

# ARGUS 162

## Manual

Version: 2.20 / EN

**Important note:**

An ARGUS basic package contains at least one DSL interface (ADSL or VDSL), which includes a variety of functions and tests. All other interfaces and functions are available as options (see datasheet). Therefore, depending on the scope of function supplied, individual menu options may be hidden.

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<b>1</b>	<b>Introduction .....</b>	<b>7</b>
<b>2</b>	<b>Safety information .....</b>	<b>11</b>
<b>2.1</b>	<b>Safety and transport information for the battery pack .....</b>	<b>14</b>
<b>3</b>	<b>General technical data .....</b>	<b>16</b>
<b>4</b>	<b>Quick-start guide .....</b>	<b>18</b>
<b>5</b>	<b>Configuring accesses .....</b>	<b>25</b>
<b>5.1</b>	<b>Access wizard .....</b>	<b>26</b>
<b>5.2</b>	<b>Phys. parameters .....</b>	<b>31</b>
<b>5.3</b>	<b>Profile .....</b>	<b>32</b>
<b>5.4</b>	<b>Notices .....</b>	<b>34</b>
<b>6</b>	<b>Physical layer .....</b>	<b>36</b>
<b>7</b>	<b>Operation on xDSL accesses .....</b>	<b>37</b>
<b>7.1</b>	<b>Configuring the xDSL interface .....</b>	<b>38</b>
<b>7.2</b>	<b>xDSL settings .....</b>	<b>39</b>
<b>7.3</b>	<b>ARGUS in access mode xTU-R .....</b>	<b>45</b>
<b>7.4</b>	<b>ARGUS in access mode xTU-R bridge .....</b>	<b>68</b>
<b>7.5</b>	<b>ARGUS in access mode xTU-R router .....</b>	<b>70</b>
<b>8</b>	<b>Operation with Ethernet accesses .....</b>	<b>72</b>
<b>8.1</b>	<b>Configuring the Ethernet interface .....</b>	<b>73</b>
<b>8.2</b>	<b>Ethernet settings .....</b>	<b>74</b>
<b>8.3</b>	<b>Establishing an Ethernet connection .....</b>	<b>75</b>
<b>8.4</b>	<b>DDM test (SFF 8472) .....</b>	<b>77</b>
<b>9</b>	<b>Virtual lines (VL) .....</b>	<b>80</b>
<b>9.1</b>	<b>Virtual lines in the status screen .....</b>	<b>80</b>
<b>9.2</b>	<b>Virtual line profiles (VL profiles) .....</b>	<b>82</b>
<b>9.3</b>	<b>Activating a virtual line .....</b>	<b>84</b>
	9.3.1 Starting a service .....	84
	9.3.2 Assigning additional virtual lines .....	85
<b>9.4</b>	<b>Virtual line settings .....</b>	<b>90</b>
<b>9.5</b>	<b>Displaying protocol statistics .....</b>	<b>97</b>
<b>10</b>	<b>Services .....</b>	<b>102</b>
<b>10.1</b>	<b>Displaying service statistics .....</b>	<b>103</b>
<b>11</b>	<b>Overview of tests and hotkey assignment .....</b>	<b>104</b>
<b>12</b>	<b>Loop .....</b>	<b>108</b>
<b>13</b>	<b>ATM tests .....</b>	<b>114</b>
<b>13.1</b>	<b>VPI/VCI scan .....</b>	<b>114</b>
<b>13.2</b>	<b>ATM-OAM ping .....</b>	<b>117</b>

<b>14</b>	<b>IP tests .....</b>	<b>120</b>
<b>14.1</b>	<b>IP ping .....</b>	<b>120</b>
<b>14.2</b>	<b>Traceroute .....</b>	<b>126</b>
<b>14.3</b>	<b>HTTP download .....</b>	<b>130</b>
<b>14.4</b>	<b>FTP download .....</b>	<b>135</b>
<b>14.5</b>	<b>FTP upload .....</b>	<b>139</b>
<b>14.6</b>	<b>FTP server .....</b>	<b>143</b>
<b>15</b>	<b>VoIP tests .....</b>	<b>150</b>
<b>15.1</b>	<b>Starting VoIP telephony .....</b>	<b>158</b>
	15.1.1 VoIP back-to-back .....	166
<b>15.2</b>	<b>VoIP wait .....</b>	<b>167</b>
<b>16</b>	<b>IPTV tests .....</b>	<b>170</b>
<b>16.1</b>	<b>IPTV .....</b>	<b>170</b>
	16.1.1 Multiple virtual lines .....	174
<b>16.2</b>	<b>IPTV scan .....</b>	<b>185</b>
<b>16.3</b>	<b>IPTV passive .....</b>	<b>192</b>
<b>16.4</b>	<b>Video on demand (VoD) .....</b>	<b>196</b>
<b>17</b>	<b>Parallel tests .....</b>	<b>204</b>
<b>18</b>	<b>Auto tests .....</b>	<b>210</b>
<b>19</b>	<b>Operation on an ISDN Access .....</b>	<b>214</b>
<b>19.1</b>	<b>Setting the ISDN Interface and Access Mode .....</b>	<b>214</b>
<b>19.2</b>	<b>Initialization phase followed by a B channel Test .....</b>	<b>215</b>
<b>19.3</b>	<b>ISDN Settings .....</b>	<b>218</b>
<b>19.4</b>	<b>Bit Error Rate Test .....</b>	<b>222</b>
<b>19.5</b>	<b>Supplementary Services Test .....</b>	<b>232</b>
<b>19.6</b>	<b>Service check .....</b>	<b>236</b>
<b>19.7</b>	<b>X.31 Test .....</b>	<b>238</b>
<b>19.8</b>	<b>Call Forwarding (CF) .....</b>	<b>246</b>
<b>19.9</b>	<b>Automatic Performance of Multiple Tests .....</b>	<b>250</b>
<b>19.10</b>	<b>Connection .....</b>	<b>254</b>
<b>19.11</b>	<b>Time Measurement .....</b>	<b>263</b>
<b>19.12</b>	<b>Managing Multiple Tests on an ISDN Access .....</b>	<b>266</b>
<b>19.13</b>	<b>The L1 State of an S-Bus Access .....</b>	<b>271</b>
<b>19.14</b>	<b>Monitor .....</b>	<b>272</b>
<b>19.15</b>	<b>Leased Lines on an ISDN Access .....</b>	<b>275</b>
<b>19.16</b>	<b>Level Measuring on an ISDN Access .....</b>	<b>281</b>

<b>20</b>	<b>Operation on a POTS access .....</b>	<b>284</b>
<b>20.1</b>	<b>Setting the POTS Interface .....</b>	<b>284</b>
<b>20.2</b>	<b>POTS Settings .....</b>	<b>285</b>
<b>20.3</b>	<b>Connection on a POTS Access .....</b>	<b>287</b>
<b>20.4</b>	<b>POTS Monitor .....</b>	<b>288</b>
<b>20.5</b>	<b>Level Measuring on a POTS Access .....</b>	<b>289</b>
<b>21</b>	<b>PESQ .....</b>	<b>290</b>
<b>21.1</b>	<b>PESQ configuration .....</b>	<b>290</b>
<b>21.2</b>	<b>PESQ test on xDSL or Ethernet access via VoIP .....</b>	<b>292</b>
<b>21.3</b>	<b>PESQ test on an ISDN access .....</b>	<b>294</b>
<b>21.4</b>	<b>PESQ test on an POTS access .....</b>	<b>295</b>
<b>22</b>	<b>Copper tests .....</b>	<b>296</b>
<b>22.1</b>	<b>R measurement .....</b>	<b>296</b>
	22.1.1 Wire types .....	297
	22.1.2 Starting R measurement .....	299
<b>22.2</b>	<b>RC measurement .....</b>	<b>301</b>
<b>22.3</b>	<b>Line scope .....</b>	<b>303</b>
	22.3.1 Starting the line scope .....	303
	22.3.2 Graph functions .....	306
<b>22.4</b>	<b>Active Probe .....</b>	<b>314</b>
	22.4.1 Active Probe II .....	314
	22.4.2 Connecting the Active Probe II .....	315
	22.4.3 Starting Active Probe II (example with line scope) .....	315
<b>22.5</b>	<b>TDR .....</b>	<b>318</b>
	22.5.1 TDR settings .....	318
	22.5.2 Starting TDR .....	318
	22.5.3 Graph functions .....	320
	22.5.4 Examples .....	325
<b>23</b>	<b>Ethernet cable tests .....</b>	<b>329</b>
<b>23.1</b>	<b>Configuring the Ethernet interface .....</b>	<b>329</b>
<b>23.2</b>	<b>Ethernet cable test settings .....</b>	<b>329</b>
<b>23.3</b>	<b>Ethernet cable test .....</b>	<b>331</b>
	23.3.1 Starting Ethernet cable test .....	331
<b>23.4</b>	<b>Ethernet port flash .....</b>	<b>335</b>
	23.4.1 Starting Ethernet port flash .....	335
<b>24</b>	<b>Test results .....</b>	<b>337</b>
<b>24.1</b>	<b>Saving test results .....</b>	<b>338</b>
<b>24.2</b>	<b>Displaying saved test results .....</b>	<b>339</b>
<b>24.3</b>	<b>Sending test results to a PC .....</b>	<b>339</b>
<b>24.4</b>	<b>Delete test results .....</b>	<b>340</b>
<b>24.5</b>	<b>Sending all test results to PC .....</b>	<b>340</b>
<b>24.6</b>	<b>Deleting all test results .....</b>	<b>341</b>

<b>25</b>	<b>WLAN .....</b>	<b>342</b>
<b>25.1</b>	<b>Starting WLAN .....</b>	<b>343</b>
<b>25.2</b>	<b>Test results via WLAN .....</b>	<b>344</b>
<b>25.3</b>	<b>WLAN in router mode .....</b>	<b>345</b>
<b>26</b>	<b>ARGUS settings .....</b>	<b>346</b>
<b>26.1</b>	<b>Configuring the device .....</b>	<b>346</b>
<b>26.2</b>	<b>Backing up and restoring settings .....</b>	<b>351</b>
<b>26.3</b>	<b>Restoring the factory settings .....</b>	<b>353</b>
<b>26.4</b>	<b>Saving numbers in the speed dial memory .....</b>	<b>354</b>
<b>27</b>	<b>Using the battery pack .....</b>	<b>355</b>
<b>28</b>	<b>Firmware update .....</b>	<b>357</b>
<b>29</b>	<b>Appendix .....</b>	<b>360</b>
A)	Abbreviations .....	360
B)	Vendor identification numbers .....	369
C)	CAUSE-Messages – DSS1 Protocol .....	370
D)	ARGUS Error Messages (DSS1) .....	372
E)	Error message: PPP connection .....	374
F)	Error message: Download test .....	375
G)	HTTP status codes: .....	376
H)	General Error Messages .....	378
I)	VoIP SIP status codes .....	379
J)	Software Licenses .....	382
K)	Index .....	383

## 1 Introduction

### **VDSL+ADSL combi tester with fibre optics or VDSL Bonding option**

The combi tester for latest turbo internet: The ARGUS 162 combines the capabilities of a tester for day-to-day installation with those of a tester for high-speed interfaces, such as GPON (FTTH) or VDSL Bonding (G.bond: ITU-T G.998.2). In addition, it is equipped with a powerful and versatile SFP slot (FTTx) and a copper-based Gigabit Ethernet interface which can, for example, provide a full ONT or xDSL modem simulation. Furthermore, ARGUS 162 is available with an optional integrated ADSL interface (Annex A + B + J + L + M) and supports VDSL2 Vectoring (G.vector: ITU-T G.993.5) as well as all well-known handset functionalities for ISDN BRI S/T/U, PRI/E1 and POTS if needed.

### **Triple Play and Quality of Service (QoS)**

HTTP and FTP downloads can be performed via Gigabit Ethernet and FTTx with speeds of multiple 100 Mbit/s. It is possible to subject these Ethernet and fibre accesses to the same practical stress tests as ADSL and VDSL interfaces. Such tests can be simply started and stopped at any time by the user, for example in the form of parallel triple-play tests. Those additional triple-play tests like data, VoIP and IPTV can also be activated by key later in the field, when required. The ARGUS 162 therefore not only simulates the terminal equipment such as VoIP phone, PC or TV set-top box (STB), but also identifies all the important quality parameters (QoS) such as the VoIP speech quality according to the MOS method (Mean Opinion Score). The multifunctional combi tester also performs various IP tests using the IPv6 protocol, which becomes more common, even in the dual-stack operation mode. Furthermore, the ARGUS 162 supports the setup of several virtual connections (VLANs, PPP connections).

### **Ethernet TDR and Copper tests**

In order to measure loop lengths and identify incorrect wiring, the tester supports cabling tests (Ethernet TDR) and, on the last mile, copper tests (Cu tests) as well as a TDR (Time Domain Reflectometer) analysis. Also, unwanted interferers can be localized promptly by spectral analysis with the Line-Scope (up to 30 MHz). The compact ARGUS Copper Box can optionally measure all important electrical values of the local loop such as DC and AC voltage, DC current, isolation and loop resistance, capacitance or longitudinal balance (LCL: ITU-T O. 9) and near-end crosstalk (NEXT) between tip, ring and ground wire - all completely automated and in real time. The ARGUS Copper Box also provides the advantage that it can be combined with various ARGUS testers and only has to be connected in the field, when one really needs it.

### **Additional features**

Without changing modules, it is possible to select the different interfaces via the intuitive menu and test them with the press of a single button. High user-friendliness is ensured by very short boot and changeover times. Alongside the ease of use is raised by the possibility to do detailed adjustments as well as by the use of the completely pre-configured profiles with a wide range of various settings and identifiers (e.g. PPP) for all the access types an operator offers. Its low weight and the user-friendly, manageable size make the ARGUS 162 an all-rounder, which lithium-ion battery pack ensures long operating times in the field.

### **Easy operation**

The large 320 x 240 pixel colour display and an intuitive menu structure, among other things, guarantee user-friendly operation. A high-performance Li-Ion battery pack ensures long operating times in the field.

You can download free software updates to ARGUS from your PC at any time. Updates are available at [www.argus.info/en/service/downloads](http://www.argus.info/en/service/downloads).



**Overview of key ARGUS functions:****xDSL interfaces (ADSL, ADSL2, ADSL2+, VDSL2)**

- **Synchronisation with DSLAM (xTU-C) and determination of all relevant connection parameters and error counters**
- **Bridge, router and terminal-device modes, via IPv4 and IPv6**

**Ethernet interfaces**

- **Gigabit Ethernet test interfaces (10/100/1000 Base-T)**
- **Ethernet cabling tests**

**SFP slot**

- **SFP slot for fiber-based interfaces (Ethernet and FTTx)**

**IP and ATM tests via xDSL and Ethernet**

- **ATM Tests (only for ADSL)**
  - ATM-OAM ping, ATM-OAM cell loop, VPI/VCI scan
- **IP tests**
  - Ping and traceroute tests (BRAS information, PPP trace, VLAN), via IPv4 and IPv6
  - Download tests for measuring throughput (HTTP-download, FTP-up/download)
  - FTP server test, up/download from ARGUS to ARGUS
  - Parallel testing of multiple services (VoIP, IPTV,...)
- **VoIP test**
  - VoIP terminal device simulation, including acoustics (var. codecs), via IPv4 and IPv6
  - OK/FAIL assessment of VoIP speech quality (QoS) according to:
    - MOS<sub>CQE</sub> (ITU-T P.800), E-model (ITU-T G.107)
    - PESQ (ITU-T P.862) in conjunction with PESQ server software
- **IPTV tests**
  - Stream request (STB mode), IPTV channel scan, IPTV passive
  - OK/FAIL assessment and display of quality parameters

**ISDN functions (PRI/E1 see extra manual)**

- U-interface (4B3T or 2B1Q) according to ANSI T1.601
- PRI/E1 interface according to ITU-T I.430/431 in TE and NT operation
- D-channel monitoring via BRI and PRI interface
- Testing of BRI and PRI fixed lines (E1, 2 Mbit/s)
- E1-BERT via all B-channels simultaneously (MegaBERT)
- Automatic service and service-feature tests, and much more
- Assessment of ISDN speech quality directly on BRI or U-interface
  - PESQ (ITU-T P.862) + MOS<sub>LQO</sub> in conjunction with PESQ server SW

### POTS functions

- Fully functional integrated analogue handset (POTS)
- With DTMF and CLIP display, pulse dialling
- High-ohm 2-wire monitor with voltage measurement
- Assessment of analogue speech quality directly at POTS access
  - PESQ (ITU-T P.862) + MOS<sub>LQO</sub> in conjunction with PESQ server SW

### Copper test (Cu test) functions

- **Copper Box:** expansion of the ARGUS copper test function, see ARGUS Copper Box manual
- **R-measurement:** ARGUS continually measures resistance and displays the values in real time (loop resistance)
- **RC measurement:** Test of loop resistance or capacitance of open line (including calculation of line length)
- **Line Scope:** High-performance realtime Line Scope with display in time and frequency range (FFT) up to 30 MHz
- **TDR:** Time domain reflectometer to measure line lengths and locate faults

### Local loop acceptance log

When connected to a PC via a USB port, ARGUS can be used to generate and print out a detailed measurement log on the PC using the software WINplus / WINanalyse.



Note:

Detailed explanations regarding PRI/E1 and Copper Box may be found in the separate documentation for the respective device.

You should receive these together with your equipment. You can also download the latest manuals at <http://www.argus.info/en/service/downloads>, or simply contact our Service Department:

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[www.argus.info/en](http://www.argus.info/en)  
[support@argus.info](mailto:support@argus.info)

## 2 Safety information

ARGUS may only be operated using the accessories supplied with the device. The use of other accessories can result in faulty measurements or even damage to ARGUS and the connected equipment. Only use ARGUS according to the instructions contained in this accompanying document. Use in any other manner can cause harm to persons or destroy your ARGUS.



- Before connecting ARGUS to an access, make sure that no dangerous voltages or voltages for which ARGUS and its accessories are not specified are present. Also keep in mind that the voltage can change over the time that the device is connected.
- Use ARGUS only according to its intended purpose at all interfaces and local loops.
- Voltages over 50 V AC and 120 V DC can cause death.
- Never conduct measurements without the battery pack!
- ARGUS is not waterproof. Therefore, protect ARGUS against water penetration.
- Before replacing the battery pack, disconnect the power adapter and all measuring leads and power ARGUS down.  
ATTENTION: Never remove the battery pack during operation.
- Remove the power adapter from the mains socket as soon as ARGUS is switched off or no longer in use (e.g. after charging the battery pack)!
- ARGUS may only be used by trained personnel.
- ARGUS may only be operated using the power adapter supplied with the device.
- Only manufacturer-approved headsets may be connected to the headset socket; any other use of this socket (e.g. connection to a home entertainment system) is expressly prohibited.
- Only the Active Probe II, the ARGUS Copper Box and the other manufacturer-approved USB devices without mains connection may be connected to the USB host interface (USB-A). Any other use (e.g. connection to a PC) is expressly prohibited.
- If external USB devices are used on the USB-host interface (USB-A), no warranty is assumed for occurrences outside the mechanical wear of normal plug-in.
- In battery power mode, always cover the ARGUS power socket with the supplied rubber protective cap labelled "Power".
- Only use the SFP slot for SFP types explicitly approved by intec GmbH. Never insert other objects or SFP modules into the SFP slot.
- When the SFP slot is not in use, always make sure that they are sealed using the supplied protective covers.



- When using the SFP slot and SFP modules, always be sure to observe normal cleanliness.
- When using SFP modules, always be sure to observe the module manufacturer's safety information and use them only for their intended purpose.
- The most common SFP modules approved for ARGUS are class-1 laser products.

Generally, the use of class-1 laser products does not require any special protection measures.

However, for your own safety please note the following:

- Always cover the ends of the glass fibers or the SFP module when disconnecting.
- Always avoid direct eye contact with the emitted laser light. Vision aids and long exposure times can make even low light doses extremely dangerous.
- The equipment may only be used by trained personnel.
- The electromagnetic compatibility (EMC) has been tested according to the regulations specified in our conformity declaration.  
ARGUS is a class A device. This device can cause radio interference in residential areas. In this case, the user may be required to implement appropriate measures.
- Active charging of the battery pack and automatic charging (on by default) may only be carried out in a temperature range of 0 °C to +40 °C.
- The device may not be used during thunderstorms.
- If ARGUS is operated under extreme conditions, it can be set to energy-saving mode to protect the device and the user; this can interrupt the running test and drop the connection.

To ensure dependable extended operation of ARGUS, always make sure that it is optimally protected against high temperatures.

- The device may not be opened.
- Please observe the following safety and transport information when using the lithium-ion battery pack.
- Before starting a test or synchronising on an interface, determine how you want to supply power to ARGUS (battery pack or power adapter). The car adapter is only for charging the device. When ARGUS is connected to this adapter, you should not run any tests or synchronise on a DSL interface.

### **Return and environmentally compatible disposal**

Currently applicable environmental legislation restricts the use of certain hazardous substances in electrical and electronic devices, particularly the concentration respectively use of lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium [Cr(VI)], polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

We hereby affirm on the basis of the assurances, designations and documentation of our suppliers that all our ARGUS-brand measurement technology products are free of substances in concentrations, preparations or applications whose market release is prohibited pursuant to the applicable requirements of the RoHS Directive 2011/65/EU of the European Parliament and Council dated 8 June 2011. Our EAR registration number is: WEEE reg. no. DE 92829367.

Since October 2005, we have been marking all our measuring devices with this symbol, in compliance with WEEE 2002/96/EC and the corresponding German statute ElektroG:



(  ) (DIN EN 50419).

In other words, ARGUS and its accessories, may not be disposed of as household waste. Please consult with our Service department with respect to the return of old devices.

### 2.1 Safety and transport information for the battery pack

#### Transport

The battery pack has been tested according to the UN directive (ST/SG/AC.10/11/Rev. 4, part III., subchapter 38.3). Protective functions have been implemented to guard against short-circuit, destruction and dangerous reverse currents. As the battery pack contains a lithium quantity below current thresholds, it is not subject to international regulations governing hazardous materials either as an individual part or mounted in ARGUS. When transporting multiple battery packs, however, you may also need to observe this safety information. Further information is available on request.



**Failure to observe the following danger and warning information can impair the protective functions of the battery pack. This can cause extremely high voltages and currents which can in turn result in abnormal chemical reactions, acid leaks, overheating, smoke, explosion and/or fire. Additionally, failure to observe this information can negatively impact both the performance capacity and the performance duration.**


#### Hazard information and warnings

1. Do not disassemble or short-circuit the battery pack.
2. Do not throw the battery pack into fire or overheat it ( $> 60\text{ }^{\circ}\text{C}$ ).
3. The battery pack must not become wet or damp.
4. Active charging of the battery pack and automatic charging (on by default) may only be carried out in a temperature range of  $0\text{ }^{\circ}\text{C}$  to  $+40\text{ }^{\circ}\text{C}$ .  
To maximise battery life, do not store the battery long-term at temperatures above  $+50\text{ }^{\circ}\text{C}$ .
5. The battery pack may only be charged using the corresponding ARGUS device or an approved charger.
6. Do not puncture the battery pack with a sharp object.
7. Do not throw the battery pack or expose it to shocks.
8. Do not use battery packs that have become damaged or deformed.
9. The battery pack contacts have a specific polarity and may not be inserted in ARGUS or a charging device with reverse polarity.
10. Only connect the battery pack to the corresponding ARGUS or charger in the intended manner.
11. The battery pack may not be directly connected to electrical outputs such as power adapters, car adapters etc.
12. Only use the battery pack with ARGUS.
13. Do not attach, transport or store the battery pack together with metallic objects.
14. Do not expose the battery pack to electrostatic charges.
15. The battery pack may not be charged or discharged together with primary batteries or other battery packs.

16. If the battery pack fails to charge by the end of the charging time, it can no longer be recharged.
17. Do not expose the battery pack to excessive pressure.
18. If the battery pack emits odours or heat, becomes discoloured or deformed or otherwise appears different from normal during operation, charging or storage, immediately remove the battery pack from the device and never use it again.
19. In the event that acid leaks and comes in contact with eyes or skin, wash immediately with clean water. Do not rub. In both cases, seek medical attention immediately. Otherwise, permanent injury may occur.
20. Keep the battery pack away from children.
21. Read this manual and the corresponding safety information carefully before using the battery pack.
22. If odours, rust or other abnormalities are detected before the first use, contact intec GmbH to clarify the next steps.


3 General technical data

Device specifications

<b>Dimensions/weight</b>  Height: 254 mm Width: 99 mm Depth: 73 mm Weight: approx. 880 g (1.94 lbs) (incl. battery pack)	<b>Inputs/outputs</b>  - RJ-45 (BRI/PRI/E1) for BRI and PRI - RJ-45 (Line) for xDSL, POTS, U-interface and Copper tests - Ethernet 10/100/1000 Base-T - Ethernet 10/100 Base-T or USB-A socket, USB-host interface - SFP slot - USB-A socket, USB-host interface - USB-B socket, USB client interface - Headset input
<b>Control panel</b>  25 keys	
<b>LCD display</b>  LCD colour display with switchable background illumination 320 x 240 pixels	<b>Temperature range</b>  Temperature range for charging battery pack: 0 °C to +40 °C Operating temperature (in battery mode): -10 °C to +50 °C Operating temperature (with power/car adapter): 0 °C to +40 °C Storage temperature: -20 °C to +60 °C Humidity: up to 95 % rel. humidity, non-condensing  <b>Power supply</b>  Lithium ion battery pack with 7.2 V rated voltage (observe the safety information) or 12 V/1.5 A ARGUS power adapter
<b>Miscellaneous</b>  ARGUS user safety tested according to EN60950-1 RoHS conformity pursuant to the WEEE directive The electromagnetic compatibility (EMC) was tested according to the regulations specified in our declaration of conformity.   CE marking ARGUS 162 complies with EC directives 2004/108/EC and 2009/C197/03. We will be happy to provide a detailed declaration of conformity on request	



**Supported standards**

<b>ADSL (Line):</b> 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.992.5, Annex J (ADSL2+) ITU-T G.992.3, Annex L (RE-ADSL2 via analogue) ITU-T G.992.3, Annex L (RE-Narrow PSD ADSL2 via POTS) ITU-T G.992.3, Annex M (ADSL2) ITU-T G.992.5, Annex M (ADSL2+) ANSI T1.413	<b>ISDN-BRI/PRI (BRI/PRI/E1):</b> ITU-T I.430 ITU-T I.431 ITU-T G.821 ITU-T X.31  <b>ISDN U-interface (Line):</b> ANSI T1.601
<b>VDSL (Line):</b> ITU-T G.993.2 (VDSL2) ITU-T G.993.5, G.vector (Vectoring) ITU-T G.998.2, G.bond (Bonding) Profiles 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a ITU-T G.998.4 (G.INP, Retransmission)	<b>R/RC measurement (Line):</b> Resistance test: - Accuracy for 20 $\Omega$ - 100 $\Omega$ : $\pm 10$ % - Accuracy for 100 $\Omega$ - 100 k $\Omega$ : $\pm 2$ % Capacitance test: - Accuracy for 1 nF - 1 $\mu$ F: $\pm 5$ %
<b>Ethernet (LAN/SFP):</b> IEEE 802.3 - 10 Base-T - 100 Base-T - 1000 Base-T - SFP (MSA) Autonegotiation Auto-MDI(X)	 <b>Dielectric strength:</b>  <b>Line:</b> DC: max. +200 V AC: max. +100 V <sub>pp</sub> (Copper tests only) DC: max. +200 V (xDSL) DC: max. +130 V (for POTS) DC: max. +145 V (for U-interface)  <b>BRI/PRI/E1:</b> DC: max. +48 V  DC voltage measurements: - Accuracy: $\pm 2$ %

### 4 Quick-start guide



#### Power key



- Switches on ARGUS
- Reactivation after power-down (adjustable, see page 349)
- Switches on display illumination (also possible with any other key). In battery mode, the display illumination switches off automatically after an interval that can be set in ARGUS (see page 349).
- Switches off ARGUS (key must be held down): after an adjustable interval (e.g. after 10 minutes), ARGUS automatically shuts down in battery mode (see page 355). When the power supply is attached, the ARGUS battery recharges automatically once the device is switched off (see page 355 Using the battery pack)

#### Enter key



- Opens menu
- Switches to next display
- Starts/opens test
- Accepts setting

### Back key



- Switches ARGUS back to the previous display without saving current entries, e.g. changes in a configuration parameter
- Cancels tests
- Exits graphic displays
- Switches to main menu after powering up

### Cursor keys



- Browses display lines page by page (vertical cursor keys)
- Cursor movement within a display line (horizontal cursor keys)
- Within selection lists or statistics, the horizontal cursor keys can be used to jump to the end (right cursor key) or the beginning (left cursor key) of the displayed list
- Select a menu, a function or a test
- Set measuring ranges in copper test
- Move display cursor in graphic displays
- Select functions in graphic status screen

### Telephony

#### ISDN and POTS



- Answers and hangs up
- Simplified single call: press the handset key twice (ISDN only)

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

- Starts VoIP telephony

### Level key



- Opens the graphic status screen
- BRI, PRI, U-interface access: starts single-layer measurement (level/voltage)
- xDSL access: displays results
- Ethernet: opens results
- Start/stop function for realtime analyses (Line Scope / TDR)

### Number block



- Entry of numerals 0 through 9, letters and special characters
- Direct function call, depending on the selected access (hot key), e.g. page 106 et seq.

