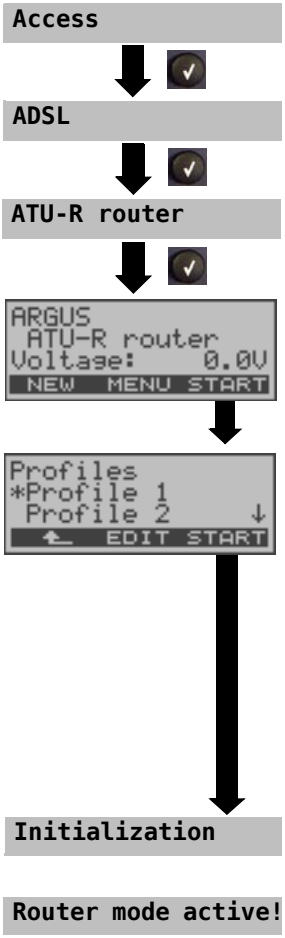
Settings for Ethernet / Protocol IP: see page 45

Setting			
Bridge / Router	**Ethernet**	Autonegotiation on / off	
	IP	- IP mode - own IP address - IP netmask - DHCP server:	Start / End address domain, Reservation period
	Router	NAT on / off	

Protocol-dependent settings for ADSL:

Setting			
Access parameters	**Phys. Access**	ADSL	ADSL mode
	Protocol	PPPoE (PPPoEoA), PPPoA , IPoA, EoA	
	ATM	Default VC: (Multicast VC)	VPI / VCI Encapsulation
	MAC / VLAN **(IPoA and EoA protocols only)**		MAC address VLAN
	PPP **(PPPoE/PPPoA protocols only)**		User name Password Set the IP Activation delay
	IP **(IPoA and EoA protocols only)**		IP Mode (Static IP) own IP address IP netmask Gateway IP DNS server DHCP client DHCP server

Setting the ARGUS-Router Access Mode



The ARGUS - Main menu

The ADSL connection is not yet setup
<START> Set up an ADSL connection.

The ARGUS will display the profiles released for use. The current profile will be released for use automatically. The display shown at the side will only appear if more than one profile has been released for use. If this is not the case, the ARGUS will immediately begin the initialization using this profile's parameters to set up the connection (the current profile is marked with an "*" in the Configuration menu).

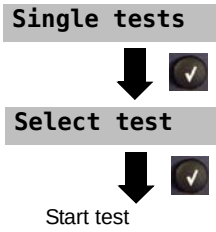
<EDIT> Edit the profile marked with the → . The ARGUS opens the Configuration menu: In this menu, you can edit the parameters (page 40).

The ARGUS will use the parameters in the profile marked with the → . The currently active profile will only be marked with an * (not an →).
The ARGUS will first synchronize with the DSLAM (the "L1 Sync" LED will flash). Afterwards, it will initialise the software.Tests with router mode active

Display the ADSL connection parameters, trace data, bit distribution etc.

<STOP> Deactivate router mode and clear down the ADSL connection.

The following tests can be performed:



IP ping	For more information, see page 81
HTTP download	For more information, see page 90
VoIP phone	For more information, see page 95
MDI analysis	For more information, see page 105

6.5.1 Tests in ATU-R router access mode

Depending on the protocol, the following ADSL tests are supported:

IP tests, see page 81	- IP ping - HTTP download
VoIP tests, see page 95	- VoIP telephony
IPTV tests, see page 105	- MDI analysis

6.5.2 Displaying the Test Results

Test reports

In the Main menu, select “Test results”.

↓-Key Select the record with the stored ADSL test results, see page 173.

Select “Display result”.

Scroll through the test results

<↓> Scroll through the test results
For details on the meaning of the parameters, see page 52.

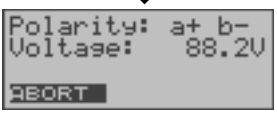
Bit distribution display

<CONT.> Display additional results:
- signal-to-noise ratio
- noise level without signal (QLN)

6.5.3 Level measurement on an access

Level measuring

In the Main menu, select “Level measuring”.
May not be started if a synchronization has been begun.



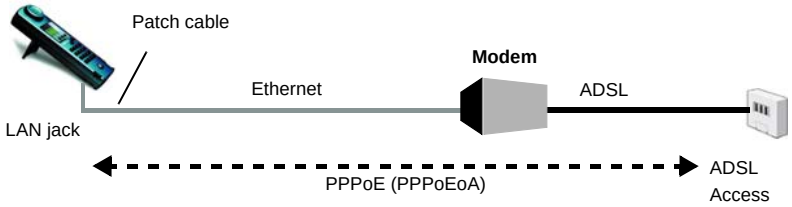
Start measurement. The ARGUS displays the polarity and the voltage on the line. The measurement will be updated continuously.

7 Operation on an Ethernet Access

In Ethernet mode, the ARGUS supports the following types of access:

The individual tests record and store data. The user must comply with the statutory regulations governing the collection and storage of such data and his obligation to give notice in this connection.

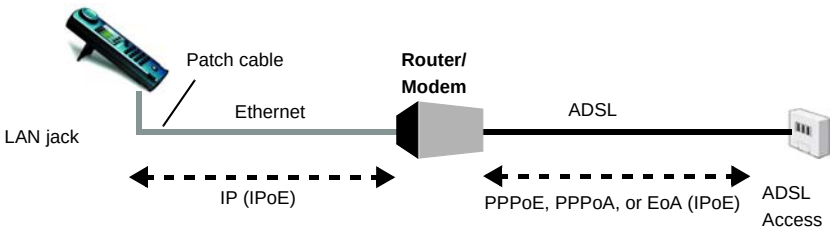
Connection to a modem:



Settings in the profile:

Access parameters	
Protocol:	PPPoE (PPPoEoA)
MAC / VLAN:	MAC address see page 42
PPP:	User name, Password, Set IP, Activation delay, see page 43

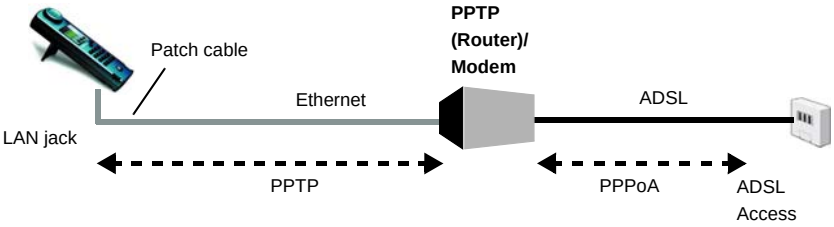
Connection to a Router/Modem:



Settings in the profile:

Access parameters	
Protocol:	IP (IPoE)
MAC / VLAN:	MAC address see page 42
IP:	IP mode, own IP address (static IP), IP netmask (static IP), Gateway IP address (static IP on PPPoE or PPPoA), DNS server (static IP on PPPoE), DHCP client, DHCP server, see page 43

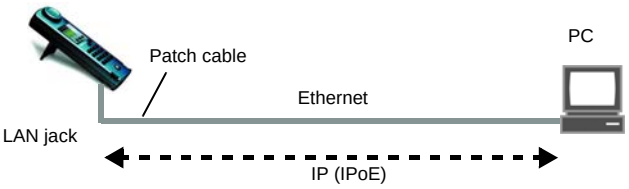
Connection to a PPTP Router/Modem:



Settings in the profile:

Access parameters	
Protocol:	PPTP
MAC / VLAN:	MAC address see page 42
PPP:	User name, Password, Set IP, Activation delay
PPTP:	IP address of the PPTP modem
IP:	IP mode, own IP address (static IP), IP netmask (static IP), Gateway IP address (static IP on PPPoE or PPPoA), DNS server (static IP on PPPoE), DHCP client, DHCP server, see page 43

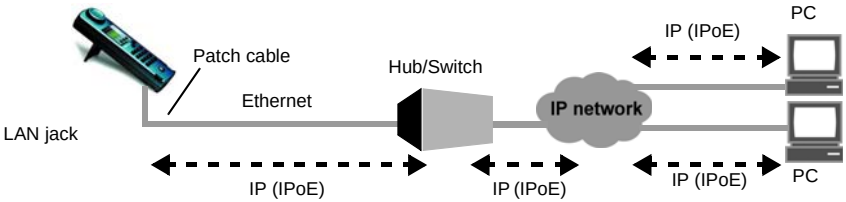
Connection to a PC via IP (IPoE):



Settings in the profile:

Access parameters	
Protocol:	IP (IPoE)
MAC / VLAN:	MAC address see page 42
IP:	IP mode, own IP address (static IP), IP netmask (static IP), gateway IP (static IP), DNS server, see page 43

Connection to IP network:



Settings in the profile:

Access parameters	
Protocol:	IP (IPoE)
MAC / VLAN:	MAC address see page 42
IP:	IP mode, own IP address (static IP), IP netmask (static IP), gateway IP (static IP), DNS server, see page 43

7.1 Setting the Ethernet Interface

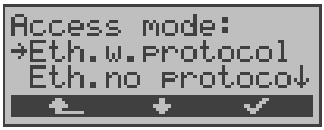
To use the ARGUS as a replacement for a PC, connect one end of the included patch cable to its "LAN" jack and the other end to a modem, hub, switch or PC (see sketch on page 60) and then switch the ARGUS on.

<LINE> Opens the Access menu.

The Access Menu:

Select Ethernet as the type of access. The selected type of access will be marked with an arrow in the display.

Ethernet will be used since it is the access type that is marked.



The Access Mode Menu:

Select the access mode:
Ethernet with protocol The protocol will be setup directly and, afterwards PPP login and the IP tests (e.g. VoIP) can be performed.
Ethernet no protocol: No protocol will be setup; in this mode it is only possible to start an Ethernet Loop from the Single Tests menu.

<START> Start the Ethernet connection.

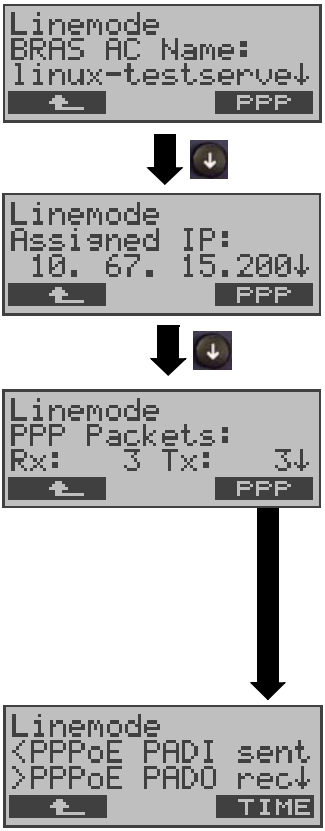
<STOP> Disable the Ethernet connection.

Switch to the Line mode

Displays the current connection status.
Display the time elapsed since the activation.

<STAT.> Display the statistics.

<ETH> Display the Ethernet Phys. Parameters



BRAS information: The ARGUS displays (for the PPPoE protocol only) the BRAS (Broadband Remote Access Server) information:
- AC (Access Server) name of the server
- Service name (name of the service)

Assigned configuration: The ARGUS will display the IP configuration assigned by the server.
- IP address assigned
- Gateway IP address
- DNS server available

PPP information: The ARGUS will display the number of PPP packets and bytes received (Rx) and sent (Tx). LAN Ethernet: The ARGUS will display the number of Ethernet frames received (Rx) and sent (Tx) and the number of bytes and errors.

In the case of **<PPP>**, a PPP trace will be displayed showing the sequence of PPP messages.
Command symbols:

< = command sent from the ARGUS

> = command sent from the DSLAM

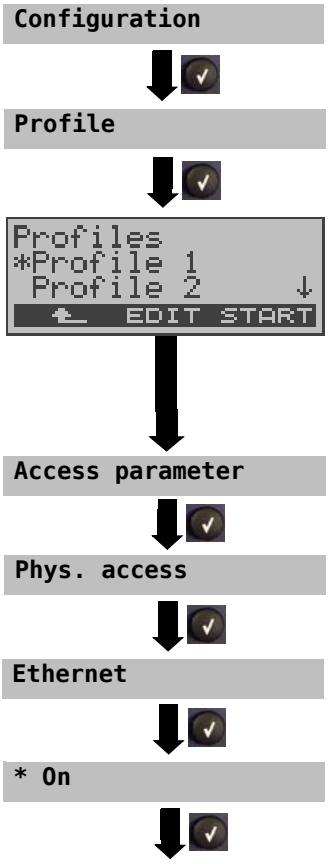
- PADI: PPPoE Active Discovery Initiation
- PADO: PPPoE Active Discovery Offer
- PADR: PPPoE Active Discovery Request
- PADS: PPPoE Active Discovery Session confirmation
- PADT: PPPoE Active Discovery Termination
- LCP: Link Control Protocol
- IPCP: Internet Protocol Control Protocol
- PAP: Password Authentication Protocol

<Time>

The **<Time>** softkey is used to tag the individual messages with times from the ARGUS system clock.

7.2 Ethernet Settings

The ARGUS stores all of the settings required to run a test (e.g. IP ping etc.) in profiles. Up to 10 user-defined profiles can be created. A specific profile can be selected before a connection is setup or a test performed, otherwise the ARGUS will use the default (preset) profile. Only those settings which are relevant will be used for the respective test situation. The default (factory) settings can be restored at any time (see page 184). The procedure for changing a setting will be illustrated with a single example:



Select a profile. The selected profile is marked with an * (asterisk).
The ARGUS will use this profile when setting up a connection.

The ARGUS will use the marked profile as the default profile and return to the Settings menu.

Select the Access parameter

Select Phys. access

Select Ethernet

Set autonegotiation (in the example, "on") The default setting will be marked in the display with an asterisk (*).

< > Open the next higher menu without making any changes to the settings.
The ARGUS will use the default setting

Setting	Explanation
Access parameters	
Phys. access	
Ethernet	
Autonegotiation	On or off: If autonegotiation is enabled, a network card can independently determine the correct transmission speed and duplex setting for the Ethernet port to which it is connected and configure itself accordingly. In the case of Ethernet, autonegotiation is based on Layer 1 of the OSI Model (in accordance with the IEEE 802.3u standard). Default setting: ***on*** For information on the **off** setting, also see the next chapter: Autonegotation / Ethernet Link Parameter
Protocol:	Selection of the protocol: PPPoE (PPPoEoA) - Point-to-Point Protocol over Ethernet IP (IPoE) - Internet Protocol over Ethernet PPTP - Point-to-Point Tunneling Protocol EoA (IPoE, IPoEoA) - Ethernet over ATM Default setting: ***PPPoE***
MAC / VLAN:	MAC (Media Access Control) / VLAN (Virtual Local Area Network)
MAC address	Display and selection of the MAC addresses. The first two MAC addresses cannot be changed. If the default MAC address is selected, the Argus will use its onw MAC address. Default setting: ***Default MAC Address*** If Dynamic MAC Address is select a different MAC address will be used for each synchronization. A third MAC address can be entered: Mark a line and then press **<Edit>**. **<Edit>** The address is entered in hexadecimal using the numeric keypad and the **<A..F>** softkey (e.g. to enter a "C" press the softkey three times, to enter an "F" six times). Default setting: ***00:00:00:00:00:00***  Use the address: The new address will be used temporarily. After the ARGUS has been switched off and back on, it will use the default address again.

VLAN	Use VLAN:	Specifies whether or not VLAN should be used: Default setting: ***No***
	ID:	Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device, which belongs to the VLAN with the ID = 1, can communicate with every other device in the same VLAN, but not with a device in other VLANs (one with an ID other than 1, i.e. 2). Range: from 0 to 4095 Default setting: ***0***
	Priority:	User - priority information: An eight-level (3 bits) priority can be assigned to each frame. In this manner, it is possible e.g. to give priority to forwarding voice data (e.g. in the case of VoIP), while HTTP is handled as a lower priority. Range: 0 to 7 Default setting: ***0***
PPP:	PPP (Point- to-Point Protocol) settings	
User name Entry of the user name assigned (by the network operator) 	Use the keypad to enter the user name. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits), page 51.	
Password	Entry of the password assigned by the network operator: For instructions, see User name.	
Set the IP	If “Yes”, the IP address entered as own IP address will be used for the connection. Default setting: ***No***	
Test delay	After setting up the PPP connection, the ARGUS will first wait until the period specified in the “activation delay” has elapsed before beginning a test. Range: 2 to 10 seconds Default setting: ***2***	
PPTP:	PPTP (Point- to-Point Tunneling Protocol) settings	
	Use the keypad to enter the IP address of the server.	

IP:	Internet protocol settings
IP mode	Setting the assignment of the IP addresses Static IP: fixed IP addresses DHCP client: IP address assigned by the server (remote end) DHCP server: IP address assigned by the ARGUS DHCP auto: The ARGUS will check whether there is a DHCP server in the network. If yes, the IP address will be assigned by the server. Otherwise, the ARGUS will assign the address. Default setting: ***DHCP client***
Own IP address	own local IP address of the ARGUS Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
IP netmask	IP netmask Range: 0.0.0.0 to 255.255.255.255 Default setting: ***255.255.255.0*** (see RFC 3330 regarding assignment)
Gateway IP	Gateway IP address Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
DNS server	DNS server 1 and DNS server 2 Entry of the IP address of the DNS server (DNS = Domain Name System) Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment)
DHCP client	DHCP timeout (setting of how long to wait for the IP address): Range: 1 to 9999 seconds Default setting: ***20***
	DHCP vendor ID: - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP vendor ID in ASCII format Default setting: ***ARGUS***, operation see page 67. - HEX data: Enter the DHCP vendor ID in HEX format. For instructions, see MAC address page 66.

	DHCP vendor info: - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP vendor info in ASCII format Default setting: ***ARGUS***, operation see page 67 - HEX data: Enter the DHCP vendor info in hexadecimal format (for instructions, see MAC Address) page 66
	DHCP user class information - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP user class i. in ASCII format Default setting: ***ARGUS***, operation see page 67 - HEX data: Enter the DHCP user class information in hexadecimal format (for instructions, see MAC address) page 66
	DHCP user-defined option (Create a user-defined DHCP option) - Option number Range: 0 to 255 Default setting: ***255 = off*** - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP userdef. option in ASCII Default setting: ***ARGUS***, operation see page 67 - HEX data: Enter the DHCP user-defined option in hexadecimal format (for instructions, see MAC address) page 66
DHCP server	Settings for the DHCP server: - Start and End IP addresses Range: 0.0.0.0 to 255.255.255.255 Default setting: ***0.0.0.0*** (see RFC 3330 regarding assignment) - Name of the domain, for information on the operation see page 67 - The period for which the IP addresses are reserved Range: 1 to 99999 hours Default setting: ***240***

Test parameters	The test parameters are described in the chapters on IP tests, VoIP tests, and MDI analysis.
Data log	Data log on or off: This setting must be "on" in order to send a trace file to a PC, see page 73. Default setting: ***off***
Use profile	To set the profile to be used. Yes: use this profile and display it in the profile list.
Profile name	Enter the name of the profile

7.3 Autonegotiation / Ethernet Link Parameter

The Ethernet link "autonegotiation" is supported by the default setting.

When negotiating the link parameter, the ARGUS notifies the remote end that the following are supported (these settings are fixed; they cannot be reconfigured):

- 10 and 100 Mbit/s
- Half and full duplex
- Flow control on / off (when on: sym. and asym. pause)

Manual setting of the Ethernet link parameter

When "autonegotiation" is deactivated, the speed, duplex mode, flow control (flow control = "pause" mode) are set in the profile (see page 66). The ARGUS the following can configured:

- 10 and 100 Mbit/s
- Half and full duplex
- Flow control on / off (flow control is only reasonable when operating in full duplex)

One-sided autonegotiation

If a device which has autonegotiation enabled (on) attempts to connect to a device on which autonegotiation is disabled (off) or not supported, no information will be exchanged with the remote end. The speed will still be determined even without autonegotiation by listening for NLP signals (10 Base-T) or a 100 Base-T idle pattern (parallel detection). In this case, the device using autonegotiation will generally fall back to half duplex (duplex mismatch is possible). This may lead to a conflict between the duplex modes with "poorer" performance.

7.4 ARGUS determines the following Ethernet parameters

Ethernet parameter in Line mode, opened via the [Level key]	
Status	Ethernet status when the ARGUS is connected, e.g. "active!" (link + protocol are setup) or "inactive!" (link + protocol are not yet setup).
Showtime	Duration of the active link in h:mm:ss.
Assigned LAN configuration, open via [<Stat.>]	
IP	IP address of the ARGUS. This IP address was, for example, assigned by a DHCP server (depending on the setting in the profile).
Netmask	IP netmask, which the ARGUS must use in this network.
Res.period	The assigned reservation period for the IP addresses
Gateway	IP address of the broadband gateway.
DNS 1	IP address of the first DNS server
DNS 2	IP address of the second DNS server (if any)
Frames [Rx|Tx]	The number of Ethernet frames received (Rx) and sent (Tx) (also referred to as Ethernet frames).
Bytes [Rx|Tx]	The number of bytes received (Rx) and sent (Tx).
Errors [Rx|Tx]	The number of errors on the receive (Rx) and send (Tx) sides.
Collision	The total number of Ethernet collisions that occurred in both directions.
Eth-Phys-Param. -> Physical Ethernet parameters, opened via the [<ETH>]	
Autonegotiation	Show the autonegotiation setting that the ARGUS uses.
Auton.remote	Show the autonegotiation setting that the remote end (modem, PC etc.) uses.
Speed	Shows the maximum speed negotiated between the ARGUS and the remote end.
Duplex	Shows the duplex mode negotiated between the ARGUS and the remote end.
Flow control	Shows whether flow control is used or not.

