ARGUS 145 *PLUS*
Manual

Version: 2.10/ **EN**

Important Notice:
A basic ARGUS package includes at least a DSL interface (ADSL, VDSL or SHDSL) or a PRI interface together with various related functions and tests. 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.

1 Introduction

The Compact Allrounder
Combi tester for xDSL, Ethernet, ISDN and Triple Play

The ARGUS®145^{PLUS} is a combi tester, which satisfies the most demanding technical requirements. It is the only handheld tester and analyser that integrates support for VDSL2 (all profiles), ADSL (Annex A, B, L, J, M) as well as SHDSL (2, 4, 6 and 8-wire), Ethernet, ISDN PRI/E1/BRI/U and POTS interfaces in a single tester – and all that without swapping modules.

GigaBit Ethernet Interface and Tests

As an option, a GigaBit Ethernet interface is available that can be used to run performance tests at up to 1000 Mbit/s. A loop function and a traffic generator are also available. When running a HTTP or FTP download, the Gigabit Ethernet interface can achieve download speeds of up to 200 Mbit/s.

SHDSL Interface

Where your needs require, the numerous standard interfaces can be supplemented with other optional functions. The SHDSL interface for example also functions in SHDSL.bis operation. In this case, various SHDSL modes are supported: ATM, TDM and EFM mode.

Copper Tests (Cu Tests)

As part of the standard features, the Copper Tests (Cu Tests) are always available to measure the line's physical qualities without synchronising with the remote node. Thanks to its support for a spectrum analysis (DMT Analysis), the ARGUS can also analyze the spectral density (PSD - Power Spectral Density) and the noise.

Used with a high-impedance probe, the ARGUS can serve as a Line Scope displaying time or frequency bands (FFT fast Fourier transform) in real-time. The required optional Active Probe II can be used to connect to an existing DSL connection and can be switched between symmetrical and asymmetrical DSL. The optional TDR function supports the measurement of line length and the location of faults on lines.

Testing the Quality of Triple Play Services

Using the optional Triple Play test functions, the ARGUS®145^{PLUS} can test VoIP, IPTV and data services via xDSL or Ethernet. Used as a handset, it can not only simulate terminal equipment such as a telephone, PC or STB, but also determine all relevant quality parameters and evaluate the speech quality in accordance with the MOS or PESQ methods. It can determine whether a line is suitable for IPTV using a VoD test, channel scan or IPTV long-term analysis. Several of these IP tests can also be performed on lines using the new higher-performance IPv6 protocol.

Testing E1 and ISDN PRI Interfaces

In addition, for ISDN PRI/E1 interfaces, it offers extensive service tests that are standard for testing ISDN BRI/U-interface accesses. Furthermore, this tester supports PRI-specific test functions, such as a MegaBERT that permits performing a bit error rate test (BERT) on the full bandwidth of 2 Mbit/s.

Easy Operation

The ARGUS®145^{PLUS} is also extremely easy to use. This ease of use was designed in with features like a large (320 x 240 pixel) color display, operation using softkeys and a USB client interface.The ARGUS comes with a high-powered, long-life lithium-ion (rechargeable) battery pack.

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/downloads/.

Note:
Details on the use of the PRI interface and the Gigabit Ethernet interface can be found in the related separate manuals.
You should find these manuals in the package with the delivered equipment. In addition, you can always download the latest manuals from our website at http://www.argus.info/en/service/downloads/ or request them from our service department.

An overview of a few of the important ARGUS functions:

xDSL tests (ADSL, ADSL2 and ADSL2+, VDSL2, SHDSL)

- **Synchronisation with the DSLAM (xTU-C) and determination of all relevant connection parameters and error counters**
- **Bridge, Router and Terminal Modes**

Ethernet interface

- **1 Ethernet test interface (10/100 Base-T), RJ-45 or**
  1 Gigabit Ethernet test interface (10/100/1000 Base-T)

IP and ATM tests via xDSL and Ethernet

- **ATM tests (ADSL and SHDSL-ATM only)**
  - ATM OAM ping, ATM OAM cell loop and VPI/VCI scan
- **IP tests**
  - Ping and trace route tests (BRAS information, PPP trace and VLAN)
  - Download tests to determine throughput (HTTP download, and FTP upload and download)
  - FTP server test, upload and download from ARGUS to ARGUS
- **VoIP test**
  - VoIP terminal simulation, including acoustics (various codecs)
  - OK/FAIL evaluations and display of the quality parameter
  - Evaluation of the VoIP voice quality (QoS) in accordance with:
    - MOS_{CQE} (ITU-T P.800), E-Model (ITU-T G.107)
    - PESQ (ITU-T P.862) in connection with PESQ Server SW
- **IPTV tests**
  - Stream requests (STB mode), IPTV channel scan, IPTV passive
  - OK/FAIL evaluations and display of the quality parameter
  - IPTV online trace for long-term analysis using WINanalyse

ISDN functions

- U-interface (4B3T or 2B1Q) in accordance with ANSI T1.601
- BRI/PRI/E1 interfaces in accordance with ITU-T I.430/431 in TE and NT operation
- D channel monitoring on BRI and PRI interfaces
- Tests of BRI and PRI leased lines (permanent circuits) (E1, 2 Mbit/s)
- E1 BERT on all B channels simultaneously (MegaBERT)

- Automatic service checks and supplementary service tests, etc.
- Evaluation of the ISDN speech quality directly at the BRI or U-interface in accordance with:
  - PESQ (ITU-T P.862) + MOS_{LQO} with PESQ Server SW

POTS functions

- A full-fledged integrated analog handset (POTS)
- With DTMF and CLIP display, as well as pulse dialling
- High-impedance 2-wire monitor with voltage measurement
- Evaluation of speech quality directly on the POTS access in accordance with:
  - PESQ (ITU-T P.862) + MOS_{LQO} with PESQ Server SW

Copper Test functions (Copper Tests)

- **R measurement:** The ARGUS performs an ongoing resistance measurement and displays the results in real-time.
- **RC measurements:** Measurement of the loop resistance and the capacitance of the open (voltage-free) line (including a calculation of the line length).
- **Line Scope:** High-performance real-time line monitor with an x-axis display of time or frequency bands (fast Fourier transform (FFT)) up to 30 MHz.
- **DMT Analysis:** Analysis of the Power Spectral Density (PSD) and the noise of up to 4096 tones (e.g. VDSL2 Profile 30a).
- **TDR:** Time domain reflectometry function for measuring line length and locating faults in lines.

Access acceptance report

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

The Concept of the ARGUS Firmware User Interface

The ARGUS firmware presents - on a graphic Status screen - the results of tests made with the latest in measurement technology. In this manner, all of the important processes can be shown on a single screen together with main sequences with all the convenience and transparence to which ARGUS users are accustomed.
In this manner - with its intuitive menu structure - the ARGUS makes it easy to not only configure, start and perform tests but also to examine the test results:

- The physical layer - Layer 1 (e.g. DSL) - can be started and stopped completely independently of the higher layers such as Virtual Lines (L2/3), services or tests.
- Layer 2 (VLAN, VPI/VCI) and Layer 3 parameters (PPP, IP) are combined in independent Virtual Line profiles (VL profiles). Multiple VL profiles can be configured and started on a single DSL access. It is also possible to bridge and route multiple Virtual Lines concurrently.
- Thanks to the introduction of services between the Virtual Lines (VLs) and the Data, VoIP and IPTV tests, it is now possible to take an incoming call even when the ARGUS is used as an IP phone with VoIP activated.

You will find other important information about profile structures on our website.

Should you have any further questions, please contact us:

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www.argus.info/en
support@argus.info

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 when the battery pack (accumulator) is not installed!
- The ARGUS is not watertight. Protect the ARGUS from exposure to water!
- Before replacing the battery pack, disconnect all the test leads and switch the ARGUS off.
  CAUTION: Never remove 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 0.45 A)
  (Output: 12 V DC; 1.5 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.
- Do not plug anything into the USB Host interface (USB-A) except an Active Probe I or an Active Probe II or mobile storage media that does not use an external power supply and is approved by the manufacturer. The use of this jack for any other application (e.g. to connect to a PC) is expressly prohibited.
- The ARGUS Power jack must always be covered with the included rubber cap (labeled "Power") while operating in battery mode.
- The electromagnetic compatibility of the ARGUS was checked in accordance with the regulations stated in our Declaration of Conformity.
  This is a Class A device. It may cause radio interference in a living area. In this event, the operator may be requested to take appropriate measures.

- The ARGUS battery pack may only be actively charged (Charge battery) or trickle charged (default setting: on) 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 lithium ion battery pack, please observe the following notes regarding safety and transport.
- Before running a test or synchronizing on an interface, determine how the ARGUS should be powered.

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 Notes on Safety and Transport - Battery Packs

Transport

The battery pack has been tested in accordance with the UN recommendations (ST/SG/AC.10/11/Rev. 4, Part III, Subsection 38.3). Protective measures have been implemented to prevent harm if it is exposed to excessive pressure, short-circuits, dangerous reverse currents or other destructive influences. However, since the amount of lithium contained in the battery pack is in any case less than the current threshold amount, neither the battery pack itself nor the ARGUS in which it is installed are subject to the international hazardous goods regulations. Nonetheless, these regulations may apply if several battery packs are transported at the same time.For more information, please contact us.

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 chemical reactions, leaking acid, overheating, smoke, or an explosion and/or fire. 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. Do not throw the battery pack into a fire or heat it (> 60 °C) (140 °F).
3. Keep the battery pack dry - do not let it get wet or damp.
4. 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).
   To maximize a battery pack service life, if it is to be stored over a longer period of time, it should not be exposed to temperatures in excess of +50 °C (95 °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. Like any battery, the battery pack has two poles (plus and minus). To prevent damage, make certain that it is correctly connected (polarity) to the ARGUS or 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 in use or being charged or 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, immediate medical care is required. Otherwise, permanent injury may result.
20. The battery pack must be kept out of reach of children.
21. Please read this manual and the associated safety instructions before using the battery pack.
22. If you find that the battery pack emits an odor, is rusty or appears to be in anything other than perfect condition before you first use it, please contact intec to determine how to proceed.

3 General Technical Data

Tester specifications:

Dimensions / Weight Height: 235 mm (9.25 in) Width: 97 mm (3.8 in) Depth: 65 mm (2.56 in) Weight: approx. 810 g (1.79 lbs) (including battery pack)	**Inputs / Outputs** - RJ-45 (BRI/PRI/E1) for BRI and PRI - RJ-45 (Line) for xDSL, POTS, U-interface and Copper Tests - Ethernet 10/100 Base-T or 1000 Base-T - USB-A jack, USB Host interface - USB-B jack, USB Client interface - Jack for headset
Keypad 25 Keys	
LCD display LCD color display with switchable background lighting, 320 x 240 pixels	**Temperature ranges** Temperature range - charging batteries: 0 °C (+32 °F) to +40 °C (+104 °F) Operating temperature (in battery mode): -10 °C (+14 °F) to +50 °C (+122 °F) Operating temperature (with power supply/car adapter): 0 °C (+32 °F) to +40 °C (+104 °F) Storage temperature: -20 °C (-4 °F) to +60 °C (+140 °F) Humidity: up to 95 % relative humidity, non-condensing **Power supply** Lithium ion battery pack, rated voltage 7.2 V (observe and comply with the safety instructions) or 12 V / 1.5 mA ARGUS electronic plug-in power supply
	Other information ARGUS user safety tested in accordance with EN60950-1 RoHS conformity pursuant to the WEEE guidelines The electromagnetic compatibility of the ARGUS was checked in accordance with the regulations stated in our Declaration of Conformity. CE symbol The ARGUS 145^{PLUS} conforms with the EU Directive 2004/108/EC as well as 2009/C197/03. We would be happy to supply you with a copy of the detailled Declaration of Conformity upon request.

Supported Standards:

<table>
<tr>
<td>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 J (ADSL2)
ITU-T G.992.5, Annex J (ADSL2+)
ITU-T G.992.3, Annex L
(RE-ADSL2 over POTS)
ITU-T G.992.3, Annex L
(RE-Narrow PSD ADSL2 over POTS)
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</td>
<td>ISDN BRI / PRI (BRI/PRI/E1):
ITU-T I.430
ITU-T I.431
ITU-T G.821
ITU-T X.31

ISDN U-interface (Line):
ANSI T1.601</td>
</tr>
<tr>
<td>VDSL (Line):
ITU-T G.993.2 (VDSL2)
Profile:
8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a</td>
<td>R measurement / RC measurement (Line):
Resistance measurement:
- Precision for the range from 20 Ω - 100 Ω: ±10 %
- Precision for the range from >100 Ω - 100 kΩ: ±2 %
Capacitance measurement:
- Precision for 1 nf - 1 µF: ±5 %</td>
</tr>
<tr>
<td>SHDSL (Line):
ITU-T G.991.2, Annex A (G.SHDSL)
ITU-T G.991.2, Annex B (G.SHDSL)
ITU-T G.991.2, Annex F (G.SHDSL.bis)
ITU-T G.991.2, Annex G (G.SHDSL.bis)
ETSI TS 101 524 V 1.2.1 (ETSI SDSL)
ETSI TS 101 524 V 1.2.2 (E.SDSL.bis)
IEEE 802.3.ah (EFM)
ITU-T G.994.1 (G.hs)</td>
<td rowspan="2">⚠ Dielectric strength:

Line:
DC voltage: +200 V max.
Alternating Current (AC): 100 V_{pp} max.
(Copper Tests only)
DC voltage: +200 V max. (xDSL)
DC voltage: +130 V max. (for POTS)
DC voltage: +145 V max. (for U-interface)

BRI/PRI/E1
DC voltage: +48 V max.

DC voltage measurement:
- Precision: ±2 %</td>
</tr>
<tr>
<td>Ethernet (LAN or 1000 BT):
IEEE 802.3

- 10 Base-T
- 100 Base-T
- 1000 Base-T (upon request)
Autonegotiation
Auto-MDI(X)</td>
</tr>
</table>

4 Operating Instructions

Power key

- Switch the ARGUS on
- To start up again after a "power down" (adjustable see page 366)
- To switch on the display backlighting (can also be done by pressing any other key). In battery mode to save power, the backlighting will switch off automatically after an adjustable period of time - see page 367.
  To switch off the ARGUS (must be pressed somewhat longer)
- After being idle for an adjustable period of time (for example after 10 minutes), the ARGUS will shutdown automatically if it is running in battery mode (see page 372). If the ARGUS is connected to its power supply, it will automatically charge its accumulators when it is switched off (see page 372 Using the Battery Pack).

Confirmation key

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

Return key

- The ARGUS will return to the previous display and ignore any entries made at this level, e.g. changes to the settings
- Cancel test
- Close the graphic display

Cursor keys

- Scroll through the display line-by-line (vertical cursor keys)
- Move the cursor within a displayed line (horizontal cursor keys)
- When viewing a selection list or statistics, the cursor will jump to the end of the list/statistics if the right cursor key is pressed or to the beginning if the left cursor key is pressed
- Select a menu, function or a test
- Setting the measurement range in a Copper Test
- Move the cursor in a graphic display
- Select functions in the graphic Status screen

Telephony

ISDN or POTS

- Accept or hang up
- Simplified overlap sending: press the telephone key twice (ISDN only)

xDSL (access mode xTU-R, xTU-R Router) and Ethernet

- Start VoIP telephony

Level key

- BRI, PRI, or U-interface access: Start the Layer 1 measurement (level/voltage)
- xDSL access: Display the results
- Ethernet: Open the results
- Start/Stop function in a real-time analysis (Line Scope / TDR)
- Open the graphic Status screen

Numerical keypad

- Entry of the digits 0 to 9, letters and special characters
- Direct access to functions appropriate for the selected Access (Hotkey), e.g. page 136 et seq.

Softkeys

- The function of the 3 softkeys varies with the situation. The current assignment of each is displayed on the bottom line of the display in three blue blocks with white text, e.g.:
  <Menu>: The Main Menu will open
  <Start>: Setup a connection or start a test

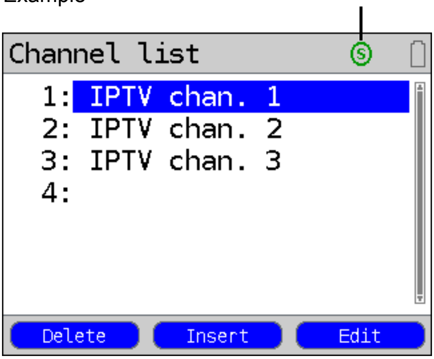
- You will find the other softkeys described at the relevant points in the manual.

Shift key

In some menus, a green circle with a green “S” will be shown in the uppermost line in the display. This indicates that the softkeys are assigned twice. In such a case, press the Shift key to change the function of the softkey (for an example, see page 207).

Example

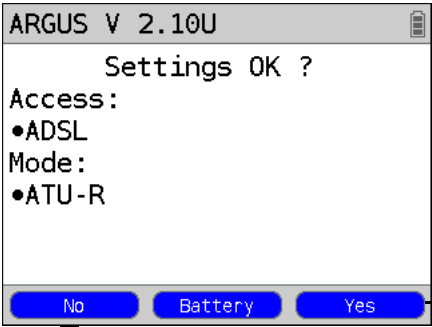
Press the Shift key: the function of the softkey will change accordingly.



The ARGUS is in largest part operated with the 4 cursor keys, the confirmation key  , the return key , the level key , and the three softkeys.
The current assignment of the three softkeys is shown in the lower line of the display.

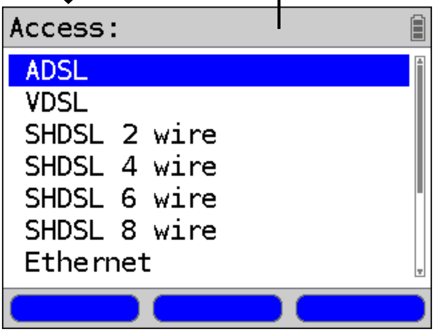
On the following pages, only the softkey's meaning in the respective context is shown - enclosed in angle brackets < >, e.g. **<Menu>**. The <✓> softkey serves the same function as the confirmation key , the <↓> softkey performs the same function as the cursor key  on the ARGUS keypad, and so on.

Example of operation:



Current assignment of the softkeys

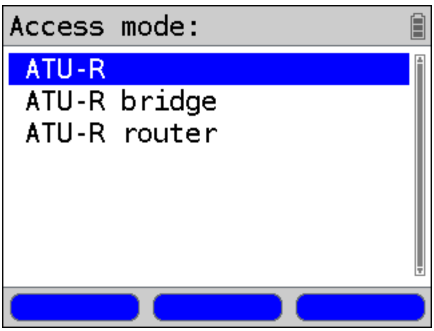
Press **<No>**: The displayed access will not be used. The Access Menu will open.



Header: Shows the name of the menu (in this example, the Access Menu), the name of the currently running test etc.

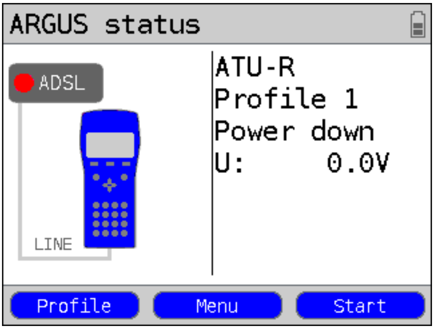
Using the — Select a line in the display: in this example, select a type of access; the selected type will marked in blue (in this example: ADSL).

Using the — Confirm the selection: in this example, the ARGUS will set the type of access to the one marked in blue. The Access Menu will open.

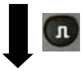


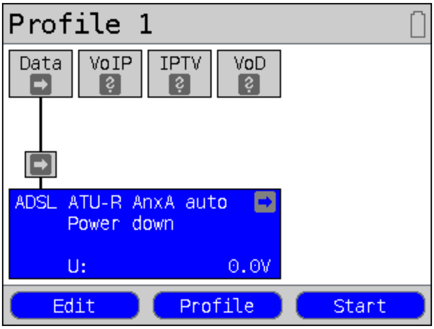
Using the — Return to the previous display without changing to marked type of access.

Continuation on next page



<Profile>	Displays the profile, see page 34
<Menu>	Open the Main Menu
<Start>	Start the ADSL connection





<Edit>	Open the xDSL and Ethernet settings
<Profile>	Configure profile
<Start>	Start the ADSL connection

Access up

PWR

Connection for the external plug-in power supply. If the plug-in power supply is connected, the ARGUS will automatically disconnect the accumulators (battery pack). After it is switched off, the ARGUS will automatically recharge the accumulators (see page 372).

LAN2

Second LAN interface (VNC server)

USB-A

USB Host interface (Active Probe I + II)

USB-B (mini-USB):

USB Client interface (PC connection)

 **Jack for a headset**

Access down

Yellow “Link/Data” LED:
signals that a physical connection has been established to another Ethernet port

- LED on constantly:
  A connection has been setup.
- LED flashing: Active - sending or receiving

Green "Speed" LED:
signals the transmission speed

- LED off: 10 Base-T
- LED on: 100 Base-T

BRI/PRI/E1

Access BRI	Pin assignment: 3/6, 4/5
Access PRI	Pin assignment: 1/2, 7/8

Line

Access POTS	Pin assignment: 4/5
Access U-interface	Pin assignment: 4/5
Access xDSL	Pin assignment: 4/5
Access SHDSL n-wire	Pin assignment: fixed 4/5, variable 3/6, 1/2, 7/8
Access Copper	Pin assignment: 4/5

LAN / 1000 BT*

Connection to a PC's network card
Connection to the Ethernet interface of an xDSL modem, router (IAD) or a hub, switch or othe Ethernet interface (Access: Ethernet).
***1000 BT (see the Gigabit Ethernet manual)**

Charging the battery (accumulator) for the first time

The compartment for the rechargeable battery pack (accumulators) is located on the back of the case. Insert the battery pack with the locating lug at the top and then tighten the thumbscrew. Use only the battery pack included in the package. With the ARGUS switched off, connect it to the supplied plug-in power supply.

Press the -key to switch the ARGUS on. The following display should appear (it may be necessary to first acknowledge other displayed notices):

The access and mode shown may vary.

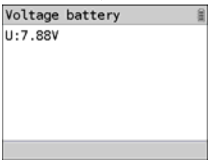
Current assignment of the softkeys

Press **<Battery>**

Menu name

Selected menu item

 Press



Once the battery pack has been fully charged, the ARGUS will indicate this in the display.

 Press: Cancel "Charge" battery pack

The supplied battery pack will not reach its full capacity until it has been fully charged (see page 372 Using the Battery Pack).

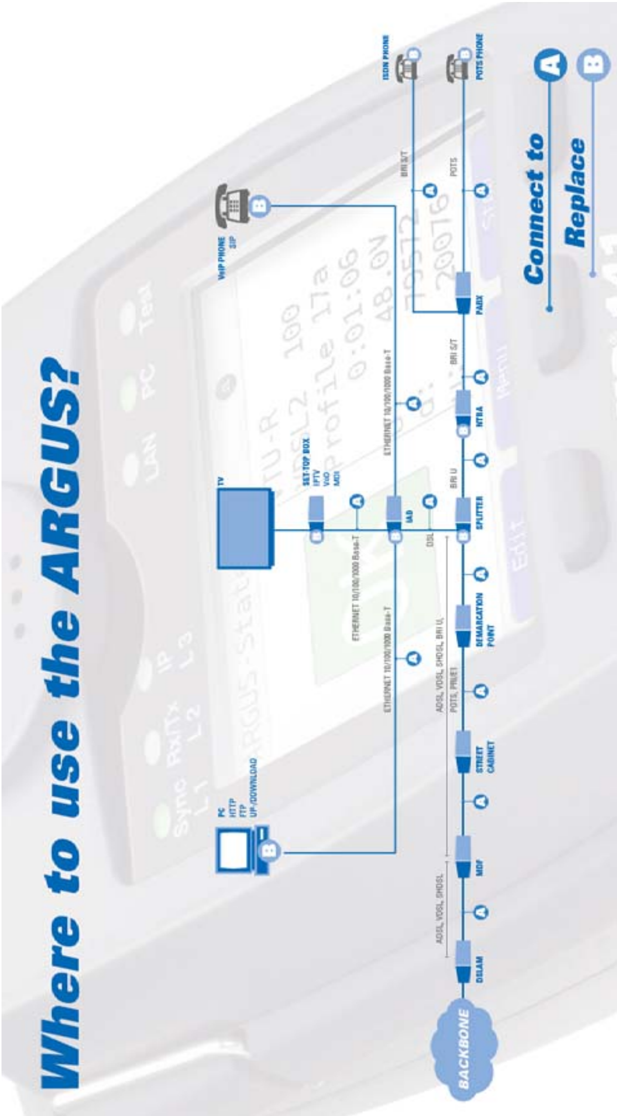
Power management

In battery mode, the ARGUS will automatically power down after it has been idle for 5 minutes (this setting can be changed, see page 367). Reasonably enough, the ARGUS will not power down 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 plug-in power supply. When the power supply is connected, the accumulator is automatically disconnected. Regardless of whether the power supply is connected, the accumulator should always installed using the ARGUS. This will ensure, among other things, the uninterrupted operation of the real-time clock.

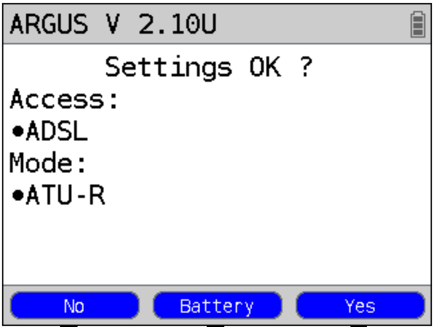
Unplug the power supply from the mains, once the ARGUS is switched off and will no longer be used (Battery charging).

An Overview of the ARGUS Connections



5 Menu Hierarchy

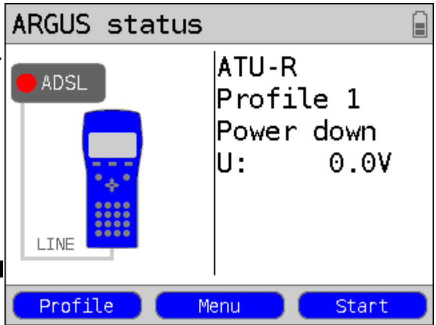
Switch the ARGUS ON



The initial display will depend on the type of access set last.
In this example: ADSL access

Menu Accu Servicing

Charging	page 373
Trickle charge	page 373



The main window will open displaying menus available for the type of access selected last (see page 28, "Single tests" menu).

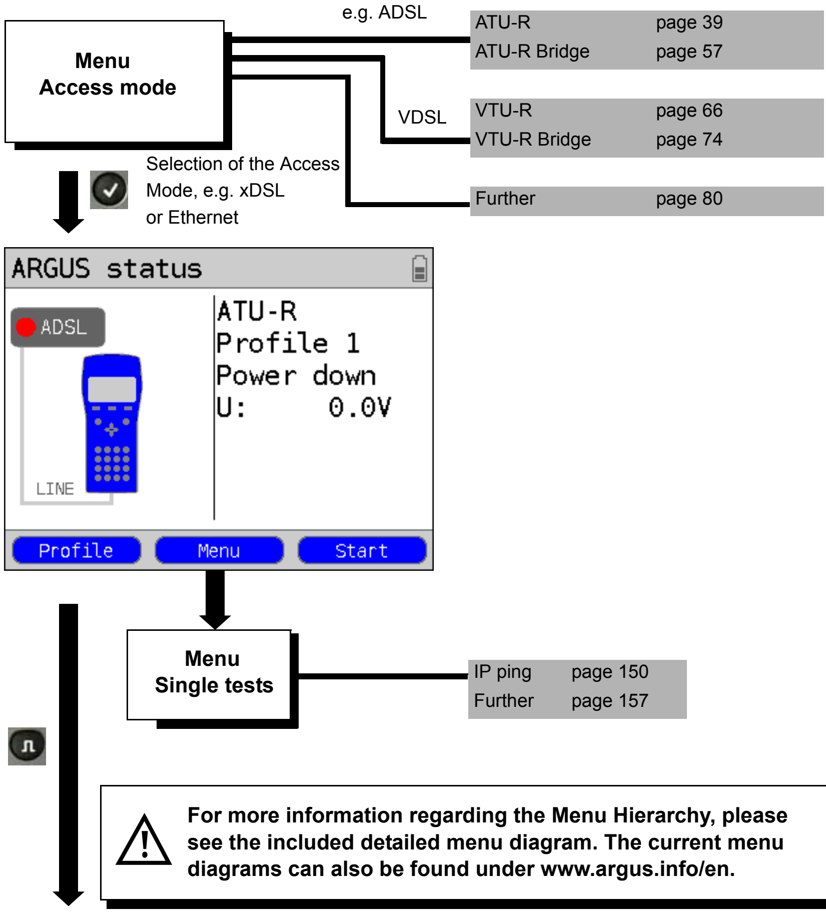
and

Menu Access

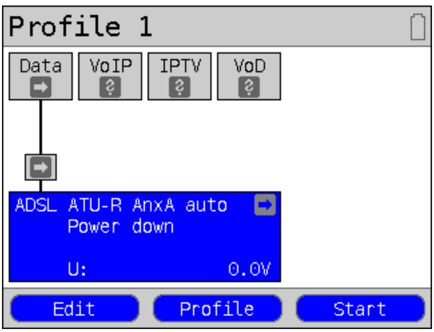
Selection of the physical access

ADSL	page 31
VDSL	page 64
...	
and so on	page 80

The Access Menu will open automatically



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.



To open the ARGUS State display, press the Level key .

The State display is the one from which all other steps are taken.

6 The Physical Layer

The physical layer (Layer 1) is shown in the Status screen (figure 2) with its own graphic element (in this example ADSL). The other elements in the Status screen will at first only be mentioned. For a detailed description of these, please see page 111 (Virtual Lines) and page 132 (Services). The physical layer of a VDSL, SHDSL or Ethernet access will be displayed in the same manner as for an ADSL access. The ADSL access and the Access mode ATU-R selected are shown in the Status screen directly. If the default settings are correct, Layer 1 (ADSL synchronisation) can be setup immediately by pressing **<Start>**. The most important information, e.g. voltage (U), modem states (Power down) and selected configuration (Annex A auto), will be displayed in the Layer 1 box (blue). If you wish to change the ADSL access parameters directly, press **<Edit>**. To change the type of access directly from the Status screen (Figure 2), press the key combination and .

Figure 1

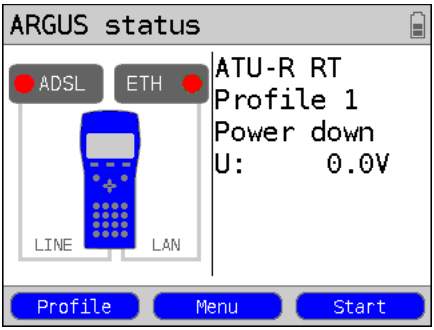
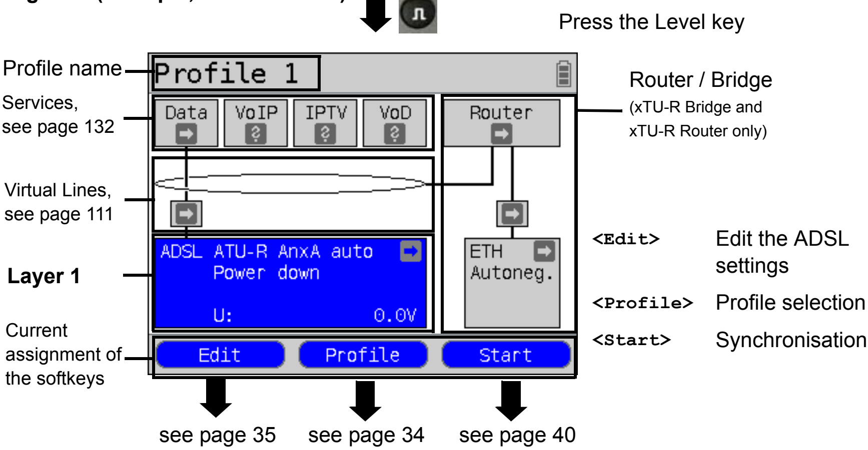


Figure 2 (example, ATU-R Router):



For information on tests that can be performed on Layer 1, see page 134.

7 Operation on an ADSL Access

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

ATU-R	Terminal mode (ADSL Transceiver Unit Remote - ATU-R), see page 39. 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 57. 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 61. Insertion of the ARGUS between the ADSL access and the PC. The ARGUS replaces both the ADSL modem and the router.

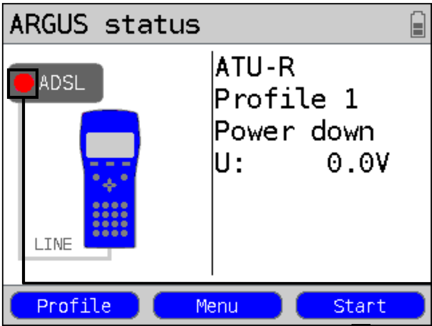
⚠ The individual ADSL tests record and store data (e.g. in tracing IP data). The user must comply with the statutory regulations governing the collection and storage of such data and his obligation to give notice in this connection.

⚠ The voltages on the subscriber line may not exceed 200 VDC and should be free of AC voltage.

7.1 Setting the ADSL Interface and Access Mode

Use the included xDSL cable to connect the ARGUS (Line jack) to the access to be tested and then switch the ARGUS on. The initial display will depend on the access setting used last. Select ADSL as the type of access and ATU-R as the access mode.

ARGUS State display



see page 40

Items displayed (from top to bottom):

Access mode (in the example: ATU-R)

- Default (preset) profile (in the example: Profile 1

- Status (in the example: Power down

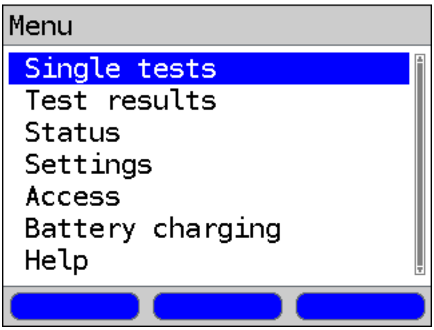
- DC voltage on the interface

The ADSL test is not yet started:

Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup.
`<Menu>`	Open the Main Menu.
`<Profile>`	Display the profile, see page 34.

Main Menu



The various submenus available for the selected type of access are shown in the Main Menu.


Opens the marked menu (in this example, Single tests).


Select a menu. The selected menu will be marked blue in the display.

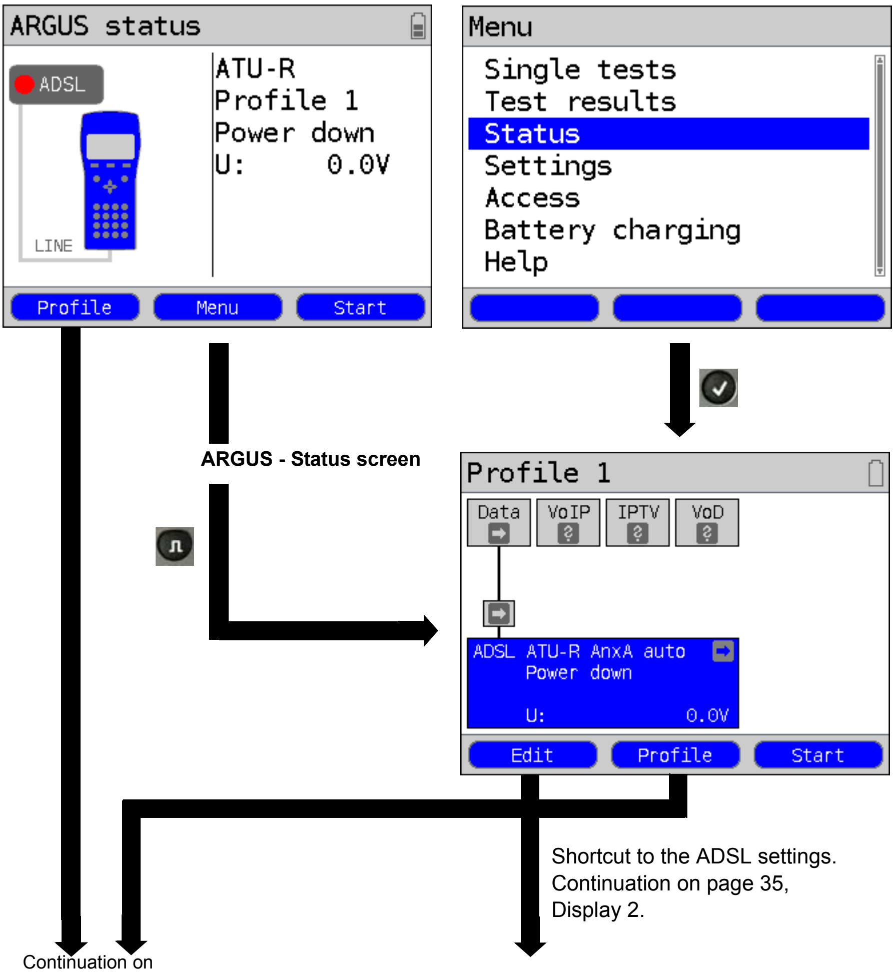

to return to the previous menu (in the example, the State display).

Note:
Starting functions with the numeric keys / key combinations
The ARGUS keypad can be used to call up or start the main functions and/or tests directly. An overview of the available key combinations can be found on page 136.

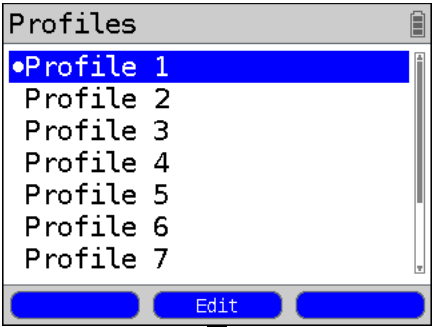
7.2 ADSL Settings

The ARGUS stores all of the settings required to run a test on an ADSL access in profiles. Up to 10 user-defined profiles can be created. A specific profile can be selected before an ADSL 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 settings can be restored at any time (see page 368). The procedure for changing a setting will be illustrated with a single example:

ARGUS - State display **ARGUS - Main Menu**

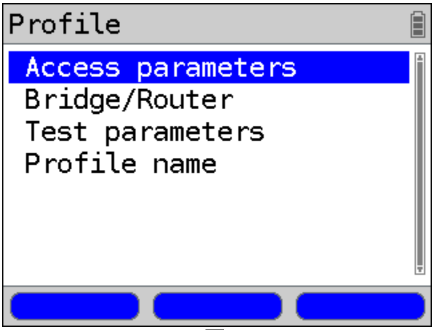


Continuation on next page



Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the settings in the default (preset) profile when setting up the ADSL connection.

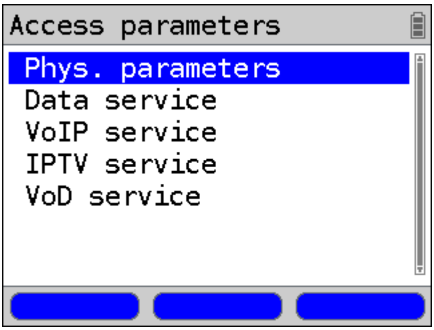
The ARGUS will use the marked profile as the default profile and will open either the State display, the Status screen or the Settings menu (depending on whether the profile was opened from the Main Menu, the Status display or the ARGUS State Display).



e.g. select Access parameters

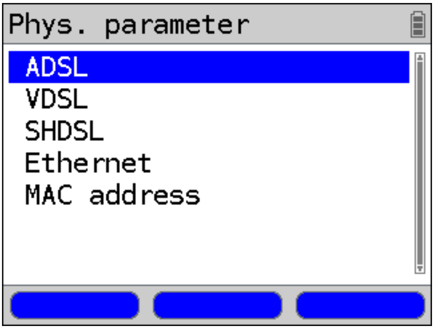
Bridge/Router settings, see page 37

Test parameter settings, beginning on page 138

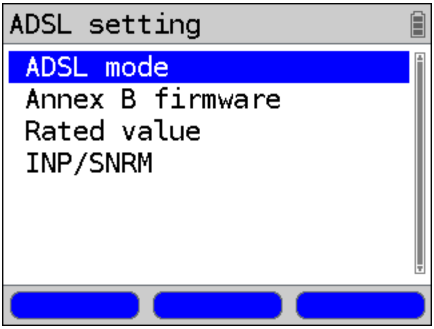


e.g. select the Phys. parameters

Continuation on next page

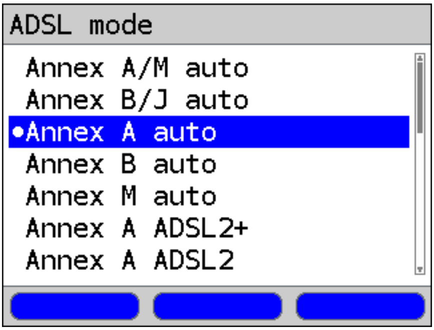


e.g. select ADSL



Continuation of the `<Edit>` shortcut on page 33.

e.g. select ADSL mode



Select ADSL mode (in the example, Annex A auto). The default setting will be marked in the display with a ●.

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

The ARGUS uses the marked ADSL mode as the default and returns to the next higher menu.

Setting	Explanation
Access parameters:	
Phys. parameters:	
ADSL:	Access parameters for the ADSL connection
ADSL mode	Different ADSL modes can be selected depending on the variant of the ARGUS. The selected ADSL mode must be compatible to ATU-C (network-side). If an ADSL auto-mode is selected (Annex A/M auto, Annex B/J auto, Annex A auto, Annex B auto or Annex M auto), the ARGUS will automatically determine the configuration at the DSLAM and make the corresponding settings. Default setting: ***Annex A auto***
Annex B firmware	Select the version in the ADSL Annex B firmware. Releases R4 and R5 are available to choose from. For more information, please contact us. Default setting: ***R4***
Rated value	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 (threshold) values, the ARGUS Status will show "OK“, otherwise "FAIL“ will be displayed. Default setting: ***d: 0*** and ***u: 0***
INP/SNRM	Determines how any free line capacity will be used by a connection. Favour DS INP: The downstream INP will be increased to a value greater than the minimum INP set for ATU-C. Favour DS SNRM: The downstream SNRM will be increased to a value greater than the DS Target SNRM set for ATU-C. Whether the free line capacity can be used will depend on ATU-C and its configuration. Default setting: ***Favour DS INP***

MAC address:		
	Display and selection of the MAC addresses. The first two MAC addresses cannot be changed manually. 1. If the default MAC address is selected, the ARGUS will use its own MAC address. Default setting: ***Default MAC address*** 2. If Dynamic MAC Address is selected, a different MAC address will be used for each synchronization. 3. A third MAC address can be entered: Mark a line and then press **<Edit>**.	
	<Edit>	Edit the MAC address for the entry. Enter the address in hexadecimal from the keypad and the softkeys **<A..F>** (e.g. to enter a "C" press the softkey three times or for an "F" six times; conclude by pressing **<OK>** to confirm your entry). Group MAC addresses cannot be used. 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.
	One after the other and	Displays the ARGUS MAC addresses: Line, LAN, LAN2, see also page 136 f.
Bridge/Router:		
Ethernet:		
Auto-negotiation	Switch on or off If autonegotiation is enabled, a network card can independently determine the correct transmission speed and duplex setting for the network port to which it is connected and can then 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*** (see page 108)	
IPv4:		
IP mode	Setting the assignment of the IP addresses	
	Static IP: DHCP server:	Static IP addresses IP address assigned by ARGUS Default setting: ***DHCP server***

Local IP address	Own local IP address of the ARGUS Range: 0.0.0.0 to 255.255.255.255 Default setting: ***192.168.10.1*** (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	Options for the DHCP Server: - Start and End IP addresses Range: 0.0.0.0 to 255.255.255.255 Default setting: (see RFC 3330 regarding assignment) Start: ***192.168.10.30*** End: ***192.168.10.40*** - Name of the domain - Reserve time of the IP addresses Range: 1 to 99999 hours Default setting: ***240***
Router:	
NAT	NAT (Network Address Translation) on or off The Router's NAT service automatically and transparently replaces the address information (e.g. the IP addresses of the LAN) with other address information (e.g. the IP addresses of the WAN). Default setting: ***NAT on***
SIP port	The port used for the incoming SIP signaling. NAT on 0 to 65535 Default setting: ***5060***

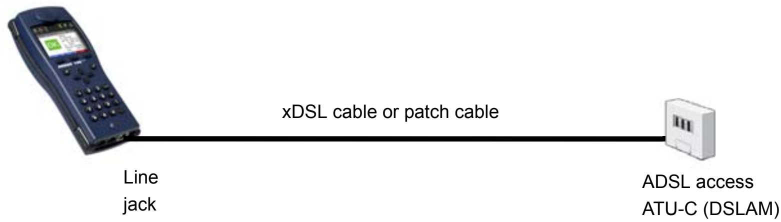
For information on other access parameters, see chapter 11 Virtual Lines (VL) page 111.

7.3 The ARGUS in the ATU-R Access Mode

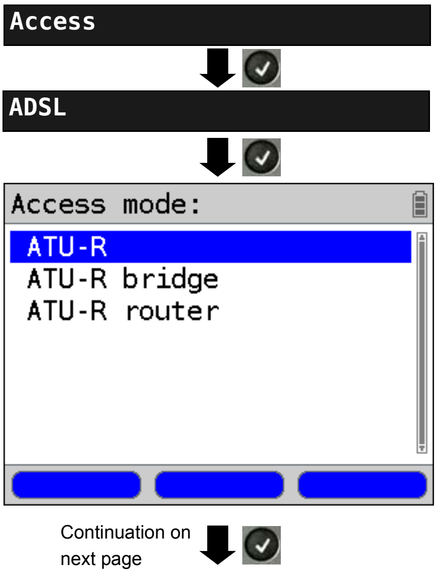
Determining the ADSL connection parameters

The ARGUS is connected directly to the ADSL access (either before or after the splitter) using the included xDSL cable or a patch cable. In this case, the ARGUS replaces both the modem and the PC. The ARGUS will set up an ADSL connection and determine all of the relevant ADSL connection parameters. The ARGUS displays the ADSL connection parameters and saves them after the connection is cleared down if desired.

⚠ **Use only the cable included in the package!**



Setting the ATU-R access mode:

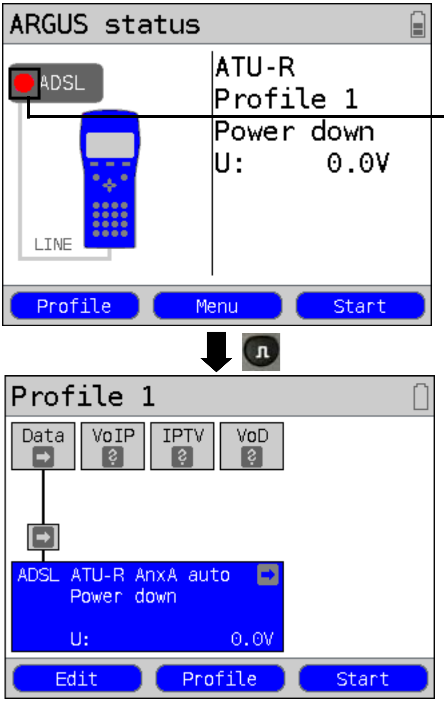


ADSL access

or

and ARGUS - Status screen

Continuation on next page



The ADSL test is not yet started: red LED in the display.

Key to the LED symbolized in the display:

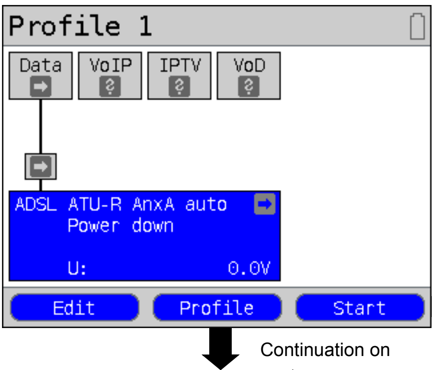
Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup.

All further functions and procedures will be explained on the basis of this Status screen.

Setting up an ADSL connection

Profile settings:

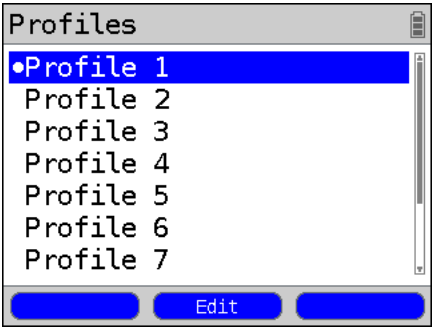
When setting up the ADSL connection, the ARGUS uses the settings saved in the profile (see page 35): ADSL mode, rated value, Annex B firmware and INP/SNRM.



ARGUS - Status screen

Continuation on next page

The ARGUS will use the default (preset) profile to setup the ADSL connection (in this example, Profile 1).



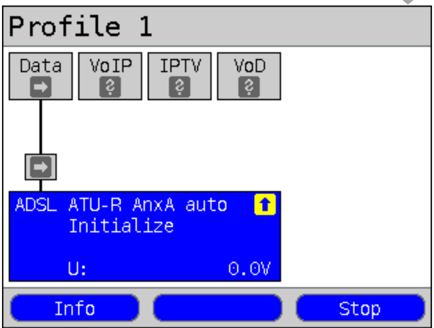
The ARGUS takes over the marked profile as the default and returns to the Status screen.

Display the profile.

The default profile will be marked in the display with a ● (in this example: Profile 1).

Mark the profile.

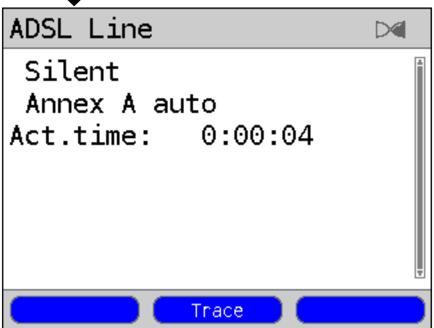
<Edit> Open the marked profile for editing. The settings of the selected profile can be edited here (see page 34).



or

Setting up an ADSL connection

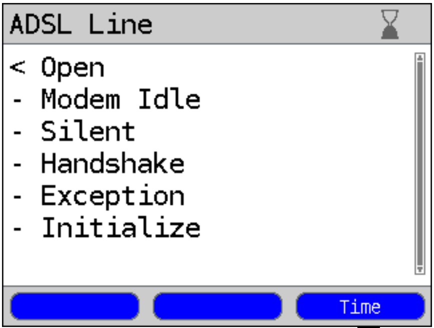
The ARGUS synchronizes with the DSLAM (the “Sync / L1” LED will flash and an element with a yellow background will be shown in the display).
The ARGUS will display the current connection status (in this example "Initialize") in the Layer 1 box (blue).



Continuation on next page

While setting up the connection:
Display:

- Current connection status
- ADSL mode
- Time elapsed since the start of synchronisation in h:min:sec.



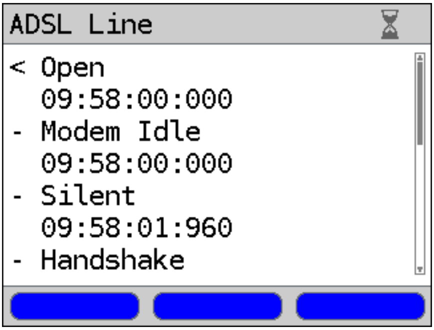
Command symbols:

<   = command sent from the ARGUS

>   = command sent from the DSLAM

-   = connection status

Display timestamp.

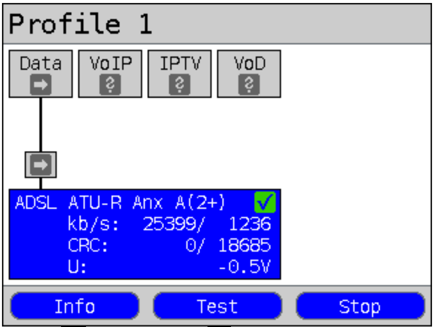


The ARGUS shows the time when (internal clock, see page 366) the command arrived.

Return to the previous display and the Status screen.

Connection successfully setup

As soon as the connection has been setup ("Sync/L1" LED on constantly and a green check mark in the Layer 1 box), the ARGUS will determine the ADSL connection parameters. After the ARGUS has synchronized, it must remain connected to the ADSL access for at least 20 seconds. After this time has elapsed, the ARGUS will have saved all of the ADSL connection parameters.



ARGUS - Status screen.
Display shows (Layer 1 box):

- Access and Access mode
- ADSL mode
- d: Downstream data rate
  u: Upstream data rate
- Number of CRC errors in downstream and upstream data
- Interface's DC voltage

see page 134

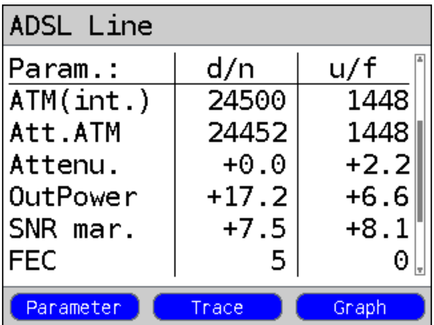
or

If the current data rate exceeds the rated (threshold) value set (see page 36), the ARGUS will display a green "OK" in the ARGUS status (see) otherwise it will show a red "FAIL".page 32

<Info> Display the ADSL connection parameters

<Test> Display the available tests, see page 134

<Stop> Clear down the ADSL connection



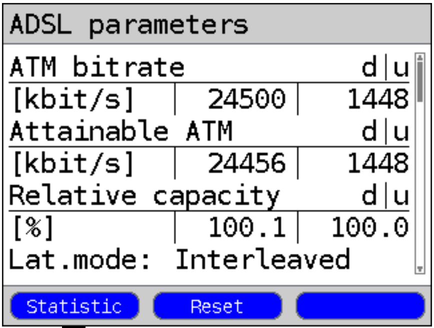
Display the ADSL connection parameters in brief:
- d/n: downstream/near
- u/f: upstream/far

Scroll through the connection parameters.

<Trace> Display the Trace data, see page 42.

<Graph> Display the graphs, see page 45.

Continuation on next page

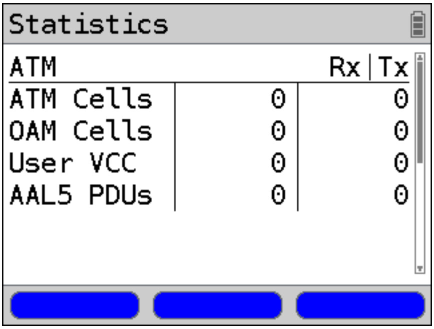


Display the connection parameters in long form for both downstream (d) and upstream (u), see table page 52.

n/a	not available
n/u	not used
n/r	not received

Scroll through parameter display

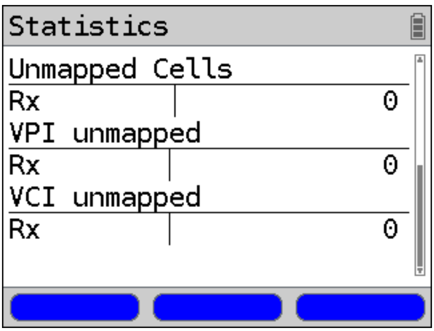
<Reset> Resets (zeros) the error counters: FEC, CRC, and HEC.



Display ATM statistics:

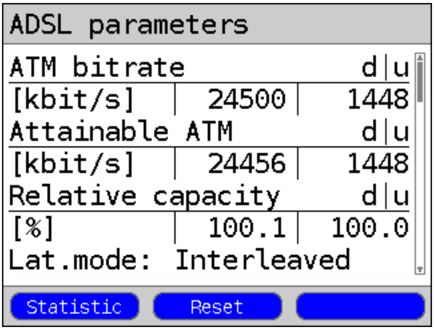
ATM Cells:
The ARGUS will display the number of ATM cells received (Rx) and sent (Tx).

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



Other ATM information:
- Received (Rx) unmapped cells
- Received (Rx) unmapped VPI
- Received (Rx) unmapped VCI

Continuation on next page



Display the connection parameters in long form for both downstream (d) and upstream (u), see table on page 52.

n/a not available

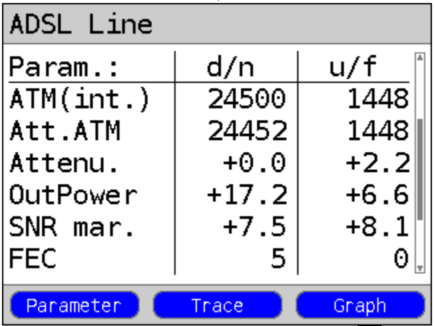
n/u not used

n/r not received

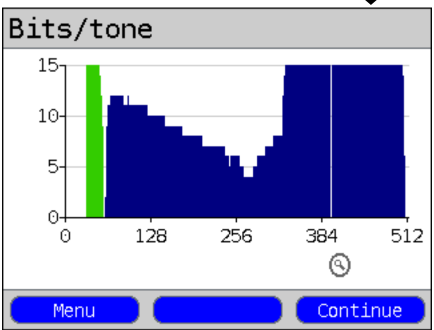
Scroll through parameter display

<Reset> Resets (zeros) the error counters: FEC, CRC, and HEC.

<Statistic> Display the ATM statistics.



Reset the error counters (FEC, CRC and HEC).
CAUTION: Once showtime has been reached, the ARGUS will automatically reset the error counters.



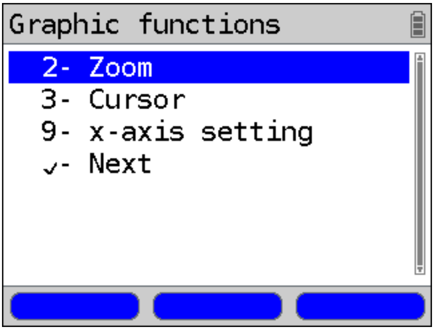
Display the bit distribution, e.g. bits transported per carrier frequency (tone).
y-axis: bits
x-axis: tones (channels)
Based on the bit distribution, it is possible to detect line disturbances (e.g. through HDB3, HDSL, RF, DPBO etc.)

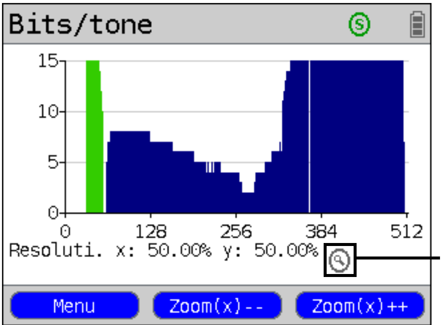
The ARGUS will return to the previous display

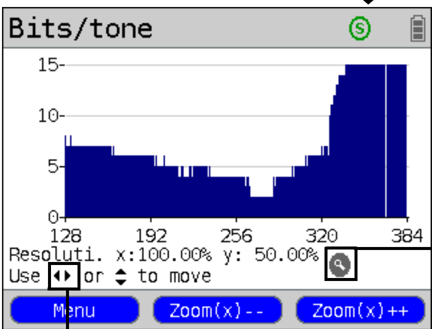
<Continue> Open next graphic

see page 50

Continuation on next page







Continuation on next page

Graphic functions:
The graphic functions like Zoom, Cursor and Setting of the x-axis allow detailed analysis of the graphs.

 Exit menu without making changes.

 Using these numeric keys the Zoom function can also be activated within a graph.

 The Cursor function is described on page 48.

 A description of how to change the units shown on the x-axis from tone to frequency can be found on page 48.

 All of the settings made for viewing this graph will also be applied to the next one opened.

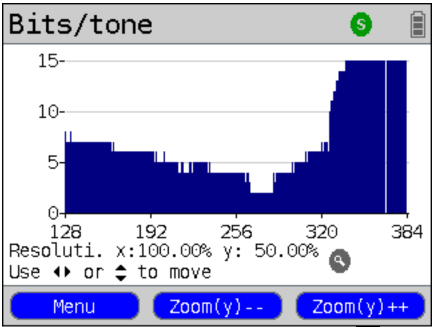
The magnifying glass is shown in the display on a white background.
The Zoom function is not active in this graph.

<Zoom(x)++> Enlarges the central section of the graph (100%)

<Zoom(x)--> Deactivates **<Zoom(x)++>** and ceases enlargement.

If the magnifying glass is shown in the display on a dark background, Zoom is active.

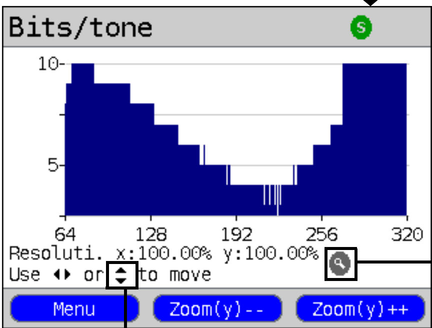
 The cursor keys can be used to move horizontally through the zoomed area.



The  is used to switch the softkey assignment. The ARGUS will switch from x-axis zoom to y-axis zoom.

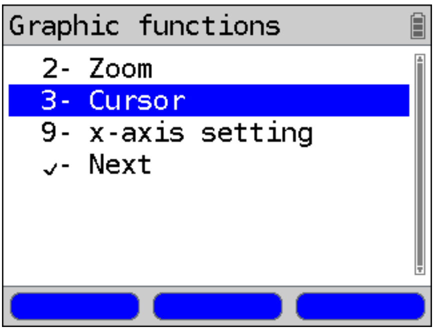
<Zoom(y)++> Enlarges the central section of the graph (100%)

<Zoom(y)--> Deactivates **<Zoom(y)++>** and ceases the enlargement.



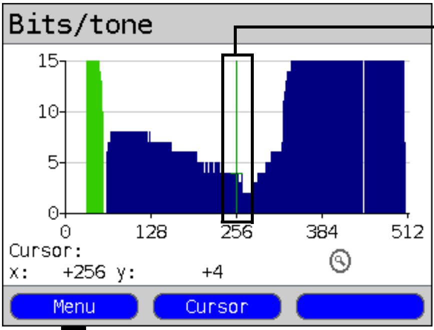
If the magnifying glass is shown in the display on a dark background, Zoom is active.

The cursor keys can be used to move vertically through the Zoomed area.



The Cursor function is used to precisely measure graphs.

Continuation on next page 



Once the Cursor function is started, a green Cursor line will be displayed in the middle of the graphic.

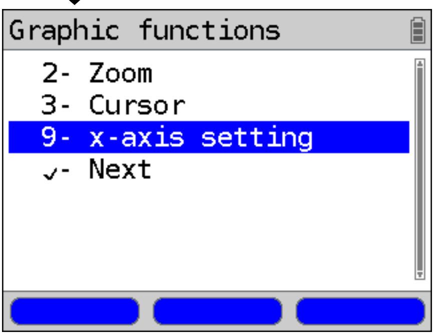
<Cursor> Using the Cursor softkey, it is possible to switch the cursor on or off as needed once it has been activated from the menu.

The value of the graph at the cursor's current position will be displayed below the graph as follows:

x: 256th Tone

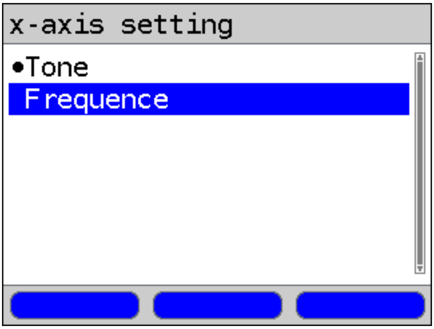
y: 4 Bits

Using the cursor keys "left" and "right", the cursor can be moved to any point in a graph to measure it. Briefly tapping the cursor key will move the Cursor one position further in the graph. The Cursor will move in ever larger steps if you press and hold the cursor key down.



The menu item x-axis setting can be used to change the x-axis label from Tone to Frequency.

Continuation on next page



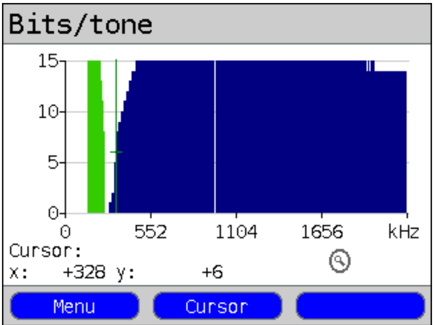
Possible selections:

Tone: Display the value of the x-axis as tones.

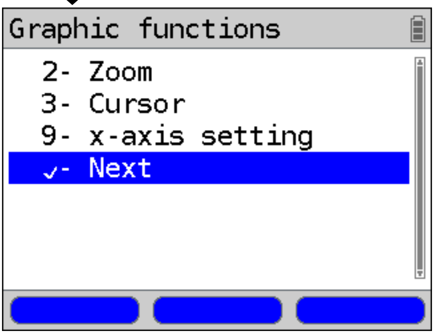
Frequency: Display the value of the x-axis as frequencies.


Set the x-axis directly

Graphic functions



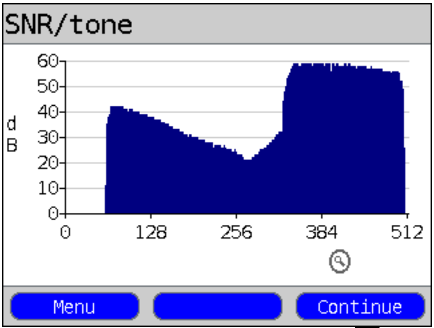

Using the cursor keys "left" and "right", you can scroll through the zoomed area (in this example, frequency).



The Zoom and Cursor functions can also be used in combination. As an example, it is easier to measure a specific point in a graph with the Cursor function if you have first Zoomed in on the area. The zoomed area will not necessarily be centered on the Cursor. The graphic functions are available for any graph.

Continuation on next page

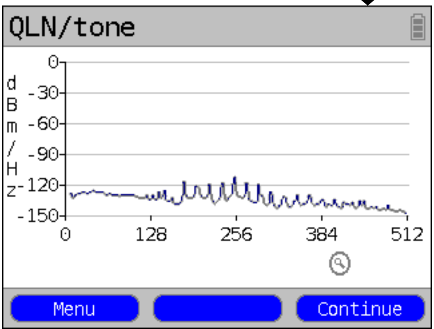
Other result graphs



Display of the signal-to-noise ratio (SNR) for each tone
y-axis: SNR in dB
x-axis: Tones (channels)

In this manner, it is possible to detect interference on individual tones (channels), in this example DPBO (Downstream Power Backoff).

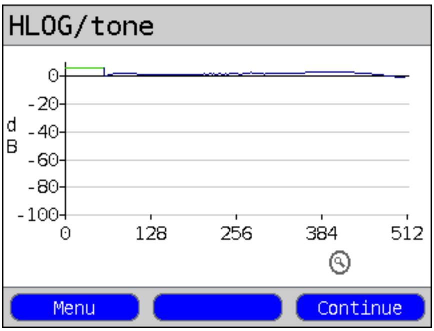
<Menu> Opens the Graphic functions, see page 46).



Display the quiet level noise (QLN) for each tone. The QLN displays the quiet level noise of the wire pair as function of the frequency.
y-axis: QLN in dBm/Hz
x-axis: tones (channels)

Based on the QLN it is possible to detect narrow-band interference caused by, for example, a medium-wave radio station or a defective switching power supply. Such interference will appear as small peaks. The example shows a line with interference from a power supply.

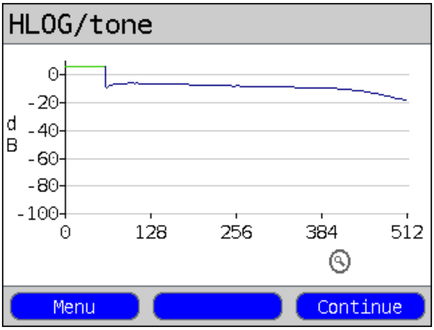
<Menu> Opens the Graphic functions, see page 46).



Display of the amplitude component of the transfer function (HLOG) for each tone. The HLOG shows the attenuation of a line for each frequency.
y-axis: Hlog in dB
x-axis: Tones (channels)

Continuation on next page

Example: skew + bad contact

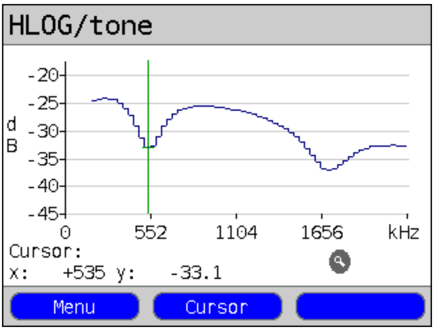


If a line is in good condition, the values will fall as the frequency rises; for a very short line, they will be nearly horizontal. In this example, a short line is shown. The upstream and downstream values from the DSLAM and the downstream values calculated by the ARGUS may sometimes be skewed in the HLOG graphs. Other times the DSLAM may not send the upstream value of the HLOG or may even send one that is false.

DSL connections are often possible even though one of the two wire pairs is high impedance or even open (with just capacitive coupling). Such defective lines commonly cause frequent interruptions and/or loss of data. The following can cause such problems: oxidized access lines, bad contacts in the telephone wallsockets, loose terminal clamps or badly insulated lines. In such cases, the attenuation on the line is higher for low frequencies than it is for high frequencies. This can be recognized by the unusual relationship between the upstream and downstream attenuation or nature of the HLOG curve. Where the problem is caused by one of the wires, the attenuation is often lower for low frequencies than for higher frequencies.

<Menu>	Opens the graphic functions (see page 46).
<Continue>	ARGUS will return to the Bits/tone graphs.

Example: Bridge tap



The example at the side shows what is known as a drop. This may indicate a stub line (bridge tap).
Using the rule of thumb:
L[m] = 50 / f [MHz],
and knowing the frequency in MHz (in this example 0.535 MHz), it is possible to estimate the approximate length of the stub line:
L [m] = 50 / 0.535 MHz = 93 m
There is a stub line of approximately 93 m in length.