### Softkeys



- The function of the three softkeys depends on the respective situation. The currently assigned function appears in the bottom line of the display in the form of three blue fields with white letters, e.g.:  
<Menu>: opens main menu  
<Start>: establishes a connection or starts a test
- Other softkeys are described in the corresponding chapters of this manual.

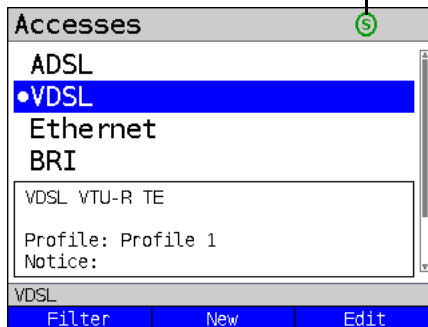
### Shift key






In some menus, a green "S" in a green circle appears in the top line of the display.



In these menus, the softkeys are assigned two functions. The Shift key toggles the softkey assignment (see example page 175).

Example: Press Shift to change the softkey assignment.



ARGUS is mainly controlled using the four cursor keys, the Enter key , the Back key , the Level key  and the three softkeys.

The bottom line of the display shows the current softkey assignments.

In the following pages of this manual, only the respective currently valid softkey function is displayed in angle brackets < >, e.g. <Menu>. The softkey <✓> performs the same function as the Enter key , the softkey <↓> has the same effect as the cursor key  on the ARGUS keypad.

## Top connections



### PWR

For external power adapter.

When the external power adapter is connected, ARGUS switches off the battery power supply. ARGUS recharges the battery automatically once it is switched off (see page 355).

### USB-A or USB-A 1/2

USB-host interface

(Active Probe II + Copper Box)

### USB-B (mini-USB)

USB-client interface (PC connection)

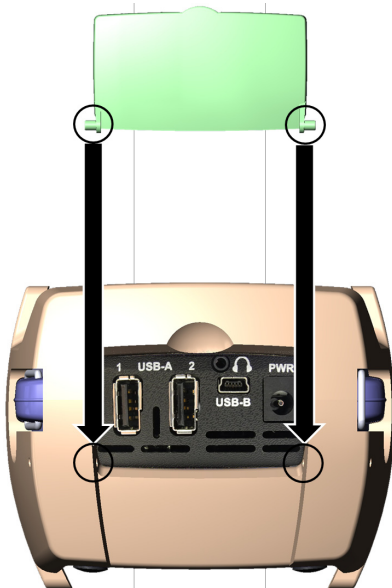


### Headset socket



**ARGUS check regularly if there are any USB devices connected.**

## Using the ARGUS socket cover with the rubber protective sleeve



First fit the rubber protective sleeve, then insert the socket cover in the two recesses in the sleeve provided for that purpose.

The socket cover does not completely protect ARGUS against water or dirt penetration.

Open or remove the cover when using the device continuously over longer periods to prevent internal heat build-up.

**Bottom connections**

Yellow Link/Data LED:  
signals physical connection with another  
Ethernet port

- LED steadily illuminated:  
connecting
- Flashing LED: transmitting/  
receiving



The green Speed LED and yellow Link/  
Data LED indicate transmission speed

- LED on: 10/100 Base-T

Green Speed LED indicates transmission  
speed

- LED on: 10/100/1000 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 Copper                Pin assignment: 4/5

**LAN**

Connection to a PC network card.


Connection to the Ethernet interface of an xDSL  
modem, router (IAD) or hub/switch or another  
Ethernet interface (access: Ethernet).

**SFP**

Connection of selected SFP modules from various  
manufacturers, for accessing fiber-based interfaces  
(Ethernet, FTTx).

Charging the battery in initial operation

The battery pack compartment is on the rear of the device. Attach the battery back by placing it against the retaining points at the top end and then screwing down the knurled screw. Use only the battery pack supplied with the device. Observe the safety information given on page 14. Now connect your (switched-off) ARGUS to the external power supply supplied with the device.

Switch on ARGUS using the  key. The following display appears (you may first need to acknowledge warnings or messages with <Continue>):



The Accesses display can vary depending on the configuration.

Current assignment of the softkeys.



Menu name

Selected menu option







ARGUS indicates in the display when the battery is completely charged.

 Press: ends charging.

You must first change the battery pack supplied with the device completely (see page 355 Using the battery pack) before full capacity is reached.

### Power-saving mode



In battery mode, ARGUS automatically switches off after five minutes of no activity (interval adjustable, see page 349). ARGUS does not switch off during a test e.g. (Loopbox) or in trace mode.

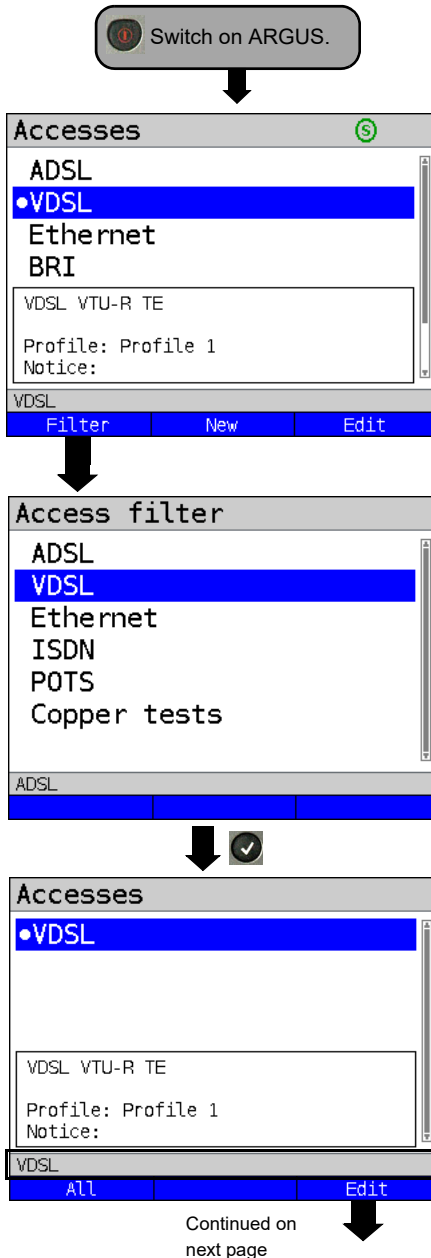
The device can alternatively be operated using the supplied external adapter. When the adapter is connected, power supply via the battery is automatically switched off. ARGUS must always be operated with the battery, regardless of the power supply type. This ensures e.g. uninterrupted operation of the real-time clock.



Unplug the adapter from the mains as soon as ARGUS is switched off and no longer in use (battery charging).



## 5 Configuring accesses



After powering up, ARGUS displays all configured accesses (up to 100). By default, one access is preconfigured for every interface type (ADSL, VDSL, ...). The most recently used access is indicated on the display with ●.

ARGUS additionally displays a preview of the selected access settings, see also page 29. The preview window opens after 2 seconds.

**<New>** Creates an access, see page 26, Fig. 2.

**<Edit>** Edits an access, see page 26, Fig. 1.



Toggles softkey assignment, see page 30.



Switches to main menu.

With the **<Filter>** softkey, ARGUS lets you filter all pre-configured accesses according to access type (ADSL, VDSL, ...) and displays this group.

In this example, VDSL is selected.

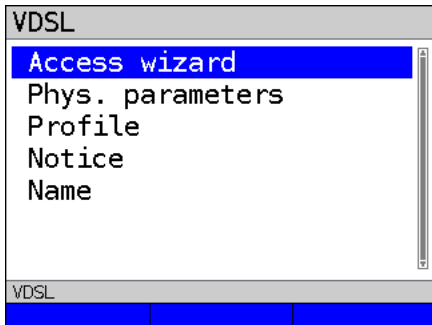
All relevant accesses are displayed in which VDSL is specified in the configuration.

The status line (above the softkeys) continues to show the access that is "still" selected (in this example VDSL).

**<All>** Display of all possible accesses, see Fig. 1.

**<Edit>** Edits the selected access profile.

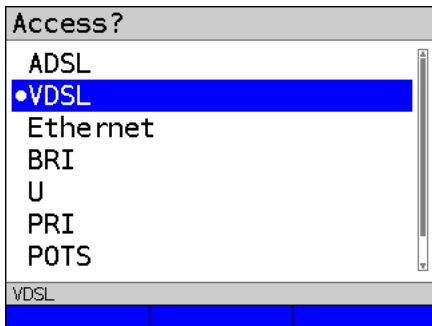
## 5.1 Access wizard



ARGUS switches to the "Accesses" main menu.

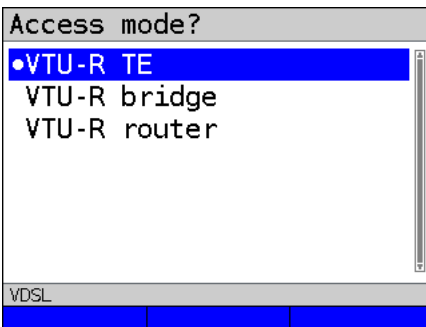
You can now configure the selected access, here VDSL, using the access wizard.

The query parameters of the access wizard depend on the selected access (ADSL, VDSL, ...), see page 29.



Selection of physical interface (here VDSL).

- For xDSL, see page 37.
- For Ethernet, see page 72.
- For BRI, see page 214.
- For POTS, see page 284.
- For Copper tests, see page 296.



ARGUS switches directly to the access mode settings.

Selection of access mode (here VDSL VTU-R terminal) device).

- For xTU-R TE, see page 45.
- For xTU-R bridge, see page 68.
- For xTU-R router, see page 70.



Continued on next page

Profile?

•Profile 1
Profile 2
Profile 3
Profile 4
Profile 5
Profile 6
Profile 7

VDSL

Edit



Access name?

VDSL

04/24 signs

VDSL

Delete Ab>AB



Continued on next page

You can now link your configured access settings with one of 20 profiles. These profiles link the access settings with the access and test parameters. You can define service, virtual line and other parameters. The selected profile is highlighted in the display in blue. The default profile is indicated with a ● in the display.

Once you have selected the profile, ARGUS suggests an access name, based on the settings you made previously (here VDSL). You can enter up to 24 characters (in this example 04/24 characters).

<Delete> Deletes access name.



Clears mark and returns cursor keys to the start.



Clears mark and returns cursor keys to the end.

<Ab>AB> Entry begins with upper-case letters and continues in lower-case.

<AB>12> Entry of upper-case letters.

<12>ab> Entry of numbers.

<ab>AB> Entry of lower-case letters.



Entry of special characters, e.g. @, /, -, ., \*, ?, %, =, &, ! etc.



Entry of special characters e.g. \_, :, +, # etc.

**Summary**

VDSL VTU-R TE

Profile: Profile 1

Notice:

✓: Save and quit wizard.  
X: Step back.

VDSL

Phys. param. Notice

ARGUS displays a summary of the configuration.

<Phys. param.> Edits the physical parameters, see page 39.

<Notice> Entry of notices, see page 34.



Save and exit the wizard.



Go back one level.

**VDSL**

Access wizard

Phys. parameters

Profile

Notice

Name

VDSL

ARGUS returns to the editing overview of the selected access (here VDSL).

To configure the services or test parameters, select "Profile"; see also page 32. You need to exit the access wizard before ARGUS can use the configured access.



Exit the access wizard.

**Accesses**

ADSL

•VDSL

Ethernet

BRI

VDSL VTU-R TE

Profile: Profile 1

Notice:

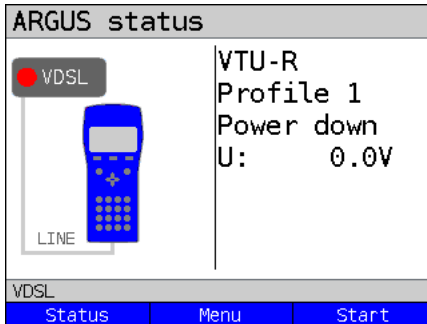
VDSL

Filter New Edit

Press OK to confirm the selected access, here VDSL.



Continued on next page



ARGUS switches to the ARGUS status display.

<Status> Switches to status screen.

<Menu> Switches to main menu.

<Start> Starts the VDSL connection.

### ARGUS access wizard

The access wizard prompts for different information depending on the access/interface.

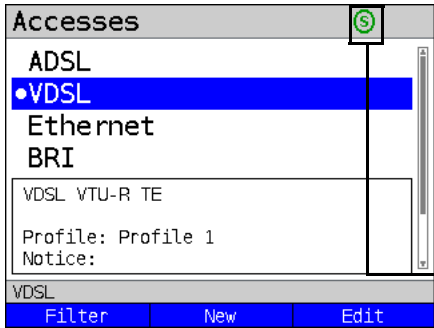
Each parameter queried depends on the respective previous parameters (from left to right).

Access/ interface	Line	Mode	Access mode	L2 mode	Ethernet interface	Profile
ADSL	-	Annex A Annex B ...	ATU-R TE, ATU-R bridge, ATU-R router,	-	LAN, SFP	Profile
VDSL	2 wire* <sup>3</sup> , 4 wire (P1+P2)* <sup>3</sup>	-	VTU-R TE, VTU-R bridge, VTU-R router,	-	LAN, SFP	Profile
Ethernet	LAN, SFP	-	IP based, cable test* <sup>2</sup> ,	-	-	Profile
BRI	-	-	TE, NT, leased line, monitor	Auto.* <sup>1</sup> , P-P, P-MP	-	-
U-interface	-	-	TE, leased line	Auto.* <sup>1</sup> , P-P, P-MP	-	-
PRI	-	-	TE, NT, leased line, monitor	-	-	-
POTS	-	-	Terminal, monitor	-	-	-
Copper tests	-	-	-	-	-	-
* <sup>1</sup> = only for BRI-TE, U-interface-TE    * <sup>2</sup> = only for LAN * <sup>3</sup> = only for VDSL Bonding						

For ADSL access, you are prompted for ADSL mode:

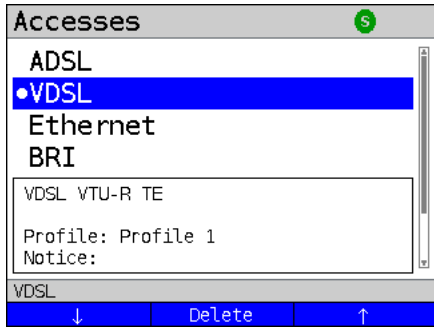
	Description
<b>ADSL mode</b>	Different ADSL modes can be set depending on the variant. The set ADSL mode must be compatible with the ATU-C (network side). When ADSL auto-modes "Annex A/M auto, Annex B/J auto, Annex A auto, Annex B auto and Annex M auto" are selected, ARGUS automatically detects and matches the configuration on DSLAM. Default: <b>Annex A/M auto</b>

Sorting the accesses in the access overview



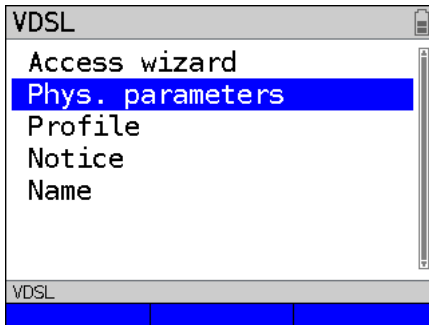
In order to keep frequently used accesses readily available, ARGUS allows you to arrange the configured accesses in any order.

Switches to softkey assignment.



- <↓> The selected access is moved down one place in the list.
- <↑> The selected access is moved up one place in the list.
- <Delete> Deletes the highlighted access.

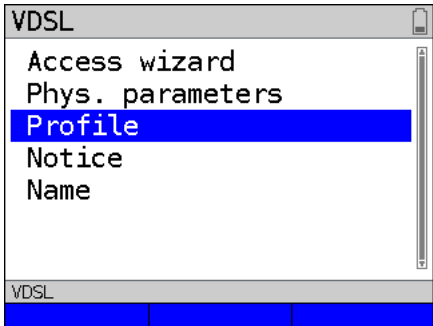
## 5.2 Phys. parameters



Edits the physical parameters of the selected access (here VDSL, see page 39).

The physical parameters can also be opened and edited directly when the access wizard is finished (see page 28 Fig. 1).

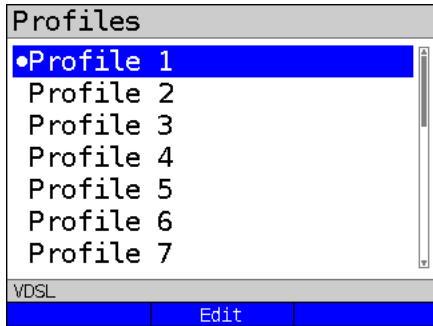
5.3 Profile



The preconfigured accesses can be linked to up to 20 profiles. These profiles link the access settings with the access and test parameters. You can set various parameters here including those for service and virtual line.



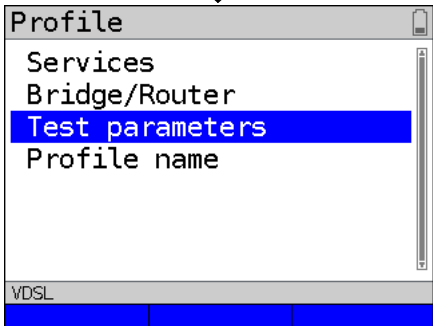
Select a profile.



ARGUS enables configuration of up to 20 profiles.



Select the profile you wish to edit. The selected profile appears in the display in blue. The default profile is indicated with a ● in the display.



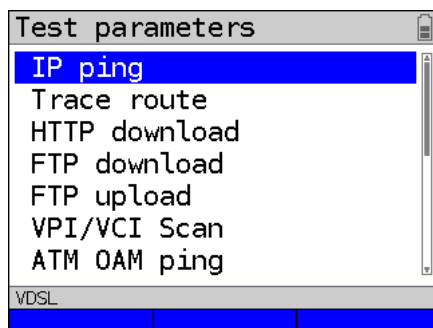
Select e.g. Services or Test parameters.

Services page 102 et seq.  
Bridge/router, see page 68.  
Profile name: Enter the name of the access, see page 27.



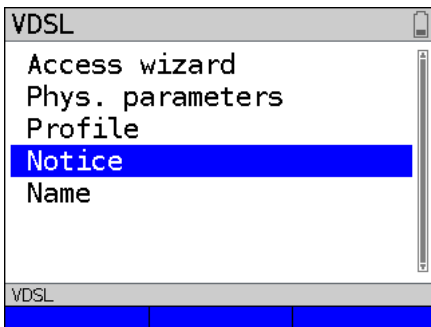
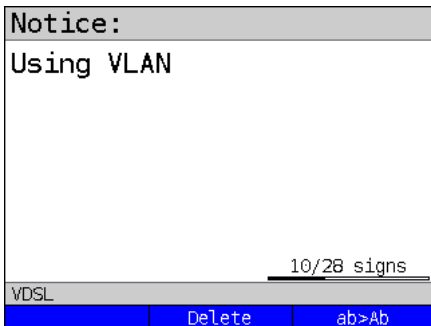
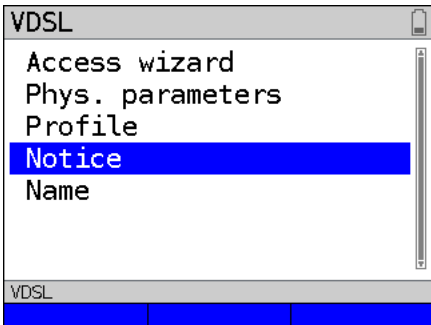
Continued on next page





Test parameter settings are described starting on page 108.

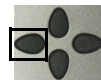
5.4 Notices



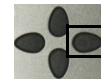
In the preview, ARGUS shows not only the selected access, the xDSL mode and the access mode but also a freely editable notice (see Fig. 1 page 28). This note can be up to 28 characters long.

In this example, the note "Using VLAN" is selected.

**<Delete>** Deletes notice.



Clears mark and returns cursor keys to the start.



Clears mark and returns cursor keys to the end.

**<Ab>AB>** Entry begins with upper-case letters and continues in lower-case.

**<AB>12>** Entry of upper-case letters.

**<12>ab>** Entry of numbers.

**<ab>AB>** Entry of lower-case letters.



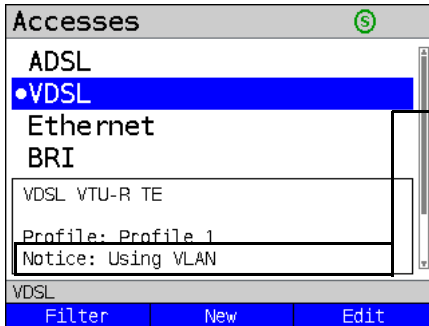
Entry of special characters, e.g. @, /, -, ., \*, ?, %, =, &, ! etc.



Entry of special characters such as \_, :, +, # etc.

Press OK to save the entered notice.

You can subsequently edit the access name as described for the access assistant, see page 27.



The saved notice is linked with the access and is displayed in the preview.

The preview appears approx. 2 seconds after the access is selected.

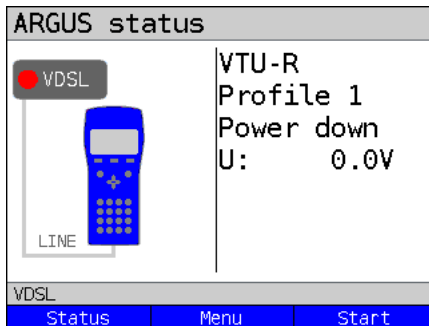
**<Filter>** ARGUS switches to the Filter menu, see page 25.

**<New>** Creates a new access.

**<Edit>** Edits access.

Selects access

Switches to ARGUS status, see page 29.



**<Status>** Switches to status screen.

**<Menu>** Switches to main menu.

**<Start>** Starts the VDSL connection.

6 Physical layer



The physical layer (layer 1) is shown in the status screen (Fig. 2) with its own graphical element (here VDSL). The other elements in the status screen are initially only named. This is explained in more detail on page 80 (Virtual Lines) and page 102 (Services). The physical layers for the ADSL and Ethernet interfaces are presented in the same way as for VDSL. The selection of the VDSL access and the access mode VTU-R are directly adopted in the status screen. If the defaults are correct, layer 1 (synchronisation on VDSL) can be established directly on <Start>. The most important information such as voltage (U) and modem states (power down) are displayed in the layer-1 box (blue). To change the VDSL configuration directly, press <Edit>. To change the access type directly in the status screen (Fig. 2), press the softkey <Access> or the key combination  plus .

Fig. 1

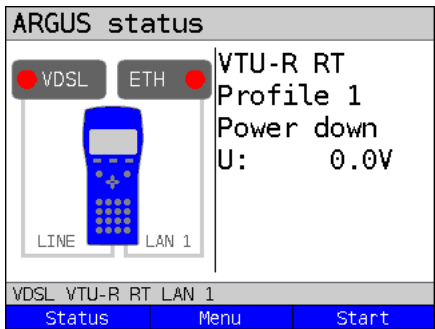
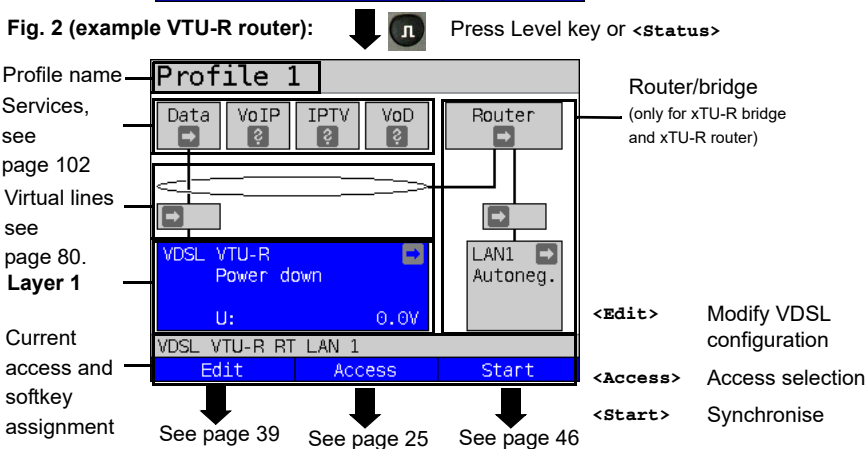


Fig. 2 (example VTU-R router):



## 7 Operation on xDSL accesses

ARGUS supports the following DSL interfaces: ADSL, VDSL

ARGUS supports the following access modes on xDSL accesses:

- |                     |   |
|---------------------|---|
| <b>xTU-R</b>        | Terminal device mode (xDSL transceiver unit) see page 45.<br>ARGUS is connected to the xDSL access (in front of or behind the splitter). ARGUS replaces the modem and PC. |
| <b>xTU-R bridge</b> | Bridge mode (xDSL transceiver unit bridge) see page 68.<br>ARGUS is connected to the xDSL access and the PC.<br>ARGUS replaces the xDSL modem.                            |
| <b>xTU-R router</b> | Router mode (xDSL transceiver unit router) see page 70.<br>ARGUS is connected to the xDSL access and the PC.<br>ARGUS replaces the xDSL modem and router.                 |



The individual DSL tests record and store data (e.g. traces of IP data). It is the user's responsibility to comply with the applicable legal requirements.



The line may not carry a DC voltage greater than 200 V DC and should be free of AC voltage components.

7.1 Configuring the xDSL interface

Status screen

ARGUS status

VTU-R


Profile 1

Power down

U: 0.0V

VDSL

LINE



Status

Menu

Start

Display (from top to bottom)

- Access mode (in this example: VTU-R)
- Previous profile (in this example: profile 1)
- Modem state (in this example: power down)
- DC voltage on the interface

**VDSL test not yet started:**

Meaning of LED image in display:

Red LED:	No test started
Yellow LED:	Test started
Green LED:	Connected

**<Menu>** Switches to main menu, see menu tree

**<Status>** Switches to status screen

Profile 1

Data

VoIP


IPTV

VoD

VDSL VTU-R

Power down

U: 0.0V



Edit

Access

Start

ARGUS status screen:  
Layer-1 box (blue in display) selected.

**<Edit>** Opens settings

Note: accessing functions via number keys/key combinations

You can call important functions/tests directly using the keys of the ARGUS keypad. You can find an overview of these key combinations on page 104.