7.5 Clearing Down the Ethernet Connection

ARGUS – State display

Stop Ethernet test.

<IP>PC>:
The ARGUS will send the trace file to the connected PC, which must be running WINplus or WINanalyse. The data will be saved in the "*.log" format and can be renamed to "*.pcap" and decoded with a freeware program (such as Wireshark). The setting “Data Log” must be set to “on”. In Bridge and Router mode, two log files will be loaded to the PC, one for the WAN and one for the LAN side.

The ARGUS saves the Ethernet parameters in the first available memory location, which can be assigned any name. The name for the memory location is entered using the keypad (default: AMP_1, AMP_2.... or the call number of the access under test if the number has been entered into the speed-dialling memory (see page 185)).

If the memory is full, you must manually select a memory location to be overwritten.

Once the results have been successfully saved in memory, the ARGUS will return to the State display. A new test can be started by pressing **<Start>**.

7.6 Tests on an Ethernet Access

Depending on the protocol, the following tests are supported:

IP tests, see page 81	- IP ping - HTTP download
VoIP tests, see page 95	- VoIP telephony
MDI analysis, see page 105	- MDI analysis

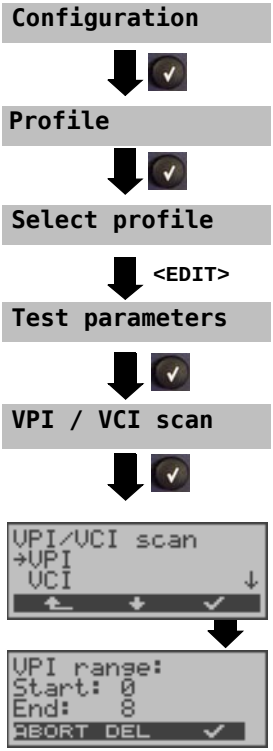
8 ATM tests

The following ATM tests can only be performed on ADSL interfaces; other interfaces such as Ethernet do not use ATM technology.

8.1 VPI / VCI scan

In a VPI/VCI scan, the ARGUS checks which VPI/ VCI combinations are active on the access under test: The ARGUS will send a test packet for each of the possible VPI/VCI combinations and wait for a packet in response.
The following parameters (see page 75) are required for the VPI/VCI scan:

Protocol independent parameters

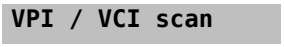


VPI / VCI scan:	
VPI	(Virtual Path Identifier) This sets the VPI range, which the ARGUS will check during the VPI / VCI scan. Range: 0 to 255 Default setting: ***0 to 8***
VCI	(Virtual Channel Identifier) This sets the VCI range, which the ARGUS will check during the VPI / VCI scan. Range: 32 to 65535 Default setting: ***32 to 48***
Number of scans	The number of scans. Range: 0 to 99 Default setting: ***2***
Timeout	This sets the maximum amount of time that the ARGUS will wait for a response from an ATM network node to a test packet which it sent. Range: 0.1 to 9.9 seconds Default setting: ***0.5 seconds***

Starting a VPI / VCI scan

Access Mode: ATU-R
Set up an ADSL connection.
The profile used to set up the ADSL connection will also be used for the VPI/VCI scan.

The ARGUS will open the Main menu.



Select “VPI/VCI scan“.

Initialization of the test software
(If it has not yet been done, set up an ADSL connection).

Displayed when the ADSL connection has been set up:
ADSL mode and duration of the ADSL connection

Display the ADSL connection parameter
see table page 52.

<TRACE> Display the commands and modem state.

<GRAPH> Bit distribution display
Display of the signal-to-noise ratio for each tone
Display the Quiet Line Noise (QLN) level for each tone.

< ↑← **>** The ARGUS will open the Status display.
Press the **<STOP>** softkey in the Status display to clear down the ADSL connection.

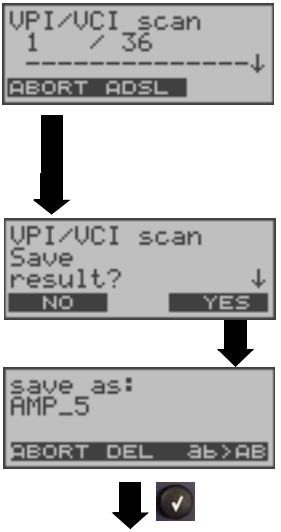
VPI / VCI scan

The VPI / VCI scan starts automatically.
The ARGUS will display the currently tested VPI/VCI combination. Depending on the protocol, the LAN, WAN, PPP and ATM statistics will also be displayed
(use the ↓-key to scroll though the display).

<ADSL> Display the ADSL connection parameters etc.

<ABORT> The test will be cancelled, the ARGUS will display the results collected thus far and will inquire whether to save them.

VPI/VCI scan Results



Once the test is over, the ARGUS will display the results: the VPI/VCI combinations active on the access under test and the statistics (scroll through with the ↓-key).

<ADSL> or Display the ADSL connection parameters, the duration of the ADSL connection, etc.

<NEW> Start a new VPI/VCI scan test.

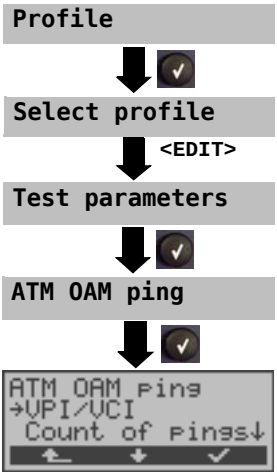
Save the test results in the internal Flash memory.

For more information on the operation, see page 173.

Single tests

8.2 ATM OAM ping

In the ATM OAM ping test, the ARGUS checks the availability of individual ATM network nodes or an ATM subnet. The following - protocol independent - parameters are required for the ATM OAM ping test (see page 78):



The ARGUS “Configuration” menu.

ATM OAM ping:	
VPI / VCI	Entry of the VPI and VCI for the ATM OAM ping Range: VPI: 0 to 255, VCI: 32 to 65535 Default setting: ***VPI: 1, VCI: 32***
Number of pings	This sets the number of test packets that the ARGUS will send. If you enter "0", the ARGUS will send packets continuously until the ATM OAM ping is stopped manually. Range: 1 to 99,999 Default setting: ***3***
Timeout	This sets the maximum amount of time that the ARGUS will wait for a response from an ATM network node to a test packet which it sent. Range: 0.1 to 9.9 seconds Default setting: ***1 second***
OAM cell type	F5 loopback seg: The loopback cell will be answered by the first ATM node of the virtual channel. F5 loopback ete The loopback cell will be answered by the endpoint of the virtual channel. Default setting: ***F5 loopback ete***

Starting an ATM OAM ping test

Access Mode: ATU-R
Setting Up an ADSL Connection
The profile used to set up the ADSL connection will also be used for the ATM OAM ping test.

The ARGUS will open the Main menu.

Select “ATM OAM ping”.

Initialization of the test software
(If it has not yet been done, set up an ADSL connection).

Displayed when the ADSL connection has been set up:
ADSL mode and duration of the ADSL connection.

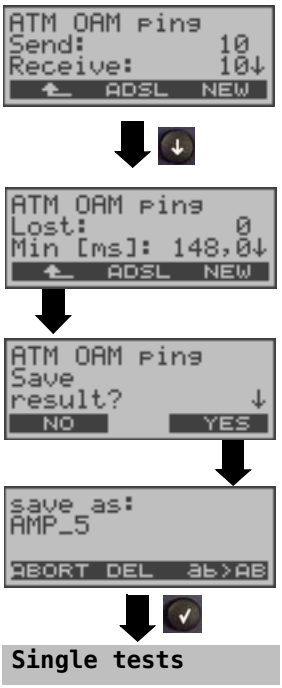
↓– ,↑– Keys Display the ADSL connection parameter see table page 52.

ATM OAM ping

The ATM OAM ping test will start automatically.
The ARGUS will display the current number of test packets sent and packets received in response. Depending on the access mode and protocol, the ARGUS will display the WAN, PPP or (optionally) the ATM or LAN statistics (scroll through with the ↓ - key).

<ABORT> The test will be cancelled, the ARGUS will display the results collected thus far and will inquire whether to save them.

ATM OAM ping Results



Once the test is over, the ARGUS will display the following results:

- Number of packets sent
- Number of packets received
- Number of packets lost
- Minimum packet round-trip delay
- Maximum packet round-trip delay
- Average packet round-trip delay
- WAN and PPP statistics
- ATM and LAN statistics

to scroll through the results.

<ADSL> or Display the ADSL connection parameters, the duration of the ADSL connection, etc.

<NEW> Start a new ATM OAM ping test.

Saving test reports

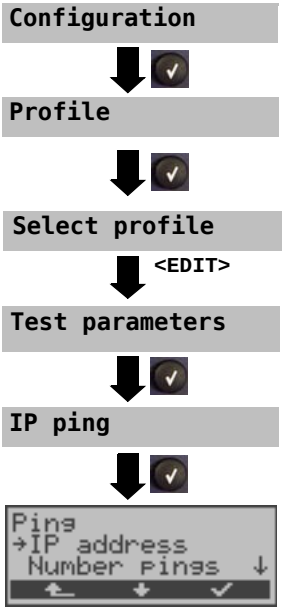
9 IP tests

9.1 Ping test

In a Ping test, the ARGUS checks whether it is possible to setup a connection to an Internet Service Provider (ISP) via the DSLAM and ATM/IP network:
The ARGUS sends a test packet to a predefined IP address (remote site) and then waits for a packet in reply. Based on the received packet, it is possible to evaluate the ATM/IP network availability and delay. It is also possible to determine the network's maximum data packet size.

The following parameters (see page 82) are required for the Ping test:

Protocol independent parameters



IP ping:	
IP address	This is the address of the remote site. The ARGUS can save up to 3 IP addresses. The saved IP addresses are available to all of the profiles.

The ARGUS shows the memory locations (a total of three) available for storing IP addresses. Use the cursor keys to mark the memory location with the IP address that you wish to edit (in this example, the first memory location is marked (1/3).

<Edit> Open the marked IP address to edit it.

<✓> The address can be entered as an IP address (number) or as a name.

as name:

Enter the name of the IP address.
Entry using the numeric keypad. Use the softkey on the right to shift the keypad (the softkey on the right assumes a different meaning when pressed), page 51.

<✓> Set the marked IP address as the default address.

Number of pings	Enter the number of test packets that the ARGUS should send to the IP address. If you enter a zero ("0"), the ARGUS will send packets continuously until the test is stopped manually. Range: 1 to 99,999 Default setting: ***10***
Pause	This setting determines the amount of time that the ARGUS will wait between sending test packets. Range: 0.1 to 9.9 seconds Default setting: ***1 second***
Packet size	This setting determines the size of the test packets. By varying the size, it is possible to determine the maximum data packet size and the relationship between size and response time. Range: 36 to 55,555 bytes Default setting: ***84 bytes***

Fragmentation	This parameter sets the fragmentation: Default setting: ***on***	
	on	Depending on the network (or router), test packets may be divided into multiple packets.
	off	Fragmentation is not permitted, i.e. the test packets may be rejected by the network (or router). In this case, the ARGUS will not receive a packet in reply.
	auto	The ARGUS determines the maximum packet size for the path to the destination address (Path-MTU) and splits the test packet into smaller packets. These can then be sent with the minimum of delay (since the network/router need not fragment the test packet).

Protocol-dependent parameters on an ADSL access:

Protocol	PPPoE (PPPoEoA) or PPPoA	IPoA / EoA (or also IPoE)
Access parameter	ATM - VPI / VCI - Encapsulation	ATM - VPI / VCI - Encapsulation
	PPP - User name - Password - Set the IP - Activation delay	
	ADSL mode	ADSL mode
		IP - IP mode - own IP address - IP netmask - Gateway IP - DNS server - DHCP client - DHCP server
	MAC / VLAN (in the case of PPPoE) - MAC address - VLAN	MAC / VLAN (in the case of EoA) - MAC address - VLAN

For information on protocol-dependent parameters on an Ethernet access, see:

	Ethernet		
Protocol	IP	PPPoE	PPPTP
Access parameter		PPP - User name - Password - Set WAN IP - Activation delay	PPTP - Server IP address PPP - User name - Password - Set WAN IP - Activation delay
	IP - IP mode - own IP address - IP netmask - Gateway IP - DNS server - DHCP client - DHCP server	IP - IP mode - own IP address - IP netmask - Gateway IP - DNS server - DHCP client - DHCP server	IP - IP mode - own IP address - IP netmask - Gateway IP - DNS server - DHCP client - DHCP server
	MAC / VLAN - MAC address - VLAN	MAC / VLAN - MAC address - VLAN	MAC / VLAN - MAC address - VLAN

Start a ping test:

Access Mode: ATU-R
Set up an ADSL connection.
The profile used to set up the ADSL connection will also be used for the Ping test.

The ARGUS will open the Main menu.

Depending on the protocol and access:
The ARGUS will first display the user name stored in the profile for the PPP connection.
The user name can, however, be changed (see page 43).

If the user name is changed here, it will only be placed in temporary storage; the profile itself is not modified.

If you change the user name, you must enter the password again (see page 43).

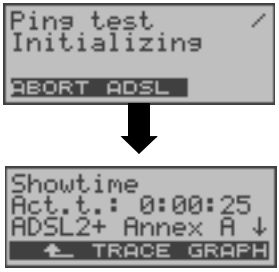
If the password is changed here, it will only be placed in temporary storage; the profile itself is not modified.

The password will remain visible during entry. It will not be masked until you have confirmed your entry.

The ARGUS displays the IP address stored in the profile.

To select the IP address for the ping.
(The default address is marked with an “*”)

<EDIT> Opens the IP address for editing.
(see page 39).



Initializing the test software
(If it has not yet been done, set up an ADSL connection).

Displayed when the ADSL connection has been set up:
ADSL mode and duration of the ADSL connection

	Display the ADSL connection parameters, see table page 52
<TRACE>	Display the commands and modem state.
<GRAPH>	Bit distribution display Display of the signal-to-noise ratio for each tone Display the Quiet Line Noise (QLN) level for each tone.
< ↑ >	The ARGUS will open the Status display. Press the **<STOP>** softkey in the Status display to clear down the ADSL connection.

Ping test

The Ping test will start automatically.
The ARGUS will display the current number of test packets sent and number of packets received in response.
Depending on the access mode and protocol, the LAN, WAN, PPP and ATM statistics will also be displayed (scroll through with the ↓-key).

<ADSL>	Display the ADSL connection parameters, the duration of the ADSL connection
<ABORT>	The test will be cancelled, the ARGUS will display the results collected thus far and will inquire whether to save them.

Ping results

Once the test is over, the ARGUS will display the results:
- Number of packets sent
- Number of packets received
- Number of packets sent again
- Checksum errors
- Number of faulty packets received
- Minimum packet round-trip delay
- Maximum packet round-trip delay
- Average packet round-trip delay
- Assigned WAN IP
- statistics

<ADSL> Display the ADSL connection parameters, the duration of the ADSL connection

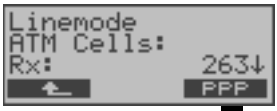
<NEW> Start a new ping test

Switch to Line mode

<Stat.> Depending on the access mode and protocol, the ARGUS will display the BRAS, IP, PPP, WAN, ATM or LAN statistics.

BRAS information:
The ARGUS displays (for the PPPoE protocol only) the BRAS (Broadband Remote Access Server) information:
- AC (Access Server) name of the server
- Service name (name of the service)

Assigned configuration:
The ARGUS will display the IP configuration assigned by the server:
- IP address assigned
- Gateway IP address
- DNS server available



PPP information:
The ARGUS will display the number of PPP packets and bytes received (Rx) and sent (Tx).

WAN Ethernet:
The ARGUS will display the number of Ethernet frames and bytes received (Rx) and sent (Tx).

ATM Cells:
The ARGUS will display the number of ATM cells received (Rx) and sent (Tx) (ADSL only).

ATM Information:
The ARGUS will display the ATM information received (Rx) and sent (Tx) such as
- Number of OAM cells
- Number of user-side VCCs
- Number of AAL5 PDUs (ADSL only)
- Received (Rx) unmapped cells
- Received (Rx) unmapped VPI
- Received (Rx) unmapped VCI
  (ADSL only)

<PPP>
Press the **<PPP>** softkey to display a PPP trace showing the sequence of PPP messages.

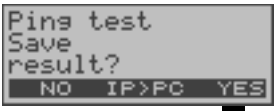
Command symbols:

< = command sent from the ARGUS

> = command, sent from the remote site

- PADI: PPPoE Active Discovery Initiation
- PADO: PPPoE Active Discovery Offer
- PADR: PPPoE Active Discovery Request
- PADS: PPPoE Active Discovery Session confirmation
- PADT: PPPoE Active Discovery Termination
- LCP: Link Control Protocol
- IPCP: Internet Protocol Control Protocol
- PAP: Password Authentication Protocol

<Time>
The **<Time>** softkey is used to tag the individual messages with times from the ARGUS system clock.



<IP>PC>:
The ARGUS will send the trace file to the connected PC, which must be running WINplus or WINanalyse. The data will be saved in the "*.log" format and can be renamed to "*.pcap" and decoded with a freeware program (such as Wireshark). The setting “Data Log” must be set to “on”. In Bridge and Router mode, two log files will be loaded to the PC, one for the WAN and one for the LAN side.

Save the test results in the internal Flash memory.

The ARGUS will save the test results in the first free record. This record can be assigned any name (default: AMP_1, AMP_2.... or the call number of the access under test if the number has been entered into the speed-dialling memory, see page 185). If all of the records have been written, you must manually select a memory location (record).

Ping Test – Error messages
If an error occurs, the ARGUS will stop the test and display an error message.

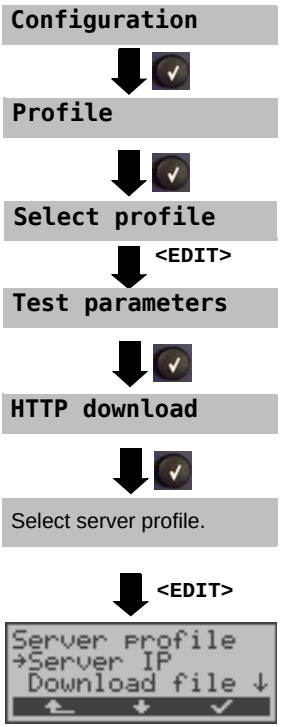
<NEW> Start a new Ping test

For a description of the error messages, please see the appendix.

9.2 HTTP download

In the HTTP download test, the ARGUS will attempt to download data from a web site or file. The ARGUS will display the current download rate and once the test is over the average speed (in the case of multiple download attempts).
The following parameters are required for the HTTP download (for a description and details on their use, see page 90):

Protocol independent parameters



The ARGUS “Configuration” menu.

Up to three user-defined HTTP Download profiles can be created.

Edit the selected profile.

Server profile:	A total of up to 3 user-defined server profiles can be created. These server profiles will then be used for the HTTP download tests. All of the parameters for an HTTP Download are in the profiles.
Server IP	Enter the IP address of the server from which the ARGUS should download the file. For information on the softkeys, see page 82.

Download filename	The name of the file that the ARGUS should retrieve in the download test. When entering a www address alias (see page 91). For information on the softkeys, see page 18.
User name	Entry of the user name for the HTTP server. For more information, see page 43.
Password	Entry of the password for the HTTP server. For more information, see page 43.
Number	This sets how often the ARGUS will retrieve the data (download file) from the “source” address in the download test. "Zero“ means continuously. In which case, the test must be terminated manually. Range: 1 to 9999 Default setting: ***3***
No. parallel down.	The number of packets into which the requested download should be divided. Range: 1 to 10 Default setting: ***4***
Profile name	Entry of a name for the profile

If an alias www address is entered as the "Source" address, the ARGUS will "only" download the one HTML page during the HTML download test. The ARGUS does not evaluate the HTML code, so any link to a “true” www address will be ignored. In this case, the ARGUS will not display an error message since the “Source” address specified will have been loaded without error.
Since it is not possible to accurately determine the transmission speed if the duration of the download test is less than 10 seconds, you should download a reasonably large file.