The ARGUS determines the following ADSL connection parameters:

ADSL connection parameters:	
ATM	The actual usable ATM bitrate in kbit/s.
Attainable ATM	This is the theoretically attainable bitrate in kbit/s.
Relative capacity	Utilization of the line as a percentage.
Latency mode	Depending on the configuration of the DSLAM, the ARGUS will display either Interleaved or Fast.
Attenuation	The line's attenuation in dB over its entire length and bandwidth. Certain types of access are not suitable where the line attenuation is particularly high. When considering the attenuation values to determine the recommended access types, it is better to use the dB values in the Hlog graphs with a 300 kHz cursor setting.
Output power	Output power in dBm referenced to 1 mW.
SNR margin	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}. This value is the amount of reserve that a line has to deal with interference. Rule of thumb: The SNR margin downstream should be at least twice the SNR margin upstream or more.
Impulse noise prot.	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 number of transmission errors corrected using the cell checkbytes. 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 superframe checksum sent from the opposing end does not match the one calculated locally. Possible cause: Fault on the line.

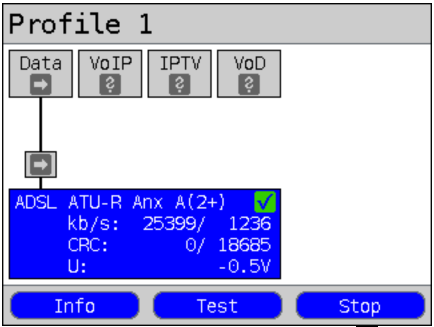
	f (far): Errors that the DSLAM has detected and informed the ARGUS. n (near): Errors which were detected by the ARGUS in the blocks it received.
HEC	Header Error Checksum The number of ATM cells with bad header checksums. f (far): Errors that the DSLAM has detected and informed the ARGUS. n (near): Errors which were detected by the ARGUS in the blocks it received.
Reset	Shows how often the error counters have been reset by the user with the `<Reset>` softkey.
Resync:	Number of times that the ARGUS has been resynchronized.
Vendor far:	The manufacturer of the ATU-C-side, see page 385 for more information.
Version:	Vendor Specific Information, generally shows the version of the software running at the ATU-C (DSLAM) end.
Vendor near:	Manufacturer of the ARGUS chipset (ATU-R), see page 385 for more information.
Version:	Vendor Specific Information, shows the software version of the ARGUS.

System information regarding the transmission to the remote end in ADSL

Usually, when a modem synchronizes with a DSLAM, information on the manufacturer and type of modem will be sent to the DSLAM's control system. In the case of ADSL, this is performed in accordance with ITU-T G.997.1. If an ARGUS is synchronizing with a DSLAM, it will - depending on the DSLAM - send the following to the control system:

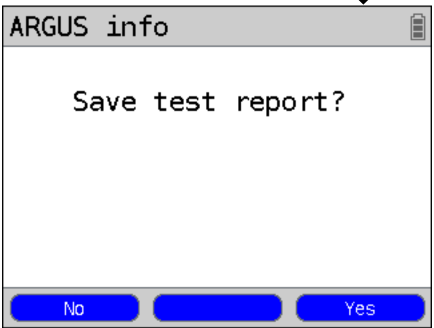
Info	Displayed at the DSLAM	Meaning
System Vendor ID	0x04, 0x00 (hex)	Country Code: Germany
	INGE or 0x49, 0x4E, 0x47, 0x45 (hex)	Provider Code: intec Germany
	0x20, 1x00 (hex)	System-FW-Version: 2.10.0
Version Number	R2.10.00 U_	Device-FW-Version: 2.10.0
Serial Number	ARGUS145plus9999	Device Type: ARGUS 145 plus / Device serial number 9999

Clear down the ADSL connection and save the reports



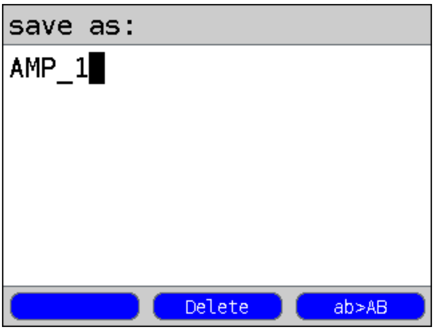
ARGUS – State display

Clear down the ADSL connection.



<No> The results will be discarded.

<Yes> Save results

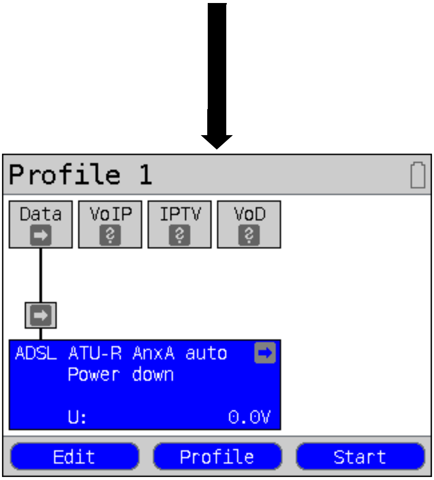


The ARGUS saves the ADSL connection parameters together with the trace data in the first available memory location. The memory location can be given any name desired (see page 361).
Default setting: AMP_1, AMP_2.... or the call number of the access under test if the number has been entered into the speed-dialling memory (see page 371).

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

Save report

Continuation on next page

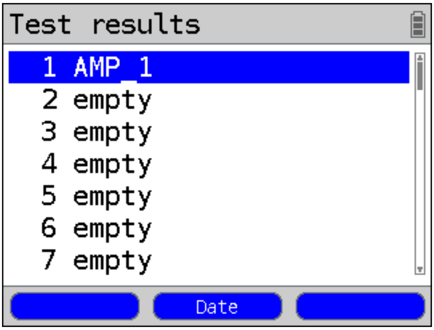


Once the results have been successfully saved in memory, the ARGUS will return to the Status screen or ARGUS State Display.
A new sync attempt can be started by pressing **<Start>**.

Displaying the saved test reports

Test results

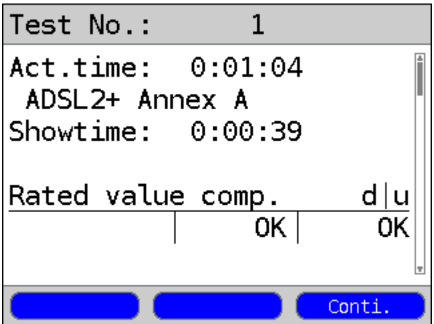
ARGUS - Main Menu



Mark the saved test results.

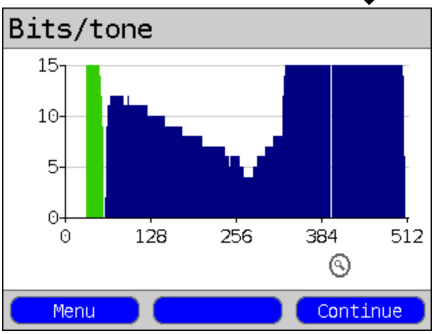
<Date> Display of the date and time that the results were saved.

View



Display the test results:
The ARGUS displays the ADSL state and the ADSL connection parameters.

Scroll through the ADSL connection parameters.



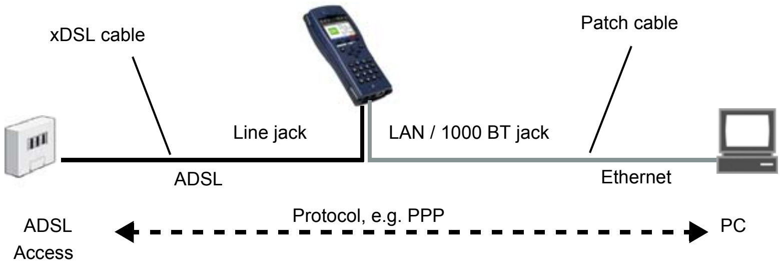
Bit distribution display (Bits/tone)

<Continue> Display of the signal-to-noise ratio for each tone (SNR / tone), the QLN / tone, the Hlog / tone and the trace data.

Close the results display.

7.4 The ARGUS in the ATU-R Bridge Access Mode

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



Bridge/Router settings, see page 37.

Settings			
Bridge/Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time

Setting the access mode to ATU-R Bridge:

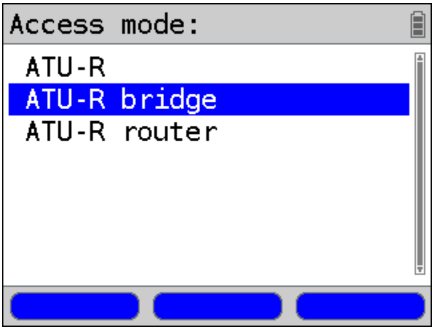
Access

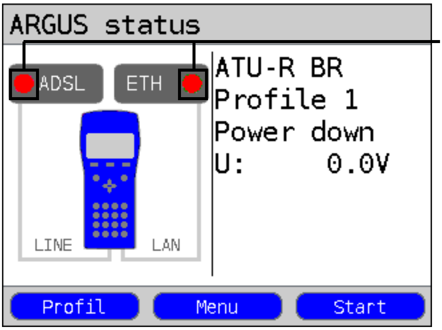
ARGUS - Main Menu

ADSL

or

and in the Status screen.





The test is not yet started: red LED in display

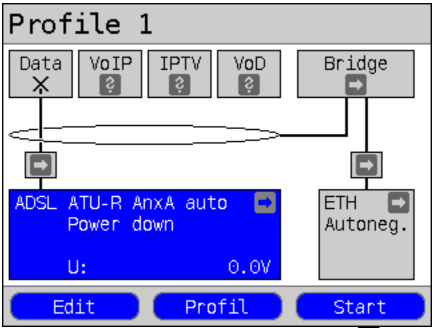
Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup.

Display:

- Access mode
- Default (preset) profile, see page 34
- Current State
- Interface's DC voltage

Continuation on next page



The test is not yet started!
The meaning of the arrow in the Layer 1 box:

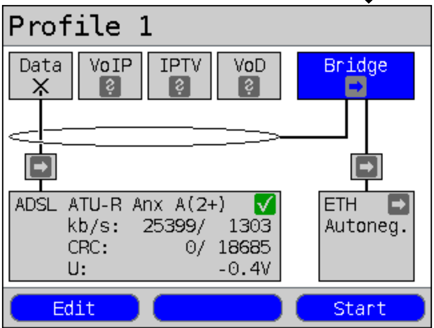
grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup.

Display shows (Layer 1 box):

- Access mode
- ADSL mode
- Current State
- Interface's DC voltage

Set up an ADSL connection

Using the cursor keys, select Bridge (see page 112).



The ADSL connection has been setup (green check mark in the Layer 1 box).

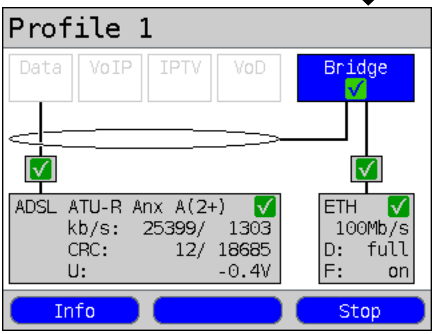
<Edit> Setting the Bridge/Router parameters

Set up an ADSL Bridge

The bridge can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Stop> Deactivate Bridge mode.

<Info> This displays the Bridge mode activity.

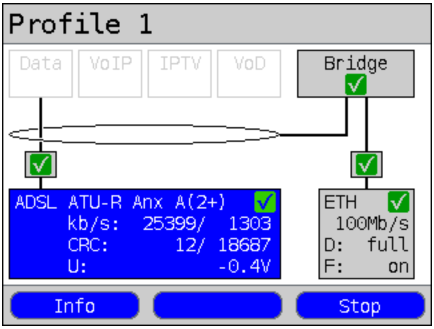


When the active ADSL physical line is in Bridge mode, the following tests may started using the **<Test>** softkey, see page 134.

When Bridge mode is active no tests are available.

Display the connection parameters

Switch to Layer 1 box and other elements, for details on the operation, see page 112.



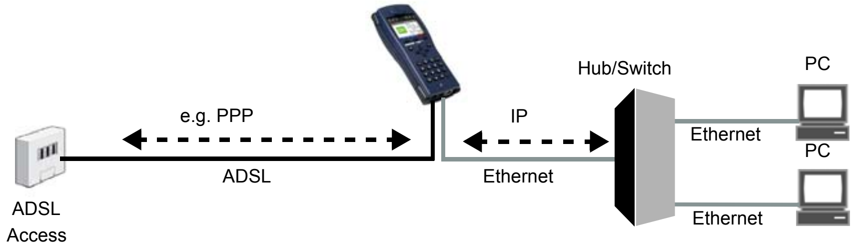
<Info> or  Display the ADSL connection parameters, see page 43.

<Stop> Clear down the ADSL connection and automatically deactivate the bridge.

7.5 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!



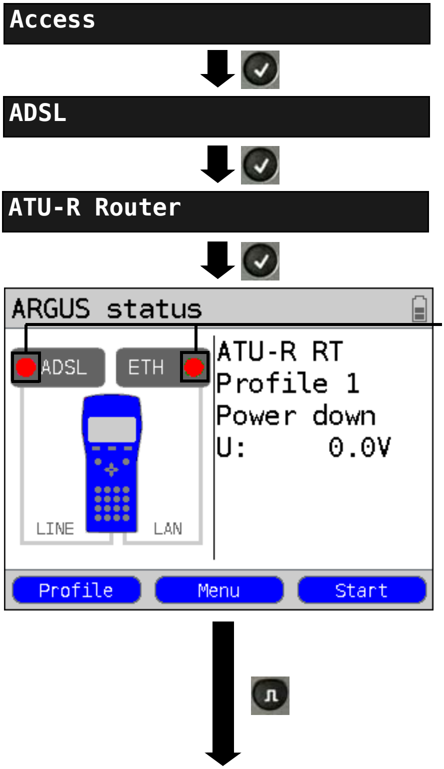
Bridge/Router settings, see page 37:.

Settings			
Bridge/Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time
	Router	- NAT On / Off - SIP port	

ADSL settings, see page 36:

Setting			
Access parameters	**Phys. parameters**	ADSL	ADSL mode Annex B firmware Rated value INP/SNRM

Setting the access mode of the ATU-R Router:



ARGUS - Main Menu

or

and in the Status screen.

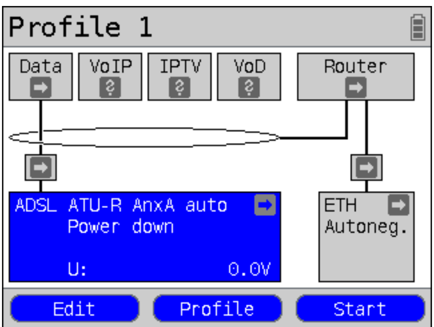
The test is not yet started:
red LED in display

Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup.

Display:

- Access mode
- Default Profile (Profile 1)
- Current State
- Interface's DC voltage



The test is not yet started:

The meaning of the arrow in the Layer 1 box:

grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup.

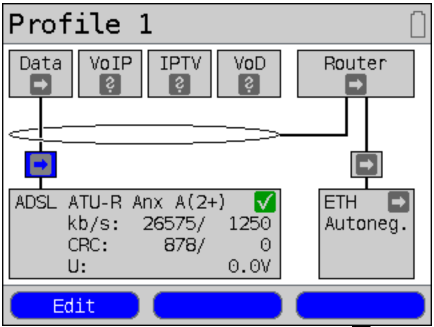
Display shows (Layer 1 box):

- Access mode
- ADSL mode
- Current State
- Interface's DC voltage

<Profile> Open profile see page 40

Using the cursor keys select the Virtual Line and then use the softkey to open the Router display, see page 112.

Setting up an ADSL connection



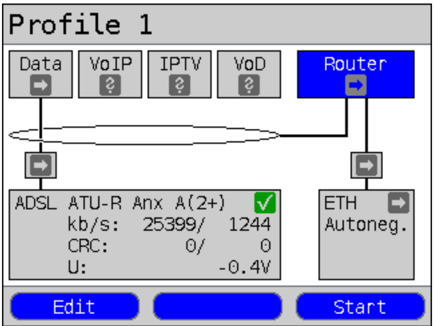
When the active ADSL physical line is in Router mode, the following tests may started using the <Test> softkey, see page 134.

When Router mode is active, no tests are available from the Router.

Virtual Line selected

<Edit> For details on setting the parameters, see chapter 11 Virtual Lines (VL) page 111.

Use the cursor keys to select Router, see page 112.



Router selected

The router can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Edit> For details on setting the Bridge/Router parameters, see page 37.

Setup the ADSL Router.
The ADSL connection is active.

Displays and operation like those in Bridge mode, see page 59.

8 Operation on a VDSL Access

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

VTU-R	Terminal mode (VDSL Transceiver Unit Remote), see page 66. Connection of the ARGUS directly to the VDSL access (before or after the splitter). The ARGUS replaces both the modem and the PC.
VTU-R Bridge	Bridge mode (VDSL Transceiver Unit Remote Bridge), see page 74. Insertion of the ARGUS between the VDSL access and the PC. The ARGUS replaces the VDSL modem.
VTU-R Router	Router mode (VDSL Transceiver Unit Remote Router), see page 77. Insertion of the ARGUS between the VDSL access and the PC. The ARGUS replaces both the VDSL modem and the router.

⚠ The individual VDSL tests record and store data (e.g. when tracing, IP 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.

⚠ The voltages on the subscriber line may not exceed 200 VDC and should be free of AC voltage.

8.1 Setting the VDSL Interface and Access Mode

The VDSL interface and Access mode are configured in the same manner as an ADSL access, see page 32 et seq.

Note: Starting functions with the numeric keys / key combinations
The ARGUS keypad can be used to call up or start the main functions and/or tests directly. An overview of the possible key combinations can be found on page 134.

8.2 VDSL Settings

The VDSL settings are configured in the same manner as those for an ADSL access, see page 33 et seq..

Setting	Explanation
Access parameters:	
Phys. parameters:	
VDSL:	Access parameters for the VDSL connection
Rated value	Use the keypad to enter the upstream and downstream comparison values for the bitrate in kbit/s. If the current bitrates on the VDSL connection exceed the rated values, the ARGUS status will show "OK“, otherwise "FAIL“ will be displayed.Default setting: ***d: 0*** and ***u: 0***
FW	Selection of the firmware (FW) in the VDSL chipset. The available firmware options are Feature Sets FS10.3 and FS10.4. For more information, please contact us. Default setting: ***FS10.3***
Carrier Set	The Carrier Set sets the carrier frequencies that the ARGUS will use to signal the DSLAM that it is ready for synchronisation (ITU G.997.1). Normally, the network operator specifies which set should be used. The following sets with the associated upstream tones (the interval between the tones is 4.3125 kHz) can be selected on the ARGUS: - A43, Tones: 9, 17, 25 - B43, Tones: 37, 45, 53 - V43, Tones: 944, 972, 999 Default setting: ***A43***,***B43, V43*** When multiple sets are selected, the ARGUS will cyclically send the tones of the selected sets in parallel.

The MAC address and the access parameters for the Bridge/Router can be found in the chapter on ADSL, see page 37. For more on all other access parameters, see chapter 11 Virtual Lines (VL) page 111.

Especially in VTU-R Bridge mode, ARGUS is able to support a special VLAN handling, see table below:

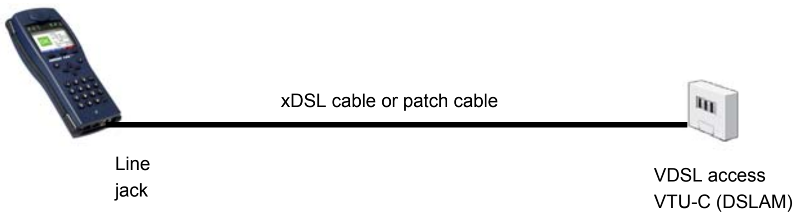
Bridge:	
VLAN handling	If the VLAN method "tagging" is used, a VLAN tag will be added to the outgoing Ethernet frames (sent to the WAN-side) while VLAN tags will be removed from incoming Ethernet frames. When the bridge is "Transparent", the Ethernet frames will be passed on unchanged. Defaul setting: ***Transparent***
VLAN 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 (i.e. one with a different ID such as 2). Range: from 0 to 4095 Default setting: ***0***

8.3 The ARGUS in the VTU-R Access Mode

Determining the VDSL connection parameters

The ARGUS is connected directly to the VDSL access (either before or after the splitter) using the included xDSL cable or a patch cable. In this case, the ARGUS replaces both the modem and the PC. The ARGUS will set up a VDSL connection and determine all of the relevant VDSL connection parameters. The ARGUS displays the VDSL connection parameters and saves them after the connection is cleared down if desired.

Use only the cable included in the package!



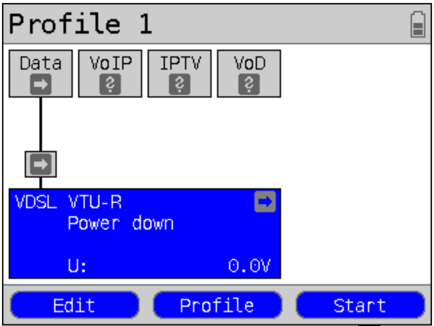
Setting the VTU-R access mode:

The VTU-R access mode settings are configured in the same manner as those for ATU-R, see page 39.

Setting up a VDSL connection

Profile settings:

When setting up the VDSL connection, the ARGUS uses the settings saved in the profile (see page 65).

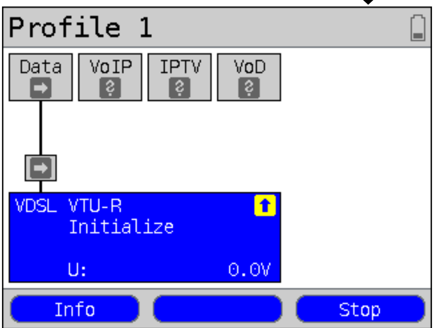


ARGUS - Status screen.

The ARGUS will use the default (preset) profile to setup the VDSL connection (in this example, Profile 1).

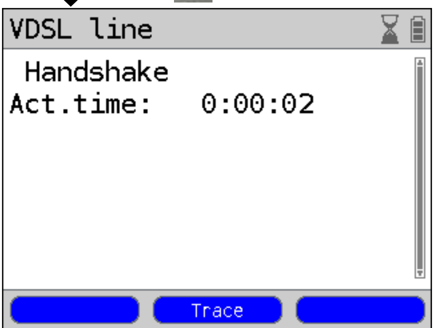
Setting up a VDSL connection

<Edit>	Open the access parameters, see page 65.
<Profile>	Profile settings are like those for ADSL, see page 34.



The ARGUS synchronizes with the DSLAM (the “Sync / L1” LED will flash and an element with a yellow background will be shown in the display).
The ARGUS will display the current connection status (in this example "Initialize") in the Layer 1 box (blue).

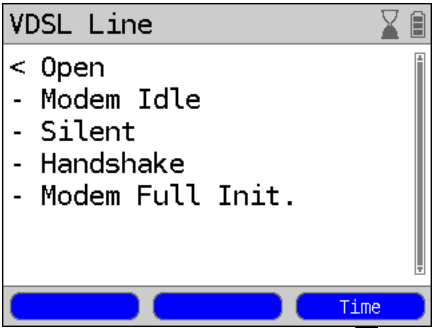
or 



While setting up the connection:
Display:

- Current connection status
- Time elapsed since the start of synchronisation in h:min:sec.

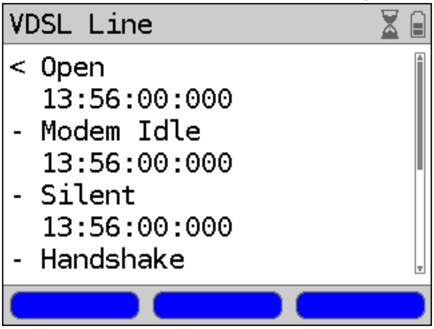
Continuation on next page



Command symbols:

<	=	command sent from the ARGUS
>	=	command sent from the DSLAM
-	=	connection status

Display timestamp.

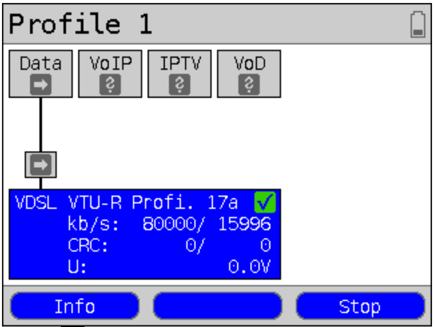


The ARGUS shows the time when (ARGUS internal clock, see page 366) the command arrived.

Switch back to the previous display and the Status screen.

Connection successfully setup

As soon as the connection has been setup ("Sync/L1" on constantly and a green check mark in the Layer 1 box), the ARGUS will determine the VDSL connection parameters. After the ARGUS has synchronized, please leave it connected to the VDSL access for at least another 20 seconds since the VDSL connection parameters supplied by the DSLAM cannot be stored in the ARGUS until this period of time has elapsed.



ARGUS - Status screen.

Display shows (Layer 1 box):

- Access and Access mode
- VDSL Profile assigned by the DSLAM. The VDSL2 standard supports eight different "Profiles". Among other things these profiles specify the respective cutoff frequency, the interval between carrier frequencies as well as the signal strength generated. As a result of these definitions, it is possible that the maximum data rate attainable will vary from profile to another (in example, "17a").
- d: Downstream data rate
  u: Upstream data rate
- Number of CRC errors in downstream and upstream data
- Interface's DC voltage

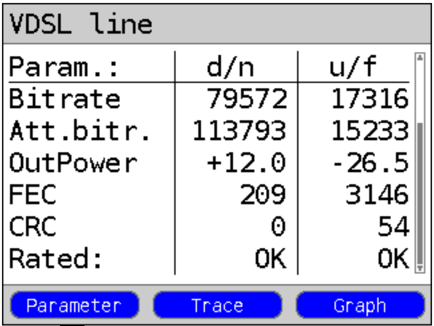
or 

If the current data rate exceeds the rated value set (see page 65), the ARGUS will display a green "OK" in the ARGUS status (see page 32) otherwise it will show a red "FAIL".

<Info> Display the VDSL connection parameters.

<Stop> Clear down the VDSL connection.

Continuation on next page

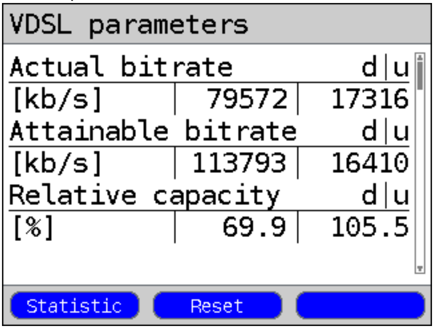


Display of the VDSL connection parameters in brief:
- d/n: downstream/near
- u/f: upstream/far

Scroll through the connection parameters.

<Trace> Display the trace data, see page 67.

<Graph> Display the graphs, see page 71.



Display the connection parameters in long form for both downstream (d) and upstream (u), see table on page 72.

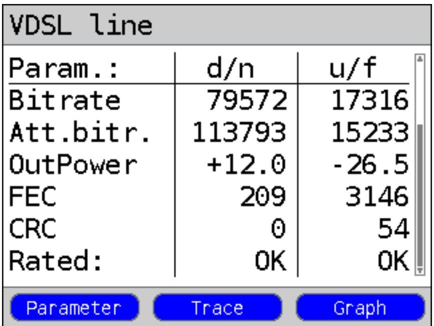
n/a	not available
n/u	not used
n/r	not received

Scroll through the parameters

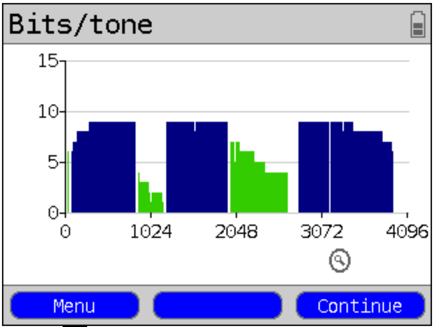
<Statistic> Open the Ethernet statistics, see page 110

Reset (zero) the FEC and CRC error counters

Reset the error counters (FEC and CRC).
CAUTION: Once showtime has been reached, the ARGUS will automatically reset the error counters.

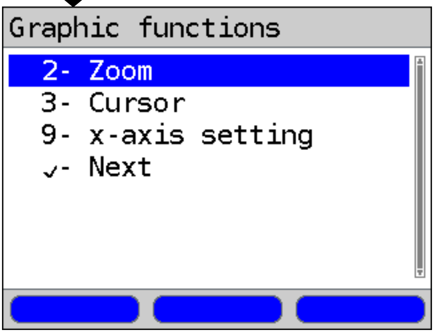


Continuation on next page



Display of the bit distribution i.e. transported bits per tone (channel).
The bands for upstream and downstream change depending on the VDSL profile (green: upstream, blue: downstream, in this example, US0, DS1, US1, DS2, US2, DS3)
y-axis: bits
x-axis: tones (channels)
Based on the bit distribution, it is possible to detect line disturbances (e.g. through HDB3, HDSL, RF etc.)

	The ARGUS will return to the previous display
`<Continue>`	Scroll to the next graphic



Graphic functions:
The graphic functions like Zoom, Cursor and Setting of the x-axis allow detailed analysis of the graphs. These, as well as other result graphs (e.g. SNR/tone, QLN/tone and HLOG/tone) can be opened and used in the same manner as with ADSL (see page 46 et seq.).

The ARGUS determines the following VDSL connection parameters:

VDSL connection parameters:	
Actual bitrate	The actual usable bitrate in kbit/s.
Attainable bitrate	This is the theoretically attainable bitrate in kbit/s.
Relative capacity	Utilization of the line as a percentage.
SNR margin	SIgnal-to-noise ratio in dB in the bands used.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}. This value is the amount of reserve that a line has to deal with interference. Unused bands are marked as n/u (not used).
Loop attenuation	The line’s attenuation in dB over its entire length and bandwidth. Certain types of access are not suitable where the line attenuation is particularly high. When considering the attenuation values to determine the recommended access types it is better to use the dB values in the Hlog graphs at a 1 MHz cursor setting. Unused bands are marked as n/u (not used).
Signal attenuation	Signal attenuation in dB in the relevant bands. Unused bands are marked as n/u (not used).
Output power	Output power in dBm referenced to 1mW.
Interleave delay	This is the delay (in ms) caused by interleaving the data blocks.
Impulse noise prot.	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.
FEC	Forward Error Correction The number of transmission errors corrected using the cell checkbytes. 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 superframe checksum sent from the opposing end does not match the one calculated locally. Possible cause: Fault on the line. 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.
Reset	Shows how often the error counters have been reset by the user with the <Reset> softkey.
Resync:	Number of times that the ARGUS has been resynchronized.
Showtime no sync:	Shows how often the connection has reached the status "Showtime" without establishing a permanent, stable connection.
Elec.length@1MHz	Displays the electrical length at a frequency of 1 MHz in dB. R: VTU-R-side C: VTU-C-side
Vendor far:	The manufacturer of the VTU-C-side, see page 385 for more information.
Version:	Vendor Specific Information, generally shows the version of the software running at the VTU-C (DSLAM) end.
Vendor near:	Manufacturer of the ARGUS chipset (VTU-R), see page 385 for more information.
Version:	Vendor Specific Information, shows the software version of the ARGUS.

System information regarding the transmission to the remote end is VDSL.

If the ARGUS is on a VDSL access and is synchronized with a DSLAM in accordance with ITU-T G.997.1, it will register with the DSLAM's control system. The data in the DSLAM will be displayed as it is for ADSL, see page 53.

Clear down the VDSL connection and save the results

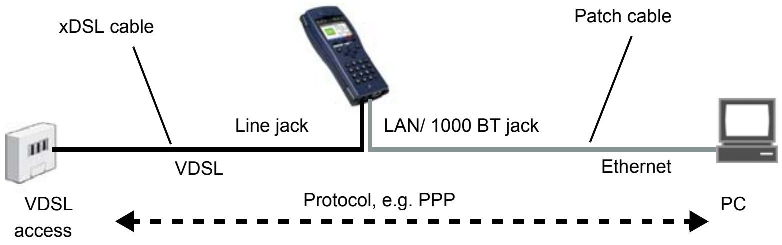
The process of clearing down a VDSL connection and saving the results is performed in the same manner as in the case of an ADSL connection, see page 54.

Displaying the saved test reports

The saved VDSL test results are displayed in the same manner as those for an ADSL access, see page 56.

8.4 The ARGUS in the VTU-R Bridge Access Mode

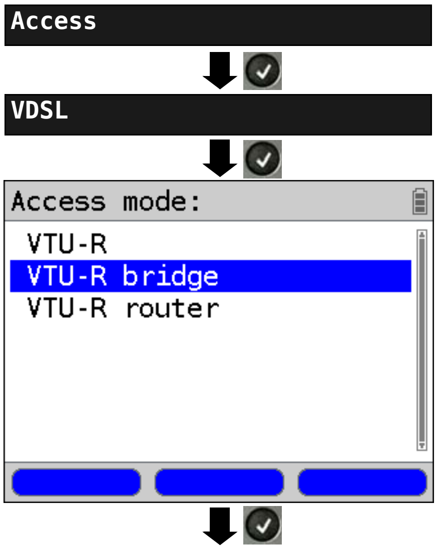
Connect the ARGUS to the VDSL access using the xDSL cable and to the PC with a patch cable. In Bridge mode, the ARGUS acts like an VDSL modem, i.e. the ARGUS passively passes all packets from the Ethernet side to the VDSL access (and vice versa). In this case, the PC is responsible for setting up the connection.



Bridge/Router settings, see page 37

Setting			
Bridge/Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time

Setting the access mode to VTU-R Bridge:

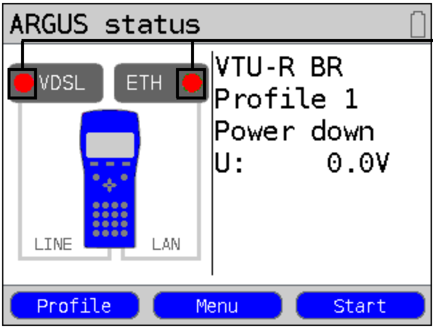


ARGUS - Main Menu

or

and in the Status screen.

Continuation on next page



The test is not yet started:
red LED in the display

Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup

Display:

- Access mode
- Default (preset) profile, see page 34
- Current State
- Interface's DC voltage

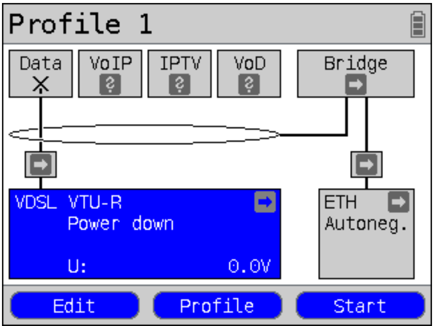
The test is not yet started!

The meaning of the arrow in the Layer 1 box:

grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup

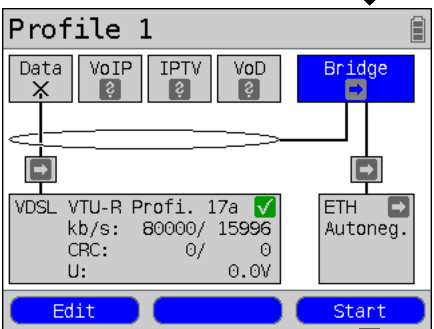
Display shows (Layer 1 box):

- Access
- Access mode
- Current State
- Interface's DC voltage



Setting up a VDSL connection

Using the cursor keys, select Bridge, see page 112.



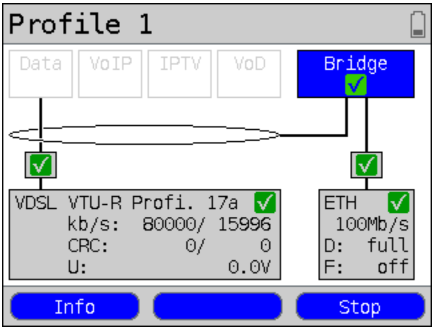
The VDSL connection has been setup

(green check mark in the Layer 1 box).

`<Edit>`	Setting the Bridge/Router parameters.

Continuation on next page.

Setting up a VDSL Bridge

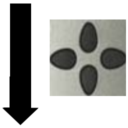


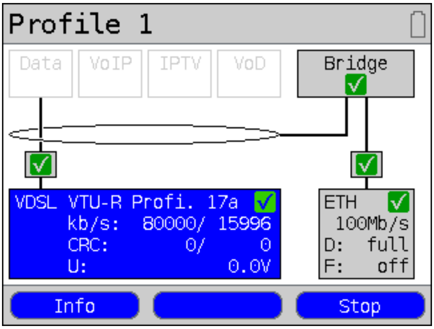
The bridge can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Stop> Deactivate Bridge mode.

<Info> This displays the Bridge mode activity.

 Display the connection parameters





Switch to Layer 1 box and other elements, for details on the operation, see page 111.

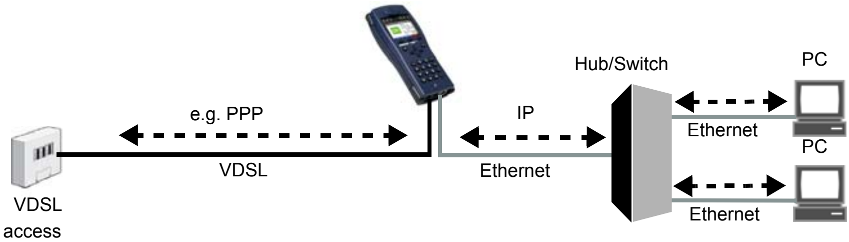
<Info> or  Display the VDSL connection parameters, see page 70.

<Stop> Clear down the VDSL connection and automatically deactivate the bridge.

8.5 The ARGUS in the VTU-R Router Access Mode

Connect the ARGUS to the VDSL 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!



Bridge/Router settings, see page 37.

Setting			
Bridge/Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time
	Router	- NAT On / Off - SIP port	

VDSL settings, see page 65:

Setting			
Access parameters	**Phys. parameters**	VDSL	Rated value FW (Firmware) Carrier set

Setting the access mode to VTU-R Router:

Access

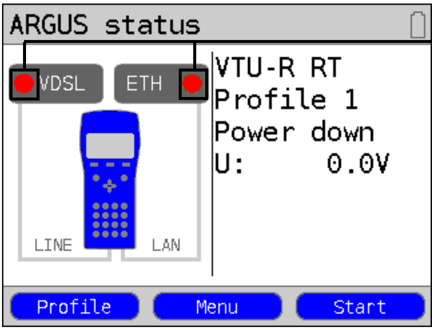
VDSL

VTU-R Router

ARGUS - Main Menu

or

and in Status screen.



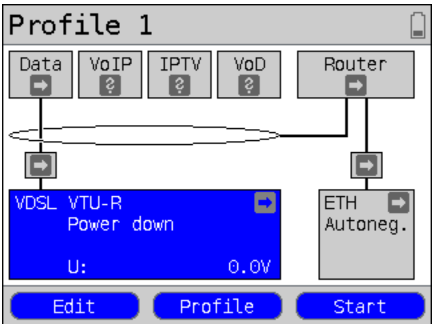
The test is not yet started:
red LED in display

Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup

Display:

- Access mode
- Default Profile (Profile 1)
- Current State
- Interface's DC voltage



The test is not yet started:

The meaning of the arrow in the Layer 1 box:

grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup

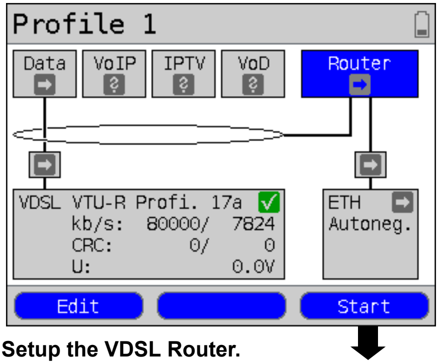
Display shows (Layer 1 box):

- Access mode
- Current State
- Interface's DC voltage

<Profile> Open profile see page 40

Use the cursor keys to select Router, see page 112.

Setting up a VDSL connection



Setup the VDSL Router.
The VDSL connection is active!

Displays and operation like in Bridge mode, see page 75.

Router selected.

The router can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Edit>	Setting the Bridge/Router parameters, see page 37.

9 Operation on an SHDSL Access

On an SHDSL access, the ARGUS supports the following Transmission Convergence (TC) layers, which can be selected in the Access Menu.

ATM:	Asynchronous Transfer Mode
STU-R	(STU-R: SHDSL Transceiver Unit-Remote) The ARGUS simulates the customer side (the modem) and the PC based on ATM.
STU-C	(STU-C: SHDSL Transceiver Unit - Central Office) The ARGUS simulates the central office side (the DSLAM) based on ATM.
STU-R Bridge	The ARGUS simulates the customer side (the modem) based on ATM. In Bridge mode, the ARGUS replaces the SHDSL modem and passively passes on all of the ATM packets sent back and forth between the Ethernet side and the SHDSL interface.
STU-R Router	The ARGUS simulates the customer side (the modem) based on ATM. In Router mode, the ARGUS replaces both the modem and the router. In doing so, it will route all of the packets between the Ethernet and SHDSL interface with or without NAT.
EFM:	Ethernet in the First Mile (see IEEE 802.3ah)
STU-R	(STU-R: SHDSL Transceiver Unit-Remote) The ARGUS simulates the customer side (the modem) and the PC based on EFM.
STU-C	(STU-C: SHDSL Transceiver Unit - Central Office) The ARGUS simulates the central office side (the DSLAM) based on ATM.
STU-R Bridge	The ARGUS simulates the customer side (the modem) based on EFM. In Bridge mode, the ARGUS replaces the SHDSL modem and passively passes on all of the packets sent back and forth between the Ethernet side and the SHDSL interface.
STU-R Router	The ARGUS simulates the customer side (the modem) based on EFM. In Router mode, the ARGUS replaces both the modem and the router. In doing so, it will route all of the packets between the Ethernet and SHDSL interface with or without NAT.
TDM:	Time Division Multiplex, not for SHDSL 6-wire
STU-R	(STU-R: SHDSL Transceiver Unit-Remote) The ARGUS simulates the customer side (the modem) based on TDM.
STU-C	(STU-C: SHDSL Transceiver Unit - Central Office) The ARGUS simulates the central office side (the DSLAM) based on TDM.

ITC:	Independent Transmission Convergence (TC independent)
STU-R	(STU-R: SHDSL Transceiver Unit-Remote) The ARGUS simulates the customer side (the modem) independent of the TC sublayer of the remote end.
STU-C	(STU-C: SHDSL Transceiver Unit - Central Office) The ARGUS simulates the central office side (the DSLAM) independent of the TC sublayer of the remote end.
HDLC:	High-Level Data Link Control
STU-R	(STU-R: SHDSL Transceiver Unit-Remote) The ARGUS simulates the customer side (the modem) based on HDLC.
STU-C	(STU-C: SHDSL Transceiver Unit - Central Office) The ARGUS simulates the central office side (the DSLAM) based on HDLC.

⚠ The individual SHDSL tests record and store data (e.g. in tracing IP 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.

⚠ In general, the ambient temperature range found in the "Technical Data" apply to operation on an SHDSL access page 16. However, even if the ambient temperature is less than 50°C if the ARGUS is run in a high performance mode for a long time, it is still possible that the protective features of the ARGUS - described in "Warning and Safety Notes" (page 12) may still shut it down to protect it against overheating.

⚠ The voltages on the subscriber line may not exceed 200 VDC and should be free of AC voltage.

9.1 Setting the SHDSL Interface and Access Mode

The SHDSL interface and Access mode settings are configured in the same manner as those for ADSL, see page 32 et seq.

Note: Starting functions with the numeric keys / key combinations:
The ARGUS keypad can be used to call up or start the main functions and/or tests directly. An overview of the available key combinations can be found on page 134.

9.2 SHDSL Settings

The SHDSL settings are configured in the same manner as those for an ADSL access, see page 33 et seq..

Setting	Explanation
Access parameter:	
Phys. parameters:	
SHDSL:	Access parameters for the SHDSL connection
Spectrum	For Region 1 (e.g. North America): Annex A/F auto, Annex A SHDSL, Annex F SHDSL.bis (5.7 Mbit/s) For Region 2 (e.g. Europe): Annex B/G auto, Annex B SHDSL, Annex G SHDSL.bis (5.7 Mbit/s) Automatic selection of the type of modulation: - TC-PAM 16 (SHDSL) - TC-PAM 32 (SHDSL.bis) Default setting: ***Annex B SHDSL***
Clock/ framing	The clock setting depends the direction on the connection (transmitting or receiving). In the case of synchronous clocking, the receive and the transmit clocks are the same. Where plesiochronous clocking is used, the two directions use different clocks. Bit stuffing is used to equalize the clock differences. - synchronous - plesiochronous (TDM only) - plesiochronous (NTR) (TDM only) (The SHDSL clock will be derived from the Network Timing Reference) Default setting: ***synchronous***
Channel selection	Use the keypad to select the B and Z-channels. Up to 36 B channels and up to 7 Z-channels can be selected. If an * is entered for the B and Z-channels, the ARGUS will automatically determine the channel assignment. Maximum selections: - 36 B channels and 1 Z-channel - 35 B channels and 7 Z-channels Minimum selections: - 3 B channels - 0 Z-channels Default setting: **** (automatic)*** If an auto mode is selected under Spectrum, the channel selection will also take place automatically regardless of the setting made here.

Data rate	Setting the data rate in kbit/s For SHDSL: - Range: 192 kbit/s to 2.3 Mbit/s - Default setting: **** (automatic)*** For SHDSL.bis (ESHDSL): - Range: 768 kbit/s to 5.7 Mbit/s - Default setting: **** (automatic)*** If an auto mode is selected under Spectrum, the data rate will also be set automatically regardless of the setting made here.
Power back off	Reduces the transmit power of the remote end. The value set here corresponds to the maximum transmit power. Range: 0 dB to 30 dB Default setting: ***0 dB***
EOC usage	Using the EOC (Embedded Operations Channel), it is possible to exchange among other things connection information. off: No requests or answers will be sent to the remote end. on (passive): No display of the remote end's parameter, since it only responds to requests. on (active): Display the performance parameters of both the local (own) and remote ends, if the remote end supports the own query. Default setting: ***on (passive)***
Sync word	The sync word is used to identify the SHDSL frame (cf. G.991.2 Chapter PMS-TC layer functional characteristics). Enter the address in hexadecimal from the keypad and the softkeys **<A..F>** (e.g. to enter a “C” press the softkey three times or for an “F” six times; conclude by pressing **<OK>** to confirm your entry). Default setting: ***3F 16 1F 03 3C 0C***
Message mode	Selection of the message mode. The message mode determines the initiation of the handshake on the part of the STU-R or the reaction on the part of the STU-C (cf. G.994.1 Chapter: transactions, entry in die Capability List). Range: GHS mode A to GHS mode D Default setting: ***GHS mode C***
Vendor Info field	Entry of the vendor information (Vendor Info) in the corresponding field. The information is entered in hexadecimal; for more information, see Sync word. Default setting: ***15 35***

`Wire pairs`	The ARGUS always uses wire pair 4/5 (Line 1) for SHDSL 2-wire. In the case of SHDSL n-wire, the ARGUS uses wire pair 4/5 1(Line 1) plus a second wire pair (Line) from the list below. The order of the wire pairs can be changed: - 2nd wire pair (Line 2) for 4-wire - 3rd wire pair (Line 3) for 6-wire - 4th wire pair (Line 4) for 8-wire The wire pair 4/5 (Line 1), however, is always the master. However, where necessary, the second, third and fourth wire pairs (Lines 2 to 4) can each be marked and using the <↓ > softkey on the left can be moved down a position in the list or using the <↑ > softkey on the right can be moved up a position in the list. Please make certain that you confirm your changes by pressing the  key to ensure that the changes are accepted. The following are the usual default (preset) settings: Line 1: wire pair 4-5 (fixed) ***Line 2: wire pair 3-6*** ***Line 3: wire pair 1-2*** ***Line 4: wire pair 7-8***
`Line probing (PMMS)`	It is possible to perform "Line Probing" (a Power Measurement Modulation Session) while setting up a connection. This is standardised in ITU-T G.991.2. In this way, it is possible to determine various line parameters required to attain the maximum data rate before the beginning the actual synchronization process. Rate adaptive mode The disturbances that will be considered in the PMM session are set here. - Current SNR DS: Current signal-to-noise ratio on the line downstream will be considered. - Worst case G.991.2 SNR DS: Reference signal-to-noise ratio pursuant to G.991.2 on the line down stream will be considered. - Current SNR US: Current signal-to-noise ratio on the line upstream will be considered. - Worst case G.991.2 SNR US: Reference signal-to-noise ratio pursuant to G.991.2 on the line upstream will be considered. Default setting: ***none***

	`<Add>`	A display of the still available modes will open. If a mode is selected with a  in this list (mode selection list), it will be added to the list of available modes above the activated (marked) mode.
	`<Delete>`	Delete the marked mode from the list.
		Accept the mode priorities.
	Target SNRm	Destination SNR margins can be specified for the line disturbances mentioned above. - Current up: 0 - Current down: 0 - Worst-case up: 0 - Worst-case down: 0 Range: -10 dB to 21 dB Default setting: ***null for all***

`Interop bits`	Line probing	PMM session supported for the following remote nodes: - G.991.2 - Globespan Default setting: ***G.991.2***
	Multiwire	The synchronization will be adjusted to suit the following remote nodes: - Auto (automatic) - Globespan - G.991.2 Default setting: ***Auto***
	EFM	Aggre-gation: Select this setting if the ARGUS is operated in STU-C mode and the modem is in a STU-R mode which does not support the discovery operation of the extended G.hs pursuant to IEEE 802.3ah Section 4. Discover and Aggregat.: This setting should be selected if the discovery operation (amended G.hs. IEEE 802.3ah Section 4) is supported. Default setting: ***Discover and Aggregat.***
	ZWR	Support for the intermediate regenerator (ZWR) functions of the following: - Off - Elcon Coco10M - Elcon International Default setting: ***Off***

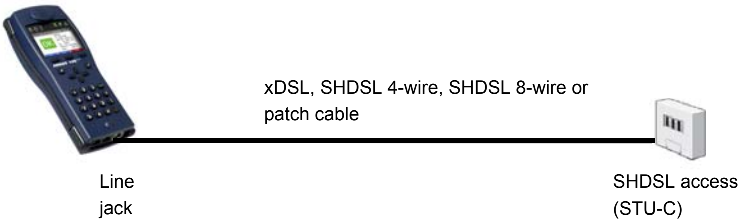
The MAC address and the access parameters for the Bridge/Router can be found in the chapter on ADSL, see page 37. For more on all other access parameters, see chapter 11 Virtual Lines (VL) page 111.

9.3 The ARGUS in the STU-R Access Mode

Determining the SHDSL connection parameters

The ARGUS is connected to the SHDSL access directly using the included (xDSL (2-wire), SHDSL 4-wire or the SHDSL 8-wire) banana plug cable or patch cable (n-wire). In this case, the ARGUS replaces both the modem and the PC. The ARGUS will set up an SHDSL connection and determine all of the relevant SHDSL connection parameters. The ARGUS displays the SHDSL connection parameters and saves them after the connection is cleared down if desired.

Use only the cable included in the package!



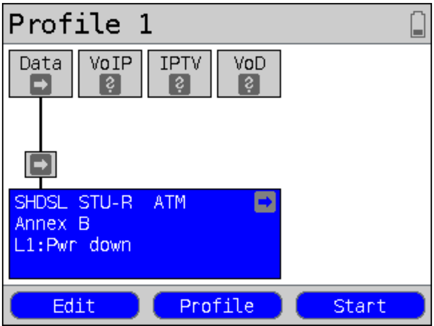
Setting the STU-R access mode:

The STU-R access mode settings are configured in the same manner as those for ATU-R, see page 39.

Setting up an SHDSL connection:

Profile settings:

When setting up the SHDSL connection, the ARGUS uses the settings saved in the profile (see page 82).

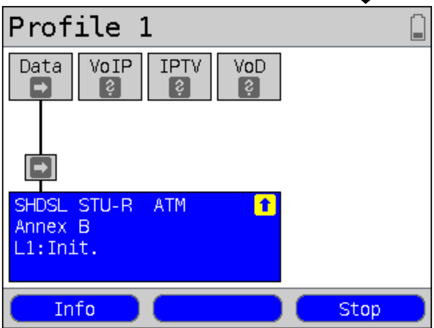


ARGUS - Status screen:
In this example, the access mode is set to STU-R, ATM.

The ARGUS will use the default profile to setup the SHDSL connection (in the example, Profile 1).

<Edit> Open the access parameters, see page 82.

<Profile> Profile settings are like those for ADSL, see page 34.



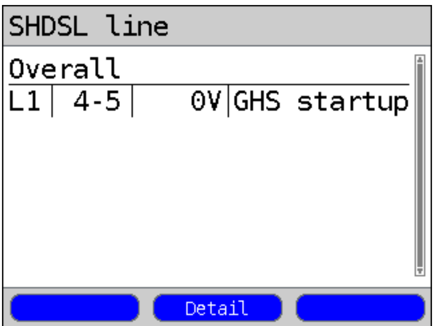
Setting up an SHDSL connection

The ARGUS synchronizes with the DSLAM (the “Sync / L1” LED will flash and an element with a yellow background will be shown in the display).
The ARGUS will display the current connection status (in this example "Init") in the Layer 1 box (blue).

Display shows (Layer 1 box):

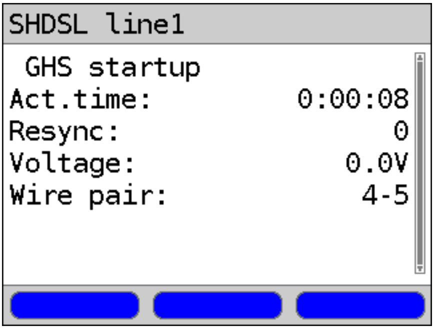
- Access and SHDSL mode
- TC sublayer
- Spectrum / Clock (synchronous)
- Status per Line
  (in example, L1=Line 1)

or 



<Detail> Open a detailed presentation of the test results.

Continuation on next page



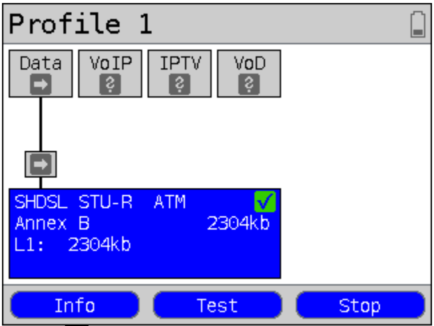
In the event that there are synchronisation problems, compare the SHDSL settings in the profile with the corresponding settings of the remote end.

The ARGUS displays the connection states as they are stepped through, the duration of the activation, the number of resyncs, the voltage on the line and the wire pair used.

 Switch back to the previous display and the Status screen.

Connection successfully setup

As soon as the connection has been setup ("Sync/L1" LED on constantly and a green check mark in the Layer 1 box), the ARGUS will determine the SHDSL connection parameters. After the ARGUS has synchronized, please leave it connected to the SHDSL access for at least another 20 seconds since the SHDSL connection parameters supplied by the DSLAM cannot be stored in the ARGUS until this period of time has elapsed.



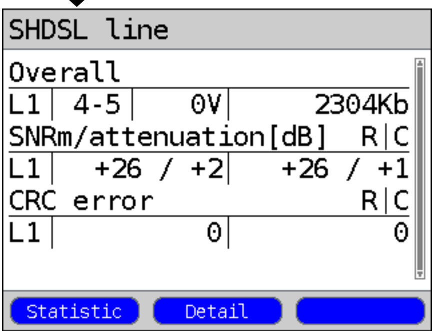
ARGUS - Status screen.

Display shows (Layer 1 box):
- Access and SHDSL mode
- Spectrum / Clock (synchronous)
- Data rate (∑ over all lines)
- Data rate by line (in example, L1)

If the current data rate exceeds the rated value set (see page 82), the ARGUS will display a green "OK" in the ARGUS status (see page 32) otherwise it will show a red "FAIL".

<Info>	Display the SHDSL connection parameters.
<Test>	Display the available tests, see page 134.
<Stop>	Clear the SHDSL connection down.

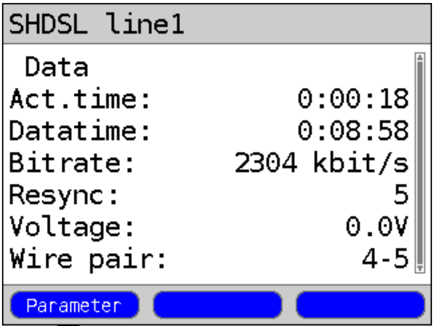
or 



The ARGUS will display a summary of the most important parameters.

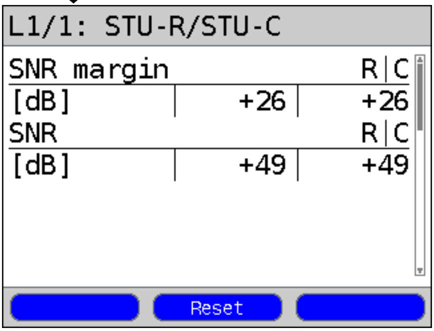
<Statistic> Display the ATM statistics, see page 44.

Continuation on next page



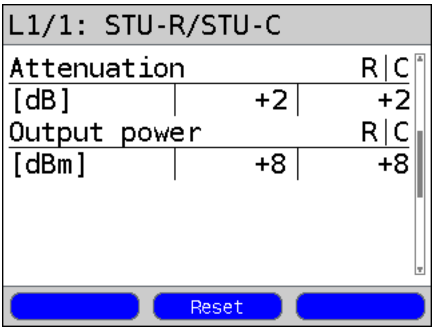
The ARGUS will display brief information about the wire pair used (Line 1).

If repeaters are used on the circuit, the results shown in the overview will only apply for the corresponding segment.



The ARGUS displays the SHDSL line's connection parameters for both the remote side (R) and the central office side (C) (see page 92, "SHDSL Transmission Line" in the illustration below) as well as for each available SHDSL line segment (see the illustration on page 92). To receive the remote end's parameters, set "EOC usage" to "on", see page 83).

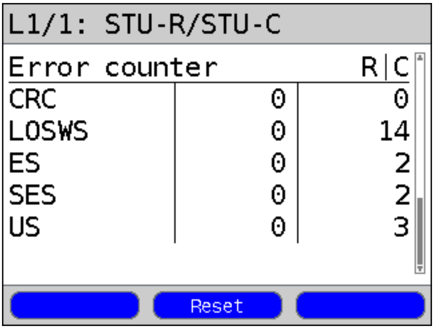
Scroll through the parameters



Display

n/a	not available
n/u	not used
n/r	not received

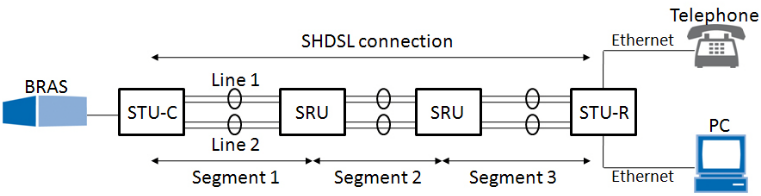
Continuation on next page



<Reset>	All of the error counters (CRC, LOSWS, ES, SES, and US) will be reset to zero (see the table page 93).
<<-> <->>	Scroll through the displays of the connection parameters for the individual line segments (if there are any). The ARGUS indicates in the top line which line segment's parameters are currently being displayed.
	Scroll through the connection parameters.
	If repeaters are used on the circuit, the results shown in the overview will only apply for the corresponding segment.
	Return to the State display

SHDSL Transmission Line illustration

1 to a maximum of 8 SHDSL Regenerator Units (SRU)



The ARGUS determines the following SHDSL connection parameters:

SHDSL connection parameters:	
SNR margin	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}. This value is the amount of reserve that a line has to deal with interference.
SNR	Signal-to-noise ratio in dB.
Attenuation (dB)	The line's attenuation in dB over its entire length.
Output Power	Output power in dBm referenced to 1 mW.
CRC	Cyclic Redundancy Check Number of all CRC anomalies (CRC6 checksum errors), also known as Code Violations (CV). The ARGUS adds up the number of CRC errors in the one-second periods.
LOSWS	Loss of Sync Word Seconds The number of seconds in which one or more sync word errors occurred.
ES	Errored Seconds The number of seconds in which one or more sync word errors occurred and/or one or more CRC anomalies occurred.
SES	Severely Errored Seconds The number of seconds in which one or more sync word errors occurred or at least 50 CRC anomalies occurred.
US	Unavailable Seconds Number of seconds in which the SHDSL connection was not available. At the latest after 10 SESs have occurred in a row, the connection is no longer available. The 10 SESs are counted as part of the time that the connection is not available. Once the connection has become unavailable, it will first be considered to available again after at least 10 seconds pass in which there are no SESs. The 10 seconds without SESs are not counted as part of the time that the connection is not available.

The meaning of the EFM states passed through (STU-R).	
Power down	STU-R / STU-C in idle state.
Init.	Initialization - "Power on“.
GHS startup	Handshake in accordance with ITU-T G. 994.1, G.hs started.
Discovery	Begin the Discovery phase.
Discovery accepted	Discovery probe was accepted.
Discovery finished	Discovery phase was successfully completed.
Aggregation accepted	Aggregation probe was accepted.
Aggregation finished	Aggregation phase was successfully completed.
GHS finished	Handshake (G.hs) was successfully completed.
Data	Data mode was reached, showtime.
Duplex Error	An error occurred, e.g. loss of sync.

System information regarding the transmission to the remote end in SHDSL

⚠ Usually, when a modem synchronizes with a DSLAM, information on the manufacturer and type of modem will be sent to the DSLAM's control system. In the case of SHDSL, this is performed in accordance with "ITU-T G.991.2 table 9-10". If an ARGUS is synchronizing with a DSLAM, it will send the following to the control system:

Info:	Entry:	Example ARGUS:
Vendor ID	intec name	"intec"
Version model	Device type	"Argus145plu"
Vendor serial	Serial number	„0000“
Other vendor information	Device SW	"R2.10.0 U_"

Clear the SHDSL connection down and save the results

The process of clearing down an SHDSL connection and saving the results is performed in the same manner as in the case of an ADSL connection, see page 54.

Displaying the saved test reports

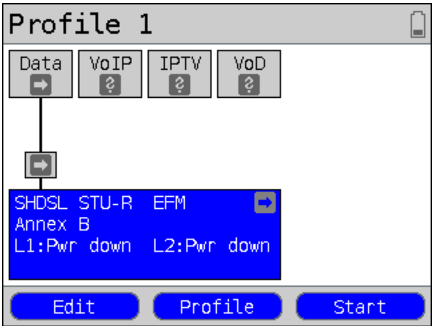
The saved SHDSL test results are displayed in the same manner as those for an ADSL access, see page 56.

Setting up an SHDSL n-wire connection

The ARGUS is connected directly to the SHDSL 4-wire access via the SHDSL 4-wire connection cable or a patch cable. In the case of an SHDSL 6-wire or 8-wire connection, connect the ARGUS to the SHDSL access using a patch cable or the SHDSL 8-wire banana cable. The ARGUS will set up an SHDSL connection and determine all of the relevant SHDSL connection parameters for two (three or four) wire pairs (Line 1 and Line 2 or where appropriate Line 3 and Line 4). The ARGUS displays the connection parameters and saves them after the connection is cleared down if desired. Sketch of the access (see page 87).

The SHDSL n-wire interface, the SHDSL mode and the Access mode settings are configured in the same manner as those for ADSL, see page 32.

The example shows an SHDSL 4-wire interface in the EFM access mode and in SHDSL mode STU-R. In the case of a 6-wire or 8-wire access, all of the steps are identical with the exception of the selection of the interface:



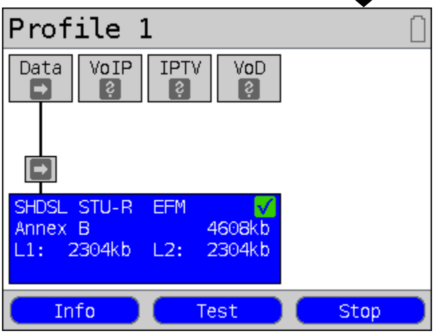
ARGUS - Status screen

The ARGUS will use the default (preset) profile to setup the SHDSL connection (in this example, Profile 1).

The SHDSL test is not yet started!

<Profile> Display the profile, see page 34.

The next step is the initialization. Afterwards, the ARGUS will synchronize with the DSLAM (the “L1/Sync” LED will flash).

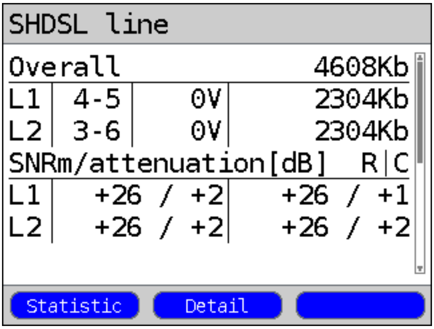


The ARGUS will show the current status of Lines 1 and 2 (in this example, L1: 2304 kb and L2: 2304 kb).
In the event that there are synchronisation problems, compare the SHDSL settings in the profile with the corresponding settings of the remote end.

The ARGUS displays the states as they are stepped through, the data rate and the voltage on both lines.

or

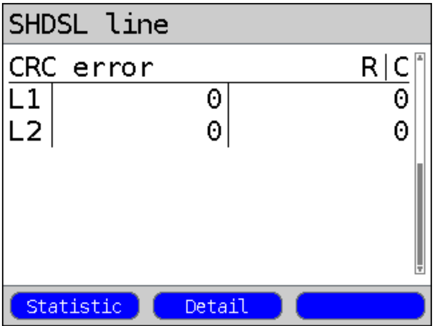
Continuation on next page

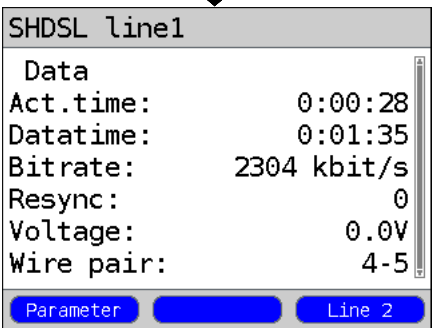


The ARGUS will display a summary of the most important parameters.

The ARGUS will display the connection parameters for the remote end (R), for the central office side (C) (see page 92, SHDSL Transmission Line illustration) for Line 1 (L1) and Line 2 (L2) and for every existing line segment. To receive the remote end's parameters, set "EOC usage" to "On" see page 83.

If repeaters are used on the circuit, the results shown in the overview will only apply for the corresponding segment.





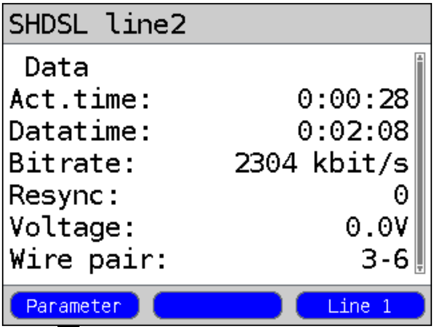
The ARGUS displays the data rate and the voltage on Line 1 as well as the wire pair used (see page 84).

<Line 2> The ARGUS displays the bitrate and the voltage and, if **<Parameter>** is pressed, the connection parameters on Line 2.

<Line 3> for SHDSL 6-wire, on Line 3

<Line 4> for SHDSL 8-wire, on Line 4

Continuation on next page

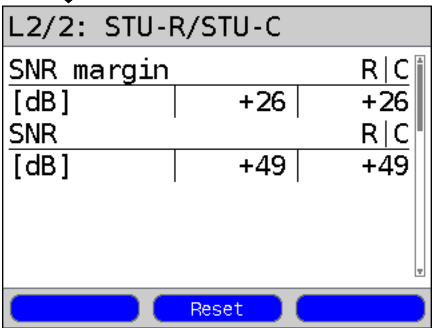


The ARGUS displays the data rate and the voltage on Line 2 as well as the wire pair used (see page 84).

<Line 1> The ARGUS displays the bitrate and the voltage and, if **<Parameter>** is pressed, the connection parameters on Line 1.

<Line 3> for SHDSL 6-wire, on Line 3

<Line 4> for SHDSL 8-wire, on Line 4



The ARGUS will display the connection parameters of Line 2 (display L2/2) (see page 93). To receive the remote end's parameters, set "EOC usage" to "On", see page 83).

<Reset> All of the error counters (CRC, LOSWS, ES, SES, and US) will be reset to zero (see the table page 93).

<<-> **<->>** Scroll through the displays of the connection parameters for the individual line segments (if there are any). The ARGUS indicates in the top line which line segment’s parameters are currently being displayed.

 Scroll through the connection parameters.

 Open the Status screen or the ARGUS-State.

The remaining display of the results and the navigation are handled in the same manner as on an SHDSL 2-wire access.
The results lists of the line selected will be displayed (see page 90).

Clear down the SHDSL connection and save the results

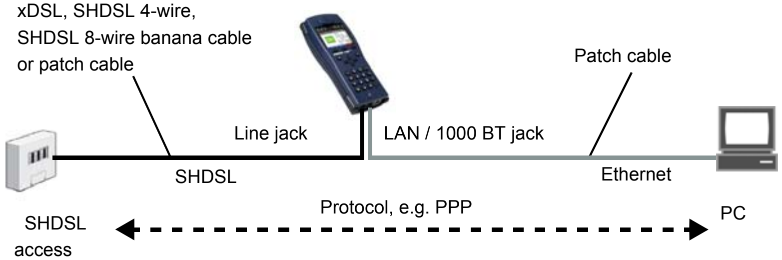
The process of clearing down an SHDSL connection and saving the results is performed in the same manner as in the case of an ADSL connection, see page 54.

Displaying the saved test reports

The saved SHDSL test results are displayed in the same manner as those for an ADSL access, see page 56.

9.4 The ARGUS in the STU-R Bridge Access Mode

Connect the ARGUS to the PC using the patch cable and to the SHDSL access using the xDSL, the SHDSL 4-wire or the SHDSL 8-wire banana cable or if desired with another patch cable.
In Bridge mode, the ARGUS acts like an SHDSL modem, i.e. the ARGUS passively passes all packets from the Ethernet side to the SHDSL access (and vice versa). In this case, the PC is responsible for setting up the connection.



Bridge/Router settings, see page 37.