38

ARGUS 162

## 7.2 xDSL settings


ARGUS stores all relevant settings (e.g. set and limit values) for a test with the accesses. Only the relevant settings are applied, depending on the test situation. You can restore the default settings at any time (see page 353):

Setting	Description	
Phys. parameters:		
ADSL:		
Rated / threshold value	Setting	Entry of the comparison value for the upstream and downstream ATM bitrate [kbit/s] using the number keys.
	Bitrate	ARGUS displays a large green "OK" in the ARGUS status screen if the current bitrate is above the set value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK". Default: <b>d: 0</b> and <b>u: 0</b>
	CRC limit value	Sets the max. CRC (cyclic redundancy check) value. ARGUS displays a large green "OK" in the ARGUS status screen if the current value is below the set limit value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK". Range: 0 to 999,999,999 Default: <b>far: *</b> and <b>near: *</b> (*=off)
	FEC limit value	Determines the maximum FEC (forward error correction) value. ARGUS displays a large green "OK" in the ARGUS status screen if the current value is below the set limit value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK". Range: 0 to 999,999,999 Default: <b>far: *</b> and <b>near: *</b> (*=off)
	HEC limit value	Determines the maximum HEC (header error correction) value. ARGUS displays a large green "OK" in the ARGUS status screen if the current value is below the set limit value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK". Range: 0 to 999,999,999 Default: <b>far: *</b> and <b>near: *</b> (*=off)

INP/SNRM	Determines whether preference is to be given to INP (inpulse noise protection) or SNRM (signal-to-noise- ratio margin) when an ADSL connection is established. Default: <b>Favour DS SNRM</b>
<b>MAC address (line)</b> <b>(not available using the access wizard)</b>	
	<p>Display and selection of the line MAC addresses. The first two MAC addresses cannot be manually edited.</p> <ol style="list-style-type: none"> <li>1. When the standard MAC address is selected, ARGUS uses its own MAC address. Default: <b>Standard MAC address</b></li> <li>2. When you select the dynamic MAC address, a different MAC address is used each time the device synchronises.</li> <li>3. You can enter a third MAC address: Mark the line and then press <b>&lt;Edit&gt;</b>. <b>&lt;Edit&gt;</b> Entry of new MAC address. The address is entered in hexadecimal form using the number keys and key combinations: *1=A, *2=B, *3=C, *4=D, *5=E, *6=F and confirmed with . No group MAC addresses may be used. Default: <b>00:00:00:00:00:00</b></li> </ol> <p> Accepting the address. The new address is temporarily saved, and is no longer available after powering down.</p>
	<p>Press one after another  and </p> <p>Display of ARGUS MAC addresses: Line, LAN, SFP, ETH, see also page 106 and following.</p>
<b>VDSL:</b>	
<b>Rated / threshold value</b>	<p>Setting bitrate Entry of the comparison value for the upstream and downstream bitrate [kbit/s] using the number keys. ARGUS displays a large green "OK" in the ARGUS status screen if the current bitrate is above the set value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK". Default: <b>d: 0</b> and <b>u: 0</b></p>



	<p><b>CRC limit value</b></p> <p>Sets the max. CRC (cyclic redundancy check) value. ARGUS displays a large green "OK" in the ARGUS status screen if the current value is below the set limit value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK".</p> <p>Range: 0 to 999,999,999</p> <p>Default: <b>far:</b> * and <b>near:</b> * (*=off)</p>
	<p><b>FEC limit value</b></p> <p>Determines the maximum FEC (forward error correction) value. ARGUS displays a large green "OK" in the ARGUS status screen if the current value is below the set limit value for an active DSL connection and an "OK" for connection parameters below the target, otherwise "NOK".</p> <p>Range: 0 to 999,999,999</p> <p>Default: <b>far:</b> * and <b>near:</b> * (*=off)</p>
<b>Firmware</b> <sup>*1</sup>	<p>Selects the firmware (FW) in the VDSL chipset. You can choose between version A and version B. Further information is available on request.</p> <p>Default: <b>A</b></p>
<b>Carrier set</b> <sup>*1</sup>	<p>The carrier set determines the carrier frequencies that ARGUS uses to signal to DSLAM that it is ready to synchronise (ITU G.997.1). The carrier generally specifies which sets are to be used. You can select the following sets with corresponding upstream tones (interval between tones 4.3125 kHz) in ARGUS:</p> <ul style="list-style-type: none"> <li>- A43, tones: 9, 17, 25</li> <li>- B43, tones: 37, 45, 53</li> <li>- V43, tones: 944, 972, 999</li> </ul> <p>Default: <b>A43, B43, V43</b></p> <p>When multiple sets are selected, ARGUS cyclically transmits the tones of the selected sets in parallel.</p>

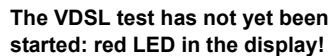
<b>Vectoring mode</b> <sup>*1</sup>	<p>Vectoring mode defines how ARGUS behaves when synchronising with DSLAM:</p> <ul style="list-style-type: none"><li>- Non-vectoring (off) This is standard VDSL2 with non-vectoring-capable DSL access multiplexers (DSLAMs) and modems. However, it can also be used for mixed operation with non-vectoring-capable modems on vectoring-capable DSLAMs. In such a case, the simulated modem is throttled to the ADSL2+ bandwidth (max. 16 Mbit/s).</li><li>- Full vectoring Full vectoring operation requires vectoring-capable DSLAMs and modems. VDSL2 vectoring is supported when this technology is present at both ends of the bundle. Default: <b>Full vectoring</b></li></ul>
<b>Retransmission (G.INP)</b>	<p>When retransmission (G.INP, G.998.4) is used, the downstream of VDSL2 links is protected against pulse noise on layer 1. Delays and packet losses are minimised; however, this increases the interleave delay for downstream. Default: <b>Down- &amp; Upstream</b></p>
	<div><div>V VDSL 80000/15997 kb/s R CRC: U1 FEC: U1</div><p>When VDSL Vectoring or Retransmission (G.INP) are active, ARGUS shows in the status line a blue highlighted „V“ for Vectoring or „R“ for Retransmission.</p><div>V VDSL 45859/18754 kb/s R CRC: U1 FEC: U1</div><p>When VDSL Vectoring or Retransmission (G.INP=) are unlocked but not active, ARGUS shows in the status line a grey highlighted „V“ for Vectoring and „R“ for Retransmission.</p></div>
<sup>*1</sup> not for VDSL-Bonding	
MAC address, see page 40.	

Profiles (<Edit> edit profiles)									
Router									
<b>IP version</b>	<p>Determines which IP version is to be used.</p> <table><tr><td>IPv4:</td><td>Internet Protocol version 4 acc. to RFC 791</td></tr><tr><td>IPv6:</td><td>Internet Protocol version 6 acc. to RFC 2460</td></tr><tr><td>Dual Stack</td><td>If IPv6 is available, this protocol is preferred; if not,</td></tr><tr><td>IPv4/IPv6:</td><td>ARGUS switches to IPv4. Default: <b>IPv4</b></td></tr></table>	IPv4:	Internet Protocol version 4 acc. to RFC 791	IPv6:	Internet Protocol version 6 acc. to RFC 2460	Dual Stack	If IPv6 is available, this protocol is preferred; if not,	IPv4/IPv6:	ARGUS switches to IPv4. Default: <b>IPv4</b>
IPv4:	Internet Protocol version 4 acc. to RFC 791								
IPv6:	Internet Protocol version 6 acc. to RFC 2460								
Dual Stack	If IPv6 is available, this protocol is preferred; if not,								
IPv4/IPv6:	ARGUS switches to IPv4. Default: <b>IPv4</b>								

<b>IPv4</b>	Definition of IP address assignment	
	IP mode:	Static IP: Fixed IP address DHCP server: Assignment of IP address by ARGUS Default: <b>DHCP server</b>
	Own IP Address:	Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>192.168.10.1</b> (assignment see RFC 3330)
	IP netmask:	Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>255.255.255.0</b> (assignment see RFC 3330)
	DHCP server:	Settings for the DHCP server: - Starting and ending IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: (assignment see RFC 3330) Start: <b>192.168.10.30</b> End: <b>192.168.10.40</b> Domain name - Duration of reservation for IP addresses Range: 1 - 99999 seconds Default: <b>240</b>
	NAT	NAT (network address translation) on or off. The NAT service automatically and transparently replaces address information (e.g. IP addresses of the LAN) with other address information (e.g. IP addresses of the WAN). Default: <b>NAT on</b>
	SIP port	Port used for incoming SIP signalling. Range: 0 to 65535 Default: <b>5060</b>
	IPv6	Firewall
		Determines whether ARGUS uses a firewall in router mode. Default: <b>on</b>
	Discard prefix	Determines whether ARGUS rejects or uses the prefix. Default: <b>on</b>
	Data log	See page 44.
<b>Bridge:</b>		
<b>IP version</b>	Determines which IP version is to be used.	
	IPv4:	Internet Protocol version 4 acc. to RFC 791
	IPv6:	Internet Protocol version 6 acc. to RFC 2460
	Dual Stack	If IPv6 is available, this protocol is preferred; if not,
	IPv4/IPv6:	ARGUS switches to IPv4. Default: <b>IPv4</b>

<b>IPv4</b>	Definition of IP address assignment	
	IP mode:	Static IP: Fixed IP address DHCP server: Assignment of IP address by ARGUS Default: <b>DHCP server</b>
	Own IP Address:	Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>192.168.10.1</b> (assignment see RFC 3330)
	IP netmask:	Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>255.255.255.0</b> (assignment see RFC 3330)
	DHCP server:	Settings for the DHCP server: - Starting and ending IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: (assignment see RFC 3330) Start: <b>192.168.10.30</b> End: <b>192.168.10.40</b> Domain name - Duration of reservation for IP addresses Range: 1 - 99999 seconds Default: <b>240</b>
<b>VLAN handling</b>	When VLAN tagging is used, a VLAN tag is attached to every outgoing Ethernet frame (from the WAN). The tag is removed from every incoming Ethernet frame. In transparent VLAN, the Ethernet frames are passed on unchanged. Default: <b>Transparent</b>	
<b>VLAN ID</b>	Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device that belongs to the VLAN with ID = 2 can communicate with every other device in the same VLAN but not with devices in other VLANs. Range: from 0 to 4095 Default: <b>2</b>	
<b>Data log</b>	Data log on or off This function must be set to "on" so that a trace file can be sent to the PC; see page 65. After terminating a virtual line (VL) via the corresponding service or the physical layer, ARGUS queries whether the trace file should be sent to the PC. The mini-USB port must also be connected to the PC. For example, when the data log is activated for VL 1, only VL 1 is recorded. When one VL is configured for multiple services and the data log is active, all data of this VL are recorded. Default: <b>off</b>	

See chapter „9.4 Virtual line settings“ (see page 90) for further configurations.



Red LED: no test started

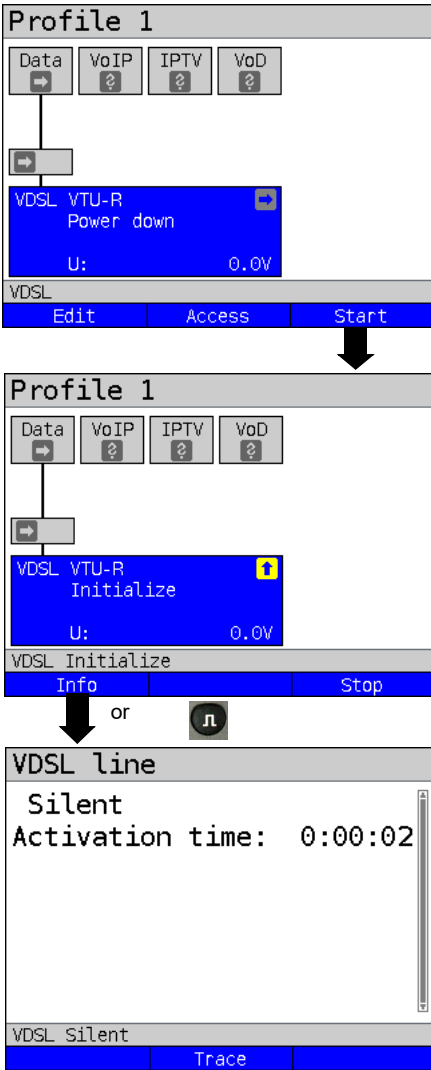
Green LED: connected



Establishing the xDSL connection using VDSL as an example

Profile configuration:

ARGUS uses the settings (see page 30) and limit values (see page 39) stored in the respective profile for establishing a VDSL connection.



ARGUS in status screen.

ARGUS uses the default profile (profile 1 in the example) to establish the VDSL connection.

- <Edit> Edits the VDSL settings and MAC address.
- <Access> Selects a new access.

Establishing a VDSL connection

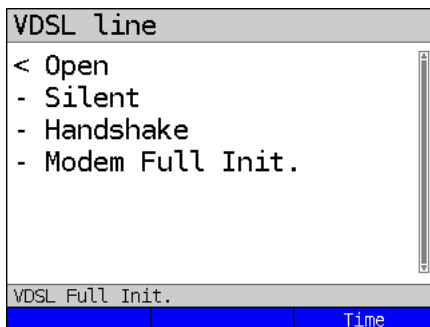
ARGUS synchronises with DSLAM (LED "Sync/L1" flashes, display shows element on yellow background). ARGUS displays the current connection status (in this example "Initialize") in the layer-1 box (blue).

While connecting:

Display:

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

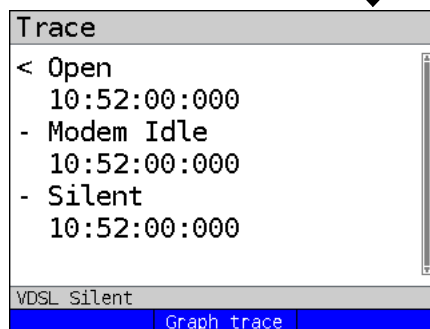
Continued on next page



Display of commands

- < = Command sent by ARGUS
- > = Command sent by DSLAM
- = Connection status

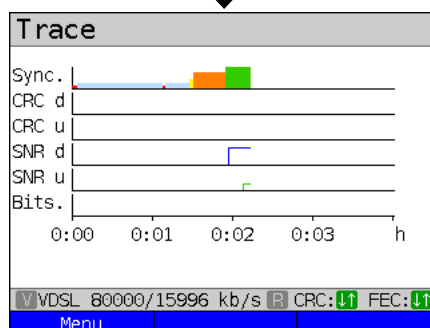
Display timestamp



ARGUS shows the time (internal clock, see page 346) at which the commands are received.



Switches to the previous display and the status screen.

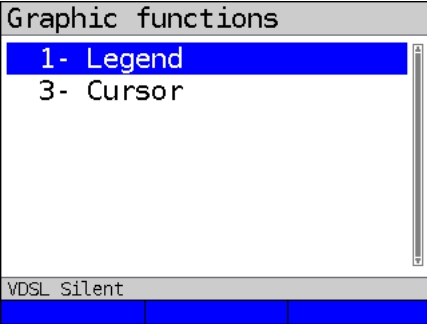


Display the graphical xDSL trace.

Display:

- Synchronising
- CRC error in downstream
- CRC error in upstream
- SNR error in downstream
- SNR error in upstream
- Bitswap events

See page 48 for an explanation of the colour code.

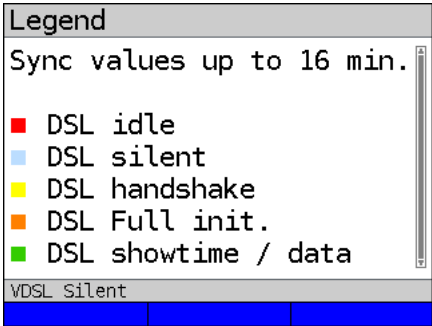


1

You can show and hide the label for the xDSL trace using the number key.

3

The function of the cursor is described on page 52.

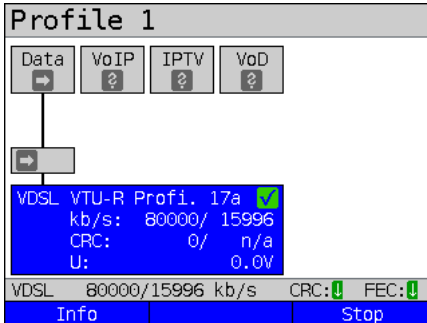


The colour code in the xDSL trace can be interpreted as follows.

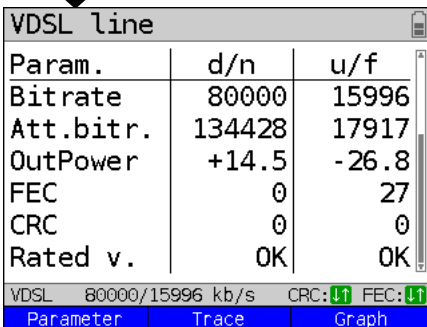


## Connected

As soon as the connection is established, (LED "Sync/L1" continuously illuminated and green tick mark in layer 1 box), ARGUS determines the VDSL connection parameters. After synchronising, ARGUS must remain connected to the VDSL access for at least 20 seconds. Only then can ARGUS save all VDSL connection parameters.



or



Continued on next page

ARGUS in status screen.

Display (layer-1 box)

- Access and access mode
- VDSL profile (ITU profiles: 8,12,17 or 30)
- d: Downstreamdata rate  
u: Upstream data rate
- Number of CRC errors in downstream/upstream
- DC voltage at interface

**<Info>** Displays the VDSL connection parameters.

**<Stop>** Disconnects the VDSL connection.

**CRC:** No CRC errors occurred in the final second.

**FEC:** In the final second, FEC errors occurred in both upstream and downstream. See page 49 for more information.

**CRC:** No upstream CRC errors occurred in the final second.

**FEC:** In the final second, FEC errors occurred in in downstream only. See page 49 for more information.

Display of VDSL connection parameters in overview:

- d/n: downstream/near
- u/f: upstream/far



Browse connection parameters

**<Trace>** Displays trace data, see page 47.

**<Graph>** Displays the graph, see page 51.

VDSL parameter		
Data Rate [kbit/s]		
Net Data	80000	15996
Attainable	133983	20493
Relative capacity		
[%]	59.7	78.0

VDSL 80000/15996 kb/s CRC: U FEC: U

StatisticQR codeReset

Displays the connection parameters in long form for downstream (d) and upstream (u), see table page 58.

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



Browse parameter display

<Reset> Resets the error counters: FEC, CRC.



Display of xDSL parameters as QR code.

Statistics		
Ethernet		
	Rx	Tx
Frames	0	0
Bytes	0	0

VDSL 80000/15996 kb/s CRC: U FEC: U

**Display Ethernet statistics (VDSL):**

ARGUS displays the received (Rx) and transmitted (Tx) Ethernet frames and bytes.

For ADSL, the following ATM statistics are displayed:

- Number of OAM cells
- Number of user-side VCCs
- Number of AAL5 PDUs
- Unmapped cells received (Rx)
- Unmapped VPI received (Rx)
- Unmapped VCI received (Rx)



Continued on next page

VDSL line		
Param.	d/n	u/f
Bitrate	80000	15996
Att.bittr.	134428	17917
OutPower	+14.5	-26.8
FEC	0	27
CRC	0	0
Rated v.	OK	OK
VDSL 80000/15996 kb/s CRC:  FEC:		
Parameter	Trace	Graph

Displays the bit distribution  
i.e. transported bits per tone (channel)

Y-axis: bits

X-axis: tones (channels)

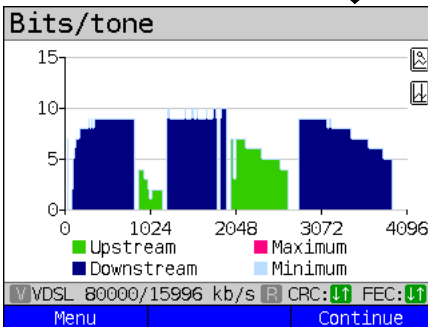
Line interference sources can be identified  
on the basis of the bit distribution

(e.g. due to HDSL, RF, DPBO etc.).



ARGUS switches to the  
previous display.

<Continue> Switches to next graph.



#### Graph functions:

The graph functions such as zoom, cursor  
and setting of the x-axis enable detailed  
analysis of the graphs:



Exits the menu without changing.



You can also use this number key to toggle  
the zoom function within a graph.



The function of the cursor is described  
on page 53.



Toggles the x-axis from tone to  
frequency is described on page 54.



Toggles the min/max is described on  
page 54.



Switches automatically to the next graph  
with the view and adopts all settings for  
this graph.



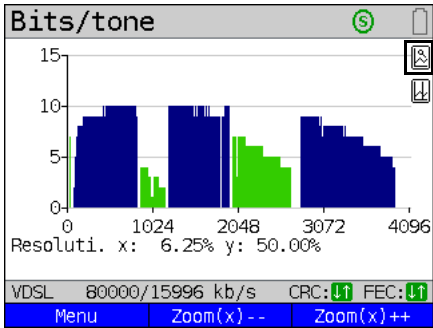
Saves the result without disconnecting  
the connection.



Graphic functions	
2- Zoom	
3- Cursor	
9- x-axis setting	
0- Min/max	
*7- Store	
✓- Next	
VDSL 80000/15996 kb/s R CRC:  FEC:	

Continued on  
next page



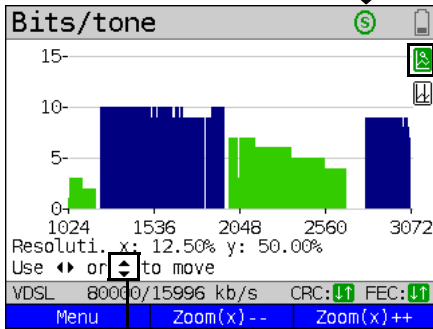


The magnifying glass shown in the display rests on a white background.

It has not yet been zoomed.

<Zoom(x)++> Magnifies the middle section of the graph (100%).

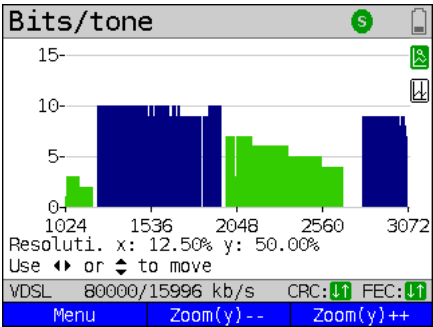
<Zoom(x)--> Reverses <Zoom(x)++> and resets magnification.



The magnifying glass shown in the display rests on a dark background, indicating that it has been zoomed.



Use the cursor keys to horizontally scroll through the zoomed range.



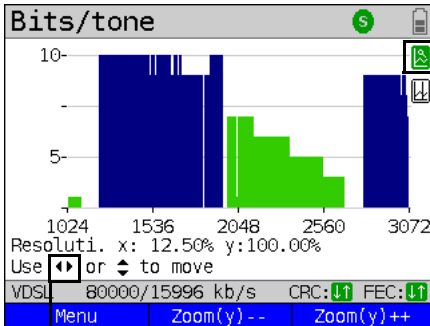
Shin toggles the softkey assignment.

ARGUS switches from x-axis zoom to y-axis zoom

<Zoom(x)++> Magnifies the middle section of the graph (100%).

<Zoom(y)--> Reverses <Zoom(y)++> and resets magnification.

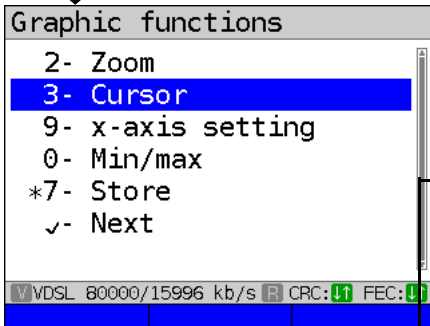
Continued on  
next page



The magnifying glass shown in the display rests on a dark background, indicating that it has been zoomed.



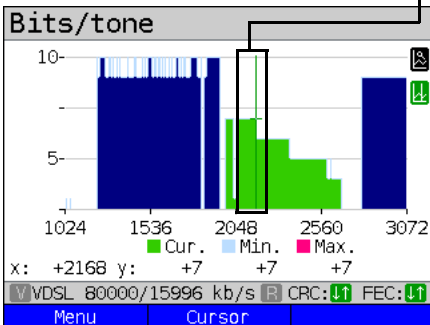
You can use the cursor keys to scroll vertically through the zoomed range.



The cursor functions enables precise determinations on the graphs.

When the Cursor function is started, a green cursor line appears in the middle of the graph.

**<Cursor>** You can toggle the cursor on and off as needed using the Cursor softkey after activating it in the menu.



The values of the graph for the position under the cursor are displayed in the graph as follows:

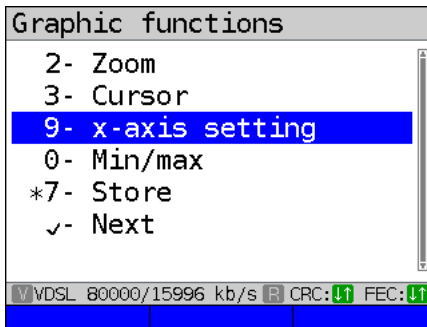
**x:** 2168. Tone

**y:** 7 bits

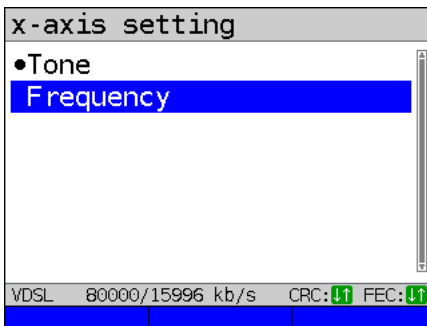


Use the left and right cursor keys to move the cursor to any point on the graph to measure it. Briefly pressing a cursor key causes the cursor to jump to by one position in the graph. When the cursor key is held down, the steps the cursor covers in the graph become progressively larger.

Continued on next page



By toggling the x-axis you can change its labelling from tone to frequency.

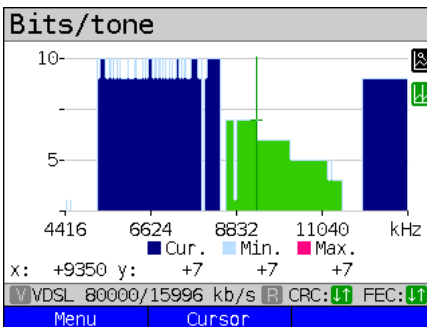


Available options:

- Tone:** Displays the values of the x-axis as tones.
- Frequency:** Displays the values of the x-axis as frequencies.



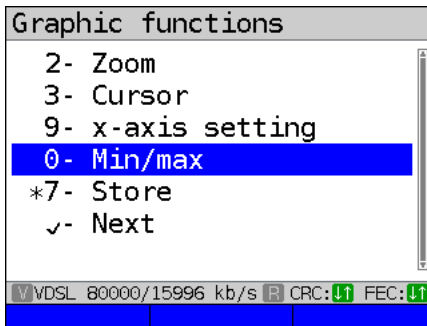
Direct setting of x-axis.



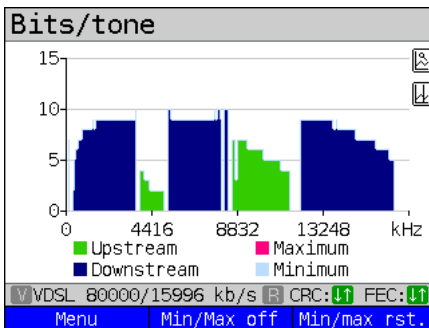
You can use the left and right cursor to scroll through the range (in this example frequency).


The zoom function and the cursor function can also be combined. However, the starting position of the cursor can vary. The graph functions can be used for all graphs.


Continued on next page



With the Min/Max setting, the bits/tone and SNR/tone graphs display the minimum and maximum values.

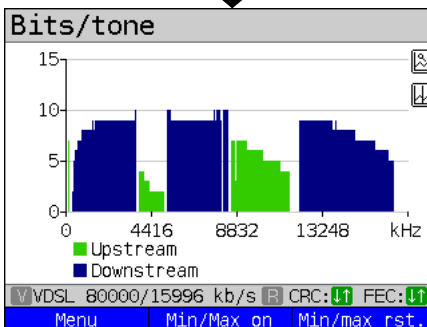


 Displays the maximum value (pink).