When entering the “Source” address (server address and download filename) make certain that you use the correct notation (upper and lower case), otherwise the ARGUS will report an Error 301 (Moved Permanently) or Error 404 (Not Found).

If the ARGUS requests multiple downloads, it will reduce the number of downloads requested to suit the number of downloads supported by the server. This may result in a deviation from the parameters set. This can, for example, be the case if the size of the requested file is unknown.

For information on protocol-dependent parameters, see page 83

Start the HTTP download:

Access Mode: ATU-R
Set up an ADSL connection.
The profile used to set up the ADSL connection will also be used for the HTTP download test.

The ARGUS will open the Main menu.

Depending on the protocol and access:
The ARGUS will first display the user name stored in the profile for the PPP connection.
The user name can, however, be changed (see page 43).

If the user name is changed here, it will only be placed in temporary storage; the profile itself is not modified.

If you change the user name, you must enter the password again (see page 43).

If the password is changed here, it will only be placed in temporary storage; the profile itself is not modified.

Select the HTTP download profile

<EDIT> Edit the profile marked with the → .
The ARGUS will open the configuration menu in which the selected profile's parameters can be edited (see page 90).

The ARGUS will use the parameters in the profile marked with the → .
The currently active profile will only be marked with an * (not an →).

Initialising the test software
(If it has not yet been done, set up an ADSL connection).

<ADSL> Display the ADSL connection parameters, the duration of the ADSL connection, etc.
or

HTTP download

The HTTP download test will start automatically.
During the download test, the display shows:
In the example, the first download of a total of three attempts (3/3) is shown. 67% of the data has already been downloaded. The current net download rate is 21.493 Mbit/s.

Display further information

- The size of the file downloaded so far
- Total size of the file to be downloaded
- Duration of the download thus far (in h:min:sec,msec)
- Time remaining before the download will be done

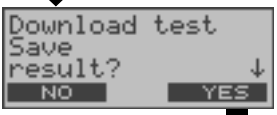
HTTP download results

Once the test is over, the ARGUS will display the following results:
- the calculated average transfer rate of the downloads (in the example, 9.5 MB/s)
- the size of the downloaded file
- the average time needed for a download
- statistics

<ADSL> Display the ADSL connection parameters, the duration of the ADSL connection, etc.
or

<NEW> Start a new download test

If an error occurs during the test, the ARGUS will interrupt the test and display an error message
(see appendix Page 203).



Save the test results.

For more information on the operation, see page 173.

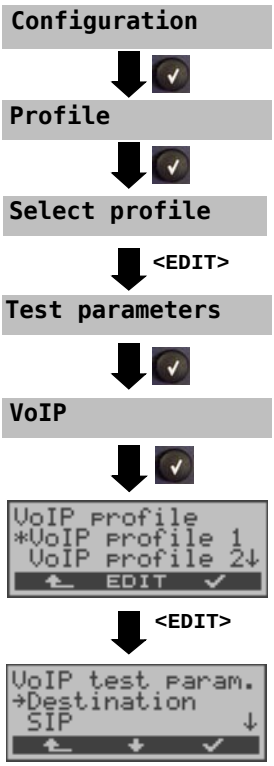
Single tests

10 VoIP test

10.1 VoIP telephony

On an ADSL or Ethernet access, the ARGUS acts as a VoIP terminal with which a telephone (voice) call can be set up. The ARGUS uses the Session Initiation Protocol (SIP) as the signaling protocol for VoIP. Using this protocol, the ARGUS can be used peer-to-peer operation (direct, address based) or with a registrar (proxy, SBC or similar).
The user can individually configure three “VoIP Profiles” for use in VoIP telephony (for more information, see page 96): the profiles can be opened – to view and edit – from the Configuration menu. If a connection is currently set up, the ADSL access parameters (e.g. the ADSL mode) will be write-protected.
The following parameters are required for VoIP telephony:

Protocol-independent parameters:



The ARGUS - Main menu

VoIP Configuration Parameters at a glance

VoIP Test param.:	Up to 3 user-defined VoIP profiles can be created. **<Edit>** Edit the selected profile.	
Destination	The VoIP destination can be entered as a call number, an IP address or as an SIP URI. The ARGUS will save up to 10 destinations. To edit a destination, select a place in the list and open it with **<Edit>**. Entry using the numeric keypad. Use the softkey on the right to shift the keypad (the softkey on the right assumes a different meaning when pressed):	
SIP	User name	User name for the registrar. For information on the softkeys, see page 43.
	Password	The password to use with the registrar. For information on the softkeys, see page 43.
	Registrar server	Use registrar Setting: yes or no. If an Internet Telephony Service Provider (ITSP) is used (in such case, you will dial a normal telephone number), a registrar must be used. A registrar is not needed if you dial a VoIP telephone directly, e.g. via its IP address or SIP-URI. Default setting: ***No*** Registrar server Address of the registrar server
	Outbound proxy/SBC	(SBC= Session Border Controller) Use proxy: This setting specifies whether or not to use Outbound Proxy. Default setting: ***No*** Outbound proxy/SBC Address of the Outbound Proxy Server Outbound proxy/SBC Port Port of the outbound proxy server Range: 0 to 65535 Default setting: ***5060***

SIP domain	Configuration of the domain name for the “From” field in the SIP message (when using an Internet Telephony Service Provider (ITPS)).
Listen port	The port used for the incoming SIP signaling. Range: 0 to 65535 Default setting: ***5060***
Remote port	The port used by the remote end. When using a registrar (see Registrar Server Setting on page 96), enter the port number of the Registrar/ Proxy Server; otherwise, enter the port number of the remote end. Range: 0 to 65535 Default setting: ***5060***
Authentication	Addtional xTU-R password used for proper authentication with the registrar. For information on the softkeys, see page 18.
Caller ID	Optional entry of any text desired which will then be displayed on the called party's equipment instead of the caller's phone number. For information on the softkeys, see page 18.
User agent	ID-string or terminal type which will be sent to the called party. For information on the softkeys, see page 18. Default setting: ***Argus 42***
Qualify	Specifies whether or not the proxy server’s availability should be checked continuously. Default setting: ***No***
Registrar expire	Specifies how long a registration with the Registrar Server is valid. Range: 10 to 6000 seconds Default setting: ***3600 seconds***
Delete existing regist.	Delete the registration with the Registrar Server. When set to "yes“, the ARGUS will be exclusively registered with the registrar server. If it is set to "no“, it will be put in the list of existing registrations. Default setting: ***yes***

Telephone setting	Jitter buffer	Sets whether the amount of playout delay is static or adaptive. Default setting: ***static***	
		Static jitter buffer:	Entry of the amount of the static playout delay. Range: 20 to 200 ms nominal: ***60ms***
		Adaptive jitter buffer:	Entry of the minimum (min) and maximum (max) amounts of playout delay and the initial value (init). Range: 20 to 600 ms min: ***60ms*** Init. ***60ms*** max: ***120ms***
	DTMF configuration	DTMF is a Dual-Tone Multi-Frequency dialing procedure. Mode: DTMF mode settings. Choose one of the following settings automatic, SIP Info, RFC 2833 or inband. Default setting: ***automatically*** Duration: The VoIP DTMF Time setting Range: 40 to 1000 ms Up to 200 ms in increments of 10, 200 to 300 ms in increments of 20, 300 to 1000 ms in increments of 100. Default setting: ***80 ms***  Increase or decrease VoIP DTMF time.	
STUN	Use STUN	Use STUN; setting - yes or no. If there is a NAT router between the ARGUS and the next remote end (gateway), you must use STUN so that the ARGUS can determine which IP address is seen by the other end for it (the ARGUS). Default setting: ***No***	
	STUN server	STUN Server Specifies the address of a STUN server which must be located in the same network (on the same level) as the remote end.	

MOS threshold	Entry of the MOS threshold: The MOS value (Mean Opinion Score) is an evaluation of the quality of the speech data. The MOS quality scale ranges from 5 (excellent) down to 1 (bad). The ARGUS will compare the MOS value of the currently active VoIP connection to the target MOS value and will display OK - if the current MOS value is at least as good as the target MOS value - or FAIL - if it is not. Range: 1.0 to 5.0 Default setting: ***4.0***
Profile name	Enter or change the name of the edited VoIP profile.

Start VoIP telephony (In this example: ADSL access)

Access Mode: ATU-R
Set up an ADSL connection.
The profile used to set up the ADSL connection will also be used for VoIP telephony.

The ARGUS will open the Main menu.

Depending on the protocol and access:
The ARGUS will first display the user name stored in the profile for the PPP connection.
The user name can, however, be changed (see page 43).

If the user name is changed here, it will only be placed in temporary storage; the profile itself is not modified.

If you change the user name, you must enter the password again (see page 43).

If the password is changed here, it will only be placed in temporary storage; the profile itself is not modified.

Select the VoIP profile.

<**EDIT**> The ARGUS will open the Configuration menu and display the parameters of the selected profile. The parameters of the selected profile can be edited here (see page 96).

Initialization of the test software
(If it has not yet been done, set up an ADSL connection).

The ARGUS will display the VoIP profile used.
If a registrar is used, the ARGUS will display how long it has been registered. Otherwise, it will display how long VoIP telephony has been activated.

Additional information will be displayed, e.g. the user ID (own number).

Display the ADSL connection parameters, bit distribution and signal-to-noise ratio etc.

The ARGUS displays the destination address stored in the first memory location in the VoIP profile (see page 96). There are several memory locations available for destination addresses.

Scroll through the destination addresses.

<EDIT> Open the marked memory location to edit it or to enter a new destination address in an empty memory location (see page 96).

or

Setup the connection

The subscriber called has not yet accept the call; the display shows “Call”.

Display further information:
"own number"
number of the party called, etc.

<LOG> Display the signaling protocol:
SIP message status codes in numerical form.

<CLEAR> Disconnect.
or
The results can be stored in the internal flash memory (for more information, see page 173).

If the party called accepts the call and a MOS value can be determined, the ARGUS will display “OK” if the speech quality meets or exceeds the target MOS value set (see page 99).

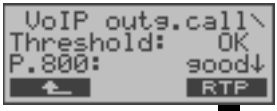
Display further information
- MOS value for the voice connection
- Codec (in the example, G.726 (32 kbit/s))
- Duration of the voice connection (Hours: Minutes: Seconds)
- “own number”
- Number of the party called

Display the ADSL connection parameters, trace data, bit distribution and signal-to-noise ratio for each tone etc.

<LOG> Display the signaling protocol:
SIP message status codes in numerical form.

Set the handset volume

<CLEAR> Disconnect.
or The results can be stored in the internal flash memory (for more information, see page 173).



the evaluation of the MOS value in accordance with ITU-T P.800 (in the example: Good), the average MOS (Avg. MOS), the current MOS (Cur. MOS), the minimum and maximum MOS that occurred, the ideal MOS (MOS possible without interference, dependent on the codec) and the R Factor in accordance with ITU-T G.107.

Scroll through the test results

Display of the other VoIP results:
- Packet statistics
- Packet loss etc.

Scroll through the test results

Statistics of the remote end (RTCP) if the remote end sends them.

Scroll through the test results

Disconnect.
The results can be stored in the internal flash memory (for more information, see). page 173

An overview of the VoIP results

During and after a successful registration:

	Display / Meaning
SIP log	A log showing the SIP methods and status codes exchanged
Register state	The ARGUS shows all of the important registration and registrar info in the Register state display.

During a call or a connection:

	Display / Meaning
MOS threshold, Voice codec	Current **MOS threshold**, **voice codec currently used**
SIP log:	A log showing the SIP methods and status codes exchanged
INFO: MOS results:	**Threshold:** Display shows whether the value stayed within the preconfigured MOS threshold. **P.800:** Evaluation in accordance with P.800 **MOS value** current / average / minimum **R-Factor** current / average / minimum
INFO: RTP results:	**RTP packets:** received / sent **RTP jitter:** current / average / minimum *(Calculation in accordance with RFC3550 performed every second)* **RTP packet loss total number:** *(RTP packets not received)* **RTP packet loss:** current / average / minimum / maximum in percent **RTP drop:** RTP packets received, but rejected by the jitter buffer **RTP error:** defective RTP packets received
INFO: RTCP results: *(The content of the RTCP packets will be displayed if this is supported by the remote end.)*	**RTP jitter - remote end:** current / average / minimum / maximum **RTP packet loss - remote end:** current / average / minimum / maximum in % **RTP packet loss - remote end Total Number** **Network delay:** current / average / minimum *(Determined by exchanging RTCP packets)*

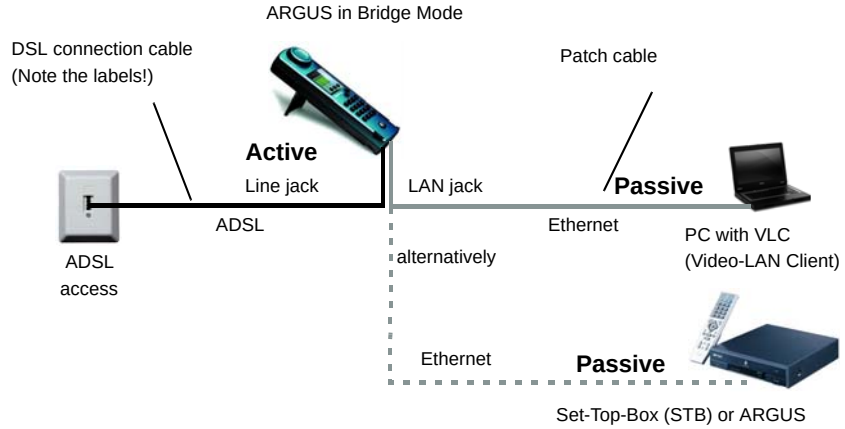
Clear down the connection, save and send log to PC

The connection is cleared down in the same manner as it is after an IP ping. However, pressing the "Cancel“ key once will only clear down the connection (if there is one). The results will be saved when the key is pressed again. The ARGUS will remain registered with the Registrar so the ARGUS can still be called (an incoming call can be rejected or accepted). If the "Cancel“ key is pressed again, the registration is also terminated and you are given the opportunity to save the results.
The Layer 1 connectivity originally setup for the VoIP connection remains.

Whenever the ARGUS offers to save the Log (in the internal memory of the ARGUS), you can instead send the Log (Trace file) to the connected PC. For more information see IP ping which is similar.

11 MDI analysis

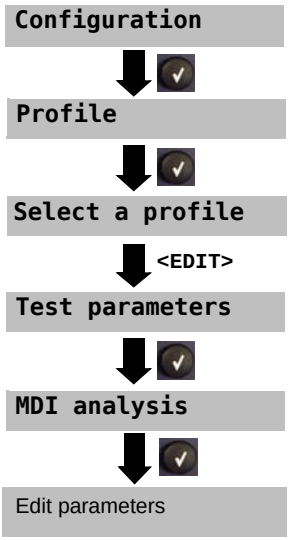
The ARGUS analyzes a UDP/RTP (User Datagram Protocol / Real-Time Transport Protocol) data stream actively or in the passive Bridge mode and determines the MDI (Media Delivery Index) in accordance with RFC 4445 and displays the Media Loss Rate and the Delay Factors.



The following parameters (see page 106) are required for the MDI Analysis:

Protocol-independent parameters:

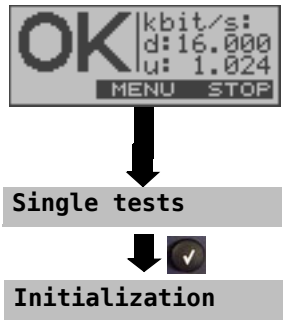
The ARGUS - Main menu



MDI analysis:	
Mode	Manual: The address of the TV channel, whose data stream should be analyzed, must be entered under Multicast IP and Port. The time span within which the ARGUS will attempt to receive a data stream is unlimited. For an active analysis, the ARGUS must be set to "manual", it will then use the configured multicast IP address and request the data stream. Automatic: The ARGUS will search for the data stream with the highest bit rate of one of the TV channels available. You must enter the time span within which the ARGUS will attempt to receive a data stream under Scan time. In this mode (when it is in bridge mode), the ARGUS is passive. Default setting: ***Automatic***
Scan time	The time span within which the ARGUS will attempt to receive a data stream. Range: 1 to 10 seconds Default setting: ***3 seconds***
Multicast IP	The multicast IP of the TV channel whose data stream should be analyzed. Default setting: ***224.0.0.0***
Port	The port number of the TV channel whose data stream should be analyzed. Range: 0 to 65535 Default setting: ***0***
Use IP header	Specify whether the IP header should be used: It is not possible to determine the packet loss (Media Loss Rate) of a data stream, which does not have a RTP header (UDP based only). In this case, it is possible to use the IP header to enable the ARGUS to determine the packet loss, if its ID field has been suitably maintained. Default setting: ***No***
	⚠ If Use IP Header has been set to "yes", but the ID field of the IP header has not been maintained, the ARGUS cannot correctly determine the packet loss (Media Loss Rate).

MDI limit values	Entry of the limit values for the Delay Factor (DF pursuant to RFC 4445), the Media Loss Rate (MLR pursuant to RFC 4445) and the packet loss in percent (PLR – Packet Loss Ratio). The Packet Loss Ratio shows the relationship between the number of packets lost to the number of packets expected (received and lost). If one of these values is exceeded while running a MDI analysis, the ARGUS will consider the test to have failed. Display shows "Fail". To run an analysis in accordance with RFC 4445, the limit value for PLR must be switched off (enter PLR = 100.0 %). Delay factor (DF): - Range: 0 to 1000 ms - Default setting: ***150 ms*** Media Loss Rate (MLR): - Range: 0 to 65535 - Default setting: ***1 per second*** Packet loss in %: - Range: 0.00 to 100 percent (100% = evaluation "off") - Default setting: ***0.10 %***

Start the MDI Analysis



Access Mode: ATU-R bridge
Set up an ADSL connection.
The profile used to set up the ADSL connection will also be used for the MDI analysis.

The ARGUS will open the Main menu.

Waiting for stream

The waiting time for a stream is dependent on the Mode setting, see page 106.

<ABORT> Quit waiting, cancel MDI analysis.

During the MDI analysis, the display shows:
- Delay Factor (DF) in msec
- Media Loss Rate (MLR) (number of lost or out-of-order data packets per second)
- Packet loss (PLR) in percent
- Evaluation with OK or FAIL dependent on the MDI limit values set (see page 107)

<ABORT> Stop MDI analysis

- Display the duration of the MDI analysis

Scroll through the test results:

- Delay Factor (DF) in msec and Media Loss Rate per sec.
- Packet Loss Ratio (PLR) in percent
- C. Err. cur.: The number of continuity counter (CC) errors per second that occurred in the MPEG packets.
- IP address of the channel with the analyzed data stream
- The channel's port number
- Packet Loss: The number of lost or out-of-order data packets counted during the test.
- CC Total: The total number of continuity counter (CC) errors that occurred in the MPEG packets during the test.
- Depending on the access mode and protocol: Display the WAN, PPP, ATM and LAN statistics

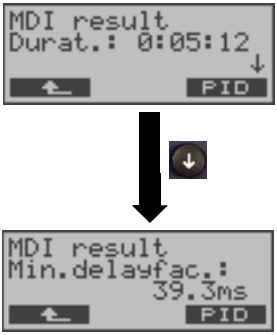
Display the ADSL connection parameters, trace data, bit distribution and signal-to-noise ratio for each tone.

<RESET> Reset Packet Loss and CC errors

< ↑ > The ARGUS will return to the previous display

Display the PIDs and their usage

< ↑ > The ARGUS will open the "MDI statistics" display



After the MDI analysis is completed, the ARGUS will display the results.
The ARGUS will first display the duration of the MDI analysis in hours:minutes:seconds.

<PID> Display the PIDs and their usage

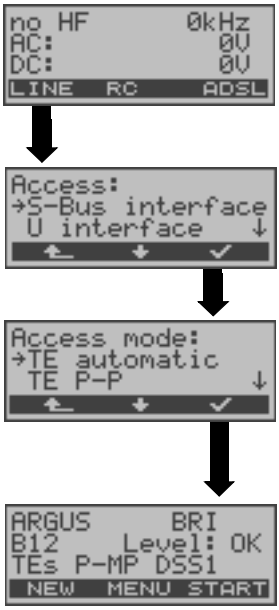
Display additional results

- IP address of the channel with the analyzed data stream
- The channel's port number
- Minimum delay factor that occurred
- Maximum delay factor that occurred
- Average value of the delay factor etc.

12 Operation on an ISDN Access

12.1 Setting the ISDN Interface and Access Mode

Using the included access cable, connect the ARGUS to the access to be tested and then switch the ARGUS on. The initial display (Start-up menu) will depending on how the ARGUS was last used.



The Access Menu

Select the physical interface.
The connection has not been set up yet!

The Access mode menu is not selectable from the Main menu. If a BRI S/T or U-interface has been selected as the physical access, it will open automatically, see page 113.