Setting			
Bridge/Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time

Setting the access mode to STU-R bridge:

Access

The ARGUS in its Main Menu

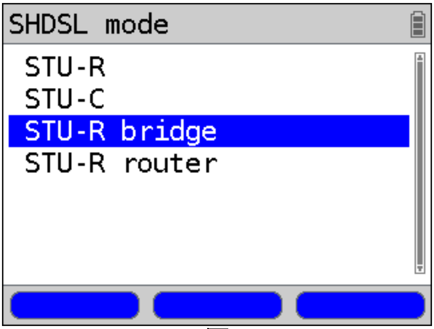
or

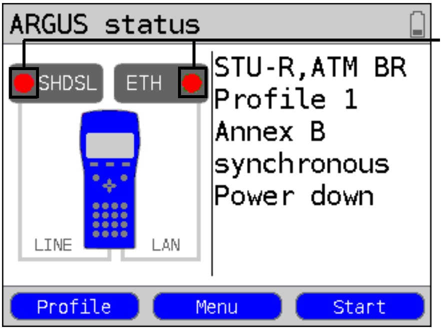
and in Status screen.

SHDSL

ATM or EFM

Continuation on next page





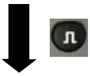
The test is not yet started: red LED in the display

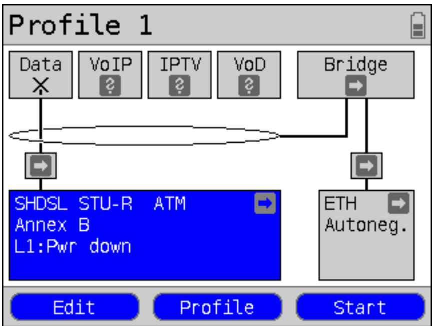
Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup

Display:

- Access mode and TC sublayer
- Default Profile (in example, Profile 1)
- Spectrum / Clock
- Current State





The test is not yet started!

The meaning of the arrow in the Layer 1 box:

grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup.

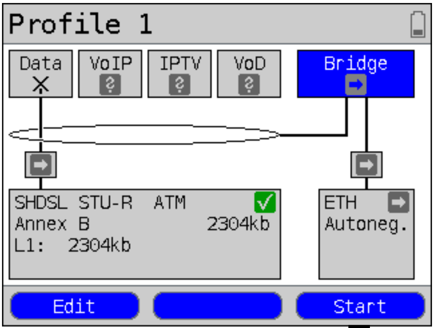
Display shows (Layer 1 box):

- Access, Access mode and TC sublayer
- Spectrum on the line
- Current State

Setting up an SHDSL connection

Using the cursor keys, select Bridge, see page 112.

Continuation on next page

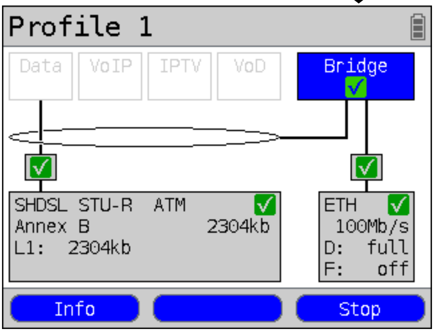


When the active SHDSL physical line is in Bridge mode, the following tests may started using the <Test> softkey, see page 134.

When Bridge mode is active no tests are available.

The SHDSL connection has been setup (green check mark in the Layer 1 box).

Setting Up an SHDSL Bridge



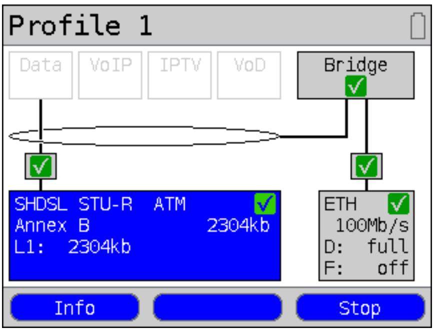
The bridge can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Stop> Deactivate Bridge mode.

<Info> This displays the Bridge mode activity.


Display the connection parameters.

Switch to Layer 1 box and other elements, for details on the operation, see page 112.



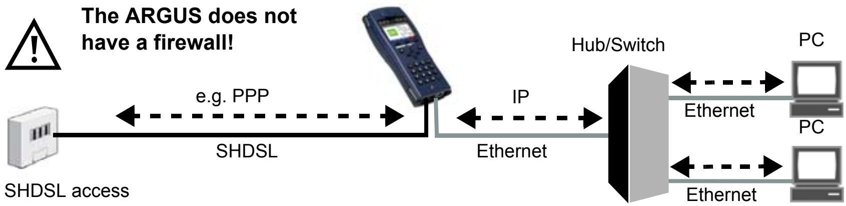
<Info> or


Display the SHDSL connection parameters, see page 93.

<Stop> Clear down the SHDSL connection and automatically deactivate the bridge.

9.5 The ARGUS in the STU-R Router Access Mode

Connect the ARGUS to the PC using the patch cable and to the SHDSL access using the xDSL, the SHDSL 4-wire or the SHDSL 8-wire banana cable or if desired with another 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.



Bridge/Router settings, see page 37.

Setting			
Bridge / Router	**Ethernet**	Autonegotiation On / Off, see page 108.	
	IPv4	- IP mode: - Local (own) IP address - IP netmask - DHCP server:	Static IP ***DHCP server*** Start / end address Domain Reserve time
	Router	- NAT On / Off - SIP port	

SHDSL settings, see page 82.

Setting			
Access parameters	**Phys. parameters**	SHDSL	Spectrum Clock/framing Channel selection Data rate Power back off EOC usage Sync word Message mode Vendor Info field Wire pairs Line probing (PMMS) Interop bits

Setting the access mode to STU-R Router

Access

ARGUS - Main Menu

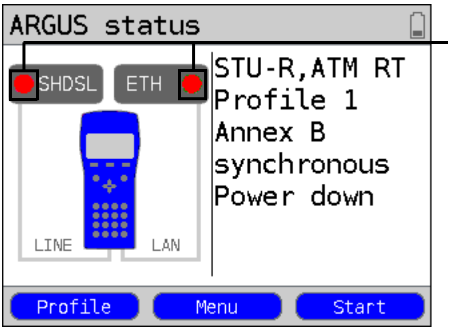
SHDSL

or

and in Status screen.

ATM or EFM

STU-R Router



The test is not yet started:
red LED in the display

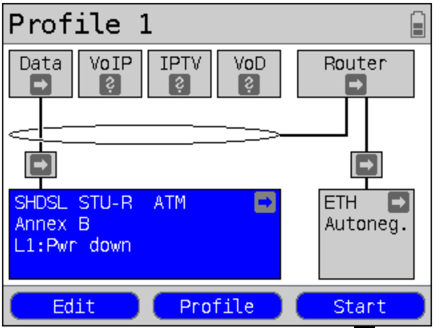
Key to the LED symbolized in the display:

Red LED	no test started
Yellow LED	test started
Green LED	A connection has been setup.

Display:

- Access, Access mode and TC sublayer
- Default Profile (in example, Profile 1)
- Spectrum / Clock
- Current State

Continuation on next page



The meaning of the arrow in the Layer 1 box:

grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup.

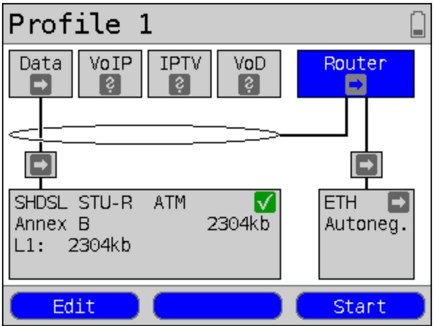
Display shows (Layer 1 box):

- Access, Access mode and TC sublayer
- Spectrum on the line
- Current State

<Profile> Open profile see page 34

Setting up an SHDSL connection

Use the cursor keys to select Router, see page 112.



Router selected.

When the active SHDSL physical line is in Router mode, the following tests may started using the **<Test>** softkey, see page 134.

⚠ When the Router mode or service is active no tests are available.

The router can also be activated directly. If Layer 1 has not yet been setup, it will be setup automatically.

<Edit> Setting the Bridge/Router parameters, see page 37.

Setup the SHDSL Router.
The SHDSL connection is active!

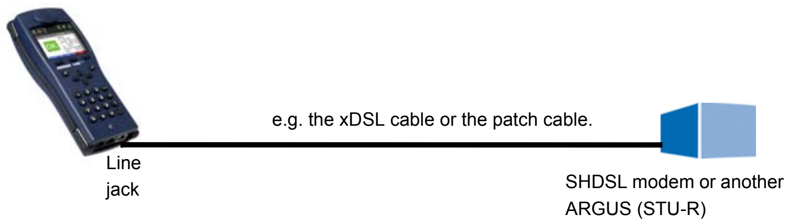
Displays and operation like in Bridge mode, see page 100.

9.6 The ARGUS in the STU-C Access Mode

Determining the SHDSL connection parameters

The ARGUS is connected directly to the SHDSL modem using the included xDSL, SHDSL 4-wire, SHDSL 8-wire banana cable connection cable or the patch cable. In this case, the ARGUS replaces the DSLAM (STU-C). The ARGUS will set up an SHDSL connection and determine all of the relevant SHDSL connection parameters. The ARGUS displays the SHDSL connection parameters and saves them after the connection is cleared down if desired. The procedure is the identical for SHDSL 2-wire ATM, SHDSL 4-wire, 6-wire and 8-wire connections as well as for EFM.

⚠ **Use only the cable included in the package!**



Setting the STU-C access mode:

The STU-R access mode settings are configured in the same manner as those for ATU-R, see page 39.

Setup of an SHDSL connection on the STU-C side:

The STU-C connection is setup in the same manner as an STU-R, see page 88.

Successful setup of an SHDSL connection on the STU-C side:

The presentation of the connection parameters and the explanations of this data are handled in the same manner as they are for STU-R, see page 90.

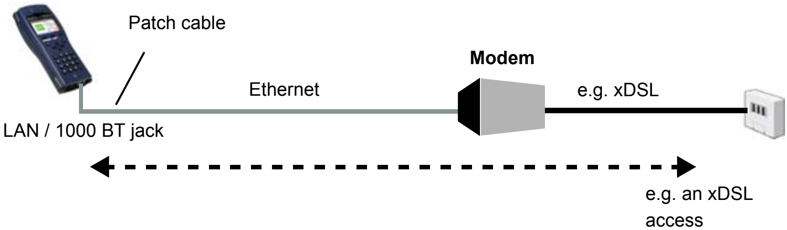
10 Operation on an Ethernet Access

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

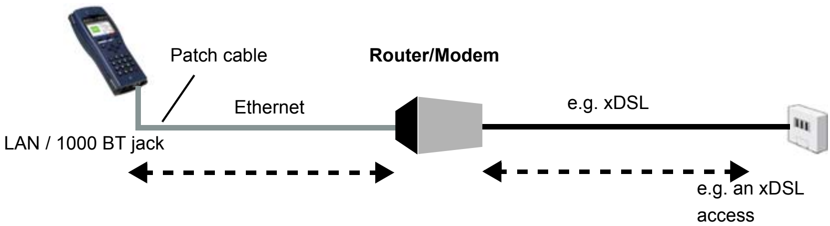
⚠ The individual tests record and store data. The user must comply with the statutory regulations governing the collection and storage of such data and his obligation to give notice in this connection.

⚠ For details on the use of the GigaBit Ethernet interface (GigE, 1000 BT jack), please see the separate Gigabit Ethernet manual.

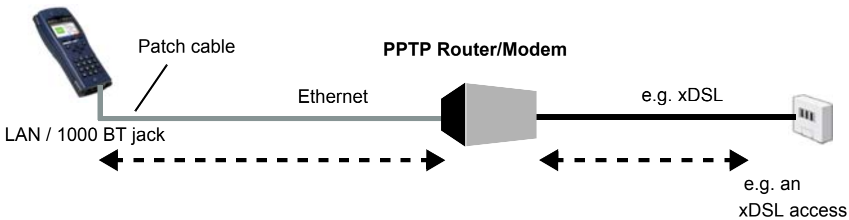
Connection to a Modem:



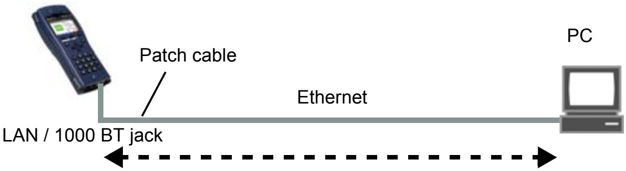
Connection to a Router/Modem:



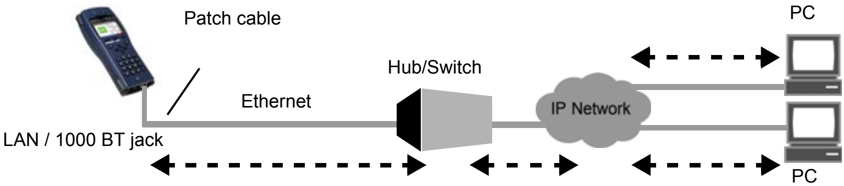
Connection to a PPTP Router/Modem:



Connection to a PC via IP



Connection to an IP network



Settings in the profile:

Access parameters	
Ethernet	Autonegotiation On / Off

10.1 Setting the Ethernet Interface

The Ethernet interface settings are made in the same manner as they are for an ADSL access, see page 32.

Note: Starting functions with the numeric keys / key combinations
The ARGUS keypad can be used to call up or start the main functions and/or tests directly. An overview of the possible key combinations can be found on page 134.

10.2 Ethernet Settings

The Ethernet settings are changed in the same way as those for an ADSL access, s. page 33.

Setting	Explanation
`Access parameters:`	
`Phys. parameters:`	
`Ethernet:`	
`Autonego-tiation`	Switch on or off If auto-negotiation is enabled, a network card can independently determine the correct transmission speed and duplex setting for the network port to which it is connected and can then configure itself accordingly. In the case of Ethernet, auto-negotiation 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, see the next section page 108.
`MAC address:`	
	Display and selection of the MAC addresses. The first two MAC addresses cannot be changed manually. 1. If the default MAC address is selected, the ARGUS will use its own MAC address. Default setting: ***Default MAC address*** 2. If Dynamic MAC Address is selected, a different MAC address will be used for each synchronization. 3. A third MAC address can be entered: Mark a line and then press **`<Edit>`**. **`<Edit>`** Edit the MAC address for the entry. Enter the address in hexadecimal from the keypad and the softkeys **`<A..F>`** (e.g. to enter a “C” press the softkey three times or for an “F” six times; conclude by pressing **`<OK>`** to confirm your entry). Group MAC addresses cannot be used. 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.
	One after the other  and  — Displays the ARGUS MAC addresses: Line, LAN, LAN2, see also page 136 f.

For information on other access parameters, see chapter 11 Virtual Lines (VL) page 111.

Autonegotiation / Ethernet Link Parameter

The default setting supports "autonegotiation" for the Ethernet link.

Setting: Autonegotiation "on"

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, 100 or 1000 Mbit/s (for details on 1000 Mbit/s, see the Gigabit Ethernet manual)
- half or full-duplex
- Flow control on / off (when on: sym. and asym. pause)

Manual setting of the Ethernet link parameter

Setting: Autonegotiation "off"

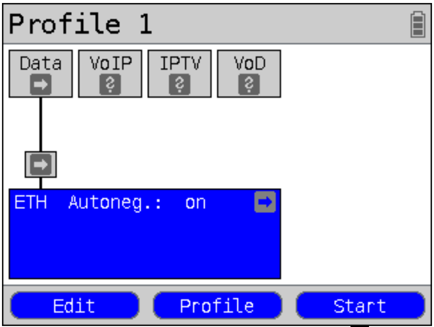
When "autonegotiation" is deactivated, the speed, duplex mode, flow control (flow control = "Pause" mode) are set in the profile (see page 107).

- 10, 100 or 1000 Mbit/s, Default setting: ***100 Mbit/s***
- half or full duplex, Default setting: ***Full***
- Flow control on / off (flow control is only reasonable when operating in full duplex)
  Default setting: ***on***

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 (10Base-T) or a 100Base-TX 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.

10.3 Setup an Ethernet connection



ARGUS - Status screen

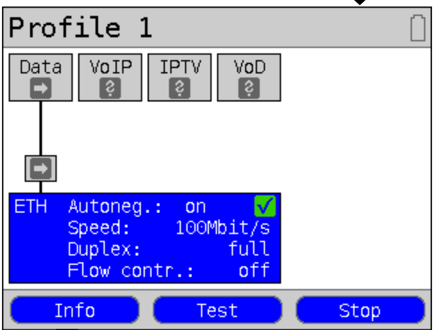
The ARGUS will use the default (preset) profile to setup the Ethernet connection (in this example, Profile 1).

The test is not yet started!

The meaning of the arrow in the Layer 1 box:

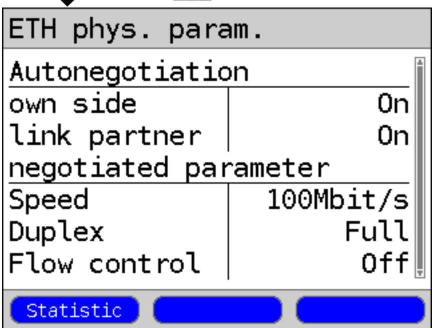
grey arrow	no test started
yellow arrow	test started
green check mark	A connection has been setup

Setup an Ethernet connection



<Info>	Displays the Ethernet connection parameters
<Test>	Display the tests possible, see page 134
<Start>	Activate Ethernet
<Stop>	Disable the Ethernet connection

or

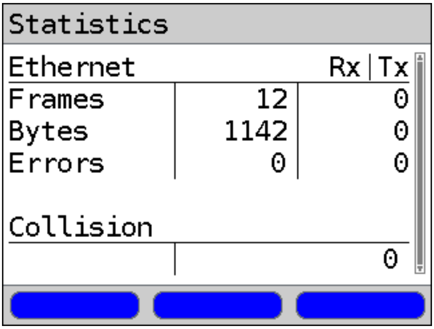


Display:

- Autonegotiation setting
- Autonegotiation on the remote end
- Negotiated speed
- Type of duplex mode
- Flow control setting

<Statistic>	Open Ethernet statistics

Continuation on next page



Statistics display:

- Ethernet frames received (Rx) and sent (Tx)
- Bytes received (Rx) and sent (Tx)
- Number of errors on the receiving (Rx) and sending (Tx) sides
- Number of collisions

Clear down the Ethernet connection and save the results

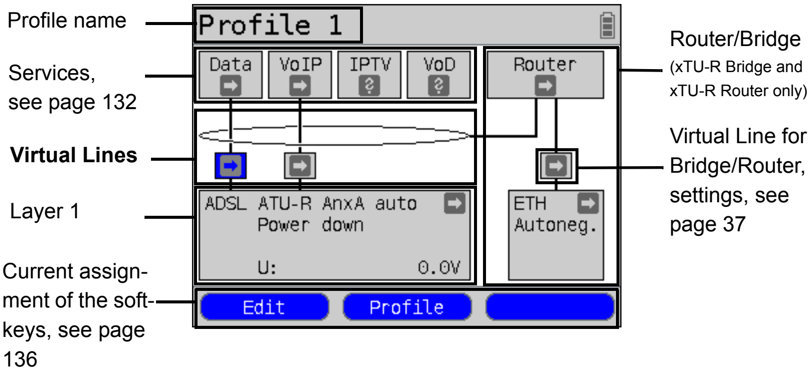
The process of clearing down an Ethernet connection and saving the results is performed in the same manner as in the case of an ADSL connection, see page 54.

11 Virtual Lines (VL)

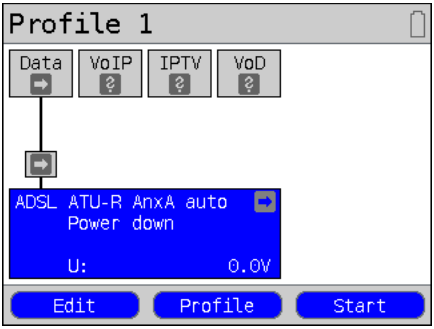
Virtual Lines (VL) are used to gather the settings for Layer 2 and Layer 3 into a profile - a VL profile. These profiles can hold information about, for example, the protocols, VPI/VCIs, VLANs and PPP data (in their own subordinate PPP profiles). With the aid of Virtual Lines, it is possible to perform tests on multiple VPI/VCIs or VLANs and various protocols.
Up to 10 Virtual Line profiles can be saved in the ARGUS. The settings in a VL profile, for example, the protocol setting, can be edited. Regardless of the state of the physical layer (Layer 1), the VL profile can be assigned to one or more services.
Therefore, it is possible to run a data test (such as an IP ping test) and a VoIP test (like a VoIP call) on the active access without having to setup Layer 1 (DSL, Eth) again - in spite of the fact that the protocols are different.

11.1 Virtual Lines in the Status screen

Virtual Lines in the Status screen are explained below using an ATU-R Router ADSL access as an example:

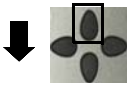


The Status screen is organized in three levels, which can be accessed individually using the ARGUS cursor keys.
The Status screen will described in greater detail using three displays as examples.

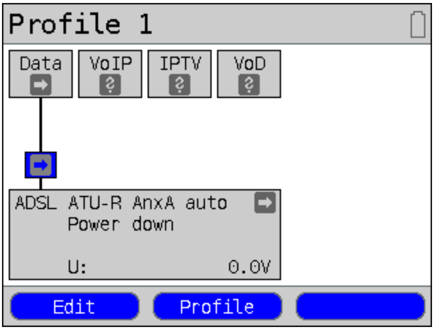


Layer 1: Physical Layer (see page 30)

<Edit>	Physical layer - configuration
<Profile>	Configure profile
<Start>	Setup the physical layer for the selected access.

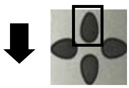


Cursor at top

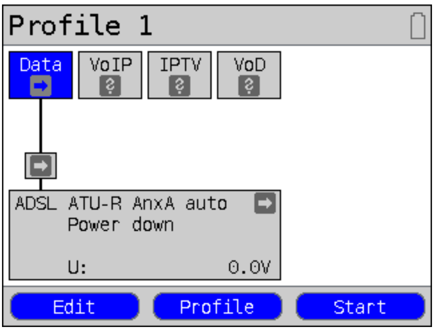


Layer 2: Virtual Lines
The following configuration options are displayed:
- Protocol (IP, PPP, PPTP)
- ATM, see page 122
- VLAN, see page 123
- PPP (PPP profile)
- PPTP, see page 124
- IP version (IPv4, IPv6, Dual)
- IPv4, see page 124
- Data log (for this VL)
- Profile name, see page 126

<Edit>	Virtual Line - configuration, see page 116
<Profile>	Configure profile



Cursor at top



Layer 3: Services (see page 132)

<Edit>	Assign a service to the VL and configure it
<Profile>	Configure profile
<Start>	Start service

Press the <Start> softkey to start both the Virtual Line and the physical layer.

Depending on the status of the physical layer, the Virtual Line or the service, the ARGUS displays different symbols in the graphic boxes.

 There is still no Virtual Line assigned to this service.

 This service, Virtual Line or physical layer is idle.

 This service is not available (Bridge mode only).

 Preparing to activate the physical layer, the Virtual Line or the service.

 The physical layer, Virtual Line or service is currently being activated.

 The physical layer, Virtual Line or service is being deactivated due to an unexpected event.

 The deactivation is being performed.

 The access has been successfully synchronized (physical layer) or a Virtual Line or service has been successfully activated without errors.

 A test is currently running in this service.

 An error has occurred here. To continue with this Virtual Line and service, press `<Reset>`

11.2 Virtual Line Profile (VL Profile)

Explanations of the various types of profile:

Profile (1 - 10), see page 34:

- Under the access parameters, you will find the Layer 1 settings (Phys. parameters, MAC address) and the assignments for the Data, VoIP, IPTV and VoD services.
- In addition to the access parameters, these profiles also hold the settings for the Bridge/Router and the test parameters.
- Each profile can be assigned an individual profile name.

Virtual Line profile (Virtual Lines 1 - 10)

- These hold the settings for Layers 2 and 3.
- Virtual Line profiles are assigned to services.
- Each Virtual Line can be assigned to multiple services.
- PPP profiles can be assigned to the Virtual Line profiles.

PPP profile (1 - 10)

- These profiles hold all the data relevant for dialling.
- PPP profile are assigned to the Virtual Line profiles.
- Each PPP profile can be assigned to multiple Virtual Line profiles.

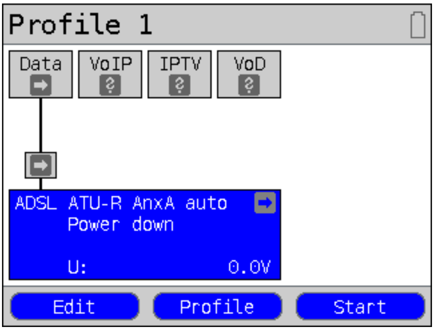
The relationship between the types of profiles

After all of the settings have been reset (see page 370), profiles (1-10) each have only one Virtual Line profile (1-10) that is assigned to the Data service. Each Virtual Line profile (1-10) is assigned a PPP profile.

In this default state, none of the other services (VoIP, IPTV or VoD) are assigned a Virtual Line profile or PPP profile.

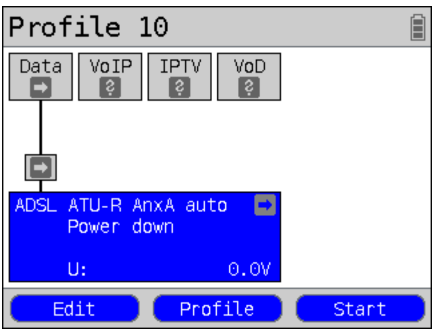
The assignment of other Virtual Line profiles and PPP profiles to services will be described beginning on page 116.

Default configuration:



Profile 1

Data service	=>	VL profile 1	=>	PPP Profile 1
VoIP service		...		...
IPTV service		...		...
VoD service		....		...



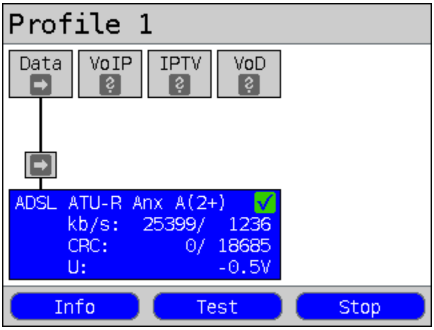
Profile 10

Data service	=>	VL Profile 10	=>	PPP Profile 10
VoIP service		...		...
IPTV service		...		...
VoD service		....		...

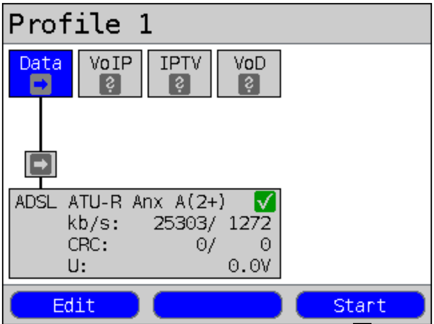
11.3 Virtual Line Activation

In order to activate a Virtual Line, a service or test must first be started. In order to start a test, a service must first be configured and assigned a Virtual Line. In this example, the Data service has been configured and assigned a Virtual Line.

11.3.1 Starting a service



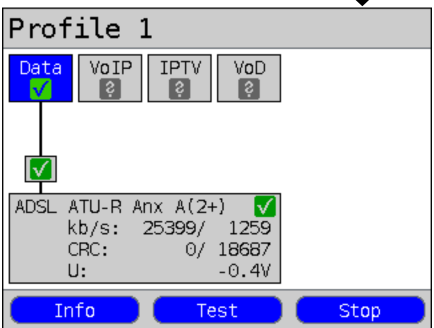
The ADSL connection is active.



Using the cursor keys, move from the Layer 1 box over the Virtual Line to the "Data" service.

If the physical layer is not yet active, it will be started automatically when the service or test is started.

<Start> Start service



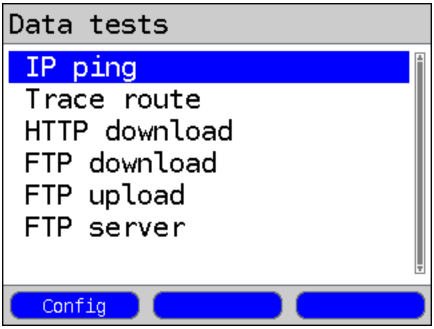
Continuation on next page

Now the physical layer (ADSL), the Virtual Line, and the Data service are all active. This is indicated by the green "check marks".

<Info> The Data service information will be displayed (e.g. the duration of the activity).

<Stop> The Data service will be stopped.

For an explanation of the services, see page 132.

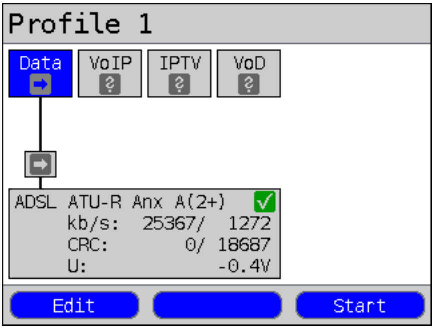


The tests that can be run on the "Data" service will be displayed.

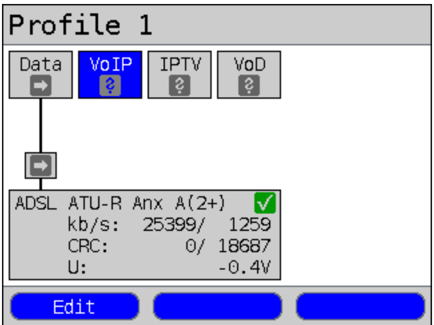
<Config> Configure the settings of the respective test (in this example, IP ping).
For more details, see the chapter on Tests (page 150).

11.3.2 Assigning additional Virtual Lines

The ARGUS can use multiple services (e.g. Data and VoIP) with a single Virtual Line. In this example, ADSL is active. The Data service has been selected. In the following, we will explain how multiple services can be connected using a single Virtual Line.



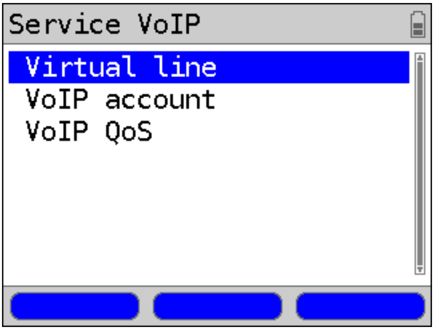
⚠ In order to configure a Virtual Line (which is connected the Data service in this example) for use with other services, its current service must first be stopped.
The physical layer remains active.



Continuation on next page

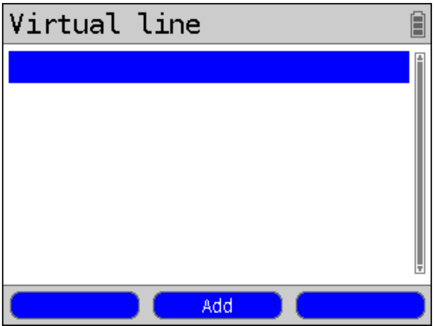
Use the cursor keys to select the VoIP service.

<Edit> The settings for the selected service (in this example, VoIP) will open.

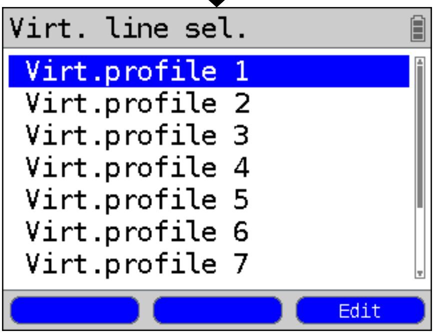


Select "Virtual Line".

Since the VoIP service has not yet been assigned a Virtual Line profile, the list is first empty.



<Add> Open the Virtual Line selection.



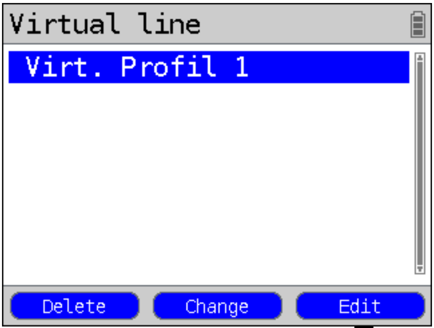
Select a Virtual Line profile for editing. The selected profile will be marked blue in the display.

Elements that are not available will be grayed out.
For example, when they are currently active.

<Edit> The possible settings are described on page 122 et seq.

Select the Virtual Line profile for the service.

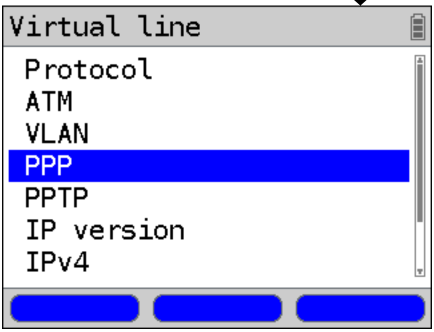
Continuation on next page



The selected Virtual Line profile will be displayed.

<Delete>	The selected Virtual Line will be deleted.
<Change>	The selected Virtual Line will be changed.
<Edit>	The selected Virtual Line will be opened for editing, see page 122.

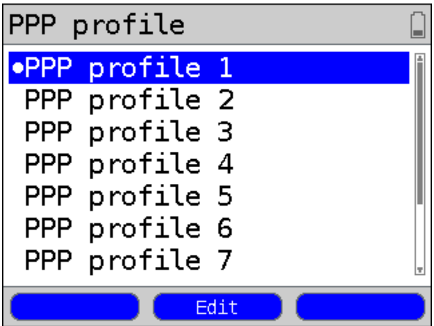
Assigning the Virtual Line profile to the service, see page 120.



e.g. select PPP

The possible settings are described on page 122 et seq.

Open the PPP profile list

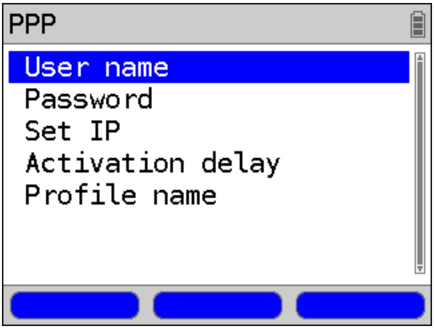


e.g. select PPP profile 1

Up to ten PPP profiles can be configured.

<Edit>	Open the selected PPP profile for editing, see page 122.

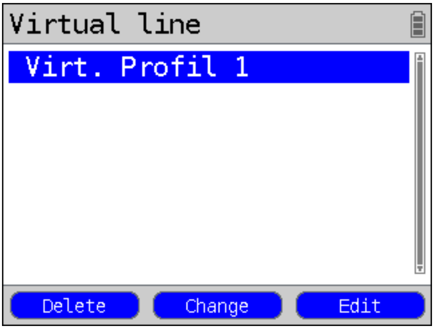
Continuation on next page



The possible settings are described on page 122 et seq.

Return the previous menu and to selection of the Virtual Line profile.

3x

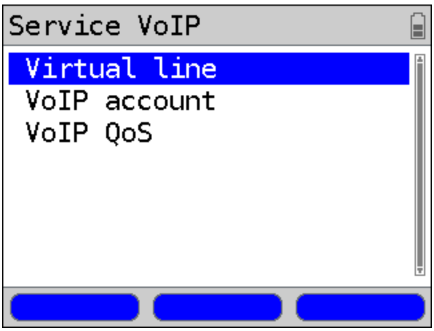


After confirming your selection, the selected profile must be confirmed once more.

<Delete> The selected Virtual Line profile will be deleted.

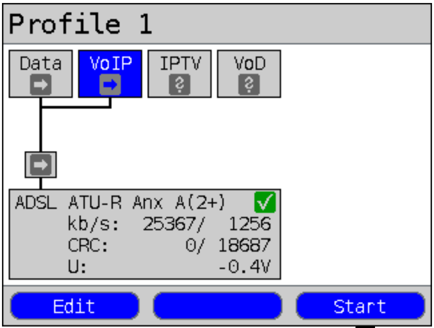
<Change> The selected Virtual Line profile will be changed.

The ARGUS will use the selected profile.



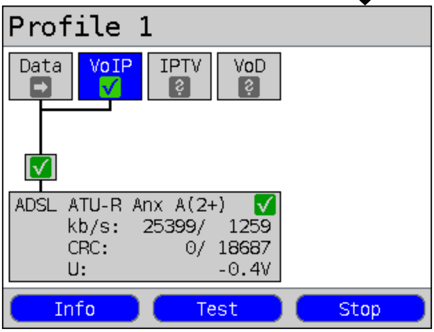
The ARGUS will open either the Status screen or the Settings menu (depending on whether the profile was opened from the Main Menu or the Status screen).

Continuation on next page



The "Data" and "VoIP" services are now connected to the physical layer (ADSL access) by single Virtual Line.

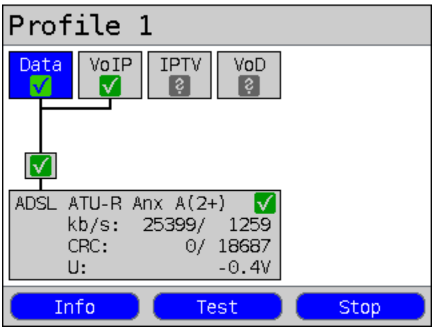
<Start> Start VoIP service



The "VoIP" service is now active.
It is now possible to perform various tests on the VoIP service.

In the next step, it is possible to activate another service.

Select "Data" with the cursor keys and press **<Start>** to activate the service.

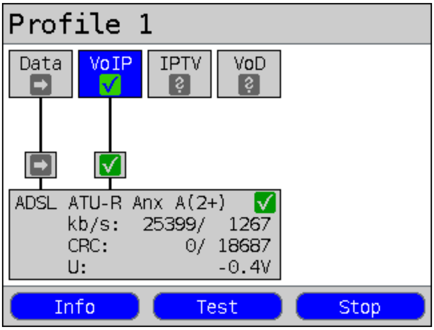


The "Data" and "VoIP" services are active. It is now possible to perform various tests on both the "Data" and the "VoIP" services.

The displays and operation of IPTV and VoD (Video on Demand) services are like those of VoIP.

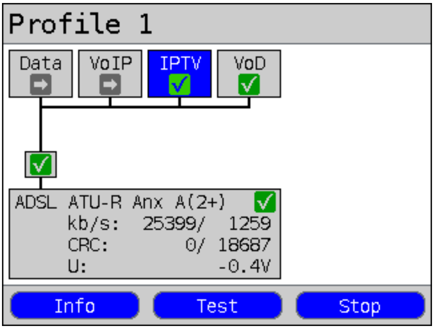
Other examples of different Virtual Line assignments:

Example 1:



One Virtual Line is connected to the Data service and another to the VoIP service. The Virtual Line for VoIP can use different protocol data from that of the Virtual Line for Data.

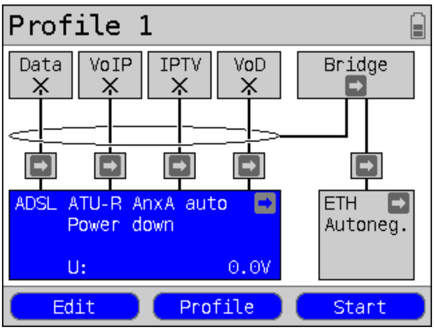
Example 2:



A Virtual Line was configured for the Data, VoIP, IPTV and VoD services.
In this example, the IPTV and VoD services are active.

⚠ In the case of the IPTV service it is possible to setup up to four Virtual Lines.
The ARGUS will however display these together as a single Virtual Line.
For more details, see the chapter on IPTV (page 203).

Example 3:



In this example, each service has been assigned a Virtual Line.
Since the ARGUS is in Bridge mode, these services cannot be performed.

11.4 Virtual Line Settings

Setting	Explanation
`Virtual Profile 1 to 10`	
`Protocol`	Selection of the transfer protocol that the ARGUS should use for the test (e.g. for an IP test). Default setting: ***PPP***

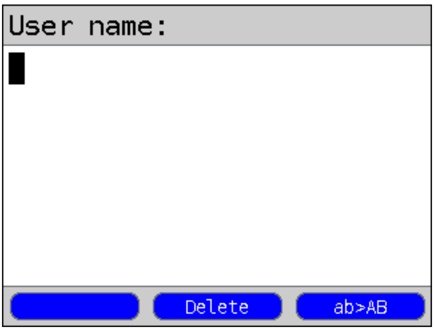
Protocol	ATM:	Interfaces:				
	ATM with ETH	**ADSL**	**VDSL**	**SHDSL ATM**	**SHDSL EFM**	**ETH**
IP	Yes	EoA	IP	EoA	IP	
IP	No	IPoA		-		
PPP	Yes	PPPoE	PPPoE	PPPoE	PPPoE	
PPP	No	PPPoA		-		
PPTP	-	-	-	-	-	PPTP

The settings - regardless of whether the "ATM with Ethernet" or "ATM without Ethernet" protocol is used - will be handled under the heading ATM.

Setting	Explanation
`ATM:`	Settings for Asynchronous Transfer Mode
`VPI/VCI`	VPI: Enter Virtual Path Identifier VCI: Enter Virtual Channel Identifier Range: 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***
`Ethernet`	Sets whether Ethernet over ATM will be used or not, see table above. Default setting: ***Yes***

`VLAN:`	VLAN (Virtual Local Area Network)	
`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 (i.e. one with a different ID such as 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 data will be handled as a lower priority. Range: 0 to 7 Default setting: ***0***
`PPP Profile:`	PPP settings (Point-to-Point-Protocol) **`<Edit>`** Open PPP profile for editing	

`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 (uppercase or lowercase letters, or digits).

`Password`	Entry of the password assigned by the network operator, for more information, see User Name. While entering the password the characters will remain visible until the password is confirmed. Afterwards, the characters of the password will be shown masked with "*".

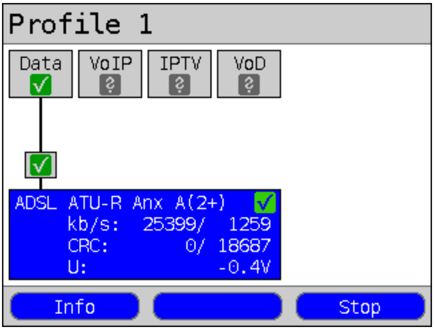
Set the IP	If "Yes", the IP address entered as IP / own IP address (see below) will be used for the connection. Default setting: ***No***
Activation delay	After setting up the PPP connection, the ARGUS will first wait until the period specified in the "activation delay" has elapsed before beginning a test. Range: 2 to 10 seconds Default setting: ***2***
Profile name	Enter the name of the PPP profile
PPTP:	PPTP settings (Point-to-Point-Tunneling Protocol)
	Local server IP address Range 0.0.0.0. to 255.255.255.255 Default setting: ***0.0.0.0***
IP version:	Internet Protocol version
	Setting that specifies which IP version should be used. IPv4: Internet Protocol version 4, in accordance with RFC 791 IPv6 Internet Protocol version 6, in accordance with RFC 2460 Dual: If IPv6 is available, it will be used by default, if not the ARGUS will switch to IPv4. Default setting: ***IPv4***
IPv4:	Internet Protocol version 4 - settings
IP mode	Setting the assignment of the IP addresses Static IP: Static IP addresses DHCP client: IP address assigned by the server (remote end) DHCP server: IP address assigned by the ARGUS DHCP auto: ARGUS checks 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***
Local 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 DNS server 2 Entry of the DNS server's IP address (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***, for more information see "User name" on page 123 - HEX data: Enter the DHCP Vendor ID in hexadecimal format; for more information see "MAC address" on page 107
	DHCP Vendor Info: - Format: Selection of the format: ASCII or hexadecimal - ASCII data: Enter the DHCP Vendor Info in ASCII format Default setting: ***ARGUS***, for more information see "User name" on page 123 - HEX data: Enter the DHCP Vendor Info in hexadecimal format; for more information see "MAC address" on page 107
	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***, for more information see "User name" on page 123 - HEX data: Enter the DHCP User Class Information in hexadecimal format; for more information see "MAC address" on page 107

	DHCP User-defined Option (creating a user-specific 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 format Default setting: ***ARGUS***, for more information see "User name" on page 123 - HX data: Enter the DHCP User-defined Option in hexadecimal format, for more information see "MAC address" on page 107
`DHCP server`	Options for the DHCP server: - Start and End IP addresses Range: 0.0.0.0 to 255.255.255.255 Default setting: (see RFC 3330 regarding assignment) Start: ***192.168.10.30*** End: ***192.168.10.40*** - Name of the domain, for more information see "User name" on page 123 - Reserve time of the IP addresses Range: 1 to 99999 hours Default setting: ***240***
`Data Log`	Data log on or off This setting must be "ON“ in order to send a trace file to a PC see page 54. After a Virtual Line has been terminated by the associated service or the physical layer, the ARGUS will enquire whether the trace file should be sent to the PC. In order to send the trace file, the Trace/ remote (see page 365) function must be active and the ARGUS must be connected to a PC using the mini-USB. As an example, if data Log is activated for Virtual Line 1, only Virtual Line 1 will be recorded. If a Virtual Line is configured for multiple services and data log is activated, all of this Virtual Line's data will be recorded. Default setting: ***Off***
`Profile name`	Enter the name of the VL profile.

11.5 Display the Protocol Statistics

Depending on the access mode and protocol, the ARGUS will display the BRAS, IP, PPP, ATM or Ethernet statistics.

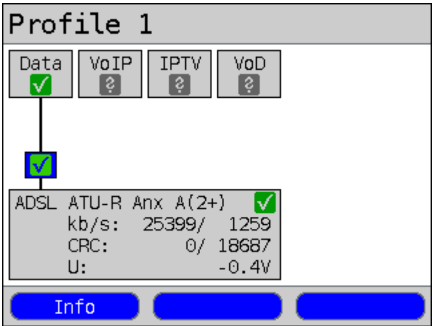


The physical line, the Virtual Line and the Data service are active.

<Info> Display DSL events

<Stop> Deactivate physical layer, VL and data

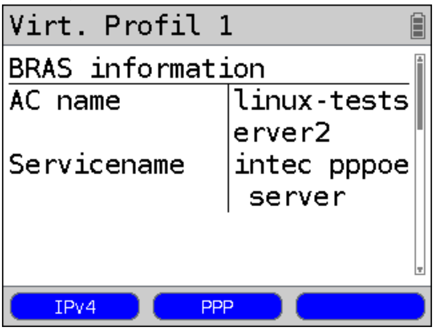
Using the cursor keys switch to the Virtual Line.



One after the other

 and 

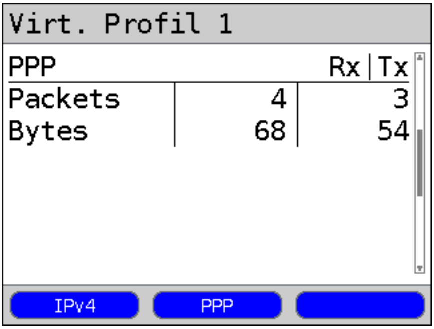
Displays the ARGUS MAC addresses: Line, LAN, LAN2, see also page 136 f.



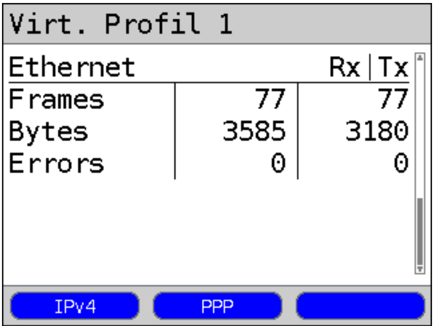
BRAS information:
The ARGUS displays (for the PPP protocol only) the BRAS (Broadband Remote Access Server) information:
- AC (Access Server): Name of the server
- Service name: Name of the service

<IPv4> Display the configuration assigned by the server.

Continuation on next page

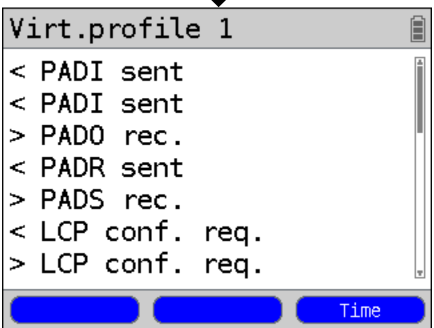


PPP information:
The ARGUS will display the number of PPP packets and bytes received (Rx) and sent (Tx).



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

<PPP> The **<PPP>** softkey is used to open a PPP trace in which the sequence of PPP messages will be shown.



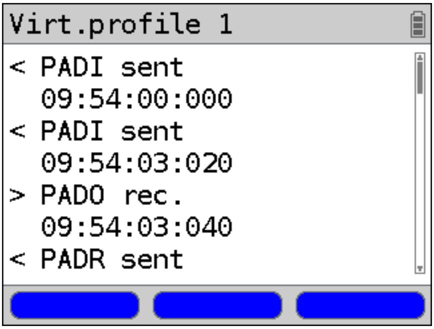
Display commands

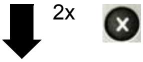
< = command sent from the ARGUS

> = command sent from the DSLAM

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

Continuation on next page



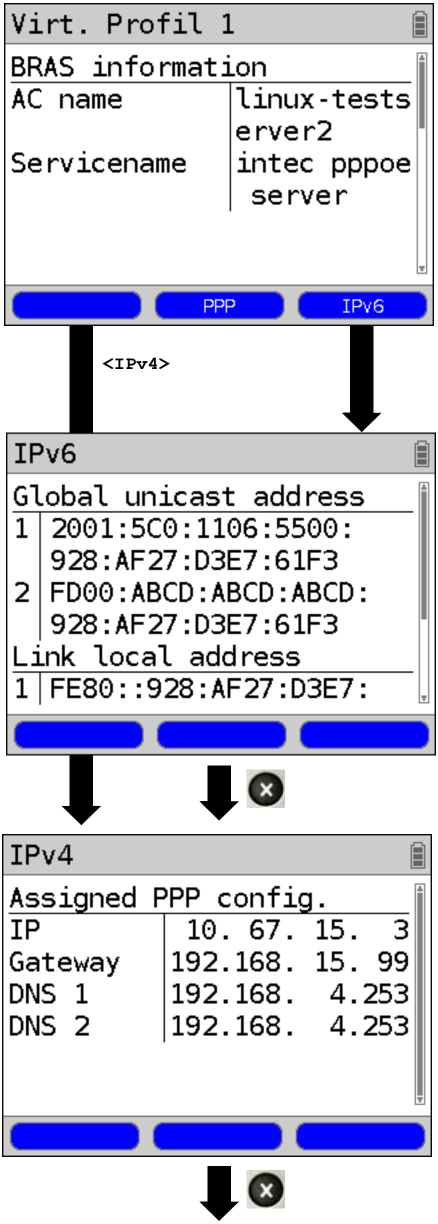


- PADI:
  PPPoE Active Discovery Initiation
- PADO:
  PPPoE Active Discovery Offer
- PADR:
  PPPoE Active Discovery Request
- PADS:
  PPPoE Active Discovery Session confirmation
- PADT:
  PPPoE Active Discovery Termination
- IPv6
  IPv6 Control Protocol
- LCP:
  Link Control Protocol
- IPCP:
  Internet Protocol Control Protocol
- PAP:
  Password Authentication Protocol

Table:

ack.	= acknowledge
auth.	= authentication
conf.	= configuration
nak.	= not acknowledge
prot.	= protocol
rec.	= received
rep.	= reply
req.	= request
rej.	= rejected

Depending on the IP version



In the case of IPv6:

<IPv6> IPv6 information will be displayed.

<IPv4> IPv4 information will be displayed.

Assigned configuration:
The ARGUS will display the IP configuration assigned by the server:
- Global Unicast Address
- Link Local Address

Use the cursor keys to scroll to additional information.

Close the results display.

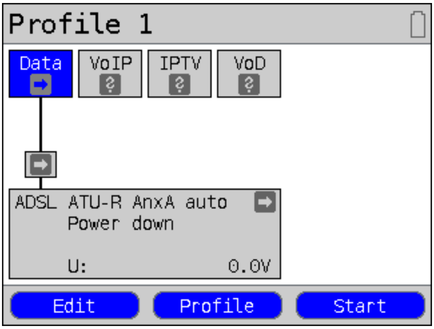
Assigned configuration:
The ARGUS will display the IP configuration assigned by the server:
- IP address received
- Gateway IP address
- DNS Server available

Close the results display.

12 Services

Four services are presented on the Status screen (see explanation on page 111).
There is an entire group of IP tests that can be performed for each Service (see the table below). Furthermore, it is possible to start and stop each service independently of the other services.

An example of the display with the possible services

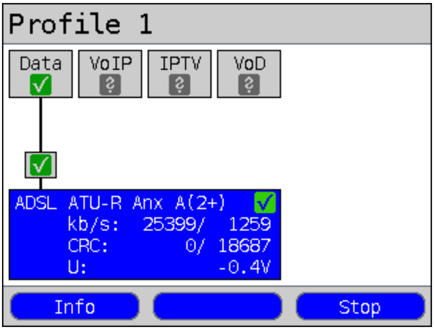


<Edit>	To assign the service a Virtual Line (VL) profile and configure the service.
<Profile>	Configure profile.
<Start>	Activate service. If the Virtual Line and physical layer are not yet activated, they will also be started automatically.

If a service is activated, a variety of tests can be started with **<Test>**. The tests that can be performed for the various services are as follows:

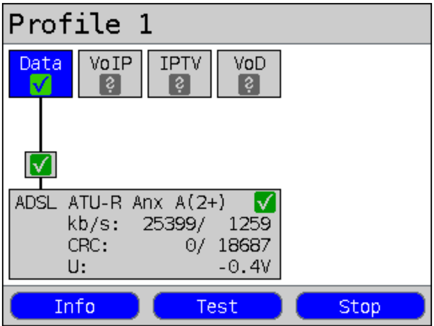
Services:			
Data	VoIP	IPTV	VoD
- IP ping	- IP ping	- IP ping	- IP ping
- Trace route	- Trace route	- Trace route	- Trace route
- HTTP download	- VoIP call	- IPTV	- Video on Demand
- FTP download	- VoIP wait	- IPTV scan	
- FTP upload	- VoIP PESQ test	- IPTV passive	
- FTP server			

12.1 Display the Service Statistics

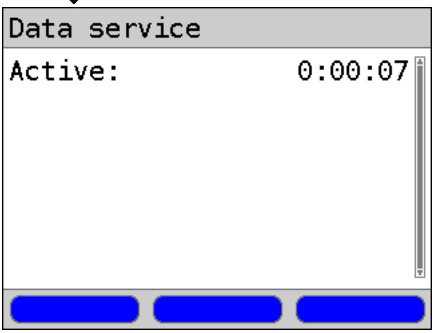


ARGUS - Status screen
The physical layer, Virtual Line and service are activated.

Use the cursor to select a service (in this example, Data)



<Info> Display how long the selected service has been activated.



⚠ If the VoIP service is selected, Info will display the VoIP call parameters, see page 197.

Exit the display and return to the Status screen.

13 Test Overview and Hotkey Assignment

Test Overview

Table of the tests possible on an xDSL or Ethernet access:

Interface Test	**ATU-R**	**VTU-R**	**STU-R**	**STU-C**	**AUT-R BR VTU-R BR STU-R BR**	**ATU-R RT VTU-R RT STU-R RT**	**Ethernet**
Loop see page 138	-	-	x[*1]	x[*1]	x[*4]	x[*4]	x
VPI/VCI scan, see page 142	x	-	x[*2]	x[*2]	x[*3]	x[*3]	-
ATM OAM ping, see page 146	x	-	x[*2]	x[*2]	x[*3]	x[*3]	-
IP ping see page 150	x	x	x	-	-	x	x
Trace route see page 157	x	x	x	-	-	x	x
HTTP download, see page 162	x	x	x	-	-	x	x
FTP download, see page 169	x	x	x	-	-	x	x
FTP upload, see page 174	x	x	x	-	-	x	x
FTP server, see page 179	x	x	x	-	-	x	x
VoIP call wait see page 200	x	x	x	-	-	x	x
IPTV see page 203	x	x	x	-	-	x	x
IPTV scan see page 217	x	x	x	-	-	x	x
IPTV passive, see page 224	-	-	-	-	-	x	x
VoD see page 228	x	x	x	-	x	x	x
PESQ see page 317	x	x	x	-	-	x	x

[*1] = EFM only [*2] = ATM only [*3] = not on VDSL [*4] = only on SHDSL

In order for the ARGUS to perform these tests (with the exception of the ATM tests: VPI/VCI scan, ATM OAM ping and Loop), you must first configure a Virtual Line. The configuration of a Virtual Line is described in the chapter devoted to Virtual Lines, see page 111.

Graphic functions:
After setting up an xDSL access or a test, the following graphic functions can be used in the result graphics:

Hotkey	**ADSL/VDSL**	**Line Scope**	**DMT Analysis**	**TDR**
Numeric key 2	Zoom	Zoom	Zoom	Zoom
Numeric key 3	Cursor	Cursor	Cursor	Cursor
Numeric key 4	-	Measurement range	Tones	Measurement range
Numeric key 5	-	-	Mode	Pulse width/ height
Numeric key 6	-	-	-	Wire types/VoP
Numeric key 7	-	Probe	Probe	-
Numeric key 8	-	Symmetry	-	-
Numeric key 9	Settings x-axis	Time/FFT	-	-
	Continue	-	New	-
	-	Start/Stop	-	Start/Stop

Hotkey Assignment
The ARGUS keypad can be used to call up or start the main functions and/or tests directly. The selection of hotkeys available depends on the type of access selected (in the table below on an xDSL or Ethernet):

Hotkey	**Service**	**ADSL**	**VDSL**	**SHDSL**	**Ethernet**
Numeric key 0	ARGUS-State	x	x	x	x
Numeric key 1	Help hotkeys	x	x	x	x
Numeric key 2	VPI/VCI scan	x	-	ATM	-
Numeric key 3	IP ping	x	x	x	x
Numeric key 4	Trace route	x	x	x	x
Numeric key 5	HTTP download	x	x	x	x
Numeric key 7	FTP download	x	x	x	x
Numeric key 8	Trace/remote	x	x	x	x
Numeric key 9	IPTV	x	x	x	x
	VoIP call	x	x	x	x
	Status screen	x	x	x	x
One after the other  and 	Quick access to the Access Menu	x	x	x	x
One after the other  and 	Displays ARGUS-specific information, such as ARGUS type, SW version, S/N., own MAC addresses, SW options etc.	x	x	x	x
One after the other  and 	Restore the saved settings, see page 368.	x	x	x	x
	The speed-dialling memory for numbers, settings (e.g. PPP user name, IP addresses etc.), profile / profile names, user-specific services, keypad infos and all of the test results stored in the ARGUS will be deleted if the settings have not been saved before hand, see page 368.				
One after the other  and 	All settings will be reset to the default factory settings, see page 368.	x	x	x	x

Different hotkeys will be available depending on the type of access selected (in this example ISDN, POTS and Copper Tests):

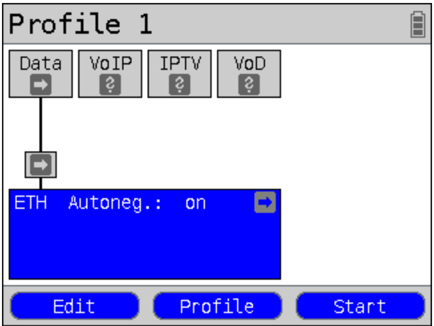
Hotkey	**Service**	**BRI S/T**	**BRI U**	**PRI**	**POTS**	**Cu Tests Status**
Numeric key 0	ARGUS-State	x	x	x	x	x
Numeric key 1	Help hotkeys	x	x	x	x	x
Numeric key 2	Start Service check (not on a leased line)	x	x	x	-	-
Numeric key 3	Start Supp. serv. test (not on a leased line)	x	x	x	-	-
Numeric key 4	Starting the Automatic Test	x	x	x	-	-
Numeric key 5	Send test results to a PC	x	x	x	x	x
Numeric key 6	Start the Test Manager	x	x	x	-	-
Numeric key 7	Open speed-dialling memory	x	x	x	x	x
Numeric key 8	Trace/remote	x	x	x	x	x
Numeric key 9	Start BERT	x	x	x	-	-
	Level measurement	x	x	L1 Status	x	-
	Call setup	x	x	x	x	-
One after the other  and 	Quick access to the Access Menu	x	x	x	x	x
One after the other  and 	Displays ARGUS-specific information, see page 136.	x	x	x	x	x
One after the other  and 	Restore the saved settings	x	x	x	x	x
	The speed-dialling memory for numbers, settings (e.g. PPP user name, IP addresses etc.), profile / profile names, user-specific services, key-pad infos and all of the test results stored in the ARGUS will be deleted if the settings have not been saved before hand, see page 370.					
One after the other  and 	All settings will be reset to the default factory settings, see page 368.	x	x	x	x	x
One after the other  and 	Start the Test Manager	x	x	x	-	-

14 Loop

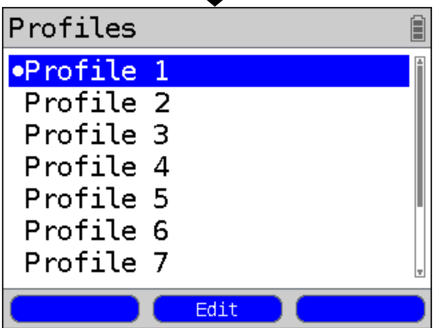
A loop can be setup on an SHDSL line (in EFM mode), as well as on an Ethernet line. A loop will take all incoming Ethernet frames at Layer 1 (L1) and send them back to the sender unchanged.
In the case of a loop on Layer 2 (L2) of the OSI model, the ARGUS swaps the source MAC address with the destination MAC address and then sends all the incoming Ethernet frames back.

The following parameters are required for the Loop:

Protocol-independent parameters:



ARGUS - Status screen
In this example: Ethernet Access



Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet connection and for the loop.

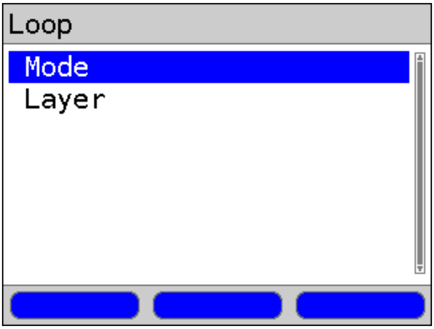
The ARGUS will use the marked profile as the default profile and return to the Settings menu.

Test parameters

Loop

Select the test to be configured (in this example, Loop).

Continuation on next page



Settings
- Mode
- Layer

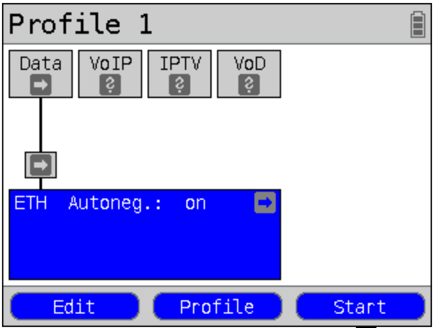
select and edit.

Quit the menu without saving the changes.

View and edit the marked parameters if necessary

Setting	Explanation
Test parameters:	
Loop:	
Mode	Use the Loop Mode to set what should be looped. - only those packets sent to own MAC (promiscuous mode off) L1: Only loop packets sent to own MAC address and broadcast packets. L2: Only loop those packets sent to own MAC address. Broadcasts will be discarded. - loop all packets (promiscuous mode on) L1: All packets (including Broadcast packets) will be looped. L2: All packets - with the exception of Broadcast packets - will be looped. Broadcasts will be discarded. Default setting: ***only own MAC***
Layer	This setting determines the OSI Model layer that will be used for the loop. - L1: In the case of loop, all incoming Ethernet frames on Layer 1 (L1) will be sent back to the sender unchanged. - L2: In the case of loop on Layer 2 (L2) of the OSI model, the ARGUS will swap the source MAC address with the destination MAC address and then send all incoming Ethernet frames back to the sender. Default setting: ***L2***

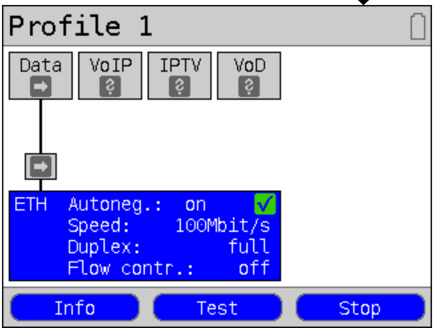
Start Loop (Access Mode: Ethernet)



Set up the Ethernet or SHDSL connection

The profile shown in the display (in this example, Profile 1) will be used for the loop.

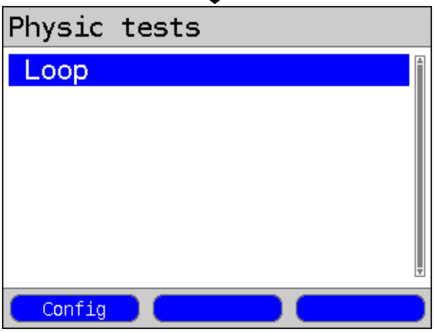
<Start> Activate Ethernet



<Info> Display the Ethernet connection parameters

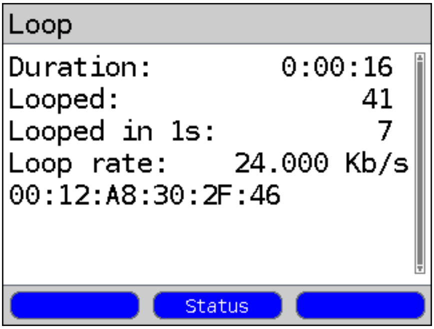
<Test> Display the available tests

<Stop> Stop the Ethernet connection



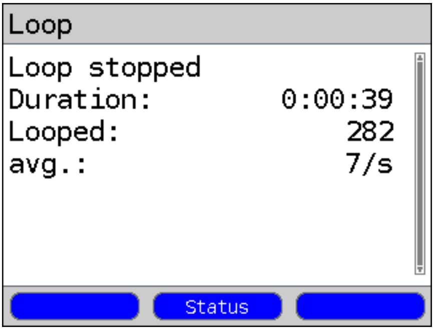
<Config> Change the loop parameters, see Page 139

Continuation on next page



The loop is started:

Duration	Current duration of the test.
Looped	Displays the number of packets looped so far.
Looped in 1 sec.	Displays the number of packets looped during the current second.
Through-put	Displays the current data throughput per second.
MAC Address	Own MAC address of the looped device (e.g. to enter in the Traffic Generator).
<Status>	Display the Status screen without stopping the test.



Duration	Total test time
Looped	Number of packets looped
Average	Number of packets looped per second
<Status>	Displays the Status screen.

⚠ The connection statistics will not be updated during the Loop test (on an SHDSL access). The ARGUS will first begin saving these statistics again after the test is completed.

Saving the results

The results of the Loop test are saved in the same manner as for an ADSL access, see Page 54.

15 ATM Tests

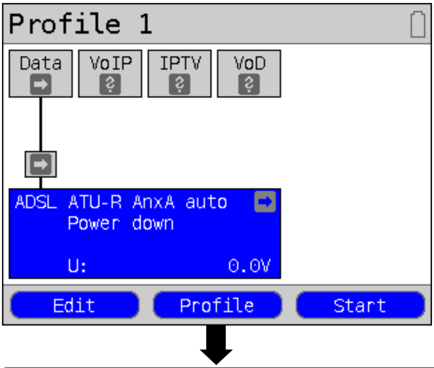
The following ATM tests can only be performed on an ADSL or SHDSL (ATM) interface. Other interfaces, such as VDSL, Ethernet or SHDSL-EFM are not based on ATM technology.

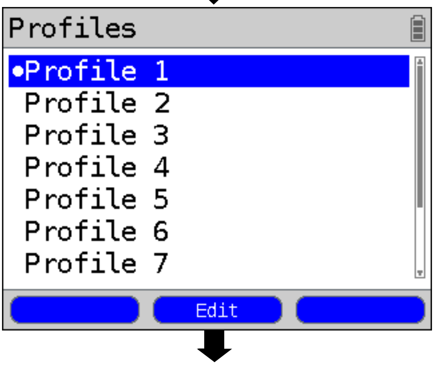
15.1 VPI/VCI Scan

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, which are stored in a profile, are required to perform a VPI/VCI Scan (if a xDSL connection has already been setup, the connection parameters, e.g. the ADSL mode and the target value, are blocked):

Protocol-independent parameters:

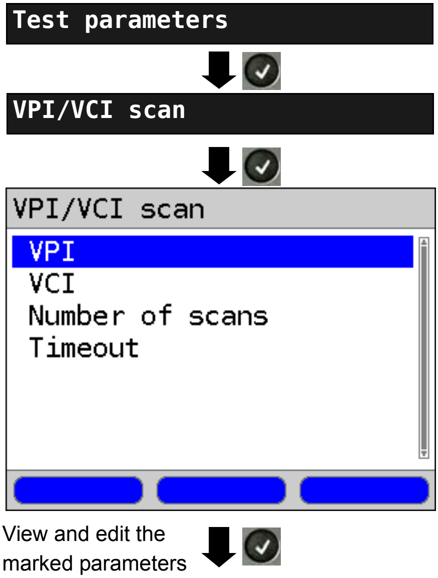




Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the xDSL connection and for the VPI/VCI Scan.

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

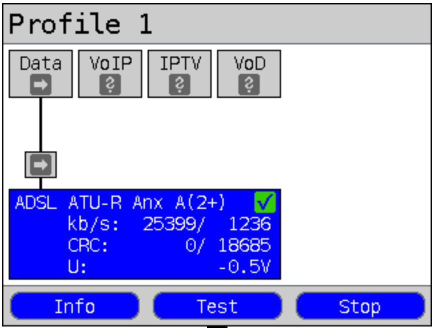
Continuation on next page



View and edit the marked parameters if necessary

Setting	Explanation
Test 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***

Start a VPI/VCI Scan

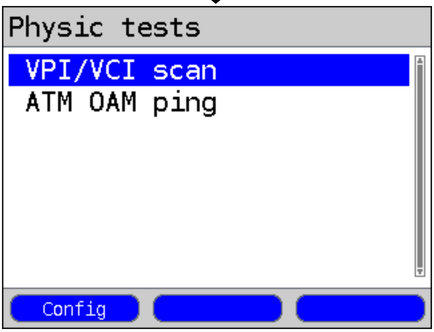


In the example, the access is set to ADSL and ATU-R is active.