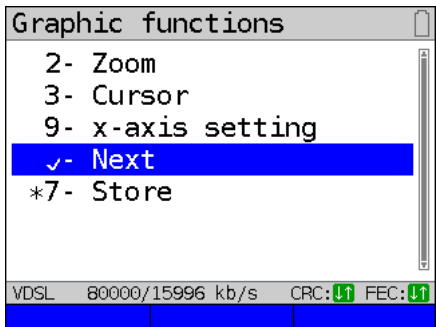
 Displays the minimum value (blue).

<Min/Max off> Hide min/max values.

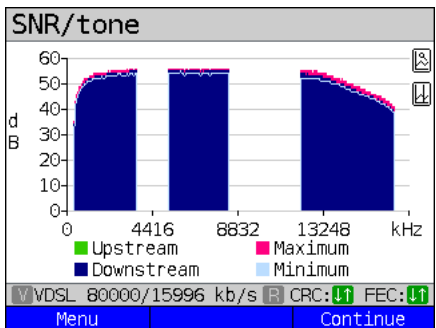
<Min/Max rst.> Reset min/max values.



Continued on next page



**Additional result graphs**



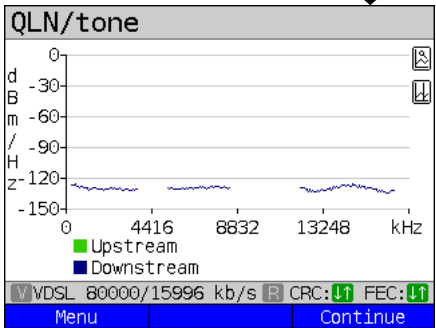
Display of signal-to-noise ratio (SNR) for each tone

y-axis: SNR in dB

x-axis: tones (channels)

This enables interference sources for individual tones (channels) to be detected, in this example downstream power backoff (DPBO).

**<Menu>** Opens the graph functions (see page 52).



Display of quiet line noise (QLN) for each tone. The QLN represents the quiet line noise of the twisted pair as a function of the frequency.

y-axis: QLN in dBm/Hz

x-axis: tones (channels)

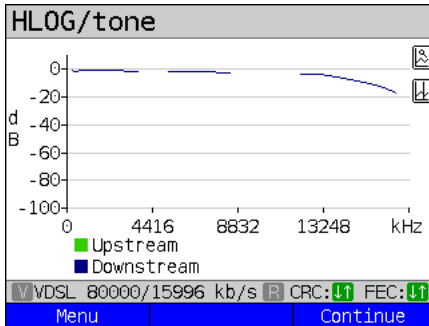
The QLN enables detection of narrow-band interference sources due to e.g. coupling of medium-wave emission sources or defective switching components. These interference sources are represented as narrow peaks. This example shows a line with interference from a power supply.

**<Menu>** Opens the graph functions (see page 52).

Continued on next page







Displays the amplitude component of the transmission function (HLOG) for each tone. HLOG shows the attenuation of a connection as a function of the frequency.

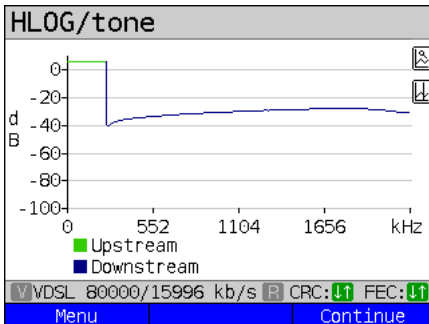
Y-axis: Hlog in dB

X-axis: tones (channels)

On a nominally functioning line, the values drop off as the frequency increases; this function is virtually horizontal on short lines. This example shows a short line.

In the HLOG graphs, a shift can occur in calculating the upstream and downstream values from DSLAM compared to the downstream values from ARGUS. It can also happen that DSLAMs do not transmit the HLOG upstream values or send falsified values.

Example: Mismatch + poor contact on ADSL

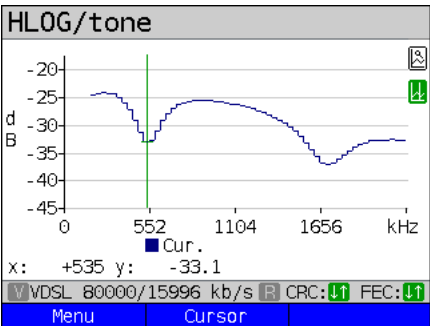


DSL connections are often possible even though one of the two cores is high-ohm or even interrupted (only capacitive coupling). This results in dropped connections and data losses. Such problems can be due to oxidized lines, poor contacts in the telephone sockets, loose terminals or improperly insulated lines. In connections like this, lower frequencies are attenuated much more than higher frequencies. This is recognisable as an atypical relationship between upstream and downstream attenuation, as well as in the HLOG curve. In the event of a problem on one of the wires, the values for the low frequencies are often less than for the higher frequencies.

<Menu> Opens the graph functions, see page 52.

<Continue> ARGUS returns to the bits/tone graph.

Example: Bridge tap on ADSL

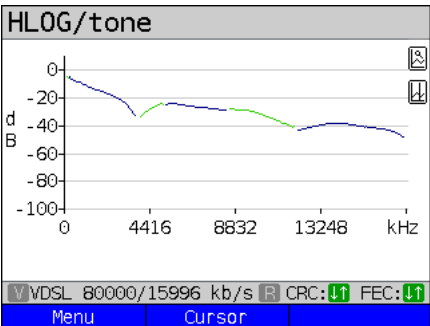


The example at left shows a sink. It can indicate a stub line (bridge tap).  
With the rule of thumb:  
 $L[m] = 50 / f \text{ [MHz]}$ ,  
you can estimate the length of a stub line if you know the frequency in MHz (in this example 0.535 MHz):

$$L \text{ [m]} = 50 / 0,535 \text{ MHz} = 93 \text{ m}$$

There is a stub line approx. 93 m long.

Example: Bridge tap on VDSL



In this example, given a frequency of approx. 3.85 MHz, the stub line is approx. 13 m long.

**ARGUS determines the following ADSL connection parameters:**

ADSL connection parameters:	
Net data rate	Actually usable ATM bitrate in kbit/s.
Attainable data rate	Theoretically attainable ATM bitrate in kbit/s.
Relative capacity	Line capacity utilisation in percent.
Latency mode	ARGUS shows "interleaved" or "fast", depending on the DSLAM configuration.
Attenuation	Attenuation on a line over the entire length and bandwidth in dB. From a specific attenuation on, certain access types are no longer recommended. However, it is better to compare individually calculated attenuation values that are recommended for specific access types with the dB value in the HLOG graph, at 300 kHz (cursor).
Output power	Output power in dBm with reference to 1 mW.





<b>SNR margin</b>	Signal-to-noise ratio margin in dB. The SNR margin is a measure of how much additional noise the transmission can stand and still maintain a bit error rate (BER) of $10^{-7}$ . This value is considered a reserve against interference signals. Rule of thumb: The SNR margin in downstream should - doubled - be at least equal to or greater than the SNR margin in upstream.
<b>Impulse noise prot.</b>	INP describes the quality of the protection against pulse interference. The number of consecutive DMT symbols that can be completely distorted without causing errors in higher layers.
<b>Interleave delay</b>	The delay (in ms) due to interleaving of data blocks.
<b>FEC</b>	Forward error correction Number of transmission errors corrected using the checkbytes of a codeword.  f (far): Errors that the DSLAM detects and passes to ARGUS.  n (near): Errors that ARGUS detects in the transmitted blocks.
<b>CRC</b>	Cyclic redundancy check The checksum of the superframes transmitted by the remote station does not agree with the locally calculated figure. Possible cause: line interference.  f (far): Errors that the DSLAM detects and passes to ARGUS.  n (near): Errors that ARGUS detects in the transmitted blocks.
<b>HEC</b>	Header error checksum Number of ATM cells with incorrect header checksums.  f (far): Errors that DSLAM detects and passes to ARGUS.  n (near): Errors that ARGUS detects in the transmitted blocks.
<b>ES</b>	Errored seconds Number of seconds containing one or more erroneous sync words and/or one or more CRC anomalies.
<b>SES</b>	Severely errored seconds Number of seconds containing one or more erroneous sync words or at least 50 CRC anomalies.
<b>LOSS</b>	Loss of signal seconds Shows the number of LOS errors in one second.

<b>UAS</b>	<p>Unavailable seconds</p> <p>Number of seconds in which the ADSL link was unavailable. The connection is considered unavailable at 10 consecutive SESs at the latest. The 10 SESs are added to the time that the connection is unavailable. Once the connection is unavailable, it only becomes available when no SESs occur in 10 consecutive seconds. The 10 SES-free seconds are added to the time that the connection is unavailable.</p>
<b>Reset</b>	Indicates how often the user resets the error counters using the <b>&lt;Reset&gt;</b> softkey.
<b>Resync</b>	Number of resyncs by ARGUS.
<b>Bitswap events</b>	Shows how much data is diverted from a faulty transmission channel (up- and downstream) to other channels.
<b>Retranmission (G.INP)</b>	<p>This parameter shows whether retransmission is activated for down- and/or upstream in DSLAM. When retransmission is activated, faulty data transmission units (DTUs) caused by transmission problems are requested and transmitted again. The following additional parameters are shown when retransmission is activated:</p> <p>The blue <b>R</b> in the ARGUS status line signals that retransmission is activated in DSLAM.</p> <p><b>R</b> = Retransmission configured or not active</p> <p><b>R</b> = Retransmission active</p> <p><b>R</b> = Retransmission working</p>
<b>Vendor far</b>	ATU-C vendor.
<b>Version</b>	Vendor-specific information, contains the software version of the ATU-C side (DSLAM).
<b>Vendor near</b>	Manufacturer of the ARGUS chipset (ATU-R).
<b>Version</b>	Vendor-specific information, contains the software version of ARGUS.

### ARGUS determines the following VDSL connection parameters

VDSL connection parameters:	
<b>Net data rate</b>	Actually usable ATM bitrate in kbit/s.
<b>Attainable data rate</b>	Theoretically attainable ATM bitrate in kbit/s.
<b>Relative capacity</b>	Line capacity utilisation in percent.

<b>SNR margin</b>	Signal-to-noise ratio in the bands used in dB. The SNR margin is a measure of how much additional noise the transmission can stand and still maintain a bit error rate (BER) of $10^{-7}$ . The value is considered a reserve against interference signals. Bands not used are indicated with n/u.
<b>Loop attenuation</b>	Attenuation on a line over the entire length and bandwidth in dB. From a specific attenuation on, certain access types are no longer recommended. However, it is better to compare individually calculated attenuation values that are recommended for specific access types with the dB value in the HLOG graph, at 1 MHz (cursor). Bands not used are indicated with n/u.
<b>Signal attenuation</b>	Attenuation of the signal in dB in the corresponding bands. Bands not used are indicated with n/u.
<b>Output power</b>	Output power in dBm with reference to 1 mW.
<b>Interleave delay</b>	The delay (in ms) due to interleaving of data blocks.
<b>Impulse noise prot.</b>	INP describes the quality of the protection against pulse interference. The number of consecutive DMT symbols that can be completely distorted without causing errors in higher layers.
<b>FEC</b>	Forward error correction Number of transmission errors corrected using the checkbytes of a codeword.  f (far): Errors that the DSLAM detects and passes to ARGUS.  n (near): Errors that ARGUS detects in the transmitted blocks.
<b>CRC</b>	Cyclic Redundancy Check The checksum of the superframes transmitted by the remote station does not agree with the locally calculated figure. Possible causes: line interference.  f (far): Errors that DSLAM detects and passes to ARGUS.  n (near): Errors that ARGUS detects in the transmitted blocks.
<b>ES</b>	Errored seconds Number of seconds containing one or more erroneous sync words and/or one or more CRC anomalies.
<b>SES</b>	Severely errored seconds Number of seconds containing one or more erroneous sync words or at least 50 CRC anomalies.
<b>LOSS</b>	Loss of signal seconds Shows the number of LOS errors in one second.

<b>UAS</b>	<p>Unavailable seconds</p> <p>Number of seconds in which the VDSL link was unavailable. The connection is considered unavailable at 10 consecutive SESs at the latest. The 10 SESs are added to the time that the connection is unavailable. Once the connection is unavailable, it only becomes available when no SESs occur in 10 consecutive seconds. The 10 SES-free seconds are added to the time that the connection is unavailable.</p>
<b>Reset</b>	Indicates how often the user resets the error counters using the <b>&lt;Reset&gt;</b> softkey.
<b>Resync</b>	Number of resyncs by ARGUS.
<b>Showtime no sync</b>	Shows how often the connection status "showtime" was achieved without a long-term stable connection.
<b>Bitswap events</b>	Shows how much data is diverted from a faulty transmission channel (up- and downstream) to other channels.
<b>Vectoring</b>	<p>The vectoring mode shows whether this remote station supports VDSL2 vectoring (ITU-T G.993.5).</p> <ul style="list-style-type: none"> <li>- Display shows "off" for non-vectoring.</li> <li>- ARGUS displays "Vectoring friendly" or "Full Vectoring" when vectoring is supported.</li> </ul> <p>See page 42 for more information.</p>
<b>SRA (Seamless rate adaption)</b>	This parameter shows whether SRA is activated for down- and/or upstream in DSLAM. Seamless rate adaption (SRA) is a seamless adaption of the data rate during a DSL connection. In SRA, the data rate is adapted depending on the SNR margin during a connection.
<b>Retranmission (G.INP)</b>	<p>This parameter shows whether retransmission is activated for down- and/or upstream in DSLAM. When retransmission is activated, faulty data transmission units (DTUs) caused by transmission problems are requested and transmitted again.</p> <p>The following additional parameters are shown when retransmission is activated:</p> <p>The blue  in the ARGUS status line signals that retransmission is activated in DSLAM.</p> <p> = Retransmission configured or not active</p> <p> = Retransmission active</p> <p> = Retransmission working</p>

<b>Data transmission units (DTU)</b>	<p>Retransmission is performed before the CRC mechanism. As long as the retransmission mechanism requests and transmits the erroneous DTUs in corrected form, no CRC errors (data losses) occur. If the retransmission mechanism cannot correct faulty transmissions, e.g. due to sustained interference, CRC errors (data losses) occur.</p> <ul style="list-style-type: none"> <li>- Retransmi. Multiple retransmitted DTUs due to a transmission problem. Is also displayed in the overview page 49 as "Retransmi".</li> <li>- Corrected Successful retransmission of a DTU</li> <li>- Uncorret. Unsuccessful retransmission of a DTU</li> </ul>
<b>INP REIN</b>	<p>In ARGUS, interference immunity (DSLAM setting) is displayed with respect to REIN INP. This describes the quality of the protection against pulse interference. REIN (Repetitive electrical impulse noise) describes periodic interference pulses, usually caused by 230 V AC voltage from the supply mains. The value indicates the number of consecutive DMT symbols that can be completely distorted without causing errors in higher layers (1 DMT symbol = ~250 µs).</p>
<b>INP SHINE</b>	<p>In ARGUS, interference immunity (DSLAM setting) is displayed with respect to SHINE INP. This describes the quality of the protection against pulse interference. SHINE (single high impulse noise event) describes random, unpredictable, non-periodic interference pulses. The value indicates the number of consecutive DMT symbols that can be completely distorted without causing errors in higher layers (1 DMT symbol = ~250 µs).</p>
<b>ETR</b>	<p>The expected throughput rate (ETR) in kBit/s is the minimum data rate that can be provided through complete error correction through retransmission.</p>
<b>Elec.length@1MHz</b>	<p>Indication of the electrical length for a frequency of 1 MHz in dB. R: VTU-R side C: VTU-C side</p>
<b>Vendor far</b>	VTU-C vendor.
<b>Version</b>	Vendor-specific information, contains the software version of the VTU-C side (DSLAM).
<b>Vendor near</b>	Manufacturer of the ARGUS chipset (VTU-R).
<b>Version</b>	Vendor-specific information, contains the software version of ARGUS.

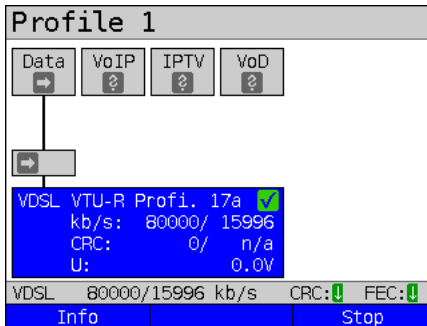
**System information for transmission to the ADSL/VDSL remote station**

When a modem is synchronised with a DSLAM, the vendor and device type of the modem is generally displayed in the control system of the DSLAM. For ADSL and VDSL, this occurs according to ITU-T G.997.1. When an ARGUS device synchronises with a DSLAM, the latter reports to the control system the following information, depending on the DSLAM.

Information	Display in DSLAM	Meaning
System vendor ID	0x04, 0x00 (hex)	Country code: Germany
	INGE or 0x49, 0x4E, 0x47, 0x45 (hex)	Provider code: intec Germany
	0x20, 2x20 (hex)	System FW version: 2.20.0
Version number	R2.20.00 U_	Device FW version: 2.20.0
Serial number	ARGUS162-9999-R2.20.0U_	Device type: ARGUS 162 / device serial number 9999

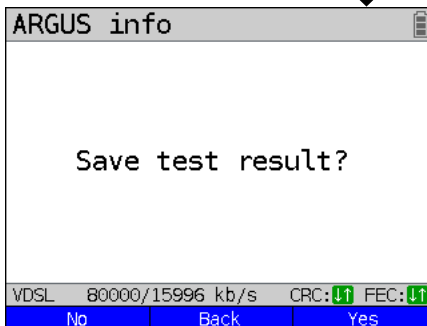


## Disconnecting the xDSL connection and saving the results



ARGUS in status screen.

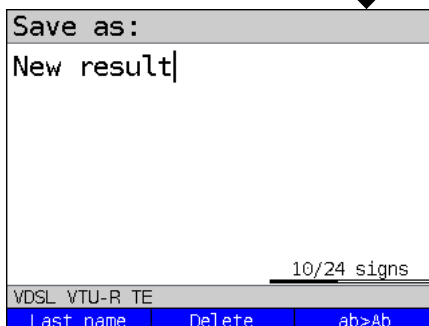
Disconnecting the VDSL connection.



<No> Results are rejected.

<Back> Results are not saved. ARGUS returns to the status display.

<Yes> Saving the result.



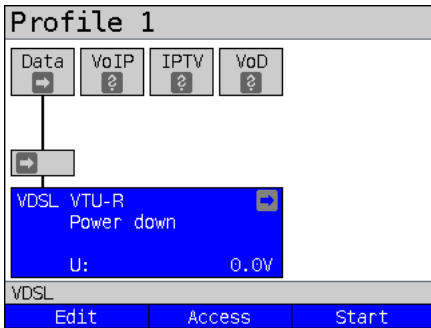
ARGUS saves the VDSL connection parameters together with the trace data in the first free slot. You can enter a user-definable name when saving (see page 338).  
Default: New result.

If all slots are occupied, you need to manually select a slot to overwrite.



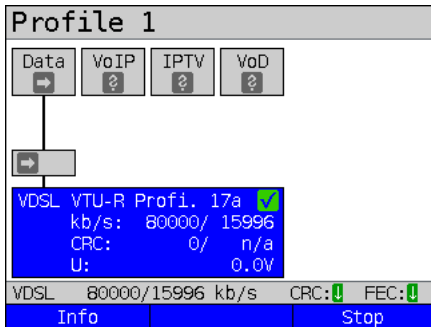
**Saving the result**

Continued on  
next page

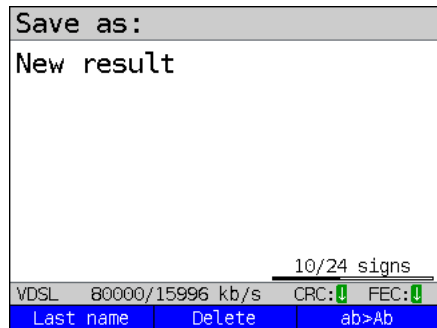




After saving, ARGUS returns to the status display or ARGUS status. You can initialise a new sync attempt directly using **<Start>**.

**Saving the results without disconnecting the xDSL connection**



ARGUS in status screen.



 and  Saves the result without disconnecting the connections.

ARGUS automatically suggests a save name.

- <Last name>** The last name used is suggested.
- <Delete>** Deletes the suggestion.
- <Ab>AB>** Entry of upper- and lower-case letters and @, /, -, .

Results accepted with the storage name shown.

## Displaying stored test results

### Test results



Test results

Used: 1/50

New result

VDSL 80000/15996 kb/s CRC: FEC:



### View



New result

Rated/threshold values

Downstream/near	n/a
Upstream/far	n/a

VDSL 80000/15996 kb/s CRC: FEC:

Continue



New result

Activation time: 0:00:31

Profile 8a

Showtime: 0:00:00

VDSL 80000/15996 kb/s CRC: FEC:

Continue

ARGUS in Main Menu

In ARGUS status, press **<Menu>**.

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .

Marked the stored test result.

Displays the test results:  
ARGUS shows whether the downstream and upstream values are within the limits.



Browse VDSL connection parameters.

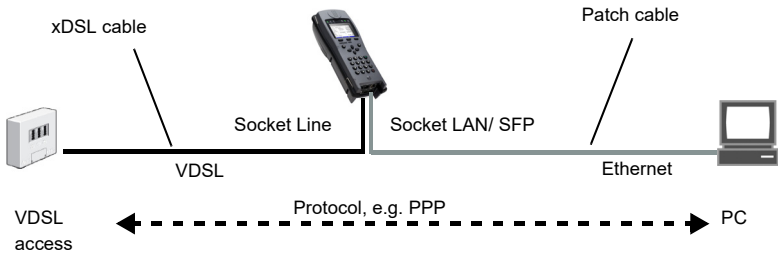
**<Continue>** Displays the signal-to-noise ratio per tone (SNR/tone), QLN/tone, HLOG/tone and the trace data.



Exits results.

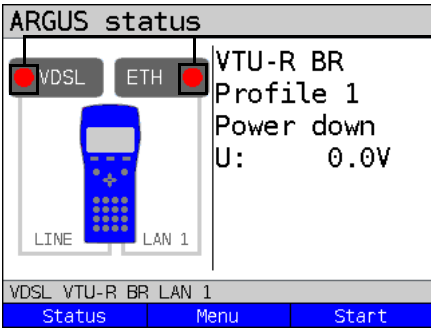
7.4 ARGUS in access mode xTU-R bridge

Connect ARGUS to the PC using the patch cable and to the VDSL access using the xDSL cable. In bridge mode, ARGUS acts as a VDSL modem, i.e. ARGUS passively hands on all packets from the Ethernet to VDSL (and vice versa). In this case, the PC is responsible for establishing the connection.



ARGUS in access mode xTU-R bridge

In this example, VDSL VTU-R bridge mode is configured and selected as described in chapter „5 Configuring accesses“ (see page 25).



Test not yet started:

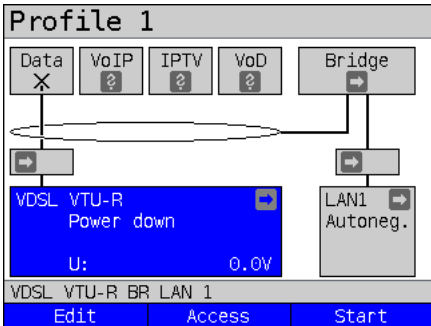
red LED in display

Meaning of LED image in display:

- Red LED: no test started
- Yellow LED: test started
- Green LED: connected

Display:

- Access mode
- Default profile, see page 39
- Current status
- DC voltage at interface



<Edit> VDSL settings.

<Access> Edits an access.

<Start> Starts VDSL.



Switch to bridge mode using the cursor keys, see page 81.

Establishing a VDSL connection

**Profile 1**

Data X	VoIP ?	IPTV ?	VoD ?	Bridge
--------	--------	--------	-------	--------

VDSL VTU-R Profi. 17a ☒  
 kb/s: 80000/ 15996  
 CRC: 0/ 0  
 U: 0.0V

LAN1 Autoneg.

VDSL 80000/15996 kb/s CRC: FEC:

Edit Start

The VDSL connection is established (green tick mark in layer-1 box).

<Edit> Bridge/router parameter settings.

### Establishing the VDSL bridge

**Profile 1**

Data	VoIP	IPTV	VoD	Bridge <input checked="" type="checkbox"/>
------	------	------	-----	--

VDSL VTU-R Profi. 17a ☒  
 kb/s: 80000/ 15996  
 CRC: 0/ 0  
 U: 0.0V

LAN1 ☒  
 1000Mb/s  
 D: full  
 F: off

VDSL 80000/15996 kb/s CRC: FEC:

Info Stop

<Stop> Deactivates bridge mode.

<Info> Displays the activity of bridge mode.

When the ADSL physical layer is active, you can run the following tests using the softkey <Test>, see page 104.



No tests are available when bridge mode is active.



Displays the connection parameters.

Switches to the layer-1 box and other elements, see page 81 for explanation.

**Profile 1**

Data	VoIP	IPTV	VoD	Bridge <input checked="" type="checkbox"/>
------	------	------	-----	--

VDSL VTU-R Profi. 17a ☒  
 kb/s: 80000/ 15996  
 CRC: 0/ 0  
 U: 0.0V

LAN1 ☒  
 1000Mb/s  
 D: full  
 F: on

VDSL 80000/15996 kb/s CRC: FEC:

Info Stop

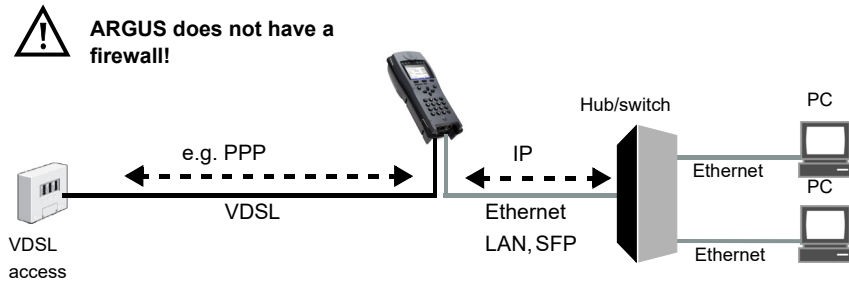
<Info> or Displays the VDSL connection parameters, see page 49.

<Stop> Disconnects the VDSL connection and automatically deactivates the bridge.

7.5 ARGUS in access mode xTU-R router

Connect ARGUS to the PC using the patch cable and to the VDSL access using the xDSL cable.

In router mode, ARGUS replaces both the modem and the router, so that multiple PCs can access a network connection (via a hub/switch). The IP addresses of the network are either issued statically or ARGUS is designated the DHCP server and assigns IP addresses to the connected PCs.

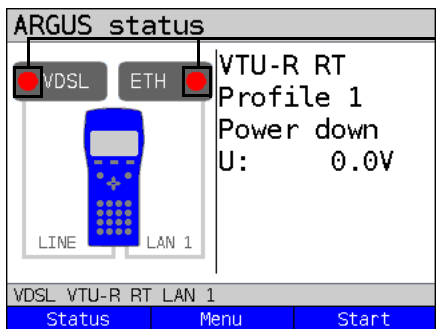


Bridge/router settings, see page 42.

xDSL settings, see page 39 and following.

Settings in access mode xTU-R bridge

In this example, VDSL VTU-R router mode is configured and selected as described in chapter „5 Configuring accesses“ (see page 25).



**Test not yet started:**

**red LED in display**

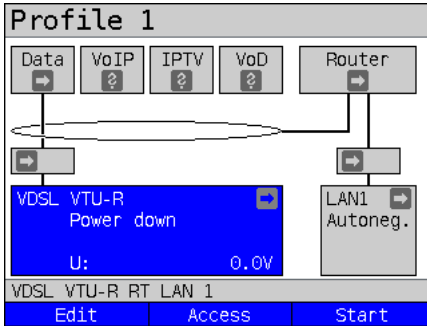
Meaning of LED image in display:

- Red LED: no test started
- Yellow LED: test started
- Green LED: connected

**Display:**

- Access mode
- Default profile (profile 1)
- Current status
- DC voltage at interface





<Edit> VDSL settings.

<Access> Edits an access.

<Start> Starts VDSL.