ARGUS State display

see page 115

The Access menu can be opened by either pressing the **<LINE>** softkey in the Start-up menu or by making the appropriate selection in the Main menu (see page 32). Select the type of physical access that the ARGUS is connected to.
If you use the ARGUS on a BRI S/T interface in an ISDN system, whose specifications deviate from the (DIN ETS 300 102) standard, such as those of 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.

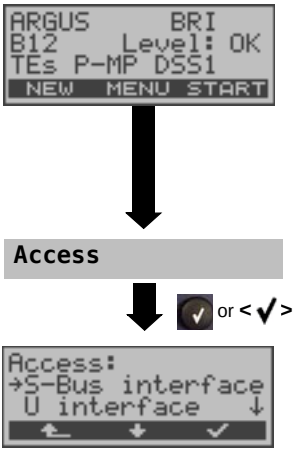
Setting the Physical Interface

If the parameters displayed at power on are not accepted, the Access menu will open automatically. However, you can also open the Access menu at any time from the Main menu (see page 21).

In the Access menu, the user must select the type of physical access to which the ARGUS is connected. When the ARGUS is restarted, the settings used last will be suggested as the default. If "automatic" is selected, a fully-automatic sequence will be started: The ARGUS will automatically determine whether the interface is a BRI S/T or a 2-wire interface (POTS or U-interface) and the access mode (P-P or P-MP).

If you use the ARGUS on a BRI S/T interface in an ISDN system, whose specifications deviate from the (DIN ETS 300 102) standard, such as those of 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.

ARGUS State display



ARGUS – status display

Open the Main menu

Using the **<↓>** or the ↓ -, ↑ -Keys — Select the Access menu

Select desired access. If "automatic" is selected, the ARGUS will automatically determine whether the access is a BRI S/T, U-interface or a POTS access and the associated Access mode (P-P or P-MP).

<✓> Press to confirm your selection.
If a BRI S/T or U-interface is selected, the Access mode menu will open automatically see page 113.

The following applies for all displays:

<↑> The ARGUS will return to the previous display and ignore any changes to the settings.
In this case, the ARGUS simply uses the "old" access.

TE Simulation

The Access mode menu is not selectable from the Main menu.
It will open automatically after the physical access – the BRI S/T or U-interface – has been selected in the Access menu.

Using the **<↓>** or the ↓ -, ↑ -Keys	Select the desired Access mode
<✓>	Confirm the Access mode. The ARGUS will open the Status display see page 115.

TE automatic

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, a configuration menu will open in which you can select the desired L2 mode

TE P-P or TE P-MP

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

12.2 Initialization Phase Including B-Channel Test:

Initialization on a BRI S/T or U-interface access

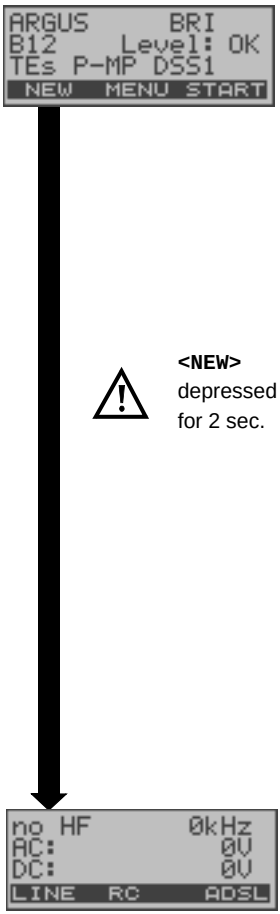
The ARGUS will setup Layer 1. While Layer 1 is being setup, "L1" LED over the display will blink. If the ARGUS cannot setup Layer 1, it will display the message “No Net”. When the ARGUS is operated on a U-interface, it can take up to 2.5 minutes to activate Layer 1. As soon as Layer 1 is successfully setup, "L1" LED will light continuously. Once Layer 2 has been setup, the "L2" LED 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.

If everything has been correctly detected, the ARGUS will display the type and mode of access found. 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 117). 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 a B-channel test and then display the results. If an error occurs in the B-channel test (e.g. access is not plugged-in), the ARGUS will either repeat the initialization or show an error message (see page 200). The ARGUS will then show the Status display.

State display on a BRI S/T access



The ARGUS will display the following:

- Type of access (e.g. BRI S/T)

- Access mode

TEs	TE Simulation Slave Mode
FVs	Leased Line Slave Mode, see page 162

- Bus configuration (D-channel Layer 2 mode)

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

D-channel protocol (in the example, DSS1)

- The availability of the B-channels

B12	Both B-channels are available
B1-	Only B-channel 1 is available
B-2	Only B-channel 2 is available
B--	No B-channel is 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

OK	Level is OK
<<	Level is too low
>>	Level is too high
--	No voltage

<**START**> Repeat the B-channel test.

<**MENU**> The ARGUS opens the Main menu, see page 21.

<**DSL**> The ARGUS opens the Access mode menu for the ADSL access, see page 38.

<**LINE**> The ARGUS opens the Access menu see page 111.

<AUTO> The ARGUS starts the automatic access recognition, see page 111.

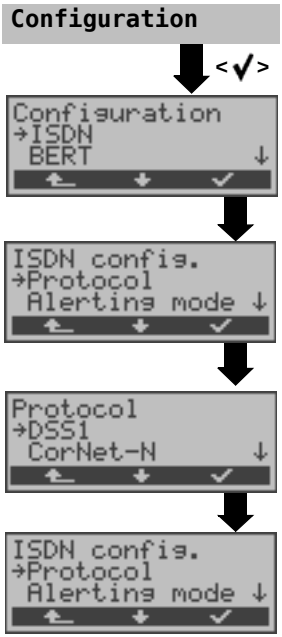
It must be mentioned again, that the ARGUS only determines the general bus status once when switched on or when the ARGUS first connected. On the other hand, the status of the protocol stacks for Layers 1, 2 and 3 will be continually monitored and displayed.

State display on a U-interface access

The ARGUS displays the availability of the B-channels, the voltage when idle, the access mode, the bus configuration and the D-channel protocol.

12.3 ISDN Parameter Configuration

It is possible to configure the following "ISDN Parameters" as needed. The default settings can be restored at any time (see page 184). The procedure for configuring a parameter is the same for all parameters and will be illustrated with a single example:



In the Main menu, select “Configuration”.

Select "ISDN".

Select the ISDN parameter e.g. "Protocol".

<↓> Select the setting for the protocol

<✓> The ARGUS will now use this setting.

< ↵ > The ARGUS will return to the previous display without storing the selected setting.

Parameter	Remark
Protocol	As an alternative to automatic protocol determination, you can also set the Layer-3 D-channel protocol manually. This setting will be stored permanently and will also active when the tester is switched on again. Default setting: ***Automatic***
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.). ⚠ When using the “Manual” setting, an incoming call must be answered within 20 seconds or it will be lost. Furthermore, you should note that the remote subscriber will not hear a ringing tone. If it is set to "automatic", 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. Default setting: ***Automatic***
Call parameter	On the user-side (ARGUS in TE mode), four different parameters can be set for a call setup (in ISDN): **1. T**ype **o**f **n**umber (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal **User-side:** **User CGN TON** **User CDN TON** **2. The N**umbering **P**lan (NP) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal **User-side:** **User CGN NP** **User CDN NP** Default setting: ***unknown*** **3. CGN Subaddress** **CGN Subaddress** Default setting: ***User specific*** **4. UUI** (User User Info)

Services	Up to three user-specific services (user spec.1 to user spec.3) can be 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 an "F", press it six times).
Call acceptance	If set to "only own MSN/DDI“, when the ARGUS is 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 speed-dialing memory , under “own number” (See “Reset all parameters” on page 184) - the incoming call must have a destination MSN Default setting: ***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 - µ-law Default setting: ***A-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 Default setting: ***DTMF***
Dest. no. MSN	A destination number can be entered, which the ARGUS will use for MSN interrogation. Default setting: ***9999***
CUG Index	Entry of the CUG Index Default setting: ***148***
Keypad	Save up to three possible keypad infos. The keypad infos are saved permanently. Use the cursor keys to select one of the three available memory locations for keypad infos. **<EDIT>** Select a Keypad Info entry to be edited. Afterwards, use the keypad to enter the Keypad Info. **<✓>** Save Keypad Info

12.4 Bit error rate 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 rate 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. Two B-channels are needed at the same time for this bit error rate test.

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.

In the case of an NGN (Next Generation Network), where a packet-switched network segment may follow a circuit switched one, please explicitly select "UDI 64k" as the service for the BERT. Then the ARGUS will, in accord with RFC 4040, switch to clear mode, deactivate the echo canceler and not use a codec.

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 set up to oneself. In this case, the ARGUS requires two B-channels for the test.

2. **BERT with a loopbox**

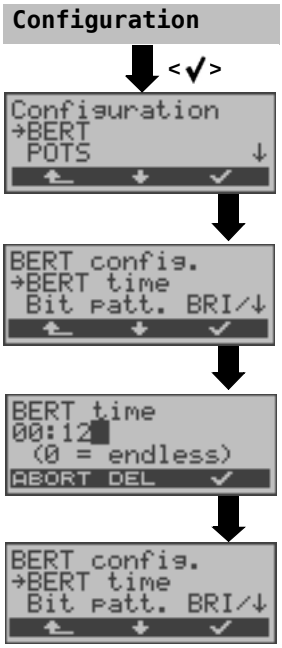
   A loopbox (e.g., another member of the ARGUS family of testers at the remote end) is required. The test uses one B-channel.

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

   This test requires a waiting remote tester such as an ARGUS in the BERT wait mode (see page 126). 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.

Setting the BERT Parameters

The default settings can be restored at any time (see page 184). The procedure for configuring a parameter is the same for all parameters and will be illustrated with a single example:

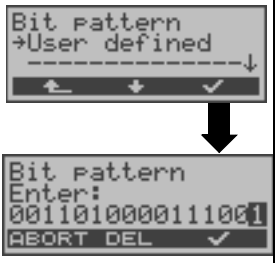


In the Main menu, select “Configuration”.

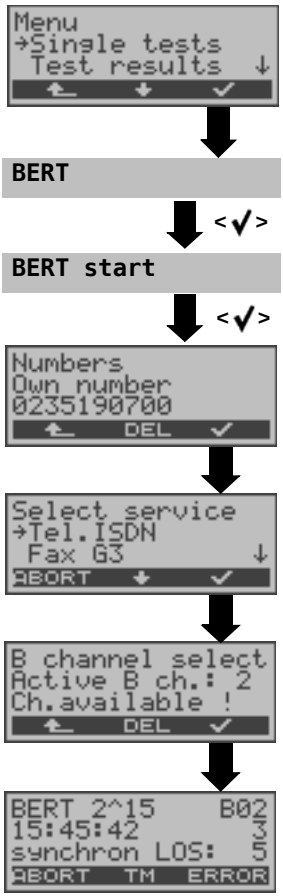
Select "BERT"

Select the BERT setting e.g. "BERT time".

Numeric keypad	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.
<✓>	Save the setting

Parameter	Remark
BERT time	You can use the keypad to enter measurement times ranging from 1 minute to 99 hours and 59 minutes (= 99:59). Default setting: ***1 minute*** ⚠ 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 **<ABORT>**).
Bit patt. BRI/U 	This setting determines the bit pattern that the ARGUS will repeatedly send in a BERT. Several predefined bit patterns are available Default setting: 2^{11}-1 Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary. ↑ -, ↓ -Keys Move the cursor **<DEL>** Changes a one (1) before the cursor to a zero (0) **<✓>** Saves the bit pattern
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) level is ***10^{-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 rate test will be evaluated as OK.
HRX value	Setting for the HRX value (**H**ypothetical **R**eference **C**onnection, see ITU-T G.821) Using the keypad, you can enter a value ranging from 0 to 100 %. Default setting: ***15%***

BERT start



The ARGUS - Main menu

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

Using the cursor keys, select the service which should be used for the BERT.

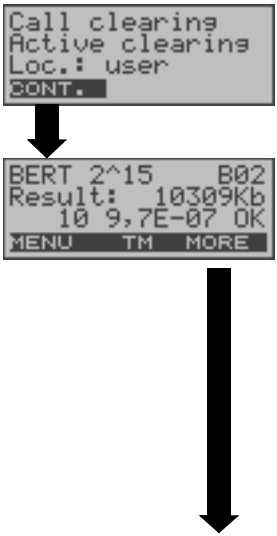
Enter the B-channel on the keypad (first press **<DEL>**). If you enter an *, the ARGUS will choose any B-channel that is free.

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.

<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).
<TM>	Open the Test Manager see page 154
0-Key	Restarts the BERT: The test time and number of bit errors will be reset.
<ABORT>	Stop the BERT

When a bit error is detected, this will be signaled by a brief alarm;
in the event that the synchronization is lost, a constant alarm will sound (see page 183 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:

Bit pattern	**2^15**
B-channel used	**B02**
Data transmitted in kbit	**10309 Kb, k= 1024 bits**
The number of bit errors	**10**
Bit error rate	**9.7E-07 = 9.7·10^{-7} = 0.00000097**
The evaluation of the results depends on the error threshold.	**OK**

<MENU> The ARGUS opens the BERT menu.

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 ITU-T G.821 with consideration of the reference connection HRX (displaying OK or NO).

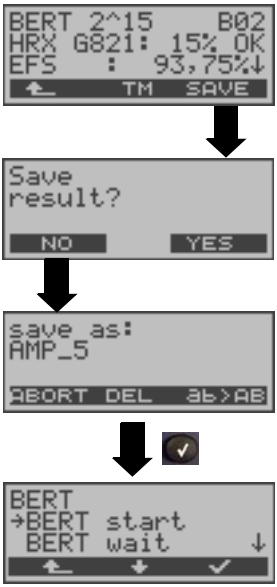
↓ -Key	Scroll
<TM>	Open the Test Manager
<SAVE>	Save the results see page 125
< ↰ >	The ARGUS will return to the previous display

Characteristic values (in accordance with ITU-T G.821)

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 $>10^{-3}$. 64,000 bits are sent in one second, i.e. Bit ERror (BER) = 10^{-3} equals 64 bit errors.
US	Unavailable Seconds: The number of all sequentially adjacent seconds (at least 9 sec) in which BER > 10^{-3}.
AS	Available Seconds: The number of all 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}. 3,840,000 bits are transferred in one minute, thus BER = 10^{-6} corresponds to 3.84 bit errors (3 errors = NO (no degraded minutes), 4 errors = OK (Degraded Minutes).
LOS	Loss of Synchronization: Synchronization is lost at an error rate > or = 20 % within a second. The absolute number of synchronization losses will be shown.

BERT - saving

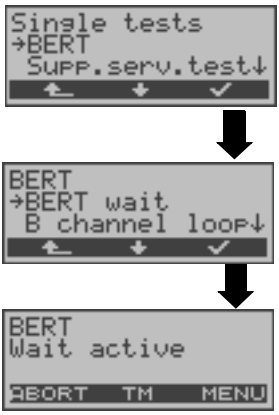
The ARGUS can store the results of several BERTs. The ARGUS saves the results together with the date, time and call number of the access under test (if this number has been entered as the "own" number in the speed-dialing memory, see page 184) under the next free record number (see page 173). If all of the records are used, the ARGUS will return to the "Autom. Test" dialog and request permission to overwrite the oldest test results.



Using the numeric keys, enter the name under which the result should be saved (Default: AMP_1, AMP_2, ... or the call number of the access under test if the number has been entered into the speed-dialing memory).
When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits).

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:



ARGUS in the Single tests menu

Activate “BERT wait”

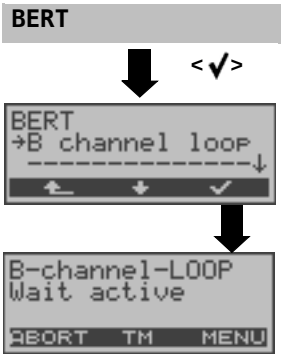
The ARGUS first waits for a call and then sets up the connection. During the connection, the received bit pattern will be evaluated. In addition, another independent bit pattern will be sent.

<MENU>	The ARGUS will open the Main menu. "BERT wait" is still active. Return to the "BERT wait" display via the Test Manager (page 154).
<TM>	Call the Test Manager (page 154)
<ABORT>	Exit “BERT wait” mode.

The ARGUS displays that will appear are the same as those described in Chapter BERT start.

B-channel loop

“B-channel loop” mode is required in order to run a bit error rate test using a loopbox at the remote end as well as to test leased lines.



ARGUS in the Single tests menu

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.

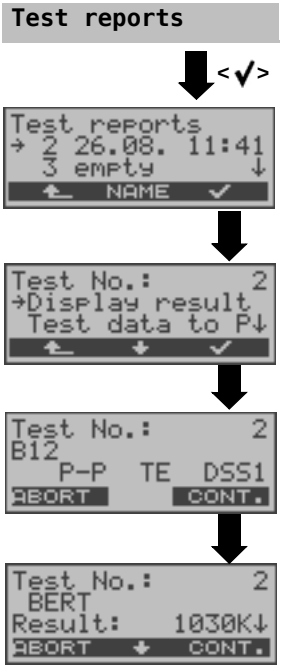
<MENU>	The ARGUS will open the Main menu. From this menu, you can start a second B-channel loop connection (this is also possible using the Test Manager). (The "B-channel loop“ remains active in the background; use the Test Manager to return to the "B-channel loop", "Wait active" see page 158).
<TM>	Open the Test Manager (page 154)
<ABORT>	Exit “B-channel loop” mode

As soon as the ARGUS takes a call, the "B-channel LOOP" connection display will open:

The ARGUS will display the caller's number (e.g. 235190700), the B-channel used (e.g. B01) and the number dialed (e.g. 907070).

↓-Key	Display further information (e.g. TON, NP, UUS, ...)
<MENU>	The ARGUS will open the Main menu.
<TM>	Open the Test Manager (page 154)
<ABORT>	Disconnect B-channel loop “B-channel loop” mode remains active.

Displaying the saved BERT results:



In the Main menu, select Test Reports.

↑-, ↓-Keys to select the record with the saved BERT

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

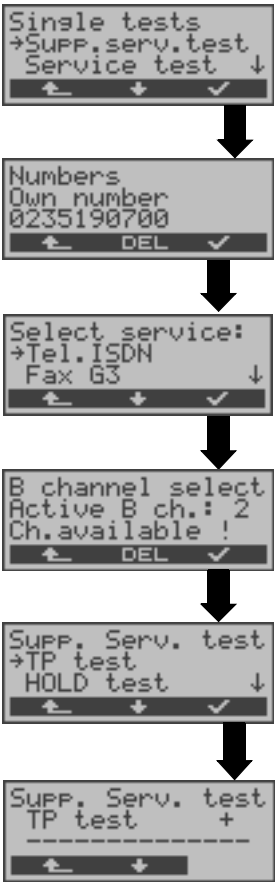
display the stored results

<↓ >	to scroll through the results
<ABORT>	Continue to the next higher menu

12.5 The Supplementary Services Test

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

Suppl.service interrogation in DSS1



ARGUS in the Single tests menu

Use the keypad to enter the "Own number" (the number of the access under test) or select it from the speed-dialing memory (see page 184). The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

Select the service which should be used for the supplementary services test.

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.

Select the supplementary service (e.g. TP) that the ARGUS should check to see whether it is supported on the access under test.

Start test

The ARGUS will automatically display the test results:

+ =	suppl. service supported
- =	suppl. service not supported
<↓ >	Scroll through the test results
< ↑ >	The ARGUS will return to the previous display

Test	Explanation
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	The ARGUS checks, one after the other, 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 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 CLIP, CLIR, COLP and COLR will be tested in pairs. If CLIR or COLR is set up 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 supported?
CF	The ARGUS will check 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?
	In the CF test, the ARGUS attempts to set up a call diversion to the call number that is in the speed-dialing memory location for “remote call number 1” (see "Saving call numbers in the Speed-dialing Memory" on page 24). When performing a CF test, the ARGUS will report an error 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 / CCBS-T	Will the access under test automatically recall a remote subscriber if the number called was busy?
CCNR / CCNR-T	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. A connection is necessary.
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. A connection is necessary.
CUG	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.
CD	An incoming call will be diverted immediately. This form of call diversion differs from the others in that it is invoked on a call-by-call basis, and is not preconfigured to a specific destination.
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?

No Screening	If the caller supports CLIP No Screening, all of the net-side call numbers connected with the ARGUS will be displayed.

Supplementary Services Test - 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).
Example: The error code 28 equates to "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" in the appendix).

A few error codes and their meaning:

Description	Cause (from network) DSS1	Cause ARGUS internal
no or another access	__	201, 204, 205, 210, 220
wrong or invalid number	1, 2, 3, 18, 21, 22, 28, 88	152 ,161, 162, 199
One or more B-channels busy	17, 34, 47	___
wrong service	49, 57, 58 ,63 , 65, 70, 79	___

12.6 Service tests

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	**3.1k audio / 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 118)	**Userspec.1 /** **Userspec.2 /** **Userspec.3 /**

ARGUS in the Single tests menu

Enter the number of the access under test

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.