<Info> Display the ADSL connection parameters

<Test> Display the tests possible

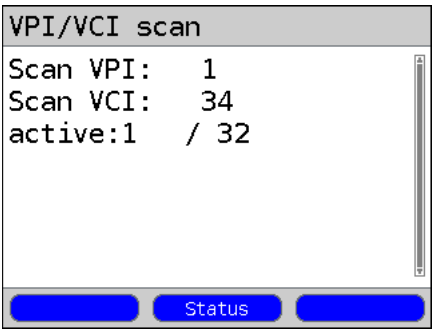
<Stop> Stop the ADSL connection



<Config> The ARGUS will display the test parameters for the VPI/VCI Scan, see Page 143.

The VPI/VCI Scan starts automatically.

VPI/VCI Scan

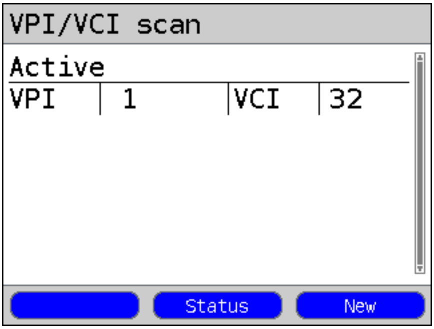


The ARGUS displays the VPI/VCI combination currently being tested and the last VPI/VCI combination that was found to be active (in the example, 1/32).

<Status> Display the Status screen without stopping the test; see above.

 Cancel the test.

VPI/VCI Scan - results



After the VPI/VCI Scan has been concluded, the ARGUS will show the VPI/VCI combinations active on the access under test.

<Status>	Display the Status screen
<New>	Start a new VPI/VCI Scan

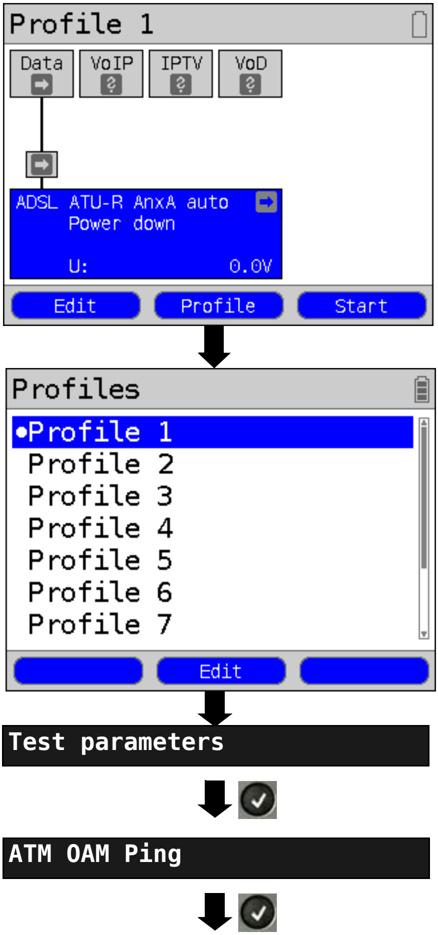
Close the results display

For information on saving the results, see IP Ping Page 156.

15.2 ATM-OAM Ping

In an ATM OAM ping test, the ARGUS checks the availabilit of individual ATM network nodes or an ATM subnet. OAM is an acronym for "Operation, Administration and Maintenance“ and is used for the monitoring and administration of ATM data transmissions. The following parameters, which are stored in a profile, are required to perform an ATM OAM ping (if an ADSL connection has already been setup, the connection parameters, e.g. the ADSL mode and the target value, are blocked):

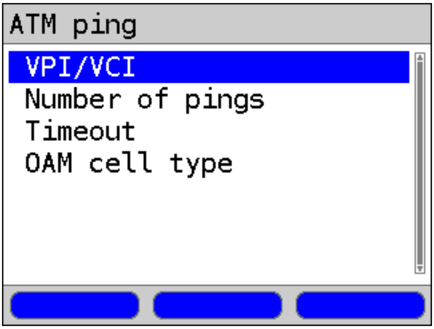
Protocol-independent parameters:



Continuation on next page

Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the xDSL connection and for the ATM OAM ping.

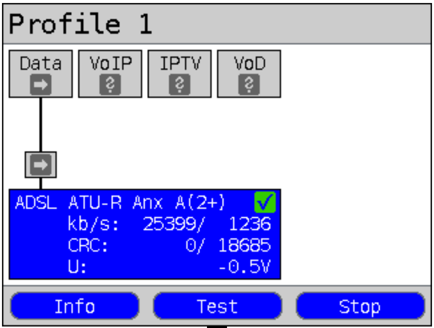
The ARGUS will use the marked profile as the default profile and return to the Settings menu.



View and edit the marked parameters if necessary

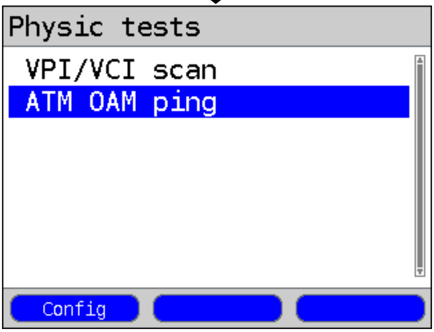
Setting	Explanation
Test parameters:	
ATM OAM ping:	
VPI / VCI	Entry of the VPI and VCI for the ATM OAM ping Range: VPI: 0 to 255, VCI: 32 to 65535 Default setting: ***VPI: 1, VCI: 32***
Number of pings	This sets the number of test packets that the ARGUS will send. If you enter "0", the ARGUS will send packets continuously until the ATM OAM ping is stopped manually. Range: 1 to 99999 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 The loopback cell will be answered by the first ATM node of the virtual channel. 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***

Start ATM OAM ping



In the example, the access is set to ADSL and ATU-R is active.

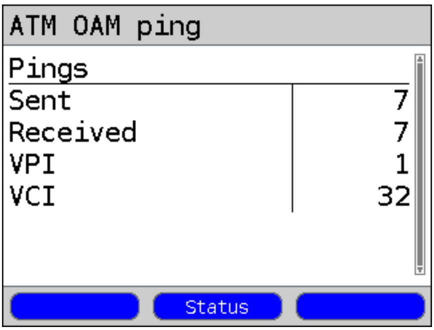
<Info>	Display the ADSL connection parameters
<Test>	Display the tests possible
<Stop>	Stop the ADSL connection



<Config> The ARGUS will display the test parameters for the ATM OAM ping, see Page 147.

The ATM OAM ping test will start automatically.

ATM OAM Ping

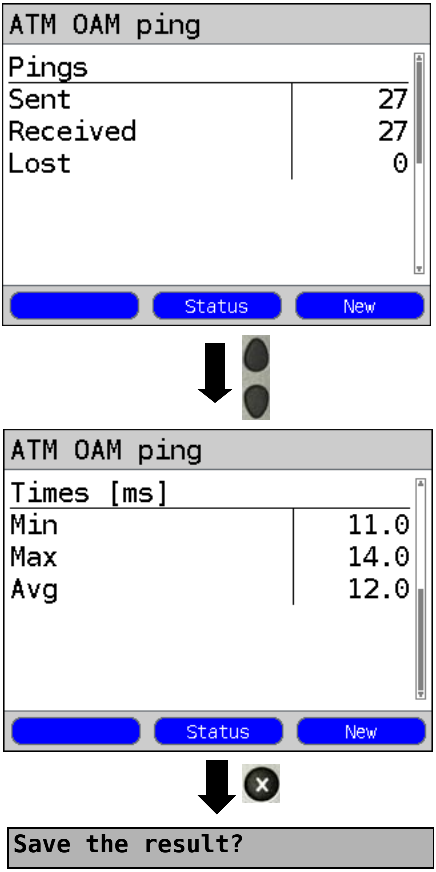


The ARGUS will display the current number of test packets sent, the current number of packets in response and the VPI/VCI on which the ping test is currently being run.

<Status> Display the Status screen without stopping the test; see above.

 Cancel the test.

ATM OAM ping result



At the end of the ATM OAM ping, the ARGUS will automatically display the results. If the test has been set to "continuous", it must be stopped manually:

- 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

<Status>	Display the Status screen.
<New>	Start a new ATM OAM ping test.

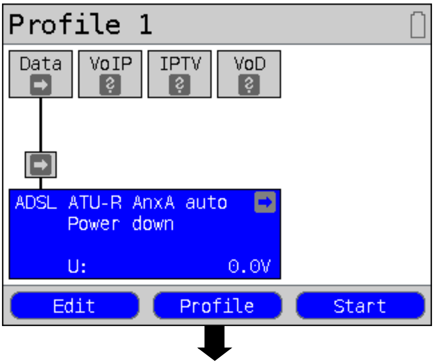
For information on saving the results, see IP ping Page 156.

16 IP Tests

16.1 IP Ping

In the IP ping test, the ARGUS checks whether it is possible to setup a connection to an Internet Service Provider (ISP) - or another computer or server address - via an Ethernet connection (IP network) or via an xDSL connection (over a DSLAM and the 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 path's maximum data packet size. The following parameters are required for the IP ping:

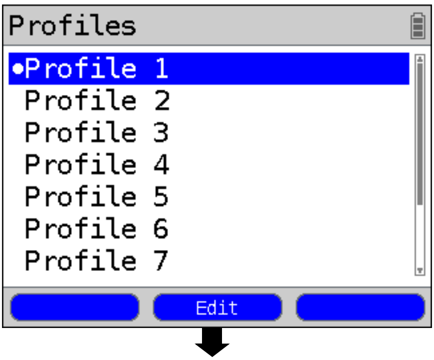
Protocol independent parameters



ARGUS - Status screen.

<Edit>	Setting the ADSL parameters.
<Profile>	Profile settings are like those for ADSL, see page 34.
<Start>	Start physical layer.

Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the IP ping test.

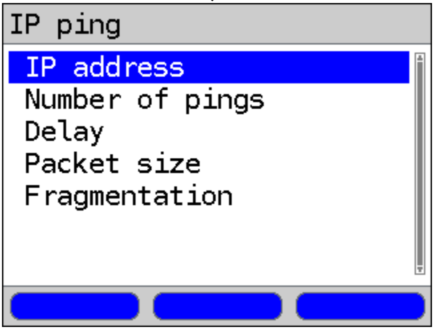


The ARGUS will use the marked profile as the default profile and return to the Settings menu.

Test parameters

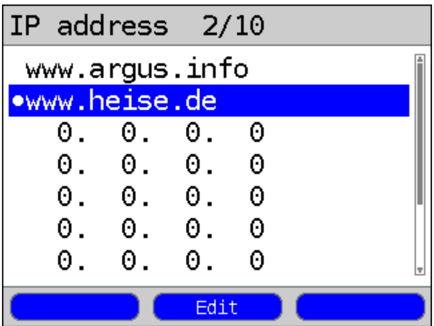
Continuation on next page

IP ping



View and edit the marked parameters if necessary

Setting	Explanation
Test parameters:	
IP ping:	
IP address	This is the address of the remote site. The ARGUS can save up to 10 IP addresses. The saved IP addresses are available to all of the profiles.



The ARGUS shows the memory locations (a total of ten) 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 (1/10)).

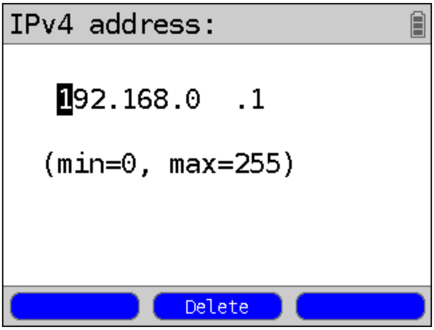
<Edit> Open the marked IP address to edit it.

● as name, IPv4 or IPv6 number

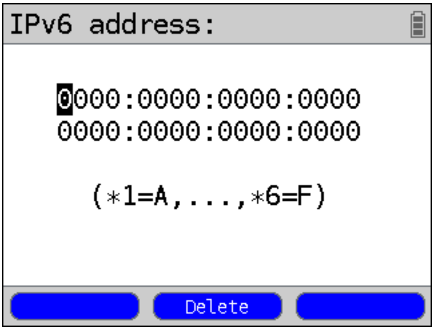
The address can be entered as an IPv4 or IPv6 number, or as a name.
Default setting: ***www.argus.info***

Continuation on next page

IP address as an IPv4 number



IP address as an IPv6 number



Enter the IPv4 or IPv6 address as a number.
Use the numeric keypad to make the entry.

<Delete> Delete the character before the cursor.


to

When entering an IPv6 address, the key combinations can be used to enter the letters A to F.


Set the marked IP-address as the default address

Use the softkey on the right to shift the keypad (the softkey on the right assumes a different meaning when pressed):
For information on entering the address as a name, see User name on page 123.

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

<ab>AB> To enter lowercase letters and @, /, -, .

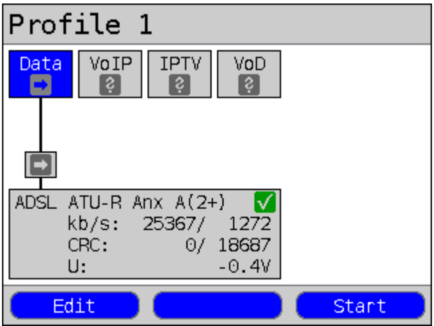
<AB>12> To enter uppercase characters and @, /,- and .


Move the cursor within the line.

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 99999 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).

Start IP ping (in the example, Access mode ATU-R, already active):

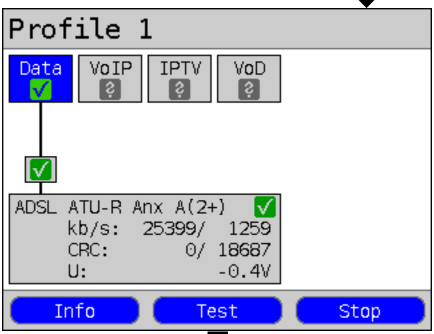


Set up the service

The profile shown on the display will be used for the IP ping (in this example, Profile 1).

<Edit> Assign Virtual Lines to the Data service.

If no xDSL or Ethernet connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



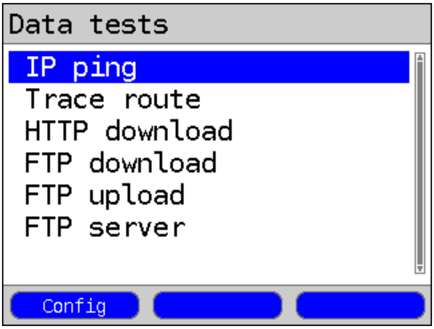
The Data service and ADSL connection are active.

<Info> Duration of the activation

<Test> Open test selection

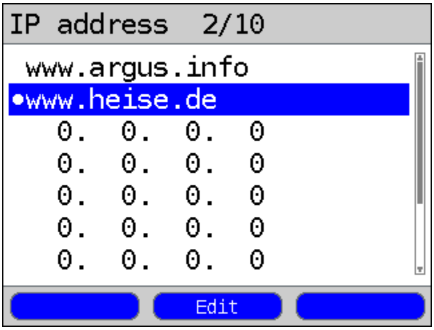
<Stop> Deactivate service

Continuation on next page



e.g. select IP ping

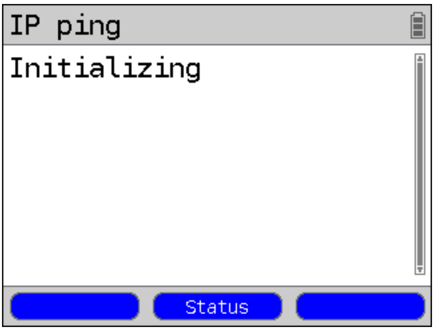
<Config> Change the IP ping parameters, see page 151.



The ARGUS displays the address stored in the profile.

Select the IP address to use for the ping; the default address is marked with an ●.

<Edit> Open address for editing, see page 151.

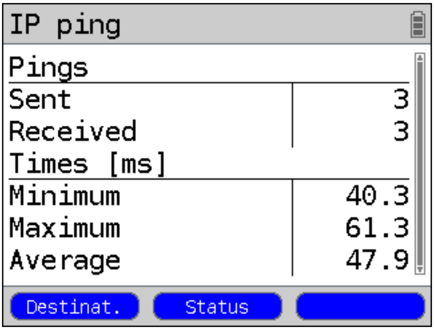


<Status> Display the Status screen without stopping the test.

⚠ In this example, a Ping test is being run on a line using the IP version IPv4. The test would be run in a similar manner on a line with IPv6.

Continuation on next page

IP ping



The IP ping will start automatically.

During the IP ping, the display shows:

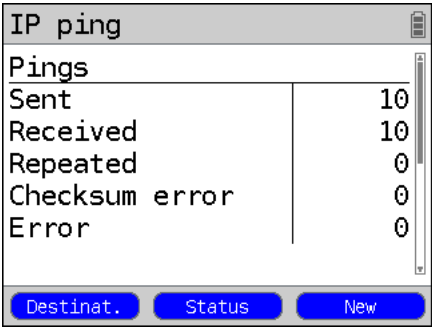
- Number of test packets sent
- The number of packets in reply
- Minimum time in ms
- Maximum time in ms
- Average time in ms

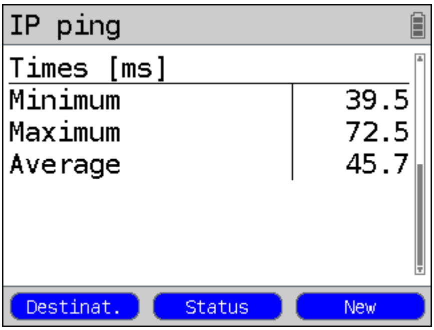
<Destinat.> Displays the URL and IP address.

<Status> Display the Status screen without stopping the test.

Test Canceled
The ARGUS will display the results collected thus far and will inquire whether to save them (see page 156).

IP ping results





Continuation on next page

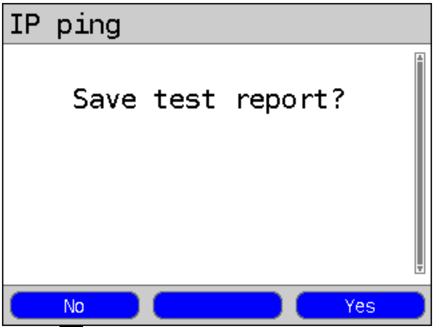
After the test has run, the ARGUS will display the results:

- Number of packets sent
- Number of packets received
- Number of packets sent again
- Checksum error
- Faulty packets received
- Minimum packet round-trip delay in ms
- Maximum packet round-trip delay in ms
- Average packet round-trip delay in ms

<Destinat.> Displays the URL and IP address.

<Status> Display the Status screen without stopping the test.

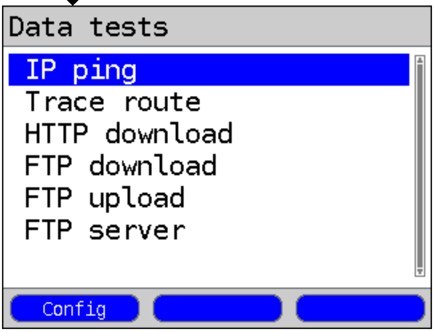
<New> Start a new IP ping test



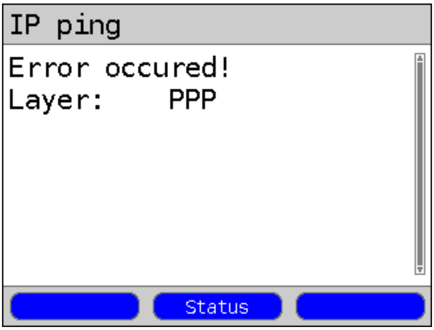
<Yes> The ARGUS will save the result of the IP ping test in the first available memory location in the internal memory (see page 361).

<No> The ARGUS will discard the results and return to the previous selection menu.

"Sending the Trace file to a PC", see page 126.



A new test can be started if required. The xDSL connection and the service are still setup (to clear the connection down, press **<Stop>** in the status display).



IP ping – Error messages

If an error occurs, the ARGUS will display an error message.

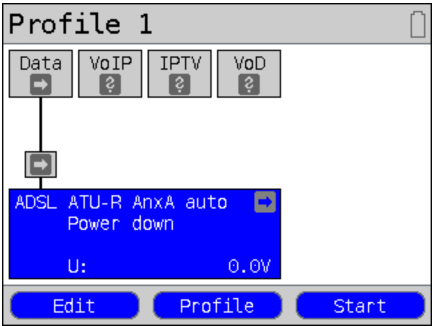
<Status> Displays the Status screen.

For a description of the error messages, please see the appendix, page 388 et seq.

16.2 Trace Route

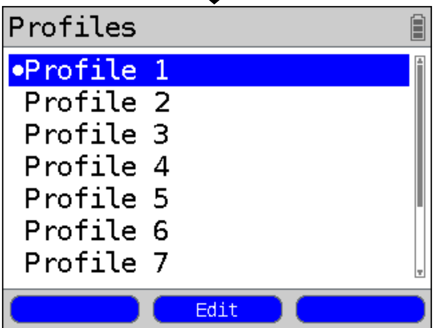
In an IP Trace route test, the ARGUS sends test packets and then displays a list of all of the network nodes (hops) and their response times on the way to the destination address. This information can then be used to precisely locate delays in the network.
The following parameters (which are stored in the profile) are required for the IP Trace route test:

Protocol-independent parameters:



ARGUS - Status screen

<Edit>	Setting the ADSL parameters.
<Profile>	Profile settings are like those for ADSL, see page 34.
<Start>	Start physical layer



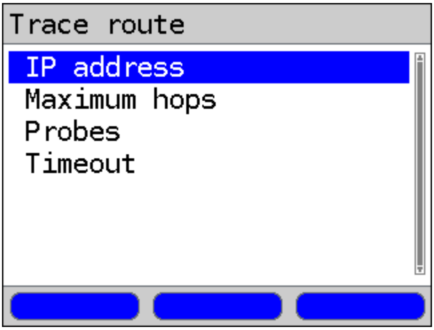
Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the Trace route test.

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

Test parameters

Trace route

Continuation on next page

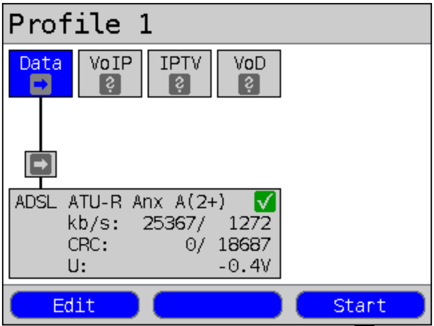


Edit the marked
parameters if necessary

Setting	Explanation
Test parameters:	
Trace route:	
IP address	The IP address of the destination node can be entered as an IP number or as a name (URL) (for instructions, see IP Ping / IP address on page 152). Default setting: ***www.argus.info***
Maximum hops	This sets the maximum number of hops that will be taken in the path to the destination node. Range: 1 to 25 Default setting: ***25***
Probes	This sets the number of attempts that will be made to get a response from a network node. Range: 1 to 10 Default setting: ***3***
Timeout	This sets the maximum amount of time that the ARGUS will wait for a response from a network node. Range: 0.05 to 9.9 seconds Default setting: ***3 seconds***

Start Trace Route

(In the example: Access mode ATU-R, already active)

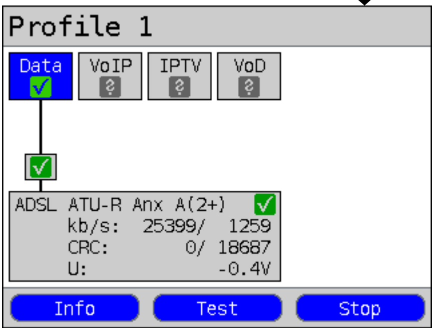


Set up the service.

The profile shown on the display will be used for the Trace route test (in this example, Profile 1).

<Edit> Assign a Virtual Line to the Data service.

If no xDSL or Ethernet connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



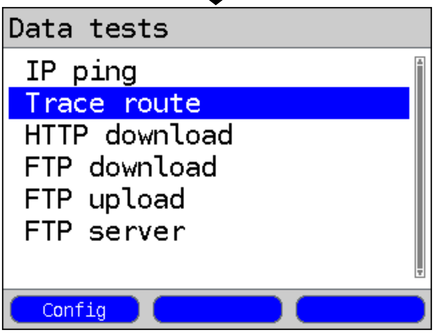
The Data service and ADSL connection are active.

<Info> Duration of the activation

<Test> Open test selection

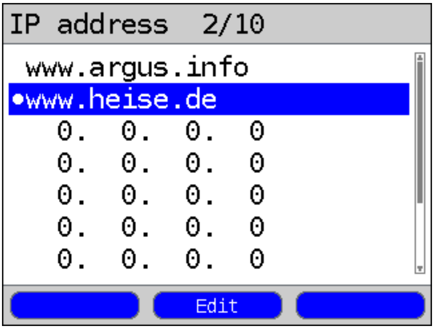
<Stop> Deactivate service

e.g. select Trace route



<Config> Change the Trace route parameters, see page 157.

Continuation on next page



The ARGUS displays the IP address or URL stored in the profile.

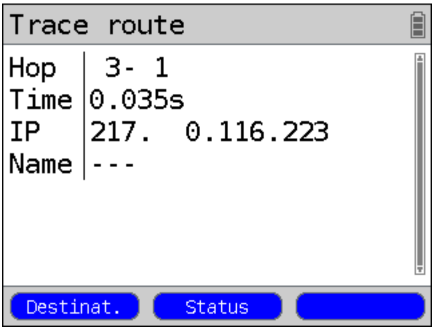
Select the address to use for the Trace route test; the default address is marked with an ●.

<Edit> Open the address to be edited, for more information, see page 151.

In this example, a Trace route is being run on a line with IP version IPv4. The test would be run in a similar manner on a line with IPv6.

The Trace route test will start automatically.

Trace route



During the Trace route test, the display shows:

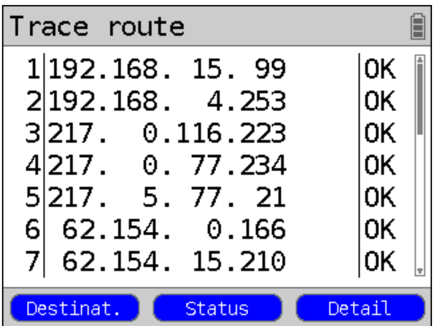
- The current hop and probe (in the example 1 -3: i.e. first hop and 3rd probe)
- Response time of the hop in the current probe (0.035 seconds)
- The IP address of the current hop; in this example, 217.0.116.223

<Destinat.> Displays the URL and IP address.

<Status> Display the Status screen without stopping the test.

Cancel Test
The ARGUS displays the test results determined up to this point and asks whether it should save them.

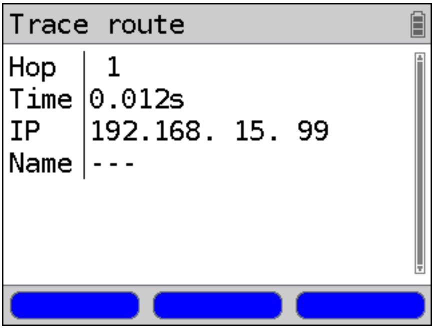
Trace route result

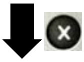


Display after the Trace route has been run:

- All the hops and an OK / FAIL evaluation are displayed.

<Detail> Displays the IP address of the hop as a name (if possible). The details of the hop, which is at the top of the list shown above, will be displayed (in this example, hop 1).





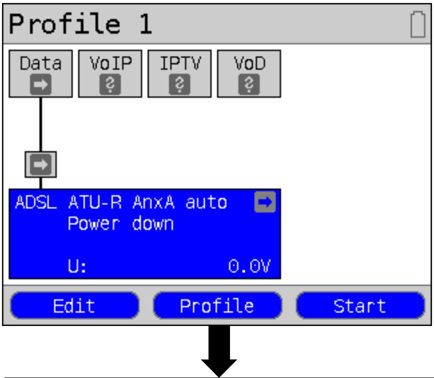
Close the results display.

Save the Trace route results, also see IP ping (seepage 156).
Sending the Trace file to a PC (see page 126).

16.3 HTTP Download

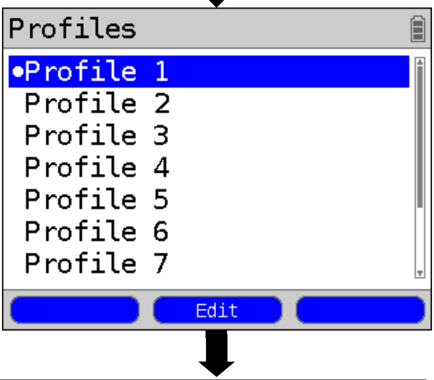
In the HTTP download test, the ARGUS will attempt to download data from a web site or file. The ARGUS will display the current "net download rate", the user data of the IP packets, and once the HTTP download is over the average speed (in the case of multiple download attempts). The following parameters (which are stored in the profile) are required for the HTTP download:

Protocol-independent parameters:



ARGUS - Status screen.

<Edit>	Setting the ADSL parameters.
<Profile>	Profile settings are like those for ADSL, see page 34.
<Start>	Start Physic (physical layer)



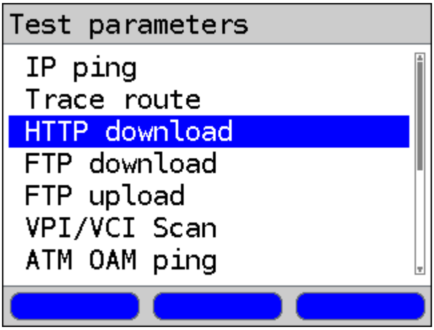
Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the HTTP download test.

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

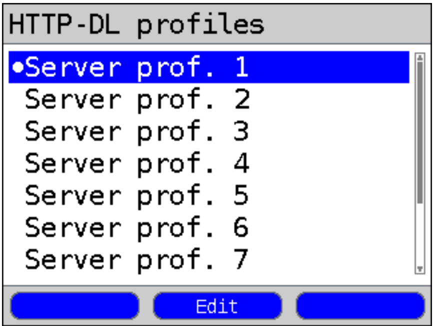
Test parameters

Continuation on next page

⚠ 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 (taking into consideration the access speed). If the test duration is less than 10 seconds, the ARGUS will not show any data rate or time at the end of the test.

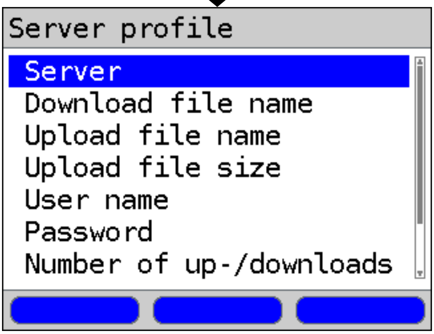


Select HTTP download.



Ten user-defined server profiles are available which will also be used for both the FTP download and upload tests.

Edit the marked server profile.



Edit the marked parameters if necessary

Setting	Explanation
`Test parameters:`	
`HTTP download:`	
`Server profile:`	A total of up to 10 user-defined server profiles can be created. These server profiles will then be available for the HTTP download, FTP download and the FTP upload tests. The profiles hold all of the parameters required for the HTTP download, FTP download and the FTP upload.
`Server`	Enter the IP address or URL of the server from which the ARGUS should download the file. In the case of an Upload test: Enter the upload destination (server address) to which the ARGUS should send the data. For information on the softkeys, see page 151.
`Download filename`	The name of the file that the ARGUS should retrieve in the download test (HTTP download or FTP download). When entering a www address alias, please see page 165) For information on the softkeys, see page 151.
`Upload file-name`	The filename under which the data – sent in the FTP upload test – should be saved on the server. Default setting: ***file***
`Upload file size`	Sets the size of the file that the ARGUS will send in the FTP upload test. Range: 0 to 999 999 999 bytes Default setting: ***1 000 000 bytes***
`User name`	Entry of the user name for the (FTP or HTTP) server. For more information on the operation, see page 151.
`Password`	Entry of the password for the (FTP or HTTP) server. For more information on the operation, see page 151.
`Number of up-/ downloads`	The number of times that the ARGUS will retrieve the data from the source address in a Download test. In the case of an Upload test: This sets how often the ARGUS will send the data of the file to the destination. "Zero“ means continuously. In which case, the test must be terminated manually. Range: 1 to 9 999 (0 = continuous) Default setting: ***3***
`Number of parallel downloads`	The number of packets into which the requested download should be divided and downloaded in parallel (see page 165). Range: 1 to 10 Default setting: ***3***
`Profile name`	Entry of a name for the profile

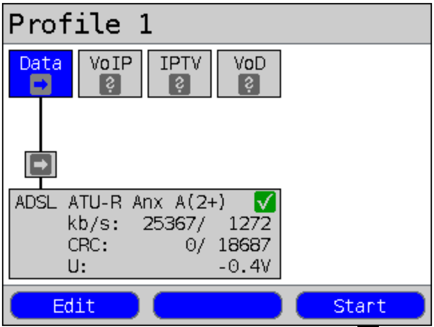
If an alias www address is entered as the "Source/Destination" address, the ARGUS will "only" download the one HTML page during the HTML download test. The ARGUS does not evaluate the HTML code, so any link to a “true” www address will be ignored. In this case, the ARGUS will not display an error message since the “Source/Destination” address specified will have been loaded without error.

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.

Where the name of the file to be downloaded exceeds the maximum permissible length, it is possible to get around this by using the "Server" field for part of the address.
The server name may be up to 80 characters long while the file name may be 60 characters long.

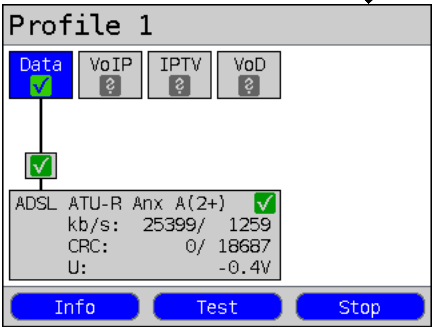
Start HTTP download (in this example: Access mode ATU-R, is already active)



Set up the service.

The profile shown on the display will be used for the HTTP download (in this example, Profile 1).

<Edit> Add a Virtual Line to the Data service.

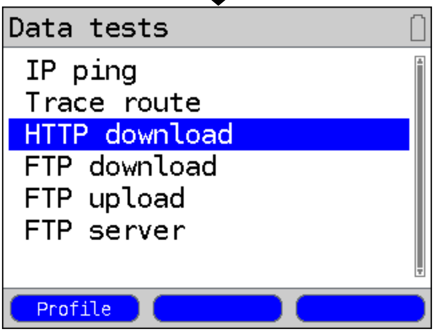


If no connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info> Duration of the activation

<Test> Open test selection

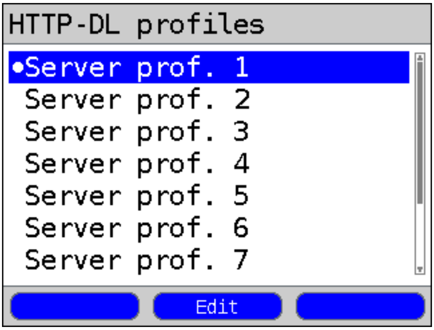
<Stop> Deactivate service



e.g. select HTTP download

<Profile> Display the available HTTP download profiles profile, see page 163.

Continuation on next page

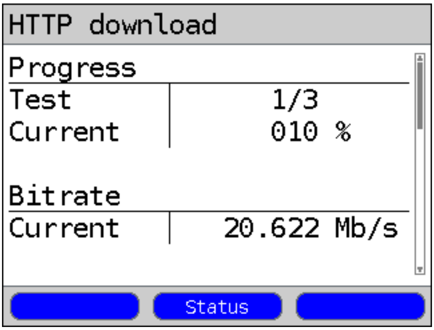


Select the server profile:
(The default is marked with an ●).

<Edit> Edit the marked profile
For information on changing the individual settings, see page 164.

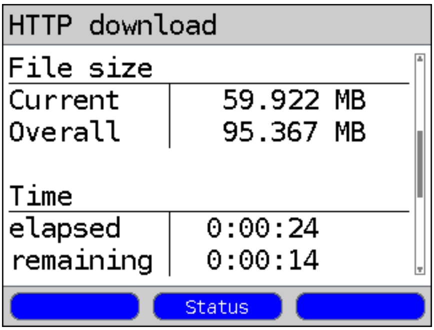
The HTTP download will start automatically.

HTTP download



During the HTTP download, the display shows:

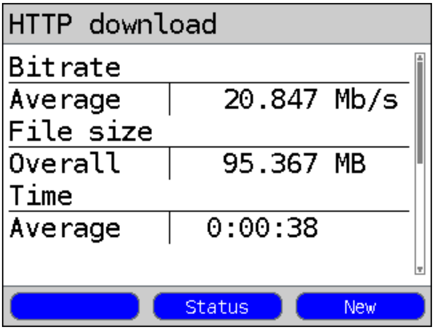
- Current download / Total downloads
  In the example, the first download attempt of a total of three (1/3) is shown.
- The amount of data already loaded (in th^e example, 10%)
- Current net download rate (in the example, 20.662 Mbit/s)
- The number of bytes already loaded (in the example, 59.922 MB)
- Size of the file to be downloaded (in the example, 95.367 MB)
- Current loading time in h:min:s
- Remaining loading time in h:min:s
- Number of parallel downloads



<Status> Display the Status screen without stopping the test.

Cancel the test.

HTTP download results

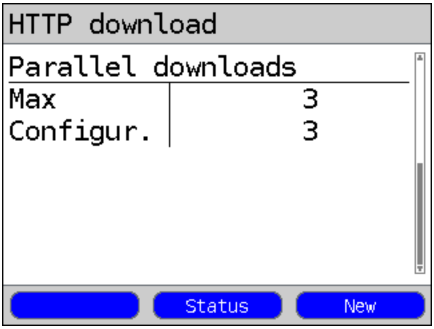


<Status> Display the Status screen

<New> Start a new HTTP download

Display results:

- Calculated average speed of all of the downloads (in the example, 20.847 Mbit/s)
- Size of file loaded (in the example, 95.367 MB)
- Average time required for a download in h:min:s
- Maximum parallel downloads
- Configured parallel downloads



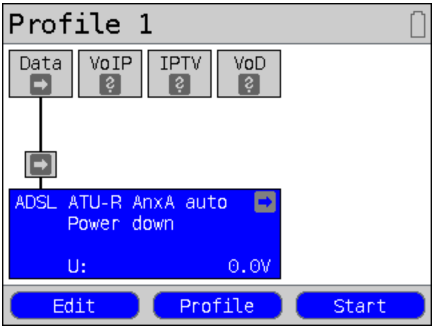
Close the results display

For information on saving the HTTP download results, see page 155.
“Sending the Trace file to a PC”, see page 126.

16.4 FTP Download

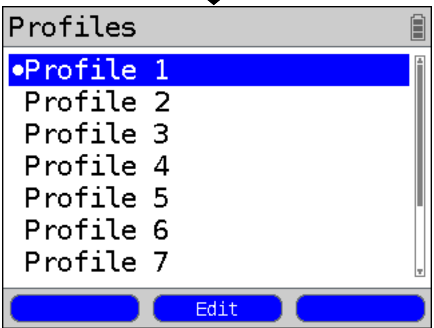
In the FTP download test, the ARGUS will attempt to download a file. The ARGUS will display the current net download rate, the user data of the IP packets, and once the test is over the net average speed (in the case of multiple download attempts). The following parameters (which are stored in the profile) are required for the FTP download:

Protocol-independent parameters:



ARGUS - Status screen.

<Edit>	Setting the ADSL parameters.
<Profile>	Profile settings are like those for ADSL, see page 34.
<Start>	Start Physic (physical layer)



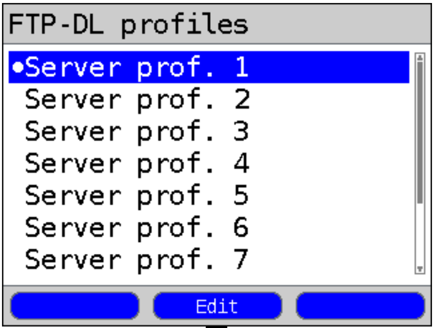
Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the FTP download.

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

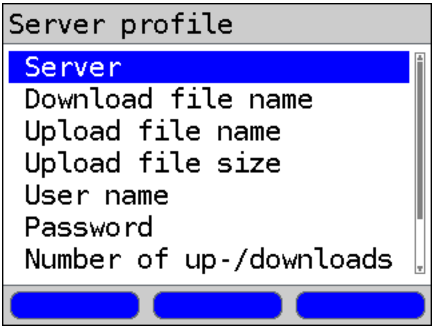
Test parameters

FTP download

Continuation on next page



Ten user-defined server profiles are available which will also be used for both the HTTP download and the FTP download tests.



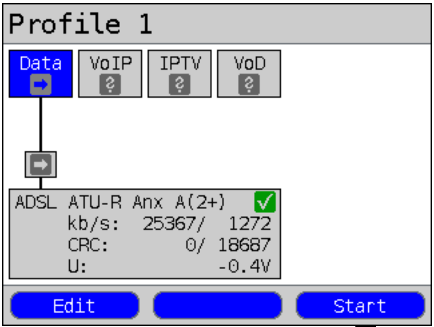
View and edit the marked parameters if necessary

FTP download parameters, see page 164

Server	IP address or URL of the FTP server
Download filename	The path and name of the file to be downloaded in the FTP download test
User name	User name for the FTP server
Password	The password for the FTP server
Number	This sets how often the data at the “Source” address should be downloaded
Profile name	Name of the server profile

⚠ In the case of a download test of less than 10 seconds, it is not possible to accurately determine the transmission speed. Consequently, it is advisable to download as large a file as is reasonable given the speed of the access. If the test duration is less than 10 seconds, the ARGUS will not show any data rate or time at the end of the test.

Start an FTP download (in this example: Access mode ATU-R, is already active)

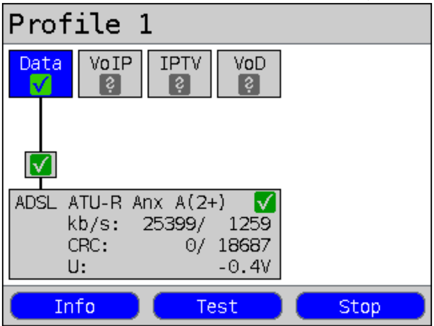


Setup the service

The profile shown on the display will be used for the FTP download (in this example, Profile 1).

<Edit> Add a Virtual Line to the Data service.

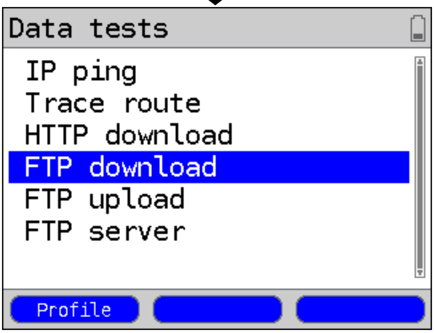
If no connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



<Info> Duration of the activation

<Test> Open test selection

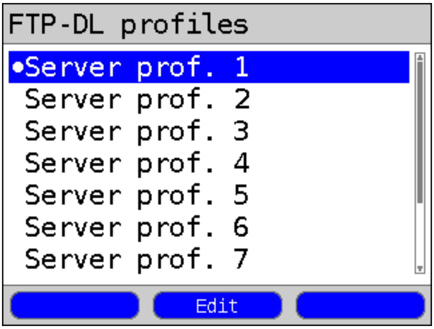
<Stop> Deactivate service



e.g. FTP download

<Profile> Display the available FTP download profiles, see page 170.

Continuation on next page

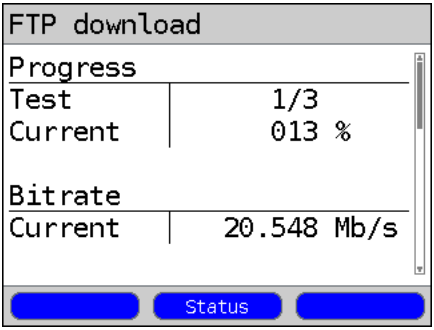


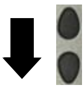
Mark the server profile (the default profile is marked with a ●).

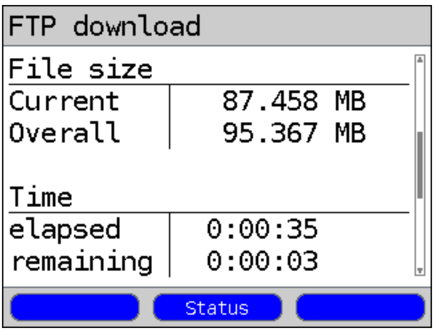
<Edit> Edit the marked profile
For information on changing the individual parameters, see page 164.

The FTP download will start automatically.

FTP download







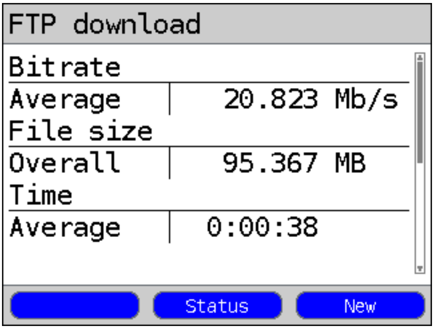
During the FTP download, the display shows:

- Current download / total downloads
  In the example the first download of a total of three (1/3) is shown.
- The amount of data already loaded (in the example, 13%)
- Current net average download rate (in the example, 20.548 Mbit/s)
- The number of bytes already loaded (in the example, 87.458 MB)
- Total size of file to be loaded (in the example, 95.367 MB)
- Current duration of the download in h:min:s
- Remaining loading time
- Number of parallel downloads

<Status> Display the Status screen without stopping the test.

 Cancel the test.

FTP download results

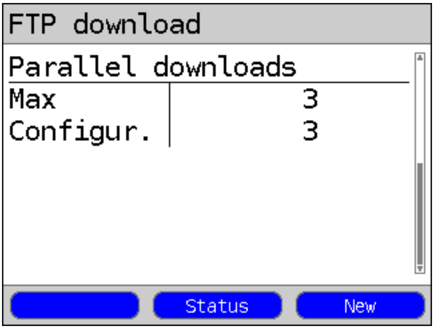


<Status> Display the Status screen.

<New> Start a new FTP download

Display after the FTP download has finished:

- Calculated average speed of all the downloads (in the example, 20.823 Mbit/s)
- Size of file loaded (in the example, 95.367 MB)
- Average time required for a download in h:min:s.
- Maximum parallel downloads
- Configured parallel downloads



Close the results display.

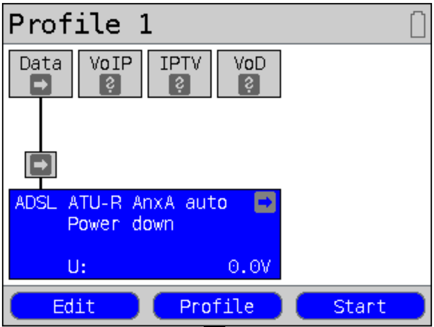
Save the result?

For information on saving the results, see IP ping page 155.
Form more on sending the trace file to a PC, see page 126.

16.5 FTP Upload

In an FTP upload, the ARGUS sends the data in a file to a server. The ARGUS will display the current net upload rate, the user data of the IP packets, and once the test is over the net average speed (in the case of multiple upload attempts). The following parameters (which are stored in the profile) are required for the FTP upload:

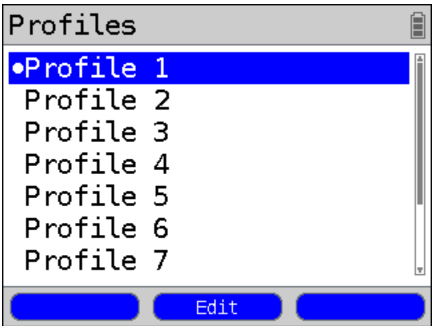
Protocol-independent parameters:



ARGUS - Status screen.

Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the FTP upload.

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



<Edit> Setting the ADSL parameters.

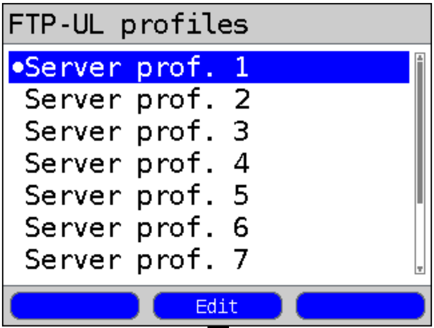
<Profile> Profile settings are like those for ADSL, see page 34.

<Start> Start Physic (physical layer)

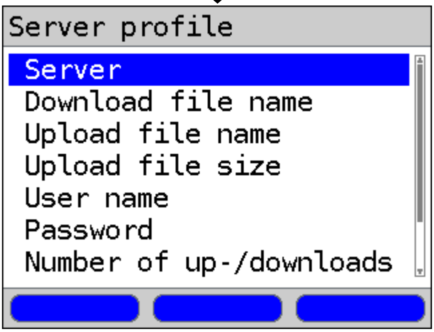
Test parameters

FTP upload

Continuation on next page



Ten user-defined server profiles are available which will also be used for both the HTTP download and the FTP download tests.



View and edit the marked parameters if necessary

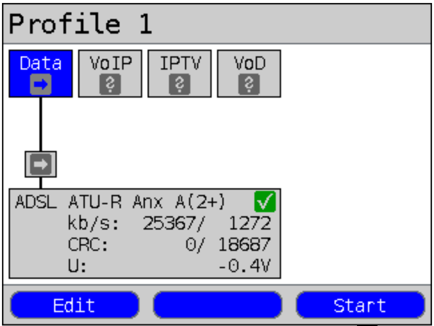
Edit the marked server profile.

FTP upload parameters, seepage 164

Server	IP address or URL of the FTP server
Upload filename	The path and filename under which the file that is sent in the test should be saved on the server.
Upload file size	The size of the file sent
User name	User name for the FTP server
Password	Password for the FTP server
Number	Number of uploads
Profile name	Name of the server profile

⚠ In the case of an upload test of less than 10 seconds, it is not possible to accurately determine the transmission speed. Consequently, it is advisable to upload as large a file as is reasonable to the server given the speed of the access. If the test duration is less than 10 seconds, the ARGUS will not show any data rate or time at the end of the test.

Start FTP upload (in this example: Access mode ATU-R, is already active)

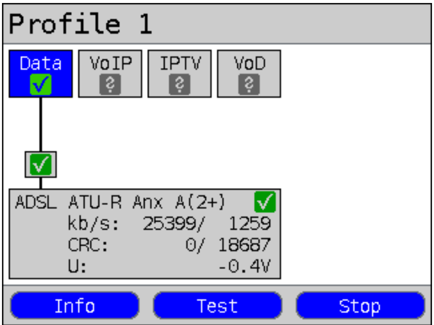


Set up the service.

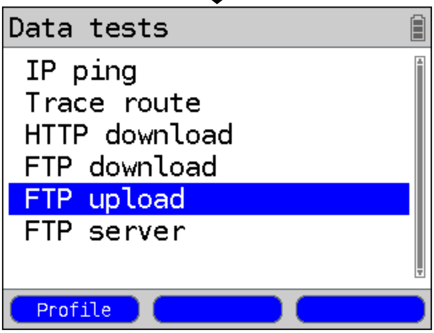
The profile shown on the display will be used for the FTP upload (in this example, Profile 1).

<Edit>	Assign Virtual Lines to the Data service.

If no connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



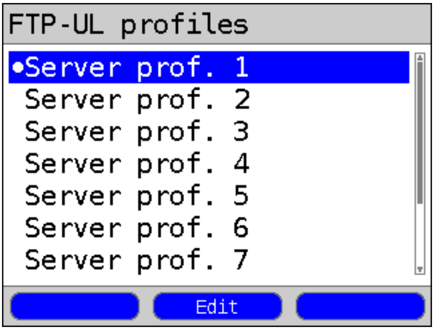
<Info>	Duration of the activation
<Test>	Open test selection
<Stop>	Deactivate service



 e.g. FTP upload

<Profile>	Display the available FTP upload profiles, see page 175.

Continuation on next page 

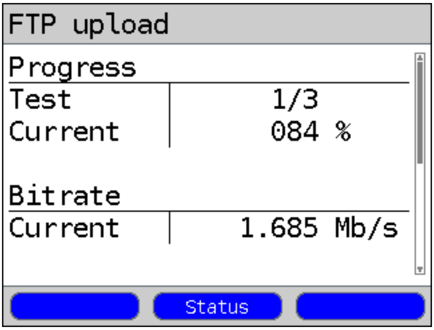


Mark the server profile (the default profile is marked with a ●)

<Edit> Edit the marked profile
For information on changing the individual parameters, see page 164.

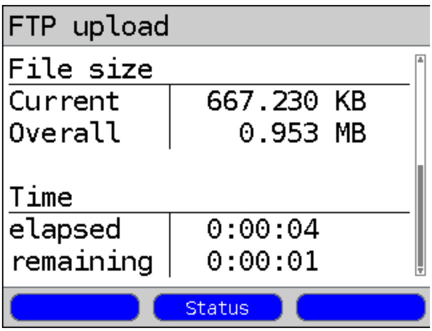
The FTP upload will start automatically.

FTP upload



During the FTP upload, the display shows:

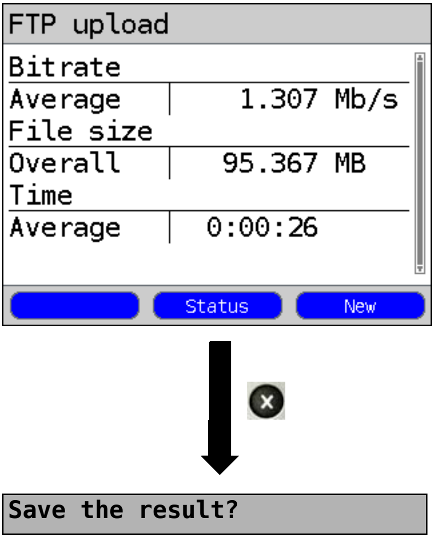
- Current upload / total uploads
  In the example, the first upload of a total of three (1/3) is shown.
- The amount of data already sent (in the example, 84%)
- Current net upload rate (in the example, 1.685 Mbit/s)
- The number of bytes already sent (in the example, 667.230 KB)
- Total file size (in this example, 0.953 MB)
- Current duration of the upload in h:min:s
- Remaining transfer time (sending)



<Status> Display the Status screen without stopping the test.

 Cancel the test.

FTP upload results



Display results:

- Calculated average bitrate of all uploads
- The size of the file sent
- The average time required for an upload

<Status> Display the Status screen

<New> Start a new FTP upload

For information on saving the results, see IP ping page 155.
For more on sending the trace file to a PC, see page 126.

16.6 FTP Server

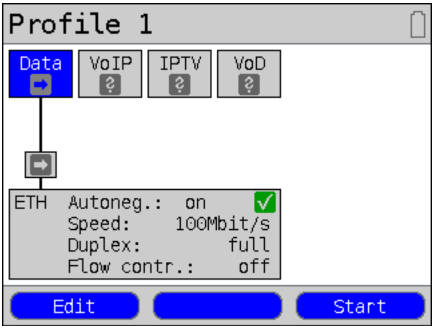
In FTP server mode, the ARGUS acts as a server for FTP requests. In this case, the ARGUS will handle both FTP download and upload requests.
These requests can be sent by a second terminal (e.g. a second ARGUS) on an xDSL or Ethernet connection.
In this manner, it is possible to perform an end-to-end test of the throughput and determine the highest average transfer rate attainable for this connection.

The throughput test is illustrated in the following on an Ethernet interface.
In this example, two ARGUS testers are used. One is used as an FTP server while the second requests an FTP download.

ARGUS 1 - FTP Server

No settings need to be made on the ARGUS that acts as the FTP Server. Simply start the FTP server single test on the selected interface.

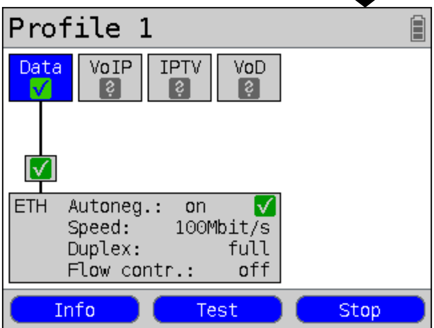
Start FTP Server (in the example: Ethernet is already active)



Set up the service.

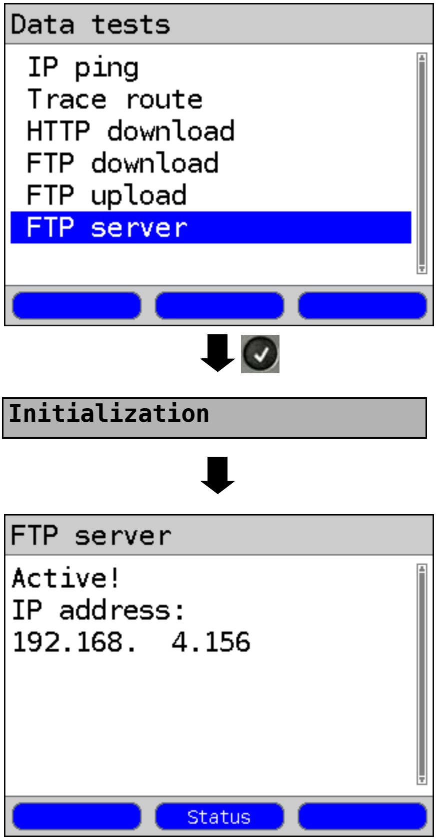
The profile shown on the display (in this example, Profile 1) will be used for the FTP server.

<Edit> Assign a Virtual Line to the Data service.



If no connection has yet been setup, a connection will be setup automatically at this point using the default profile, see page 40.

Continuation on next page



e.g. FTP Server

The ARGUS will use the IP address entered in own "local IP address" as the destination address (Server) for the second ARGUS.

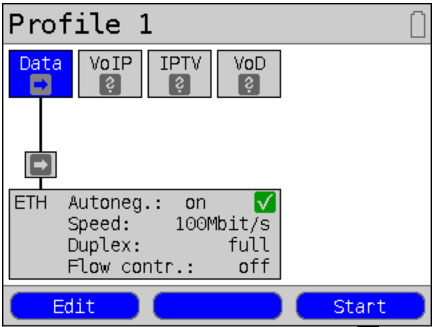
<Status> Display the Status screen without stopping the test.

ARGUS 1 will now wait for an FTP request from a second terminal (in the example, a second ARGUS).
The IP mode in the example is "static", the IP netmask is in the default configuration.

ARGUS 2 - FTP Download / Upload

As far as the ARGUS that will issue the FTP requests (in this example, FTP download) is concerned, basically the same settings can be used as in the case of an FTP download test.
Netmask and local (own) IP address (IP mode: static) should match the settings of ARGUS 1.

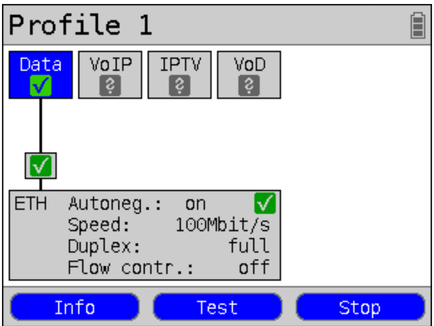
Start an FTP Download:



Set up the service.

The profile shown on the display (in this example, Profile 1) will be used for the FTP server.

<Edit> Assign a Virtual Line to the Data service.



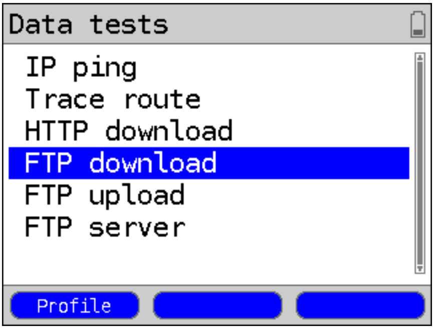
If no connection has yet been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info> Duration of the activation

<Test> Open test selection

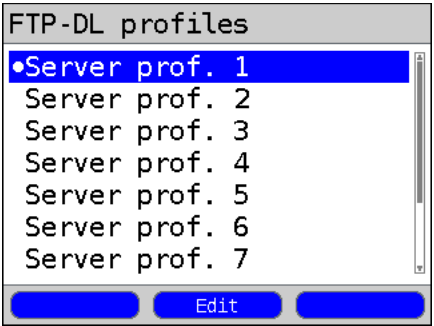
<Stop> Deactivate service

Continuation on next page



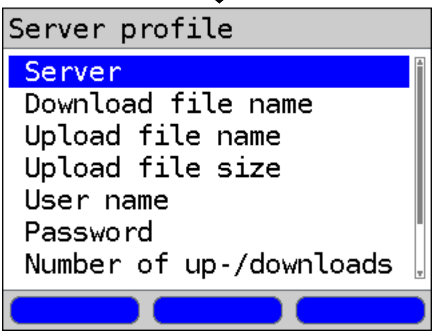
e.g. FTP Download

<Profile> Edit the FTP Download parameters, see page 170.

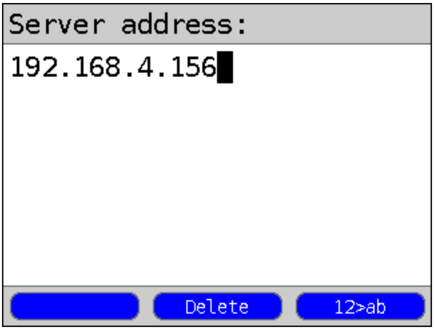


Mark the server profile (the default profile is marked with a ●).

<Edit> Edit the marked profile
For information on changing the individual parameters, see page 164.

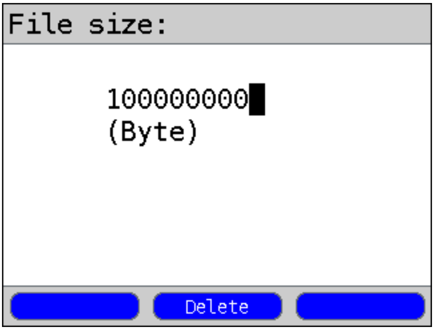


Continuation on next page



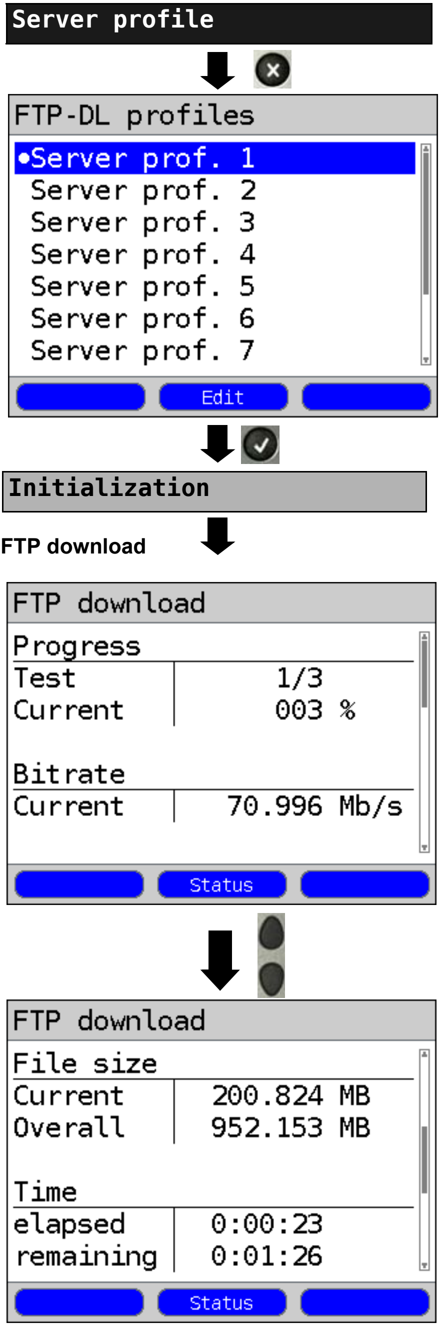
In the server profile of ARGUS 2, just enter the IP address of ARGUS 1 in the Server IP address, see page 180.

<Delete>	Delete the character before the cursor
<12>ab>	see page 123



Here the download file name is, at the same time, the size of the file to be downloaded.
The download file name: 1 000 000 000 equals a file size of: 1 GB

⚠ In the case of a download test of less than 10 seconds, it is not possible to accurately determine the transmission speed. Consequently, it is advisable to upload as large a file as is reasonable to the server given the speed of the access. If the test duration is less than 10 seconds, the ARGUS will not show any data rate or time at the end of the test.



<Edit> Edit the marked profile
For information on changing the individual parameters, see page 164.

The FTP download will start automatically.

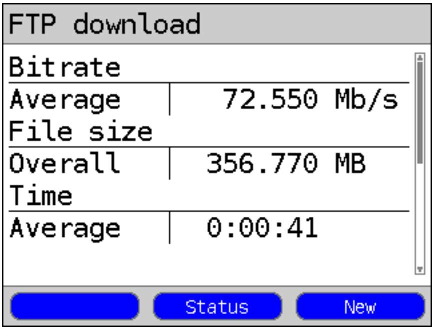
During the FTP download, the display shows:

- Current download / total downloads
  In the example the first download of a total of three (1/3) is shown.
- The amount of data already loaded
  (in the example, 3%)
- Current net average download rate
  (in the example, 70.996 Mbit/s)
- The number of bytes already loaded
  (in the example, 200.824 MB)
- Total size of file to be loaded
  (in the example, 952.153 MB)
- Current duration of the download in h:min:s
- Remaining loading time
- Number of parallel downloads

<Status> Display the Status screen without stopping the test.

 Cancel the test.

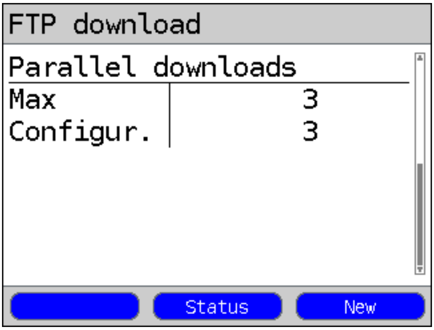
FTP download results



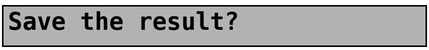
<Status>	Display the Status screen.
<New>	Start a new FTP download

Display after the FTP download has finished:

- The calculated average speed of all the downloads (in this example, 72.550 Mbit/s)
- The size of file loaded (in the example, 356.770 MB)
- Average time required for a download in h:min:s.
- Maximum parallel downloads
- Configured parallel downloads



Close the results display.

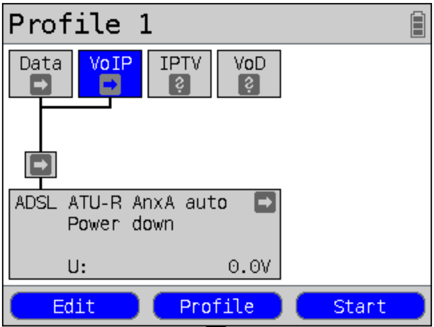


For information on saving the results, see IP ping page 155.
For more on sending the trace file to a PC, see page 126.

17 VoIP Tests

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. VoIP calls can be set up with or without a registrar or proxy. The ARGUS can be used to setup a VoIP connection (DSL telephony) via xDSL or Ethernet. The MOS/R-factor of the RTP data stream will determined and displayed as an evaluation of the voice quality.
Three "VoIP accounts (Profiles)" can be configured for use in VoIP telephony:

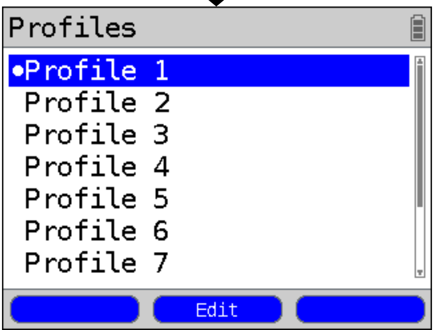
Protocol-independent parameters:



ARGUS - Status screen.

Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the VoIP test.

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



Access parameters

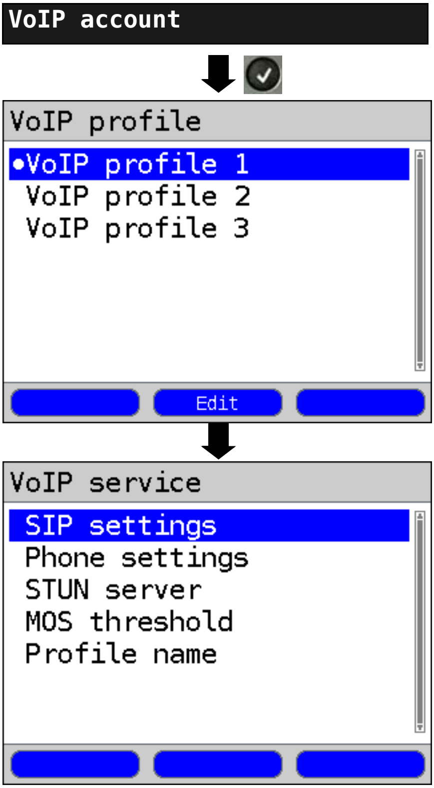
Service VoIP

Continuation on next page

`<Edit>` Assign a Virtual Line to the VoIP service.

`<Profile>` Profile settings are like those for ADSL, see page 34.

`<Start>` Start service



A total of 3 user-defined VoIP profiles can be configured.

<Edit> Edit the VoIP profile.

Edit the marked profile.