Switch to router mode using the cursor keys, see page 81.

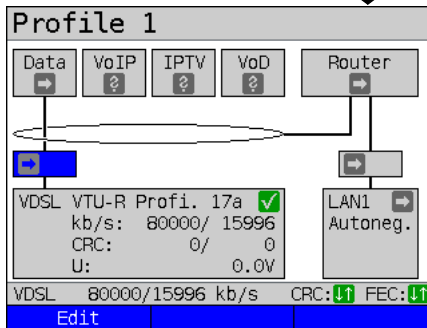
Establishing the VDSL connection

When the ADSL physical layer is active, you can run the following tests using the softkey <Test>, see page 104.



No tests are available when router mode is active.

Virtual line selected.

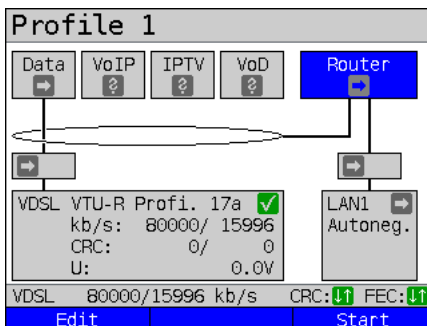


<Edit> Edits the parameters, see chapter „9 Virtual lines (VL)“ (see page 80).



Switch to Router using the cursor keys, see page 81.

Router selected.



The router can also be activated directly. If layer 1 has not yet been established, this is automatically started as well.


<Edit> Bridge/router parameter settings, see page 42.

**Establishing the VDSL router.  
The VDSL connection is active.**

**See page 68 for bridge mode display and operation.**

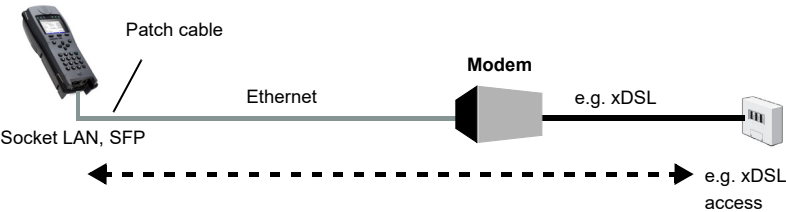
8 Operation with Ethernet accesses

ARGUS supports the following access modes in Ethernet operation:

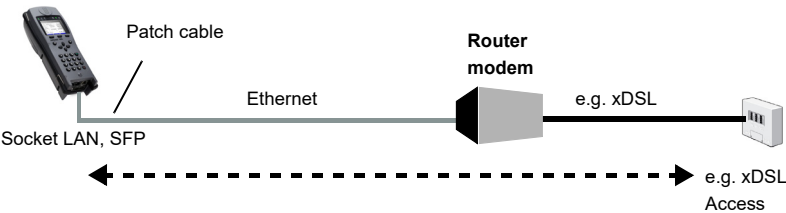


The individual tests acquire and store data. It is the user's responsibility to comply with the applicable legal requirements.

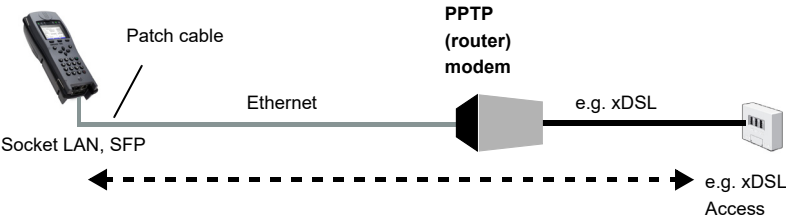
Connecting to a modem:



Connecting to a router modem:

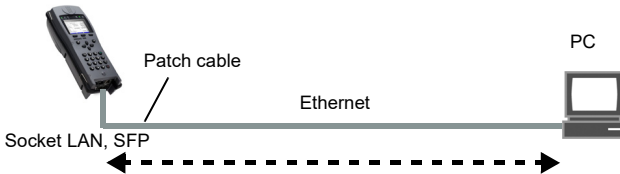


Connecting to a PPTP router modem:

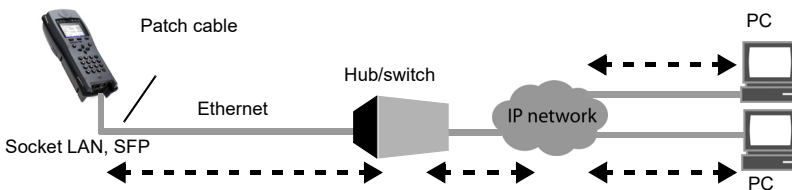




### Connecting to a PC via IP



### Connecting to an IP network:



## 8.1 Configuring the Ethernet interface

Please refer to chapter „5 Configuring accesses“ (see page 25) for instructions on configuring the Ethernet interface.

### **Note: accessing functions via number keys/key combinations**

You can call important functions/tests directly using the keys of the ARGUS keypad. You can find an overview of these key combinations on page 104.

### **Note:**

The Ethernet cable tests (including Ethernet-TDR) are described in chapter „23 Ethernet cable tests“ (see page 329).

8.2 Ethernet settings

You can modify the Ethernet settings as described for VDSL, see page 39.

Setting	Description
Preconfigured accesses	
Phys. parameters:	
Ethernet:	
Autonego- tiation	Switches on or off When autonegotiation is switched on, network cards can automatically detect the correct transmission speed and duplex method of the Ethernet port to which they are connected and configure themselves accordingly. In Ethernet, autonegotiation is based on layer 1 of the OSI model (according to IEEE standard 802.3u). Default: <b>on</b> To set this to <b>off</b> , see the following section, page 74.
MAC address, see page 40.	

See chapter „9.4 Virtual line settings“ (see page 90) for further configurations.

Autonegotiation/Ethernet link parameters

Ethernet link autonegotiation is supported by default!

Setting: autonegotiation "on"

When negotiating the link parameters, ARGUS informs the remote station that the following is supported (these settings are fixed and cannot be configured):


- 10, 100 or 1000 Mbit/s
- Half or full duplex
- Flow control on/off (for on: symmetric and asymmetric pause)

Manually configuring the Ethernet link parameters

Setting: autonegotiation "off"

When autonegotiation is deactivated, the speed, duplex and flow control ("pause" method) can be configured in the profile (see page 74).

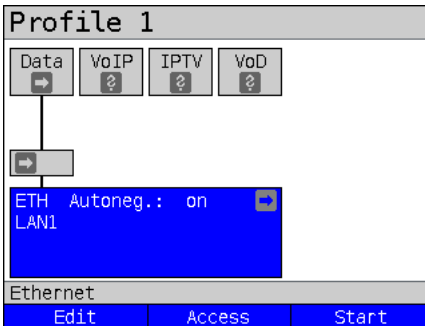
- 10, 100 or 1000 Mbit/s, default: **100 Mbit/s**
- Half or full duplex, default: **full**
- Flow control on/off ("Flow control off" is only useful in full duplex mode)  
Default: **on**



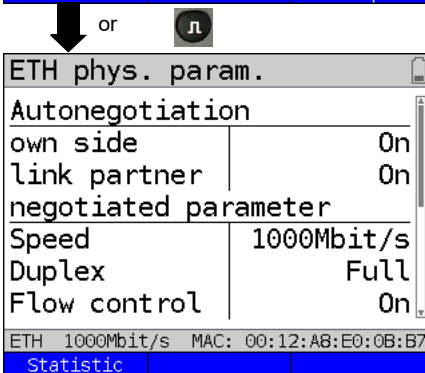
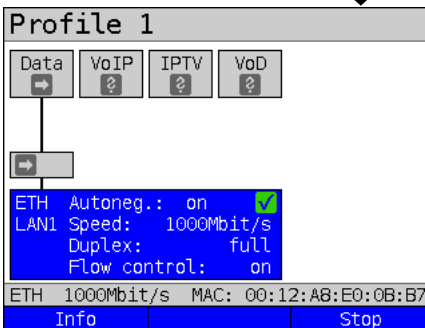
**Unilateral autonegotiation**

When a terminal device with autonegotiation "on" encounters a device without autonegotiation, no information is transmitted by the remote station. Even without autonegotiation, the speed is determined using the pulse method/idle pattern (parallel detection). In this case, the terminal device with autodetection generally drops back to half duplex (duplex mismatch possible), which can result in a duplex mode conflict with "poor throughput".

### 8.3 Establishing an Ethernet connection



#### Establishing an Ethernet connection



ARGUS in the status screen.

ARGUS uses the default profile (profile 1 in the example) to establish an Ethernet connection.

#### The test has not yet started!

Meaning of the arrow in the layer-1 box

Gray arrow no test started

Yellow arrow test started

Green check mark connected

**<Info>** Displays Ethernet connection parameters.

**<Stop>** Stops the Ethernet connection.

Display:

- Autonegotiation setting
- Autoneg. at remote station
- Negotiated speed
- Type of duplex mode
- Flow control setting

**<Statistic>** Opens Ethernet statistics

ETH phys. param.			
Wires		Pol	Skew
3-6	OK	+	8ns
1-2	OK	+	0ns
7-8	OK	+	0ns
4-5	OK	+	0ns
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7			

s. <Statistic> page 75

Statistics		
Ethernet		Rx   Tx
Frames	0	0
Bytes	0	0
Errors	0	0
Collisions		0
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7		

Displays polling and offset between wires

- Wire allocation

Left column ARGUS wire allocation

Right column ARGUS wire allocation after autonegotiation with remote terminal. When the display shows "OK", the remote station has inverted the wire allocation.

- Polling

- Skew in ns

Statistic display

- Received (Rx) and transmitted (Tx) internet frames
- Received (Rx) and transmitted (Tx) bytes
- Number of errors on the receiver (Rx) and transmitter (Tx) side
- Number of collisions

**Disconnecting from the Ethernet connection and saving the results**

You can disconnect and save the results from an Ethernet connection as described for VDSL, see page 65.

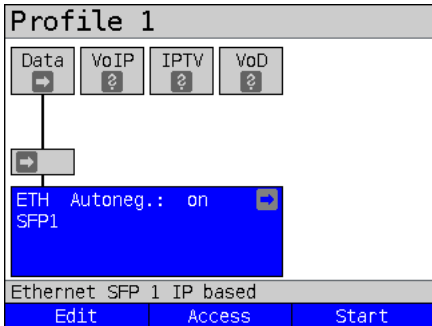
**Saving the results without disconnecting from the Ethernet connection**

You can save your results for an Ethernet connection without disconnecting in the same way as for VDSL, see page 66.

### 8.4 DDM test (SFF 8472)

With the Digital Diagnostic Mode (DDM) test according to SFF 8472, ARGUS detects various optical and electrical line parameters, such as link speed, transmission level or the remote station currently in use.

#### Starting the DDM test (access mode: Ethernet SFP)

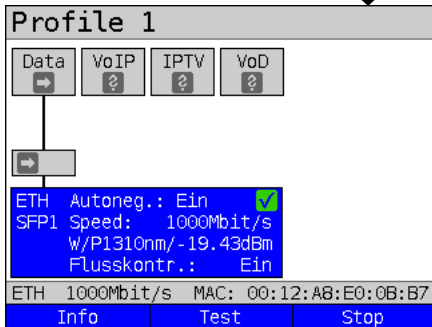


ARGUS in status screen.

The profile shown in the display (profile 1 in this example) is used for the DDM test.

**<Start>** Activates Ethernet.

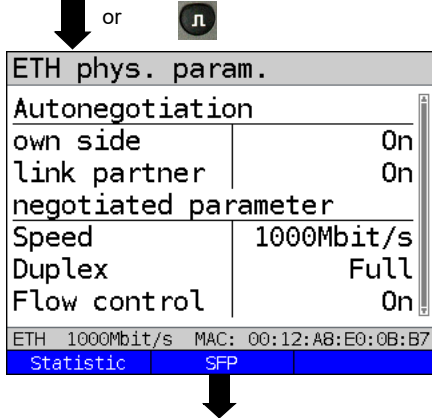
It is not necessary to establish a link with the remote station.



**<Info>** Displays Ethernet connection parameters.

**<Test>** Displays the available tests.

**<Stop>** Stops the Ethernet connection.



Display:

- Autonegotiation setting
- Autoneg. at other end
- Negotiated speed
- Type of duplex mode
- Flow control setting

**<Statistic>** Opens Ethernet statistics.

Continued on next page

SFF8472 parameter	
Vendor	
Name	AVAGO
OUI(hex)	00 17 6A
P/N	AFBR-57M5APZ
Rev.	-
S/N	C811250873
DateCode	23.06.2011
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7	

Display:

Displays system information on the SFP mode used

- SFP module used
- Name of manufacturer
- Manufacturer number (OUI)
- Part number
- Revision
- Serial number (S/N)
- Date of manufacture



SFF8472 parameter	
Specifics	
Transceiver	1000-SX
Encoding	8B-10B
Medium	optical
Speed	1 Gbit/s
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7	

Display:

Display of access-specific information such as

- Wavelength (where appropriate)
- SFP type (transmitter) used
- Coding used
- Transmission type used (optical or electrical)
- Link speed



SFF8472 parameter	
DDM	
Tx power	0.38 mW
Tx level	-4.22 dBm
Rx power	0.52 mW
Rx level	-2.81 dBm
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7	

Display:

Display of diagnostic parameters (power meter)

- Received (Rx) and transmitted (Tx) power in mW
- Received (Rx) and transmitted (Tx) level in dBm



SFF8472 parameter	
DDM	
Temperature	28.9 °C
VCC	3309.8 mV
Tx bias	4.26 mA
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7	

Display:

Display of measured connection parameters

- Temperature in °C
- Supply voltage in mV
- Transmit quiescent current in mA in operation



SFF8472 parameter	
maximum link length	
Multimode OM	15 m
Multimode OM	30 m
Multimode OM	0 m
Multimode OM	0 m
ETH 1000Mbit/s MAC: 00:12:A8:E0:0B:B7	

Display:

Displays the maximum possible line lengths in m

- Copper or single-mode glass fibers or for
- Multimode glass fibers in omni-modes 1 through 4

### Disconnecting the Ethernet connection and saving the results

You can disconnect and save the results from an Ethernet connection as described for VDSL, see page 65.

### Saving the results without disconnecting the Ethernet connection

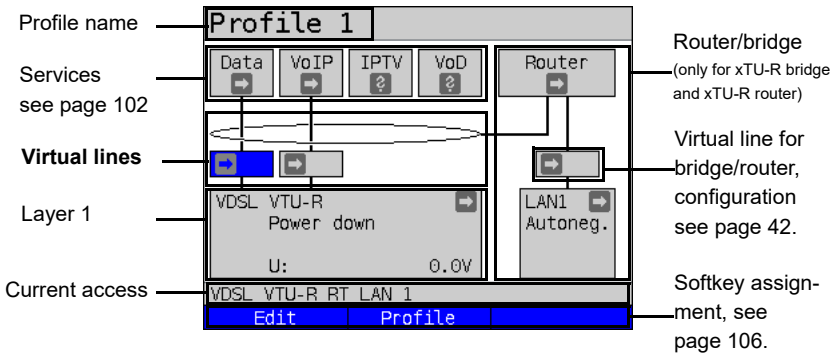
You can save your results for an Ethernet connection without disconnecting in the same way as for VDSL, see page 66.

9 Virtual lines (VL)

Virtual lines (VL) compile the configurations of layer 2 and layer 3 into profiles, called the VL profiles. These profiles contain e.g. information on protocols, VPI/VCIs, VLANs and PPP data (stored in their own subordinate PPP profiles). Virtual lines can be used to conduct tests across multiple VPI/VCIs or VLANs and across different protocols. ARGUS allows you to define up to 20 such VL profiles. In a VL profile, you can edit e.g. the protocol configuration. The VL profiles can be assigned to one or more services independently of the state of the physical layer (layer 1). Thus, a data test (e.g. IP ping and a VoIP test (e.g. VoIP call) can be performed on a single active access without having to re-establish layer 1 (DSL, Ethernet) in spite of differing protocols.

9.1 Virtual lines in the status screen

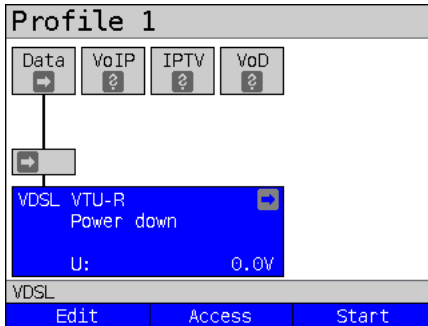
The virtual lines in the status screen are explained using the access VDSL VTU-R router:





The status screen is divided into three levels that can be individually selected using the cursor keys of the ARGUS keypad.

The status screen is described in greater detail using three display examples.



### Level 1: physical layer (see page 36)

- <Edit> Configures physical layer.
- <Access> Selects access.
- <Start> Establishes physical layer of the selected access.

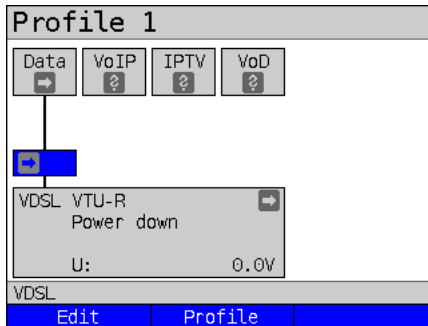


### Level 2: virtual lines

- <Edit> Configures virtual line, see page 85.

The following configuration options are shown:

- Protocol (IP, PPP, PPTP)
- ATM, see page 90
- VLAN, see page 91
- PPP (PPP profiles)
- PPTP, see page 93
- IP version (IPv4, IPv6, dual)
- IPv4, see page 93
- IPv6, see page 95
- Data log (for this VL)
- Profile name, see page 96

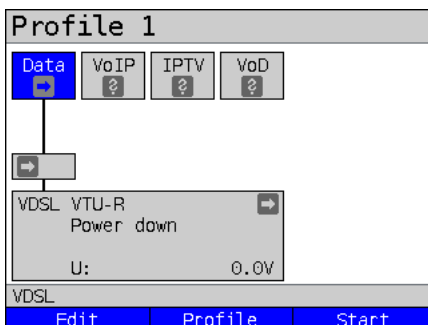


- <Profile> Configures the profile.

### Level 3: services (see page 102)

- <Edit> Assigns a VL to a service and configures it.
- <Profile> Configures the profile.
- <Start> Starts the service.

The virtual line and the physical layer start automatically when you press the softkey <Start>.



Depending on the state of the physical layer, the virtual lines or the services, ARGUS displays a variety of symbols in the status screen.



This service has not yet been assigned to a virtual line.



This service, VL or physical layer is idle.



This service is not available (bridge mode only).



Preparing activation of physical layer, VL or service.



Activating the physical layer, VL or service.



Physical layer, VL or service deactivated due to an unexpected occurrence.



Deactivating.



Synchronisation achieved (physical layer) or a VL or service was activated successfully without errors.



A test is currently running in this service.



An error occurred here. Reset with **<Reset>** to continue with the VL/service.

### 9.2 Virtual line profiles (VL profiles)

The various profile types are explained below:

#### Profiles (1 - 20), see page 32:

- Under the services, these contain the assignments for the services Data, VoIP, IPTV and VoD.
- In addition to the services, the settings for the bridge/router and the test parameters can be found here as well.
- Every profile can be assigned an individual profile name.

#### VL profiles (virtual lines 1 - 20 )

- These contain the layer 2/3 settings.
- VL profiles are assigned to services.
- One VL can be assigned to multiple services.
- The VL profiles can be assigned to PPP profiles.

#### PPP profiles (1 - 20)

- These contain all relevant data for dialling.
- PPP profiles are assigned to VL profiles.
- One PPP profile can be assigned to multiple VL profiles.

Relationships between profile types

When all configurations are reset (see page 353), a VL profile (1-20) is only assigned to the service data in each profile (1-20). One PPP profile is assigned to each VL profile (1-20). All other services (such as VoIP, IPTV and VoD) are initially not assigned a VL profile or a PPP profile.

The assignment further VL and PPP profiles to services is described starting on page 85.

Default configuration:

Profile 1

Data

VoIP

IPTV

VoD

VDSL VTU-R

Power down

U: 0.0V

VDSL

Edit

Access

Start



Profile 20

Data

VoIP

IPTV

VoD

VDSL VTU-R

Power down

U: 0.0V

VDSL

Edit

Access

Start

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



Profile 20		
Service data	=>	VL profile 20 => PPP profile 20
Service VoIP	...	...
Service IPTV	...	...
Service VoD	...	...

9.3 Activating a virtual line

A service or test must be started in order to activate a virtual line. To enable a test to be started, a service must be configured, and a virtual line assigned to it. In this example, the service Data is configured and assigned to a virtual line.

9.3.1 Starting a service

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a  
kb/s: 80000/ 15996  
CRC: 0/ n/a  
U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

InfoStop

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a  
kb/s: 80000/ 15996  
CRC: 0/ 0  
U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

EditStart

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a  
kb/s: 80000/ 15996  
CRC: 0/ 1  
U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

InfoTestStop

The VDSL access is active.

Use the cursor keys to switch from the layer-1 box over the virtual line to the service Data.

If the physical layer is not yet active, this is started automatically with the service or test.

<Start> Starts the service.

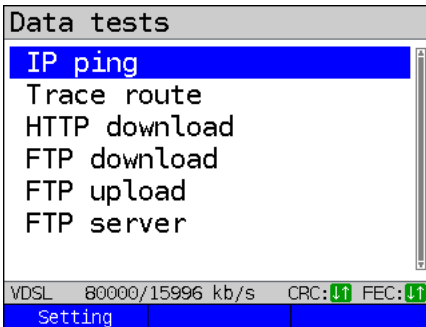
The physical layer (VDSL), the virtual line and the service Data are now active. This is indicated by a green check mark.

<Info> Displays information on the service Data (e.g. duration of activity).

<Stop> Stops the service Data.

See page 102 for explanations of the services.

Continued on next page

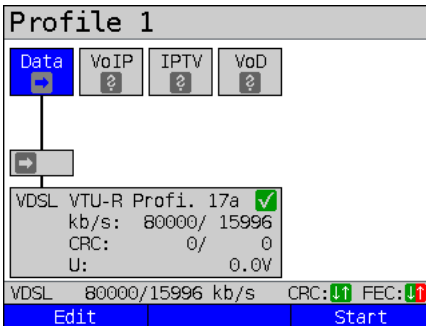


The tests that can be run using the service Data are displayed.

**<Setting>** Configures the respective test (in this example IP ping). A detailed description is provided in the chapter Test, see page 120.

### 9.3.2 Assigning additional virtual lines

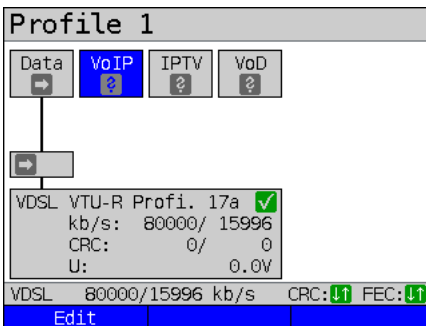
ARGUS can use multiple services concurrently (e.g. Data and VoIP) via a single virtual line. In this example, VDSL is active. The service Data is selected. The following explains how multiple services can be connected via a single virtual line.



To configure a virtual line (in this example for the service Data) for other services, you must first stop the service. The physical layer remains active.



The service VoIP is greyed out when the VoIP option is not set.



Using the cursor keys, select the service VoIP.

**<Edit>** Opens the configuration of the selected service (in this example VoIP).

Continued on next page

Service VoIP

Virtual line

VoIP account

VoIP QoS

VDSL 80000/15996 kb/s CRC: ↑↓ FEC: ↑↓



Virtual line

•No virtual line

Virt. profile 1

Virt. profile 2

Virt. profile 3

Virt. profile 4

Virt. profile 5

Virt. profile 6

VDSL 80000/15996 kb/s CRC: ↑↓ FEC: ↑↓

Edit



Virtual line

Protocol

ATM

VLAN

PPP

PPTP

IP version

IPv4

VDSL 80000/15996 kb/s CRC: ↑↓ FEC: ↑↓



Continued on  
next page

Select "Virtual line"



Select the virtual profile you wish to edit. The selected profile is highlighted in blue in the display.



Elements not available are grayed out, for instance when they are currently active.

<Edit> The configuration options are described starting on page 90.

Edit the selected VL profile.



e.g. select PPP

The configuration options are described starting on page 92.

Opens PPP profile selection

PPP profile

- PPP profile 1
- PPP profile 2
- PPP profile 3
- PPP profile 4
- PPP profile 5
- PPP profile 6
- PPP profile 7

VDSL 80000/15996 kb/s CRC: FEC:

Edit



e.g. select PPP profile 1

Up to 20 PPP profiles can be configured.

<Edit> Edits the selected PPP profile, see page 92.

PPP settings

User name

Password

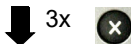
Set IP

Activation delay

Profile name

VDSL 80000/15996 kb/s CRC: FEC:

The configuration options are described starting on page 92.



Virtual line

- No virtual line
- Virt. profile 1
- Virt. profile 2
- Virt. profile 3
- Virt. profile 4
- Virt. profile 5
- Virt. profile 6

VDSL 80000/15996 kb/s CRC: FEC:

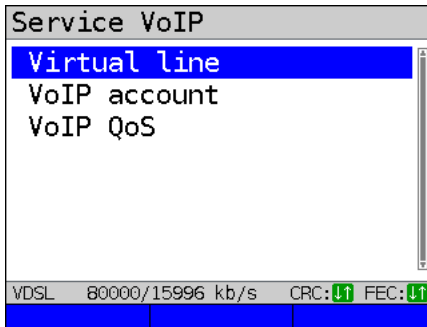
Edit



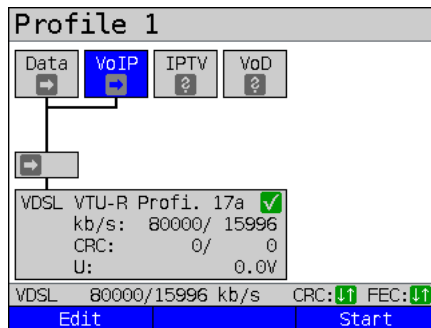
The desired profile has not yet been selected.



Continued on next page

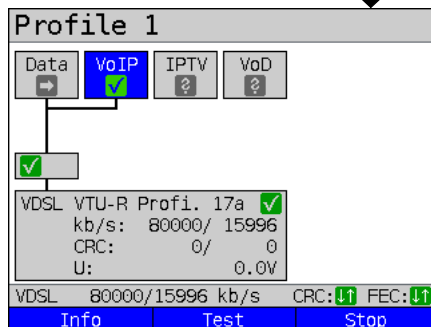


ARGUS switches to the status screen or the Settings menu (depending on whether you accessed the profiles using the main menu or the status screen).



The services Data and VoIP are now connected to the physical layer (VDSL access) via a virtual line.

<Start> Starts the service VoIP.



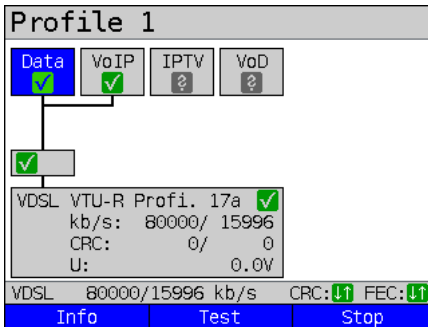
The service VoIP is now active. You can now run a variety of tests via the service VoIP.

In the next step, you can now activate a further service.



Select Data using the cursor keys and press <start> to activate the service.



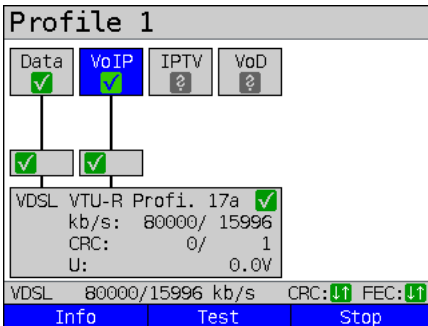


The services Data and VoIP are active. You can now run a variety of tests via the services Data and VoIP.