There are PBXs that use separate call numbers for incoming and outgoing calls. In this case, for the Service tests, you can enter a “remote” call number that does not match the “own” number that is stored in the ARGUS.

If the Service test should extend outside of the local exchange, it is possible to perform the Service test 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.
The ARGUS makes a distinction between outgoing calls (the first +, - or *) and incoming calls (the second +, - or *).

<↓ >	Scroll through the test results
+ =	Service supported
- =	Service not supported
* =	A definite statement cannot be given, see the adjacent error code for the reason.

Interpreting the test results:

Display	Explanation
+ +	The self call functions OK or the remote end can take the call for this service
+ -	The call was sent successfully, however, it was rejected at the remote end due to a lack of authorization.
-	An outgoing call with this service is not possible
+ *	The 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).
*****	Wrong number, no B-channel available or other error

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 G3 service is OK. No statement is possible about incoming. The error code 63 gives the coded cause of the error (see the table in the Appendix). In this case, it is recommended that you have someone place a call to the access under test using this service.

Fax G4 service is supported in both directions.

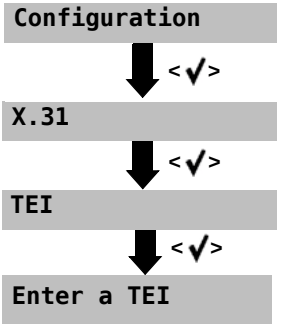
If an error occurs (See “Supplementary Services Test - Error Messages” on page 132) the Service test will be aborted. Any other error will be coded in decimal (in the example above 63), assigned to the respective service and then displayed.

12.7 X.31 test

The ARGUS will either perform a “Manual X.31 test” or an “Automatic X.31 test”:
The ARGUS will first perform a TEI test and then begin to setup an 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.
Two different parameters can be set for the X.31 test:

Configuring the X.31 parameters



In the Main menu, select “Configuration”.

Select "X.31"

Select the desired parameter (in this example, TEI)

Using the keypad, enter the TEI

<√> The ARGUS saves the TEI entered.

< ↵ > The ARGUS will return to the previous display without saving any TEI entered.

Parameter	Remark
TEI	Entry (from the keypad) of the TEI to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI.
LCN	Entry (from the keypad) of the LCN to be used in the X.31 test.

X.31 test, automatically (D-channel)

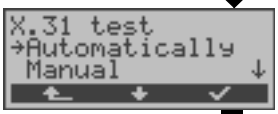
The "Automatic X.31 test" is performed in two steps:

First Step:
The ARGUS tests whether it is possible to access the X.25 service via the D-channel on the BRI S/T access under test. The ARGUS checks all of the TEIs from 0 to 63 one after the other. All the TEIs, which support X.31-service 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 (see "Reset all parameters" on page 184). With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.

ARGUS in the Single tests menu

Select "X.31 Test"

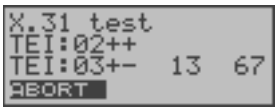


Select "Automatically"

Start test

The test can take up to 4 minutes (a rotating bar will be displayed). The ARGUS will display the currently tested TEI, the previously tested TEI and the results:

+ = X.31 is available for this TEI
- = X.31 is not available for this TEI



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

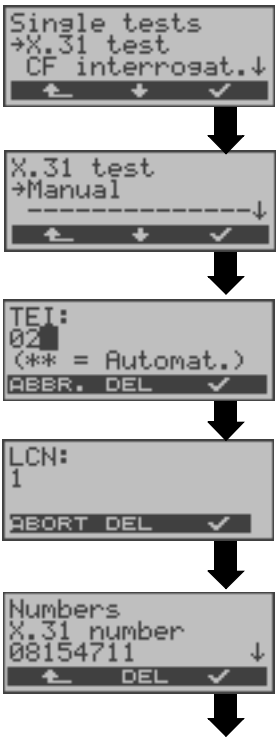
↓-Key to scroll through the results

Test results

TEI 02	=	The first valid TEI value is 02.
+ +	=	Both test steps were successful.
+ -	=	2. test step was unsuccessful. In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above, 13) and the associated diagnostic code (in the example, 67) if available (see page 201). If the X.31 service is not supported, the ARGUS will report “X.31 (D) n. impl.”

Manual X.31, D-channel test

The ARGUS first requests a TEI, LCN and an X.31 number. If an ****** 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.



ARGUS in the Single tests menu
Select "X.31 Test"

Select "Manual"

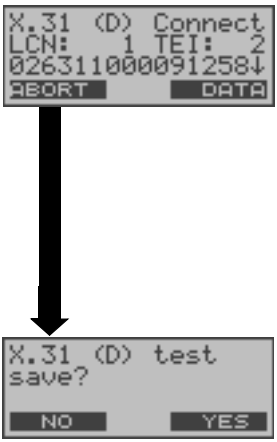
The ARGUS displays the TEI stored in the Configuration menu (see page 136). You can edit the TEI from the keypad; If you enter ****** , the ARGUS will automatically determine a TEI.

<DEL> Delete the TEI

The ARGUS displays the LCN saved in the Configuration menu. It is possible to edit the LCN from the keypad.

The saved X.31 number (speed-dialing memory) is displayed (see page 184). 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).

<DATA> Send predefined data packets (three different packets are available).

Display additional information (if made available by the exchange).

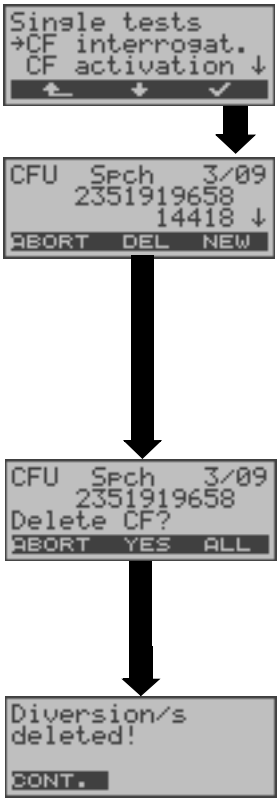
The connection will be maintained until the user or the opposing end clears it. When the X.31 is cleared down, the ARGUS will automatically clear down the D-channel connection.

<YES> The ARGUS saves the results.
For information on displaying the saved test results, see page 173.

12.8 Call Forwarding (CF)

CF Interrogation

The ARGUS will check whether a call diversion has been setup in the exchange for the access under test (DSS1 only).
The ARGUS will show the type of diversion (CFU, CFNR or CFB) and the call diversion's service. The display is limited to a maximum of 10 call diversions for all of the MSNs. The ARGUS will count any additionally set up call diversions.
Any call diversion setup in the exchange can be cleared with the ARGUS.



ARGUS in the Single tests menu

Select "CF interrogation"

Start the CF Interrogation which 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.

↓ -Key to scroll

<NEW> Repeat the CF interrogation

Delete call diversion

Security query:

<YES> The ARGUS will delete the displayed number in the exchange. If the call diversion could not be cleared, the ARGUS will report: Call diversion not changeable.

<ALL> Delete all current call diversions.

<CONT.> The ARGUS opens the Single tests menu.

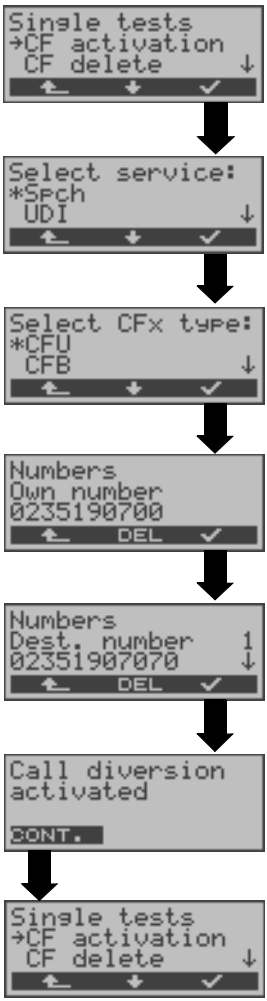
Some PBXs or exchanges do not permit the use of the mechanism used (by the ARGUS) for the interrogation of the call diversions for all MSNs or they return a negative acknowledgment of the interrogation of call diversions, implying that no call diversions have been set up.
In the event of a negative acknowledgment, 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**
Language	**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	**Tel7k**
UDI 64 kBit	**UDI**
Unknown Basic Service	**Unkno**

CF activation

Using the ARGUS, call diversions can be setup in the exchange.



ARGUS in the Single tests menu

Select "CF activation"

Select the call diversion service

Select the call diversion type

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

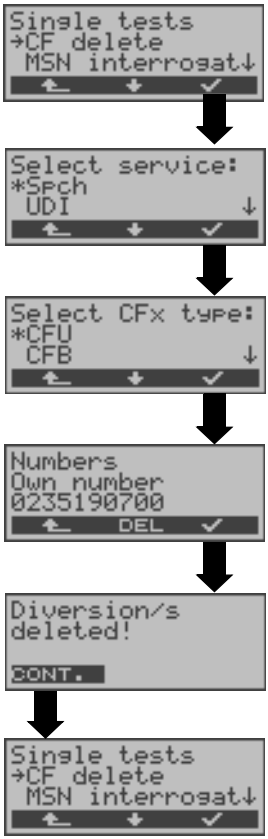
<DEL> Delete the digit before the cursor

Enter the number to which calls should be diverted.

Setup the call diversion

CF delete

Using the ARGUS, call diversions can be deleted in the exchange.



ARGUS in the Single tests menu

Select "CF delete"

Select the call diversion service

Select the call diversion type

Under "Own number", enter the number which should no longer be diverted.

<DEL> Delete the digit before the cursor

Delete call diversion

12.9 MSN interrogation (only on a DSS1 BRI S/T)

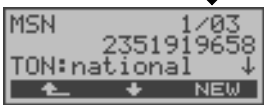
On a P-MP access using the DSS1 protocol, the ARGUS will determine the MSNs of the access under test. It will display a maximum of 10 call numbers. Depending on the Type of Number (TON), the ARGUS will display the call numbers in different versions:
- only the MSN (without area code)
- MSN with national area code without the leading “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 addition, pay attention to the "Destination MSN" setting.

ARGUS in the Single tests menu

Select "MSN interrogation"

Start the MSN interrogation



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

<↓ > Scroll through the test results

<NEW> 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!

12.10 Connection

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	**3.1 kHz audio / 3.1k**
7 kHz Audio	**7 kHz audio / 7 kHz**
Unrestricted Digital Information with tones / display	**UDI-TA / UDI TA**
Telephony	**Telephony 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	**Telex / Ttx64**
International inter working for Videotex	**Videotex / VTX**
Telex	**Telex / Telex**
OSI application according to X.200	**OSI / OSI**
7 kHz Telephony	**Telephony 7kHz / Tel7k**
Video telephony, first connection	**Video telephony 1 / Vid.1**
Video telephony, second connection	**Video telephony 2 / Vid.2**

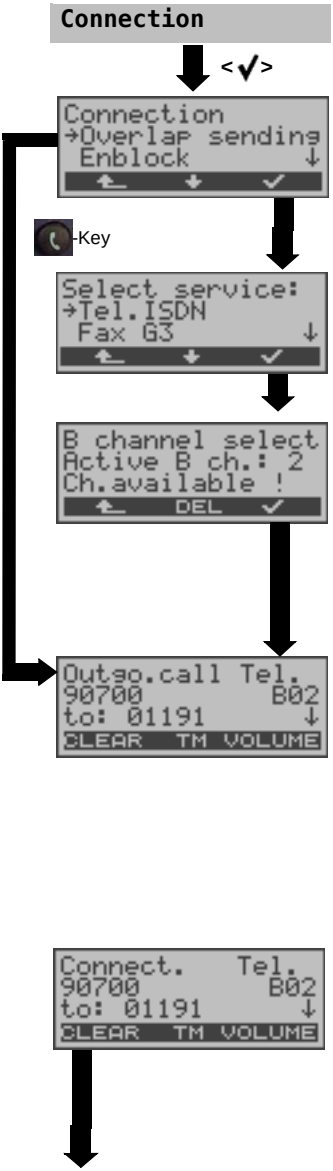
Additional three user-specific services (See “Services” on page 118).

b) The integrated handset can be used as a phone during a telephone connection.

c) When an ISDN connection is set up, pressing the number keys (0-9) or the * or # will generate and send the corresponding DTMF tones.

Overlap sending (outgoing call)

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



In the Single tests menu, select “Connection”.

Select "Overlap sending"

The ARGUS will open the connection display

Select the service to be used for the connection.

Enter the B-channel via the keypad (by default, the last B-channel used will be suggested). To enter 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.

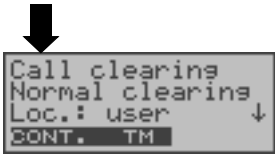
Setup the connection

Enter the number on the keypad.
The ARGUS displays the service (Tel.), the own number (90700), the B-channel (B02) and the number called (01191), the call reference (CR value) as well as its length and flag.

↓-key	Scroll through the Infos
<TM>	For information on starting the Test Manager, see page 154.
<CLEAR>	Cancel setup

The connection is setup using B-channel 2.

↓-key	Scroll through the Infos (if there are any): - Subaddress of the caller (SUB) - User-User Information (UUI) - Display Information - Type of number (TON) - Numbering Plan (NP)
<CLEAR>	Disconnect
<VOLUME>	Set the handset volume
e.g. **0-key**	Keypad information, can also be transferred during the call, see page 153 and page 118.



The ARGUS displays the cause of the disconnect.
(see page 151 Clearing Down a Connection).

Displaying Advice of Charges (AOC)

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 DIN ETS 300 182 standard, rather in the form of the information element DISPLAY (DSP), the ARGUS will display the DISPLAY message's character string.

Note regarding the entry of the call number

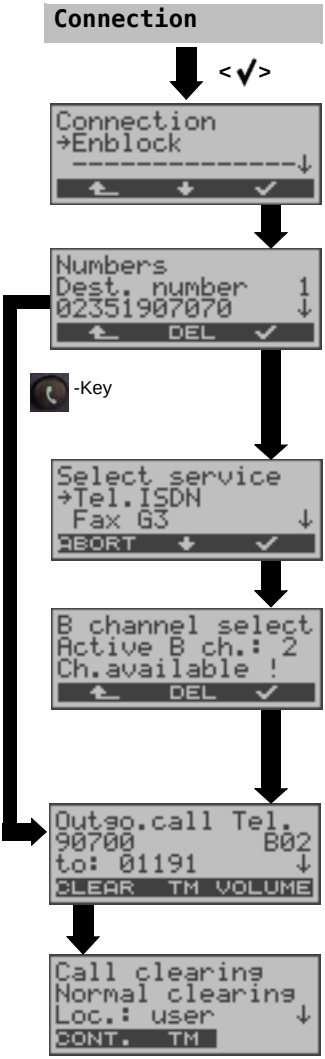
Separate the extension from the access number with a # (e.g. 02351 / 9070-0 is entered on the ARGUS as: 023519070 #0).
For an outgoing call, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number, only the extension (DSS1-CGPN or 1TR6-OAD).
A ‘#‘ 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

Press	The ARGUS will open the Connection/Overlap window directly regardless of the currently open menu.
Press again	A dial tone will be heard and once the call number is entered, the call will be setup.

En-bloc sending (outgoing call)

In en-bloc sending, the ARGUS sends the entire dialing information in one block. The number is dialed from the call number memory (see page 184).



In the Single tests menu, select “Connection”.

Select Enblock

-Key — Select the number from the call number memory (see page 184) or reenter the number on the keypad

<DEL> — Delete digit

-Key — The ARGUS will open the connection display

Select the service to be used for the connection.

Enter the B-channel via the keypad (by default, the last B-channel used will be suggested). To enter 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.

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

Cancel setup

The ARGUS displays the cause of the disconnect. (see page 151 Clearing Down a Connection)

Incoming Call

An incoming call can be taken at any time even when a test (e.g. a BERT) is in process (see page 155). 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 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 page 184) 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 complete destination number (DDI), if the Alerting mode is set to manual (see page 117).

-Key	View additional information (if available)
<REJECT>	Reject call

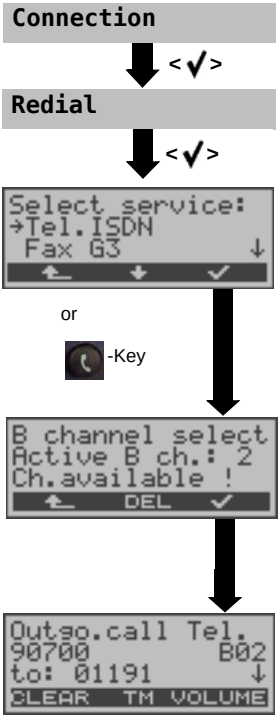
Accept the call

-Key	View additional information (if available)
<TM>	Start Test Manager (see page 154).
<VOLUME>	Set the handset volume
e.g. **0-key**	Keypad information, can also be transferred during the call, see page 153 and page 118.

Clearing the connection

Redial

The ARGUS will set up a call using the last number dialed.



In the Single tests menu, select “Connection”.

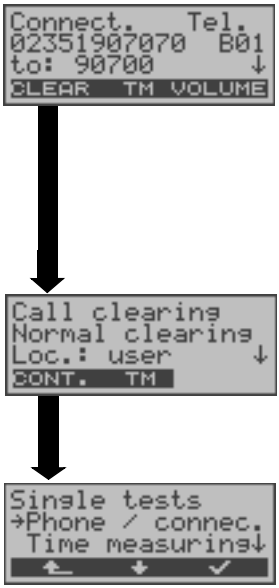
Select “Redial”

Select the service to be used for the connection.

Enter the B-channel via the keypad (by default, the last B-channel used will be suggested). To enter 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.

Using the number used last, start dialling (for information on the other displays and operation see Overlap sending page 146).

Clearing Down a Connection



-Key — View additional information (if available)

<TM> — For information on starting the Test Manager, see page 154.

<VOLUME> — Set the handset volume

<CLEAR> — Clearing the connection (see page 151).

or

-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 (if available)

<TM> — For information on starting the Test Manager, see page 154.

The ARGUS opens the Single tests menu.

The following causes are shown in clear text:

Cause	Display	Explanation
255	**Active clearing**	Clearing User actively initiated the disconnection
Length 0	**Normal clearing**	Cause element with Long 0
01	**unalloc. number**	Signals “No access under this call number”
16	**Norm. clearing**	Normal clearing
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

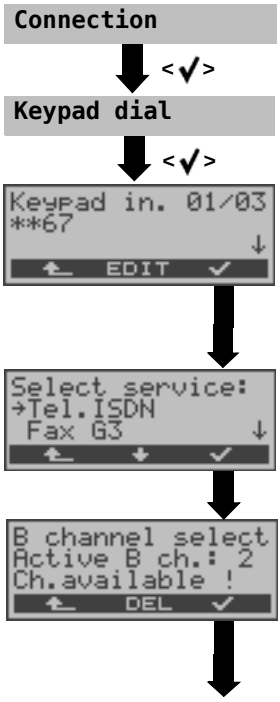
57	**BC n.enabled**	Requested bearer capability is not enabled
63	**Serv./Opt.n.verf**	Unspecified for “Service not available” or “Option not available”
69	**Req.fac.not impl.**	Requested facility is not supported
88	**Incompat. Destination**	Incompatible destination
102	**Timer expired**	Error handling 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 C and D page 200).

12.11 Testing features via the keypad

This feature is only relevant on a BRI S/T 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. Each step is acknowledged either acoustically (handset) or via special protocol elements (cause). These causes are displayed by the ARGUS.



In the Single tests menu, select “Connection”.

Select “Keypad dial”

-Key — Select a Keypad Info entry, see page 118.

<EDIT> — Select a Keypad Info entry to be edited. Afterwards, use the keypad to enter the Keypad Info (see page 118).

Select the service to be used for the connection.

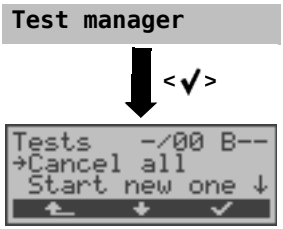
Enter the B-channel to be used for the connection via the keypad (by default, the last B-channel used will be suggested). To enter a new B-channel, first press **<DEL>**. If you enter an *, the ARGUS will choose any B-channel that is free. The ARGUS will show whether the B-channel is available.

Start the dialing procedure
(for more displays and information see Overlap sending page 146)

12.12 Test manager: Managing multiple tests or connections

The ARGUS can simultaneously start several tests or “connections” fully independently of each other. 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, select "Test manager".