Edit the marked parameters if necessary

Setting	Explanation	
VoIP account settings:		
VoIP:	Up to 3 user-defined VoIP profiles can be created. **<Edit>** The selected profile will be opened for editing.	
SIP	User name	User name for the registrar, for more information, see page 123.
	Password	Password for the registrar, for more information, see page 123.
	Registrar Server	Use Registrar: Setting: yes or no. A registrar must also be used if an Internet Telephony Service Provider (ITSP) is used (in such case, you will dial a normal telephone number). A registrar is not needed if you dial a VoIP telephone directly, e.g. via its IP address or the SIP URI. Default setting: ***No***
	Outbound Proxy/SBC	Use proxy (SBC = Session Border Controller) This setting specifies whether or not to use outbound proxy. Default setting: ***No*** Outbound Proxy/SBC: Address of the 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 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 188), 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 more information, see page 123

SIP (Continuation)	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 123.
	User agent	ID-string or terminal type which will be sent to the called party. Default setting: ***Argus145plus***
	Qualify	Specifies whether or not the proxy server's availability should be checked continuously. Default setting: ***No***
	Reg. Expire	Specifies how long a registration with the registrar server is valid. Range: 10 to 6000 seconds Default: ***3600 seconds***
	Del. exist. registrar	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***
Phone Settings	RTP port range	The SIP signaling and RTP data will be sent to different ports. The port range used for RTP can be configured for use e.g. with a router. Range: 0 to 65535 Default: Start: ***10000*** End: ***20000***
	Silence detection	If this is set to "ON", the ARGUS will not send speech packets when there is silence (a break in the speech). This can, however, lead to problems with the assignment of ports if there is a NAT router in the path. If this setting is set to "not used", the (remote) link partner will not be notified as to "silence detection" setting. The setting will, however, remain. Default setting: ***Off***

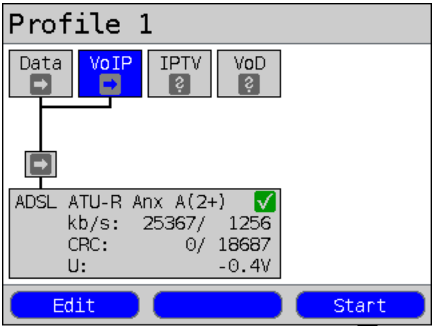
Phone Settings (Continuation)	Jitter buffer	Sets whether the size of the jitter buffer is static or adaptive. Default setting: ***static***	
		static:	Entry of the size of the static jitter buffer Range: 20 to 200 ms nominal: ***60 ms***
		adaptive:	Entry of the minimum (min) and maximum (max) sizes of the jitter buffer and the initial value (init). Range: 20 to 600 ms Default setting: min: ***60 ms*** init: ***60 ms*** max: ***120 ms***
	Codecs	Preparation of a list of voice codecs to be used. If there are multiple codecs in the list, the priority is determined by the order in the list.	
			Switch between softkey sets
		<↓>	The marked codec will be moved down one place in the list.
		<↑>	The marked codec will be moved up one place in the list.
		<Insert>	A display of the still available voice codecs will open. If a voice codec is marked with a  in this Codec Selection list, it will be added to the Codec Priority list (in the active list of voice codecs)
		<Delete>	Delete the marked codec from the list
			Apply the codec priorities

<table>
<tr><td>Phone Settings
(Continuation)</td><td>DTMF Settings</td><td>DTMF (Dual-tone multi-frequency) is a multi-frequency dialling mode.Mode:
DTMF mode settings
Choose one of the following settings "automatic", "SIP Info", "RFC 2833" or "inband".
Default setting: automatic
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.</td></tr>
<tr><td rowspan="2">STUN server</td><td>Use STUN</td><td>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 for it (the ARGUS) by the other end.Default setting: No</td></tr>
<tr><td>STUN server</td><td>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.</td></tr>
<tr><td>MOS threshold</td><td colspan="2">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 MOS threshold value and will display "OK" - if the current MOS value is at least as good as the MOS threshold value - or "FAIL" - if it is not.
Range: 1.0 to 5.0
Default: 4.0
<table>
<tr><td>Value</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>Voice quality</td><td>excellent</td><td>good</td><td>fair</td><td>poor</td><td>bad</td></tr>
</table>
The MOS value determined here is the MOS_{CQE} (Conversational Quality Estimated). This value can be strongly influenced by the codec used.</td></tr>
<tr><td>Profile name</td><td colspan="2">Enter or change the name of the edited VoIP profile</td></tr>
</table>

VoIP QoS (Quality of Service)		
Layer 3 DiffServ	Differentiated Services: Classification/Prioritization of IP packets (L3)	
RTP (ToS/DSCP)	ToS	Type of Service Field used to set the prioritization in the IP header of the user data (RTP), for more infomation, see page 152. Range: 0 to 0xFF Default setting: ***18***
	DCSP	Differentiated Services Codepoint Field used to set the prioritization in the DS field (6 bits) of the user data (RTP), for more information, see page 152. Range: 0 to 0x3F Default setting: ***00***
SIP (ToS/DSCP)	ToS	Type of Service Field used to set the prioritization in the IP header of the SIP data (signaling), for more information, see page 152. Range: 0 to 0xFF Default setting: ***18***
	DCSP	Differentiated Services Codepoint Field used to set the prioritization in the DS field (bits) of the SIP data (signaling), for more information, see. page 152. Range: 0 to 0x3F Default setting: ***00***
Layer 2 VLAN prio	The VLAN prioritization on Layer 2 (L2) is an extension of the Ethernet header.	
RTP VLAN prio	VLAN prioritization of user data (RTP). Range: 0 to 7 Default setting: ***0***	
SIP VLAN prio	VLAN prioritization of SIP data (signaling). Range: 0 to 7 Default setting: ***0***	

17.1 Start VoIP Telephony

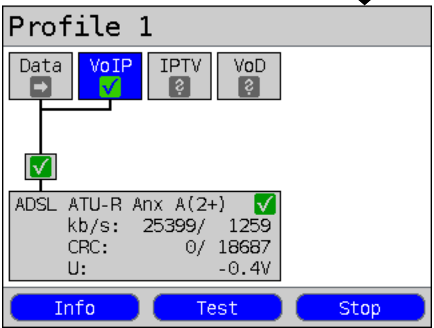
(Example: ADSL access already active)



Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for VoIP telephony.

<Edit> The default Virtual Line profile will be opened for editing.

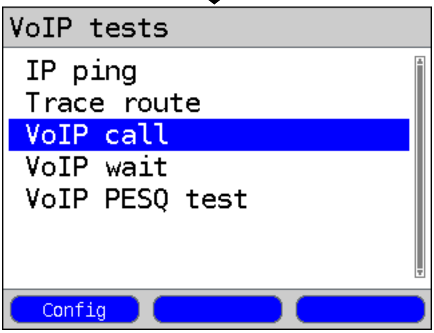


If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info> Duration of the activation

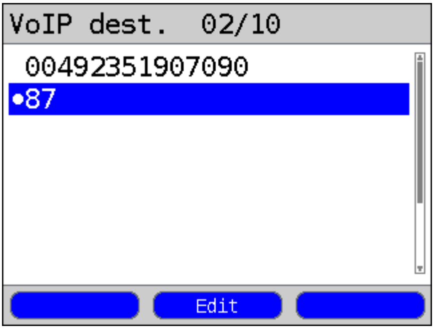
<Test> Open test selection

<Stop> Deactivate service



e.g. select VoIP call

Continuation on next page

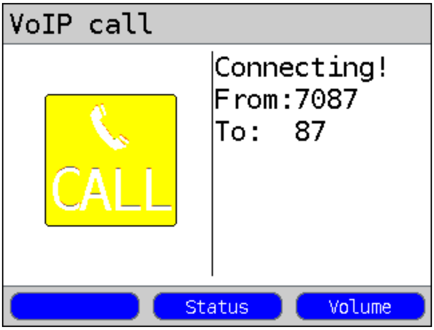


Mark VoIP destination
(default is marked with a ●).

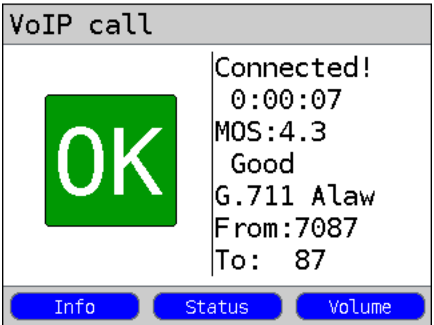
Move the cursor down to select an empty line and add a new VoIP destination using **<Edit>**.

<Edit>	Open the VoIP destination number for editing

Set up a connection



The ARGUS will display its "own call number" (From: 7087) and the subscriber number called (To: 87). The subscriber called has not yet accepted the call: display shows "Connecting!" and a yellow "CALL" icon.

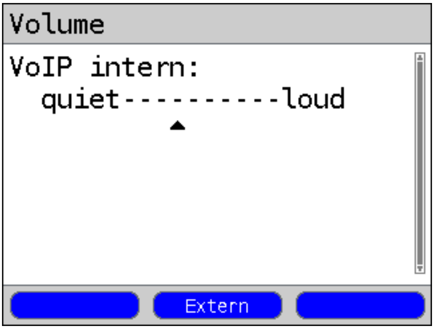


Continuation on next page

Continuation on next page, second screenshot.

The subscriber called has accepted the call; the display shows “Connected!”. The ARGUS will determine the MOS value and will indicate whether the speech quality meets or exceeds the MOS threshold set (see page 191) - i.e. will display "OK" or "Fail". The ARGUS will also show the evaluation of the MOS value in accordance with ITU-T P.800 (in this example, "Good"). Furthermore, it will display the duration of the connection and the currently used voice codec (in this example, G.711 A-law, see page 190).

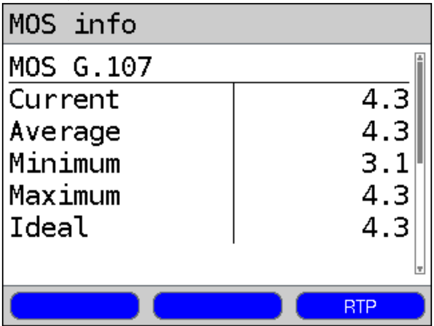
<Info>	Display of the VoIP parameters.
<Status>	Display the Status screen without stopping the test; see page 196.
<Volume>	Opens the volume setting.



Setting the volume:

<Extern>	Headset operation
<Intern>	Handset operation
<OK>	Settings confirmed

<Info>

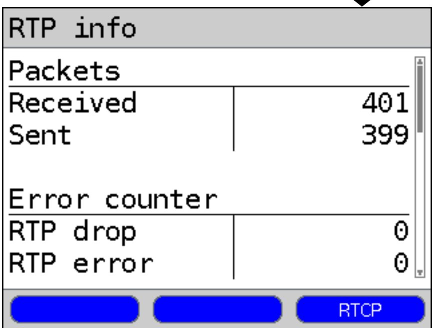


Display MOS info:

- Current MOS
- Average MOS
- Min./max. MOS value
- Ideal MOS (MOS possible without
- interference, depends on Codec)
  Current and average
- R-Factor in accordance with ITU-T G.107

Return to the previous display.

Display of the other VoIP results:

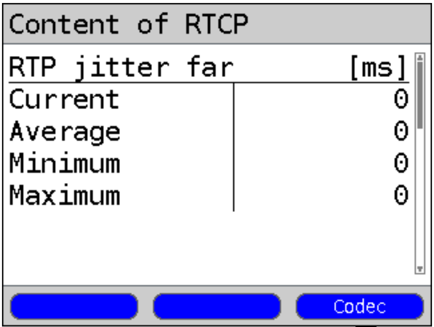


Packet statistics:

- Packets received (Rx)
- Packets sent (Tx)
- Error counters:
  RTP drop
  RTP error
- RTP jitter Rx:
  Current jitter
  Average jitter
  Minimum jitter
  Maximum jitter
- RTP packets lost (Rx)
  (total, current, average, min. and max.)

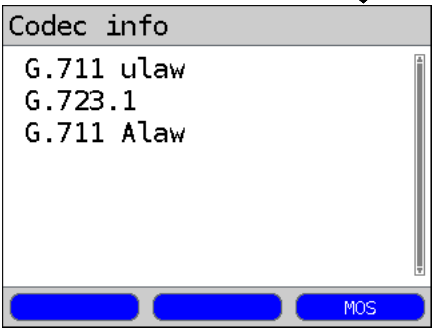
Return to "outgoing call"

Continuation on next page



Content of RTCP
Display of the statistics sent by the link partner:
- Current jitter at the link partner (remote end) Rx (far)
- Average jitter far (remote end)
- Maximum and minimum jitter at the link partner
- RTP packets lost at the link partner Rx (far): Total, current, average, min. and max.
- Network delay calculated from the RTCP packet transfer time: current, average, min., and max.

If the message "no data" is displayed, RTCP is not supported by the link partner (remote end).



The ARGUS will display the codecs supported by the link partner.

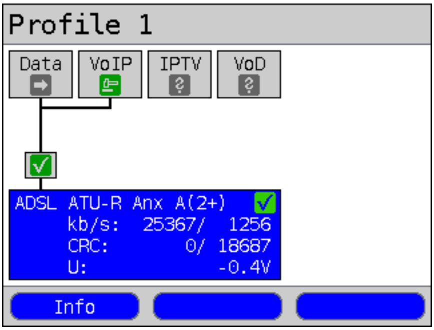
Open the “outgoing call" display

<MOS> Return to the "MOS info" display.

Display the Status screen without stopping the test.

or

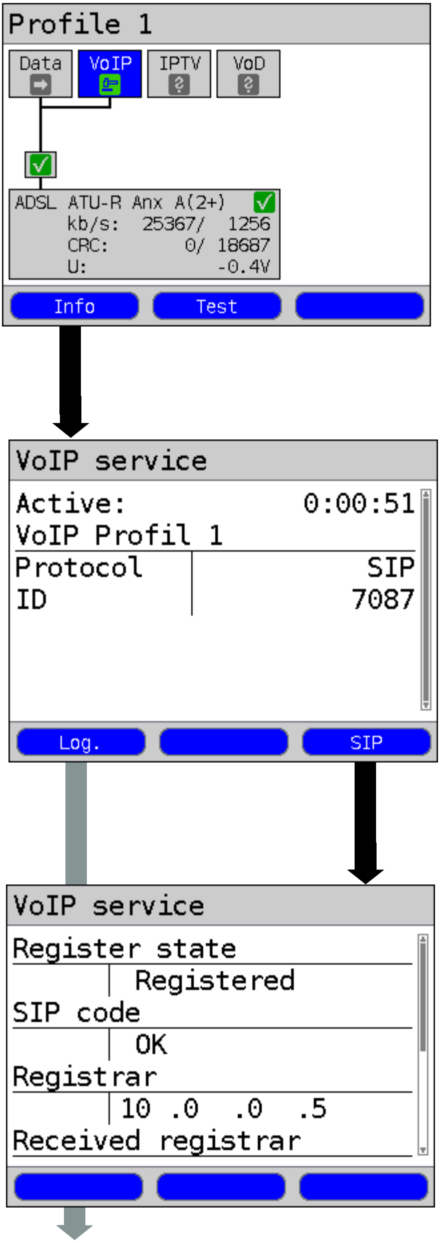
<Status> In ARGUS Status, see page 194.



ARGUS - Status screen.
The VoIP service still has a test active (indicated by the green "hammer" icon).

Use the cursor keys to select VoIP service

Continuation on next page



<Test> Display the results summary

<Info> or Display the VoIP call parameters.

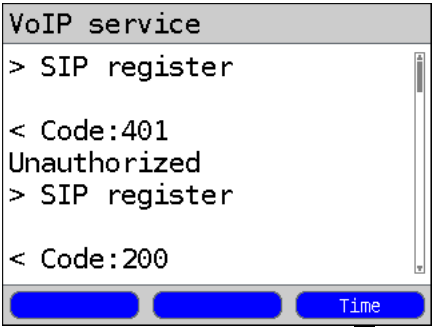
The ARGUS will display how long the VoIP service has been active, as well as the user name and protocol used.

<SIP> Display the registration details: Status codes, register IP, register used, Outbound Proxy/SBC and URI used etc.

<Log.> Displays the VoIP service SIP commands, see page 198.

The ARGUS shows the registration details before, during and after the connection. The setting "Use Registrar" must be set to "yes" for this purpose.

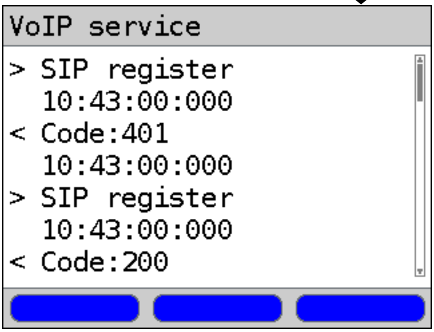
Continuation on next page



The ARGUS will display the VoIP service SIP commands.

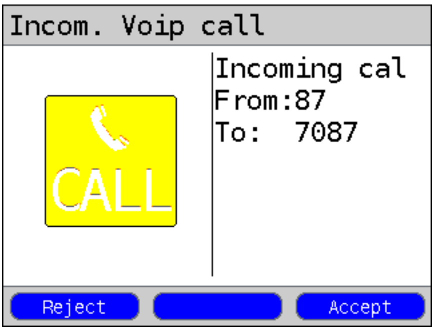
Other info ((see chapter I) VoIP SIP status codes page 395).

<Time> Appends a timestamp to all events.



⚠ The timestamp is based on the internal system clock of the ARGUS, see page 366

Incoming call:



The ARGUS can be called while VoIP service is active. An incoming call will be indicated with yellow Call icon. The incoming call can be accepted or rejected. To have incoming calls accepted automatically, start the "VoIP wait" test, see page 201.

<Reject> Reject call.
Switch to the Status screen.

<Accept> Accept call.
Open the ARGUS-State.

VoIP Features at a Glance

During and after a successful registration:

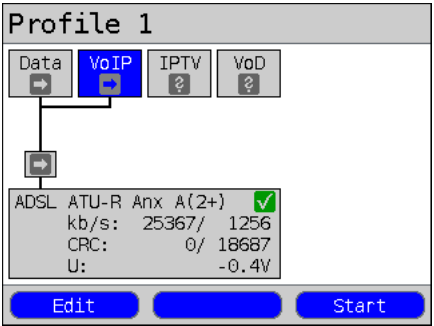
	Display / Meaning
SIP Log	Log showing the SIP methods exchanged and status codes.
Register state	The ARGUS shows all of the important registration and registrar info in the Register state display.

During a call or a connection:

	Display / Meaning
MOS value, Voice codec	Current **MOS value**, current **voice** codec used.
SIP Log:	Log showing the SIP methods exchanged and status codes.
INFO: MOS results:	**Threshold:** Shows whether the value stayed within the preconfigured MOS threshold. **P.800:** Evaluation in accordance with ITU-T P.800 **MOS value:** current/average/min./max. **R factor:** current/average/min./ideal
INFO: RTP results:	**RTP packets:** received / sent **RTP drop:** RTP packets received but discarded by the jitter buffer. **RTP error:** RTP packets received but defective. **RTP jitter Rx:** current / average / min. / max. *(calculated in accordance with RFC 3550 per sec.)* **RTP packet loss Rx:** current / average / minimum / maximum in percent **RTP packet loss total number:** *(RTP packets not 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 percent **RTP packet loss - remote end** **Total number** **Network delay:** current / average / minimum / maximum *(Calculated on the basis of RTCP packets exchanged)*

17.2 VoIP Wait

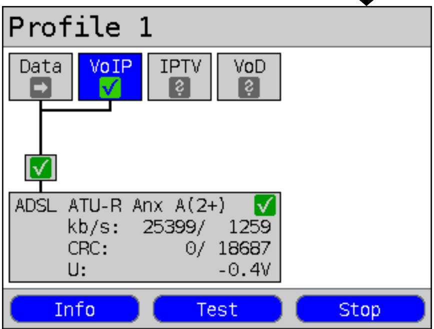
When running the "VoIP Wait" test, the ARGUS behaves like a VoIP telephone.
To run the "VoIP Wait" test, the parameters for "VoIP call" (see page page 188) and "VoIP Wait" must be configured:



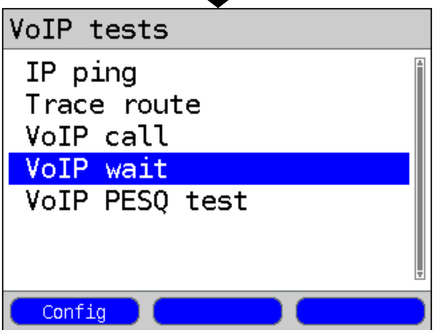
Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for "VoIP wait".

<Edit> The default (preset) Virtual Line profile will open for editing.

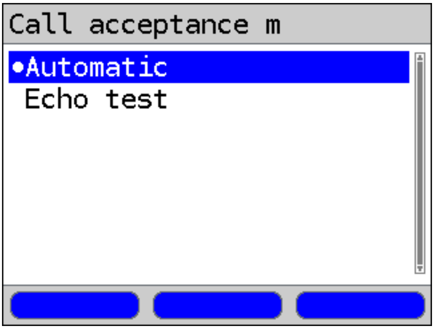


If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



Continuation on next page

<Config> Opens the call accept mode for "VoIP wait".



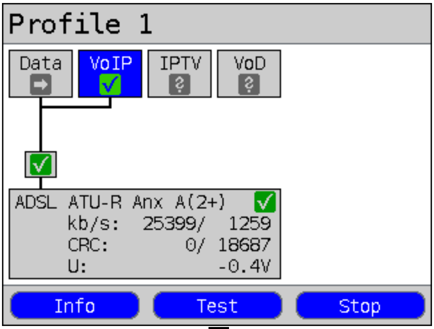
The "VoIP wait" test supports

- Automatic
- Echo test

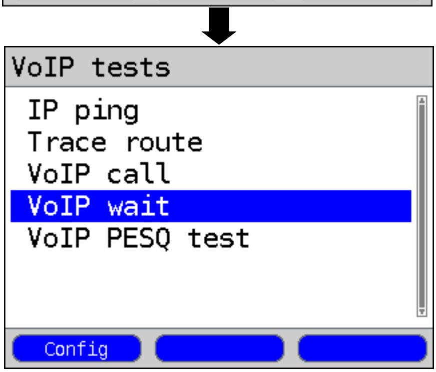
Default setting: ***Automatic***

The ARGUS will use the user name entered under the SIP parameters as its own number, see page 188.

Start VoIP wait.

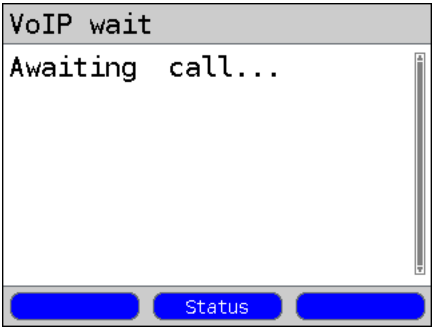


The VoIP service and the ADSL connection are active.



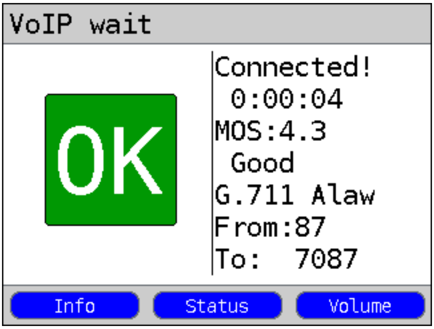
Select "VoIP wait"

Continuation on next page



The ARGUS will wait for a VoIP call.

<Status> Open ARGUS Status, see page 194.



The ARGUS will accept the call (see setting page 201) automatically.

The call (connection) parameters are explained in the section on VoIP calls, see page 194 et seq..

Call clearing:

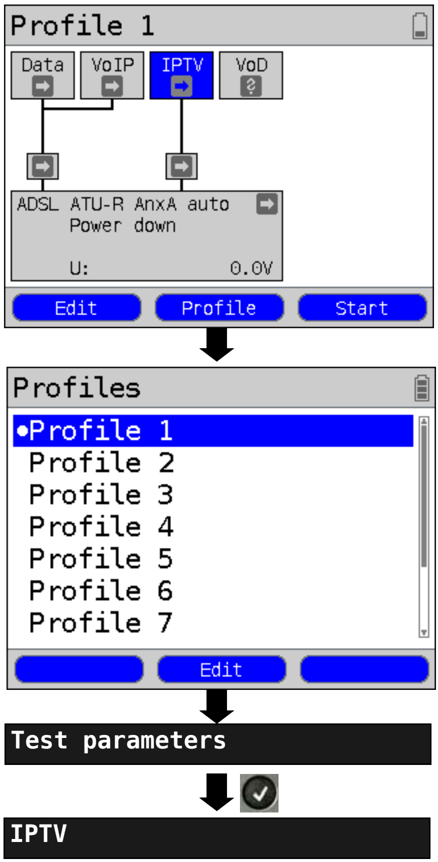
⚠ The connection is cleared down in the same manner as it is after an IP ping. However, pressing the "Cancel" key once will only clear down the connection (if there is one). The ARGUS will remain registered with the registrar (VoIP service active) so the ARGUS can still be called (an incoming call can be rejected or accepted). Deactivate the VoIP service to clear the registration with the registrar. In this case, the existing connection will, however, not be cleared down.

18 IPTV Tests

18.1 IPTV

The ARGUS requests a data stream from a server (Depending on the type of access, the ARGUS will substitute for a settop-box (STB) or modem and STB) and checks the regularity of the incoming packets, the loss of packets and the programme's switch on or zapping time. Up to three user-defined "IPTV Profiles“ can be configured (when the xDSL connection has already been setup the access parameters, e.g. the ADSL mode and the target value are locked):

Protocol-independent parameters:



Continuation on next page

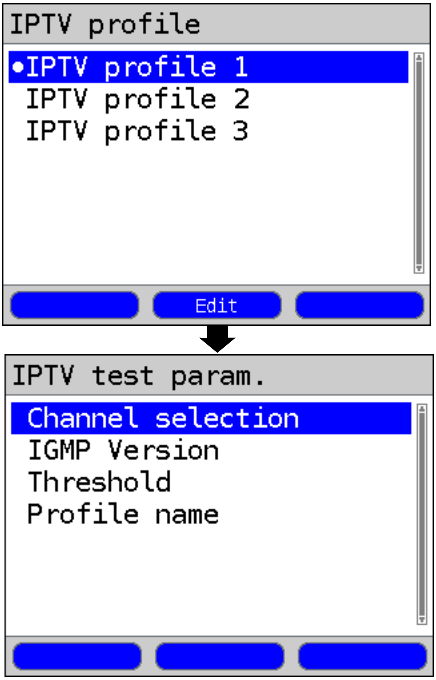
ARGUS - Status screen.

The IPTV-STB emulation is performed using the "IPTV" service.
The following example shows the procedure and considers its special aspects.

`<Edit>`	Assign Virtual LinesVirtual Lines to the IPTV service.
`<Profile>`	Profile settings are like those for ADSL, see page 34.
`<Start>`	Start service

Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the IPTV test.

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



A total of 3 user-defined IPTV profiles can be configured.

Edit marked IPTV profile

View and edit the marked parameters if necessary 

Setting	Explanation
`Test parameters:`	
`IPTV:`	Up to 3 user-defined IPTV profiles can be created. **`<Edit>`** The selected profile will be opened for editing.
`Channel selection`	The channel list can be used and edited for all profiles. Up to 250 channels can be created. A configuration can also be conveniently prepared using the WINplus/WINanalyse software on a PC. Selection of the TV test channels for the IPTV test: **`<Edit>`** The channel is opened for editing.
`Multicast IP`	Entry of the multicast IP. Range: 0.0.0.0 to 255.255.255.255 Default setting: ***224.0.0.0***

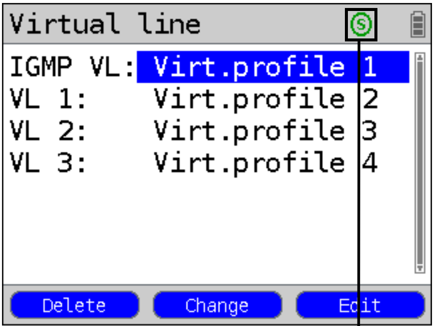
`Port`	Entry of the port Range: 0 to 65535 Default setting: ***0***
`Alias name`	Entry of a station name for the IPTV channel
`IGMP version`	Version of the management protocol to log on/off of a multicast group. Range: 2 to 3 Default setting: ***3***
`Threshold`	Setting of the threshold values for the IPTV test. If these values are exceeded during the IPTV test, the test will display the assessment "FAIL"; otherwise "OK" will be displayed. If an "*" is entered, the corresponding threshold will not be checked.
`IGMP latency`	Setting of the latency threshold value (the delay in starting the programm). Range: 0 to 25 000 ms Default setting: ***500 ms***
`Sync error`	Setting of the threshold value for the sync error. Range: 0 to 10 000 Default setting: ***0***
`PCR jitter`	Setting the threshold values for PCR jitter. Range 0 to 2 000 ms Default setting: ***8 ms***
`Error indication`	Setting of the threshold value for the Error indication. Range: 0 to 10 000 Default setting: ***0***
`CC error`	Setting of the threshold value for the CC error. Range: 0 to 10 000 Default setting: ***0***
`CC error ratio`	Setting of the threshold value for the CC error ratio. Range: 0.00% to 100.00% Default setting: ***0.10%***
`Audio bytes`	Setting of the threshold value for the Audio bytes. Range: 0 to 6 553 600 Default setting: ***0***
`Video bytes`	Setting of the threshold value for the Video bytes. Range: 0 to 6 553 600 Default setting: ***0***

RTP jitter	Setting of the threshold value for RTP jitter. Range: 0 to 2 000 ms Default setting: ***100 ms***
RTP sequence error	Setting of the threshold value for the RTP sequence error. Range: 0 to 10 000 Default setting: ***0***
Current RTP loss ratio	Setting of the threshold value for the current RTP loss ratio. Range: 0.00 % to 100.00% Default setting: ***0,00%***
Total RTP loss ratio	Setting of the threshold value for the RTP loss ratio for the entire test. Range: 0.00% to 100.00% Default setting: ***5.00%***
Profile name	Entry of a name for the IPTV profile.

18.1.1 Multiple Virtual Lines

The ARGUS can use up to 4 Virtual Lines for the IPTV service. In this case, the IGMP VL is used for the transport of the IGMP protocol and Virtual Lines 1 to 3 are used to receive the video/audio streams.

The selected Virtual Line Profile in overview.

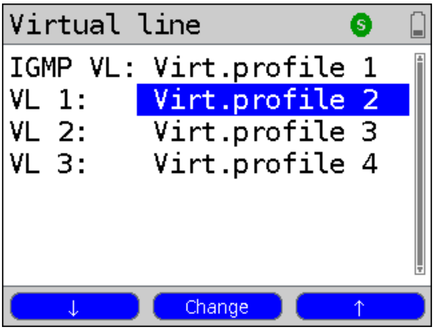


<Delete> Remove the selected virtual profile (in this example, Virt. Profile 1) from the list.

<Change> The selected virtual profile (in this example, Virt. profile 1) will be replaced by the newly selected virtual profile.

<Edit> Edit the selected virtual profile (in this example, Virt. Profile 1), see page 118.

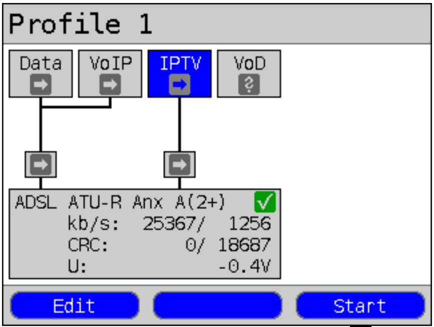
Switch between softkey sets



<↓> The marked profile will be moved down one place in the list.

<↑> The marked profile will be moved up one place in the list.

Start IPTV

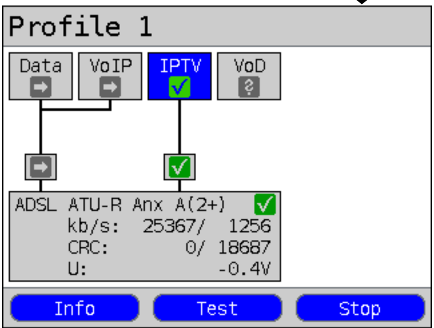


Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for IPTV.

<Edit> Assign a Virtual Line to the IPTV service or edit it.

Activate the IPTV service.

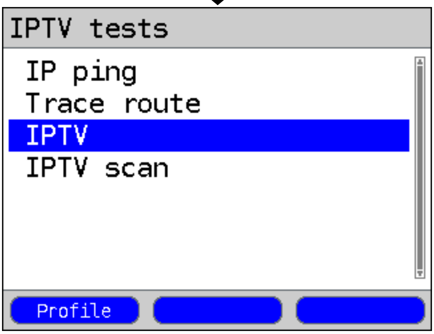


If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info> Duration of the activation

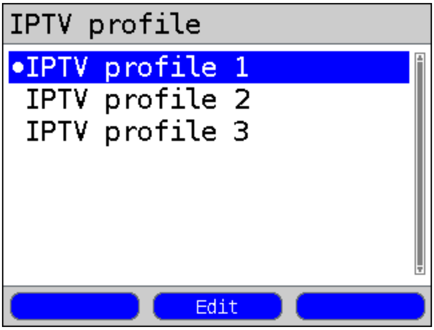
<Test> Open test selection

<Stop> Deactivate service



<Profile> Display the IPTV profile, see page 204.

Continuation on next page

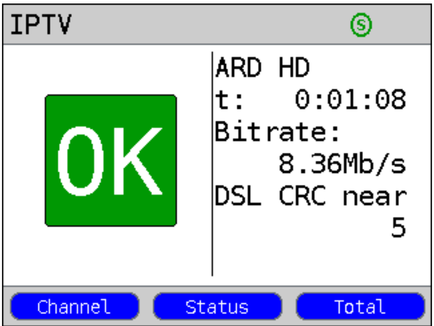


Select the IPTV profile
(the default profile is marked with a ●).

<Edit> Edit the marked profile
For information on changing the individual parameters, see page 204.

The IPTV test will start automatically.

IPTV test



During the test, the ARGUS displays the selected IPTV channel, the duration of the test and the current bitrate. If the measured values exceed the threshold limits in the settings, the ARGUS will report that the IPTV test failed (FAIL); otherwise it will display "OK". The ARGUS will continue to display “FAIL” until the measured value returns to a value less than the limit value once again.

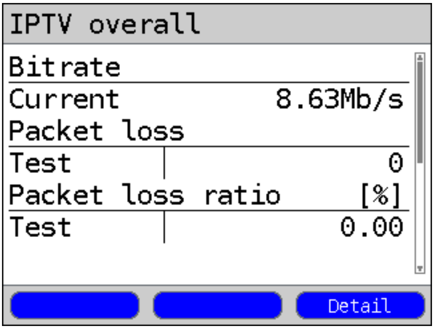
<Channel> Select a new channel

<Status> Display the Status screen without stopping the test.

<Total> Display all of the IPTV statistics.

 Cancel the test.

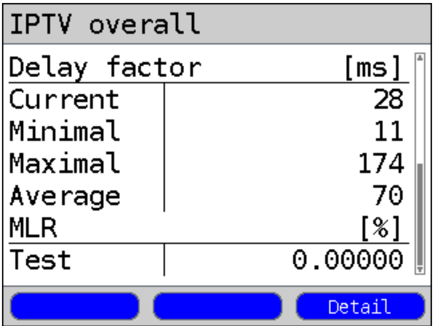
Continuation on next page



Display:

- Current bitrate
- Number of packets lost during the test
- Display the packet loss ratio as a percentage

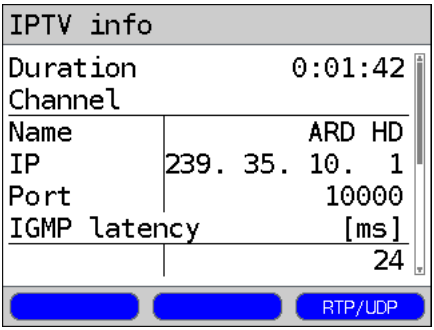
<Detail> Open the IPTV details



Display

(MDI in accordance with RFC 4445):

- Display the current delay factor in ms
- Display the minimum delay factor in ms
- Display the maximum delay factor in ms
- Display the average delay factor in ms
- Display the Media Loss Rate (MLR) as a percentage

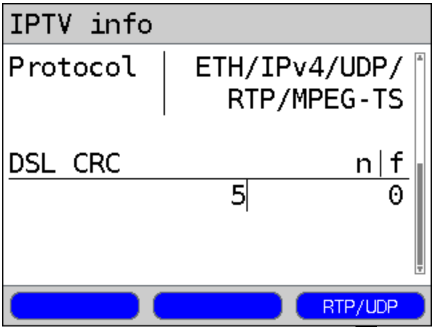


Display:

- Display the test duration
- Display the selected station name
- Display the IP address of the station
- Display the port of the station
- Display the IGMP latency (switch on time of the programme) in ms

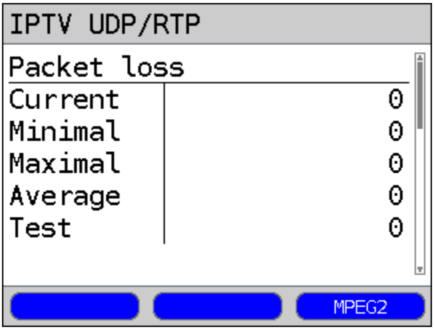
<RTP/UDP> Open the RTP/UDP details, see page 211.

Continuation on next page



Display

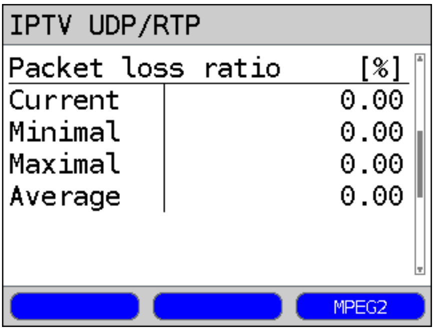
- Display the selected IPTV protocol
- Display the DSL-CRC error counter (not on Ethernet), see page 43.



Display:

- Number of packets currently lost
- Minimum number of packets lost
- Maximum number of packets lost
- Average number of packets lost
- Total number of packets lost during the test

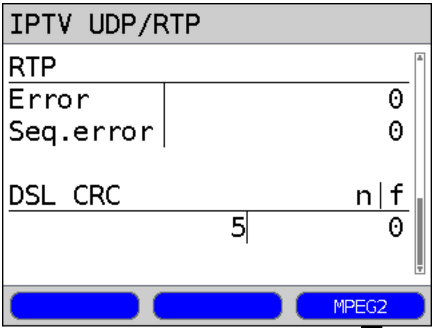
<MPEG2> Open the MPEG2 details, see page 212.



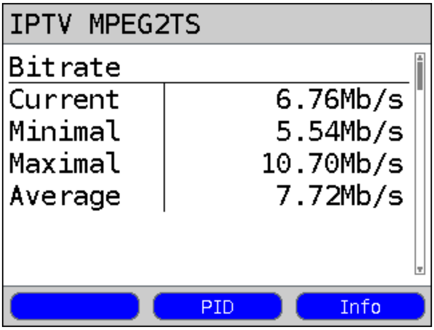
Display:

- Display the current packet loss ratio
- Display the minimum packet loss ratio
- Display the maximum packet loss ratio
- Display the average packet loss ratio

Continuation on next page



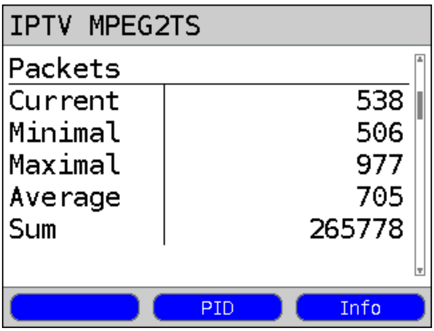
Display:
- Display the RTP errors
- Display the RTP sequence errors



Display:
- Display the current MPEG bitrate
- Display the minimum MPEG bitrate
- Display the maximum MPEG bitrate
- Display the average MPEG bitrate in Mbit/s

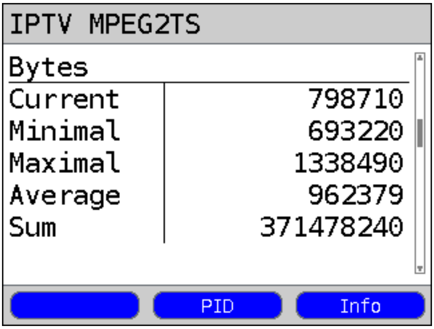
<PID> Open the PID details, see page 214.

<Info> Open the IPTV info, see page 210.

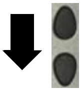


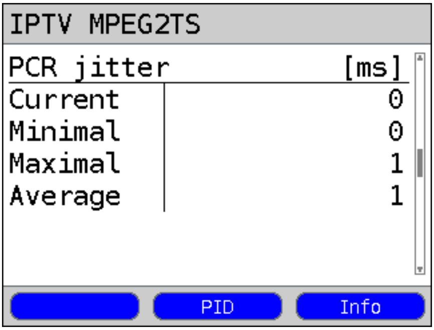
Display:
- Current number of MPEG packets
- Minimum number of MPEG packets
- Maximum number of MPEG packets
- Average number of MPEG packets
- Total number of MPEG packets

Continuation on next page

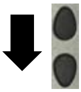


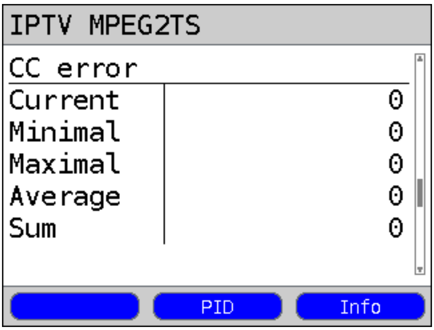
Display:
- Current number of bytes
- Minimum number of bytes
- Maximum number of bytes
- Average number of bytes
- Total number of bytes



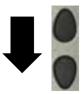


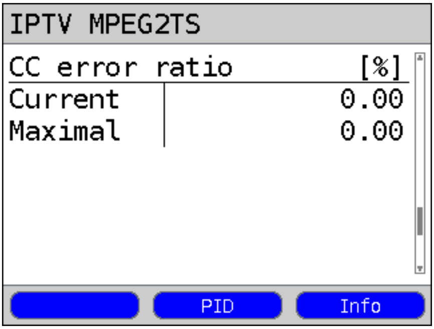
Display:
- Current PCR jitter (in ms)
- Minimum PCR jitter (in ms)
- Maximum PCR jitter (in ms)
- Average PCR jitter (in ms)





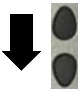
Display:
- Current number of CC errors
- Minimum number of CC errors
- Maximum number of CC errors
- Average number of CC errors
- Total number of CC errors

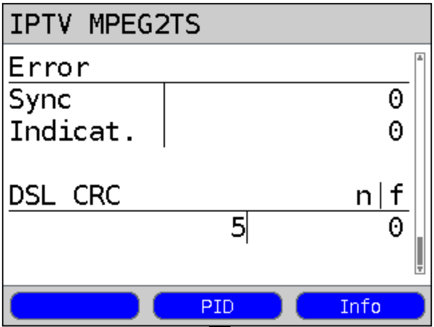




Display:

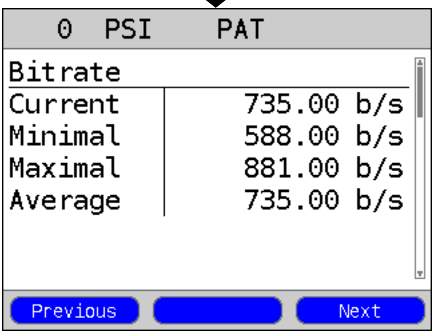
- Current CC error ratio.
- Maximum CC error ratio.





Display:

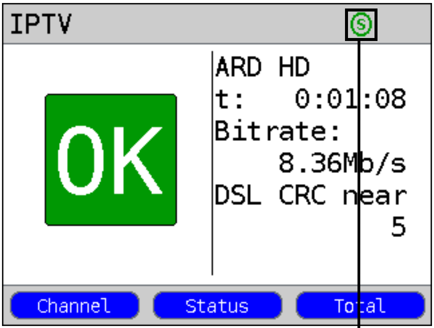
- Display of the sync errors.
- Display of the Error indication
- Display of the DSL-CRC errors (n/f)



Display of the Codecs and PIDs.
PIDs (Packet Identifier) identify the audio, video and PCR components of each programme.

<Previous>	Return to previous overview
<Next>	Open the next overview

3x 

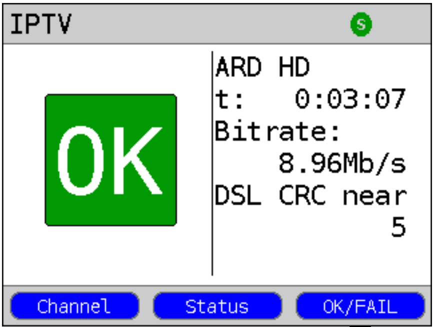


<Channel> Select a new channel

<Status> Display the Status screen without stopping the test.

 Cancel the test

 Switch between softkey sets

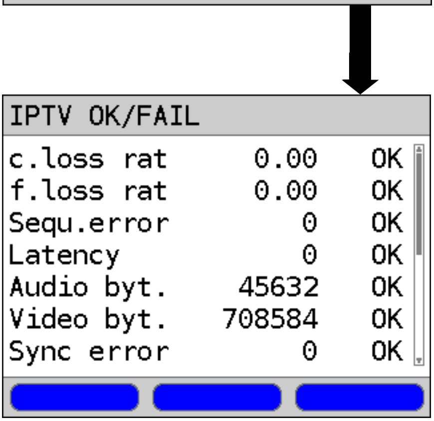


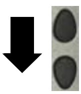
<Channel> Select a new channel

 The IPTV test will continue until a new channel is selected.

<Status> Display the Status screen without stopping the test.

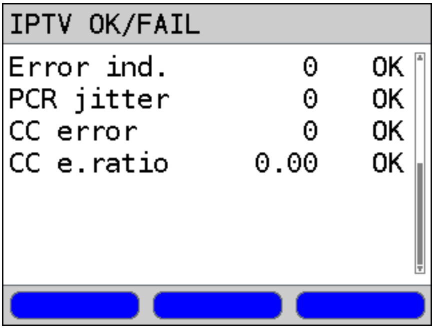
<OK/FAIL> Opens the IPTV test's OK/FAIL overview.





Display:

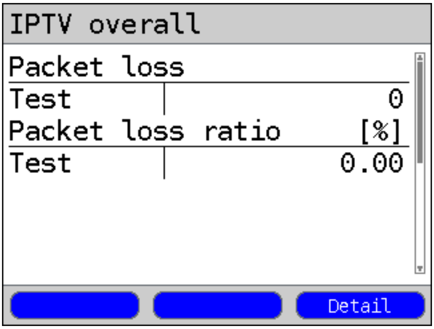
- Current loss ratio (in %)
- Total loss ratio (in %)
- Sequence errors
- Latency (in ms)
- Audio bytes (in bytes)
- Video bytes (in bytes)
- Sync errors
- Error indication
- PCR jitter (in ms)
- CC errors
- CC error ratio (in %)



Stop the IPTV test

Stop IPTV test.

IPTV results

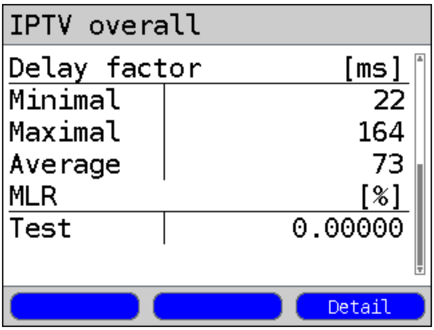


Displays the number of packets that were lost during the IPTV test and how high the loss ratio is.

Display further information:

- Minimum delay factor
- Maximum delay factor
- Average delay factor
- MLR (Media Loss Rate) during the test

<Detail> Display the IPTV test detail information, see page 210 f.



Close the results display

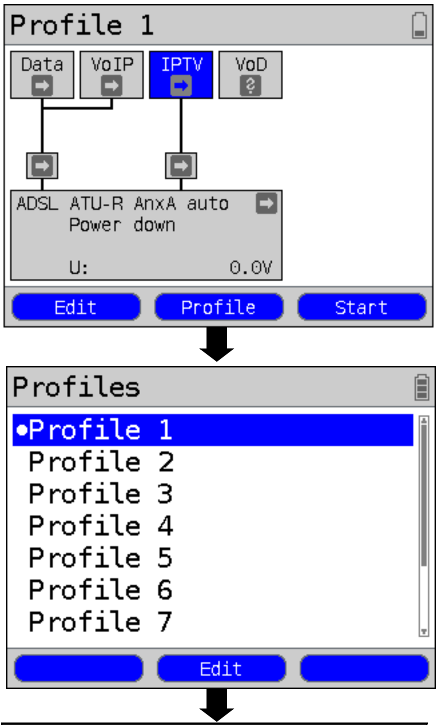
Save the result?

For information on saving the results, see IP Ping page 156.
For information on sending the trace file to a PC (see page 156).

18.2 IPTV Scan

The ARGUS will check the availability of the TV broadcaster. The ARGUS will also show the zapping time between the TV broadcasters.
Up to three user-defined "Scan profiles" can be created. The following parameters, which are stored in a profile, are required to perform an IPTV scan (if a xDSL or Ethernet connection has already been setup, the connection parameters, e.g. the ADSL mode and the rated value, are blocked):

Protocol-independent parameters:



ARGUS - Status screen.

<Edit> Assign Virtual Lines to the IPTV service.

<Profile> Profile settings are like those for ADSL, see page 34.

<Start> Start service

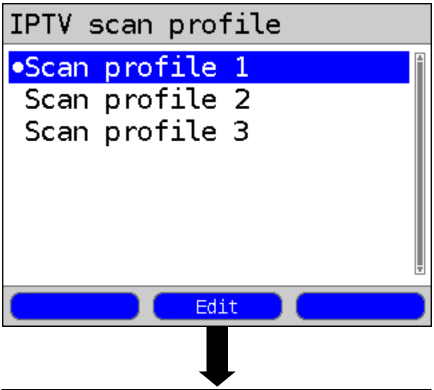
Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the IPTV scan.

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

Test parameters

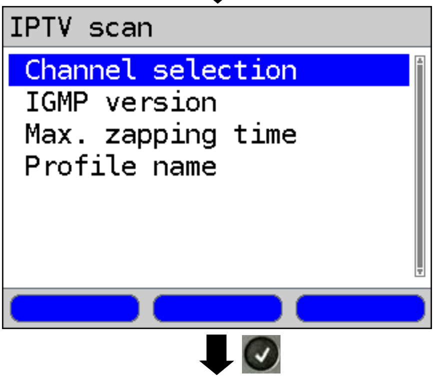
IPTV scan

Continuation on next page



A total of 3 user-defined Scan profiles can be configured.

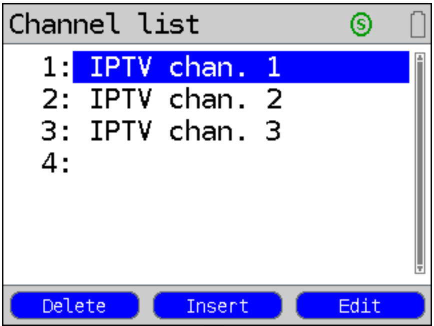
Edit the marked Scan profile.



View and edit the marked parameters if necessary

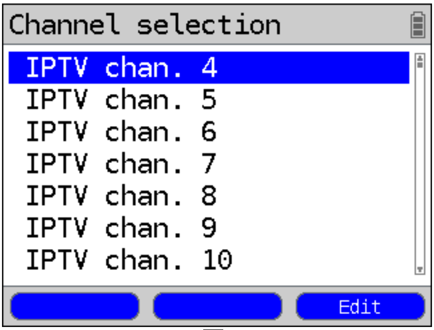
IPTV Scan settings:

Setting	Explanation
Test parameters:	
`IPTV scan:`	Up to 3 user-defined Scan profiles can be created. `<Edit>` The selected profile will be opened for editing.
`Channel selection`	The channel list can be used and edited for all profiles. Up to 250 channels can be created. A configuration can also be conveniently prepared using the WINplus/WINanalyse software on a PC. Selection of the TV test channels for the IPTV scan:



The ARGUS will first display the TV channels that have already been selected in the order that they will be tested in an IPTV scan. If no channels have been select so far, the list will initially be empty. The places in the list can be filled one after the other. Up to 250 channels can be selected.

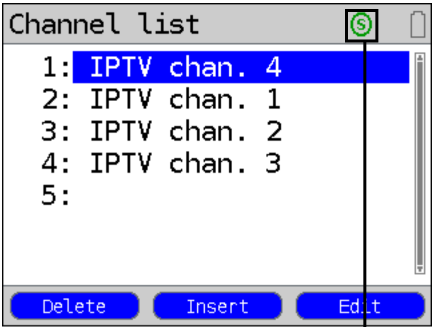
`<Insert>` A list of the available channels will open.



Mark the channels. Channels, which have already been selected, will no longer appear in the channel list (see Display Channel selection).

`<Edit>` Open marked channel for editing:
- Enter the address (multicast IP and port number) of the TV channel
- Enter any alias name desired for the TV channel (e.g. station name).

Continuation on next page



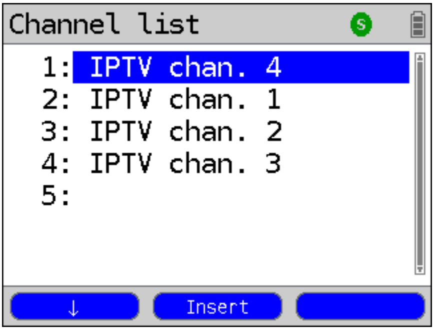
Add the selected TV channel (in the example, IPTV channel 4) to the Channel selection and then add the next channel (in the example, IPTV channel 5).
If two or more channels have been added to the list, their order can be changed using the following softkeys:

<Delete> Delete the marked TV channel from the list.

<Insert> Open the channel list showing the channels available.

Continuation on next page

Switch between softkey sets



<↓> The marked channel will be moved down one place in the list.

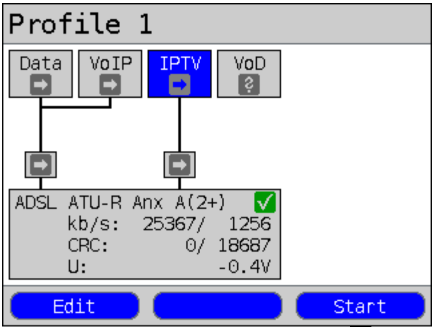
<↑> The marked channel will be moved up one place in the list.

Accept channel selection in the order shown

IGMP version	Version of the management protocol to log on/off of a multicast group (broadcast TV only). Range: 2 to 3 Default setting: ***3***

`Max. zapping time`	Enter the zapping time (IPTV timeout): The zapping time is the period of time that elapses between requesting and receiving a IPTV channel. If the measure zapping time exceeds the value entered here, the ARGUS will consider the test to have failed and will display the message "Failed". Range: 1 to 25 seconds Default setting: ***5 seconds***
`Profile name`	Entry of a name for the IPTV scan profile

Start the IPTV Scan

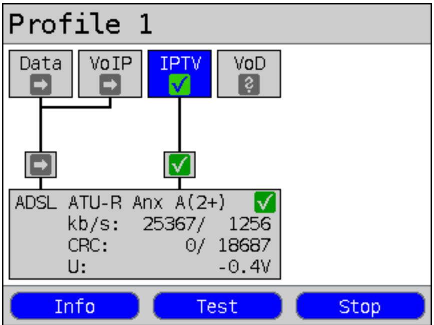


Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for IPTV.

<Edit> Assign a Virtual Line to the IPTV service or edit it.

Activate the IPTV service.

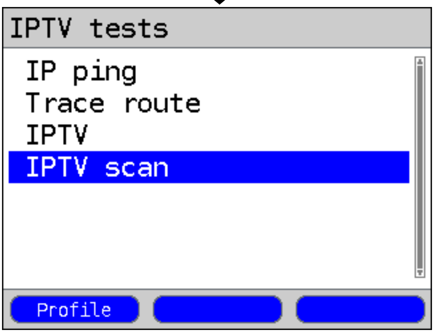


If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info> Duration of the activation

<Test> Open test selection

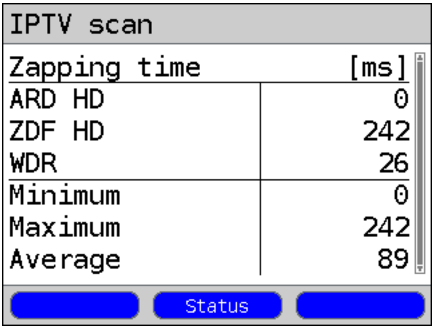
<Stop> Deactivate service



<Profile> Display the IPTV scan profile, see page 218.

Continuation on next page

IPTV Scan



The IPTV scan will start automatically.

Display of the zapping time (time required to switchover) between the TV channels. If it is not possible to establish reception of a TV channel within the time period set (see page 221), the ARGUS will display "Failed".

Display of the minimum, maximum and average zapping time.

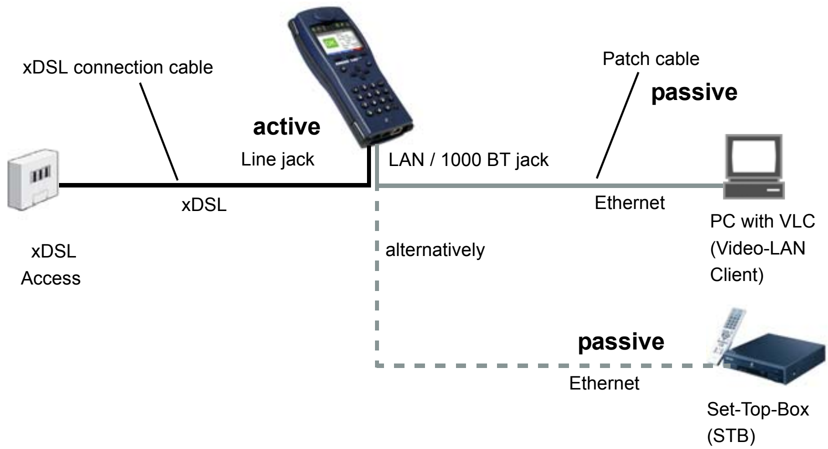
<Status> Display the Status screen without stopping the test.

Close the results display.

For information on saving the results, see IP ping page 156.
For information on sending the trace file to a PC (see page 156).

18.3 IPTV Passive

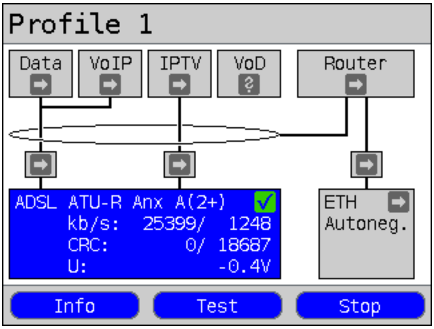
The ARGUS listens for TV channels without requesting one.
If the ARGUS detects TV channels, it will display a list of multicast IPs or channel names.



⚠ Instead of a PC or STB, you can also connect a second ARGUS in STB mode.

For more on protocol-independent parameters and test parameter settings for the IPTV passive test, see page 203 f.

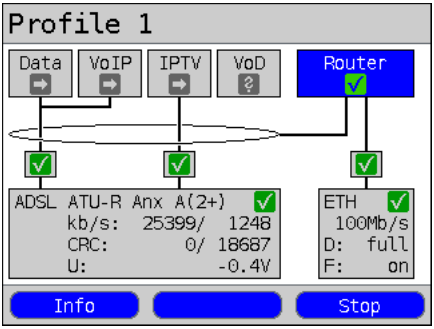
Start IPTV passive



Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for the IPTV passive test.

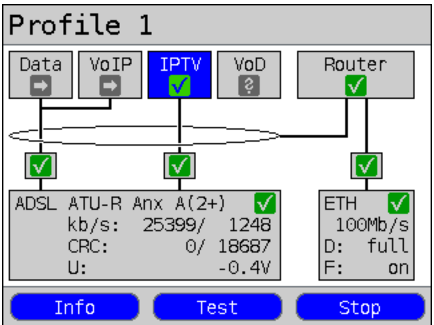
Use the cursor to select and activate the router.



Router mode started.

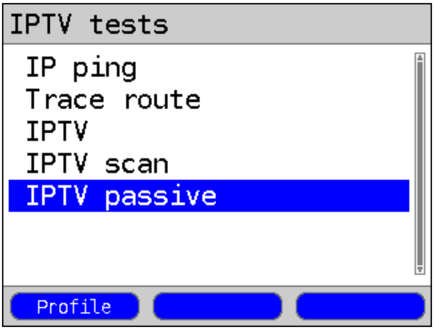
<Info>	The duration of the router's activity will be displayed.
<Stop>	Stop Router mode.

Use the cursor to select and activate the IPTV service.

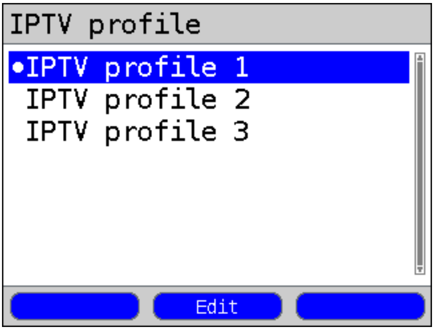


The IPTV service and Router mode are active and the ADSL connection is synchronous.

Continuation on next page



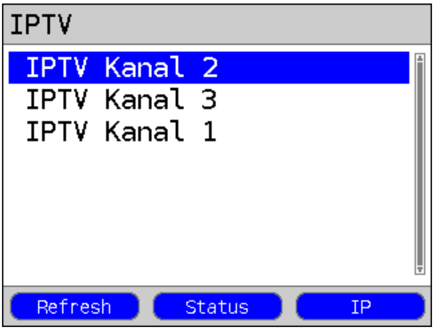
<Profile> Display the IPTV passive settings, see page 204.



Select the IPTV profile
(the default profile is marked with a ●).

<Edit> Edit the marked profile
For information on changing the individual parameters, see page 204.

The ARGUS will automatically check whether IPTV streams are available and display those that are.



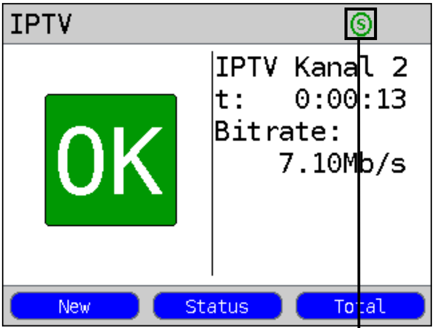
In this example, 3 streams are displayed.

<Refresh> Refresh the channel list

<Status> Display the Status screen without stopping the test.

<IP> Display the multicast IP of the selected channel.

Continuation on next page

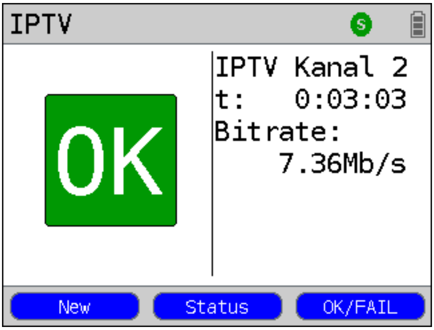


During the test, the ARGUS displays the selected IPTV channel, the duration of the test and the current bitrate. If the measured values exceed the threshold limits in the settings, the ARGUS will report that the IPTV test failed (FAIL); otherwise it will display "OK". The ARGUS will continue to display “FAIL” until the measured value returns to a value less than the limit value once again.

<New> Start a new IPTV test or select a different available channel, see page 226.

<Status> Display the Status screen without stopping the test.


Switch between softkey sets



<OK/FAIL> Opens the IPTV test's OK/FAIL overview, see page 215.

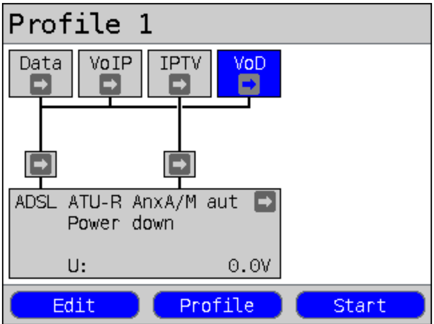

Cancel the test.

The IPTV result statistics are described on page 210 f.

18.4 Video on Demand (VoD)

In the VoD-STB mode, the ARGUS requests a data stream from a VoD server. Depending on the type of access under test, the ARGUS replaces the STB or the modem and STB. VoD services are often made available via RTSP (Real-Time Streaming Protocol), which is a control protocol that supports functions such as wind forward, rewind, pause etc. Nonetheless, the ARGUS also supports the FTP, HTTP and MMS protocols. During the test, the ARGUS checks the regularity of the incoming packets, the loss of packets, the packet and PCR jitter as well as other possible errors.
Depending on the preset thresholds, the ARGUS will display an OK/FAIL evaluation as well as various important metadata of the received VoD stream.
Up to three user-defined "VoD profiles" can be preconfigured (where a xDSL connection has already been setup, the access parameters, e.g. the ADSL mode and the rated value, are blocked):

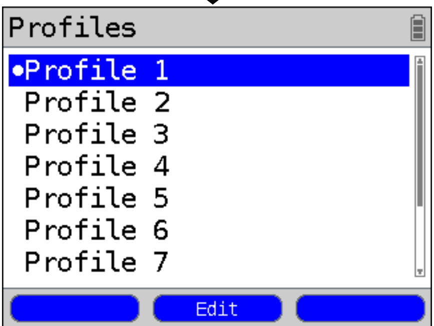
Protocol-independent parameters:



ARGUS - Status screen.

The VoD test is performed on the service of the same name.
The following example shows the procedure and considers its special aspects.

<Edit>	Assign Virtual Lines to VoD service.
<Profile>	Profile settings are like those for ADSL, see page 34.
<Start>	Start service



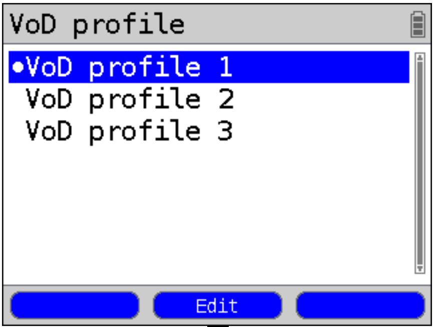
Select a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the default (preset) profile to setup the Ethernet or xDSL connection and for the VoD test.

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

Test parameters

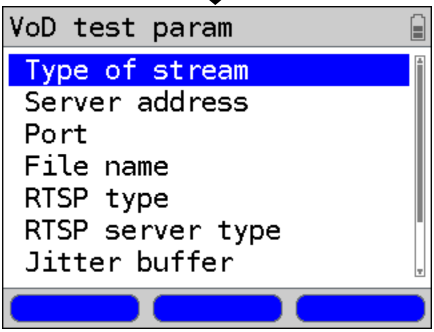
Continuation on next page

Video on Demand



A total of 3 user-defined VoD profiles can be configured.

Edit the marked VoD profile

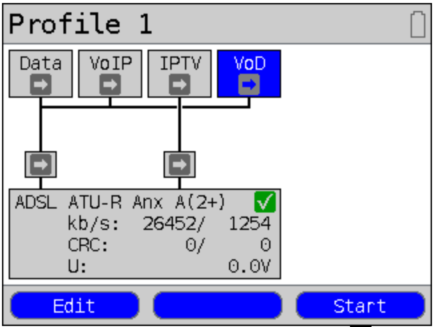


View and edit the marked parameters if necessary

Setting	Explanation
Test parameters:	
VoD:	Up to 3 user-defined VoD profiles can be created. **<Edit>** The selected profile will be opened for editing.
Type of stream	Select the type of stream. The following types are supported: RTSP, HTTP, FTP and MMS. Default setting: ***RTSP***
Server address	Entry of the address of the server from which the stream should be loaded. Use the numeric keypad to make the entry. Use the softkey on the right to shift the keypad (the softkey on the right assumes a different meaning when pressed), see page 152.

`Port`	Entry of the port Range: 0 to 65535 Default setting: ***0***
`Filename`	Name of the file that should be downloaded from the server. For information on the softkeys, see page 152.
`RTSP type`	Type of control protocol; TCP or UDP. Default setting: ***TCP***
`RTSP server type`	As a rule, if the server at the other end is a VoD server which conforms with the standards, you should set the "RTSP server type" to "Standard". However, if the server is one that deviates from the standard to support proprietary features (e.g. Kasenna), it may be necessary to make adjustments to the settings. Default setting: ***Standard***
`Jitter buffer`	The size of the jitter buffer. Ideally, you should set this value to match the value from the previously used STB. Range: 0 to 5 000 ms Default setting: ***300 ms***
`Threshold values`	Setting of the threshold values for the PCR jitter and the continuity errors (assessment of the picture quality). If these values are exceeded during the IPTV test, the test will display the assessment "FAIL"; otherwise "OK" will be displayed. PCR jitter: - Range: 0 to 10 000 ms - Default setting: ***8 ms*** Continuity error: - Range: 0.0% to 100% - Default setting: ***0.1%***
`Profile name`	Entry of a profile name for the VoD profile.

Start VoD

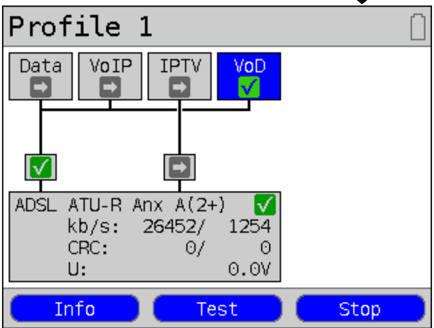


Set up the service.

The profile used to set up the xDSL connection (in this example, Profile 1) will also be used for VoD.

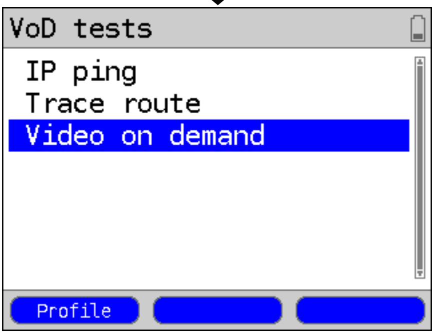
<Edit>	Assign a Virtual Line to the VoD service or edit it.

Start the VoD service.



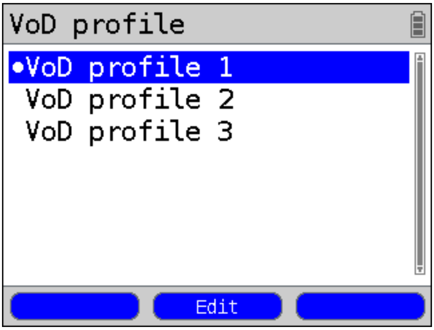
If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).