The display and operation for IPTV and VoD (video on demand) are the same as for VoIP.

Further examples of different virtual line assignments:

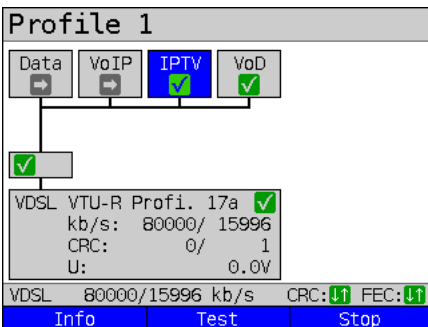
Example 1:



One virtual line is connected with the service Data and another with the service VoIP.

The virtual line for VoIP can thus be used for different protocol data than the virtual line for Data.

Example 2:



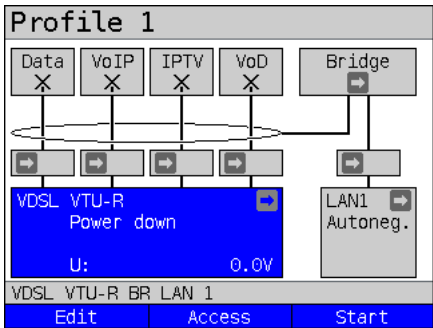
One virtual line was configured for the services Data, VoIP, IPTV and VoD. In this example, the services IPTV and VoD are active.



Up to four virtual lines can be established for the service IPTV. However, ARGUS only displays these as a single composite virtual line.

A detailed description is provided in the chapter IPTV, see page 170.


Example 3:



In this example, each service was assigned a virtual line.  
As ARGUS is in bridge mode, these services cannot be executed.

9.4 Virtual line settings

Setting		Description		
Virt. profile 1 to 20				
Protocol		Selection of transmission profile that ARGUS uses for the test (e.g. for the IP tests). Default: <b>PPP</b>		
Protocol	ATM:	Interfaces:		
	ATM with ETH	ADSL	VDSL	Ethernet
IP	no	EoA	IP	IP
IP	no	IPoA		
PPP	yes	PPPoE	PPPoE	PPPoE
PPP	no	PPPoA		
PPTP	-	-	-	PPTP
You can choose between the protocol "ATM with Ethernet" or "ATM without Ethernet" using the ATM menu option.				
ATM:		Settings for asynchronous transfer mode		
VPI/VCI		VPI: Enter the virtual path identifier VCI: Enter the virtual channel identifier Ranges VPI: 0 to 255, VCI: 32 to 65535 Default: <b>VPI: 1</b> and <b>VCI: 32</b>		

<b>Encapsulation</b>	Encapsulation of the transmitted packets: LLC or VC-MUX Default: <b>LLC</b>	
<b>ATM with Ethernet</b>	Determines whether Ethernet is used via ATM or not, see table above. Options: - No (PPPoA, IPoA) - Yes (PPPoE, EoA) Default: <b>yes (PPPoE, EoA)</b>	
<b>VLAN:</b>	VLAN (Virtual Local Area Network)	
<b>VLAN</b>	VLAN mode	Determines whether VLAN may be used. Up to two VLANs can be used concurrently (2 VLAN tags (Q in Q)). Default: <b>no VLAN</b>
	1. VLAN tag (C-VLAN), 2. VLAN tag (S-VLAN) (Q in Q)	
	ID:	Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device that belongs to the VLAN with ID = 2 can communicate with every other device in the same VLAN but not with devices in other VLANs. Range: from 0 to 4095 Default: 1. VLAN: <b>7</b> 2. VLAN: <b>2</b>
		The IDs 0, 1 and 4095 are reserved for management purposes and should preferably not be used.
	Priority:	User priority information: One of eight (3-bit) priorities can be specified for each frame. This makes it possible e.g. to give priority to transmitting speech data while treating HTTP data with lower priority. Range: 0 to 7 Default (1. and 2. VLAN): <b>0</b>

	<div><div>TPID:</div><div>Tag Protocol Identifier The TPID is a 16-bit sub-field within the 4-byte VLAN data field. This field contains the tag information defined by IEEE 802.1q. Default: VLAN 1: <b>8100 hexadecimal</b> VLAN 2: <b>88A8 hexadecimal</b></div></div> <div><div>Note:</div><div>When using two VLANS with layer 3 (IP) or layer 4, both are to be set to 8100.</div></div>
PPP profile:	
User name	<div><div><div>User name:</div><div></div><div>00/49 signs</div><div>VDSL</div><div>Delete</div><div>ab&gt;Ab</div></div><div>Entry of the user name assigned by the carrier:  The user name is entered using the number keys. Pressing the right softkey changes the meaning and thus influences the input via the number keys (letters (upper and lower case) and numbers).</div></div>
Password	<div>Entry of a password (max. 55 characters) assigned by the carrier; see "User name" for an explanation. During entry, the characters of the password are visible until Enter is pressed once. The characters are subsequently only displayed encrypted with "***".</div>
Set IP	<div>When "yes" is set, the IP address defined under IP/own IP address (see below) is used for connecting. Default: <b>no</b></div>
Current delay	<div>Once a PPP connection has been established, the test is only started after the preset delay time has elapsed. Range: 2 - 10 seconds Default: <b>2</b></div>
Profile name	<div>Enter the name of the PPP profile.</div>

<b>PPTP</b>	PPP settings (Point-to-Point Tunnelling Protocol)
	Own server IP address Range 0.0.0.0. to 255.255.255.255 Default: <b>0.0.0.0</b>
<b>IP version:</b>	Internet Protocol version
	Determines which IP version is to be used.  nur IPv4: Internet Protocol version 4 acc. to RFC 791 nur IPv6: Internet Protocol version 6 acc. to RFC 2460 Dual Stack IPv4/IPv6: If IPv6 is available, this protocol is preferred for a test. If not, ARGUS switches automatically to IPv4. Dual Stack Lite: Assigning a globally routable IPv6 address. Default: <b>IPv4</b>
<b>IPv4:</b>	Internet Protocol version 4 configuration
<b>IP mode</b>	Definition of IP address assignment  Static IP: Fixed IP address DHCP client: Assignment of IP address by server (remote side) DHCP server: Assignment of IP address by ARGUS DHCP auto: ARGUS checks for the presence of a DHCP server in the network. If a server is present, it assigns the IP address; if not, ARGUS does this. Default: <b>DHCP client</b>
<b>Own IP address</b>	Own ARGUS IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>0.0.0.0</b> (assignment see RFC 3330)
<b>IP netmask</b>	IP netmask Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>255.255.255.0</b> (assignment see RFC 3330)
<b>Gateway IP</b>	Gateway IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>0.0.0.0</b> (assignment see RFC 3330)

<b>DNS Server</b>	<p>DNS server 1</p> <p>DNS server 2</p> <p>Entry of DNS server IP address (DNS = Domain Name System)</p> <p>Range: Range 0.0.0.0. to 255.255.255.255</p> <p>Default: <b>0.0.0.0</b> (assignment see RFC 3330)</p>
<b>DHCP client</b>	<p>DHCP timeout:</p> <p>Range: 1 - 9999 seconds</p> <p>Default: <b>20</b></p>
	<p>DHCP Vendor ID:</p> <ul style="list-style-type: none"> <li>- Format: choose format: ASCII or hexadecimal</li> </ul> <p>ASCII data: Entry of DHCP vendor ID in ASCII format</p> <p>Default: <b>ARGUS</b>, for details see "User name", page 92</p> <ul style="list-style-type: none"> <li>- HEX data: entry of DHCP vendor ID in hexadecimal format, see MAC address page 74</li> </ul>
	<p>DHCP vendor info:</p> <ul style="list-style-type: none"> <li>- Format: choose format: ASCII or hexadecimal</li> <li>- ASCII data: Entry of DHCP vendor information in ASCII format, default: <b>ARGUS</b>, for details see "User name", page 92</li> <li>- HEX data: entry of DHCP vendor information in hexadecimal format, see MAC address page 74</li> </ul>
	<p>DHCP user class information</p> <ul style="list-style-type: none"> <li>- Format: choose format: ASCII or hexadecimal</li> <li>- ASCII data: entry of DHCP user class info in ASCII format</li> </ul> <p>Default: <b>ARGUS</b>, for details see "User name", page 92</p> <ul style="list-style-type: none"> <li>- HEX data: entry of DHCP user class information in hexadecimal format, see MAC address page 74</li> </ul>
	<p>DHCP user-defined option (generate a custom DHCP option)</p> <ul style="list-style-type: none"> <li>- Option number</li> </ul> <p>Range: 0 to 255</p> <p>Default: <b>255 = off</b></p> <ul style="list-style-type: none"> <li>- Format: choose format: ASCII or hexadecimal</li> <li>- ASCII data: entry of DHCP user-defined option in ASCII format</li> </ul> <p>Default: <b>ARGUS</b>, for details see "User name", page 92</p> <ul style="list-style-type: none"> <li>- HEX data Entry of DHCP user-defined option in hexadecimal format, see MAC address page 74</li> </ul>

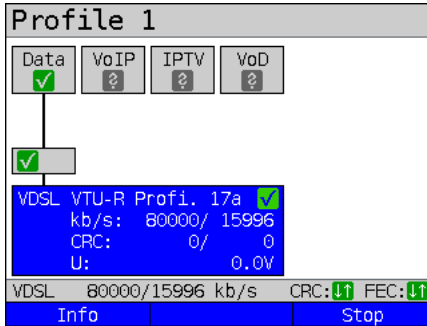
<b>DHCP server</b>	Settings for the DHCP server: - Starting and ending IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: (assignment see RFC 3330) Start: <b>192.168.10.30</b> End: <b>192.168.10.40</b> - Domain name, see "User name" page 92 for details - Duration of reservation for IP addresses Range: 1 - 99999 seconds Default: <b>240</b>	
<b>IPv6:</b>	Internet Protocol Version 6 settings	
<b>AFTR</b>	AFTR mode	Determines whether Address Family Transition Router (AFTR) mode is set automatically or statically. Default: <b>Automatic</b>
	AFTR address	Entry of the AFTR address.
<b>DHCP client</b>	DHCP mode	Determines whether DHCPv6 is selected automatically or whether the Router Advertisement (RA) server is ignored. Default: <b>Automatic</b>
	DHCP options	Determines whether the DHCPv6 options are automatically selected or all options requested. Default: <b>Automatic</b>
	Enterprise Number (PEN)	Entry of PEN (Private Enterprise Number). Range: 0 to 65535 Default: <b>46443</b>

<b>Data log</b>	<p>Data log on or off</p> <p>This function must be set to "on" so that a trace file can be sent to the PC; see page 65.</p> <p>After terminating a VL via the corresponding service or the physical layer, ARGUS queries whether the trace file should be sent to the PC.</p> <p>For example, when the data log is activated for VL 1, only VL 1 is recorded. When one VL is configured for multiple services and the data log is active, all data of this VL are recorded.</p> <p>Default: <i>off</i></p>
<b>Profile name</b>	<p>Enter the name of the VL profile. Enter the name as for the access name, see page 27.</p>



## 9.5 Displaying protocol statistics

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



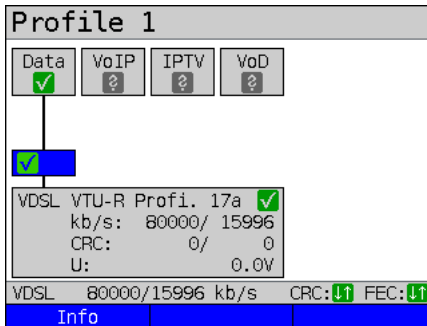
The physical layer, virtual line and service data are active.

**<Info>** Displays DSL results.

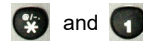
**<Stop>** Deactivates physical layer, VL and Data service.



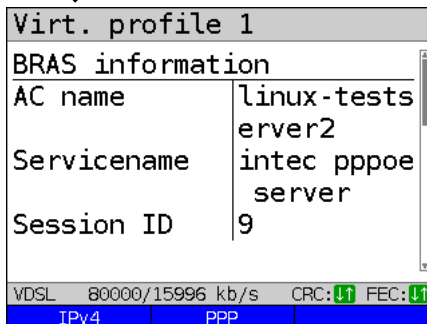
Switch to the virtual line (VL) using the cursor keys.



Press one after another



Display of ARGUS MAC addresses:  
Line, LAN, SFP, ETH,  
see also page 106 and following.



BRAS information:

For PPP protocol only, ARGUS displays the Broadband Access Server (BRAS) information:

- AC (access server): name of server
- Service name name of service

**<IPv4>** Displays the configuration assigned by the server.



Continued on next page

Virt. profile 1			
PPP		Rx	Tx
Packets	5		4
Bytes	120		106
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>			
IPv4		PPP	

PPP information:  
ARGUS displays the received (Rx) and transmitted (Tx) PPP packets and the bytes.



Virt. profile 1			
Ethernet		Rx	Tx
Frames	32		33
Bytes	1969		1994
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>			
IPv4		PPP	

Ethernet:  
ARGUS displays the received (Rx) and transmitted (Tx) Ethernet frames, bytes and errors.



Virt. profile 1			
< PADI sent			
< PADI sent			
> PADO rec.			
< PADR sent			
> PADS rec.			
< LCP conf. req.			
> LCP conf. req.			
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>			
		Time	

<PPP> The softkey <PPP> opens a PPP trace, which displays the PPP login process.

Command display  
< = Command sent by ARGUS  
> = Command sent by DSLAM

<Time> The <Time> softkey assigns the individual messages to times according to the ARGUS system clock.

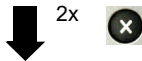
Continued on  
next page



```

Virt. profile 1
< PADI sent
  16:10:00:000
< PADI sent
  16:10:02:930
> PADO rec.
  16:10:02:950
< PADR sent
VDSL  80000/15996 kb/s  CRC:↓↑ FEC:↓↑

```



- 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 CP:  
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

## IP version-dependent

Virt. Profil 1	
BRAS information	
AC name	linux-tests
Servicename	erver2
Session ID	intec pppoe server 94
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	
PPP	IPv6

In this example IPv6:

<IPv6> IPv6 information is displayed.

<IPv4> IPv4 information is displayed.

IPv6	
Global unicast address	
1	2001:5C0:1100:D910: 1559:DA0B:998F:7D07
Link local address	
1	FE80::1559:DA0B:998F: 7D07
DNS server address	
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	

Assigned configuration:  
ARGUS displays the IP configuration  
assigned by the server:

- Global Unicast Address
- Link Local Address



Use the cursor keys to display  
further information.



Exits results.

IPv4	
Assigned PPP config.	
IP	10. 67. 15. 95
Gateway	192.168. 15. 99
DNS 1	192.168. 4.253
DNS 2	192.168. 4.253
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	

Assigned configuration:  
ARGUS displays the IP configuration  
assigned by the server:

- Received IP address
- Gateway IP address
- Available DNS servers



Exits results.



10 Services

The status screen (see explanation page 80) shows four services. Each service can be used to conduct an entire suite of IP tests (see list below). It is also possible to start and stop each service independently of the others.

Example screen with the possible services

Profile 1

Data

VoIP

IPTV

VoD

VDSL VTU-R

Power down

U: 0.0V

VDSL

Edit

Profile

Start

<Edit>

Assigns the service a VL profile and configures the service.

<Profile>

Configures the profile.

<Start>

Activates the service. If virtual lines and the physical layer are not active, they are also automatically started as well.

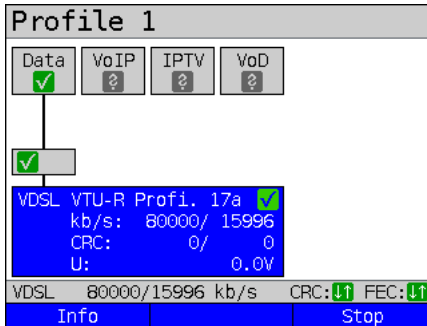
The meaning of the symbols, s. page 82.

Once a service is activated, a variety of tests can be started using <Test>.

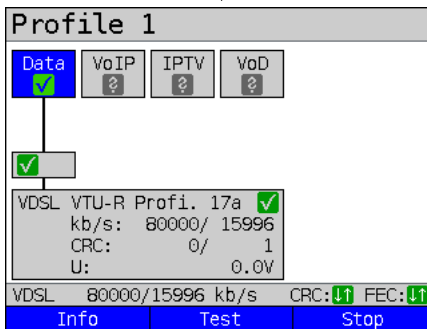
Services:			
<div><div>Data</div><div></div></div>	<div><div>VoIP</div><div></div></div>	<div><div>IPTV</div><div></div></div>	<div><div>VoD</div><div></div></div>
<div><div>- IP ping</div><div>- Traceroute</div><div>- HTTP download</div><div>- FTP download</div><div>- FTP upload</div><div>- FTP server</div></div>	<div><div>- IP ping</div><div>- Traceroute</div><div>- VoIP call</div><div>- VoIP wait</div><div>- VoIP PESQ test</div></div>	<div><div>- IP ping</div><div>- Traceroute</div><div>- IPTV</div><div>- IPTV scan</div><div>- IPTV passive</div></div>	<div><div>- IP ping</div><div>- Traceroute</div><div>- Video on demand</div></div>

Possible tests that can be executed using the various services.

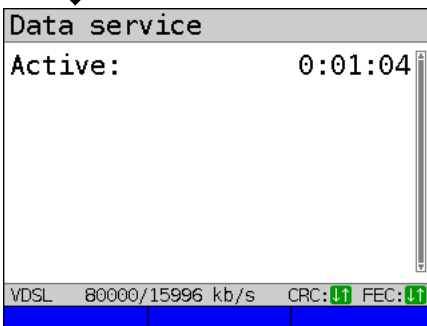
## 10.1 Displaying service statistics



ARGUS in the status screen.  
The physical layer, VL and service are active.



Switch to a service (in this example Data) using the cursor keys.



**<Info>** Displays the duration of activity of the selected service.



In the service VoIP, the VoIP call parameters are displayed here, see page 163.



Exit the display and return to the status screen.

## 11 Overview of tests and hotkey assignment

### Overview of tests

Display of possible tests at the xDSL and Ethernet interface:

Interface Test	ATU-R VTU-R	AUT-R BR VTU-R BR	ATU-R RT VTU-R RT	Ethernet
Loop see page 108	x	-	x	x
VPI/VCI scan see page 114	x*1	x*1	x*1	-
ATM-OAM ping see page 117	x*1	x*1	x*1	-
IP ping see page 120	x	-	x	x
Traceroute see page 126	x	-	x	x
HTTP download see page 130	x	-	x	x
FTP download see page 135	x	-	x	x
FTP upload see page 139	x	-	x	x
FTP server see page 143	x	-	x	x
VoIP call/wait see page 150	x	-	x	x
IPTV see page 170	x	-	x	x
IPTV scan see page 185	x	-	x	x
IPTV passive see page 192	-	x*1	x	x
VoD see page 196	x	x	x*1	x
PESQ see page 290	x	-	x	x

\*1 = not for VDSL

A virtual line must be configured first before ARGUS can execute these tests (exceptions: VPI/VCI scan, ATM-OAM ping, loop). Configuration is described in the chapter "Virtual line", see page 80.















**Graphic functions:**

After running the xDSL interface or a test, you can use the following graphic functions in the result displays:















Hotkey	xDSL trace	ADSL/ VDSL	Line Scope	TDR
Number key 1	Legend	-	-	-
Number key 2	-	Zoom	Zoom	Zoom
Number key 3	Cursor	Cursor	Cursor	Cursor
Number key 4	-	-	Measuring range	Measuring range
Number key 5	-	-	Total power	Pulse width/ height
Number key 6	-	-	-	Wire type/VoP
Number key 7	-	-	Probe	-
Number key 8	-	-	Symmetry	-
Number key 9	-	Setting of x-axis	Time/FFT	-
Number key 0	-	Min/Max	Peak hold	-
Number key #	-	-	100 Ohm input resistance	-
	-	Continue	-	-
	-	-	Run/Hold	Run/Hold
Press one after another  and 	-	-	Reference curve	Reference curve
Press one after another  and 	-	Store	Store	Store

### Hotkey assignment

You can call important functions/tests directly using the keys of the ARGUS keypad. Depending on the selected access type (xDSL and Ethernet in this example), different hotkeys can be used:

Hotkey	Service	ADSL	VDSL	ETH
Number key 0	ARGUS status	x	x	x
Number key 1	Hotkey help	x	x	x
Number key 2	VPI/VCI scan	x	-	-
Number key 3	IP ping	x	x	x
Number key 4	Traceroute	x	x	x
Number key 5	HTTP download	x	x	x
Number key 6	Test status	x	x	x
Number key 7	FTP download	x	x	x
Number key 8	Copper Box	x	x	-
Number key 9	IPTV	x	x	x
	Status screen	x	x	x
	VoIP call	x	x	x
Press one after another  and 	Shortcut to access selection menu.	x	x	x
Press one after another  and 	Displays ARGUS-specific information such as ARGUS type, SW version, S/N, own MAC addresses, SW options and more.	x	x	x
Press one after another  and 	Restores the saved test settings, see page 352.	x	x	x
Press one after another  and 	Resets all settings to the factory default, see page 353.	x	x	x
Press one after another  and 	ARGUS saves the current measurement without stopping it. ARGUS automatically suggests a name.	x	x	x

Depending on the selected access type (ISDN, POTS and Copper tests in this example), different hotkeys can be used:

Hotkey	Service	BRI S/T	BRI U	PRI	POTS	Cu tests Status
Number key 0	ARGUS status	x	x	x	x	x
Number key 1	Hotkey help	x	x	x	x	x
Number key 2	Start services test (not for fixed lines)	x	x	x	-	-
Number key 3	Test service features (not for fixed lines)	x	x	x	-	-
Number key 4	Starts an automatic test.	x	x	x	-	-
Number key 5	Sends test results to PC	x	x	x	x	x
Number key 6	Opens Test Manager	x	x	x	-	-
Number key 7	Opens saved numbers	x	x	x	x	-
Number key 9	Starts BERT	x	x	x	-	-
	Level measurement	x	x	L1 Status	x	-
	Connect	x	x	x	x	-
Press one after another  and 	Shortcut to access selection menu.	x	x	x	x	x
Press one after another  and 	Displays ARGUS-specific information, see page 106.	x	x	x	x	x
Press one after another  and 	Restores the saved test settings, see page 352.	x	x	x	x	x
Press one after another  and 	Resets all settings to the factory default, see page 353.	x	x	x	x	x
Press one after another  and 	Opens Test Manager.	x	x	x	-	-
Press one after another  and 	ARGUS saves the current measure- ment without stopping it. ARGUS automatically suggests a name.	x	x	x	x	x

12 Loop

A loop can only be created on Ethernet.

In a loop, all incoming Ethernet frames on layer 1 (L1) are returned to the sender unchanged.


In a loop on layer 2 (L2) of the OSI model, ARGUS swaps the source MAC address for the destination MAC address and then returns all Ethernet frames.


The loop requires the following parameters:

Protocol-independent parameters

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
Test parameter:	
Loop	
Layer	<div><p>This setting determines what layer of the OSI model the loop runs on.</p><ul style="list-style-type: none"><li>- L1: all incoming Ethernet frames on a loop on layer 1 (L1) are returned to the sender unaltered.</li><li>- L2: on a loop on layer 2 of the OSI model, ARGUS exchanges the source MAC address with the destination MAC address and returns all incoming Ethernet frames.</li><li>- L3: on a loop on layer 3 (L3) of the OSI model, ARGUS exchanges the destination and own IP address as well as the MAC addresses and then returns all incoming Ethernet frames.</li></ul><p>Default: <b>L2</b></p></div>

<b>Layer 2</b>	<b>MAC mode</b> You can use the loop MAC mode to determine what gets looped. <ul style="list-style-type: none"> <li>- For own MAC only (promiscuous mode off)             <ul style="list-style-type: none"> <li>L1: only packets for the own MAC address and broadcast packets are looped.</li> <li>L2: only packets for the own MAC address are looped. Broadcasts are rejected.</li> <li>L3: only packets for the own MAC address and own IP address are looped. Broadcasts are rejected.</li> </ul> </li> <li>- Loop everything (promiscuous mode on)             <ul style="list-style-type: none"> <li>L1: all packets (including broadcast) are looped.</li> <li>L2: all packets - except broadcasts - are looped. Broadcasts are rejected.</li> <li>L3: all packets for which the IP address has been recognised are looped.</li> </ul> </li> </ul> Default: <b>for own MAC only</b>	
	<b>VLAN</b>	VLAN (Virtual Local Area Network)
	<b>VLAN mode</b>	Determines whether VLAN may be used. Up to two VLANs can be used concurrently. Default: <b>no VLAN</b>
	<b>1. VLAN (C-VLAN)</b>	<b>ID</b> Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device that belongs to the VLAN with ID = 2 can communicate with every other device in the same VLAN but not with devices in other VLANs. Range: from 0 to 4095 Default: <b>2</b>
		 The IDs 0, 1 and 4095 are reserved for management purposes and should preferably not be used.
		<b>Priority</b> User priority information: One of eight (3-bit) priorities can be specified for each frame. This makes it possible e.g. to give priority to transmitting speech data while treating HTTP data with lower priority. Range: 0 to 7 Default: <b>0</b>

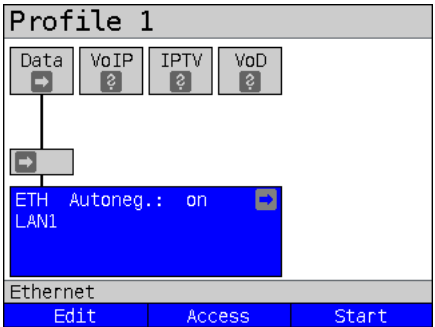
			TPID	<p>8100 Hex The VLAN TPID 8100 hex is a 16-bit field that identifies frames according to IEEE 802.1Q (VLAN-tagged frame). It also makes it possible to use all network paths actively according to IEEE 802.1Q (shortest path bridging, SPB).</p> <p>88A8 Hex VLAN TPID 88A8 supports provider bridging according to IEEE 802.1ad. It also makes it possible to use all network paths actively according to IEEE 802.1Q (shortest path bridging, SPB).</p> <p>Default: <b>8100 Hex</b></p>
			2. VLAN (S-VLAN)	<p>ID Identifier for the VLAN to which the frame belongs. Every VLAN is assigned a unique number, the VLAN ID. A device that belongs to the VLAN with ID = 2 can communicate with every other device in the same VLAN but not with devices in other VLANs.</p> <p>Range: from 0 to 4095</p> <p>Default: <b>2</b></p>
				<p> The IDs 0, 1 and 4095 are reserved for management purposes and should preferably not be used.</p>
			Priority	<p>User priority information:</p> <p>One of eight (3-bit) priorities can be specified for each frame. This makes it possible e.g. to give priority to transmitting speech data while treating HTTP data with lower priority.</p> <p>Range: 0 to 7</p> <p>Default: <b>0</b></p>
			TPID	<p>8100 Hex The VLAN TPID 8100 hex is a 16-bit field that identifies frames according to IEEE 802.1Q (VLAN-tagged frame). It also makes it possible to use all network paths actively according to IEEE 802.1Q (shortest path bridging, SPB).</p>

		88A8 Hex	VLAN TPID 88A8 supports provider bridging according to IEEE 802.ad. It also makes it possible to use all network paths actively according to IEEE 802.aq (shortest path bridging, SPB).  Default: <b>88A8 Hex</b>
<b>Layer 3</b>	IP-mode	For IP address assignment, this determines whether a static IP address is to be used or whether a server (remote station) issues the IP address (DHCP client). Default: <b>Static IP</b>	
	Own IP address	Own ARGUS IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>0.0.0.0</b> (assignment see RFC 3330)	

#### Notes for the use of VLANs

	Contains received Ethernet packets		
Loop - VLAN mode	no VLAN	one VLAN	two VLANs
No VLAN	x	x	x
1. VLAN tag (C-VLAN)	-	ARGUS loops when the VLAN IDs and TPIDs contained in Ethernet packets agree with the VLAN 1 settings.	ARGUS loops when the first VLAN ID (also called outer or service ID) and TPID contained in Ethernet packets agree with the VLAN 1 settings.
1. VLAN tag (C-VLAN) and 2. VLAN tag (S-VLAN)	-	-	ARGUS loops when the first VLAN ID (also called outer or service ID) and TPID contained in Ethernet packets agree with the VLAN 2 settings and the second VLAN ID (also called the inner or customer ID) and TPID agree with the VLAN 1 settings.
- = ARGUS does not loop.			
x = ARGUS loops regardless of whether the received Ethernet packets contain VLANs.			