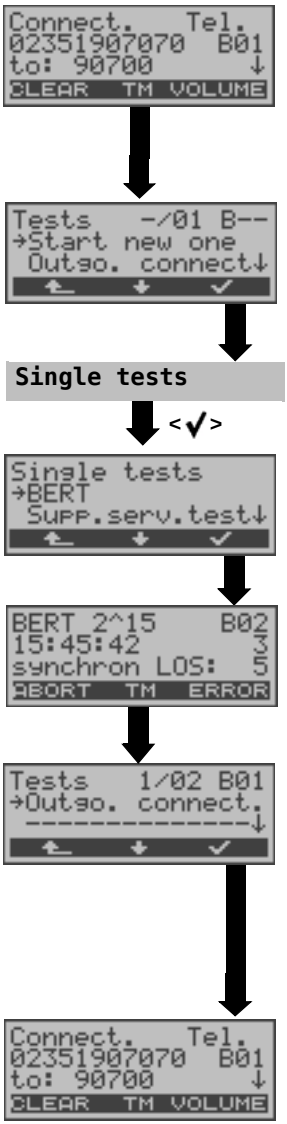
Open the Test Manager

<TM>
or
6

Opens the test manager directly, if the ARGUS is in the Single tests menu or has a connection for a call or is running a test.

12.12.1 Starting Several Tests to Run Simultaneously

Starting a new test or connection during an existing connection



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

<TM> Calls the Test Manager
or

6

The ARGUS displays the number of existing connections (-/01).
Select "Start new one".

The ARGUS will open the Main menu.

Select single tests.

Select the desired test, e.g. BERT

Start BERT (still connected)

For information on running a BERT, see page 119

The ARGUS will open the Test Manager.

Select “Outgo. connect.”.

An example of the display

Tests 1/02 B01

- The connection was the first started
- There are currently two active connections or tests
- The connection uses B-channel 1

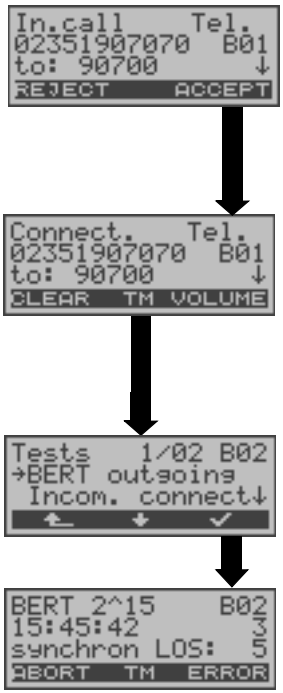
The ARGUS will open the "Connect. Tel." display.
If a test (or connection) is cancelled or cleared, the ARGUS will return to the Test Manager if there is another test (or connection) running in the background.

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

Test/ Connection display.	**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 If the auto. test is running, all of the resources are in use and no other tests or connections are possible.	No
S-Bus level	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 page 145 Setting up an ISDN connection). The incoming call can be accepted without affecting the currently running test. If either the “B-channel loop” or the “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> Reject the incoming call
The ARGUS returns to the BERT.

Accept the call

The BERT will continue in the background.

<TM> Calls the test manager
or
6

Select “BERT outgoing”.

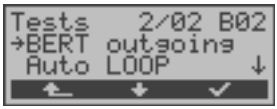
The ARGUS will open the BERT display.

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.

12.12.2 Switching between tests

Open the test manager.



<↓> Select the test (connection) to which you wish to switch.

<✓> The ARGUS will jump to the selected test.

< ↵ > 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.

12.12.3 Cancel all

Open the test manager.

<↓> Select "Cancel all"

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

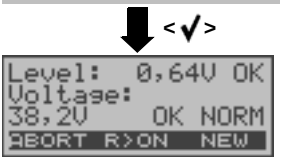
12.13 Level measuring on an S-Bus access

Level measurement – connected line

The ARGUS measures the level of the received useful signal and the phantom feed. The measurement will be updated continuously.

Level measuring

In the Main menu, 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).
Measurement results:
- Evaluation of the useful signal level:

<<	Level is too low
>>	Level is too high
OK	Level is in order (0.75 V $^{+20\%}_{-33\%}$ i. e. from 0.9 V to 0.5 V)
none	no level

- Evaluation of the level of the feed

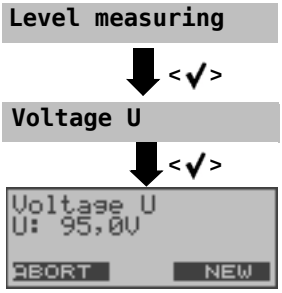
OK NORM	Normal feed (40 V $^{+4.25\%}_{-13.75\%}$, i.e. from 41.7V to 34.5V)
OK Rev	Inverted phantom feed
NONE	No feed (Voltage)

<R>ON>	**100** Ω resistor switched in
<R>OFF>	**100** Ω resistor switched out
<NEW>	to set up Layer 1 again - to ensure a reasonable measurement.

12.14 Level measurement on a U-interface access

Measuring the feed voltage

In the Main menu, select “Level measuring”.



Start measurement

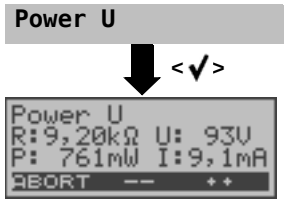
The ARGUS will display the level of the feed voltage.
The measurement will be updated continuously.

<ABORT> Stop measurement.
The ARGUS opens the Level measuring menu.

Measurement of the U-interface under load

The ARGUS measures the voltage on the U-interface under various selectable loads and displays the calculated current and power. From these values, it is possible to estimate the length of the line.

In the Level measuring menu, select "Power U"



Start measurement

The ARGUS displays the switched-in load in kΩ, the measured voltage in Volts (should not exceed 100 V), the calculated power in mW and the calculated current in mA.

<++> To increase the load by one increment (i.e. the resistance is lowered)

<--> To decrease the load by one increment (i.e. the resistance is increased)

<ABORT> The ARGUS opens the level measuring menu.

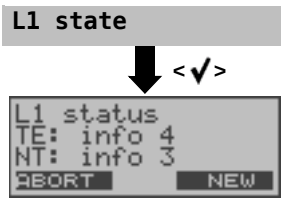
Step	Load / kΩ	Maximum voltage / V
1	64.4	approx. 126.0 [1)]
2	28.1	approx. 126.0 [1)]
3	19.2	approx. 114.0 [1)]
4	13.9	approx. 114.0 [1)]
5	11.3	approx. 114.0 [1)]
6	9.2	approx. 109.4 [2)]
7	7.98	approx. 101.8 [2)]
8	6.88	approx. 94.6 [2)]
9	6.13	approx. 75.0 [1)]
10	5.46	approx. 75.0 [1)]
11	5.0	approx. 75.0 [1)]
12	4.55	approx. 75.0 [1)]
13	4.21	approx. 73.9 [2)]
14	3.90	approx. 71.2 [2)]
15	2.72	approx. 59.5 [2)]

1) The voltage is limited by the power capacity of the individual circuit elements.
2) The voltage is limited by the maximum power (1300 mW).

When switching the load levels, the power limitations of the components within the ARGUS and the maximum permissible power (1300 mW) 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.

12.15 The L1 Status of a BRI access

The ARGUS displays the current status of Layer 1: i.e., which signal is received from the remote end (Rx) and which signal does the ARGUS send (Tx).



In the Main menu, select “L1 status”.

The ARGUS displays the status of Layer 1 or of the signal, which is currently being sent (Info 0, ... , Info 4).

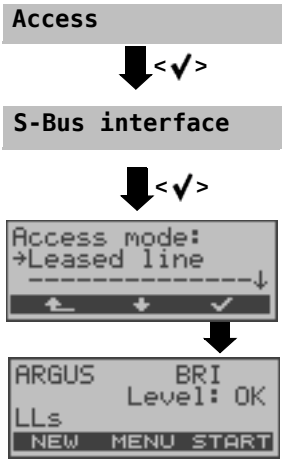
<NEW> To setup Layer 1 again (if necessary).

12.16 Leased line

Besides dial-up connections to any subscriber, ISDN also supports the use of permanent circuits switched to a specific remote location (leased lines). These leased lines (permanent circuits) are available after setting up Layer 1, in other words after synchronizing both terminals.
As a quick test of a leased line, you can simply call the opposite end using a selected B-channel. However, for a more revealing test of a leased line, you should perform a bit error rate test.

⚠ Both ends of the permanent circuit (leased line) must use the same channel.

12.16.1 Telephony



The ARGUS - Main menu

Display "LLs" in the status display.

The ARGUS will open the B-channel selection.
Alternative: Alternatively, in the Single tests menu, select Connection.

The ARGUS will display the B-channels available. Use the ↓ -, ↑ -keys to select a B-channel or enter the number of the B-channel on the keypad (first press **<DEL>**).

<✓> The ARGUS will setup the phone connection and display the B-channel used together with the duration of the leased line connection (permanent switch circuit) in hours:minutes:seconds.

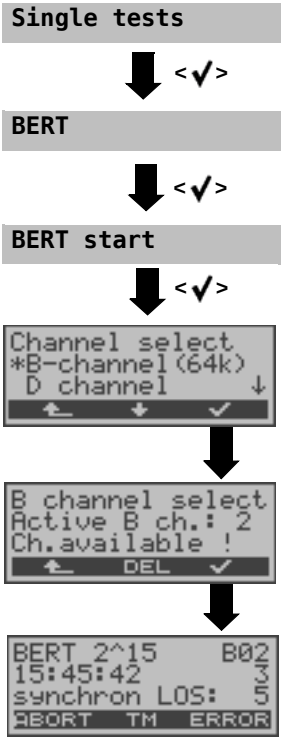
<VOLUME> Setting the volume

<TM> Start Test Manager (see page 154). Another connection can be setup.

<ABORT> Disconnect.
The ARGUS will open the Status display.

12.16.2 Bit error rate test

On a BRI S/T access:



A number of variations are possible in testing leased lines with a BERT.
In the simplest case, a B-channel loop will be set up at the remote end.
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 122), however, you need not enter call numbers or select a service.

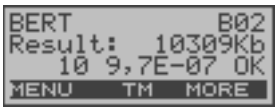
In the case of a BRI access in end-to-end mode (see page 122 and page 126), it is also possible to run a BERT in the D-channel.

↓ -, ↑-Keys — Change the B-channel or use the keypad to enter the B-channel

BERT start

The ARGUS will display
- the bit pattern, B-channel used and the bitrate
- synchronicity of the bit pattern (synchron)
- sync.time in h:min:sec (the period of time that the ARGUS has been synchronized)
- LOS counter
- the bit errors that have occurred.

<ERROR>	Insert artificial bit errors to test the reliability of the BERT.
0-key	The test time and bit error counter will be reset.
<TM>	Start Test Manager (see page 154).
<ABORT>	Cancel the BERT.

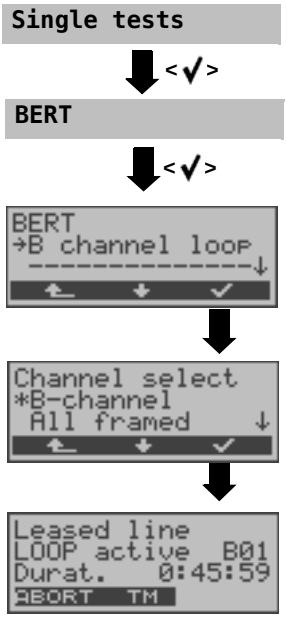


Once it is over, the ARGUS will display the results of the BERT (see page 122). For information on saving the test results, see page 125.

"BERT wait" on a leased line

In this mode, the BERT will wait for the BERT at the remote end which is necessary for an end-to-end test: See “BERT wait” on page 126.

12.16.3 Loopbox



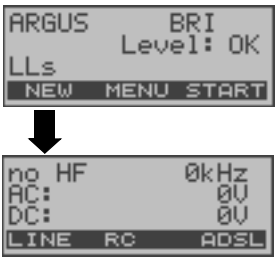
The ARGUS can be used as a loopbox on a permanent circuit (leased line).

Channel selection:
The ARGUS will loop either one B-channel (Channel selection: B-channel) or all B-channels and the D-channel (Channel selection: All framed).

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

<ABORT> Stop the Loopbox

12.16.4 Switching from permanent switch mode



ARGUS – status display

<DSL> The ARGUS opens the Access mode menu for the ADSL access.

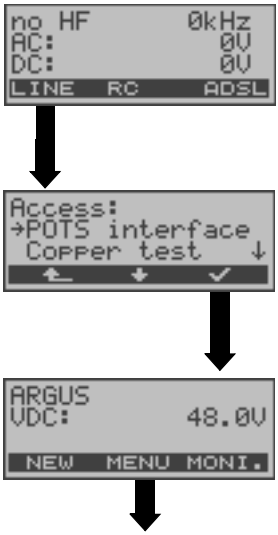
<LINE> The ARGUS opens the Access menu see page 111.

<AUTO> The ARGUS starts the automatic access recognition, see page 111.

13 Operation on a POTS access

13.1 Setting the physical interface

Use the included connection cable to connect the ARGUS (line jack) to the access to be tested and then switch the ARGUS on.



The Access Menu

Select a POTS (physical) interface. The POTS connection is not yet setup!

ARGUS State display

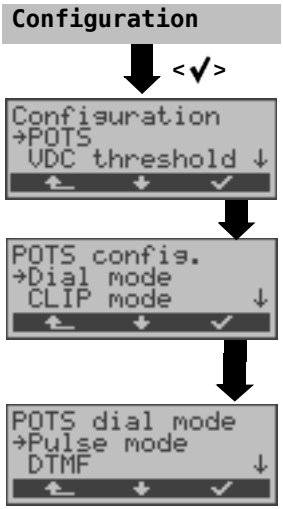
The ARGUS will display the voltage when idle. The POTS connection is not yet setup!

ARGUS - Main menu

see page 21

13.2 Setting the POTS parameters

It is possible to configure the following POTS parameters as needed. The default settings can be restored at any time (see page 184). The procedure for configuring a parameter is the same for all parameters and will be illustrated with a single example:



In the Main menu, select “Configuration”.

Select "POTS"

Select the parameter to be configured (e.g. Dial mode).

Select the desired dialling mode (e.g. Pulse mode).

<✓> The ARGUS will now use this setting.

<↵> The ARGUS will return to the “POTS config”. menu without making any changes.

Parameters:	Remark:
Dial mode	Selection of the dialling mode: DTMF or pulse dialing Default setting: ***DTMF***
POTS CLIP	Select the transfer procedure used to pass the call number: **FSK** CLIP via FSK (Frequency Shift Keying) for Germany as well as some other parts of 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 Default setting: ***FSK***

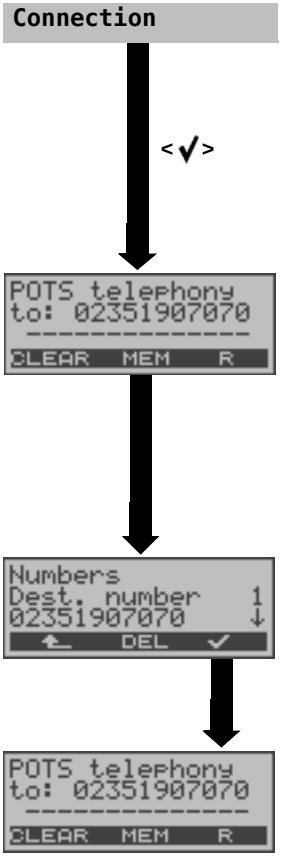
DTMF parameter	Settings for the three parameters Level, Duration and Interval of the DTMF signals generated during POTS (analog) operation.
Level	Setting the DTMF level: The level can range between -30 dB and +9 dB. Use the cursor keys to raise or lower the level by 3dB. Default setting: ***-3 dB***
Duration	Setting the DTMF time: The duration of the signal can take a value between 40ms and 1s. Default setting: ***80 ms*** Use the cursor keys to raise or lower the setting: In the range 40 - 200 ms: 10 ms steps In the range 200 - 300 ms: 20 ms steps In the range 300 - 1000 ms: 100 ms steps
DTMF interval	Setting the interval between two DTMF characters: The interval can take a value between 40ms and 1s. Default setting: ***80 ms*** Use the cursor keys to raise or lower the setting: In the range 40 - 200 ms: 10 ms steps In the range 200 - 300 ms: 20 ms steps In the range 300 - 1000 ms: 100 ms steps
Defaults	Restores the default settings: Level = ***-3 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. Default setting: ***80 ms*** The flashtime can take a value between 40ms and 1s. Use the cursor keys to raise or lower the setting: In the range 40 - 200 ms: 10 ms steps In the range 200 - 300 ms: 20 ms steps In the range 300 - 1000 ms: 100 ms steps

For information on restoring the default parameter settings, see page 184.

13.3 Connection on a POTS access

Outgoing Calls

The Argus behaves like a POTS (analog) terminal. 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, select “Phone / connec.”
or
simplified overlap sending using the telephone key

- Key — The ARGUS will open the POTS telephony window directly (e.g. from the status display): Once the call number is entered, the call will be setup.

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 for the access under test.

<R>	Generate a flash signal
<No.>	Select the number from the call number memory or reenter the number on the keypad
<↓>	Scroll through the speed-dialing memory see page 185
<DEL>	Delete the digit before the cursor

The last number dialed will always be used as the default (simplified last number redial).

The ARGUS sends the complete dialing information together.

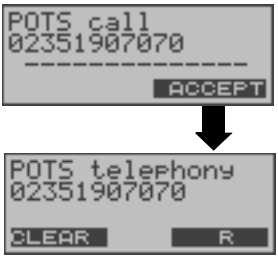
<CLEAR>	Disconnect
	Set the handset volume

Simplified overlap signaling using the telephone key

Press the - key and the ARGUS will immediately open the POTS telephony display. Once the call number is entered, the call will be setup.

Incoming Call

The ARGUS signals an incoming call both audibly and on the display.



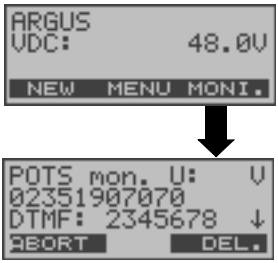
If the access supports CLIP, the ARGUS will display the number of the caller.

Accept the call

<R>	Generate a FLASH signal
<CLEAR>	Disconnect

13.4 POTS monitor

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



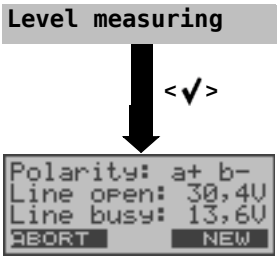
Start monitoring (alternatively: select “Start Monitor” in the Main menu)

The ARGUS displays the voltage (when "off hook"), the number of the caller (if CLIP is supported) and the DTMF characters dialed by both telephone subscribers and the SMS received. Any received DTMF-characters will be appended to the line, which will shift left for each character once it is full.
An incoming call will be signalled acoustically.

↓-key	Press to display additional information, if available on the access
<DEL>	Clears the display.
<ABORT>	Stop monitoring. the ARGUS will open the Status display.

13.5 Level measuring 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, 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.

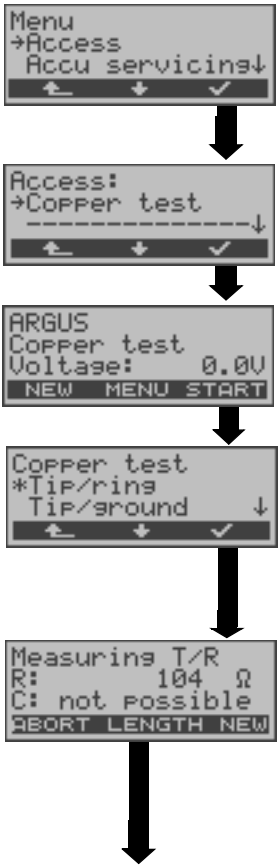
<NEW>	To repeat the measurement
<ABORT>	The ARGUS will open the Main menu.

14 Copper test

In a copper test, the ARGUS will measure the line's resistance (loop) and capacitance (open). Use the included cable to connect the ARGUS (Line jack) to the test points (red or black banana plug). You can perform the copper test between both wires or between a single wire and the earth (ground).
To perform a TRG test (a to b, a to earth and b to earth), the optional 3-wire cable is required.

Switch the ARGUS on.

The line must be voltage-free (out of service) for the measurement!



Open the Main menu and select the Access menu.

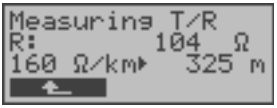
Select "Copper test"

Select the test points (Tip/ring or Tip/ground). The default setting will be marked in the display with an "*". In the example, the test will be performed using both wires (a to b - or tip and ring).
The ARGUS will first determine the resistance. If the resistance test shows that the line is open (infinite resistance), the ARGUS will begin the capacitance measurement.

The ARGUS displays the resistance measured. The capacitance will not be displayed, since the resistance measurement shows that it is a closed line and, therefore, the capacitance cannot be determined.

<NEW> Repeat the test.

Determination of the approximate length of the line.