<Info>	Duration of the activation
<Test>	Open test selection
<Stop>	Deactivate service



<Profile>	Displays the VoD profile, see page 229

Continuation on next page

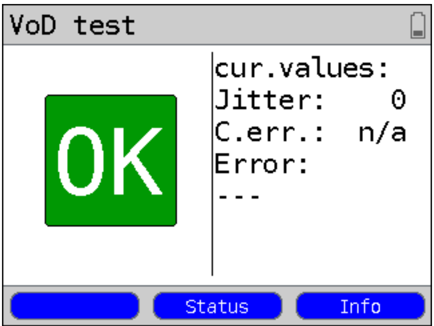


Mark the VoD profile
(the default profile is marked with a ●).

<Edit>	Edit the marked profile For information on changing the individual parameters, see page 204

The VoD test will start automatically.

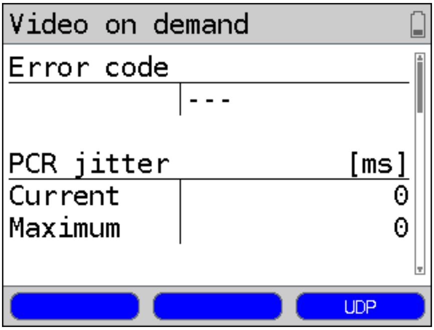
VoD test



During the test, the ARGUS displays the current PCR jitter and the continuity errors. If the measured values exceed the threshold limits in the settings, the ARGUS will report that the VoD test failed (FAIL); otherwise it will display "OK". The ARGUS will continue to display “FAIL” until the measured value returns to a value less than the limit value once again.

<Status>	Display the Status screen without stopping the test.
<Info>	Display Video on Demand test statistics.
	Cancel the test

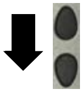
Continuation on next page

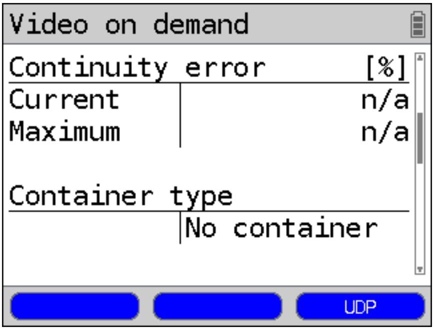


Display:

- Display the current error code
- Display the current and maximum PCR jitter

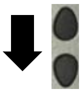
<UDP> Open the UDP information, see page 234

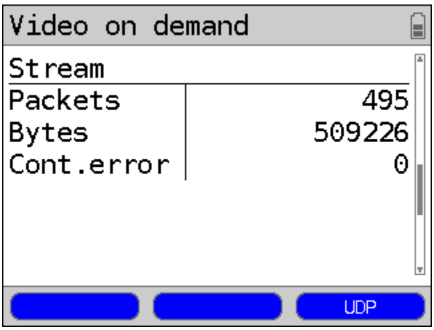




Display:

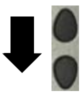
- Display the current and maximum continuity errors in %
- Display the container type



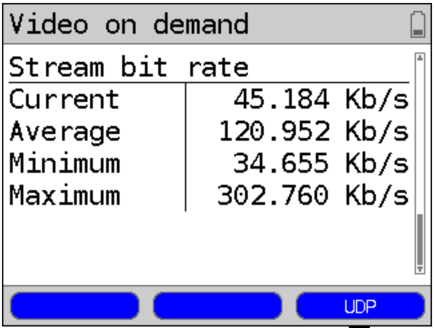


Display:

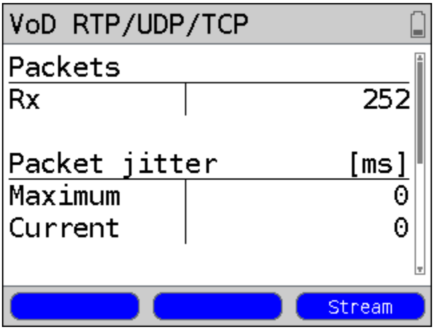
- Display the stream packets
- Display the stream bytes
- Display the stream cont. errors



Continuation on next page

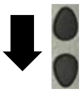


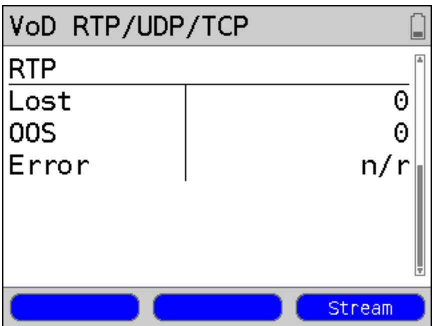
Display:
- Current stream bitrate
- Average stream bitrate
- Minimum bitrate
- Maximum bitrate



Display:
- Packets received
- Maximum packet jitter
- Current packet jitter

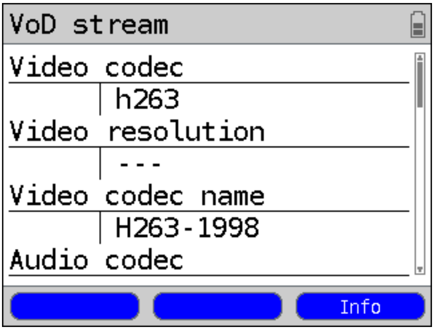
<Stream> Open the Stream information, see page 235.





Display:
- Packets received
- Maximum packet jitter
- Current packet jitter

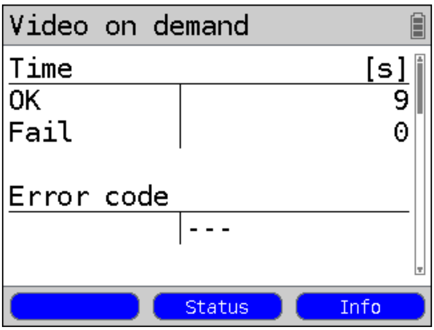
Continuation on next page



Stop VoD

Display:
- Video codec
- Video resolution
- Video codec name
- Audio codec
- Audio channels
- Audio sample rate
- Audio bits/sample
- Audio bitrate
- Audio codec name
- Audio codec descr.
- Total run time
- Author (general)
- Title
- Author (META)
- Copyright

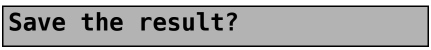
VoD results



Display the test duration that has been evaluated with OK or FAIL, as well as the error code.

The other test results are present beginning on page 233.

Close the results display



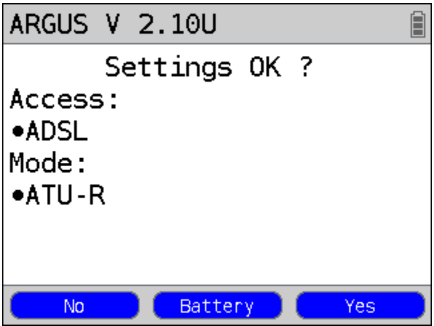
For information on saving the results, see IP Ping page 156.
For information on sending the trace file to a PC, see page 126.

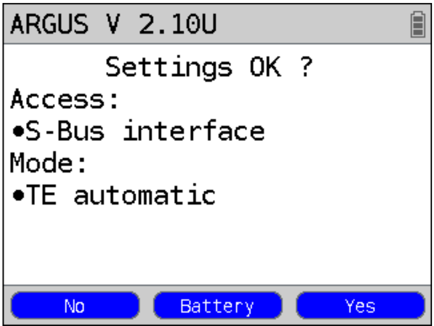
19 Operation on an ISDN Access

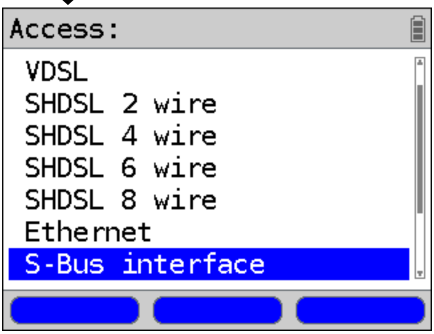
⚠ The voltages on the subscriber line may not exceed 48 VDC (BRI S/T) or 145 VDC (BRI U) and should be free of AC voltage.

19.1 Setting the ISDN Interface and Access Mode

Use the included connection cable to connect either the ARGUS "BRI/PRI/E1" jack to the S-Bus access to be tested or the ARGUS "Line" jack to the U-interface to be tested and then switch the ARGUS on. Which initial display is now shown will depend on which access setting was made last on this ARGUS (in the examples, ADSL and S-Bus accesses):







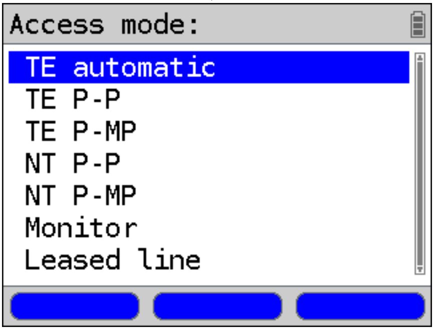
The Access Menu:

Using  Select a type of access; the selected type will be marked in blue (in the example, S-Bus).

 The ARGUS will set the type of access to S-Bus interface. The Access Menu will open.

Continuation on next page

Continuation on next page

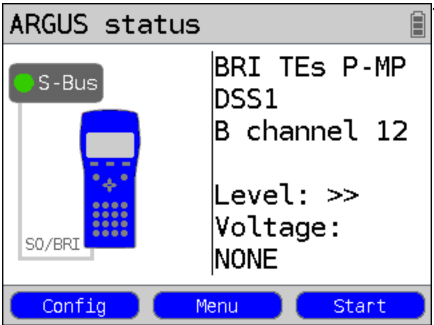


Access Menu:

Using [up/down keys]: Select an Access mode; the selected mode will be marked in blue (in this example, TE automatic).

[✓]: The ARGUS will use the marked access mode (in this example, TE automatic). The ARGUS starts the initialization phase and then opens the State display.

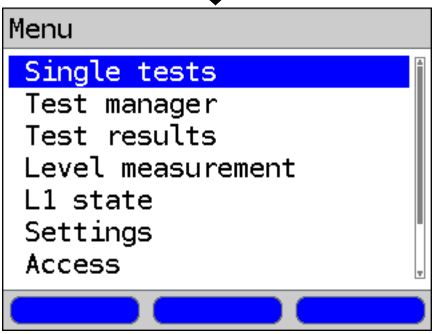
ARGUS State Display



ARGUS State Display, see page 239.

<Config>	Open the "ISDN settings" menu, see page 241.
<Start>	Repeat the B channel test.

Main Menu



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

[✓]: The ARGUS will open the marked menu (in this example, Single tests).

[up/down keys]: Select a menu.The selected menu will be marked blue in the display.

[✗]: to return to the previous menu (in the example, the State display).

TE simulation

In the Access Menu (see page 236), select the desired simulation mode:

- **TE automatic**

  On an S-Bus interface or U interface access, the ARGUS will automatically determined the D channel Layer 2 mode (PP or P-MP). If the ARGUS determines that the access supports both modes, a configuration menu will open in which you can select the desired Layer 2 mode.

- **TE P-P (point-to-point) or TE P-MP (point-to-multipoint)**

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

NT simulation on an S-Bus interface

In the Access Menu (see page 236), select the desired simulation mode:

- **NT P-P (point-to-point) or NT P-MP (point-to-multipoint)**

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

19.2 Initialization phase followed by a B channel Test

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

The ARGUS will begin the initialization after taking over the existing, confirmed settings or new settings for the type of access and mode. Next the ARGUS will setup Layer 1. While it is setting up Layer 1, the "Sync/L1" LED above the display will blink. If the ARGUS cannot setup Layer 1, it will display the message “No net”. When the ARGUS is operated on a U interface access, it can take up to 2.5 minutes to activate Layer 1. As soon as Layer 1 is successfully setup, the "Sync/L1" LED will light continuously.

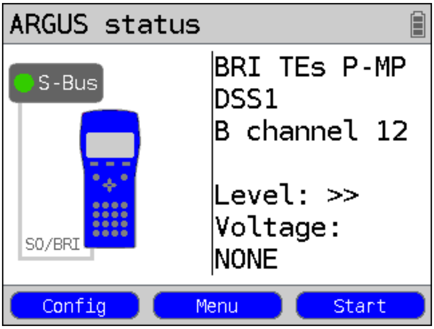
Once Layer 2 has been setup, the "Rx/Tx/L2" LED will light.

If both modes (P-P / P-MP) are found when Layer 2 on the D channel is checked, the mode must be selected manually (see page 238).

If everything has been detected without errors, 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 (in both TE and NT mode) or use the protocol set manually (see page 242 protocol). On a bilingual access, the ARGUS will use the DSS1 protocol.

The "IP / L3" LED 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 display an error message (see appendix). The ARGUS will then idle in the State display:

Example:
ARGUS State Display on a BRI access



Display:

- **Type of access (in the example, BRI S/T)**
- **Access Mode**

  NTs NT Simulation Slave (see L1 page 242)
  NTm NT Simulation Master L1TE
  TEs Simulation Slave L1TE Simulation
  TEm Master L1
- **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 channels are available
  B1- Only B channel 1 is available
  B-2 Only B channel 2 is available
  B-- No B channel is available

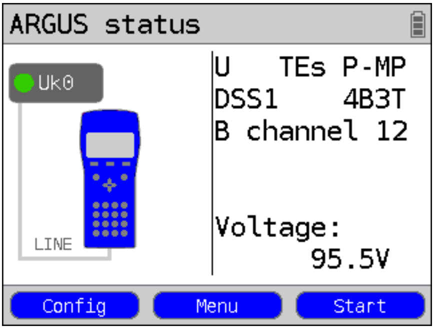
⚠ If only one B channel is available, this can have an impact on the service check and the testing of the supplementary services.

- Level and voltage evaluation

`OK normal`	Level/voltage is alright
`<<`	Level/voltage too low
`>>`	Level/voltage too high
`--`	No level/voltage
`OK INV`	Emergency supply
`<Start>`	Repeat the B channel test.
`<Config>`	Open the "ISDN settings" menu, see page 241.

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.

- ARGUS State Display on a U interface



Display:
- Access type (in the example, BRI U)
- Access mode (in the example, TEs)
- L2 protocol (in the example, DSS1)
- BRI U variant (line coding)
- Voltage when idle

19.3 ISDN Settings

It is possible to configure the following "ISDN Parameters" as needed. The procedure for configuring a parameter will be illustrated with a single example: It is possible to restore the parameters, see page 368.

`Settings`

ARGUS - Main Menu.

`ISDN`

`Protocol`

Use the cursor keys to select, e.g. protocol.

`● Automatic`

Mark the desired protocol. The selected protocol will be marked in blue (in this example, Automatic). The default protocol will be marked in the display by a ●. The ARGUS will use the default protocol for the ISDN connection.

The ARGUS takes the marked setting for use as the default and returns to the next higher menu.

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

Setting	Explanation
ISDN:	
L1 permanent?	On a BRI S/T connection in NT mode, Layer 1 (L1) is permanently active. Default setting: ***No***

Protocol	As an alternative to automatic protocol determination, you can also set the Layer 3 D channel protocol manually. If the protocol setting is changed, the ARGUS will save this new setting permanently, i. e. it will use this protocol the next time that it is switched on. ISDN Protocols: - Automatic - DSS1 - CorNet-N - CorNet-T (not for the access types "NT P-P" and "NT P-MP") - CorNet-NQ (for the access types "TE P-P" and "NT P-P" only) - QSIG (for the access types "TE P-P" and "NT P-P" only) - VN4 Default setting: ***Automatic***
Alerting mode	You can specify whether, for an incoming call on a S-Bus point-to-point access, the ARGUS should only display the access number without extension or the complete number with extension. When set to "Manual", the ARGUS will display the extension. Incoming calls will be signaled. When the ARGUS accepts a call, it will send the Layer 3 "Alert" message. The digits of the extension that have been sent by this point will be displayed. ⚠ With 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***
Clock mode	This parameter sets where the clock will be generated in the case of a S-Bus access. You can either specify that the ARGUS generates the clock (Master) or that it is the slave of a clock generated at the other end (Slave). Setting: In NT mode: ***Master*** In TE mode: ***Slave*** Leased line: ***Slave*** Any change to this setting will not be saved permanently; it will only apply to the current measurement.

BRI termination	You can add terminating resistors to a BRI access. Setting: In NT mode: ***Terminating resistor switched in*** In TE mode: ***No terminating resistor is switched in*** Leased line ***No terminating resistor is switched in*** Any change to this setting will not be saved permanently; it will only apply to the current measurement.
Call parameters	Four different parameters can be set for (ISDN) calls generated on both the network-side (ARGUS in NT mode) and on the user-side (ARGUS in TE mode): 1. Type of number (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal Network-side: Net CGN TON Net CDN TON User-side: User CGN TON User CDN TON Default setting: ***unknown*** 2. Numbering Plan for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal: Network-side: Net CGN NP Net CDN NP User-side: User CGN NP User CDN NP 3. CGN/CDN Subaddress CGN/CDN Sudaddress Type: User specific and NSAP Default setting: ***User specific*** 4. UUI (User User Info) *For more information, see Prefix on page 244.
Services	Up to three user-specified services (user spec. 1 to user spec. 3) can be entered and saved. For each "user spec. service“, you must enter the info-elements BC, HLC and LLC in hexadecimal (switch with the left softkey). 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 the ARGUS is set to "own MSN/DDI" and is in TE mode on a P-MP access, it will only signal those calls which are 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-dialling memory under "own number" (see "Saving call numbers in the speed-dialling memory" on page 371). - the incoming call must have a destination MSN Default setting: ***all MSN/DDI***
`Voice coding`	There are two options for coding voice data in a B channel: - ***A-law*** (Default setting) - µ-law
`DTMF / Keypad`	DTMF or Keypad setting Default setting: ***DTMF***
`CUG Index`	Enter the CUG index that the ARGUS should use when testing the CUG (Closed User Group) service. Range: 0 to 32 767 Default setting: ***148***
`Keypad`	A maximum of three Keypad Infos can be stored. First use the vertical cursor keys to select one of the three available memory locations for Keypad Infos. **`<Edit>`** Edit the selected Keypad Info. Afterwards, use the keypad to enter the Keypad Info.  Save the Keypad Info.
`Prefix`	Entry of the national or international telephone prefix. The prefix is selected in "Call parameters" under the selection "Type of number", see page 243. National: ***0 (Default setting)*** International: ***00 (Default setting)***

Starting functions with the numeric keys / key combinations
Using the ARGUS keypad, you can start important 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 assignment of functions to the numeric keys can also viewed on the ARGUS display. Open the Main Menu and select "Help" or press number key "1". An overview of the available key combinations can be found on page 134.

19.4 Bit Error Rate Test

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

As a rule, the network operator will guarantee an average error rate of 1 x 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 (end-to-end) or calls itself (self call), 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 ITU-T G.821.

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

When used on an NGN (Next Generation Network), where a packet switched connection (e.g. IP) can follow a circuit switched network (e.g. ISDN), the "UDI64k" must be explicitly selected 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 ARGUS sets up the ISDN connection to itself. 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 (e.g. a second ARGUS in the "BERT wait" mode)(see page 253, BERT wait). A bit pattern is sent to this remote tester. Independent of the bit pattern received, the remote tester will use the same algorithm to generate the bit pattern that it sends back. Therefore, both directions are tested independently.

BERT Parameter Configuration

`Settings`

ARGUS - Main Menu

The procedure for configuring a parameter will be illustrated with a single example. The default settings can be restored at any time (see page 368).

`BERT`

`BERT time`

`Enter the BERT time`

The ARGUS sets the value entered as the default BERT time and returns to the next higher menu.

Setting	Explanation
BERT:	
`BERT time`	You can use the keypad to enter measurement times ranging from 1 minute to 99 hours and 59 minutes (= 99:59). If the time is set to 00:00 (= BERT with unlimited measurement time), the BERT will not stop automatically. In this case, the BERT must be terminated manually by pressing the . Default setting: ***00:00*** (continuous) In the case of an Autom. Test ***(see Chapter 19.9 Automatic Performance of Multiple Tests, page 273)*** the ARGUS will automatically set this to a value of 1 minute.
`Bit patt. BRI/U`	This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a S-Bus or U interface access. Several predefined bit patterns are available Default setting: $\boldsymbol{2^{11}-1}$ Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary: Use the horizontal cursor keys to move the cursor right or left. `<Delete>` Changes the digit before the cursor from 1 to 0
`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" (Not OK) as the test result. Using the keypad, this parameter can be set to any value from 01 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is $\boldsymbol{10^{-06}}$ (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^{6} = 1,000,000 sent bits), the bit error rate test will be evaluated as "OK".
`HRX value`	Setting the HRX value (Hypothetical reference connection, see the ITU-T G.821). Using the keypad, you can enter a value ranging from 0 to 100 %. Default setting: ***15 %***

BERT Start

Single tests

ARGUS - Main Menu.

BERT

BERT - saving the result

Enter the phone number

The speed-dialling memory will now open (see page 371). Enter/dial your own number to perform the BERT in an extended call to oneself (two B channels) Enter/dial a remote number for a BERT to a loopbox (one B channel) or end-to-end.

Scroll through the speed-dialling memory.

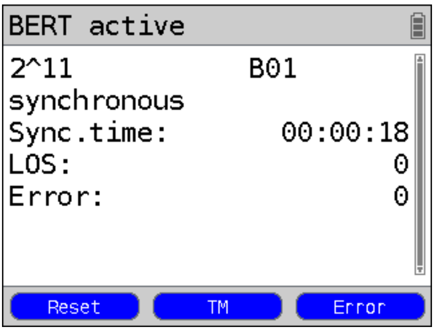
Select service

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

Select B channel

First press `<Delete>` and then enter the B channel on the keypad. If you enter an "*", the ARGUS will choose any B channel that is free.

BERT Start



The ARGUS display after the connection has been setup and synchronized in both the send and receive directions:

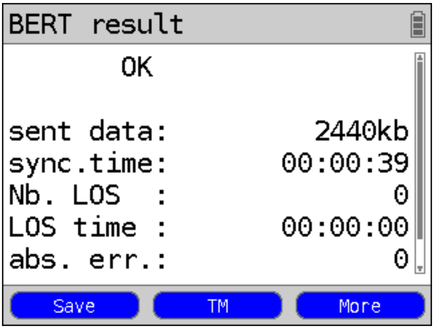
- The bit pattern and B channel / bit rate used
- The synchronicity of the bit pattern (in this example, synchron)
- Sync. time in h:min:s (time in which the ARGUS can sync to the bit pattern)
- LOS counter: shows the absolute number of synchronization losses. Synchronization is lost at an error rate greater than or equal to 20 % within a period of a second.
- The number of bit errors that have occurred

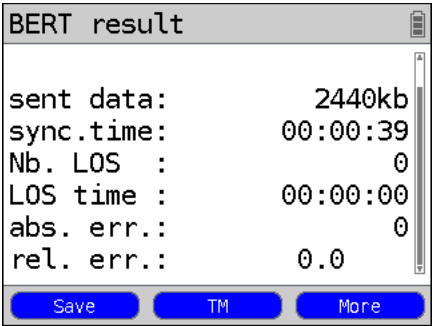
<Error>	The ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).
<TM>	Open the Test Manager, see page 289.
 or **<Reset>**	Restarts the BERT. The test time and number of bit errors will be reset.
	Stop BERT

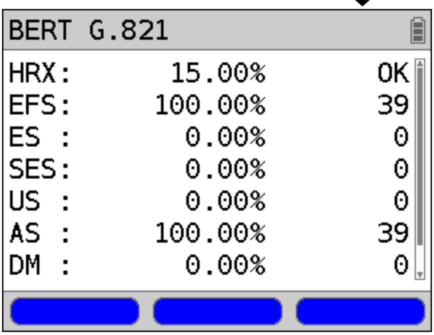
If the ARGUS has been so configured and a bit error is detected, this will be signaled by a brief alarm; in the event that the synchronisation is lost, a constant alarm will sound (see page 367, Alarm bell).

After the BERT 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.

BERT results:







Scroll through the results

- The evaluation of the results depends on the error threshold (in this example OK), see page 247.
- Trans. data (transferred data): (K = 1024 bits, k = 1000 bits)
- Sync. time in h:min:s (Time within which the ARGUS can sync to the bit pattern)
- No. LOS (counter) Synchronization is lost at an error rate greater than or equal to 20 % within a period of a second.
- LOS time: Duration of the BERT minus the sync. time (the time in which the ARGUS could not sync to the bit pattern after it had been in sync at least once)
- abs. err: The number of bit errors
- Rel. err: The bit error rate (e.g. 9.7E-07 = $9.7 \cdot 10^{-7}$ = 0.00000097)

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

All values are given as relative values (in percentages) as well as in absolute figures.
The ARGUS evaluates the measurement results to determine whether they satisfy the threshold limits defined in the CCITT G.821; with consideration of the defined hypothetical reference connection HRX (displaying OK or NO (Not OK)).

Scroll through the results

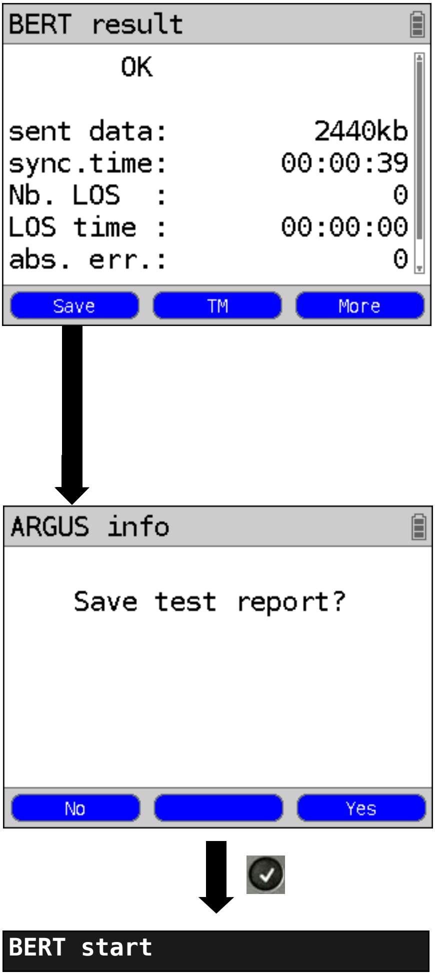
Return to the previous display

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.
ES	Errored Seconds: The number of seconds in which one or more errors occurred.
SES	Severely Errored Seconds: The number of seconds in which the bit error rate is greater than 10^{-3}. In one second, 64,000 bits are transferred, thus BitErrorRate (BER) = 10^{-3} equates to 64 bit errors.
US	Unavailable Seconds: The number of all sequentially adjacent seconds (at least 10 sec) in which BER > 10^{-3}.
AS	Available Seconds: The number of all sequentially adjacent seconds (at least 10 sec) in which BER < 10^{-3}.
DM	Degraded Minutes: The number of minutes in which the bit error rate is greater than or equal to 10^{-6}. In one minute, 3,840,000 bits are transferred, thus a BER = 10^{-6} corresponds to 3.84 bit errors (3 errors = OK (no degraded minutes), 4 errors = NO (Not OK) (Degraded Minutes).
LOS	Loss of Synchronize: Synchronization is lost at an error rate greater than or equal to 20% within a period of 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-dialling memory, see page 371) in the next free memory location (see page 361). If all of the memory locations are used, the ARGUS will request permission to overwrite the oldest test results.



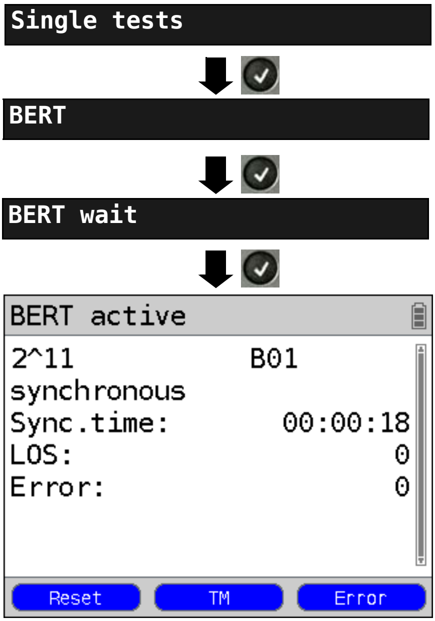
Use the keypad to enter the name under which the ARGUS should save the results, for more information see page 361.

BERT - saving the result

Display the saved BERT results, see page 362.

BERT wait

In “BERT wait” mode, the ARGUS will wait for the BERT at the remote end. This is required for an end-to-end test.



ARGUS - Main 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 while an independent bit pattern will be sent back.

<TM> Opens the Test Manager (see page 289).

For information on the displays shown, see "BERT start" on page 247.

Display BERT results

B channel loop

“B channel loop” mode is required in order to run a bit error rate test using a loopbox (an ARGUS is the loopbox) at the remote end.

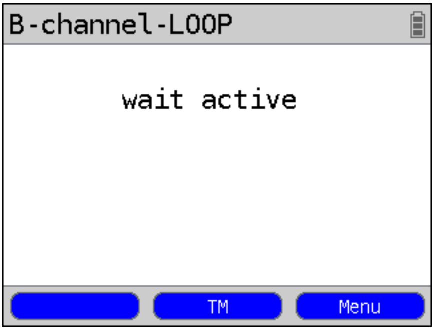
Single tests

ARGUS - Main Menu.

BERT

B channel loop

Activate a “B channel loop”

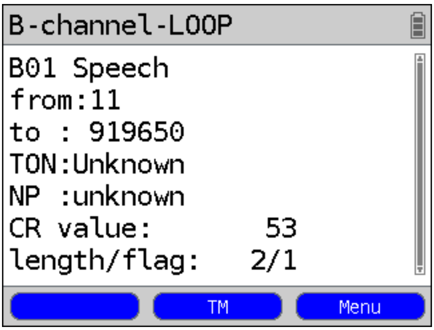


The ARGUS will wait for a call. Any incoming call (regardless of the service) will be taken immediately. The ARGUS will switch a loop back in the B channel that is specified by the exchange and then send the received bit pattern back to the caller/ sender.

<TM> Open the Test Manager (page 289).

<Menu> Open the Main Menu: the “B channel loop” remains active. From this menu, you can start a second B channel loop connection (this is also possible using **<TM>**). If you press **<TM>** (see page 289) the ARGUS will return to the "B channel loop, wait active" display.

Exit the “B channel loop” mode.



Display shown after accepting a call:

- B channel used and service
- The caller's number (from:)
- The number dialled (to:)
- If available: TON, NP, UUS etc.

<TM> Opens the Test Manager (page 289).

<Menu> Open the Main Menu.

Clear down the B channel loop connection; the B channel loop, however, remains active!

19.5 Supplementary Services Test

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

Suppl. service interrogation in DSS1

`Single tests`

ARGUS Main Menu

`Supplementary Services`

The speed-dialling memory opens (see page 371).

`Enter own number`

Scroll through to your own call number (the number of the access under test) or enter it using the keypad.

The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

`Select service`

Using the cursor keys, select the service which should be used for the supplementary services test.

`Select B channel`

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. If you enter an "*", the ARGUS will choose any B channel that is free.

`Select test case`

The ARGUS will determine whether the selected supplementary service is supported by this access.

Start test

```
Supp. Serv. test
 TP test
```

Display the test results:

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

Scroll through the results

Close the results display and open the next higher menu

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?
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-dialling memory location for “remote call number 1” (see "Saving call numbers in the Speed-dialling 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 and the ARGUS is in TE mode, the ARGUS will display all of the connected network-side call numbers. It is also possible to check the CLIP No Screening function by monitoring with the WINanalyse software on a PC.

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 “ARGUS Error Messages (DSS1)” on page 388).

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	___

19.6 Service check

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

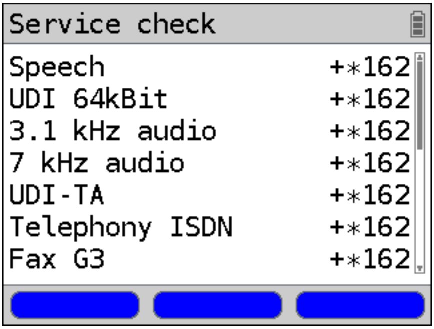
Service	**Name displayed on the ARGUS**
Speech	`Speech`
Unrestricted Digital Information (data telecommunications)	`UDI 64kBit`
3.1 kHz audio	`3.1`
7 kHz audio	`7 kHz audio`
Data transfer with tones & displays	`UDI-TA`
Telephony	`Telephony ISDN`
Telefax Groups 2/3	`Fax G3`
Fax Group 4	`Fax G4`
Combined text and facsimile communication	`Mixed`
Teletex Service basis mode	`Teletex`
International interworking for Videotex	`Videotex`
Telex	`Telex`
OSI application according to X.200	`OSI`
7 kHz Telephony	`Telephony 7kHz`
Video telephony, first connection	`Video telephony 1`
Video telephony, second connection	`Video telephony 2`
Three user-specific services (see, page 243)	`User-specified 1 to 3`

The test runs automatically.
The ARGUS will make a separate self call to test each of the user-specific services. However, the call will not be answered so no charges will be incurred.

Display	
`Single tests`	ARGUS - Main Menu
`Service check`	
`Enter own number`	Enter the own (local) number of the access under test or select it from the speed-dialling memory.
`Select B channel`	The ARGUS suggests the B channel used last. If you enter an "*", the ARGUS will choose any B channel that is free.
`Service test starts`	

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 check should extend outside of the local exchange, it is possible to perform the Service check in an end-to-end mode. In this case, you must enter the remote call number for a second terminal device. The ARGUS will then automatically check whether the remote terminal can accept the call under the various services – in other words, whether it is “compatible” with these services. In the test results, the second part (second +, - or *) refers to the answer from the remote exchange.

Test results:



The ARGUS will display the results of the test once it is done. The ARGUS makes a distinction between outgoing calls (the first +, - or *) and incoming calls (the second +, - or *).

+	=	suppl. service supported
-	=	suppl. service not supported
*	=	No definite assessment can be made so an error code is displayed. In such case, it is recommended that you have someone place a call to the access under test using this service.

Scroll through the results

Close the results display and open the next higher menu.

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 to the remote end failed (e.g. remote end busy thus no B channel was 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.

19.7 X.31 Test

The ARGUS will perform a “Manual X.31 Test” or, if desired, an “Automatic X.31 Test”:
In the case of an automatic test, the ARGUS will first setup the D channel connection and then an X.31 connection. The ARGUS will then 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.

Configuring the X.31 parameters

Settings

ARGUS - Main Menu.

X.31 profile

The ARGUS stores the parameters of the X.31 Test in the three X.31 profiles.

● X.31 profile 1

Mark a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the current profile for the X.31 Test.

<Edit>

The ARGUS takes over the marked profile as the default and returns to the Settings menu.

TEI

Enter a TEI

The ARGUS saves the TEI entered and returns to the next higher menu.

The default parameters can be restored at any time (see page 368).

Setting	Explanation
X.31 profile:	Up to three user-defined X.31 profiles can be created. **<Edit>** The selected profile will be opened for editing.
Packet number	Number of packets sent Range: 0 to 65 000 Default setting: ***10***
TEI	Entry (from the keypad) of the TEIs (Terminal Endpoint Identifier) to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI. Range: min. 0 to a max. of 63 Default setting: ***** (automatic)***
LCN	Entry (from the keypad) of the LCN (Logical Channel Number) to be used in the X.31 test. Range: 0 to 4095 Default setting: ***1***
Packet size	Size of the data packets: 16, 32, 64, 128 or 256 bytes. Default setting: ***128 Bytes***
Agree packet size	Negotiate with the network side (DCE) regarding the data packet size. If the desired data packet size is larger than the default, this parameter should be set to “yes”. Default setting: ***No***
Window size	Window size of Layer 3, selection of 1 to 7 packets. Default setting: ***2 Packets***
Agree window size	Negotiate between the terminal (DTE) and the network (DCE) an agreement regarding the window size. Default setting: ***No***
Throughput	Data throughput in bits/s: 75, 150, 300, 600, 1200, 2400, 4800 or 9600 bits/s. Default setting: ***1200 bit/s***
Agree throughput	Agree on the data throughput Default setting: ***No***

User data

Content of the user data

- Format setting for the user data

- Entry of the ASCII data

ASCII data

● ASCII data 1/3

Use the cursor keys to select one of the three available memory locations for the ASCII data (in this example, the first location 1/3).

<Edit>

Enter ASCII data

Save ASCII data

Use the numeric keypad to enter the ASCII data.When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits):

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of lowercase characters (e.g. to enter a “C” press the “2” on the keypad three times), plus @, /, -, and .
<AB>12>	Entry of the uppercase characters and @, /,- and .
	Move the cursor
<Delete>	Delete the character before the cursor
	Do not save ASCII data.

- Entry of the hexadecimal data:

`Hex data`

Select one of the three available memory locations for the hexadecimal data (in this example, the first location 1/3)

`● Hex data 1/3`

<Edit>

`Enter hexadecimal data`

Use the keypad to enter the hex value. To enter the values "A...F", use the softkey **<A..F>** (e.g. to enter a "C", press the softkey **<A..F>** three times). To confirm the entry of the hexidecimal characters A to F press **<OK>** (the softkey in the middle changes from **<Delete>** to **<OK>**).

Save hexadecimal data

<Delete> Delete the character before the cursor

Do not save the hexadecimal values.

CUG	Closed User Group. Default setting: ***No***
CUG Index	Coding for Closed User Group Range: min. 0 to 255 max. Default setting: ***1***
D bit	Local: DCE acknowledges data packets, i. e. flow control on local DTE-DCE path. End-to-end: DTE-DTE flow control Default setting: ***Local***
Facilities	Coding for various supplementary services A maximum of 3 facilities can be stored. For instructions, see User data on page 263.
Profile name	Use the keypad to enter the profile name for the X.31 profile. The ARGUS will later display this name for the profile.

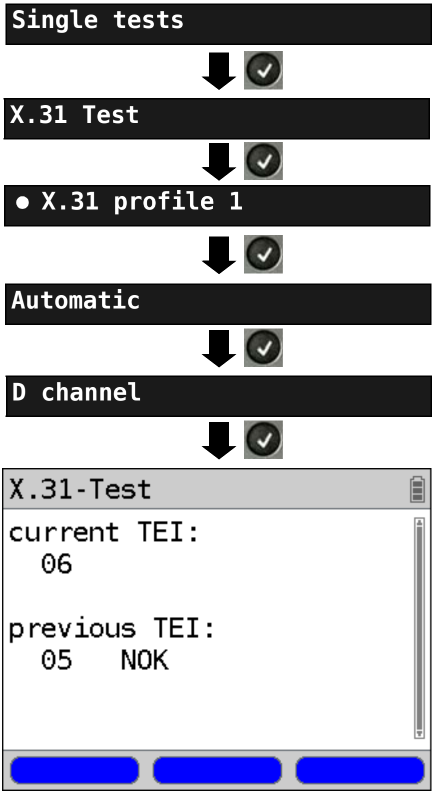
Automatic X.31 Test

D channel

The “automated X.31 Test in D channel“ consists of two steps:

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

Second step: For each TEI with which X.31 is possible on Layer 2, a "CALL_REQ" packet will be sent and then the ARGUS will wait for an answer. Beforehand, the ARGUS will request the entry of the X.25 access number, which will be saved in speed-dialling memory under X.31 test number (see page 371). With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.



ARGUS Main Menu.

Select the profile.

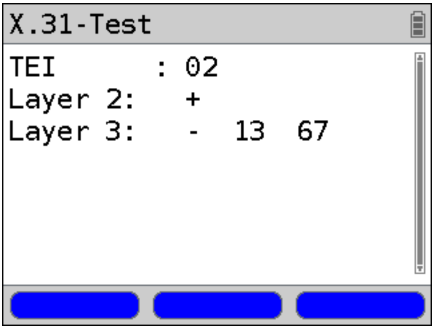
<Edit> Change to the profile parameters (see page 262).
The parameters can be edited.

Start test

The test can take up to 4 minutes.
The ARGUS will display the currently tested TEI, the previously tested TEI and the results:

OK = X.31 is available for this TEI
NOK = X.31 is not available for this TEI

Test results



The ARGUS will check whether the X.31 service is available for Layer 3 for the TEIs found in Step 1.
Example: Test results

TEI 02 The first valid TEI is 02.

Layer 2
- **+** First test step was successful
- **-** First test step was not successful

Layer 3
- **+** Second test step was successful
- **-** Second test step was not successful
  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, if there is any (see the Appendix page 389).

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

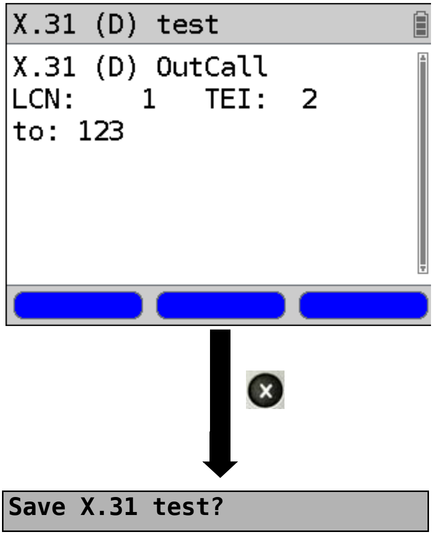
Manual X.31 Test

D channel

The ARGUS first requests a TEI, an LCN and an X.31 number (the ARGUS uses the values stored in the X.31 profile). 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 setup a connection.

`Single tests`	ARGUS - Main Menu
`X.31 Test`	
`● X.31 profile 1`	Select the profile. **<Edit>** Change to the profile parameters (see page 262). The parameters can be edited.
`Manual`	
`D channel`	
`TEI is displayed`	The ARGUS displays the TEI stored in the X.31 profile. It can be edited from the keypad. If you enter "**", the ARGUS will automatically select a TEI. **<Delete>** Delete the TEI
`LCN is displayed`	The ARGUS displays the stored LCN (see page 262). It is possible to edit the LCN from the keypad.
`X.31 number displayed`	The ARGUS displays the X.31 number saved in the speed-dialling memory (see page 371). It can be edited from the keypad. Setup an X.31 connection.

Continuation on next page



The ARGUS will display the LCN, the TEI, the X.31 number and the negotiated connection parameters.

<Data>	Sends a predefined data packet
<Statistic>	Displays the L1/L2/L3 statistics
<L2>	Scrolls to the L2 statistics
<L3>	Scrolls to the L3 statistics

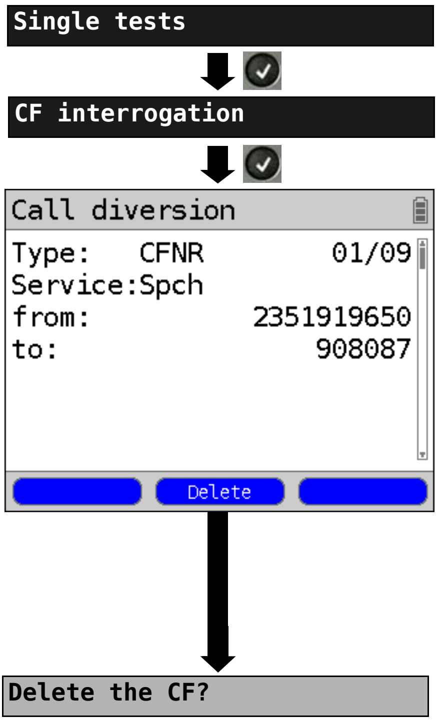
The X.31 connection will be maintained until the user or the remote end clears it. When the X.31 connection is cleared, the ARGUS will automatically clear the D channel connection.

<Yes> The ARGUS saves the results (see page 361).

19.8 Call Forwarding (CF)

CF Interrogation

The ARGUS will check whether a call diversion has been setup in the exchange for the access under test. 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. The ARGUS will count any additionally set up call diversions. The ARGUS can clear any call diversion setup in the exchange.



ARGUS - Main Menu.

Start the CF Interrogation. The test can take a few seconds.

Display:

- Type of call diversion (in the example, CFNR)
- The type of call diversion will be displayed / number of call diversions found
  In this example: Display the first of a total of one call diversion found (01/09)
- The call diversion service
- The number that should be diverted (from:)
- The number to which calls should be diverted (to:)

<Delete> Delete call diversion

Security query

<Yes> Clears the displayed call diversion in the exchange. If this is not possible, the ARGUS will report: "Call diversion not changeable!"

<All> Delete all call diversions.

Do not delete the call diversion! Open 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 acknowledgement 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 require that the local MSN is 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:

Bearer Service	**Abbreviation**
All services	**All**
Speech	**Spch**
Unrestricted Digital Information (data telecommunications)	**UDI**
Audio 3.1 kHz	**A3k1H**
7 kHz audio	**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**

CF Activation

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

Single tests	ARGUS - Main Menu.
CF activation	
Select service	Using the cursor keys, select the "Service" of the call diversion.
Select the type of call diversion	Using the cursor keys, select the type of call diversion.
	The speed-dialling memory opens (see page 371). Under own (local) number, enter the call number which should be diverted.
Enter own number	
Enter destination number	Enter the call number to which calls should be diverted.
	Set up the call diversion
Call diversion activated	Open the Single Tests Menu.

CF Delete

The ARGUS can clear selected call diversions setup in the exchange.

`Single tests`

ARGUS - Main Menu.

`CF delete`

`Select service`

Using the cursor keys, select the "Service" of the call diversion.

`Select the type of call diversion`

Using the cursor keys, select the type of call diversion.

`Enter own number`

The speed-dialling memory opens (see page 371).
Under "Own number", enter the call number which should no longer be diverted.

Delete call diversion

`Call diversion deleted`

Open the Single Tests Menu.

19.9 Automatic Performance of Multiple Tests

The ARGUS performs an automatic test series and displays the test results. The required parameters (e.g. measurement time and error level for the BERT, see page 246) should be checked before the automatic test series is begun.

Using the ARGUS WINplus or WINanalyse software, the test results can be saved on a Windows PC. On the PC, WINplus / WINanalyse can be used to generate a comprehensive report that can then be printed, sent by e-mail and/or archived. The ARGUS automatically performs the following sequence of single tests:

On a BRI S/T or U-interface (ARGUS in TE mode)

- Status
- Level measurement
- Service check
- BERT in an extended call to oneself
- Supplementary service test (Suppl.serv.test)
- CF Interrogation (Call Diversions)
- X.31 test

On a BRI S/T or U interface leased line (permanent circuit)

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

Test results

ARGUS - Main Menu

Test results

1 AMP_1
2 empty
3 empty
4 empty
5 empty
6 empty
7 empty

Date

Select the memory location. If the memory is full, you must manually select a memory location to be overwritten. For each memory location used, the ARGUS will display the name assigned to the memory location (in this example, AMP_1) or the time and date (if you press `<Date>`). Empty memory locations are labeled "empty“, see page 361.

Start

Press the on the numeric keypad to by pass the test results and directly access a memory location.

save as:

AMP_1

Delete | ab>AB

As names for the memory locations, the ARGUS will suggest either AMP_1, AMP_2, AMP_3 etc. or the call number entered as the "Own number“ in the speed-dialling memory (see page 371).

Accept the suggested name for the memory location or enter a new name (see page 371).

Enter own (local) number

In TE mode:
Enter the “Own number”; on accesses using the DSS1 protocol you must also enter a “remote number”.

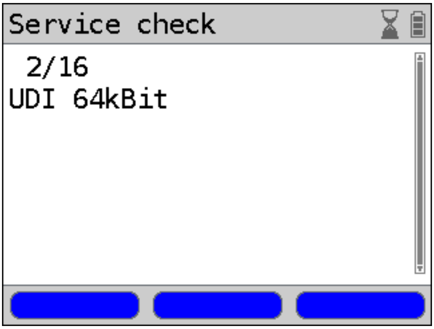
Select service

Select service
(required for Supp.Serv.test and BERT).

Start the automatic test

During the test sequence, the ARGUS will display the single test currently running.

Terminating the test (early):

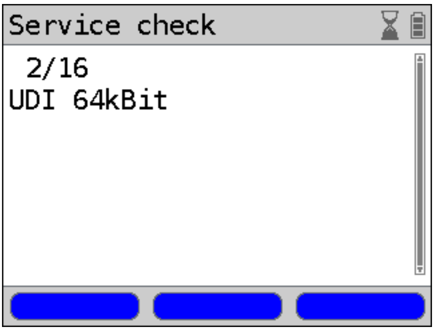


Interrupt test

The ARGUS will terminate the test sequence, any test results already gathered will be lost. Any "old" data stored in this memory location from a prior test will be retained.

Open the next higher menu.

Skipping individual tests:



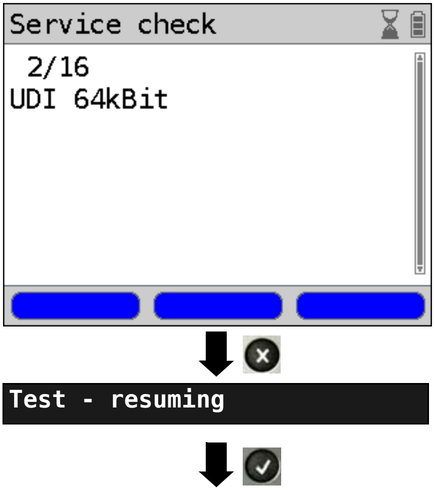
A single test can be skipped: In this example, the ARGUS is currently running a Service check.

Stop current test

Stop the current single test.

In this case, the ARGUS will execute the next single test.

Resuming a test:



The ARGUS can resume an interrupted single test: In this example, the ARGUS is running a Service test.

Stop the current single test

The ARGUS repeats the "interrupted" single test (in the example: a Service check).

For information on displaying the test results, see page 362.

19.10 Connection

The ARGUS can set up a connection for the following services:

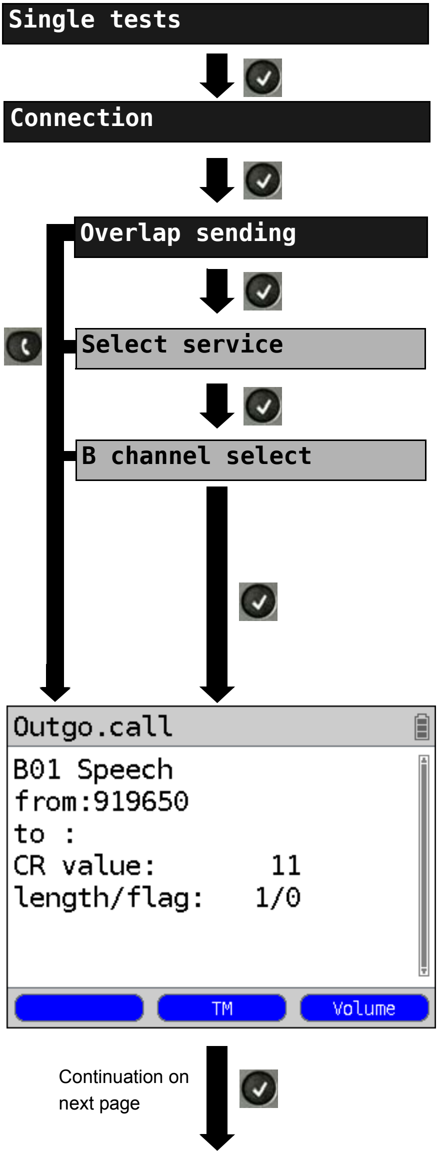
Service	Display
Speech	**Speech**
Unrestricted Digital Information (data telecommunications)	**UDI 64kBit**
3.1 kHz audio	**3.1 kHz audio**
7 kHz audio	**7 kHz audio**
Data transfer with tones & displays	**UDI-TA**
Telephony	**Tel. ISDN**
Telefax Groups 2/3	**Fax G3**
Fax Group 4	**Fax G4**
Combined text and facsimile communication	**Mixed**
Teletex Service basis mode	**Teletex**
International interworking for Videotex	**Videotex**
Telex	**Telex**
OSI application according to X.200	**OSI**
7 kHz Telephony	**7 kHz**
Video telephony, first connection	**Videotel. 1**
Video telephony, second connection	**Videotel. 2**
Three user-specified services (see, page 243)	**User-specified 1 to 3**

A headset or the integrated handset can be used as a phone during a telephone connection.

When a 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.



ARGUS - Main Menu

<Call no.> Open the call number entry dialog

The ARGUS will open the Connection display.
Besides overlap sending (as shown on the left), one of the following can be selected here
- En-bloc sending (see page 280)
- Redialling (see page 281)
- Keypad dial (see page 285).

Select the service to be used for the connection.

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. Press **<Delete>** first before entering a new B channel. If you enter an *, the ARGUS will choose any B channel that is free. The ARGUS will show whether the B channel is available.

To set up a connection

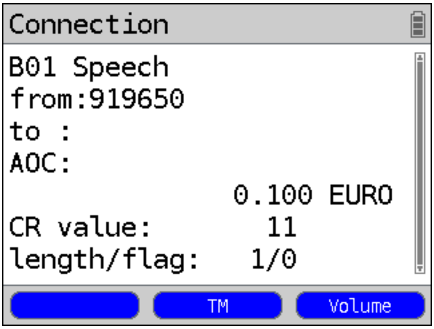
Enter the call number on the keypad.
Display:

- B channel and service
- The number in the speed-dialling memory under “own number”, see page 371 (from:)
- The number dialled (to:)
- Other information depending on the access, e.g. TON and NP

<TM> Start the Test Manager, see page 289.

<Volume> Set the volume

or Cancel setup



or

Disconnect

The connection is setup using B channel 1.

Depending on the type of access other information will be displayed.
- Subaddress of the caller (SUB)
- Destination number
- User-User Information (UUI)
- Display Information
- Type of number (TON)
- Numbering plan (NP)
- Units for charges

<TM> Start the Test Manager, see page 289.

<Volume> Set the volume

- Display 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 300182 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 own call number

Separate the extension from the access number with a # (e.g. 02351 / 9070-40 is entered on the ARGUS as: 023519070 #40). 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).
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).

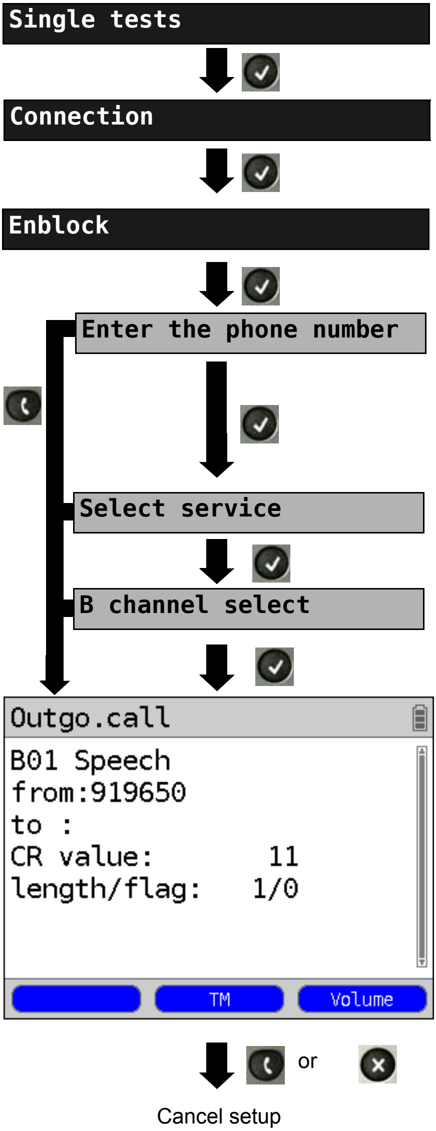
Simplified overlap sending using the telephone key

pressed once: The ARGUS will open the Connection/Overlap window directly regardless of the currently open menu.

depressed 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 dialling information in one block.



ARGUS - Main Menu

<Call no.> Open the call number entry dialog

The speed-dialling memory opens (see page 371).
Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

The ARGUS will open the Outgo. call display, operation like by overlap sending.

Enter the B channel on the keypad (for details on entry, see “Overlap sending”).

For more information on the displays and operation, see Overlap sending page 278.

<TM> Start the Test Manager, see page 289.

<Volume> Set volume

Redialling (outgoing call) + Last caller (incoming call)

The ARGUS will set up a call using the last number dialled or the number of the last caller.

Single tests

ARGUS - Main Menu

Connection

`<Call no.>` Open the call number entry dialog

Redialling or Last caller

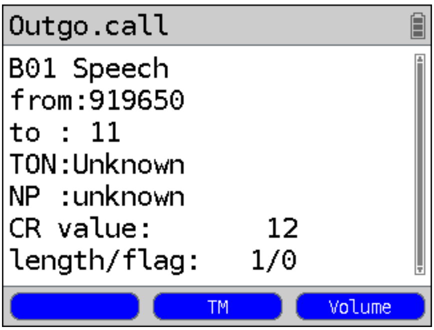
Confirm number

Select service

B channel select

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. Before entering a new B channel first press `<Delete>`. If you enter an *, the ARGUS will choose any B channel that is free. The ARGUS will show whether the B channel is available.

The dialling procedure will begin using the number last called or the number of the last caller.



For more information on the displays and operation, see Overlap sending page 278.

`<TM>` Start the Test Manager, see page 289.

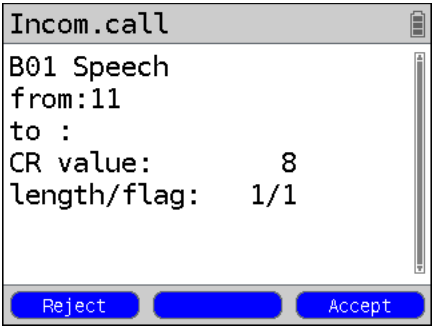
`<Volume>` Set volume

or

Cancel setup

Incoming Call

An incoming call can be taken at any time even when a test (e.g. a BERT) is in process (see page 290). 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 244) 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 speed-dialling memory (see page 371) and the incoming call has a destination MSN.



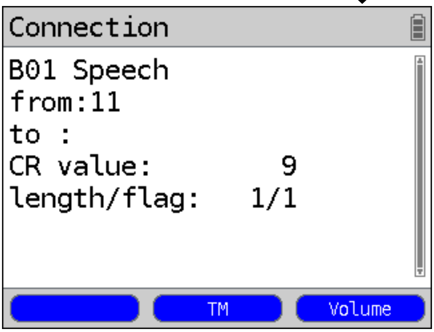
Display:

- B channel used and service
- The caller's number (from:)
- Destination number (to:)
- Other information depending on the access, e.g. TON and NP

The ARGUS will display the complete destination number (DDI), if the Alerting mode is set to manual (see page 242).

Reject call

Accept call



Depending on the type of access additional information will be displayed (in the example, CR value and length/flag).

⚠ The call number of the last incoming call will be saved in the "Last caller" memory location.

<TM> Start Test Manager, see page 289.

<Volume> Set volume.

 or 

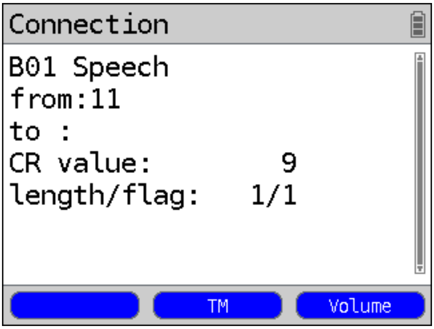
Disconnect

The ARGUS displays the cause of the disconnect (see page 283).

Charge information in NT mode:

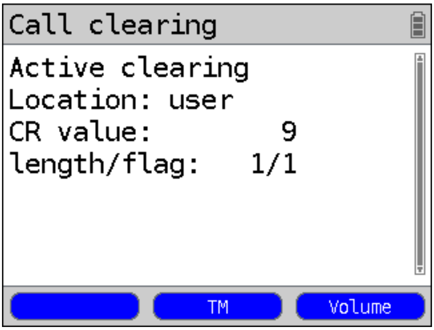
In NT mode, the ARGUS will – for incoming calls – send advice of charges in accordance with DSS1 as units and as currency (in euros).

Clear (disconnect) the connection



<TM> Start Test Manager ,see page 289.

<Volume> Set volume



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).
Depending on the access, additional information will be displayed (in this example, Units).

The following causes are shown in clear text:

Reason	Display	Explanation
255	Active clearing	Clearing User actively initiated the disconnection
Length 0	Normal clearing	Cause element with Length 0
01	unalloc. number	Signals “No access under this call number”
16	Normal clearing	Normal clearing
17	User busy	The number called is busy
18	No user respond	No answer from the number called
19	Call time too long	Call time too long

21	Call reject	The call is actively rejected
28	Wrong number	Wrong call number format or call number is incomplete
31	Norm. clearing	Unspecified “normal class” (Dummy)
34	No B chan.avail.	No circuit / B channel available
44	Req.chan.unavail	Requested B channel not available
50	Req.fac.not subs	Requested supplementary service (facility) not subscribed
57	BC not authoriz.	Requested bearer capability is not enabled
63	Srv./opt.n.avail	Unspecified for “Service not available” or “Option not available”
69	Req.fac.not impl.	Requested facility is not supported
88	Incompat. Dest.	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 ”ARGUS Error Messages (DSS1)" on page 388).

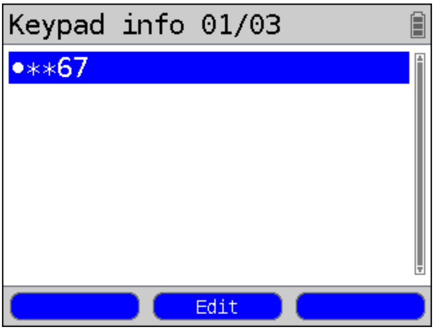
Testing Features via the Keypad

This feature is only relevant on an S-Bus or U interface. 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.

Single tests — ARGUS - Main Menu.

Connection

Keypad dial



Select keypad info, see page 244.

<Edit> Edit the selected keypad info entry. Afterwards, use the keypad to enter the keypad info.

Select service — Using the cursor keys select the service that should be used for the connection.

B channel select — Use the keypad to enter the B channel for the connection, see page 278.

Outgo. call — Start the dialling procedure. For more information on the displays and operation, see Overlap sending page 278.

19.11 Time Measurement

The ARGUS measures three different times:
- Connection setup time
- The propagation delay of the data
- The difference between the propagation delays for the data on two B channels.

Connection setup time

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

Single tests — ARGUS Main Menu

Time measurement

Conn. up time

Dial the number — The speed-dialling memory opens (see page 371). Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

Select service

B channel select — Enter the B channel on the keypad

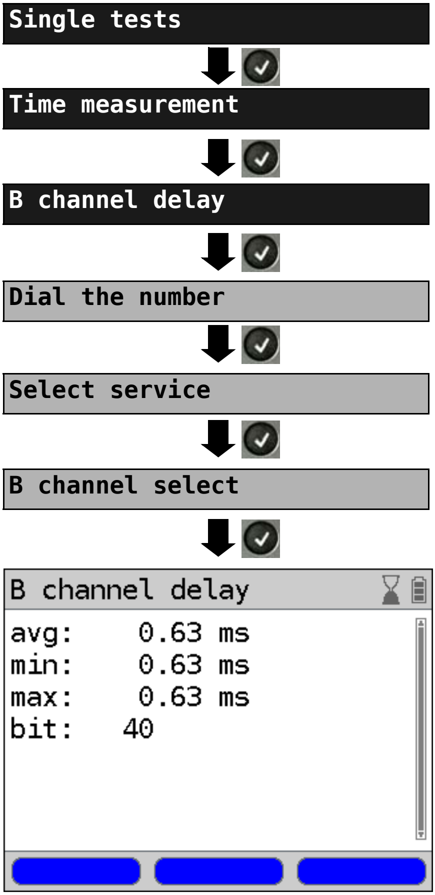
Perform measurement

Display:
- Connection setup time in seconds
- L3 message received when the connection has been fully setup

If the ARGUS cannot perform the measurement - e.g. because the call number entered was wrong or no B channel is free - the cause (see page 386) will be displayed.

B channel delay

The ARGUS places a call to itself (self call) or to a remote loopbox and measures the propagation delay for the data in the selected B channel. The measurement (continuous measurement) must be terminated manually.



ARGUS Main Menu

The speed-dialling memory opens (see page 371).
Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

Enter the B channel on the keypad

Perform measurement

Display

- avg: average B channel delay
- min: shortest B channel delay
- max: longest B channel delay
- bit: The average B channel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

The measurement will be repeated in cycles (continuous measurement).

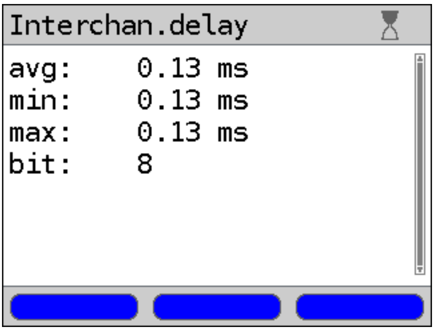
Stop measurement, the ARGUS will display the last measurement.

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B channel is free) the ARGUS will display the corresponding cause. If the ARGUS does not receive the data back in the B channel within 13 seconds, it will display the message “No loop”.

Interchannel delay

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

Single tests	ARGUS Main Menu
Channel selection:	
Interchannel delay	
Enter remote number	The speed-dialling memory opens (see page 371). Use the cursor keys to scroll to desired the number or enter a new number.
Select service	Perform measurement



avg: average interchannel delay

min: shortest interchannel delay

max: longest interchannel delay

bit: The average interchannel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µsto send a bit).

The measurement will be repeated in cycles (continuous measurement).

Stop measurement.The ARGUS will display the last measurement.

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B channel is free) the ARGUS will display the corresponding cause. If the ARGUS does not receive the data back in the B channel within 13 seconds, it will display the message “No loop”.

19.12 Managing Multiple Tests on an ISDN Access

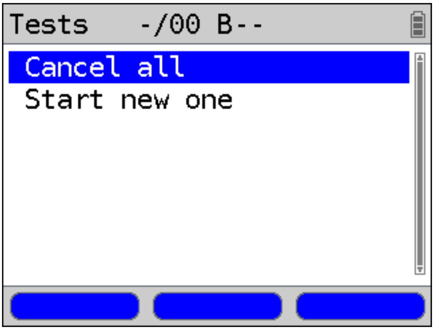
The ARGUS can simultaneously start several tests or “connections” independently of each other. As an example, a BERT can be run at the same time that you make a phone call. The individual tests or “connections” use resources.

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.

Test Manager

ARGUS - Main Menu

Open the Test Manager

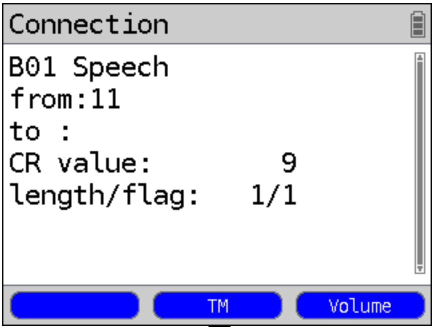


<TM>
or

Opens the Test Manager directly in the Single Tests Menu if a connection has already been setup or if the ARGUS is running a test.

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.

Open the Test Manager (can also be opened by pressing the -key).

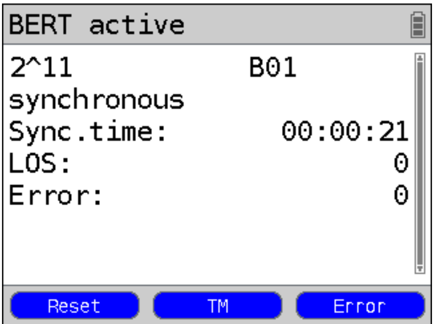
Start new one

Single tests

Bit error rate test

Select the desired test (e.g. bit error rate test, BERT).

Start BERT, the connection is still setup.



For information on running a BERT, see page 247.

Open the Test Manager,
mark “Outgoing connection”.

Outgoing call

Open the
Connection display.

An example of the display

```
Tests    1/02  B01
```

The connection was the first started

There are 2 connections/ tests

The connection uses B channel 1

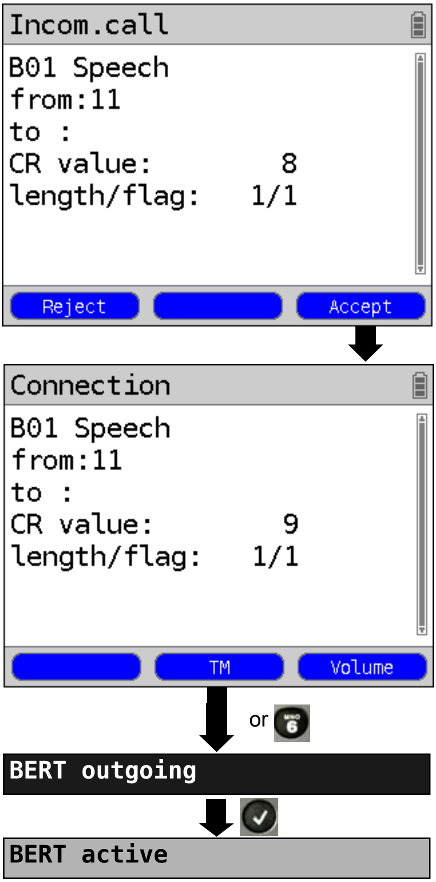
If a test (or connection) is canceled (or cleared), the ARGUS will return to the Test Manager if there is another test (or connection) running in the background.

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

Test / Connection	**Number of times that a test or 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 check	1	No
Suppl.serv.test	1	No
Time measurement	1	No
X.31 test	1	No
CF Interrogation / Active / Delete	1	No
Automatic test	1	No

Switching between Parallel Tests or Connections

This operation will be illustrated using the example of "Accepting an incoming call during a BERT". The ARGUS signals an incoming call both audibly and on the display (see page 277). The incoming call can be accepted without influencing the currently running BERT.
If either the “B channel loop” or the “BERT wait” function is active, the call will be accepted automatically.



While running a BERT, the ARGUS displays information about an incoming call.

<Reject> Reject the incoming call. The ARGUS will switch to the BERT.

Accept call
The BERT will continue in the background.