Starting the loop (access mode: Ethernet)

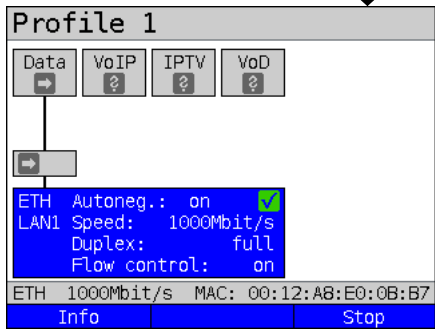


ARGUS in status screen.

Establishing the Ethernet connection

The profile shown in the display (profile 1 in this example) is used for the loop.

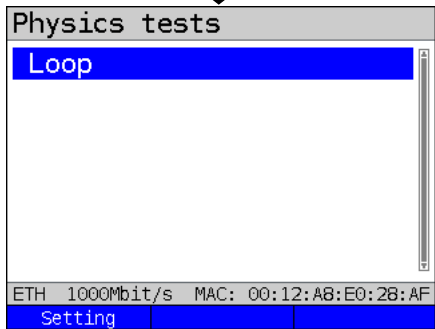
**<Start>** Activates Ethernet.



**<Info>** Displays Ethernet connection parameters.

**<Test>** Displays the available tests.

**<Stop>** Stops Ethernet connection.



**<Setting>** Changes loop parameters, see page 108.

Continued on  
next page





Loop	
Duration:	0:01:14
Looped:	807025
Looped in 1s:	2143
Loop rate:	41.568 Mb/s
ETH 1000Mbit/s MAC: 00:12:A8:E0:28:AF	
Status	



Loop	
Loop stopped	
Duration:	0:01:23
Looped:	228083
avg.:	5940/s
ETH 1000Mbit/s MAC: 00:12:A8:E0:28:AF	
Status	



The loop is started:

<b>Duration</b>	Current duration of test
<b>Looped</b>	Number of packets looped so far
<b>Looped in 1s</b>	Number of packets looped in the current second
<b>Loop rate</b>	Displays the current data rate per second.
<b>MAC address</b>	Own MAC address of looping device (e.g. for entry in the traffic generator).
<b>&lt;Status&gt;</b>	Displays status screen without ending the test.
<b>Duration</b>	Overall duration of test.
<b>Looped</b>	Number of looped packets.
<b>avg.</b>	Number of looped packets per second.
<b>&lt;Status&gt;</b>	Display of status screen.

### Saving the results

You can save the results for the loop test in the same way as for VDSL, see page 65.

## 13 ATM tests

The following ATM tests can only be performed on an ADSL interface. Other interfaces such as VDSL or Ethernet are not based on ATM.

### 13.1 VPI/VCI scan

In VPI/VCI scan, ARGUS checks which VPI/VCI combinations are active on the test access. ARGUS transmits a test packet for all possible VPI/VCI and waits for a response packet.

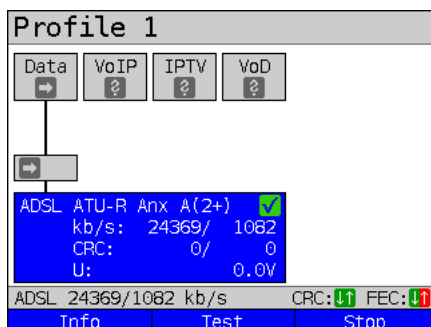
The following parameters must be saved in the profile for the VPI/VCI scan (when the xDSL connection is already established, the connection parameters, e.g. ADSL mode and target value, are locked).

#### Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
<b>Test parameters:</b>	
<b>VPI/VCI scan:</b>	
<b>VPI</b>	Virtual path identifier: VPI range that the ARGUS VPI/VCI scan tests. Range: 0 to 255 Default: <b>0 to 8</b>
<b>VCI</b>	Virtual channel identifier: VCI range that the ARGUS VPI/VCI scan tests. Range: 32 to 65535 Default: <b>32 to 48</b>
<b>Number of scans</b>	Number of scans. Range: 0 to 99 Default: <b>2</b>
<b>Timeout</b>	Maximum wait time for the response from the ATM network node to the test packet sent by ARGUS. Range: 0.1 - 9.9 seconds Default: <b>0.5 seconds</b>

## Start VPI/VCI scan



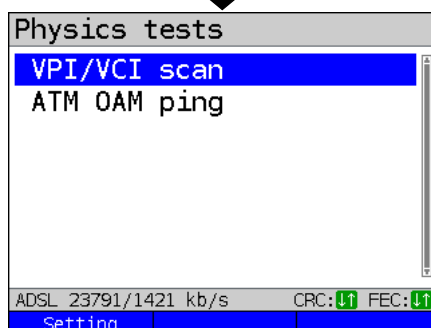
ARGUS in the status screen.

The ADSL ATU-R example shown in this example is active.

**<Info>** Displays ADSL connection parameters.

**<Test>** Displays the available tests.

**<Stop>** Stops the ADSL connection.

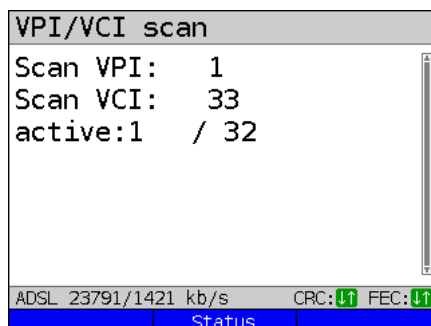


**<Setting>** ARGUS displays the test parameters for the VPI/VCI scan, see page 114.

## Initialisation

The VPI/VCI scan starts automatically.

## VPI/VCI scan



ARGUS displays the VPI/VCI combination currently being tested and the most recently detected active VPI/VCI combination (in this example: 1/32).

**<Status>** Displays status screen without ending the test; see above.



Cancels test.

### VPI/VCI scan result

```

VPI/VCI scan
Active
VPI      1      VCI      32
ADSL 23791/1421 kb/s  CRC: 0x0000 FEC: 0x0000

```

When the VPI/VCI is finished, ARGUS displays the VPI/VCI combinations active on the test connection.

**<Status>** Display of status screen.

**<New>** Start new VPI/VCI scan.



Exits results.

Save result?

For saving results, see IP ping page 125.

## 13.2 ATM-OAM ping

With an ATM-OAM ping, ARGUS checks the availability of individual ATM nodes or the availability of an ATM partial network. OAM stands for Operation, Administration and Maintenance and is used to monitor ATM data transmission.

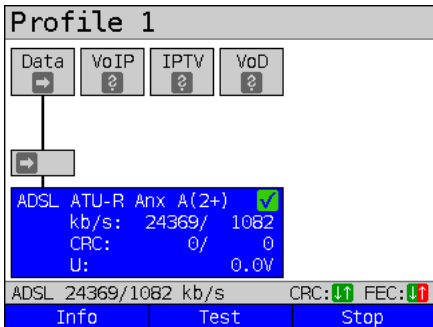
The following parameters must be saved in the profile for the ATM-OAM ping (when the ADSL connection is already established, the connection parameters, e.g. ADSL mode and target value, are locked):

### Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
<b>Test parameters:</b>	
<b>ATM-OAM ping</b>	
<b>VPI/VCI</b>	Entry of the VPI and VCI for the ATM-OAM ping. Range: VPI: 0 to 255, VCI: 32 to 65535 Default: <b>VPI: 1, VCI: 32</b>
<b>Number of pings</b>	Number of test packets sent by ARGUS. When 0 is set ARGUS sends continuously until the ATM-OAM ping is halted manually. Range: 1 to 99999 Default: <b>3</b>
<b>Timeout</b>	Maximum wait time for the response from the ATM network node to the test packet sent by ARGUS. Range: 0.1 - 9.9 seconds Default: <b>1 second</b>
<b>OAM cell type</b>	F5 loopback segm.: the first ATM node of the virtual channel responds to the loopback cell. F5 loopback etc: the end point of the virtual channel responds to the loopback cell. Default: <b>F5 loopback etc</b>

Start ATM-OAM ping



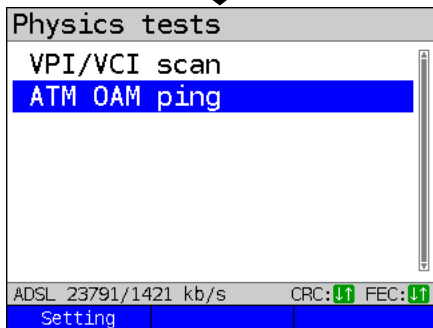
ARGUS in the status screen.

The ADSL ATU-R example set in this example is active.

**<Info>** Displays ADSL connection parameters.

**<Test>** Displays the available tests.

**<Stop>** Stops the ADSL connection.

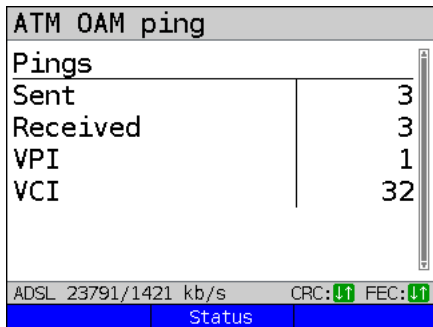


**<Setting>** ARGUS displays the test parameters for the ATM-OAM ping, see page 117.

The ATM-OAM ping starts automatically.


Initialisation

ATM-OAM ping



ARGUS displays the current number of sent test packets, the current number of response packets and the VPI/VCI on which the ping was executed.

**<Status>** Displays status screen without ending the test; see above.

 Cancels test.

## ATM-OAM ping result

ATM OAM ping	
Pings	
Sent	30
Received	30
Lost	0
ADSL 23791/1421 kb/s CRC:  FEC:	
Status New	



ATM OAM ping	
Times [ms]	
Min	25.0
Max	27.0
Avg	25.0
ADSL 23791/1421 kb/s CRC:  FEC:	
Status New	



Save result?

At the end of the ATM-OAM ping, ARGUS automatically displays the result; for the setting "infinite" the test must be cancelled manually.

- Number of packets sent
- Number of packets received
- Number of packets lost
- Minimum packet response time
- Maximum packet response time
- Average packet response time

<Status> Display of status screen.

<New> Start new ATM-OAM ping.

For saving results, see IP ping page 125.

14 IP tests

14.1 IP ping

In IP ping, ARGUS tests whether a connection exists via Ethernet or xDSL using a DSLAM and whether the ATM/IP network to the internet service provider (ISP) or another computer or server address is possible. ARGUS sends a test packet to a specified IP address (remote station) and waits for a response packet. On the basis of the received response packet, is it possible to draw conclusions as to the availability and delay of the ATM/IP network. It is also possible to measure the maximum data packet size of the path.

The IP ping uses the following parameters:

Protocol-independent parameters

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
<b>Test parameters:</b>	
<b>IP ping:</b>	
<b>IP address</b>	Address of remote station. ARGUS can store up to 10 IP addresses. The stored IP addresses are available in all profiles.

IP address 1/10

•www.argus.info

ipv6.argus.info

0. 0. 0. 0

0. 0. 0. 0

0. 0. 0. 0

0. 0. 0. 0

0. 0. 0. 0

VDSL 80000/15996 kb/s CRC: FEC:

Edit

• as name, IPv4 or IPv6 number

Continued on next page

ARGUS displays the ten available slots for IP addresses. Mark the line with the IP address you wish to edit using the cursor keys (in this example the first slot is marked (1/10)).

<Edit> Edits the selected IP address.

The address can be saved in the form of an IPv4 number, IPv6 number or a name.  
Default: **www.argus.info**



IP address as IPv4 number

**IPv4 address:**

192.168.0.1

(min=0, max=255)

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

Delete

IP address as IPv6 number

**IPv6 address:**

0000:0000:0000:0000

0000:0000:0000:0000

(\*1=A, ..., \*6=F)

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

Delete



You can use square brackets to include port information with IPv6 addresses in "IP address as name".

Enter the IPv4 or IPv6 address as a number. The editable area is highlighted in blue. Enter the address using the number keys.

**<Delete>** Deletes the place in front of the cursor.



to



When entering an IPv6 address, the letters A-F are available using these key combinations.



Adopts the marked IP address as the default.

Toggle entry using the softkey (right softkey changes the meaning when pressed). Enters the address as name, see user name page 92.

**<Ab>AB>** Entry begins with upper-case letters and continues in lower-case.

**<AB>12>** Entry of upper-case letters.

**<12>ab>** Numerical entry.

**<ab>AB>** Entry of lower-case letters.



or



Entry of special characters, e.g. @, /, -, . or \_; ~, +, ...



Moves the cursor in the display line

<b>Number of pings</b>	Enter the number of pings that ARGUS sends to the IP address. When 0 is set ARGUS sends continuously until the test is cancelled manually. Range: 1 to 99999 Default: <b>10</b>
<b>Pause</b>	Defines a pause between two test packets. Range: 0.1 - 9.9 seconds Default: <b>1 second</b>
<b>Packet size</b>	Sets the size of the test packet. You can determine the maximum packet size and the response time as as function of size by varying the packet size. Range: 36 to 55,555 bytes Default: <b>84 bytes</b>

Fragmentation	Sets the fragmentation Default: <b>on</b>
	<b>on</b> Test packets may be fragmented into multiple packets depending on the network (or router).
	<b>off</b> Fragmentation prohibited, i.e. the test packets may be rejected by the network (or routers) (ARGUS does not receive a response packet).
	<b>auto</b> ARGUS determines the maximum packet size of the path to the destination address (path MTU) and fragments the test packets so that the packets are transmitted with minimum delay (no fragmentation by the network/router necessary).

Starting IP ping (example access mode VTU-R, already active):

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a  
kb/s: 80000/ 15996  
CRC: 0/ 0  
U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

EditStart

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a  
kb/s: 80000/ 15996  
CRC: 0/ 1  
U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

InfoTestStop

Establishing the service

The profile shown in the display (profile 1 in this example) is used for the IP ping.

<Edit> A virtual line is allocated to the service Data.

If no xDSL or Ethernet connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

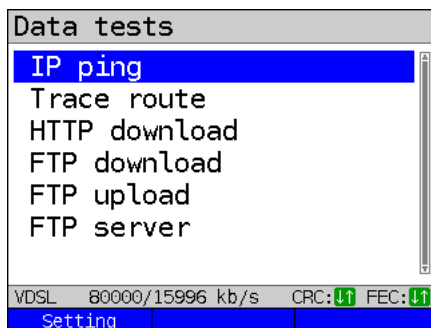
The service Data and the VDSL connection are active.

<Info> Duration of activation.

<Test> Opens test selection.

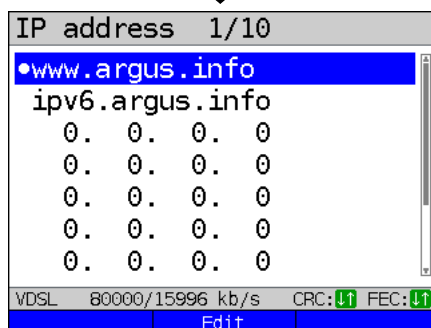
<Stop> Deactivates the service.

Continued on next page



e.g. select IP ping

**<Setting>** Changes IP ping parameters, see page 120.



ARGUS displays the addresses stored in the protocol.



Select the address for the ping; the default is indicated with ●.

**<Edit>** Edits the address, see page 120.

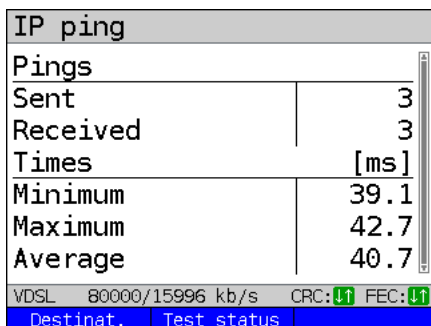


In this example a ping test is conducted with IP version IPv4. Use with IPv6 is analogous.

The IP ping starts automatically.

## Initialisation

### IP ping



Display during the IP ping test:

- Number of test packets sent
- Number of response packets
- Minimum time in ms
- Maximum time in ms
- Average time in ms

**<Destination address>** Display of URL and IP address.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.



**Cancels test**  
ARGUS displays the test results acquired up to this point and offers you the option of saving them (automatic prompt); see page 125.

IP ping result


IP ping	
Pings	
Sent	10
Received	10
Repeated	0
Checksum error	0
Error	0
VDSL 80000/15996 kb/s CRC: <span>U↑</span> FEC: <span>U↑</span>	
Destinat.	Test status New

ARGUS displays the results when the test is finished:

- Number of packets sent
- Number of packets received
- Number of packets repeated
- Checksum errors
- Number of packets received with error
- Minimum packet response time in ms
- Maximum packet response time in ms
- Average packet response time in ms

IP ping	
Times	[ms]
Minimum	39.1
Maximum	68.9
Average	43.1
VDSL 80000/15996 kb/s CRC: <span>U↑</span> FEC: <span>U↑</span>	
Destinat.	Test status New

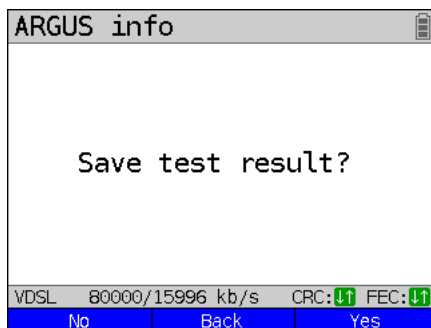
- <Desti-nation address> Displays the URL and the IP address.
- <Test status> Displays test status without ending the test or starting a new test, see page 204.
- <New> Starts a new IP ping test.

Test status	
IP ping 	
Sent:	10
Rec.:	10
Avg.:	46 ms
Max:	56 ms
Data <span>✓</span>	
↓	0 kb/s <input type="text"/> %
↑	0 kb/s <input type="text"/> %
CRC:	0/ 0
FEC:	0/ 0
VDSL 80000/16000 kb/s CRC: <span>U↑</span> FEC: <span>U↑</span>	
New	Start

Display of test status:  
You can observe the running test or start a new test here, see page 204.

- <New> Selects a new single test.
- <Start> Starts a new IP ping test.

2x  Continued on next page

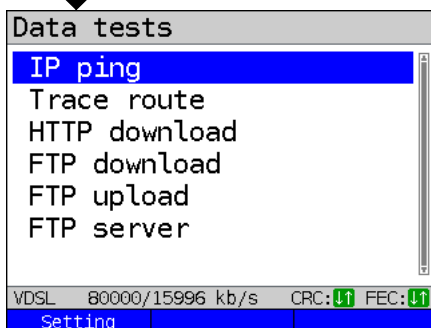


**<Yes>** ARGUS saves the result of the IP ping test to the first free storage slot in internal memory (see page 338).

**<Back>** ARGUS returns to the test result without saving results.

**<No>** ARGUS returns to the last selection menu without saving results.

Sends trace file to PC, see page 96



A new test can be started as needed. The xDSL link and the service are still connected (the connection can be disconnected in the status screen with **<Stop>**).



### Error messages in IP ping

ARGUS displays an error message as soon as an error occurs.

**<Test status>** Display of status screen.

For a description of error messages, see the Appendix, page 372 ff.

## 14.2 Traceroute

In IP traceroute, ARGUS sends test packets and displays all hops and their response times on the way to the destination address. This data enables precise localisation of possible delays in the network.

The following parameters must be saved in the profile for the IP traceroute:

### Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
<b>Test parameters:</b>	
<b>Traceroute:</b>	
<b>IP address</b>	The IP address of a destination node can be entered as either an IP number or a name (URL), see IP ping/IP address for instructions, page 121. Default: <b><i>www.argus.info</i></b>
<b>Maximum hops</b>	Maximum number of hops over which the path to the destination address node is tracked. Range: 1 to 25 Default: <b>25</b>
<b>Probes</b>	Number of attempts to address a network node. Range: 1 to 10 Default: <b>3</b>
<b>Timeout</b>	Maximum wait time for the response of a network node. Range: 0.05 - 9.9 seconds Default: <b>3 seconds</b>

## Starting traceroute

(Example: access mode VTU-R, already active)

Connecting the service.

The profile shown in the display (profile 1 in this example) is used for the traceroute test.

**<Edit>** A virtual line is assigned to the service Data.

If no xDSL or Ethernet connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

The service Data and the VDSL connection are active.

**<Info>** Duration of activation.

**<Test>** Opens test selection.

**<Stop>** Deactivates the service.



e.g. select Trace route

**<Setting>** Changes traceroute parameters, see page 126.

Continued on next page

IP address 1/10

• **www.argus.info**

ipv6.argus.info

0.	0.	0.	0
0.	0.	0.	0
0.	0.	0.	0
0.	0.	0.	0
0.	0.	0.	0

VDSL 80000/15996 kb/s CRC: U1 FEC: U1

Edit



## Initialisation

### Traceroute

Trace route

Hop	3- 3
Time	0.015s
IP	192.168.111. 1
Name	fritz.box

VDSL 80000/15996 kb/s CRC: U1 FEC: U1

Destinat. Test status



Test status

**Tracer.** ✓

Hop: 6- 1  
Time: 0.092 s  
bi-eal-i.BI.  
DE.N

**Data** ✓

↓	9 kb/s	<input type="text"/>	%
↑	8 kb/s	<input type="text"/>	%
CRC:	0/	0	
FEC:	0/	2	

VDSL 80000/16000 kb/s CRC: U1 FEC: U1

New Stop

ARGUS displays the IP addresses or URLs saved in the protocol.



Select the address for the traceroute test; the default is indicated with ●.

<Edit>

Edits the address, see page 120 for instructions.



In this example a traceroute test is conducted with IP version IPv4. Use with IPv6 is analogous.

The traceroute test starts automatically.

Display during the traceroute test:

- Current hop and attempt ("probe"), in this example:  
3 - 3: i.e. 3 hops and 3rd attempt.
- Response time of hop for current attempt (0.015 seconds).
- IP address of current hop, in this example 192.168.111.1 with name where applicable.

<Destinat.>

Display of URL and IP address.

<Test status>

Displays test status without ending the test or starting a new test, see page 204.



Cancels test

Displays the test results up to this point, with possibility of saving (automatic prompt).

Display of test status:

You can observe the running test or start a new test here, see page 204.

<New>

Selects a new single test.

<Stop>

Stops the traceroute test.



## Traceroute result

Trace route			
1	192.168. 15. 99	0.014s	
2	192.168. 4.253	0.014s	
3	192.168.111. 1	0.016s	
4	217. 5. 98. 14	0.033s	
5	217.237.152. 70	0.033s	
6	62.154. 74. 38	0.039s	
7	62.154. 74. 90	0.037s	
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑			
Destinat.	Test status	Detail	

Display after end of traceroute:

- All hops and their response times are displayed.

<Detail> Displays the name of the IP address of the hop (if possible). The details of the hop at the top of the list are displayed (in this example hop 1).

Trace route	
Hop	1
Time	0.014s
IP	192.168. 15. 99
Name	---
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑	

<↓> Switches to next hop, in this example hop 2.

<↑> Switches to previous hop.



Exits results.

## Save result?

Saves the traceroute results (see also IP ping, page 125).  
Sends trace file to PC, see page 96.

### 14.3 HTTP download

In HTTP download, ARGUS downloads the data of a website or file. ARGUS displays the current "net download rate", the usable data of the IP packets, and following conclusion of HTTP download the average speed (for multiple download attempts).

The following parameters must be saved in the profile for the HTTP download:



It is not possible to obtain meaningful speed values for download tests with a duration of less than 10 seconds; therefore you should download as large a file as you can (depending on the access speed). If the duration of the test is less than 10 seconds, ARGUS does not display any data rate or time.

#### Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32.

Setting	Description
<b>Test parameters:</b>	
<b>HTTP download:</b>	
<b>Server profile:</b>	You can create up to 15 user-defined server profiles that can be used for HTTP and FTP download and FTP upload. The profiles contain all parameters for HTTP and FTP download and FTP upload.
<b>Server address</b>	Entry of server address or URL of the server from which ARGUS downloads the file. For upload test: entry of upload destination address (server address) to which ARGUS sends the file. See page 120 for information on using the softkeys.
<b>Download file name</b>	Name of the file with the data that ARGUS downloads for tests (HTTP download and FTP download). Observe the notes for www alias addresses! (see page 131). If a specific port is required please enter it into the server address. See page 120 for information on using the softkeys.
<b>Upload file name</b>	Entry of the file name under which the file sent to the server in the FTP upload test is stored. Default: <b>file</b>
<b>Upload file size</b>	Sets the size of the file that ARGUS sends in FTP upload. Range: 0 to 1000 Mbyte Default: <b>100 MByte</b>

<b>User name</b>	Name of the user for the (FTTP, HTTP) file server. See page 120 for instructions
<b>Password</b>	Password entry for the (FTTP, HTTP) file server (max. 40 characters). See page 120 for instructions
<b>Number</b>	Number of times ARGUS downloads the file in the download test. For upload test: number of times ARGUS uploads the file in the upload test. "Zero" means infinite: the test continues until stopped manually. Range: 0 to 9,999 bytes (0=infinite) Default: <b>3</b>
<b>No. parall. down.</b>	Number of packets into which the requested download is fragmented and simultaneously downloaded (see page 131). Range: 1 to 10 Default: <b>3</b>
<b>Profile name</b>	Enters a name for the profile.



If a www alias address is entered as the "Source/destination address", ARGUS downloads "only" the HTML page in HTML download. ARGUS does not evaluate the HTML code, so that any link to a "real" www address is not considered. In this case, ARGUS does not indicate an error, as the HTML page of the specified "Source/destination address" was loaded without error.



When entering the "Source" address (server address and download file name), be sure to observe the correct capitalisation; otherwise ARGUS will return error 301 (Moved Permanently) or 404 (Not Found).



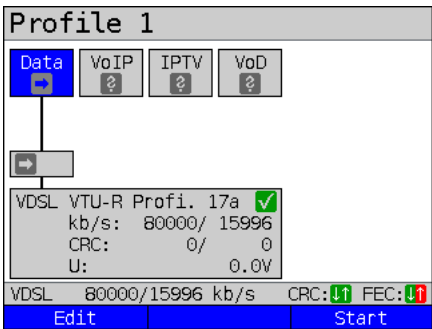
When requesting multiple download components, ARGUS may reduce the number of downloads depending on the server support, which can cause deviations from the set parameters. This can occur e.g. as soon as the size of the requested file is unknown.



If the download file name exceeds the maximum permissible length, you can work around this limit by fragmenting the address and additionally using the "Server" field.

The server name may be up to 80 characters long, the file name 60 characters long.

Starting HTTP download (example: access mode VTU-R, already active)

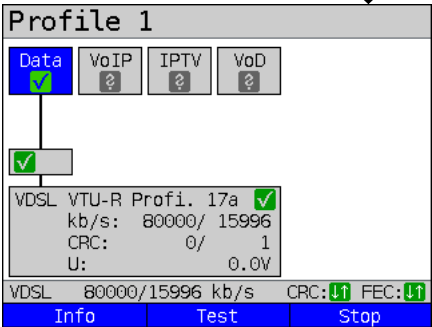


Connecting the service.

The profile shown in the display (profile 1 in this example) is used for HTTP download.

**<Edit>** A virtual line is added to the service Data.

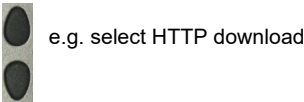
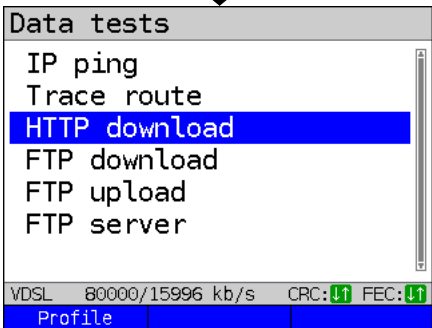
If no connection is established, ARGUS automatically connects at this point using the default profile (see page 46).