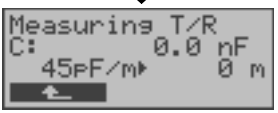


↓ -, ↑-Keys — Select the line-specific resistance of your line
(Range of settings: 20 Ω/km to 300 Ω/km).
The ARGUS will calculate the approximate length of the line (in the example: 325 meters),

<↵> — to return to the previous display

If the ARGUS has determined that the line is open, it will measure the line's capacitance. The resistance in the example is very high - outside the range of the ARGUS - and as a result the ARGUS cannot measure it.

<NEW> Repeat the test.



Determination of the approximate length of the line.

↓ -, ↑-Keys — Select the line-specific capacitance of your line
(Range of settings: 35 pF/m to 99 pF/m).
The ARGUS will calculate the approximate length of the line.

<↵> — to return to the previous display

Measurement ranges:

Determining the resistance of the line:

Range: 100 Ω to100 kΩ
Resolution: 0.1 kΩ
Precision: ±4%

Determining the capacitance of the line:

Range: 1 nF to 1 µF
Resolution: 0.2 nF
Precision: ±5%

15 Test reports

15.1 Save test reports (Ethernet as an example)

ARGUS – State display

Stop Ethernet test.

<IP>PC>:
The ARGUS will send the trace file to the connected PC, which must be running WINplus or WINanalyse. The data will be saved in the "*.log" format and can be renamed to "*.pcap" and decoded with a freeware program (such as Wireshark). The setting “Data Log” must be set to “on”. In Bridge and Router mode, two log files will be loaded to the PC, one for the WAN and one for the LAN side.

The ARGUS will save the test results in the first free record. This record can be assigned any name (default: AMP_1, AMP_2.... or the call number of the access under test if the number has been entered into the speed-dialling memory, see page 185). If all of the records have been written, you must manually select a memory location (record).

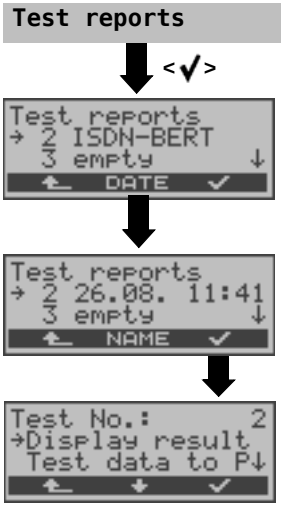
A record name can be entered using the numeric keypad. When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad:

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of lowercase characters and @, /,- and .
<AB>12>	Entry of uppercase characters and @, /,- and .
<DEL>	Delete the character before the cursor
↓ -, ↑ -Keys	Move the cursor

Once the results have been successfully saved in memory, the ARGUS will return to the State display. A new test can be started by pressing **<Start>**.

15.2 Display results

The ARGUS displays the saved test results. Using the WINplus or WINanalyse software, the test results can also be saved on a PC. WINplus or WINanalyse can then be used to generate a comprehensive measurement report from these results.
The ARGUS saves the test results of various test runs together with the date and time (from the internal clock of the ARGUS) in memory locations with sequential record numbers 1, 2, 3, ... Additionally, settings such as your own plus a remote call number will also be saved. The results are not lost when the ARGUS is switched off.
Each function in the Test results menu involves at least one record. The selections "All tests to PC" and "Deleted all" affect all records. Therefore, the first step will open a dialog in which you must select the desired data record.



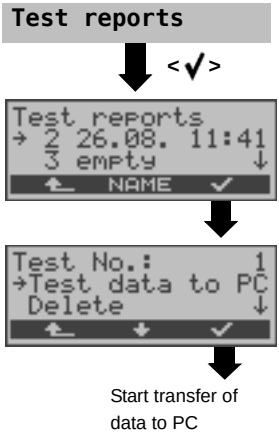
In the Main menu, select "Test reports".

Use the cursor keys to select the record (saved test results). The ARGUS will also display the associated name or the corresponding date and time for each record number. Empty records are labeled as "empty".

<NAME> Display the record names, e.g. AMP_1, ...
or
<DATE> Display the date and time

15.3 Test reports – sending to a PC

Using the included "USB serial adapter", data records can be transferred from the serial interface of the ARGUS (“Ser.”) to a PC (USB interface) where these test results can be visualized and archived. Connect the ARGUS to your PC and start the ARGUS WINplus program.



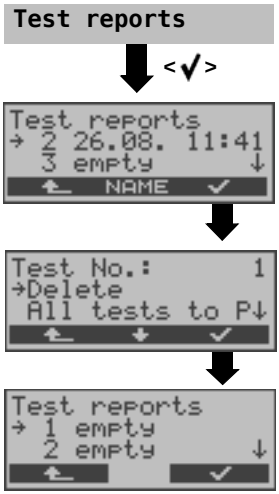
In the Main menu, select “Test results”.

↓-key Select the record (saved test results)

Select "Test data to PC".

Start transfer of data to PC

15.4 Deleting test reports



In the Main menu, select “Test results”.

↓-key Select the record (saved test results)

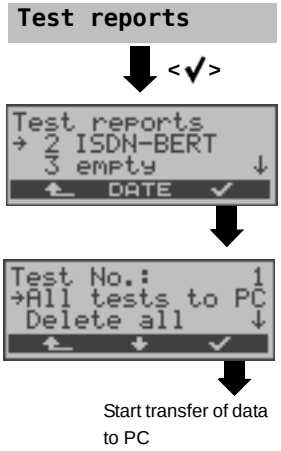
Select "Delete"

Delete the selected record (in the example, no. 1).
A deleted record will be shown as “empty”.

To delete all of the test results, select "Delete all".

15.5 Send all test reports to a PC

The ARGUS sends all of the saved test results to the PC.



In the Main menu, select “Test results”.

↓-key Select the record (saved test results)

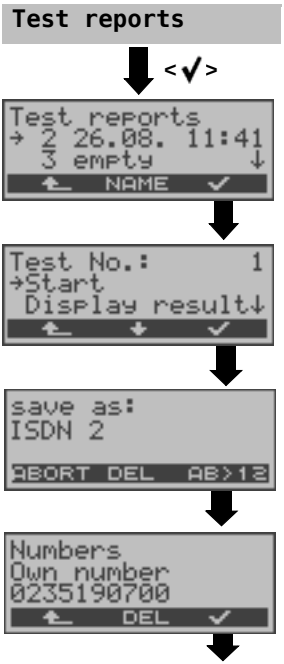
Select "All tests to PC".

Start transfer of data to PC

15.6 Starting automatic tests on an ISDN access

The ARGUS performs an automatic test series and displays the test results. The required parameters (on a BRI S/T access e.g. the measurement time and error level for the BERT, see page 121) should be checked before the automatic test series is begun. The ARGUS automatically performs the following sequence of tests:

On a BRI S/T or U-interface access	**On a BRI S/T or U-interface leased line (permanent circuit)**
- Status	- Status
- Level measuring	- Level measuring
- Service tests	- BERT in end-to-end mode (e.g. with a loopbox on the remote end)
- BERT in an extended call to oneself	
- Supplementary Services Test	
- CF Interrogation (Call Diversions)	
- MSN Interrogation	
- X.31 test	



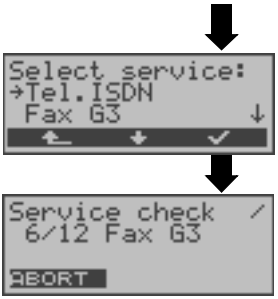
In the Main menu, select “Test results”.

↓ -key Select the record (memory location), in which the results of the automatic test sequence should be saved.

Select "Start"
In the example, the new test is saved in record number 1.

After function key 4 is pressed to start the test, the ARGUS requests that the user enter the record name.

Enter “Own number” ; on accesses using the DSS1 protocol, also enter a “remote number”.



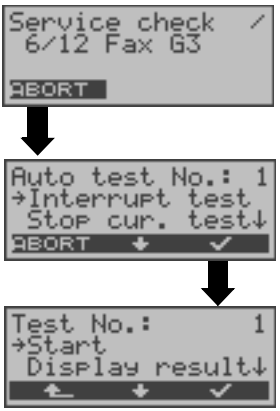
Select the service which should be used for the supplementary services test.

Start test

The ARGUS will display the currently running single test in the first three lines.

<ABORT> Interrupting a test

Terminating the test (early):



The ARGUS is running an automatic test.

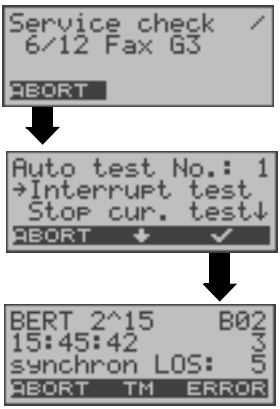
Interrupting a test

Select "Interrupt test"

<ABORT> Test - resuming

If a test is aborted, any results determined up to this point 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 currently running a Service check.

Interrupting a test

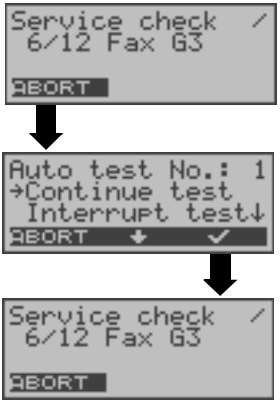
Select "Stop cur. test"

<ABORT> Continue the Service check.

The ARGUS will skip the current single test.

The next single test (in this example, BERT) will be started.

Resuming a test:



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

Interrupting a test

Select "Continue test".
<AB0RT> Test - resuming

The ARGUS repeats the “disturbed” single test.
(in the example, Service test)

Displaying the results of the automatic test sequence

The ARGUS displays the saved results of the single tests of the automatic test sequence (see page 177) run on a BRI S/T or U-interface in the following order:

On a BRI S/T or U-interface access

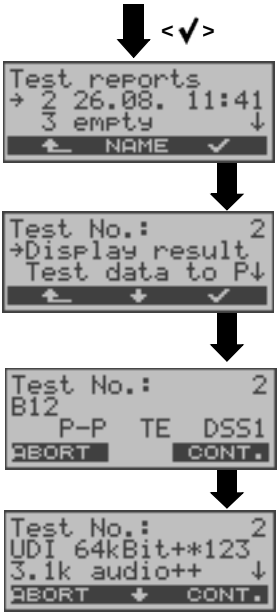
- Status
- Level measuring
- Service tests
- BERT in an extended call to oneself
- Supplementary Services Test (Suppl.serv.test)
- CF Interrogation (Call Diversions)
- MSN Interrogation
- X.31 test

BRI S/T or U-interface leased line

- Status
- Level measuring
- BERT

Test reports

In the Main menu, select “test reports”.



↓ -key Select the record (saved ISDN test reports)

Select “Display result”.

Display the test results:

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

Display the result of the next single test
e.g. display Service check:

<↓ > to scroll through the results of the single tests

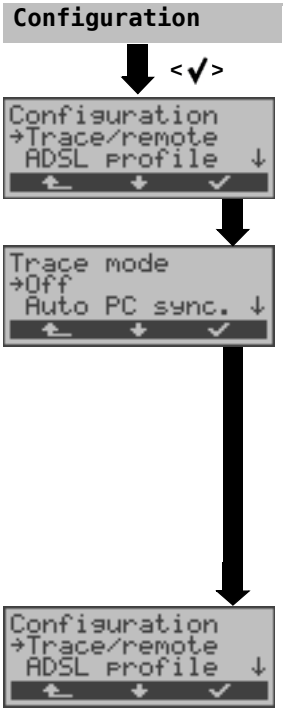
<CONT.> to display the results of the next single test

16 ARGUS Settings

The ARGUS can be configured to suit your special requirements. The default (factory) settings can be restored by selecting “Reset”.
(see page 184 Reset all parameters).

16.1 Trace / remote

The ARGUS remains active and passes the data from the D-channel (all of the D-channel messages sent to and received from the network) or DSL trace data online directly to the connected PC running the optional WINplus/WINanalyse software.



In the Main menu, select “Configuration”.

Select "Trace/remote".

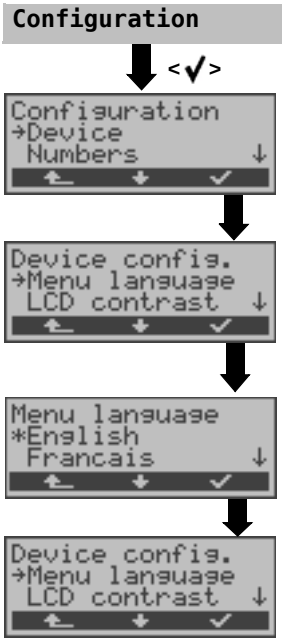
Auto PC sync	Even after it is switched on again, the ARGUS remains in Trace mode and passes D-channel data to the PC ("Trace" LED on continuously).
Manual PC sync	The ARGUS is set to Trace mode and will pass D-channel data to the PC until it is switched off. When it is switched on again, it will not return to Trace mode.

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 *.

16.2 Device settings

The procedure for configuring a parameter is the same for all device parameters and will be illustrated with a single example:



In the Main menu, select “Configuration”.

Select "Device".

Select a parameter (e.g. Menu language).

Select the desired "Menu language" (e.g. German).

<✓> Confirm your setting.

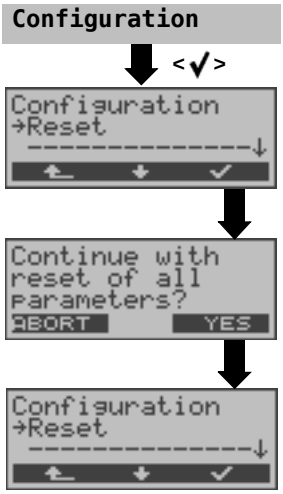
< ↵ > The ARGUS will return to the previous display without storing the parameter setting.

Parameter	Remark
Menu language	Selection of the menu language Default setting: ***German***
LCD contrast	 Setting the display contrast: The contrast can be adjusted in 16 steps. Use the cursor-keys to adjust the display contrast. The display shows a vertical arrow, which shows the current setting on a scale from low to high contrast.

Enter date / time	 Enter the date and time. Initialization of the internal clock using the keypad. Use the ↓-key to scroll to the next line. The entered time will be continuously updated by the ARGUS's real time clock as long as the power is not switched off. When the power is switched off (the ARGUS switched off without batteries), the clock will run a few more weeks on its internal supply. If the backup supply is exhausted, the time will be undefined and must be set again.
Baud rate	Sets the maximum Baud rate to be used by the ARGUS to communicate with a PC. Default setting: ***max 57,600 baud***
Ringer volume	Using the "Ringer volume" parameter, the beginning and ending volume can be adjusted. The volume can be adjusted from Level 1 (low) to Level 7 (very loud). The volume is increased in increments. Beginning volume: Default setting: ***Level 1*** Ending volume: Default setting: ***Level 7***
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. Default setting: ***off***
Power down	Set the how long the ARGUS can remain idle before it will switch to power-down mode. If power-down mode is disabled, the ARGUS will display a message, when it is switched on, warning that this will lead to a shorter battery life. The ARGUS can be set to automatically power down after 5, 10, 15 or 30 minutes. Default setting: ***after 5 minutes*** Set how long the background lighting will remain on. The background lighting can be set to switch off after 30 sec., 1 minute or 5 minutes. Default setting: ***off after 30 seconds***
Software option	To enable a software option (e.g. additional functions), you must first enter a software key via the keypad.

16.3 Reset all parameters

The ARGUS will reset all of the parameters to their default values.
The speed-dialing memory with the call numbers, PPP user name, PPP password, IP addresses, Profile names, User-specific services, Keypad Infos and all of the test results stored in the ARGUS (e.g. Automatic test sequence on an ISDN access, ADSL test results etc.) will be deleted.



In the Main menu, select “Configuration”.

Select "Reset".

Security query

Reset ARGUS to its default values

Alternative: Then press one after the other the keys * and 2. The ARGUS will first prompt you to confirm that you really want to do this (see above).

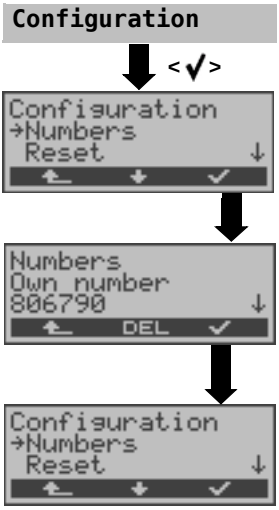
The default values can be found in the relevant chapter.

17 Saving call numbers in the speed-dialing memory

Ten call numbers with a maximum of 24-places can be entered in the speed-dialing memory.

⚠ The first speed-dial number (displayed as "Own number") must be the call number of the access under test (this is especially important for the automatic Service check).

In the "Remote No.1-8" memory locations, you can save remote call numbers. In the "X.31 test number" memory location, the ARGUS expects the entry of the X.25 access number for the X.31 test (see page 136).



In the Main menu, select “Configuration”.

Select "Numbers"

Using the keypad, enter the number of the access under test.

<DEL> Delete the character before the cursor

↓-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: 02351/9070-0 is entered as 023519070#0

⚠ 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.

18 Use of accumulators and battery packs

Replacing the accumulators

Switch the ARGUS off and disconnect the plug-in power supply. Afterwards, remove the complete set of accumulators or replace the battery pack (see page 25).

Accumulators - Usage

The accumulators used in the ARGUS must have the same capacity and be charged to the same level. To ensure that this achieved, you must observe the following rules:

Accumulator set

- The supplied accumulators must only be charged and discharged in the ARGUS.
- Do not use the supplied accumulators in other devices.
- Do not use accumulators with differing capacities or ones that are not equally charged.
- Order a complete set of new accumulators from the manufacturer and use these to replace the complete set of old accumulators. After you have replaced a set of accumulators, they must be fully charged in the ARGUS before use.
- The accumulators should not be exposed to very high or low temperatures any longer than necessary.
- Discharge and recharge the accumulators fully at least once a month (even if the ARGUS is not used for a longer period of time).
- When the capacity of the accumulators decreases, replace all of the entire set.
- Do not use batteries.

Battery pack (accumulators)

- The supplied battery pack may only be charged in the ARGUS.
- Do not use the supplied battery pack in other devices.
- The ARGUS battery pack may only be actively charged (Charge accus) or trickle charged (default setting: off) when the ambient temperature is between 0 °C (32 °F) and +40 °C (104 °F).
- Recharge the battery pack fully at least once a month (even if the ARGUS is not used for a longer period of time).
- To maximize a battery pack service life, if it is to be stored over a longer period of time (> 1 year), it should not be exposed to temperatures in excess of +35 °C (95 °F).
- Please read the extensive notes on safety and the transport of the battery pack found in the section "Safety Instructions“.

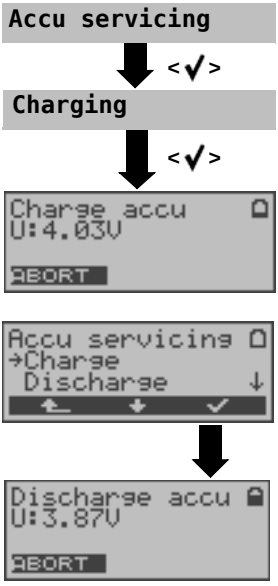
Automatic recharging of the accumulators when the ARGUS is switched on

The ARGUS automatically recharges the accumulators (often shortened to "accus"), if the ARGUS is connected to the plug-in power supply and is switched off and the battery pack voltage is too low. While charging, the ARGUS displays the message “Charge accu”. If you press and hold the power switch, the ARGUS will switch off before the accumulators are recharged. Once the accumulators are charged, the ARGUS display "Done" and - if no errors occurred while charging - will automatically switch off.

Charge accus

The ARGUS will display the current charge of the accumulators graphically, if no power supply is connected. In the LCD display, a battery symbol will begin to blink, when there is still approximately (depending on the mode of operation) 5 minutes reserve power. During this period, it is possible that there may be audible interference and in rare cases even malfunctions. Connect the power supply.

When the power supply is connected, the accumulators in the ARGUS can be completely discharged or immediately (without being first discharged) recharged. The discharge procedure takes up to 7 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, select “Accu service”.

Select "Charge accu".

Charging will begin if the plug-in power supply is connected. The ARGUS will display the level of the charge and the voltage while charging the accumulators.

<ABORT> The download is stopped.

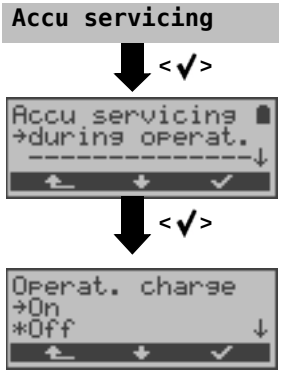
Discharging and recharging the accumulators (Accu servicing)

The accumulators will first be fully discharged and then - after a brief pause - automatically recharged.
In the Main menu, select “Accu service”. Afterwards select "Discharge & Charge".

Notes on the use of the battery pack The accumulator service can take up to 16 hours.