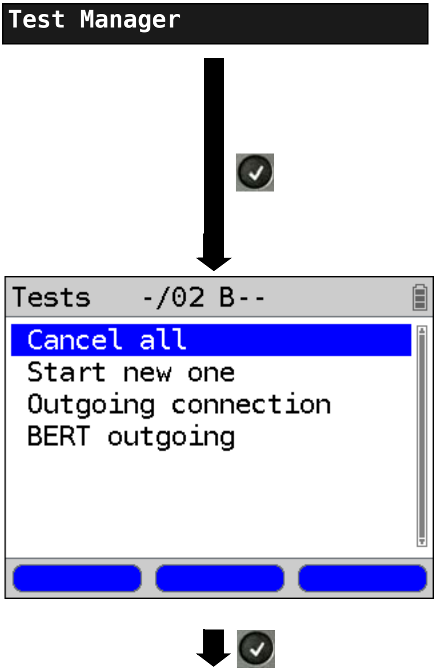
Mark “BERT outgoing”.

Switch to BERT.

The connection remains active in the background, the handset is assigned to the connection.

⚠ The handset will be assigned to the appropriate currently active connection. The assignment of the handset to a given connection is also retained in the background.

End All Currently Running Tests or Connections



All tests will be terminated and
all connections cleared down.

ARGUS - Main Menu.

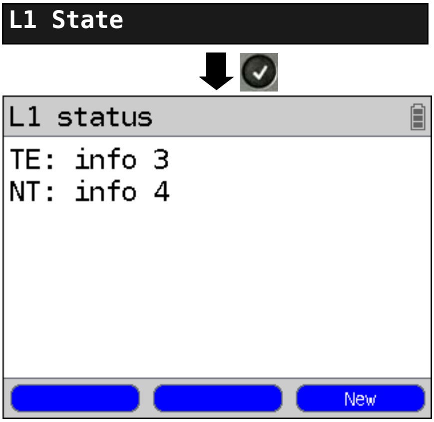
Open the Test Manager

<TM> or  Opens the Test Manager directly in the Single Tests Menu if a connection has already been setup or if the ARGUS is running a test.

19.13 The L1 State of an S-Bus Access

The ARGUS displays the current status of Layer 1: i. e. which signal does the remote end receive and which signal does the ARGUS receive?

ARGUS - Main Menu



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

<New>	Layer 1 will be setup again
	Close the display and open the Main Menu.

19.14 Monitor

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

Access — ARGUS - Main Menu

S-Bus interface

Monitor

Status display — Monitoring is not yet active!

`<Start>` — Start monitoring

```
Monitoring
Durat.:   0:00:03
Signals:            39

          Listen
```

The ARGUS displays the recording time in h:min:sec and the number of recorded signals.

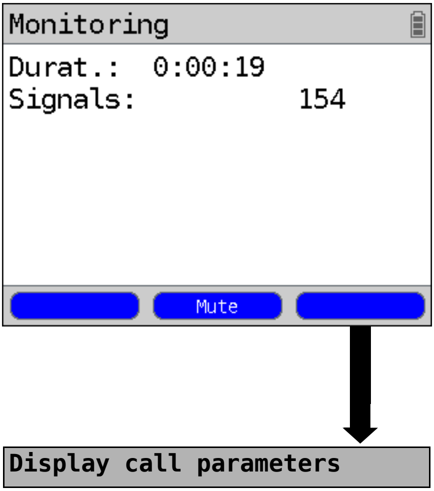
Stop monitoring.

Listening-in on voice data

B channel select

Enter the second B channel from the keypad (first press **<Delete>**) or use the cursor keys to select it. The ARGUS will switch the handset to this B channel.

Continuation on next page



Listening-in on voice data (Direction: Net --> User) possible.

<Mute> To stop listening

<Talk> Parallel call display while monitoring

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

The ARGUS displays the call parameters of the last SETUP received.
Display:

- Call direction (N -> U for Net -> User)
- B channel used
- Service
- Own number (from:)
- Destination number (to:)

Depending on the type of access additional information will be displayed.

- Sub-address (SUB),
- User-User-Info (UUI),
- DSP messages
- Type of number (TON)
- Numberin Plan (NP)

Listening-in when monitoring is not active

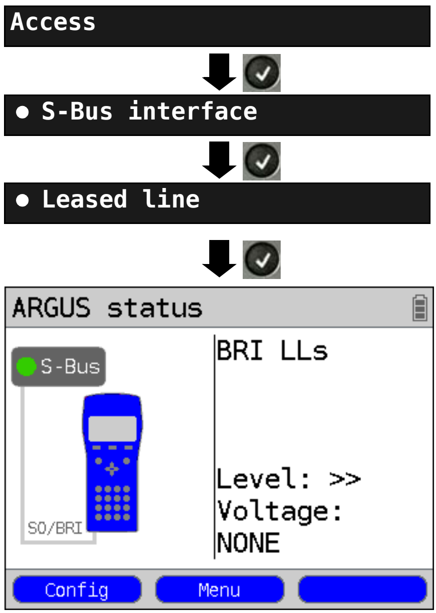
Access	ARGUS - Main Menu
S-Bus interface	
Monitor	
Status display	Monitoring is not active!
<Menu>	
Listening-in	
Network-side	It is possible to passively listen-in on the network-side, the terminal-side or both sides.
B channel select	Enter the B channel from the keypad (first press <Delete>) or use the cursor keys to set it.
Listening-in	Stop listening-in and open the Main Menu.

19.15 Leased Lines on an ISDN Access

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 by exchanging HDLC-frames. The location where the clock is generated can be selected (see page 242). A quick and simple test of a leased line can be made by placing or taking a call on a selected B channel. However, for a more precise test, a bit error rate test should be run.

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

Telephony



ARGUS - Main Menu.

<Config> ISDN parameter configuration, see page 241.

Continuation on next page

```
B channel select
```

Enter the B channel from the keypad (first press <Delete>) or use the cursor keys to set it.

```
Setup the telephone connection
```

The ARGUS will display the B channel used and the duration of the leased line (in h:min:sec).

Disconnect

<Volume>	Set the volume
<TM>	Start the Test Manager, see page 290. Another connection can be setup.

Alternatively, the connection can be setup via Connection in the Single Tests Menu.

Bit Error Rate Test

There are a number of variants of the bit error rate test: In the simplest case, a B channel loop will be set up at the remote end; for information on parameter settings, see page 246. 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 245, Parameter settings, page 247), however, you need not enter call numbers or select a service.

```
Single tests
```

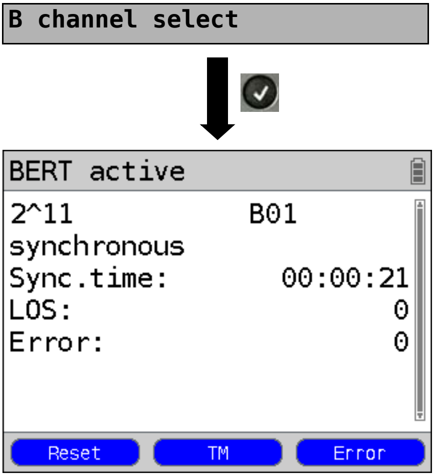
```
Bit Error Rate Test
```

```
BERT start
```

```
B channel (64k)
```

In the case of a BRI in end-to-end mode (see page 246 and page 253), it is also possible to run a BERT in the D channel with HDLC framing (channel selection: D channel).

Continuation on next page



First press **<Delete>** and enter the B channel on the keypad, or use the cursor keys to set it.

BERT Start

During the BERT, the display shows:

- The bit pattern and channel used
- The synchronicity of the bit pattern (in this example, synchron)
- Sync. Time in h:min:s
  The time in which the ARGUS can sync to the bit pattern.
- LOS
  Synchronization is lost at an error rate greater than or equal to 20 % within a period of a second. The absolute number of synchronization losses will be shown.
- Fault: the bit errors that have occurred.

<Reset> The test time and number of bit errors will be reset.

<TM> Start Test Manager, see page 289.

<Error> Insert artificial bit errors to test the reliability of the BERT.

 Stop the BERT
Display the test results, see page 362.

For information on saving the test results, see page 252.

Loopbox

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

Single tests

ARGUS - Main Menu

Bit Error Rate Test

B channel loop

B channel select

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

Activate loopbox

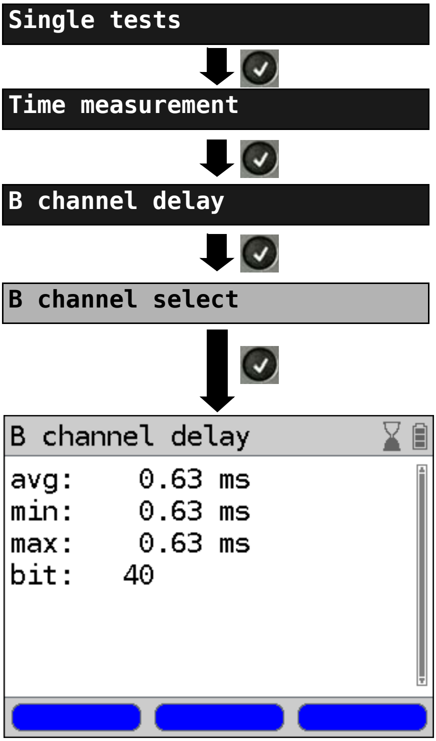
The ARGUS will display the B channel used and how long the loopbox has been activated (in h:min:sec).

Deactivate the loopbox.

Time Measurement

B channel delay

The ARGUS will measure the delay on the selected B channel. If the ARGUS does not receive the data back in the B channel in about 13 seconds, it will display the message “No loop”. The measurement (continuous measurement) must be terminated manually.



ARGUS - Main Menu

First press `<Delete>` and enter the B channel on the keypad, or use the cursor keys to set it.

Perform measurement

Display:

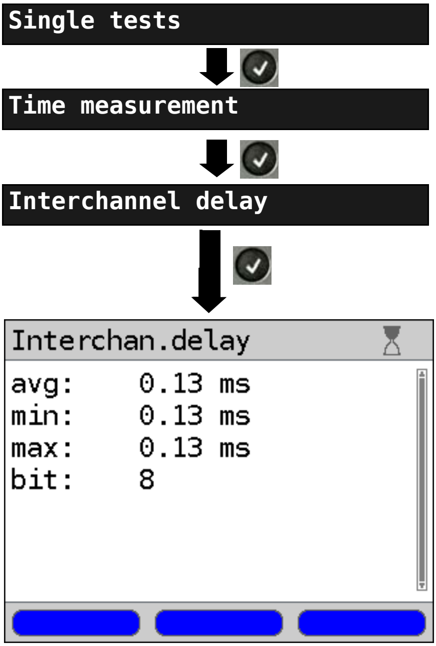
avg:	average B channel delay
min:	shortest B channel delay
max:	longest B channel delay
bit:	The average B channel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

The measurement will be repeated in cycles (continuous measurement).

Stop measurement, the ARGUS will display the last measurement.

Interchannel delay

The ARGUS will send the B channel data to a loopbox which will then send it back on the same channel. The ARGUS measures the propagation delay for the data on each of the B channels and determines the difference between the two propagation delays (interchannel delay). If the ARGUS does not receive the data back in the B channel in about 13 seconds, it will display the message “No loop”.
The measurement (continuous measurement) must be terminated manually.



ARGUS - Main Menu

Perform measurement

Display:

avg: average interchannel delay

min: shortest interchannel delay

max: longest interchannel delay

bit: The average interchannel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

The measurement will be repeated in cycles (continuous measurement).

Stop measurement, the ARGUS will display the last measurement.

19.16 Level Measuring on an ISDN Access

Level Measurement on a S-Bus Access

Level measurement – connected line

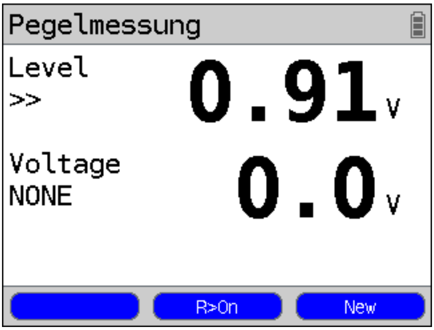
The ARGUS measures the level of the received useful signal and the phantom feed. The measurement will be updated continuously.

`Level measurement`

ARGUS - Main Menu

`Connected line`

Start measurement



The ARGUS will display the level of the useful signal (Level) and the feed voltage.

Evaluation of the useful signal level:

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

Stop measuring level.
Open the Level measuring menu.

Evaluation of the feed voltage:

`Voltage OK Normal voltage`	Normal feed (40 V $^{+4{,}25\,\%}_{-13{,}75\,\%}$ i.e. from 41.7 V to 34.5 V)
`Voltage OK Feed voltage`	The (inverted phantom) feed is alright (OK).
`Voltage None`	No feed (Voltage)

`<R>On>`	`100` Ω resistor switched in
`<R>Off>`	`100` Ω resistor switched off
`<New>`	Setup Layer 1 again

Level measurement other TE

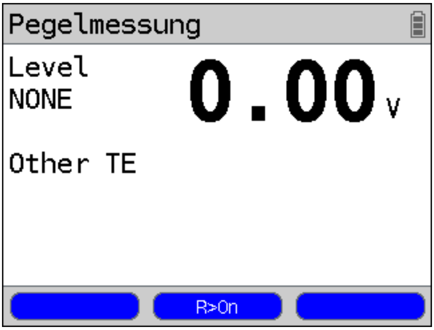
In TE mode, the ARGUS will measure the level of a terminal connected in parallel. In this case, the ARGUS is passive. Layer 1 must be activated on the terminal. The ARGUS updates its measurement continuously.

Level measurement

ARGUS - Main Menu

Other TE

Start measurement



The ARGUS displays the level and an evaluation of the useful signal:

<<	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

<R>On>	100 Ω resistor switched in
<R>Off>	100 Ω resistor switched off
<New>	Setup Layer 1 again

Stop measuring level.
Open the Level measurement menu.

Level Measurement on a U interface

Measurement of feed voltage on a U interface

`Level measurement`	ARGUS - Main Menu
⬇ ✓	
`U interface feed voltage`	
⬇ ✓	Start measurement
`Level measuring results`	The ARGUS will display the level of the feed voltage. The measurement will be updated continuously.
⬇ ✗	

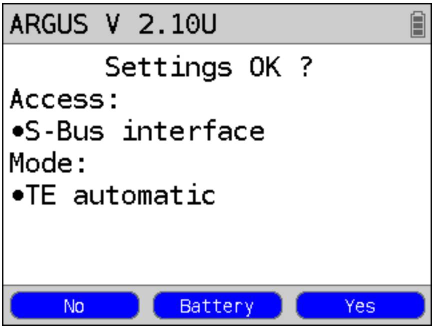
Stop measuring level.
Open the Level measuring menu.

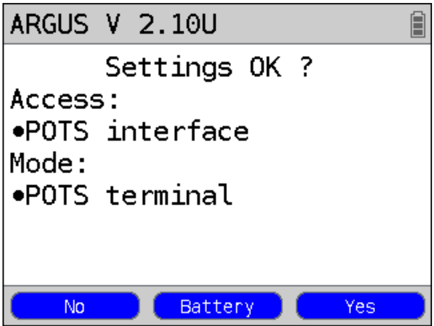
20 Operation on a POTS access

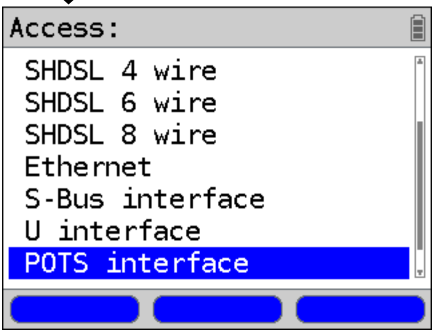
⚠ The voltages on the subscriber line may not exceed 130 VDC and should be free of AC voltage.

20.1 Setting the POTS Interface

Use the included connection cable to connect the ARGUS (Line jack) to the POTS access to be tested and then switch the ARGUS on. Which initial display is now shown will depend on which access setting was made last on this ARGUS (in this example, S-Bus and POTS interface):







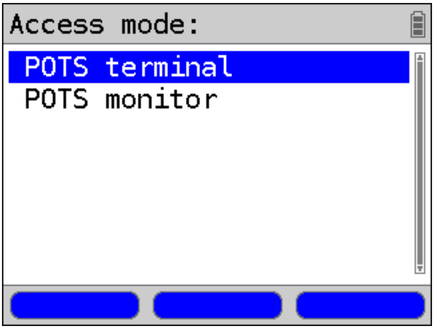
The Access Menu:

Press — Select a type of access; the selected type will be marked blue.

The ARGUS will set the type of access to the one marked blue - POTS interface. The Access Menu will open.

Continuation on next page

Continuation on next page

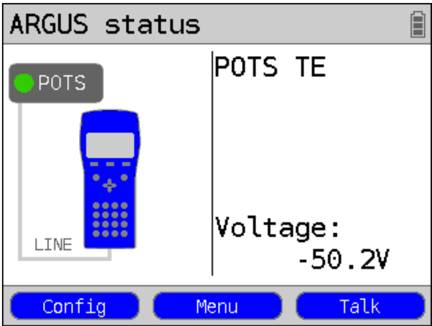


Access Menu:

Press — Select an Access Mode; the selected mode will be marked blue (in this example, POTS terminal).

ARGUS State Display

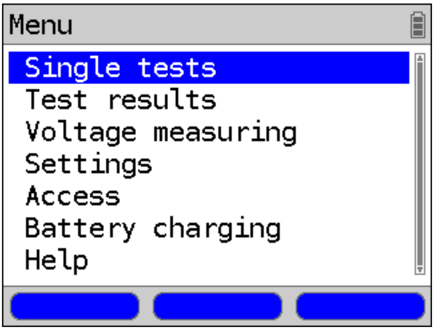
The ARGUS will use the marked Access Mode. The State Display will open.



The ARGUS displays the voltage on the line when it is "on hook“ (not busy).
Positive voltage: Polarity on a+; on b- (red wire is a, black wire is b)
Negative voltage: Polarity on a-; on b+

<Config>	Opens the Settings menu for POTS parameters, see page 312.
<Menu>	Open the Main Menu
<Call>	For information on setting up a call, see page 314.

Main Menu



The various menus available for the selected type of access will be shown in the Main Menu.

The ARGUS will open the marked menu (in this example, Single tests).

Select a menu. The selected menu will be marked blue in the display.

Return to the previous menu (in the example, the State display).

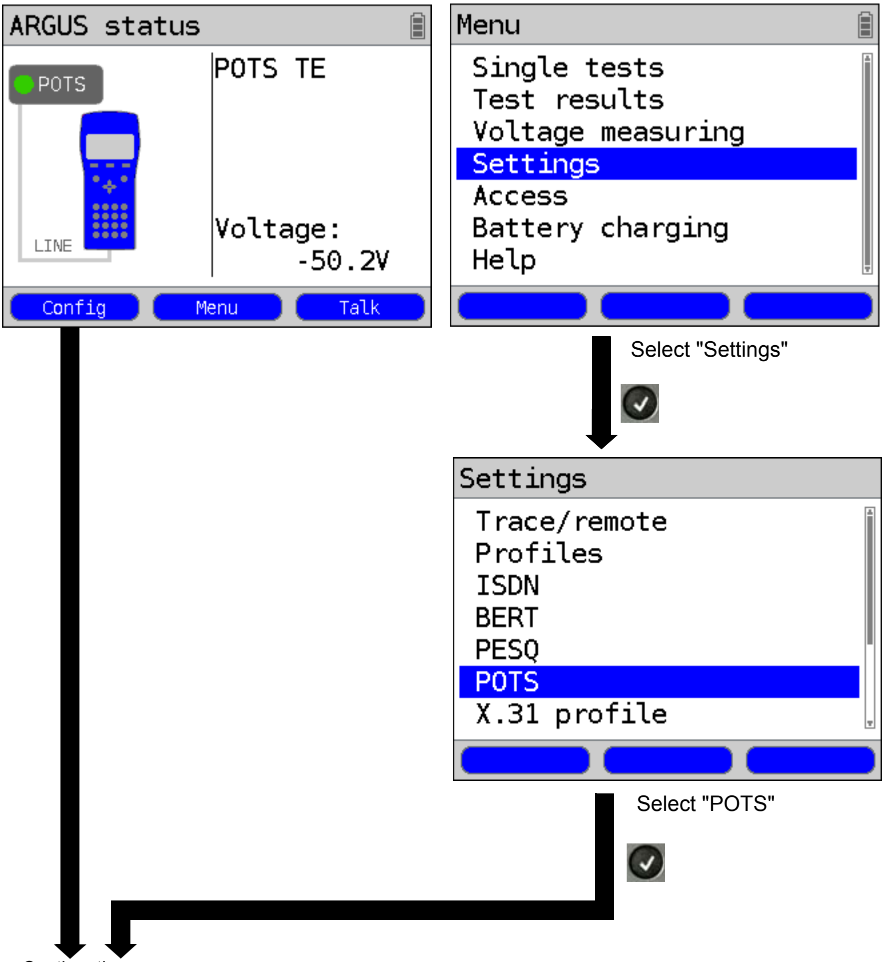
Note: Starting functions with the numeric keys / key combinations:
Using the ARGUS keypad, you can start important functions / tests directly, regardless of the menu that the ARGUS is currently showing. If a function is called where the ARGUS expects the entry of a digit, pressing a number key will be interpreted as the expected input.

The assignment of functions to the numeric keys can also viewed on the ARGUS display. Open the Main Menu and select "Help" or press number key "1".
An overview of the possible key combinations can be found on page 134.

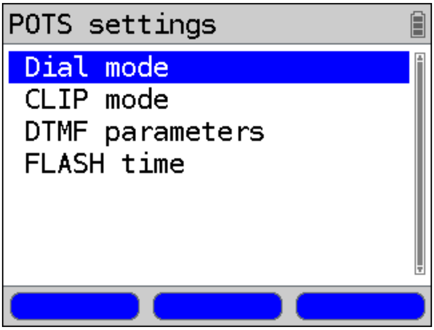
20.2 POTS Settings

It is possible to configure the following "POTS Settings". The default settings can be restored at any time (see page 368). The procedure for configuring a parameter will be illustrated with a single example:

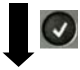
ARGUS State Display **The ARGUS - Main Menu**

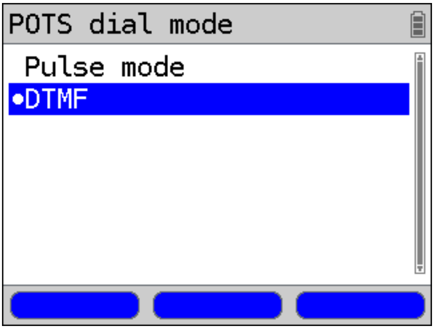


Continuation on
next page



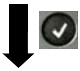
For example, select the POTS "Dial mode"





Select the type of dialling mode.
The default setting will be marked in the display with a ●.

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



The marked "Dial mode" mode will be activated as the default setting.
Open the next higher menu.

Setting	Explanation
POTS	
`Dial mode`	Selection of the dial mode: DTMF or pulse dialling Default setting: ***DTMF***
`CLIP Mode`	Select the transfer procedure used to pass the call number: **FSK** CLIP via FSK (Frequency Shift Keying) For Germany and some other places in Europe **DTMF** CLIP via DTMF (Dual-tone multi-frequency) For Scandinavia and the Netherlands The ARGUS will automatically detect that a CLIP was sent using DTMF with the polarity reversal and will set itself accordingly (e.g. Netherlands). 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 3 dB. Range: -30 to +9 dB Default setting: ***-3 dB***
`Time`	Setting the DTMF time: Range: 40 to 1000 ms 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

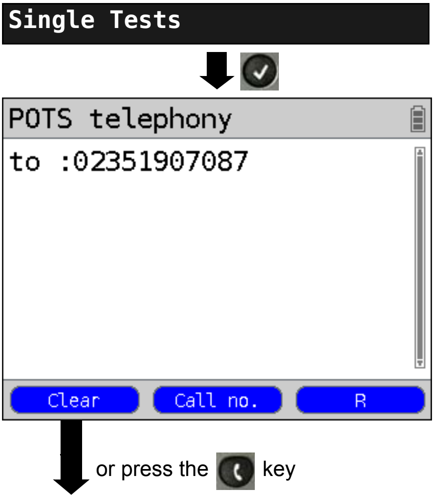
`Interval`	Setting the interval between two DTMF characters: Range: 40 to 1000 ms Default setting: ***80 ms*** Use the cursor keys to raise or lower the setting: In the range 40 - 200 ms: 10 ms steps In the range 200 - 300 ms: 20 ms steps In the range 300 - 1000 ms: 100 ms steps
`Defaults`	Restores the 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. Range: 40 to 1000 ms 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

For information on restoring the default parameter settings, see page 370.

20.3 Connection on a POTS Access

Outgoing Calls

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



or press the key

Clearing the connection

For information on the ARGUS in the "POTS telephony" access mode, see page 308.
The ARGUS - Main Menu

<Call> or — Setup the connection: Enter the number on the keypad. Each of the number's digits will be dialled individually. The ARGUS will display the number dialled. As soon as the remote party answers, a voice connection will be set up.

<Call no.> — The ARGUS will display the last number dialled (simplified last number redial) or that of the last caller.

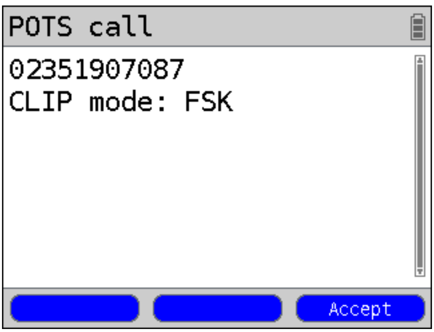
<R> — Generate a FLASH signal.

Scroll through the speed-dialling memory to select a different number or enter a new one using the keypad.

⚠ Simplified overlap signaling using 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 (for information on CLIP mode, see page 312).

<Accept> or — Accept call

⚠ The call number received will be saved in the “Last caller” memory location.

20.4 POTS Monitor

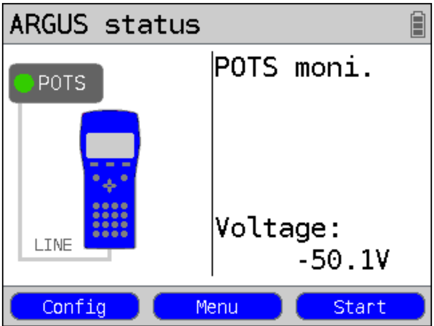
The POTS monitor function provides a high impedance tap (for listening-in) that does not influence the interface. You can listen-in on the line with the integrated handset or a headset without having the ARGUS send on or otherwise influence the interface.

Access

POTS interface

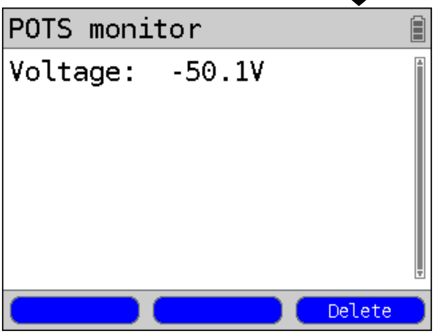
POTS monitor

The ARGUS - Main Menu



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

Start Monitoring



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

Press to display additional information, if available on the access

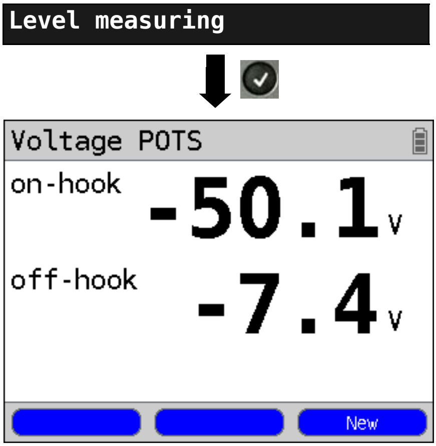
<Loud> Increase volume (The microphone is off.)

<Delete> Clears the display.

Stop monitoring and the ARGUS will open the State Display.

20.5 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).



ARGUS Main Menu

Start Measurement

The ARGUS will display the polarity of the 2-wire POTS line (red wire "a"; black wire "b") as well as the "on hook" and "off hook" voltage levels.

<New> To repeat the measurement

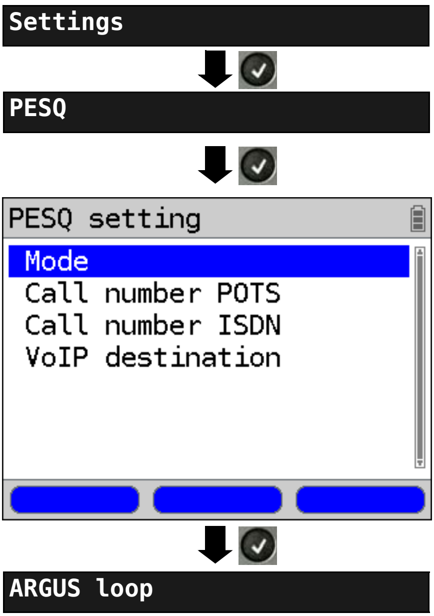
 Open the Main Menu

21 PESQ

To provide objective evaluation of speech quality, the ARGUS will perform a PESQ analysis in accordance with ITU-T P.862 (Perceptual Evaluation of Speech Quality) on an ISDN, POTS, or xDSL access or on an Ethernet line directly. The PESQ test is only available for the interface that was enabled earlier (e.g. ISDN option).
The ARGUS does not perform the PESQ analysis itself, rather it is handled by a PESQ Server. This server has its own call number. The ARGUS is connected to the access under test directly and sends or loops a standardized speech sample to the server.
To assess the speech quality sending, the ARGUS will send the recorded speech sample to the server, which will determine the PESQ value and send this result back to the ARGUS. The ARGUS will then display this PESQ result.
To assess the speech quality sending and receiving, the speech sample will first be sent from the server to the ARGUS which will then loop it back to the server.

The network to be tested and its gateways must support RFC2833.

21.1 PESQ Settings



The ARGUS - Main Menu

Use the cursor keys to select the parameter (in this example, Mode).

Use the cursor keys to select ARGUS loop for example.

The ARGUS will now use the marked setting.

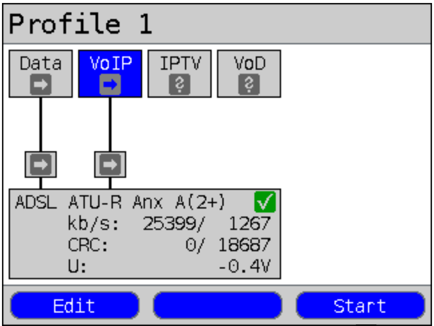
The ARGUS opens the next higher menu without making any changes to the parameters.

Setting	Explanation	
PESQ:		
Mode	Loop:	Evaluation of the speech quality sending and receiving. The ARGUS receives the speech sample from the server and loops this back to the server.
	Sending:	Evaluation of the speech quality sending. The ARGUS sends the recorded speech sample to the server.
Call number POTS	Enter the server number for a PESQ test on a POTS interface.	
Call number ISDN	Enter the server number for a PESQ test on an ISDN interface.	
VoIP destination	Enter the server number for a PESQ test on an xDSL interface or on an Ethernet access.	

21.2 PESQ Test on an xDSL or Ethernet Access via VoIP

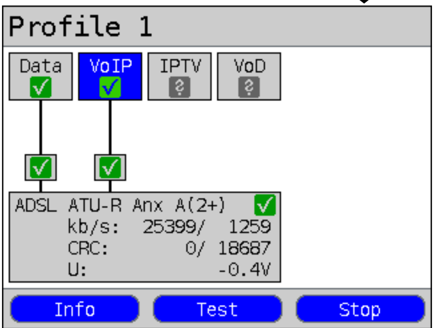
To perform a PESQ test on an xDSL or Ethernet access, first start VoIP telephony. For information on the setting of the VoIP parameters, see page 186 in the chapter on VoIP tests.

Start VoIP telephony (in this example on an ADSL access)

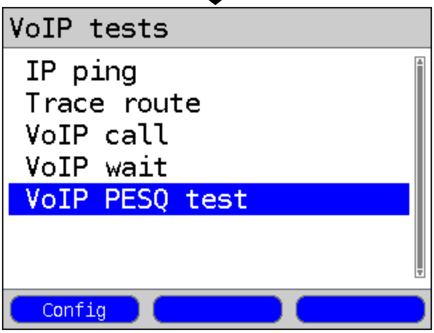


Setup the service

<Edit> Assign a Virtual Line to the VoIP service or edit it.



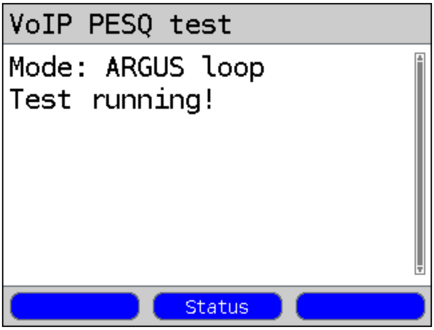
If no xDSL connection has been setup, a connection will be setup automatically at this point using the default profile (see page 40).



<Config> Display the PESQ Settings, see Page 318.

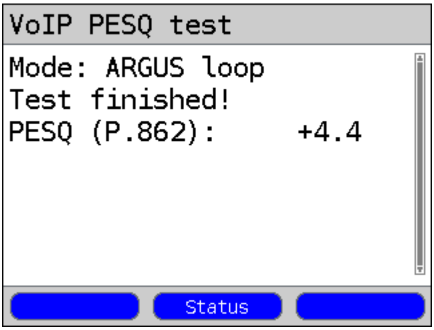
Continuation on next page

Synchronisation with the PESQ Server



The ARGUS will dial the call number entered under "VoIP destination" in the PESQ parameters.
In this case, the ARGUS will not dial the destination call numbers saved in the VoIP profile.

Test results:



The ARGUS will display the configured mode (in this example, ARGUS loop) and determine the PESQ value in accordance with ITU-T P.862.

The PESQ quality scale ranges from +4.5 (excellent) down to -0.5 (bad).
The evaluation of this value can be performed like for an MOS value (see page 191).

Save the result?

Close the results display
For information on saving the results, see IP Ping page 156.
“Sending the Trace file to a PC”, see page 126.

21.3 PESQ Test on an ISDN Access

Single tests

ARGUS - Main Menu (The type of access must be set to BRI or U-interface.)

PESQ test

Select service

Select the (speech) service, e.g. Telephony ISDN.

Enter the B channel

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. When entering a new B channel, first press `<Delete>`. If you enter an "*", the ARGUS will choose any B channel that is free. The ARGUS will show whether the B channel is available.

Select the PESQ Server

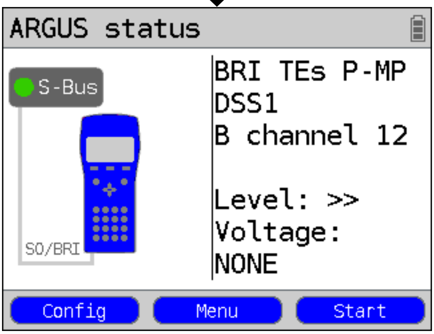
The ARGUS will dial the call number entered under "Call number ISDN" in the PESQ settings.

Synchronisation with the PESQ Server

⚠ The ARGUS cannot dial another call number saved under the general settings in the speed-dialling memory.

⚠ If there are any synchronisation problems, it is possible that changing the DTMF parameters may help. If you select the menu item "POTS", you can configure the following DTMF parameters:
- Level
- Time
- Interval

also change for PESQ on ISDN.



Test results:

ISDN PESQ-Test
Mode: ARGUS Loop
Test beendet!
PESQ (P.862): +2.8
MOS-LQO: +2.6

Save the result?

The ARGUS will display the selected mode (in this example, ARGUS loop) and the PESQ value determined in accordance with ITU-T P.862, as well as the similar MOS_{LQO} (LQO = Listening Quality Objective) pursuant to ITU-T P.800.1.

The PESQ quality scale ranges from +4.5 (excellent) down to -0.5 (bad).
The evaluation of this value can be performed like that for an MOS value (see page 191).

The ARGUS saves the results in the first available record number in memory; any name can be assigned to the record (default: AMP_1, AMP_2....) using the numeric keypad.

21.4 PESQ Test on a POTS Access

Single tests

PESQ test

Selection of the PESQ Server

Synchronisation
with the PESQ Server

The POTS PESQ test is
running.

ARGUS - Main Menu (the type of access must be set to POTS.)

The ARGUS will dial the call number entered under "Call number POTS" in the PESQ settings.

⚠ Please observe: (see Chapter 21.3 PESQ Test on an ISDN Access Page 321).

The PESQ test results for a POTS access will be shown like those for an ISDN access.

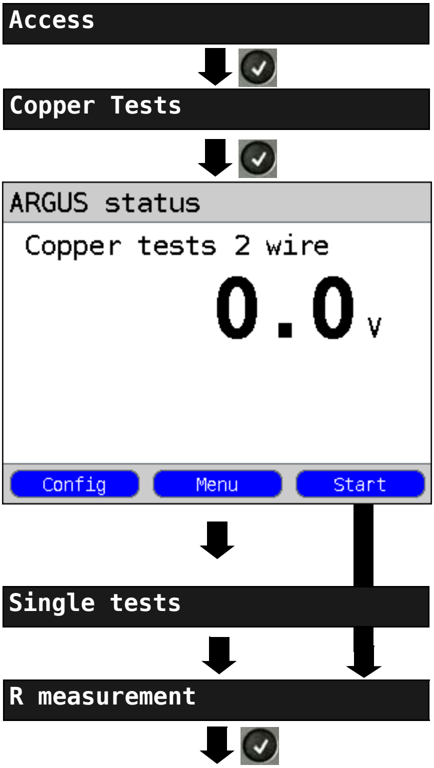
22 Copper Tests

In the Access Menu, you will find an entry for "Copper Tests". These tests are used to examine the physical properties of the line tested.
The use of the various functions is described briefly below. Since the results are generally only presented in graphic form and as correct interpretation of the results also requires certain knowledge of the line measured, detailed instructions on the interpretation of the results would spring the bounds of this manual. To facilitate interpretation of the results, the ARGUS supports various aids, such as e.g. the Zoom and Cursor functions.

22.1 R Measurement

The ARGUS is first connected directly from the "Line" jack to the test points and then performs an ongoing resistance measurement and displays the results in real-time.

To perform the R measurement, the access line must be voltage-free (out of service)!



ARGUS - Main Menu

Select Copper Tests.

ARGUS State Display
Any DC voltage on the line will be displayed here.
- Maximum measurement range: 200 V
- Resolution: 0.1 V
- Precision: ±2 %.

Make certain that the line is voltage-free before beginning the R measurement.

<Menu> Open the Main Menu.

<Start> Open the Single Tests Menu directly

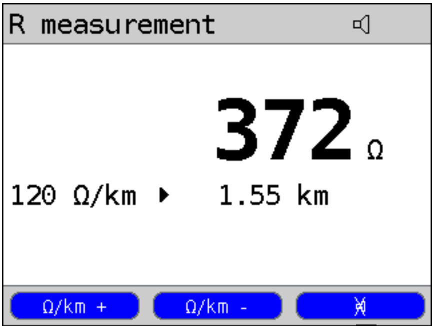
Select one of the Copper Tests:
- R Measurement
- RC Measurement
- etc.

The selected Copper Test will start as soon as it is selected.
In this example, R Measurement.

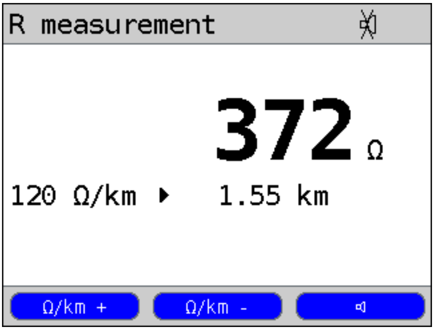
Initialization

The R Measurement will start automatically.

Line loop:



In this example, the R Measurement shows a resistance of 372 Ω . In the case of a copper cable with a specification of 120 Ω / km, this would indicated that the line is 1.55 km long (round-trip 3.1 km). The ARGUS calculates the line's specific electrical resistance. The loop resistance would be twice as high as the specific electrical resistance, i.e. for a specific electrical resistance of 120 Ω / km, the loop resistance would be 240 Ω / km.



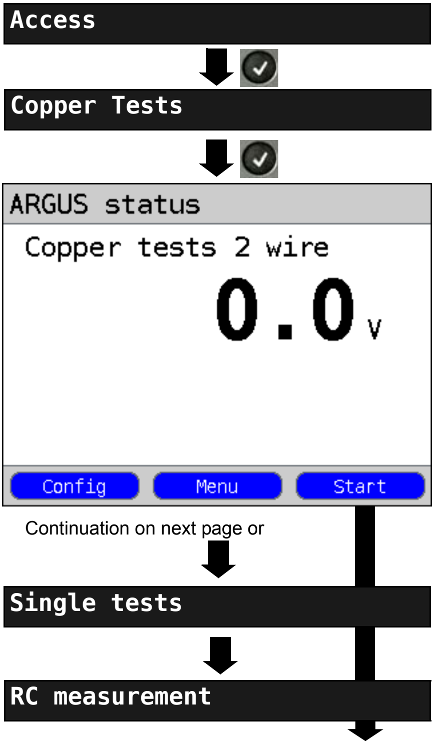
⚠ The ARGUS will sound a signal tone if the resistance exceeds 20 Ω.

<◀> Disable signal tone

22.2 RC Measurement

The ARGUS measures the line's resistance (loop) and capacitance (open). The ARGUS is first connected directly from the "Line" jack to the test points. Switch the ARGUS on.

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



ARGUS - Main Menu

Select Copper Tests.

ARGUS State Display
Any DC voltage on the line will be displayed here.
- Maximum measurement range: 200 V
- Resolution: 0.1 V
- Precision: ±2 %.

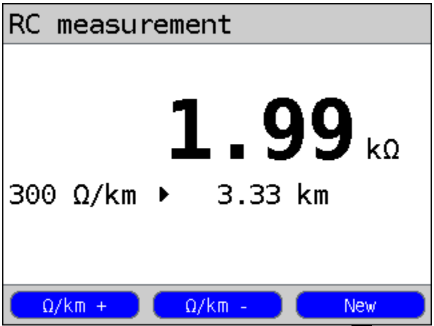
Make certain that the line is voltage-free before beginning the RC Measurement.

<Menu>	Open the Main Menu.
<Start>	Open the Single Tests Menu directly or start the RC measurement (depending on the ARGUS options).

Select one of the Copper Tests:
- R Measurement
- RC Measurement
- etc.

The selected Copper Test will start as soon as it is selected.
In this example - RC Measurement.

Line loop:



Repeat the test.

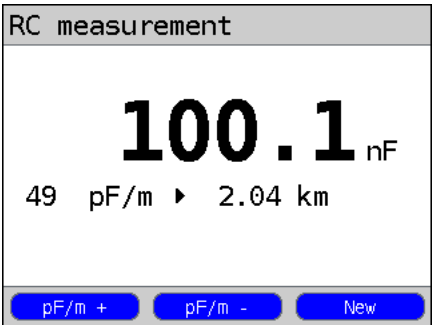
The ARGUS will first determine the resistance. If the resistance test determines that the line is open (infinite resistance), the ARGUS will measure the capacitance.

The ARGUS displays the resistance. The capacitance will not be displayed, since in this example it is a loop. In addition, the ARGUS will determine the approximate length of the line, e. g. to the next short-circuit, based on the resistance of the line (in this example 3.33 km at a line resistance of 300 Ω / km). The ARGUS calculates the line's specific electrical resistance. The loop resistance would be twice as high as the specific electrical resistance, i.e. for a specific electrical resistance of 300 Ω / km, the loop resistance would be 600 Ω / km.

<Ω/km +>	increase the line-specific resistance (max. value of 300 Ω/km)
<Ω/km ->	decrease the line-specific resistance (min. value of 20 Ω/km), increment 20 Ω
<New>	Repeat the test.
	Return to the State Display

Resistance measurement: 20 Ω to 100 kΩ
Precision: 20 Ω ≤ R ≤ 100 Ω: ±10 %
R > 100 Ω: ±2 %

Open line:



Repeat the test.

The ARGUS displays the capacitance. The resistance is out of the range of the ARGUS (> 100 kΩ).

<pF/m +>	increase the line-specific capacitance (max. value of 99 pF/m).
<pF/m ->	decrease the line-specific capacitance (max. value of 35 pF/m), increment 2 pF
<New>	To repeat the measurement
	Return to the State Display

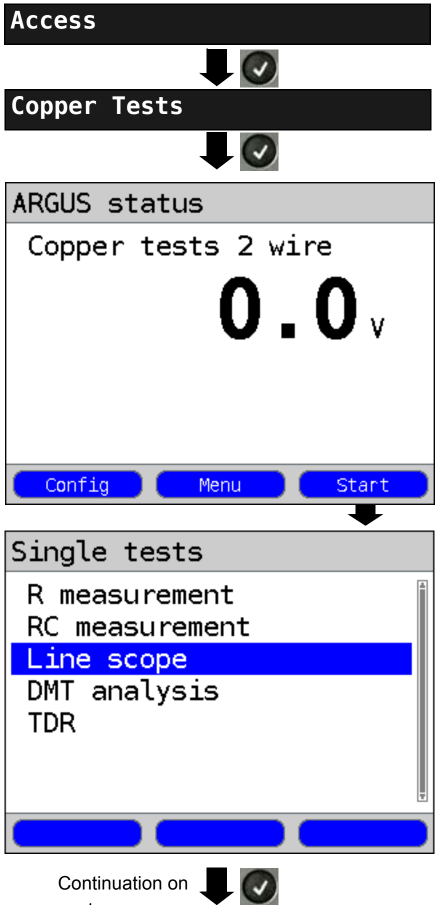
Capacitance measurement: 1 nF to 1 µF
Precision: ±5 %

22.3 Line Scope

In the Line Scope test, the ARGUS performs an analysis of the connected line in real-time. The high-impedance Line Scope can be switched on an existing connection between the modem and DSLAM.
The results can be shown with the x-axis displaying the time domain or frequency domain (FFT).

⚠ **The voltages on the subscriber line may not exceed 200 VDC or 100 VAC_{pp}.**

22.3.1 Start Line Scope



Continuation on next page

ARGUS - Main Menu

Select Copper Tests

ARGUS State Display
Any DC voltage on the line will be displayed.

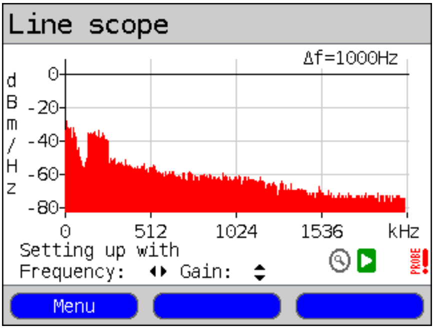
<Menu>	Open the Main Menu.
<Start>	Open the Single Tests Menu directly

Select one of the Copper Tests:
- R Measurement
- RC Measurement
- Line Scope
- etc.

The selected Copper Test will start as soon as it is selected.

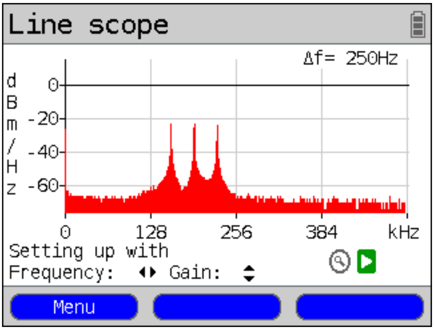
In this example - Line Scope.

Line Scope ARGUS State Display



A variety of different conditions or events on the access line can be examined with the Line Scope.
In this example, an ADSL (Annex B) connection has been set up between a modem and DSLAM with an ISDN U interface.
The Line Scope is close to the modem, since the upstream spectrum is particularly prominent.
If the upstream was substantially lower than the downstream, this would indicate that the ARGUS was near the DSLAM.

<Menu> Open the Graphic functions, see page 330.

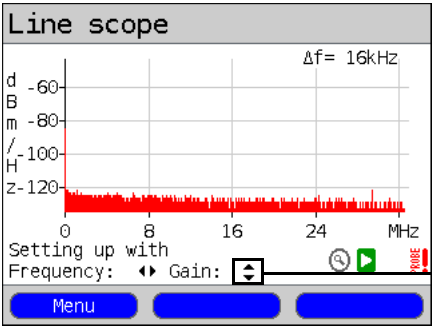


Besides determining the general condition of the line or connection, it is also possible to use the Line Scope to detect various events.
As an example, it can be used to see the handshake tone that will be sent periodically by any modem which is connected to the line when attempting to establish a connection with the DSLAM. In this way, it is possible to determine whether an active modem is connected at the other end of the line.

Furthermore, the Line Scope can not only be used to examine the DSL spectrum or handshake tones, it can also be used to detect objectionable, temporary interference (in real-time operation) or noise peaks rising out of the background noise.

Connection example:

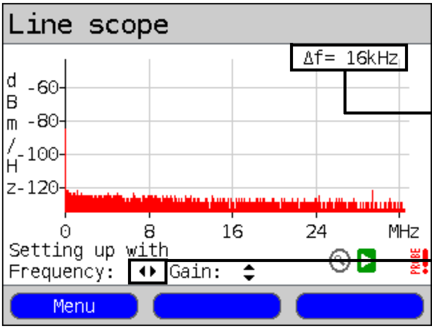
Gain:
The optimum for detecting different signals is achieved by setting the gain (y-axis) and reducing the frequency band shown (x-axis). In a frequency range up to 3 MHz, the ARGUS will always begin with the lowest gain (-26 dB).
Measurement range: -130 to +10 dBm/Hz.



Gain (Y): Setting the gain:
-26 dB, - 20 dB, 0 dB, 20 dB

The ARGUS will show all measurement results as dBm/Hz values. These values can only be compared to each other if the resolution of the frequency band examined is taken into account, since in this case the entire energy of the frequency band is determined as a "value per Hz". The bandwidth currently examined by the ARGUS is shown in the display as Δf.

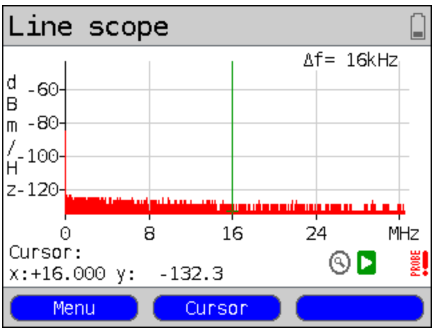
Frequency range:
Measurements can be made in a frequency range of 20 kHz to 30 MHz. The resolution depends on the measurement range selected.



The Δf, in the upper right of the display, shows the step width (increment) shown on the display.

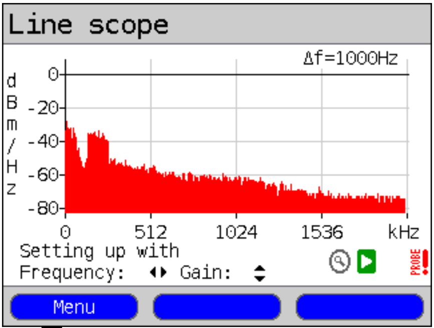
Frequency (X): Set the frequency range displayed. The displayed range will be halved or doubled each time the cursor key is pressed.

Example:



In a measurement range with a maximum of 32.768 MHz, approximately 2048 values can be displayed, therefore:
Δf = 32.768 MHz / 2048 values = 16 kHz.
Accordingly, the y-value marked with the Cursor and displayed (in this example at 16 MHz) is the middle (in this example y = -133.3 dBm/Hz) of a frequency range ranging from 16 MHz - Δf/2 to 16 MHz + Δf/2, i. e. from 15.992 MHz to 16.008 MHz.

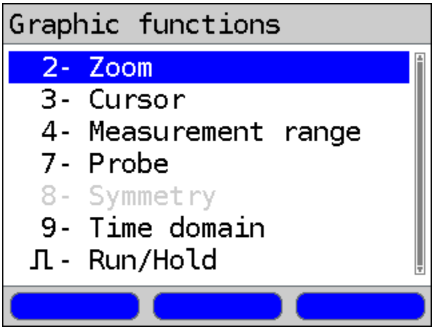
22.3.2 Graphic functions



The graphic functions like Zoom and Cursor allow detailed analysis of the graphs.

<Menu> Open the Graphic functions.

To save the results and quit the Line Scope press the -key in the State Display (i.e. the display showing the graph).



The Graphic functions menu will open.

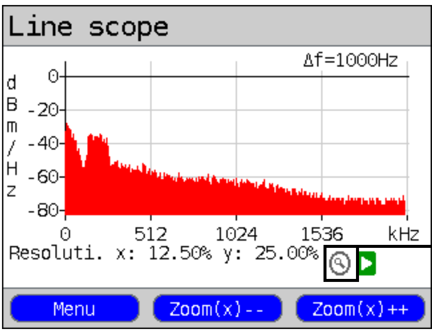
Exit menu without making changes.

Using these numeric keys the Zoom function can also be activated within a graph.

The Cursor function is described on page 331.

Confirms the selection and returns to the graph.

Zoom:



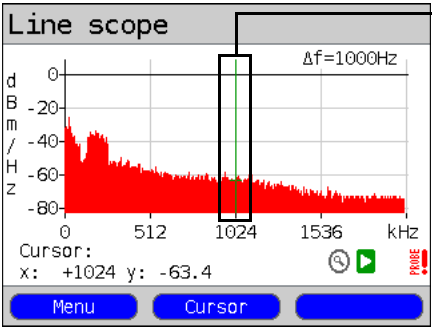
The magnifying glass is shown in the display on a white background.
The Zoom function is not active in this graph.
If the magnifying glass is on a dark background, the graphic is zoomed.

<Zoom(x)++> Enlarges the central section of the graph (100 %)

<Zoom(x)--> Not yet zoomed. Deactivates **<Zoom(x)++>** and ceases enlargement.

Using the it is possible to switch the function of the softkeys and select either x-axis zoom or y-axis zoom, see page 47 and page 46.

Cursor:



Once the Cursor function is started, a green Cursor line will be displayed in the middle of the graphic.

<Cursor> Using the Cursor softkey, it is possible to switch the cursor on or off as needed once it has been activated from the menu.

The value of the graph at the cursor's current position will be displayed below the graph as follows:

x: +1024 kHz (precision ±1 %)

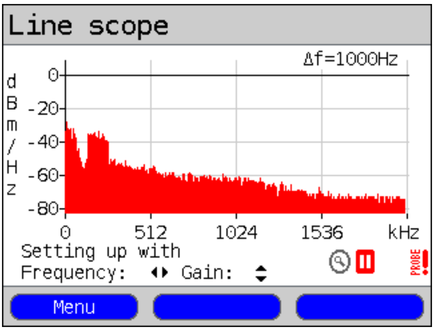
y: -63.4 dBm/Hz (precision ±2 dB)

⚠ If the Stop function (see page 334) is activated, the Cursor can be moved faster.

Using the "left" and "right" cursor keys, the cursor can be moved to any location in the graph to measure it. Briefly tapping the cursor key will move the Cursor one position further in the graph. The Cursor will move in ever larger steps if you press and hold the cursor key down.

The Zoom and Cursor functions can also be used in combination. As an example it is easier to measure a specific point in a graph with the Cursor function if you have first zoomed in on the area. The zoomed area will not necessarily be centered on the Cursor.

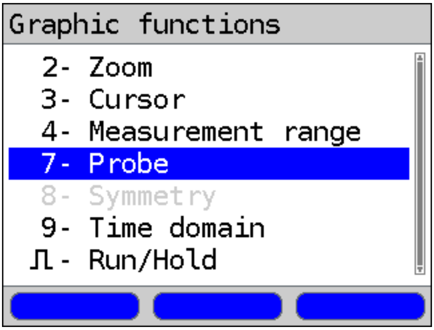
Measurement range:

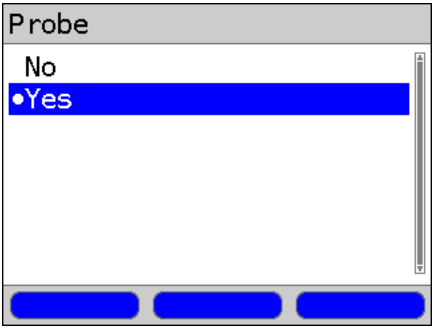


The Line Scope be in the State Display in the measurement range when it is first started. In the measurement range, both the frequency range (x) and the gain (y) can be set. If the measurement range has been hidden so as to work with the Cursor or Zoom, it can be redisplayed by pressing:

<Menu> or 4 Redisplay measurement range.

Probe:





The Line Scope is high-impedance:
Input impedance: 3.6 kΩ
Input capacitance: 20 pF

Nonetheless, a high-impedance probe (ARGUS Active Probe) may still be required to make certain measurements with the Line Scope.

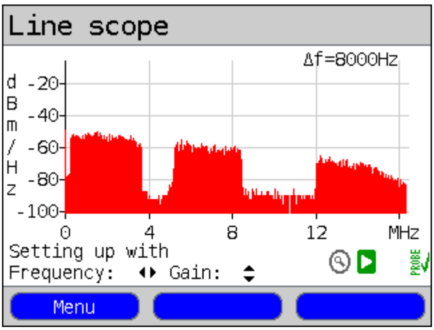
ARGUS Active Probe I:
Input impedance: 12.4 kΩ
Input capacitance: 5 pF

ARGUS Active Probe II:
Input impedance: 70 kΩ
Input capacitance: < 1 pF
Functions: Symmetrical / Asymmetrical Switch

After they have been connected, the probes can be switched on in this menu.

Activating the probe, chapter 22.5.4 Start the Active Probe I

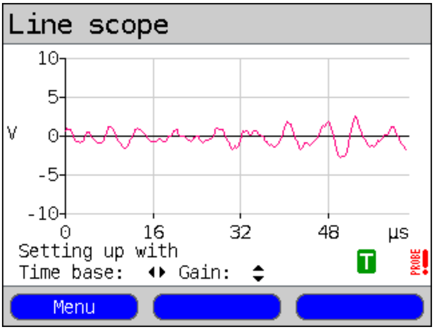
Symmetry:



Active Probe II only!
Once the probe has been switched on and recognized, you can switch between symmetrical and asymmetrical operation. In asymmetric mode, the useful signal will be hidden so that only the noise and any possible interference is displayed (see example).

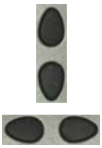
Symmetrical / Asymmetrical Switching

Time domain:



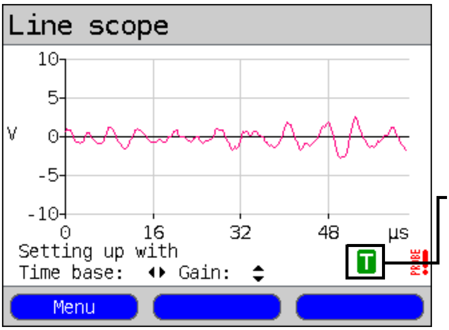
<Menu> or  Open time range

The Line Scope display can be switched from displaying the frequency on the x-axis to showing time on the x-axis. In this case, the ARGUS behaves like a normal oscilloscope capable of showing a voltage range of 0 to 40 V_{pp}, on the y-axis and having a resolution of 2 mV_{pp}.
In this mode, it is easy to recognize the various AC voltages such as the square wave of an E1 access.



The gain and time base can be adjusted as before (when displaying frequencies) with the horizontal and vertical cursor keys.

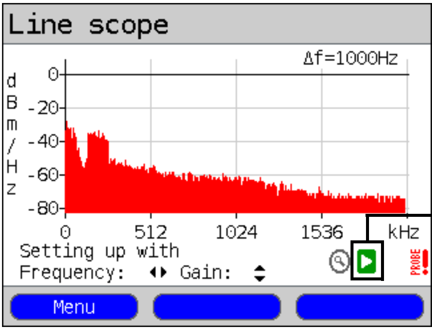
The Cursor function is also available to measure the signal in the time domain. However, there is no Zoom function.



If the ARGUS determines that the signal regularly exceeds a certain threshold, it will automatically attempt to trigger on this signal so as to place it optimally in the displayed time domain.

The trigger symbol is green.
If there is no signal or the level is too low, the trigger symbol will be red. In which case, the ARGUS will not trigger.

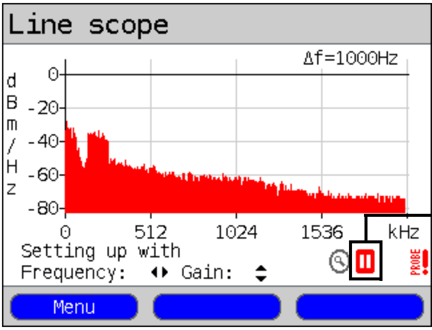
Start / Stop:



It is always possible to stop or restart a test while the test is running (real-time operation).

The test is running.

Stop test

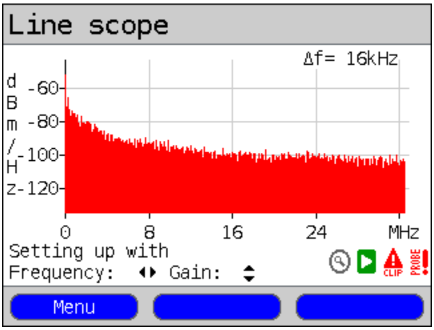


The test has been stopped.

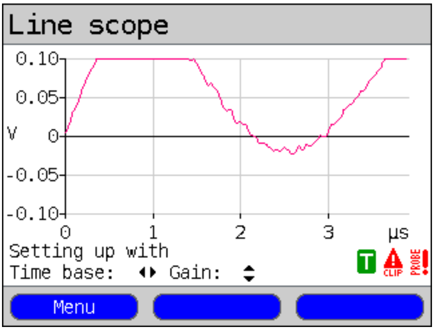
Start the test again.

Clipping:

Frequency range:



Time domain:



If the signal on the Line Scope's input is too high or if the gain has been set too high in the frequency or time domain, the Line Scope's input stage will be overdriven.

In this case, the ARGUS will display a clipping symbol  .

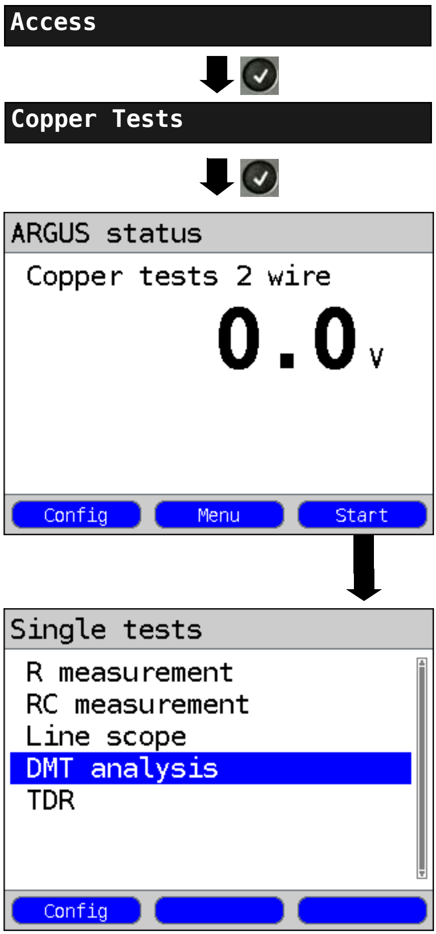
The displayed signal will be clipped in both the frequency and the time domain. To eliminate clipping, reduce the gain.

22.4 DMT Analysis

Using DMT Analysis (Discrete Multitone Transmission), the ARGUS can examine the spectral density (PSD - Power Spectral Density) of individual tones on a line.

The voltages on the subscriber line may not exceed 200 VDC or 100 VAC$_{pp}$.

22.4.1 Start DMT Analysis



ARGUS - Main Menu

Select Copper Tests

ARGUS State Display
Any DC voltage on the line will be displayed.

<Config>	For information on changing the DMT Analysis settings, see page 339.
<Menu>	Open the Main Menu.
<Start>	Open the Single Tests Menu directly

Select one of the Copper Tests:
- R Measurement
- RC Measurement
- Line Scope
- DMT Analysis
- etc.

The selected Copper Test will start as soon as it is selected.

As an example - DMT Analysis

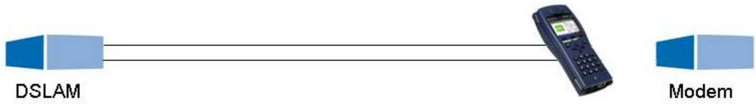
Continuation on next page

Modes of operation in the DMT Analysis:
The DMT Analysis can be operated in two different modes:

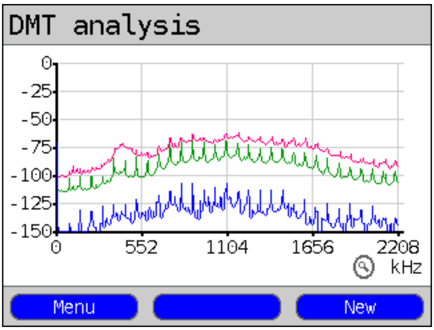
1. Low-impedance	Input impedance: 100 Ω	
2. High-impedance	with the ARGUS Active Probe I: Input impedance: 12.4 kΩ Input capacitance: 5 pF	with the ARGUS Active Probe II: Input impedance: 70 kΩ Input capacitance: < 1 pF

1. Low-impedance mode:
In this mode, the ARGUS is connected at one end of the line as a terminal. For this mode, the line must be separated on at least one end. See following example.

Low-impedance example:



In this mode, it is possible to, for example, determine the noise on a quiet line or whether there is permanent interference on the line. In this manner, it is possible to determine which line in a cable bundle has the lowest quiet line noise.



In the case of permanent interference (see the display in the example), one might find that the source is RF from a defective plug-in power supply coupled to the idle line.

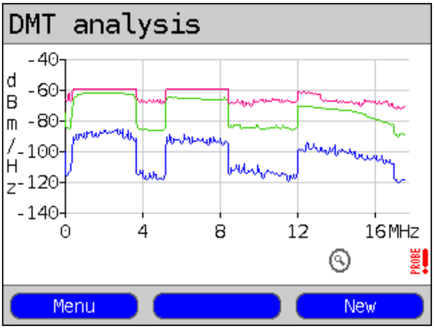
It is also possible to detect the effect of crosstalk from a neighbouring line on the idle line.

<Menu>	Open the Graphic functions, see page 340.
<New>	Starts a new recording.

2. High-impedance mode:
The line need not be separated (see the following example).

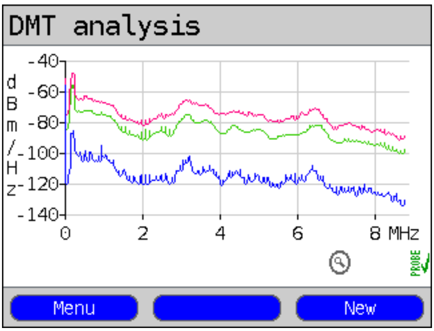
High-impedance example:

In this mode, it is possible to actively monitor signals (e.g. from the modem or DSLAM) on an existing connection. In this manner, it is possible to track down the source of broadband interference that overpowers the active signals.



As an example (see the example display), it is possible in this manner to recognize the various upstream and downstream bands of an existing VDSL2 connection. Depending on where the DMT Analysis is performed on the line, the level of either the upstream or the downstream will be greater.

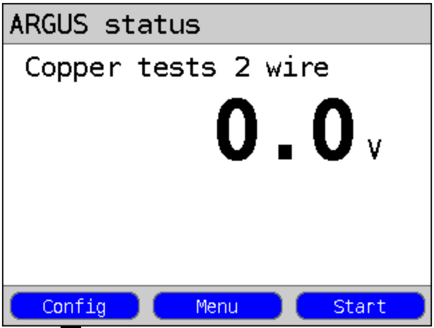
DMT Analysis ARGUS State Display



A DMT Analysis is not performed in real-time. Once the DMT Analysis has been started from the "Single Tests Menu", it will record (depending on the presets - in this example the mode "All") one after the other the average (green), the peak/maximum (red) and the bottom/minimum (blue) signal traces for the duration of the measurement.
The results are presented in the form of a graph. A new measurement will first be done after the `<New>` softkey is pressed.

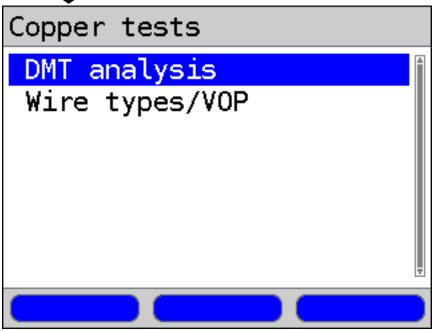
`<New>` or 	Start a new measurement (any previous recordings will be lost).

The settings - determining the conditions under which the DMT Analysis will record something - can be configured before a test is performed.

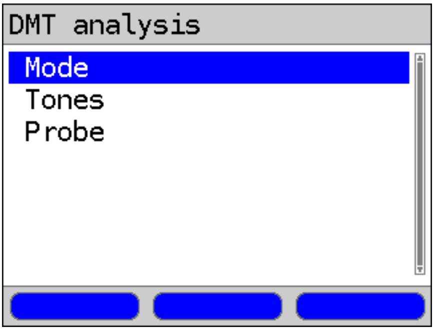


ARGUS State Display

<Config>	Change the DMT Analysis settings.
<Menu>	Open the Main Menu.
<Start>	Open the Single Tests Menu directly.



Select DMT Analysis



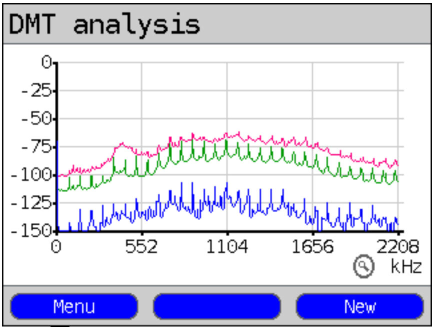
Preset the
- Mode
- Tones
- Probe

Edit the marked parameters if necessary

<table>
<tr><th>Setting</th><th>Explanation</th></tr>
<tr><td colspan="2"><code>DMT Analysis:</code></td></tr>
<tr><td><code>Mode</code></td><td>The mode can be used to set which signal trace in the graph should be recorded by the DMT Analysis. Choose between:
- Average measurement:
Shows the mean value measured during the measurement time set (Frames: 128, Time: 250 ms), shown in green in the graph
- Peak measurement:
Shows the peak value measured during the measurement time set (Frames: 2048, Time: ca. 4 s), for each carrier frequency in red in the graph
- Bottom (minimum) measurement:
Shows the minimum value measured during the measurement time set (Frames: 2048, Time: ca. 4 s), for each carrier frequency in blue in the graph
- All (Average, Peak and Bottom will be recorded)
Default setting: Average</td></tr>
<tr><td><code>Tones</code></td><td>The frequency range to be recorded is determined using the Tones setting. The DMT Analysis can record a maximum frequency range of 130 kHz to 30 MHz. In such case, the resolution is the usual tone interval, i.e. 4.3125 kHz, with a precision of ±1 %.
The power measurement range is fixed at -140 to -40 dBm/Hz. It cannot be changed.
The following selected frequency ranges can be preset for measurements on a DSL line:
- 1.1 MHz (ADSL), 130 kHz to 1.1 MHz
- 2.2 MHz (ADSL2+), 130 kHz to 2.2 MHz
- 8.8 MHz (VDSL2 8a), 130 kHz to 8.8 MHz
- 17.6 MHz (VDSL2 17a), 130 kHz to 17.6 MHz
- 30.0 MHz (VDSL2 30a), 130 kHz to 30.0 MHz
Default setting: 1.1 MHz (ADSL)</td></tr>
<tr><td><code>Probe</code></td><td>Depending on whether "yes" or "no" is selected for the Probe setting is chosen, the DMT Analysis will be performed in high or low-impedance mode. If Probe is set to "yes", the ARGUS will an ARGUS Active Probe to be connected and on.
Default setting: No</td></tr>
</table>

22.4.2 Graphic functions

DMT Analysis state display

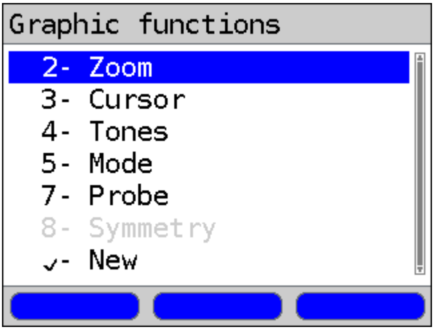


The graphic functions like Zoom and Cursor allow detailed analysis of the graphs.

<New> or Start a new recording (any previous recordings are lost).

<Menu> Open Graphic functions.

To save the results and quit the DMT Analysis press the -key in the State display (i.e. the display showing the graph).



The Graphic functions menu will open.

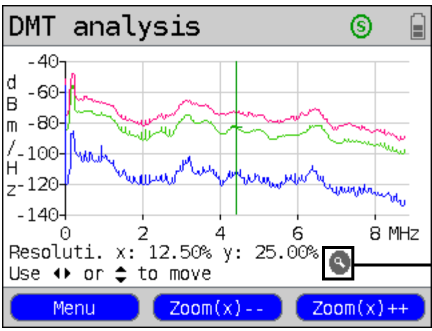
Exit menu without making changes

Using these numeric keys the Zoom function can also be activated within a graph.

The Cursor function is described on page 341.

Confirms the selection and returns to the graph.

Zoom:



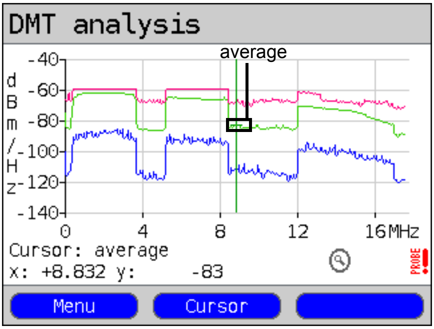
The magnifying glass is shown in the display on a gray background. Zoom is active. If the magnifying glass is shown in the display on a white background, Zoom is not active.

<Zoom(x)--> Enlarges the central section of the graph (100 %)

<Zoom(x)++> Not yet zoomed. Deactivates **<Zoom(x)++>** and ceases enlargement.

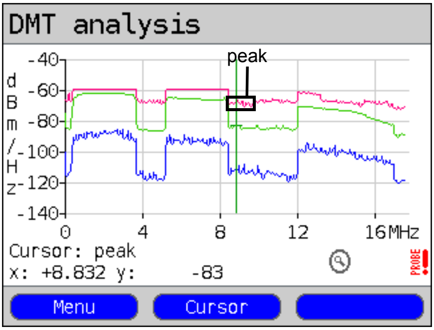
Using the it is possible to switch the function of the softkeys and select either x-axis zoom or y-axis zoom, see page 48 and page 48.

Cursor:



Once the Cursor function is started, a green Cursor line will be displayed in the middle of the graphic.

<Cursor> Using the Cursor softkey, it is possible to switch the cursor on or off as needed once it has been activated from the menu. By default the Cursor will be first placed on the middle trace (green, "average") in the graph. Pressing the softkey again will move the Cursor to the maximum trace (red, "peak") and when pressed again to the minimum trace (blue, "bottom") in the graph.



The value of the graph at the cursor's current position will be displayed below the graph (first example) as follows:

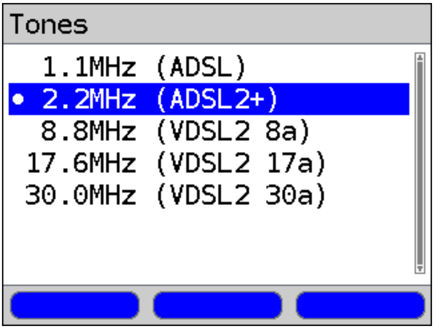
x: +8.832 MHz (precision: ±1 %)

y: -83 dBm/Hz (precision: ±2 %)

Using the "left" and "right" cursor keys, the cursor can be moved to any location in the graph to measure it. Briefly tapping the cursor key will move the Cursor one position further in the graph. The Cursor will move in ever larger steps if you press and hold the cursor key down.

The Zoom and Cursor functions can also be used in combination. As an example it is easier to measure a specific point in a graph with the Cursor function if you have first Zoomed in on the area. The zoomed area will not necessarily be centered on the Cursor.

Tones:

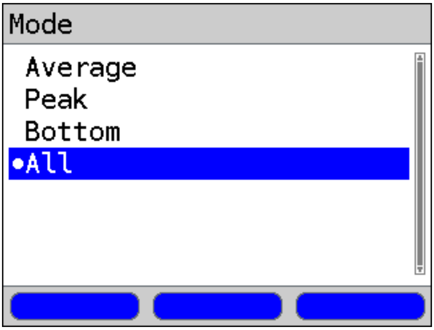


Set the frequency range, see page 339.

The smaller the frequency range, the faster the DMT analysis will be performed.

Open the Tones menu

Mode:

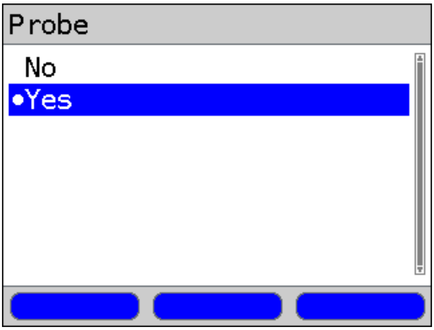


Set the signal traces to be displayed, see page 339.

The fewer the traces to be recorded, the shorter the recording time.

Open the Mode menu.

Probe:



The DMT Analysis is low impedance (100 Ω).
However, if an ARGUS Active Probe is connected, the DMT Analysis can also be performed as passive, high impedance monitoring.

ARGUS Active Probe I / II:
Input impedance: 12.4 / 70 kΩ
Input capacitance: 5 / < 1 pF

After you have connected it, the probe can, at this point, be switched on.

For information on activating the probe, see page 344.

In the DMT Analysis, you cannot switch between symmetrical and asymmetrical operation. Consequently, this menu item remains grayed out.

22.5 The Active Probes

The ARGUS Active Probes are active high-impedance probes with which it is possible to passively monitor an existing connection without noticeably disturbing it.

⚠ Nonetheless, in spite of the probe's high-impedance, it is possible that there may be short interruption in the existing communications connection when the probe is first connected.

The ARGUS Active Probes I + II are intended for use with the ARGUS Line Scope and DMT Analysis functions. The high-impedance Line Scope (input impedance 3.6 kΩ) and the low impedance DMT Analysis (input impedance 100 Ω) can also be used without the use of one of the ARGUS Active Probes (see page 332 and page 342).

22.5.1 Active Probe I

The specifications of the ARGUS Active Probe I are as follows:
- Input impedance: 12.4 kΩ
- Input capacitance: 5 pF
- Frequency range: 20 kHz to 30 MHz
- 2 x 4 mm shrouded banana plug cable - Data transferred to ARGUS via an RJ45 cable (pins 4/5)
- Supply voltage: 5 V via ARGUS USB host interface and USB cable

22.5.2 Active Probe II

The specifications of the ARGUS Active Probe II are as follows:
- Input impedance: 70 kΩ
- Input capacitance: < 1 pF
- Frequency range: 10 kHz to 30 MHz (±1.5 dB)
- Attenuation symmetrical: 14.5 dB
- 2 x 4 mm banana jacks (separation 12mm)
- Data transferred to ARGUS via an RJ45 cable (pins 4/5)
- Supply voltage: 5 V via ARGUS USB host interface and USB cable

The Active Probe II can be operated in "symmetrical" or "asymmetrical" mode. Using the  hotkey it is possible switch between these modes in the menu. Application examples, see page 332, Line Scope.

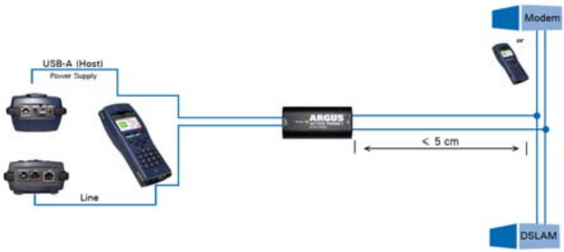
Picture of the ARGUS Active Probe I:

Picture of the ARGUS Active Probe II:

22.5.3 Connect Active Probe I

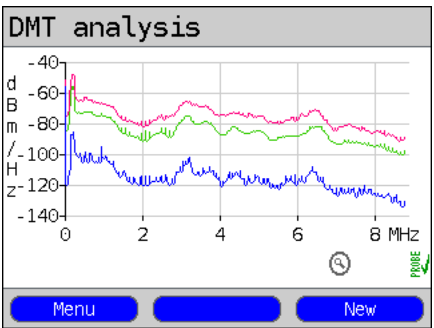
The Active Probe is connected to the ARGUS's "Line" jack and its USB-A (Host) interface. The USB Host interface of the ARGUS is used to supply the Active Probe with 5 V.
The Active Probe is then connected to access under test (this example shows an Active Probe I connected on the line between the modem and DSLAM). The connection should be made using leads as short as possible (< 5 cm).

Connection example:



The connection cable with the two banana plugs to the Active Probe I has been intentionally kept short. The Active Probe I should be operated with leads that are as short as possible. In order to attain the best measurement results, it is important that the Active Probe be as close as possible to the line to be measured. Any extension of these cables will increase the input capacitance of the Active Probe and may thus corrupt the measurement results. Even the position of the two cables next to each other may - the greater the distance that they run in parallel to each other - falsify the results. If the Active Probe is used as delivered, the ARGUS will automatically include the resulting additional attenuation when calculating the measurement results.

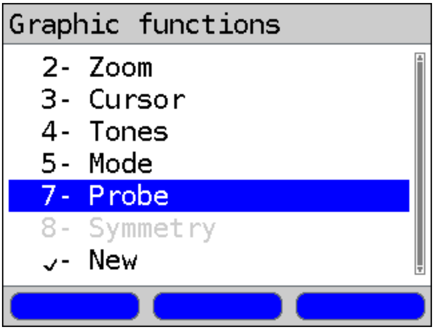
22.5.4 Start the Active Probe I



After a test has been started (in this example, DMT Analysis), the Probe menu can be opened from the Graphic functions or with the  key.

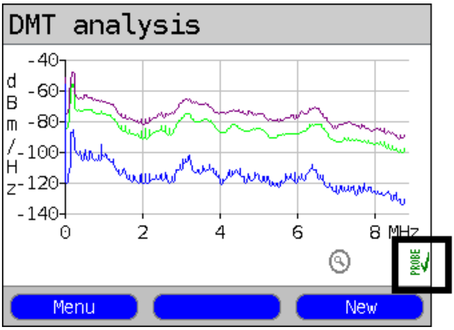
In the case of the DMT Analysis, an Active Probe's settings can even be made before starting a test (see page 338).

Continuation on next page



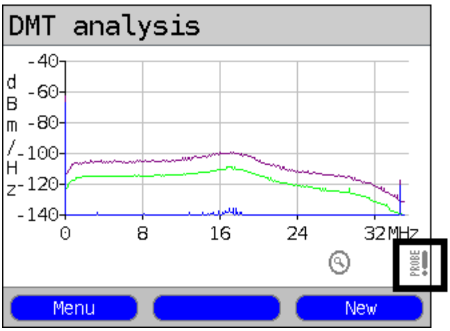
Open the Probe menu directly.

If the Probe is to be used, select the setting "yes".
The ARGUS will then switch the supply power onto the USB-A interface and will automatically take the attenuation caused by the insertion of the Active Probe into account when calculating the measurement results.



If the Active Probe is activated and if it is properly powered by the ARGUS, the green LED will light on the probe.

If the Active Probe is correctly connected, a green checkmark will appear in the lower right of the display during the test.

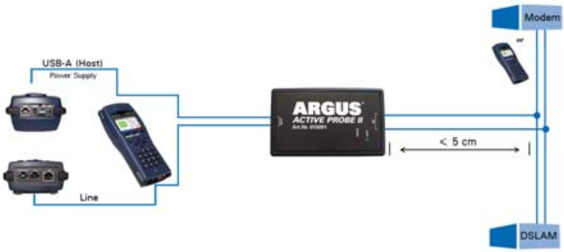


If the Active Probe has not been correctly connected and is not recognized by the ARGUS or if it has been deactivated in the Probe menu, an exclamation mark will appear at the lower right of the display instead.

22.5.5 Connect the Active Probe II

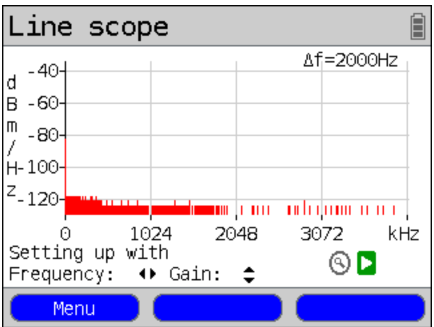
The Active Probe II is connected to the ARGUS's "Line" jack and its USB-A (Host) interface. The USB host interface of the ARGUS is used to supply the Active Probe with 5 V. The Active Probe is then connected to access under test (this example shows an Active Probe II connected on the line between the modem and DSLAM). The connection should be made using leads as short as possible (< 5 cm).

Connection example:



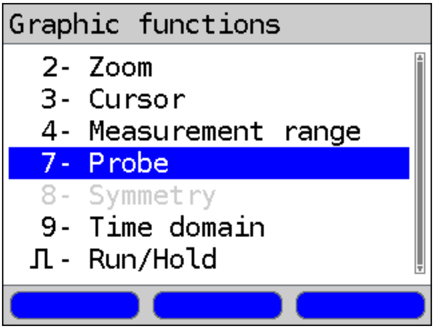
⚠ The included leads and adapter have been purposely kept short. The leads used with an Active Probe II should be kept as short as possible. In order to attain the best measurement results, it is important that the Active Probe be as close as possible to the line to be measured. Any extension of these cables will increase the input capacitance of the Active Probe and may thus corrupt the measurement results. Even the position of the two cables next to each other may - the greater the distance that they run in parallel to each other - falsify the results. If the Active Probe is used as delivered, the ARGUS will automatically include the resulting additional attenuation when calculating the measurement results.

22.5.6 Start Active Probe II (Line Scope as an example)

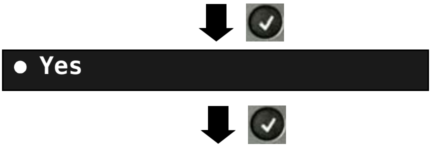


After a test has been started (in this example, Line Scope), the Probe menu can be opened from the Graphic functions or with the  key.

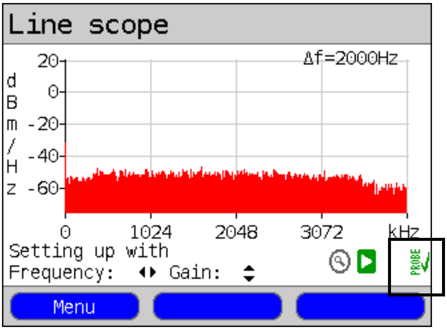
Continuation on next page



Open the Probe menu directly.



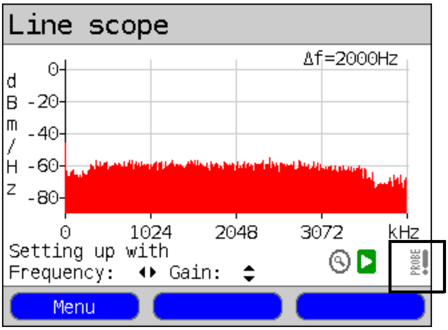
If the Probe is to be used, select the setting "yes".
The ARGUS will then switch the supply power onto the USB-A interface and will automatically take the attenuation caused by the insertion of the Active Probe into account when calculating the measurement results.



If the Active Probe is activated and if it is properly powered by the ARGUS, the green LED will light on the probe.

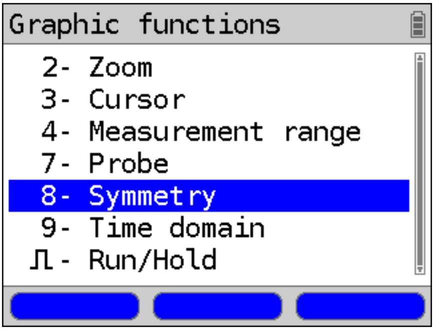
It can take up to 10 seconds for the probe to activate.

If the Active Probe is correctly connected, a green checkmark will appear in the lower right of the display during the test.

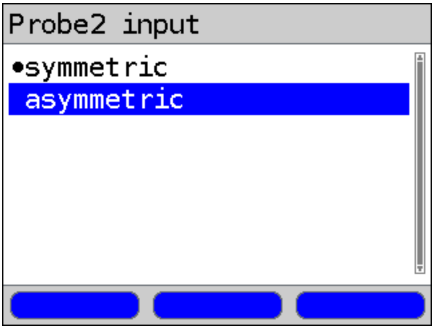


If the Active Probe has not been correctly connected and is not recognized by the ARGUS or if it has been deactivated in the Probe menu, an exclamation mark will appear at the lower right of the display instead.

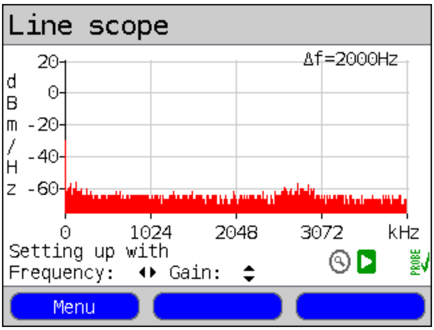
Symmetrical/Asymmetrical Switch:



For an example of the use of symmetrical / asymmetrical switching, see page 332, Line Scope.



Once a test has been started and the Active Probe II activated, the key can be used to switch the probe between symmetrical and asymmetrical input.



When the ARGUS is set asymmetrical mode, it will display any interference and noise on the line. The useful signal will be hidden.

22.6 TDR

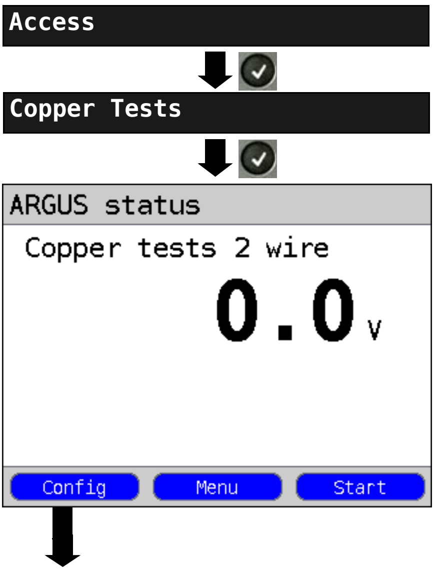
Using the TDR function, it is possible to determine the line length in realtime and locate sources of interference. Correct interpretation of the pulses displayed by the ARGUS will allow detection of among others stub lines, bad contacts or short-circuits. In performing a TDR, the ARGUS sends a pulse down the connected line and displays the returning reflected pulse.

⚠ **Any DC voltage on the access line may not exceed 200 VDC. Furthermore, the line must be free of any AC voltages.**

⚠ The result displayed of a TDR measurement may create the impression that there are multiple disturbances on the line. It is advisable to clear the first disturbance or fault and then run the test again. It is possible that the first disturbance or fault caused one or more reflections and thus created the false impression that the line has multiple faults. In many cases there is only one fault on the line.

⚠ The ARGUS will generate a reflection at about 3 meters. To measure short lines precisely and to avoid this reflection, we recommend the use of longer a connecting cable e.g. one 5 m long.The pulse will still appear in the graph but by using the longer connecting cable you can be sure that it is not from the line under test.

22.6.1 TDR Settings



ARGUS - Main Menu

Select Copper Tests

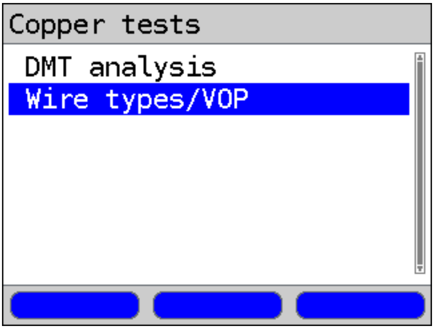
ARGUS State Display
Any DC voltage on the line will be displayed.

<Config> Switch to the wire types list settings.

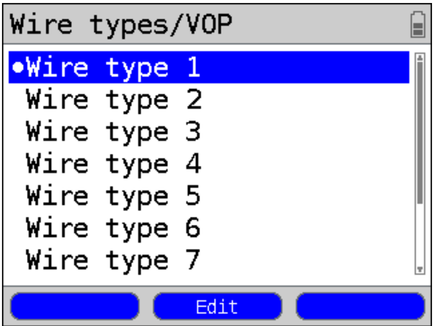
<Menu> Open the Main Menu.

<Start> Open the Single Tests Menu directly

Continuation on next page

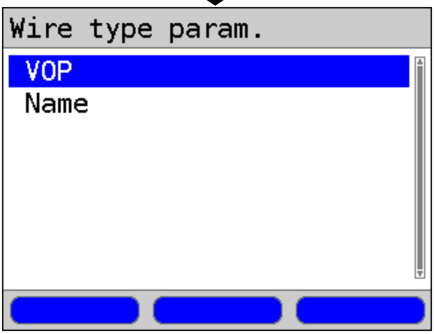


Select wire types/VoP.



Select the wire type to be configured.

<Edit> Change the wire type parameter.



Setting	Explanation
Wire types/VoP	
Velocity of Propagation	The velocity of propagation factor for the specific type of cable must be know in order to correctly calculate the length of cable. This velocity of propagation factor is the ratio between the velocity of propagation of the pulse in the cable and the velocity of propagation of the pulse in a vacuum (c_0 = 299,792,458 m/µs). The pulse transit time delay for many wire types is also specified in V/2: Minimum: 45.0 m/µs Maximum: 149.7 m/µs Default setting: ***100.0 m/µs*** Select and edit the velocity of propagation as VoP or V/2, and then save it.
Name	Enter the name of the wire type. Default setting: ***Wire type 1***

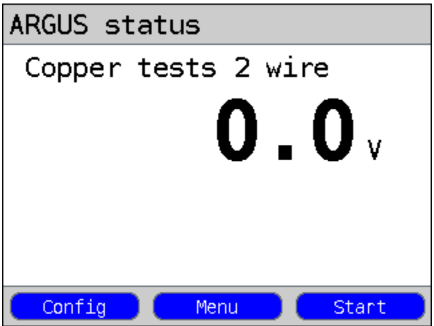
22.6.2 Start TDR

Access

ARGUS - Main Menu

Copper Tests

Select Copper Tests



ARGUS State Display
Any DC voltage on the line will be displayed.

Select and start TDR.

<Config> Switch to the Wire types list settings, see page 349.

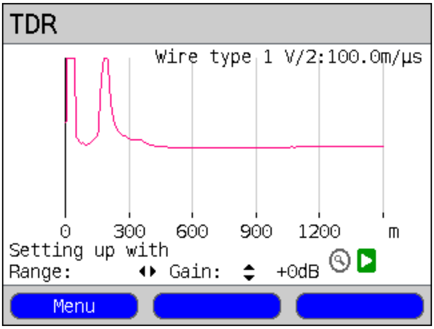
<Menu> Open the Main Menu.

<Start> Open the Single Tests Menu directly

TDR

Continuation on next page

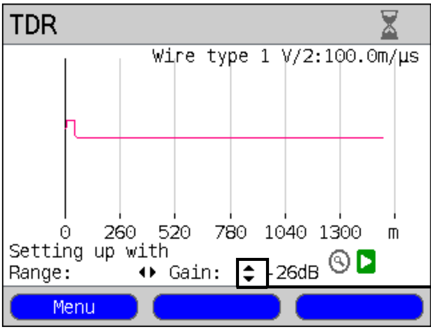
TDR State Display:



The ARGUS will directly show the possible locations of faults on the 2-wire copper line.
In the example, one sees that following the input pulse (starting at 0 meters) a second pulse rises at about 150 meters. This could indicate that the line is open at the end of 150 meters.

Analysis in greater detail is possible by adjusting the range and gain and by using the Graphic functions.

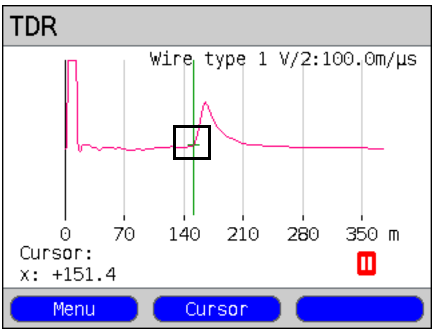
Gain:



The optimum for detecting different pulse reflections is achieved by adjusting the gain (y-axis) and reducing/increasing the range shown (x-axis).
The ARGUS always begins with the lowest gain (-26 dB) and a range of 1500 meters.

Gain (Y): Setting the gain:
from -26 dB, -20 dB, 0 dB, +14 dB, +24 dB, +34 dB, +44 dB

Range:

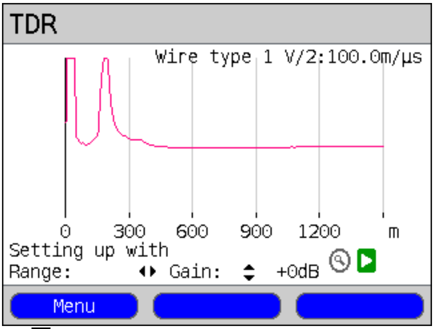


A TDR measurement can be performed on lines ranging from 3.5 to 6,000 meters. The resolution is about 0.3% of the measurement range shown.

The precision is approximately ±2 % of the measurement range. When determining the distance, look at where the pulse reflection begins not at its maximum point.

Range (x): Set the displayed measured range. The displayed range will be halved or doubled each time the cursor key is pressed.

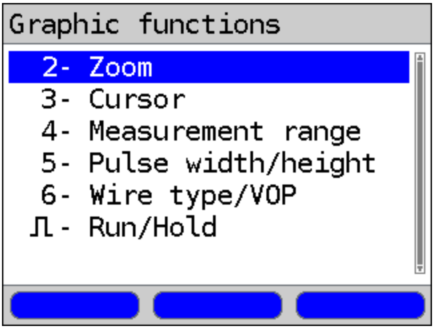
22.6.3 Graphic functions



The graphic functions like Zoom and Cursor allow detailed analysis of the graphs.

<Menu> Open the Graphic functions.

To save the results and quit the TDR function, press the -key in the State Display (i. e. the display showing the graph).



The Graphic functions menu will open.

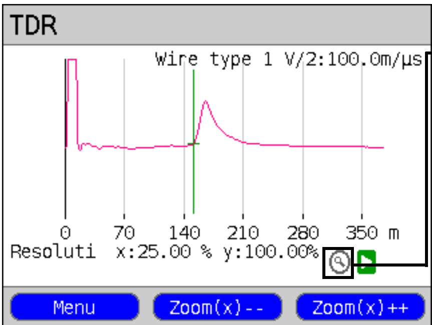
Exit menu without making changes.

Using these numeric keys the Zoom function can also be activated within a graph.

The Cursor function is described on page 354.

Confirms the selection and returns to the graph.

Zoom:



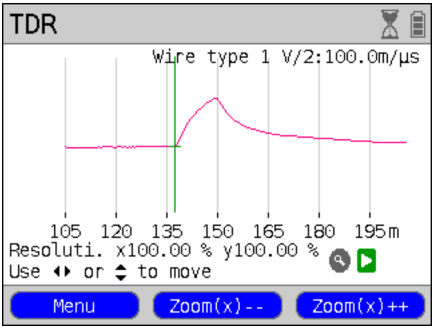
Continuation on next page

The magnifying glass is shown in the display on a white background.
The Zoom function is not active in this graph.
If the magnifying glass is on a dark background, the graphic is zoomed.

<Zoom(x)++> Enlarges the central section of the graph (100 %)

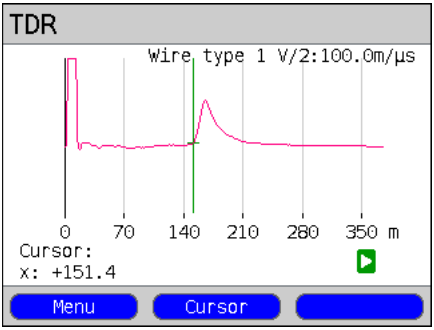
<Zoom(x)--> Not yet zoomed. Deactivates **<Zoom(x)++>** and ceases enlargement.

The zoom on the y-axis is not available. The resolution remain by 100 %.



The Zoom softkeys can be used to zoom in on or out of (the graph) by anywhere from 25 % to 100 %. In the process, the resolution will be doubled or halved.
By using the Cursor at the same time, it is possible to precisely locate the reflection on the line measured.

Cursor:



Once the Cursor function is started, a green Cursor line will be displayed in the middle of the graphic.

<Cursor> Using the Cursor softkey, it is possible to switch the cursor on or off as needed once it has been activated from the menu.

The value of the graph at the Cursor's current position will be displayed below the graph:

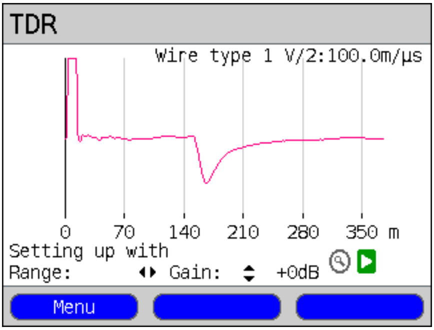
x: +151.4 m

If the Stop function (see page 356) is activated, the Cursor can be moved faster.

Using the "left" and "right" cursor keys, the cursor can be moved to any location in the graph to measure it. Briefly tapping the cursor key will move the Cursor one position further in the graph. The Cursor will move in ever larger steps if you press and hold the cursor key down.

The Zoom and Cursor functions can also be used in combination. As an example it is easier to measure a specific point in a graph with the Cursor function if you have first zoomed in on the area. The zoomed area will not necessarily be centered on the Cursor.

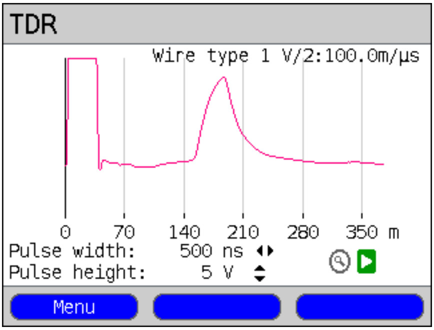
Measurement range:



The TDR function will be in the State Display in the measurement range when it is first started. In the measurement range, both the range (x) and the gain (y) can be set. If the measurement range has been hidden so as to work with the Cursor or Zoom, it can be redisplayed by pressing:

<Menu>
or  Redisplay measurement range.

Pulse width/height:



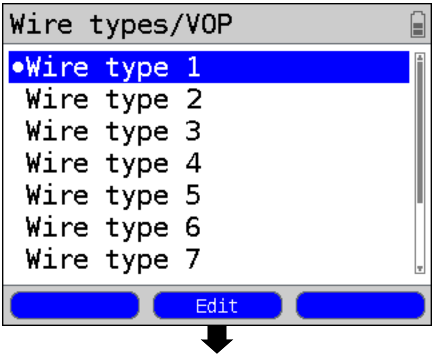
Using the pulse height and pulse width settings, it is possible to adjust the shape of the ARGUS's pulse to suit the line being tested.

 Setting the pulse

Height:
The pulse height sets the voltage level of the pulse that the ARGUS sends down the line. The default value is ***5 V***, but the level can be adjusted to 20 V. As a rule, it is advisable to increase the pulse height for longer lines.
However, even if a line is short, if there is a lot of noise on the line it may be advisable to increase the pulse height so that the reflection rises far enough above the noise to make interpretation easier.

Width:
The pulse width sets the length of the pulse in nanoseconds (ns) that the ARGUS sends down the line. The default pulse width is ***500 ns***; however, depending on the measured range, this value can be increased up to a maximum of 2000 ns (2 µs). Like a higher pulse a longer pulse carries more energy and is therefore mainly of use on longer lines. It must be noted, however, that a longer pulse can also conceal important reflections and thus prevent correct interpretation of the TDR results.

Wire types / VoP:



see page 351

The absolute VoP value must always be less than 1. It is, however, shown as a percentage on an ARGUS. In a cable with a VoP (velocity of propagation factor) of 0.7, a signal will propagate at 70 % of the speed of light (c_0).

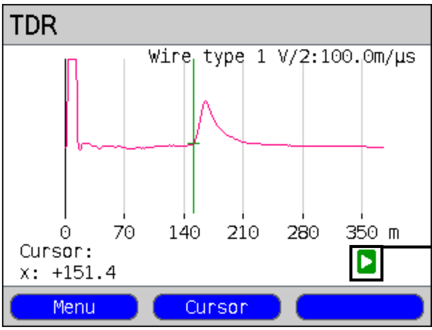
The pulse transit time delay for many wire types is also specified in V/2:

V/2 = VoP[%] * 1.5.

In the example, where the wire has a VoP of 0.7 or 70 %, the V/2 would be equal to 105 m/µs.

As an example, a typical patch cable has a VoP of 0.667 or 66.7%, which is the same as a V/2 value of exactly 100 m/µs. When attempting to precisely measure cable, e.g. in a building, it is necessary to know and set the correct VoP value. The correct VoP of a wire type can be determined using a cable that is of the same wire type, has a known length, and which can be used as a reference before making the other measurements.

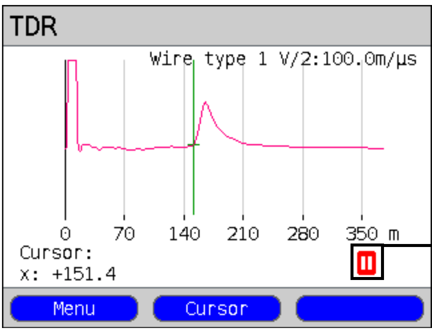
Start / Stop:



It is always possible to stop or restart a test while the test is running (real-time operation).

The test is running.

Stop test.



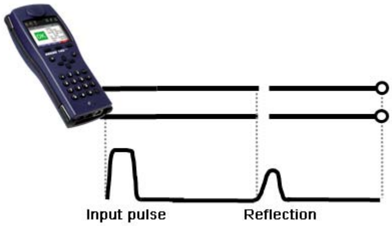
The test has been stopped.

Start the test again.

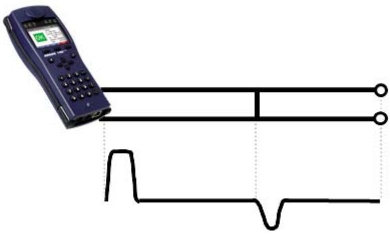
22.6.4 Examples

The following ideal waveforms may be of assistance to you in interpreting the reflected pulse:

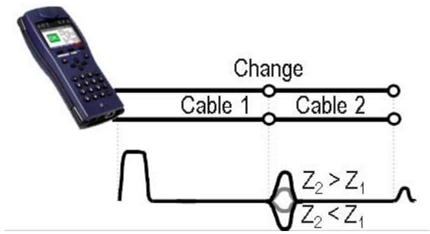
Examples:



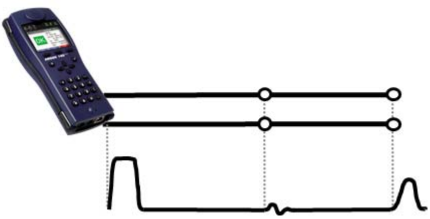
Open cable
The reflected pulse is positive. No indication can be seen of adjacent disturbances or the remote end of the line.



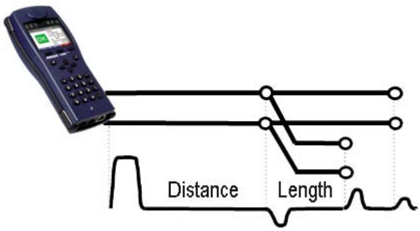
Short-circuit
The reflected pulse is negative. No indication can be seen of adjacent disturbances or the remote end of the line.



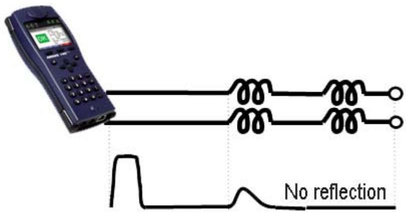
Mismatch
Different cross-sections were used in the line. The greater the mismatch, the greater the amplitude of the reflection.



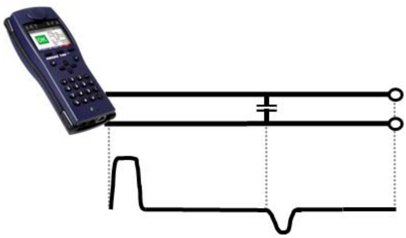
Bad junction point
A bad junction between lines produces an "S" shaped reflection. The worse the contact, the greater the reflection.



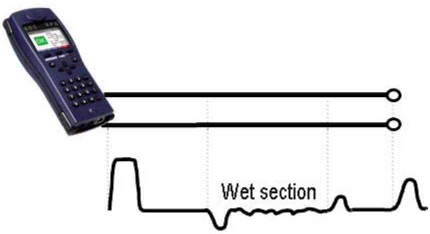
Stub line (Bridge Tap)
The beginning of a stub line is shown in the form of a negative reflection which is then followed - after a period corresponding to the line length to the end of the stub - by a positive reflection if the stub line is open at its end.



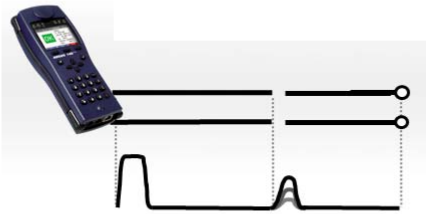
Inductance coils / Chokes
Inductance coils used on the line are optimized for the transmission of voice frequencies. They block DSL signals. The first such coil on a line can be detected using the TDR function. The reflection in this case will be a positive pulse with a tail trailing off towards the end of the line. Faults after this inductance coil cannot be detected.



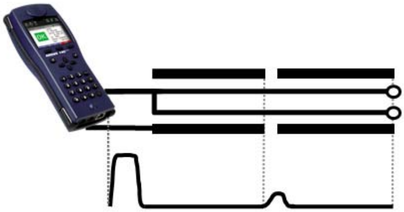
Capacitance network
Like a short-circuit, a capacitance network reflects the pulse in a negative form.



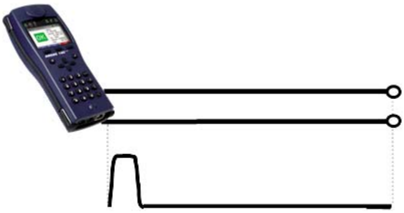
Moisture
If moisture has gotten into the cable, it will cause a reflection like that of a stub line. The stretch between the negative and the positive reflections will, however, be substantially more noisy than is usually seen from a stub line.



Loose contact
Real-time operation is the best approach to locating a loose contact. The amplitude of the positive reflection will vary as the contact is shaken.



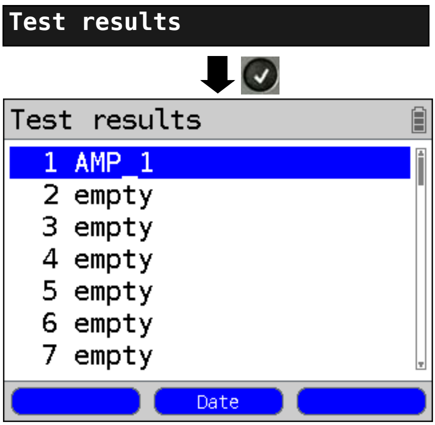
Open shielding
The ARGUS can also be used to locate the fault where the shielding of a line is broken or open. In this case, connect one contact of the ARGUS to the "a" and "b" wires and the other contact to the line's shield. The reflection will be like that of an open line.



Correct line termination
If the line is properly terminated, the entire pulse sent by the ARGUS will absorbed. There will be no visible reflection.

23 Test Results

The saved test reports can be viewed either on the ARGUS display or on a PC. The test data can be sent to a Windows PC, where - using the WINplus or WINanalyse software - it is possible to generate - among other things - a comprehensive test report.
The ARGUS saves the test results together with the date, the time (ARGUS internal clock, see page 366) and the call number, which is entered in the speed-dialling memory as the "own number" (see page 371) in one of the 50 sequentially numbered (1, 2, 3, etc.) memory locations. If no call number is entered under "own number", the ARGUS will suggest "AMP_x" as a name where the "x" in this case represents the current memory location. If all the settings are reset, the test results that have been saved will also be deleted. The functions ("View", "Test data to PC", "Delete") in the Test results menu refer to a test result. Therefore, a window will open first showing a list of the reports saved.



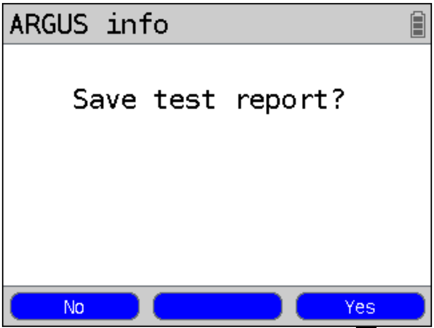
ARGUS - Main Menu.

The ARGUS will display for each memory location the corresponding name of the memory location as well as the date and time. Empty memory locations are labeled as "empty".

<Date> The date and time that the results were saved will be displayed. The **<Name>** softkey will also be displayed.

<Name> Display the name of the memory location.

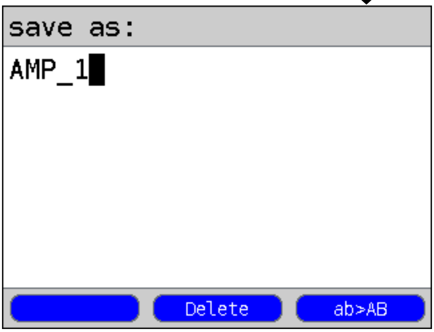
23.1 Saving Test Reports



The results of a test can be saved when a test is completed or when a connection is cleared down.

The ARGUS saves the test result in the first available memory location. If the memory is full, you must manually select a memory location to be overwritten.

As names for the memory locations, the ARGUS will suggest either AMP_1, AMP_2, AMP_3 etc. or the call number entered as the "Own number“ in the speed-dialling memory (see page 371).



The name shown can accepted or a new one can be entered using the keypad. When the right softkey is pressed, it assumes a different meaning and thus influences the entries made from the keypad. Up to 24 characters can be entered.

Store the result

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of lowercase characters (e.g. to enter a “c” press the “2” on the keypad three times), plus @, /, -, and .
<AB>12>	Entry of the uppercase characters and @, /,- and .
<Delete>	Delete the character before the cursor
	Move the cursor
	Do not save the results; return to the previous display.

23.2 Displaying the Saved Test Reports

`Test results`

ARGUS - Main Menu

`1 AMP_1`

Select a memory location (In this example, the first memory location named AMP_1 has been selected).

`View`

Display the test report

23.3 Test Results – Sending to a PC

The test results can be sent to a PC, where they can be visualized and archived. Use the included USB cable to connect the ARGUS (ARGUS "USB-B" jack) to a USB jack on your PC and then start WINplus or WINanalyse on your PC.

`Test results`

ARGUS - Main Menu.

`1 AMP_1`

Select a memory location (In this example, the first memory location named AMP_1 has been selected).
All of the test results will be sent.

`Test results to PC`

Start transfer of test results to PC

23.4 Test results – Deleting

`Test results`

ARGUS - Main Menu

`1 AMP_1`

Select a memory location
(In this example, the first memory location named AMP_1 has been selected).

`Delete`

Delete the test report stored in the selected memory location.

`1 empty`

The memory location will again be marked as "empty".

For information on how to delete all test results, see on page 370 “Reset Settings to Factory Settings”.

23.5 Send All Test Results to a PC

The ARGUS sends all of the saved test results to the PC. Connect the ARGUS to your PC and start WINplus or WINanalyse on the PC.

`Test results`

ARGUS - Main Menu

`1 AMP_1`

Select one of the stored test reports (in this example, the test results stored in the memory location named AMP_1).

`All tests to PC`

Start transfer of data to PC

23.6 Delete All Test Reports

The ARGUS will delete all of the test reports stored in the internal memory.

Test results

1 AMP_1

Select one of the memory locations with stored test results (in this example, the memory location named AMP_1).

Delete all

Press **<Yes>** to confirm that you really do want to delete all of the 50 possible test reports.

24 ARGUS Settings

The ARGUS can be configured to suit special requirements. The default (factory) settings can be restored by selecting "Reset“ (see page 370).

24.1 Trace/remote

The ARGUS passes the recorded data (as an example, in the case of an ISDN access, all of the D channel messages sent to and received from the network) online directly to the connected PC.

Settings

ARGUS Main Menu

Trace/remote

● Off

The default (preset) Trace mode will be marked in the display with a ●.

Mark the desired Trace mode The selected Trace mode will be marked blue in the display.

Open the next higher menu without making any changes.

The marked Trace mode will be activated as the default setting.

Off	Basically, the data will not be sent to the PC. Default setting: ***off***
Auto PC sync.	All data will always be sent to the PC (“PC” LED will flash). This setting remains active even after the ARGUS is switched on again.
Manual PC sync.	Data will be sent to the PC until the ARGUS is switched off (the "PC" LED will flash). When the ARGUS is switched off and then back on again, Trace mode will be off.

If the ARGUS cannot send the data to the PC without errors, the “PC” LED will flash at 5Hz (5 times per sec).

24.2 Device Settings

The procedure for configuring a device setting will be illustrated with a single example: "Alarm bell".

Settings

ARGUS - Main Menu

Device

Alarm bell

Using the cursor keys, select a setting (e.g. Alarm bell).

● Off

The default setting will be marked in the display with a ●.

Mark the desired setting. The selected setting will be marked blue in the display.

The marked setting will be activated as the default setting.

Open the next higher menu without making any changes to the settings.

Setting	Explanation
`Menu language`	Selection of the menu language. Default setting: ***depends on country***
`LCD lightness`	Setting the display contrast: The contrast can be changed in 16 steps. The contrast can be increased or decreased using the cursor keys. The display shows a vertical arrow, which shows the current setting on a scale from low to high contrast.
`Date / Time`	Entry of the date and time (initialisation of the internal clock) via the keypad. Use the vertical cursor keys to scroll from line to line in the display. The entered time will be continuously updated by the ARGUS's real time clock as long as the power is not interrupted. If the ARGUS switched off without batteries, the clock will still run a few more days on its own internal supply. If the backup supply is exhausted, the time will be undefined and must be set again.

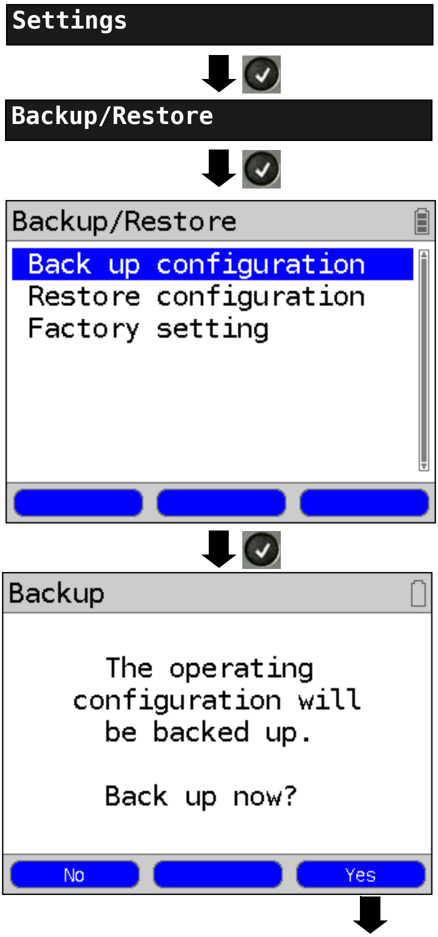
<table>
<tr><td>Ringer volume</td><td>With this setting you can set the volume level used by the ARGUS to signal an incoming call.
The initial volume level can be set.
- Default setting: Level 1 (very quiet)
In addition, you can also set the end volume level.
- Default setting: Level 7 (very loud)
When an incoming call is received, the ARGUS will begin signalling with the initial (very low) volume and increase the volume by one increment each time it signals until it has reached the final (very loud) volume.</td></tr>
<tr><td>Alarm bell</td><td>The ARGUS signals with an audible alarm in a variety of situations, e.g. when a bit error occurs in a BERT or the ARGUS has synchronized on an xDSL access or when an error counter increments.
<table>
<tr><td>short - long</td><td>Synchronized successfully</td></tr>
<tr><td>long - short</td><td>Synchronization lost</td></tr>
<tr><td>short - short</td><td>Error counter incremented (The alarm refers to the last second only. Only one alarm is signalled even if there were several errors.)</td></tr>
</table>
When this setting is set to "off“, all audible alarms are suppressed.
Default setting: off</td></tr>
<tr><td>Jingle</td><td>After the tester is switched on and has initialized, it will indicate its readiness by sounding the ARGUS jingle.
Default setting: off</td></tr>
<tr><td>Power management</td><td>Switch off automatically: Set how long the ARGUS can remain idle before the power management will switch to power down mode if the ARGUS is not connected to the plug-in power supply. If power management is disabled, the ARGUS will display a message, when it is switched on, warning that this will lead to a shorter battery life. This notice can be deactivated by pressing the "X"-key.
By pressing <On>, you can reactivate this notice.
Default setting: after 5 minutes

Lighting: Sets how long the background lighting will remain on. When operated from the mains power, the background lighting will always remain on. When operating from the battery pack, the ARGUS switch off the background lighting after the set time.
Default setting: off after 30 seconds</td></tr>
<tr><td>Software option</td><td>Enabling a software option the associated key code must be entered via the keypad. Additional ARGUS options can be enabled if desired by entering the associated 20-place code on the keypad.
To obtain this code, please contact us.</td></tr>
</table>

24.3 Settings – Backup / Restore

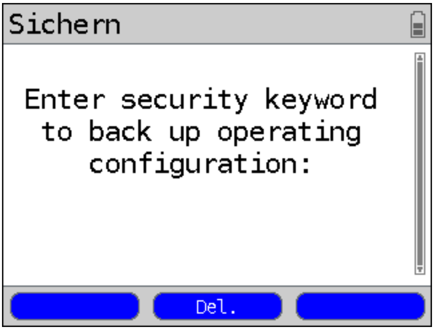
The ARGUS can backup and when needed restore all of its settings (numbers / speed-dialling memory, PPP user name, PPP password, IP addresses, profile names, user-specific services, keypad infos, etc.).

Saving settings

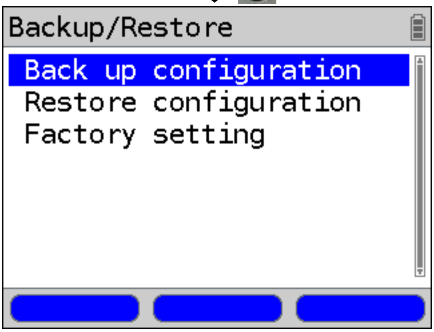


ARGUS - Main Menu

All of the ARGUS settings made will be backup and can thus be restored at a later time.

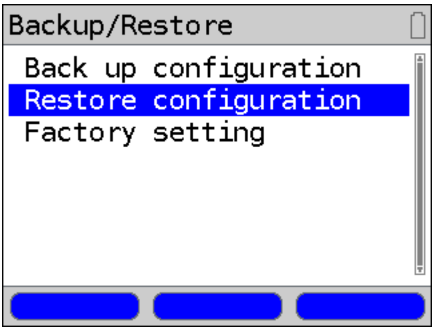


To backup or restore the settings, you must first enter the safety key.
To request the safety key, contact your support (sales partner) or intec directly (see page 11).



The settings can now be backed up and restored again later should this be needed.

Restoring settings



Select Restore settings.

and Restore the backed up settings.

If no settings have been saved, this function has the same effect as "Resetting to Factory Settings“, see page 370. The saferty key is not required.

<Yes>

The backed up configuration will now be restored.

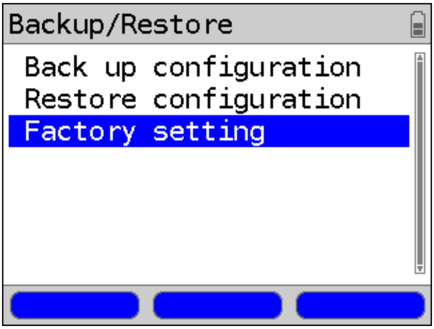
24.4 Reset Settings to Factory Settings

The ARGUS will reset all settings to the original factory settings.

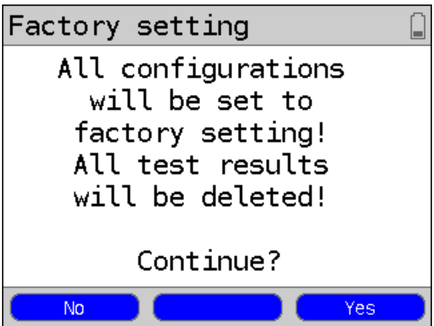
⚠ The speed-dialling memory with the call numbers, PPP user name, PPP password, IP addresses, profile names, user-specific services, keypad infos and all of the test results stored in the ARGUS will be deleted.

Settings

Backup/Restore



All settings will be reset to their factory settings.



and The ARGUS will immediately display the security warning query "All settings will be reset to the factory settings! All test results will be deleted! Reset now?“

⚠ Please contact your support (sales partner) or intec directly for the safety key (see page 11).

The following steps are performed in the same manner as in "Back up configuration", see page 368.

24.5 Saving Call Numbers in the Speed-dialling Memory

Ten 24-place call numbers can be entered in the speed-dialling 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 Numbers menu, you can jump from the beginning of the list to the end by scrolling up.

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 261).

`Settings`

ARGUS Main Menu

`Numbers`

Scroll to the desired location in the speed-dialling memory. Enter the number via the keypad.

`Enter the phone number`

<Delete> If the cursor is to the right of the last character, this character will be deleted. Otherwise, the character that the cursor is on will be deleted.

The ARGUS will return to the next higher menu without saving the number.

The ARGUS saves the number and returns to the next higher menu.

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 a "#") as the number called (CDPN or DAD) and, for the calling number (DSS1-CGPN), 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: 02351/9070-40 is entered as 023519070#40

If the "# " is at the end of a number, when the number is later dialled it will be done without CGPN or OAD.This is important for some PBXs.

25 Using the Battery Pack

Changing the battery pack

Switch the ARGUS off and disconnect the plug-in power supply. Afterwards, loosen the thumbscrew to release the battery pack.

Battery pack handling

⚠ The ARGUS may only be operated with the included battery pack. Connecting any other voltage supply to the contacts in the device will damage the ARGUS.

- 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 battery) or trickle charged (default setting: on) 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).
- If the lithium-ion battery pack is stored, it should first be charged to between 40 and 60 % of its capacity. If the lithium-ion battery pack is stored for a longer period of time, it should be recharged to this level every six months.
  To maximize the service life of a battery pack, if it is to be stored over a longer period of time, it should not be exposed to temperatures in excess of +50 °C (95 °F).
- Please read the extensive notes on safety and the transport of the lithium-ion battery pack found in the section "Safety Instructions" (see page 12).

Automatic recharging of the battery pack when the ARGUS is switched off

The ARGUS automatically recharges the battery pack, 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 battery”. If you press and hold the power switch, the ARGUS will switch off before the battery pack is recharged. The ARGUS remains on after fully recharging the battery pack.

Charge battery

The ARGUS will display the current charge of the battery pack graphically, if no power supply is connected. A battery symbol on the display will begin to blink, when there is still approximately (depending on the mode of operation) 8 minutes reserve. During this period, it is possible that there may be audible interference and in rare cases even malfunctions. Connect the power supply.
When the plug-in power supply is connected, the battery pack in the ARGUS can be fully recharged. It is not necessary to manually discharge the lithium-ion accumulators in the ARGUS battery pack. It may take up to 6 hours to fully recharge the battery pack.

Charge battery	ARGUS Main Menu
Charge	Connect the power supply! The charging process begins. The ARGUS will display the voltage while charging the battery pack.
Charge battery U: 4.03V	

Automatic recharging of the battery pack in the background (trickle charge)

Charge battery	ARGUS Main Menu
Auto charge	
● On	If the battery voltage is too low, the ARGUS will charge the battery pack automatically in the background when the plug-in power supply is connected (battery symbol shown on the display).

The ARGUS uses this setting and returns to the next higher menu.

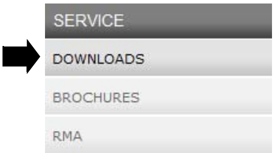
⚠ If the ARGUS is disconnected from the power supply before the battery pack is fully recharged, the ARGUS will not automatically begin to charge the battery pack again when it is reconnected to the power supply, since the battery voltage is no longer less than the threshold value.

26 Firmware Update

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

Click on "Service" (shown here in blue) in the navigation bar.

After this page opens, click on "Downloads" in the "Service" column on the left.



This will open the product list:

Select the model of your ARGUS.

After you have selected the type of device, the page showing the relevant firmware updates will open. On this page, you can select the firmware variant for your specific country.

After you have selected the required variant, a browser window will open to permit you to select the location where the firmware should saved on your PC. The remaining steps are explained in the WINanalyse manual and in the guide for the Update Tool

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. An ARGUS USB cable is required to perform an update (USB cable with a mini-USB plug).
Save the configuration and test reports on a PC 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.

27 Appendix

A) Acronyms

	Characters
.bis	Reference to SHDSL.bis (Enhanced SHDSL)
2B1Q	2 Binary 1 Quaternary - line code
3PTY	Three Party Service
4B3T	4 Binary 3 Ternary - a Modified Monitored State 43 code (MMS43)
Δf	Bandwidth
Ω	Ohm (electrical resistance)
	A
A	Ampere (unit of electrical current)
A3k1H	Audio 3.1 kHz
A7kHz	Audio 7 kHz
AAL	ATM adaptation layer
AC	Alternating Current or also an abbreviation for ACcess server
ADSL	Asymmetric Digital Subscriber Line
AI	Action Indicator
AIT	Application Information Table
AMP	ARGUS measurement report
ANSI	American National Standards Institute
Anx.	Annex
AOC	Advice of Charge
AOC-D	Advice of Charge Charging information During the call
AOC-E	Advice of Charge Charging information at the End of the call
AS	Available Second
ASCII	American Standard Code for Information Interchange.
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	1. Basic Encoding Rules 2. Bit Error Rate
BERT	Bit Error Rate Test
BR	Bridge
BRAS	Broadband Remote Access Server

BRI	Basic Rate Interface
e.g.	Example
	C
C	Celsius
c_0	Speed of light
CALL PROC	CALL PROCeeding message
CAT	Conditional Access Table
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 (call forwarding when busy)
CFNR	Call Forwarding No Reply (Call forwarding if no reply)
CFU	Call Forwarding Unconditional (Call forwarding permanently)
CGN	see also CGPN
CGPN	CallinG Party Number
CLIP	1. Calling Line Identification Presentation 2. Clipping
CLIR	Calling Line Identification Restriction
CO	Central Office
Codec	Coder Decoder
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONN	CONNect Message
CONN ACK	CONNect ACKnowledge Message
CQE	Conversational Quality Estimated
CR	Call Reference
CRC	Cyclic Redundancy Check
CT	Call Transfer
CUG	Closed User Group
CW	Call Waiting
	D
DAD	Destination Address
dB	Decibel
dBm/Hz	Unit of power referenced to 1 mW (milliwatt) per Hertz
DC	Direct Current
DCE	Data Communication Equipment

DDI	Direct Dialling In (dialling in to an extension directly)
DF	Delay factor
UDI	Unrestricted Digital Information (data telecommunications)
DHCP	Dynamic Host Configuration Protocol
diffserv	Differentiated Services
DIN	Deutsches Institut für Normung e. V. (the German Institute for Standardization)
DISC	DISConnect Message
DL	Download
DMT	Discrete Multitone Transmission
DNS	Domain Name System
DPBO	Downstream Power Back Off
DSCP	Differentiated Services
DS	Downstream band
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DSS1	Digital Subscriber Signalling System No. 1
DTE	Data terminal equipment
DTMF	Dual Tone Multi Frequency
	E
E1	Primary rate access (PRI)
EAZ	Terminal Ident. No.
ECT	Explicit Call Transfer (call forwarding or explicit call diversion)
E-DSS1	European Digital Subscriber Signalling System Number 1
EFM	Ethernet in the First Mile (see IEEE 802.3ah protocol)
EFS	Error Free Seconds
EU	European Union
EIT	Event Information Table
ElektroG	Elektro- und Elektronikgerätegesetz (German Electrical and Electronic Equipment Act)
EMV	Electromagnetic Compatibility
EN	European Norm
EoA	Ethernet over ATM
EOC	Embedded Operations Channel
ES	Errored Seconds
ESHDSL	Enhanced SHDSL (SHDSL.bis)
ete	end-to-end
ETH	Ethernet
ETSI	European Telecommunications Standards Institute
	F
F	Farad (unit of capacitance)

Fax G3	Telefax Groups 3
Fax G4	Fax Group 4
FEC	Forward Error Correction
FFT	Fast Fourier Transform
FS	Feature Set
FSK	Frequency Shift Keying
FTP	File Transfer Protocol
FW	Firmware
	G
GB	Gigabyte
Gbit/s	Gigabits per second
GBG	Closed user group (CUG) (Geschlossene Benutzer Gruppe)
G.hs	ITU-T G.994.1 handshake procedure
GigE	Gigabit Ethernet
	H
h	hour
HDB3	High Density Bipolar of order 3
HDLC	High-Level Data Link Control
HDSL	High bit rate digital subscriber line
HEC	Header Error Checksum
HEX	Hexadecimal
HLC	High Layer Compatibility
HLOG	Amplitude component of the transfer function for each tone
HOLD	Call Hold
HRX value	Hypothetical reference connection
HTTP	Hyper-Text Transfer Protocol
Hz	Hertz (unit of frequency - 1 cycle per second)
	I
i. e.	in example
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	Internet Protocol
IPCP	Internet Protocol Control Protocol
IPoA	Internet Protocol over ATM
IPoE	Internet Protocol over Ethernet
IPTV	Internet Protocol Television
ISDN	Integrated Services Digital Network

ISO	International Standard Organization
ISP	Internet Service Provider
ITSP	Internet Telephony Service Provider
ITC	Independent Transmission Convergence
ITU	International Telecommunication Union
	K
KB	Kilobyte
Kbit/s	Kilobits per second
	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 for D channels
LCD	Liquid Crystal Display
LCN	Logical Channel Number (X.25 channel number)
LCP	Link Control Protocol
LED	Light-Emitting Diode
LL	Leased Line (permament circuit)
LLC	Low Layer Compatibility
LOS	Loss of Synchronization
LOSWS	Loss of Sync Word Seconds
LQ	Listening Quality
LQO	Listening Quality Objective
	M
m	meter
MAC	Media Access Control
MB	Megabyte
Mbit/s	Megabit per second
MCID	Malicious Call Identification
MDF	Main Distribution Frame
MDI	Media Delivery Index (RFC 4445)
MLR	Media Loss Rate
MMS	Microsoft Media Server protocol
min.	minute
Modem	Modulator/Demodulator
MOS	Mean Opinion Score
MPEG	Moving Picture Experts Group
MTU	Maximum Transmission Unit
mVpp	millivolt peak-to-peak

	N
n/a	not available
n/r	not received
n/u	not used
NAT	Network Address Translation
NGN	Next Generation Network
NIT	Event Information Table
NOK	Not OK
NP	Numbering Plan
NSF	Network Specific Facilities
NT	Network Termination
NTBA	Network Termination for ISDN Basic rate Access
NTR	Network Timing Reference
	O
OAD	Origination Address
OAM	Operations, Administration and Maintenance
OoS	Out of Sequence (OOS)
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
PAM	Pulse Amplitude Modulation
PAP	Password Authentication Protocol
PAT	Program Association Table
PC	Personal Computer
PCR	Program Clock Reference
PD	Protocol Discriminator
PDU	Protocol Data Unit
PESQ	Perceptual Evaluation of Speech Quality
PID	Packet Identifier
PLR	Packet Loss Ratio
PMT	Program Map Tables
POTS	Plain old telephone service (PSTN - public switched telephone network)
P-P	Point-to-point
P-MP	Point-to-multipoint
PMMS	Power Measurement Modulation Session
PMS	Physical Media Specific

PPP	Point-to-Point Protocol
PPPoA	Point-to-Point Protocol over ATM
PPPoE	Point-to-Point Protocol over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PRI	Primary Rate Interface (PRI access)
PSD	Power Spectral Density
PSI	Program Specific Information
PWR	Power
	Q
QLN	Quiet Line Noise
QoS	Quality of service
	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
RT	Router
RTCP	Real-Time Control Protocol
RTP	Real-Time Transport Protocol
RTSP	Real-Time Streaming Protocol
Rx	Receive
	S
s	second
SBC	Session Border Controller - Outbound Proxy
SCI	Sending Complete Indication
SDT	Service Description Table
SES	Severely Errored Second
SHDSL	Single-Pair Highspeed Digital Subscriber Line
SIN	Service Indicator (1TR6)
SIP	Session Initiation Protocol
SNR	Signal-to-Noise-Ratio
SNRM	Signal-to-Noise-Ratio Margin
Spch	Speech
SRU	SHDSL Regeneration Unit
STB	Set-Top Box
STU-C	SHDSL Transceiver Unit - Central Office
STU-R	SHDSL Transceiver Unit - Remote
STUN	Session Traversal Utilities for NAT

SUB	Sub-addressing (sub-addressing is possible)
SUSP	SUSPend Message
	T
T	Trigger
TC	1. Trellis Code 2. Transmission Convergence
TCP	Transmission Control Protocol
TC-PAM	Trellis coded pulse amplitude modulation
TDM	Time Division Multiplex
TDR	Time Domain Reflectometry
TDT	Time and Date Table
TE	TErminal, Terminal Equipment
TEI	Terminal Endpoint Identifier
Tel31	Telephony 3.1 kHz
Tel7k	Telephony 7 kHz
TM	Test Manager
ToN	Type of Number
ToS	Type of Service
TP	Terminal Portability (moving the terminal on the bus)
TS	Technical Specification
TTX	Teletext
Tx	Transmit
	U
UDP	User Datagram Protocol
U interface	BRI U interface (U access)
UL	Upload
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
US	VDSL: Upstream band or SHDSL: Unavailable Second
USB	Universal Serial Bus
UUI	User-User-Info (UUI),
UUS	User-to-User Signalling (transfer of user data)
	V
V	Volt (unit of electrical voltage)
V/2	Pulse transit time delay
VC	Virtual Channel
VCC	Virtual Channel Connection
VCI	Virtual Channel Identifier
VC-MUX	Virtual Circuit Multiplexing
VDSL	Very High Speed Digital Subscriber Line

ViSyB	Video Syntax Based
ViTel	Video-Telephony
VLAN	Virtual Local Area Network
VL	Virtual Line
VLC	Video LAN Client
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VoP	Velocity of Propagation (speed with which a pulse travels down a line)
VPI	Virtual Path Identifier
$\mathbf{V_{pp}}$	Volt peak-to-peak
VTU-R	VDSL Transceiver Unit - Remote
	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
	Z
Z	Impedance

B) Vendor identification numbers

Abbreviation	Manufacturer
ALCB	Alcatel (STMicroelectronics)
ANDV	Analog Devices
BDCM	Broadcom
GSPN	Globespan
IKNS	Ikanos
IFTN	Infineon
META	Metanoia
STMI	STMicroelectronics
TSTS	Texas Instruments

C) 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 virtual switched connection)
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 inquiry	Response to status inquiry
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 or option unspecified, 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)

D) 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 causes
150	ARGUS	An error occurred during the supplementary service test. Frequent 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 has been cleared down b) No response to 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 answer to 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	The X.31 Layer 3 test was not performed. The error can only occur in a test log.

X.31 Diagnostic (only for a cause less than 256)

0 to 255	Network	See ISO 8208: 1987(E) Figure 14a page 121 Figure 14b page 123 et seq. And/or CCITT Recommendation X.25, Annex E

E) Error message: PPP connection

ARGUS Display	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.
`PPP: 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 packets received.
`PADS timeout`	No PADO packets received.

F) Error message: Download test

ARGUS Display	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.
`Ftp open error`	Error when opening the FTP connection.
`Ftp login error`	FTP login error. Wrong user name or password or anonymous login not supported.
`Ftp passiv err.`	FTP server does not support passive transmission mode.
`Ftp rec. error`	FTP receive error.
`Network error`	Network error
`Ftp error`	General FTP error.
`URL error`	Fault: No HTTP or FTP 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.
`Ftp no file`	FTP download error: No such file or directory found.
`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

G) 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 the server.
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	Due to a failed dependency, 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.

H) 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.
`Ping start 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.

I) 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 data regarding subscriber availability (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.

J) 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.
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