Automatic recharging of the battery pack during operation (trickle charge)

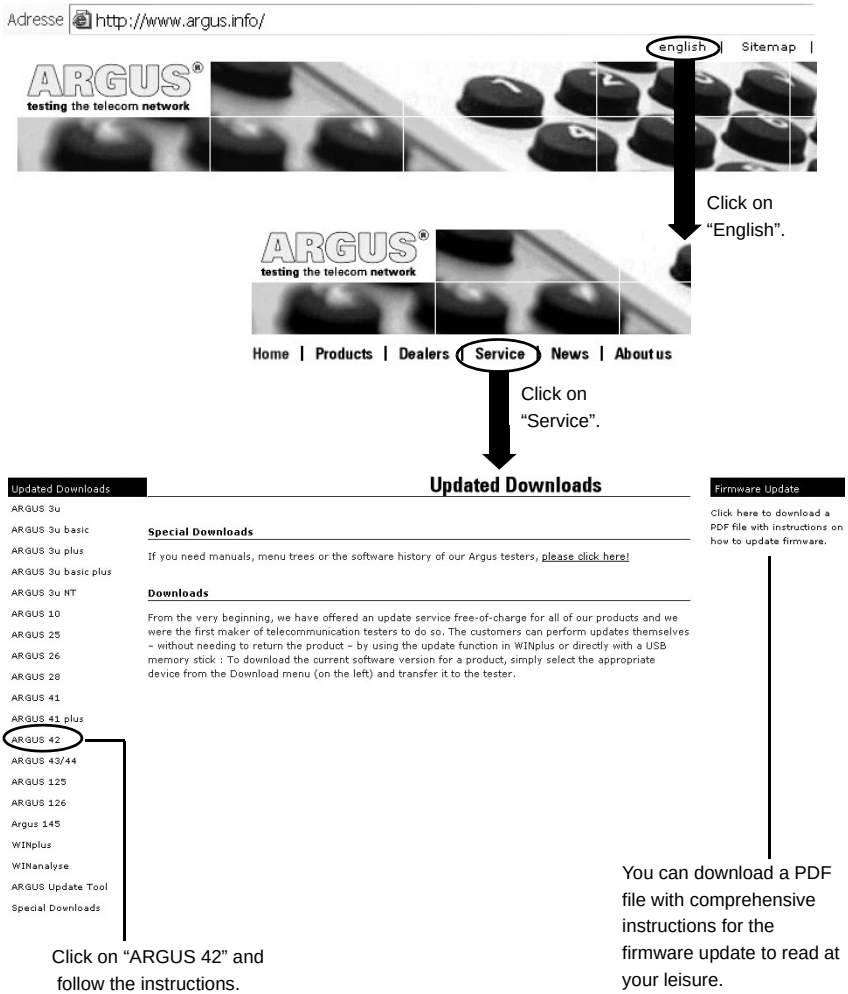
"Accu servicing during operation" does not replace "normal" charging, since the ARGUS will only top up the current charge with a trickle charge.
If the ARGUS is disconnected from its power supply, it is possible that the accumulators may not be fully charged. In such case, when the ARGUS is reconnected to the power supply, it will not begin to charge the accumulators again until their voltage drops below the threshold once more.
If the ARGUS is switched off during "Accu servicing during operation", it will switch back to "normal accu charging" (see page 187 Automatic recharging of the accumulators when the ARGUS is switched on).



If the trickle charge setting is set to “ON”, the ARGUS will begin charging the accus automatically while it is in operation (if the power supply is plugged in) as soon as the voltage drops below the threshold (display shows battery symbol).

19 Firmware update

You can download a firmware file from www.argus.info/en/service free-of-charge and save it on your PC to later transfer to your ARGUS tester.
Open the Internet site www.argus.info/en:



Important information regarding the ARGUS firmware update:

Do not, under any circumstances, start to update the firmware if the ARGUS is running on its battery pack. First connect the ARGUS to the plug-in power supply, before sending the firmware update file from your PC to the ARGUS.

The ARGUS USB serial adapter is required in order to perform an update. Save the configuration and test reports before beginning an upgrade.

Do not disconnect the ARGUS from the PC during the update.

Do not switch the ARGUS off while an update is being performed.

You must also pay attention to the messages on the ARGUS display – not just the instructions displayed by the Update Tool on the PC.

The update has not been successfully completed until the Update Tool displays a corresponding message on the PC and the ARGUS – after being automatically restarted by the Update Tool – shows the normal startup screen.

The ARGUS will not switch on until after you have clicked on one of the two buttons ("back to step 1" or "Exit program") on the Update Tool after the update has been completed.

20 Appendix

A) Acronyms

	Characters
2B1Q	2 Binary 1 Quaternary - line code
3PTY	Three Party Service
4B3T	4 Binary 3 Ternary - a Modified Monitored State 43 code (MMS43)
	A
A3k1H	Audio 3.1 kHz
A7kHz	Audio 7 kHz
POTS	POTS interface
AAL	ATM adaptation layer
AC	Access Server
ADSL	Asymmetric Digital Subscriber Line
AMP	Argus measurement report
ANSI	American National Standards Institute
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 at the end of the call
AS	Available Seconds
ATM	Asynchronous Transfer Mode
ATU-R	ADSL Transceiver Unit - Remote
Auto-MDI-X	Automatic Medium Dependent Interface Crossing
Avg	Average
	B
BC	Bearer Capability
BER	Bit Error Rate
BERT	Bit Error Rate Test
BRAS	Broadband Remote Access Server
	C
CALL PROC	CALL PROCeeding message
CC	Continuity Counter
CCBS	Completion of Calls to Busy Subscriber
CCNR	Call Complete No Response Automatic callback if the called party did not answer
CD	Call Deflection
CDN	see also CDPN
CDPN	CalleD Party Number
CF	Call Forwarding

CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CGN	see also CGPN
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
Codec	Coder Decoder
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
CRC	Cyclic Redundancy Check
CT	Call Transfer
CUG	Closed User Group
CW	Call Waiting
	D
DDI	Direct Dialling In (dialling in to an extension directly)
DF	Delay Factor
UDI	Unrestricted Digital Information (data telecommunications)
DHCP	Dynamic Host Configuration Protocol
DIN	Deutsches Institut für Normung e. V. (the German Institute for Standardization)
DISC	DISConnect Message
DMT	Discrete Multitone
DNS	Domain Name System
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DSS1	Digital Subscriber Signalling System No. 1
DTMF	Dual Tone Multi Frequency
	E
ECT	Explicit Call Transfer / call forwarding or explicit call diversion
E-DSS1	European Digital Subscriber Signalling System Number 1
EFS	Error Free Seconds
EU	European Union

EIT	Event Information Table
ElektroG	Elektro- und Elektronikgerätegesetz (German Electrical and Electronic Equipment Act)
EN	European Norm
EoA	Ethernet over ATM
ES	Errored Seconds
ete	End-to-end
ETH	Ethernet
ETSI	European Telecommunications Standards Institute
	F
Fax G3	Fax Group 3
Fax G4	Fax Group 4
FEC	Forward Error Correction
FSK	Frequency Shift Keying
	H
HEC	Header Error Checksum
HLC	High Layer Compatibility
HOLD	Call Hold
HRX value	Hypothetical reference connection
HTTP	Hyper-Text Transfer Protocol
	I
IAD	Integrated Access Device
ID	Identifier
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
INFO	INFOrmation Message
INP	Impulse Noise Protection
IP	Intenet Protokoll
IPCP	Internet Protocol Control Protocol
IPoA	Internet Protocol over ATM
IPoE	Internet Protocol over Ethernet
ISDN	Integrated Services Digital Network
ISO	International Standard Organization
ISP	Internet Service Provider
ITSP	Internet Telephony Service Provider
ITU	International Telecommunication Union
	L
L1	Layer 1 in the OSI reference model
L2	Layer 2 in the OSI reference model
L3	Layer 3 in the OSI reference model
LAN	Local Area Network

LAPD	Link Access Procedure - D-channel
LCD	Liquid Crystal Display
LCN	Logical channel number / X.25 channel number
LCP	Link Control Protocol
LED	Light-Emitting Diode
LL	Leased Line
LLC	Low Layer Compatibility
LOS	Loss of Synchronization
	M
MAC	Media Access Control
MCID	Malicious Call Identification
MDF	Main Distribution Frame
MDI	Media Delivery Index (RFC 4445)
MLR	Media Loss Rate
MOS	Mean Opinion Score
MPEG	Moving Picture Experts Group
MSN	Multiple Subscriber Number
MTU	Maximum Transmission Unit
	N
n/a	Not available
n/r	Not received
n/u	Not used
NAT	Network Address Translation
NOK	Not OK
NP	Numbering Plan
NTBA	Network Termination Basic Access
	O
OAM	Operations, Administration and Maintenance
OSI	Open Systems Interconnection
	P
PABX	Private Automatic Branch Exchange
PADI	PPPoE Active Discovery Initiation
PADO	PPPoE Active Discovery Offer
PADR	PPPoE Active Discovery Request
PADS	PPPoE Active Discovery Session confirmation
PADT	PPPoE Active Discovery Termination
PAP	Password Authentication Protocol
PC	Personal Computer
PID	Packet Identifier
PLR	Packet Loss Ratio
P-P	Point-to-point

P-MP	Point-to-multipoint
PPP	Point-to-Point Protokoll
PPPoA	Point-to-Point Protocol over ATM
PPPoE	Point-to-Point Protocol over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PWR	Power
	Q
QLN	Quiet Line Noise
	R
RC	Resistance (R) and capacitance (C)
REL	RELease Message
REL ACK	RELease ACKnowledge Message
REL COMPL	RELease COMPLete Message
RFC	Request for Comments
RJ	Registered Jack (standardized jack)
RoHS	Restriction of Hazardous Substances
RTCP	RealTime Control Protocol
RTP	RealTime Transport Protocol
Rx	Receive
	S
SBC	Session Border Controller - Outbound Proxy
SES	Severely Errored Second
SIP	Session Initiation Protocol
SNR	Signal-to-Noise-Ratio
Spch	Speech
STB	Settop-Box
STUN	Session Traversal Utilities for NAT
SUB	Sub-addressing / Sub-addressing is possible
SUSP	SUSPend Message
	T
TCP	Transmission Control Protocol
TE	TErminal, Terminal Equipment
TEI	Terminal Endpoint Identifier
Tel31	Telephony 3.1 kHz
Tel7k	Telephony 7 kHz
TM	Test Manager
TON	Type of Number
TP	Terminal Portability / Moving the terminal on the bus
TS	Technical Specification
TTX	Teletext
Tx	Transmit

	U
UDP	User Datagram Protocol
URI	Uniform Resource Identifier
USB	Universal Serial Bus
UUI	User-User-Info (UUI),
UUS	User-to-User Signalling / transfer of user data
	V
VC	Virtual Channel
VCI	Virtual Channel Identifier
VC-MUX	Virtual Circuit Multiplexing
ViSyB	Video Syntax Based
ViTel	Video-Telephony
VLAN	Virtual Local Area Network
VLC	Video LAN Client
VoIP	Voice over Internet Protocol
VPI	Virtual Path Identifier
	W
WAN	Wide Area Network
WEEE	Waste Electrical and Electronic Equipment
	X
xDSL	Collective term for different DSL variants
xTU-C	xDSL Transceiver Unit - Central Office
xTU-R	xDSL Transceiver Unit - Remote

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 clearing
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	Requested service is rejected
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 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	Unspecified for “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	The 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	In this phase, the message is not permitted, not defined or not supported
99	Information element non-existent or not implemented	In this phase, the content of the information element is 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) ARGUS Error Messages (DSS1)

Error Number	Cause	Description
0	Network	The network is not in a state defined for DSS1. This may, however, occur in connection with normal clearing on a PBX.
1 to 127	Network	DSS1 Cause
150	ARGUS	An error occurred during the supplementary service test. Common cause: no response from network
152	ARGUS	The CF-Test was started with the wrong own number.
153	ARGUS	No HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty)
154	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
161	ARGUS	The party called did not answer within the prescribed time (approx.10 sec)
162	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
163	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	ARGUS	A call number was entered.
200	ARGUS	Internal error
201	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)
204	ARGUS	a) Layer 2 connection was cleared-down b) No response to SETUP (call setup) c) Layer 2 connection could not be setup
205	ARGUS	Reestablish the Layer 2 connection
206	ARGUS	The selected B-channel is already busy.
210	ARGUS	No response to the clear-down (REL sent, no REL_CMP/ REL_ACK received from network)
220	ARGUS	Remote end signaled that it is in State 0.
245	ARGUS	Keypad sent via ESC, but no response was received from network
250	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 answer from network (to a CALL-REQUEST or a 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 14a page 123 et seq. and/or CCITT Recommendation X.25, Annex E

D) Error message: PPP connection

Display on ARGUS	Description
External fault:	
Negotiation err	Cannot negotiate the network protocol for PPPD, so the remote site is not reachable.
Idle release	Connection was terminated, since there was no activity.
Time out rel	Connection was terminated, since the maximum connection time elapsed.
Echo req. error	Remote site did not answer echo requests so the connection has been terminated. (PPP connections are tested at regular intervals by sending echo requests to the remote site.)
Hanging up rel	Disconnected by remote site.
Loopback erro	The setup of the PPP connection was cancelled, since a loopback was detected.
Authent. Error	Authentication error: Wrong user name or password - rejected by remote site.
PADO timeout	No PADO packet received.
PADS timeout	No PADS packet received.

E) Error message: Download test

Display on ARGUS	Description
External fault:	
Http redir.error	Fault: Too many HTTP redirects.
Http no response	No answer from HTTP server.
Http serv.error	HTTP server has returned an error. (for details see the table below "HTTP Error Messages")
Http encod.error	Due to an encoding problem, data transfer with HTTP is not possible.
Network error	Network error
URL error	Fault: no HTTP URL specified
Socket error 2	Error when connecting a socket. The server's HTTP service is not available.
Http Head.error	Error in the header of the requested HTTP file.
Unknown address	Unknown host address. Possible cause: Error in the address entered, DNS resolution not working or network not accessible.
Unknown download error	Unknown download error

F) HTTP status codes:

Display on ARGUS: Code No.	Meaning
100	Client should continue its request.
101	The protocol is being changed at the Client's request.
200	The Client's request has succeeded.
201	The Client's request that a new document be created was successful.
202	The Client's request has been accepted for processing.
203	The Client's request will be answered with information from a source other than the server.
204	The Client's request was successful. The server sends [no content] only the HTTP header.
205	The Client's request was successful. The server [resets content] sends a new HTTP body.
206	The Client's request was successful. The server sends only part of the requested document [partial content].
300	The request was not precise enough so multiple documents have been returned.
303	The requested resource has been found at a different URI and should be retrieved from there.
304	The requested document has not been changed in the interim.
305	The requested document must be retrieved from a proxy instead of from .
307	The requested resource has been temporarily relocated to a different URI [temporary redirect].
400	Syntax error in the Client's request [Client error].
401	The request requires user authentication.
402	Payment is required to process this request.
403	The Client's request has been refused. (e.g. because authentication failed).
404	The requested document was not found (e.g. because of an error in the URL entered or while the document is no longer available).
405	The method specified by the Client in its request is not allowed by the server.
406	The requested document in a format that is not supported by the Client.
407	The request requires that the Client authenticate itself with a proxy.

408	The Client did not place its request within the time allowed by the server [Request Timeout].
409	Due to a conflict (e.g.another request) the Client's request cannot be completed by the server.
410	The requested URL is [gone] no longer available on the server.
411	The Client sent data to the server without a defined Content Length.
412	The preconditions in the Client's request could not be satisfied by the server.
413	The Client's request has been refused by the server because the request entity is too large.
414	The Client sent a URL to the server that is too large (e.g. because of the form values contained).
415	The Client's data is not supported by the server.
416	The range (in a document) requested by the Client does not exist.
417	The server could not (or did not wish to) satisfy the Client's expectation given in the Expect request header field.
424	For aesthetic reasons, the requested document will not be sent by the server.
500	Due to an unexpected condition, the server cannot fulfill the Client's request (e.g. faulty configuration, missing or wrong CGI program).
501	The server does not support the function required to fulfill the Client's request.
502	The server received an invalid response from an upstream server or proxy which it accessed in attempting to fulfill the request.
503	The server is currently unable to handle the request due to a temporary overloading of the server.
504	The Client's request (of a gateway or proxy) did not receive a response within the specified time.
505	The server does not support the HTTP protocol version that was used in the Client's request.

G) General Error Messages

Display on ARGUS	Description
Prot. not supp.	The protocol (IP, PPPoE, etc.) is not supported in the selected mode.
Unknown error	Unknown error occurred.
No PPP connec.	No PPP connection can be setup.
Test aborted	Test aborted by user.
Pingstart error	Error when starting the Ping test.
Fault: PPP connection	Unexpected termination of the PPP connection.
Unexp. PING end	Unexpected termination of the Ping test.

H) VoIP SIP status codes

SIP requests:

The six basic requests / methods:

INVITE Invite a user to a session (call - initiates a session)

ACK Acknowledge an INVITE request

BYE Terminate a session (hangup)

CANCEL Terminates the setup of a connection

REGISTER Provides subscriber data (host name and IP address)

OPTIONS Supplies information regarding the functions supported by the other SIP telephone

SIP responses:

SIP responses are answers to SIP requests. There are six basic types of SIP responses with numerous sub-responses:

1xx Informational responses (180 indicates for example that the phone of the party called is ringing)

2xx Reports that the request has been successful

3xx Redirection responses

4xx Client failure responses

5xx Server failure responses

6xx Global failure responses

Display on ARGUS: Code No.	Meaning	Explanation
100	Trying	The ARGUS is attempting to setup a call.
180	Ringing	The phone at the other end is ringing.
181	Call Being Forwarded	The call is being forwarded.
182	Call Queued	The call is in a wait loop.
183	Session Progress	The call is being setup.
200	OK	Everything is all right.
202	Accepted	Connection has been accepted.

300	Multiple Choices	There is no unique destination address for the remote end. Please select one.
301	Moved Permanently	Calls are being permanently forwarded.
302	Moved Temporarily	Calls are being temporarily forwarded.
305	Use Proxy	A proxy must be used.
380	Alternative Service	Alternative service
400	Bad Request	The request is not OK.
401	Unauthorized	You are not authorized.
402	Payment Required	Payment is required.
403	Forbidden	This is not permitted.
404	Not Found	The remote end was not found or does not exist.
405	Method Not Allowed	The method (e.g. SUBSCRIBE or NOTIFY) is not permitted.
406	Not Acceptable	The options used in the call are not supported.
407	Proxy Authentication Required	The proxy must be authenticated.
408	Request Timeout	The time for the request has been exceeded (timeout).
409	Conflict	There is a conflict.
410	Gone	The subscriber is no longer reachable here.
411	Length Required	The length must be supplied.
413	Request Entity Too Large	The values are too long.
414	Request URI Too Long	The URI is too long. (Destination address)
415	Unsupported Media Type	The codec is not supported.
416	Unsupported URI Scheme	The URI scheme is not supported. (Destination address)
420	Bad Extension	The extension is wrong.
421	Extension Required	An extension is necessary.
423	Interval Too Brief	There is a problem with the SIP parameters. (Register Expire is too short)
480	Temporarily Unavailable	The subscriber is currently not reachable.
481	Call/Transaction Does Not Exist	This connection does not exist (any longer).
482	Loop Detected	A redirection loop has been detected.
483	Too Many Hops	Too many redirects.
484	Address Incomplete	The SIP address is incomplete or faulty.
485	Ambiguous	The SIP address is not unique.
486	Busy Here	The destination is busy.
487	Request Terminated	The request has been terminated.
488	Not Acceptable Here	The call cannot be accepted.
491	Request Pending	A request is waiting.

493	Undecipherable	Decryption error.
500	Server Internal Error	Internal error in the server.
501	Not Implemented	The requested method (functionality) has not been implemented.
502	Bad Gateway	The gateway is bad.
503	Service Unavailable	The service is not available.
504	Server Time-Out	The gateway did not respond in time.
505	Version Not Supported	The SIP protocol version is not supported.
513	Message Too Large	The message length is too long. Use TCP.
600	Busy Everywhere	All terminals are busy at the remote end.
603	Declined	The system at the remote end refused to accept the call.
604	Does Not Exist Anywhere	This user does not exist any longer.
605	Not Acceptable	SIP request not acceptable.

I) Software Licenses

The ARGUS firmware includes code from what are known as Open Source packages, which have been published under various licenses (GPL, LGPL, MIT, BSD, etc.). Additional information can be found - if requested in your order - on the CD-ROM included in the package (see Software_License.htm) or can be viewed at http://www.argus.info/web/download/Software_License.htm.
In the event that you are interested in the sources licensed under GPL or LGPL, please contact support@argus.info. A machine-readable copy of the source code can be obtained from intec Gesellschaft für Informationstechnik mbH for a minimal fee - to cover the cost of physically copying the code. This offer is valid for 3 years.

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