**<Info>** Duration of activation.

**<Test>** Opens test selection.

**<Stop>** Deactivates the service.



e.g. select HTTP download

**<Profile>** Displays the available HTTP download profiles.

Continued on  
next page



HTTP-DL profiles	
•	Server profile 1
	Server profile 2
	Server profile 3
	Server profile 4
	Server profile 5
	Server profile 6
	Server profile 7

VDSL 80000/15996 kb/s CRC: FEC:

**Edit**



Initialisation
----------------

### HTTP download

HTTP download	
<b>Progress</b>	
Test	1/3
Current	006 %
<b>Bitrate</b>	
Current	72.106 Mb/s

VDSL 80000/15996 kb/s CRC: FEC:

**Test status**



HTTP download	
<b>File size</b>	
Current	164.673 MB
Overall	953.674 MB
<b>Time</b>	
elapsed	0:00:19
remaining	0:01:31

VDSL 80000/15996 kb/s CRC: FEC:

**Test status**



Mark the server profile:  
(default is indicated with ●).

The server profiles are also used for FTP download and FTP upload.

**<edit>** Edits the marked profile, see page 130 for changes to the individual settings.

HTTP download starts automatically.

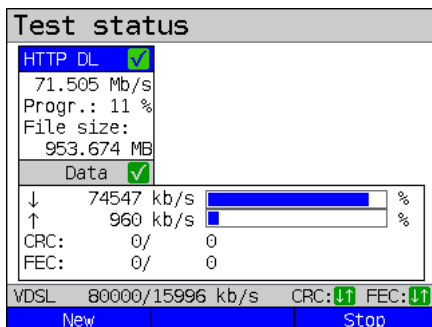
Display during HTTP download:

- Current download/total number of downloads, in this example the first download attempt out of three (1/3) is displayed.
- Data already transferred (in this example 6 %).
- Current net average download rate (in this example 72,106 Mbit/s).
- Bytes transferred so far (in this example 164,673 MB).
- Size of file to be downloaded (in this example 953,674 MB).
- Transfer time so far in h:min:s.
- Remaining transfer time in h:min:s.
- Number of parallel downloads.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.



Cancels test.



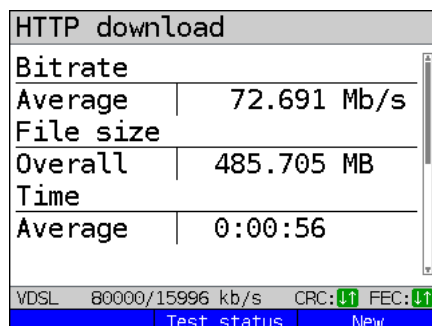
Display of test status:

You can observe the running test or start a new test here, see page 204.

<New> Selects a new single test.

<Stop> Stops HTTP download test.

### HTTP download result



<Test status> Displays test status without ending the test or starting a new test, see page 204.

<New> Starts a new HTTP download.

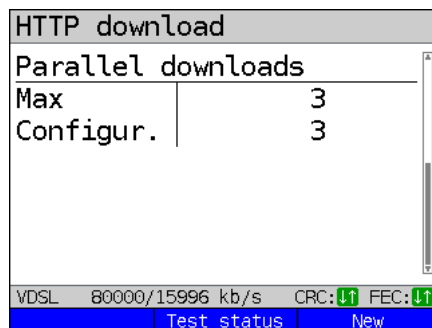
Display of results:

- Calculated average speed of all downloads (in this example 72,691 Mbit/s).
- Transferred file size (in this example 485,750 MB).
- Average time required for a download in h:min:s.
- Maximum parallel downloads.
- Configured parallel downloads.

Exits results.


Saves HTTP download result, see page 124.

Sends trace file to PC, see page 96



14.4 FTP download

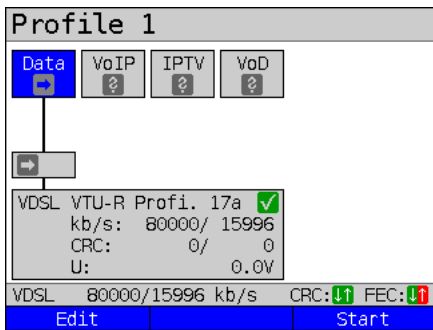
In FTP download, ARGUS downloads data in the form of a file. ARGUS displays the current net download rate, the usable data of the IP packets, and following conclusion of test the average speed (for multiple download attempts).

 No meaningful evaluations are possible for download tests with a duration of less than 10 seconds. Therefore, the download file should be as large as possible (depending on the access speed). If the duration of the test is less than 10 seconds, ARGUS does not display any data rate or time.

Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32. See page 130 HTTP download for an explanation of the test parameters.

Starting FTP download (example: access mode VTU-R, already active)

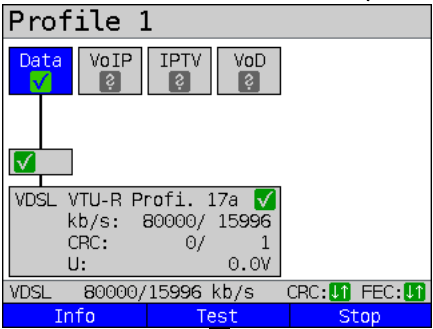


Connecting the service.

The profile shown in the display (profile 1 in this example) is used for FTP download.

<Edit> A virtual line is added to the service Data.

If no connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

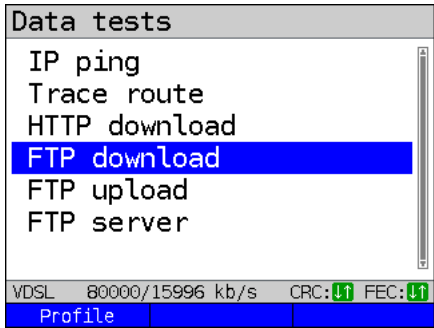


<Info> Duration of activation.

<Test> Opens test selection.

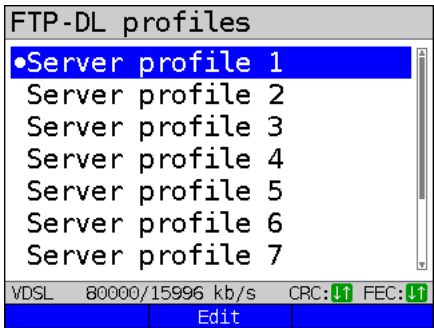
<Stop> Deactivates the service.

Continued on  
next page



e.g. FTP download

**<Profile>** Displays the available FTP download profiles.



Mark the server profile (default is indicated with ●).

The server profiles are also used for HTTP download and FTP upload.

**<Edit>** Edits the marked profile, see page 130 for changes to the individual parameters.



FTP download starts automatically.



## FTP download

FTP download	
<b>Progress</b>	
Test	1/3
Current	005 %
<b>Bitrate</b>	
Current	71.171 Mb/s
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status	



FTP download	
<b>File size</b>	
Current	199.327 MB
Overall	952.153 MB
<b>Time</b>	
elapsed	0:00:23
remaining	0:01:26
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status	



Test status	
FTP DL	
71.365 Mb/s	
Progr.: 11 %	
File size:	
952.153 MB	
Data	
↓ 71959 kb/s	%
↑ 873 kb/s	%
CRC: 0/ 0	
FEC: 0/ 1	
VDSL 80000/15996 kb/s CRC:  FEC:	
New	Stop

Display during FTP download:

- Current download/total number of downloads, in this example the first download out of three (1/3) is displayed.
- Data transferred so far (in this example 5 %).
- Current net average download rate (in this example 71,171 Mbit/s).
- Bytes transferred so far (in this example 199,327 MB).
- Total download file size (in this example 952,153 MB).
- Duration of test so far (in h:min:s).
- Remaining transfer time.
- Number of parallel downloads.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.



Cancels test.

Display of test status:

You can observe the running test or start a new test here, see page 204.

**<New>** Selects a new single test.

**<Stop>** Stops FTP download test.

## FTP download result

FTP download	
Bitrate	
Average	72.655 Mb/s
File size	
Overall	754.525 MB
Time	
Average	0:01:27
VDSL 80000/15997 kb/s CRC: <span style="color: green;">↑↑</span> FEC: <span style="color: green;">↑↑</span>	
<div>Test status</div> <div>New</div>	

- <Test status> Display of test status.
- <New> Starts a new FTP download.

Display after end of FTP download:

- Calculated average speed of all downloads (in this example 72,655 Mbit/s).
- Transferred file size (in this example 754,525 MB).
- Average time required for a download in h:min:s.
- Maximum parallel downloads.
- Configured parallel downloads.

FTP download	
Parallel downloads	
Max	3
Configur.	3
VDSL 80000/15997 kb/s CRC: <span style="color: green;">↑↑</span> FEC: <span style="color: green;">↑↑</span>	
<div>Test status</div> <div>New</div>	


Exits results.

Save result?

For saving results, see IP ping page 124.  
Sends trace file to PC, see page 96.

14.5 FTP upload

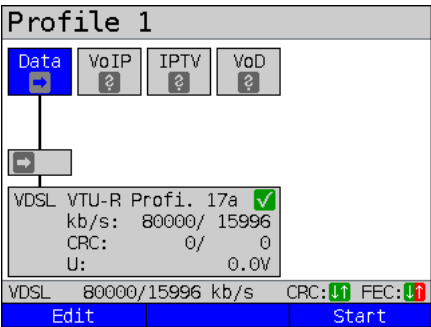
In FTP upload, ARGUS sends the data of a file to a server. Among other information, ARGUS displays the current net upload rate, the usable data of the IP packets, and following conclusion of test the average net speed (for multiple download attempts).

 No meaningful evaluations are possible for upload tests with a duration of less than 10 seconds. Therefore, the upload file should be as large as possible (depending on the access speed). If the duration of the test is less than 10 seconds, ARGUS does not display any data rate or time.

Protocol-independent parameters:

The opening of test parameters is described in the chapter "Configuring accesses", see page 32. See page 130 HTTP download for an explanation of the test parameters.

Starting FTP upload (example: access mode VTU-R, already active)

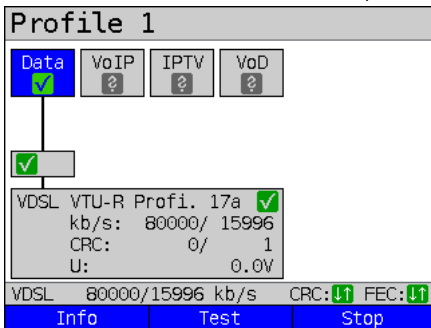


Connecting the service.

The profile shown in the display (in this example profile 1) is used for FTP upload.

**<Edit>** A virtual line is assigned to the service Data.

If no connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

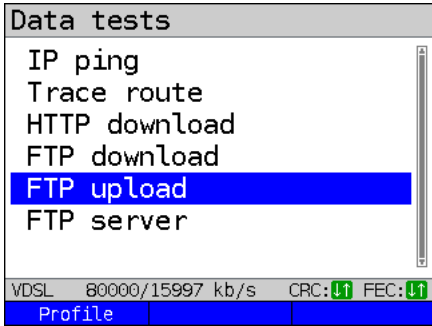


**<Info>** Duration of activation.

**<Test>** Opens test selection.

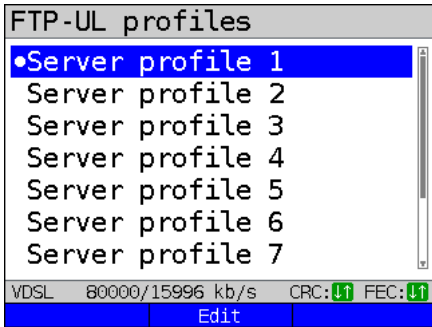
**<Stop>** Deactivates the service.

Continued on  
next page



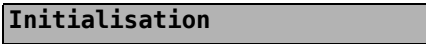
e.g. FTP upload

**<Profile>** Displays the available FTP upload profiles.



Mark the server profile (default is indicated with ●).

The server profiles are also used for HTTP download and FTP download.



**<Edit>** Edits the marked profile, see page 130 for changes to the individual parameters.

FTP upload starts automatically.

## FTP upload

FTP upload	
Progress	
Test	1/3
Current	011 %
Bitrate	
Current	14.899 Mb/s
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status	



FTP upload	
File size	
Current	30.344 MB
Overall	95.367 MB
Time	
elapsed	0:00:17
remaining	0:00:36
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status	



Test status	
FTP UL	
14.950 Mb/s	
Progr.: 13 %	
File size:	
95.367 MB	
Data	
↓	281 kb/s
↑	15769 kb/s
CRC:	0/ 0
FEC:	0/ 1
VDSL 80000/15996 kb/s CRC:  FEC:	
New	Stop

Display during FTP upload:

- Current upload/total number of uploads, in this example the first upload out of three (1/3) is displayed.
- Data already transferred (in this example 11 %).
- Current net upload rate (in this example 14,899 Mbit/s).
- Bytes transferred so far (in this example 30,344 MB).
- Overall file size (in this example 90,367 MB).
- Current upload time in h:min:s.
- Remaining transfer time.

<Test status> Displays test status without ending the test or starting a new test, see page 204.



Cancels test.

Display of test status:

You can observe the running test or start a new test here, see page 204.

<New> Selects a new single test.

<Stop> Stops FTP upload test.

**FTP upload result**

FTP upload	
Bitrate	
Average	14.994 Mb/s
File size	
Overall	95.367 MB
Time	
Average	0:00:30

VDSL	80000/15997 kb/s	CRC:	FEC:
Test status		New	

Display of results

<Test status>      Display of test status.

<New>              Starts a new FTP upload test.

**Save result?**

For information on saving results, see IP ping page 124.

Sends trace file to PC, see page 96.

14.6 FTP server

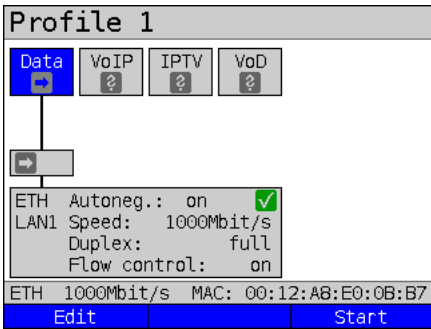
In FTP server mode, ARGUS behaves like a server for FTP requests. In this mode, ARGUS serves FTP download and FTP upload requests. These requests can be sent from a second terminal device (e.g. another ARGUS unit) via an xDSL or Ethernet access. This makes it possible to test end-to-end throughput and determine the maximum possible data rate for this access.

In the following, the throughput test is explained using the Ethernet interface as an example. This example uses two ARGUS units. One serves as the FTP server while another requests the FTP download.

ARGUS 1 - FTP server

No settings need to be configured on the ARGUS used as the FTP server. The FTP server test just needs to be started on the selected interface.

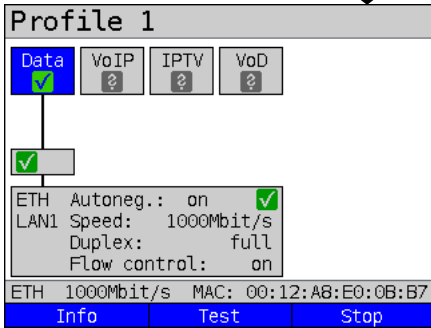
Starting FTP server (example: Ethernet, already active)



Connecting the service.

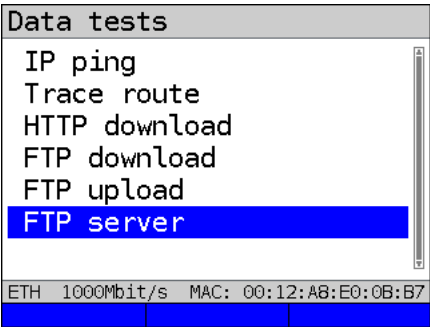
The profile shown in the display (profile 1 in this example) is used for the FTP server.

<Edit> A virtual line is assigned to the service Data.

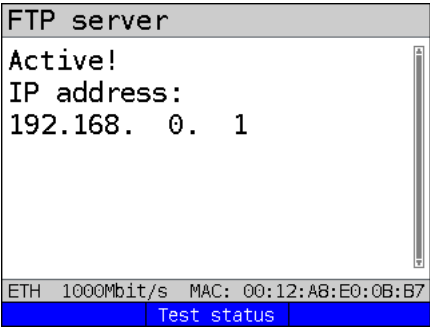


If no connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

Continued on next page



e.g. FTP server



ARGUS uses the IP address configured under "own IP address" as the destination address (server) for the second ARGUS unit.

<Test  
status>

Displays test status without ending the test or starting a new test, see page 204.

ARGUS 1 now waits for an FTP request from a second terminal device (in this example the second) ARGUS).

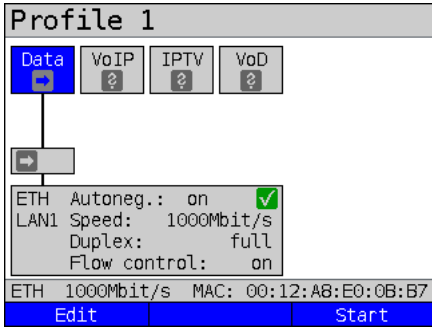
The IP mode in this example is "static", the default IP netmask configuration is used.



ARGUS 2 - FTP down/upload

In principle, you can adopt the same configuration for the ARGUS unit sending the FTP request (FTP download in this example) as in an FTP download test.  
The netmask and IP address (IP mode: static) should match the settings on ARGUS 1.

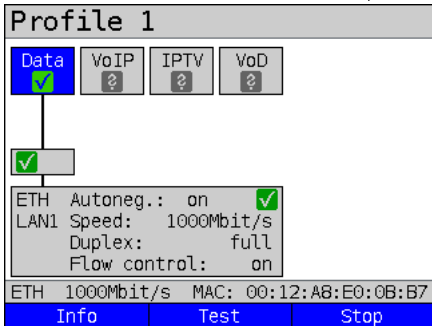
Starting FTP download:



Connecting the service.

The profile shown in the display (profile 1 in this example) is used for the FTP server.

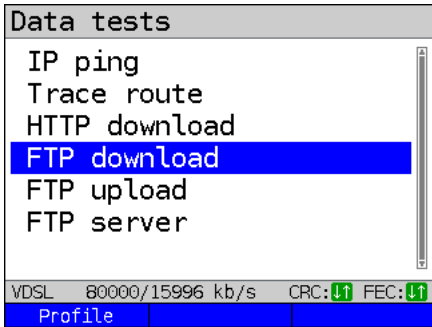
<Edit> A virtual line is assigned to the service Data.



If no connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

- <Info> Duration of activation.
- <Test> Opens test selection.
- <Stop> Deactivates the service.

Continued on  
next page

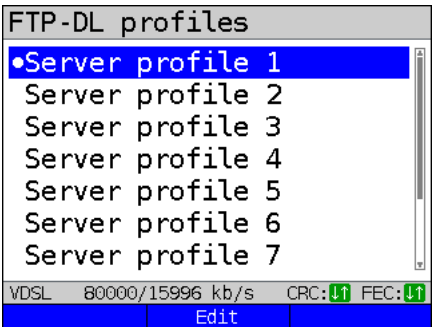


Test selection



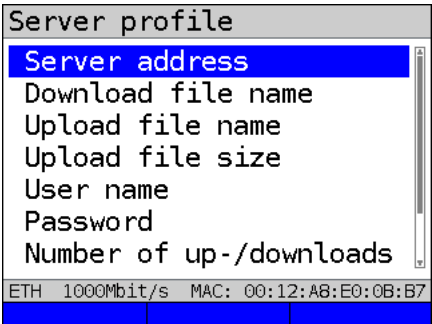
e.g. FTP download

<Profile> Edits FTP parameters, see page 130.



Mark the server profile (default is indicated with ●).

<Edit> Edits the marked profile, see page 130 for changes to the individual parameters.



See page 130 HTTP download for an explanation of the test parameters.



Continued on  
next page

Server address:	
192.168.4.156	
13/79 signs	
ETH 1000Mbit/s	MAC: 00:12:AB:E0:0B:B7
Delete	ab>Ab

Enter the address of ARGUS 1 in the server profile of ARGUS 2 as the server IP address, see page 144.

<Delete> Deletes the place in front of the cursor.

<12>AB> see page 92.



Download file name



File name:	
1000000000	
10/59 signs	
ETH 1000Mbit/s	MAC: 00:12:AB:E0:0B:B7
Delete	ab>Ab

In this case too the download file name is the size of file to be downloaded. The file size is specified in bytes.

Download file name: 1,000,000,000 results in a file size of: 1 GB.



No meaningful evaluations are possible for download tests with a duration of less than 10 seconds. Therefore, the upload file should be as large as possible (depending on the access speed). If the duration of the test is less than 10 seconds, ARGUS does not display any data rate or time.

## Server profile

FTP-DL profiles

- Server profile 1
- Server profile 2
- Server profile 3
- Server profile 4
- Server profile 5
- Server profile 6
- Server profile 7

VDSL 80000/15996 kb/s CRC: FEC:

**Edit**

**<Edit>** Edits the marked profile, see page 130 for changes to the individual parameters.

## Initialisation

FTP download starts automatically.

## FTP download

Display during FTP download:

FTP download

Progress

Test	1/3
Current	005 %

Bitrate

Current	71.171 Mb/s
---------	-------------

VDSL 80000/15997 kb/s CRC: FEC:

**Test status**

- Current download/total number of downloads, in this example the first download out of three (1/3) is displayed.
- Data already transferred (in this example 5 %).
- Current net average download rate (in this example 71,171 Mbit/s).
- Bytes transferred so far (in this example 199,327 MB).
- Total download file size (in this example 952,153 GB).
- Current upload time in h:min:s.
- Remaining transfer time.
- Number of parallel downloads.

**<Test status>** Displays the test status without ending the test.



Cancels test.

FTP download

File size

Current	199.327 MB
Overall	952.153 MB

Time

elapsed	0:00:23
remaining	0:01:26

VDSL 80000/15997 kb/s CRC: FEC:

**Test status**

**FTP download result**

FTP download	
<b>Bitrate</b>	
Average	72.655 Mb/s
<b>File size</b>	
Overall	754.525 MB
<b>Time</b>	
Average	0:01:27
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status New	

<Test status> Display of test status.

<New> Starts a new FTP download.

Display after end of FTP download:

- Calculated average speed of all downloads  
(in this example 72,655 Mbit/s).
- Transferred file size  
(in this example 754,525 MB).
- Average time required for a download in h:min:s.
- Maximum parallel downloads.
- Configured parallel downloads.



FTP download	
<b>Parallel downloads</b>	
Max	3
Configur.	3
VDSL 80000/15997 kb/s CRC:  FEC:	
Test status New	

Exits results display.



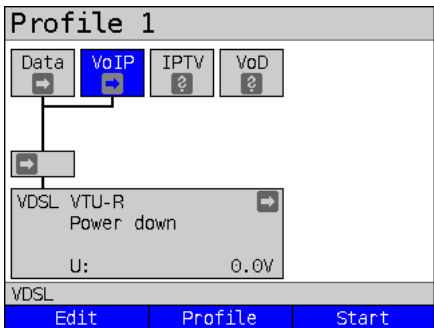
**Save result?**

For saving results, see IP ping page 124.  
Sends trace file to PC, see page 96.

15 VoIP tests

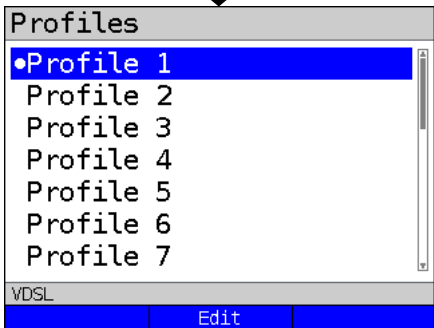
ARGUS operates as a VoIP terminal device with active acoustics, enabling voice links. Session Initiation Protocol (SIP) is available as a VoIP signalling protocol. Calls can be established both with and without registrar/proxy. ARGUS can be used to establish VoIP connections (DSL telephony) via xDSL and Ethernet. To assess voice quality, ARGUS determines and displays the MOS/R-factor and the RTP datastream. You can configure three VoIP "accounts" (profiles):

Protocol-independent parameters:



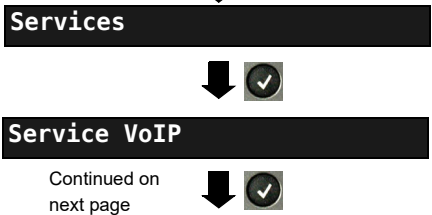
ARGUS in status screen.

- <Edit> A virtual line is assigned to the service VoIP.
- <Profile> See page 32 for profile settings.
- <Start> Starts the service.



Select the profile you wish to edit. The selected profile appears in the display in blue. The default profile is indicated with a ● in the display. ARGUS adopts the parameters from the default profiles for establishing the Ethernet or xDSL connection and conducting the VoIP test.

ARGUS uses the marked profile as the default profile and switches to the menu Settings.



**VoIP account****VoIP profile**

•VoIP profile 1  
VoIP profile 2  
VoIP profile 3

A total of three user-defined VoIP profiles are available.

VDSL

Edit

<Edit> Edits the VoIP profile.

Edits the marked profile.

**VoIP service**

SIP settings  
Phone settings  
STUN server  
MOS threshold  
Profile name

VDSL

Edit the marked  
parameters.







Setting	Description
<b>VoIP account settings:</b>	
<b>VoIP:</b>	You can create a total of three VoIP profiles. <Edit> Activates the profile you wish to edit.
<b>SIP</b>	User name      User name for registrar, see page 92 for instructions.
	Password      Password for the registrar, see page 92 for instructions.
	Authentication      Additional xTU-R password for legitimate authentication. See page 92 for instructions
	Caller ID      Optional entry of a user-definable text which then appears in the display of the called party in place of the caller's originating number. See page 92 for information on using the softkeys.
	Registrar Server      Use registrar: select yes or no If an internet telephony service provider (ITSP) is used (in this case you dial a normal telephone number), a registrar must be used as well. If a VoIP telephone is dialled directly, e.g. via the IP address or SIP URL, no registrar is needed. You can edit and use an IPv4 or IPv6 address as well as a name for the registrar server. The address is edited in the same way as for the IP ping test, see page 120. Default: <b>no</b>
	Outbound proxy/SBC      Use proxy (SBC = session border controller) Determines whether an outbound proxy is to be used. Default: <b>no</b>  Outbound proxy/SBC: address of proxy server. The outbound proxy/SBC is configured in the same way as for the IP ping test, see page 120.  Outbound proxy/SBC port: port of proxy server. Range: 0 to 65535 Default: <b>5060</b>



SIP trunking	Use trunking	SIP trunk makes it possible to manage multiple different numbers, each with its own extensions, using a single access account. Default: <b>no</b>
	CLIR	The setting CLIR (calling line identification restriction) can be used to suppress the originating caller ID. Default: <b>no</b>
	Own basic number	The trunk number is a telephone number with no extension. Default: <b>4923519070</b>
	Own extension (DDI)	DDI enables the desired access to be dialled directly. You can edit the extension using <Edit> (up to 4 characters). Default: <b>0</b>
SIP domain	Configuration of the domain name for the "from" field in the SIP message (when using an ITSP).	
Listen port	Port used for incoming SIP signalling. Range: 0 to 65535 Default: <b>5060</b>	
Remote port	Port used at the remote station: When a registrar is used (see "registrar server" setting on page 152), entry of the port number of the registrar/proxy server, otherwise entry of the port number at the remote station. Range: 0 to 65535 Default: <b>5060</b>	
User agent	ID string/terminal device type is transmitted to the called party. Default: <b>Argus162</b>	
Qualify	Determines whether the availability of the proxy service is to be continuously verified. Default: <b>no</b>	
Reg. expire	Determines the period of validity of registration with the registrar. Range: 10 - 6000 seconds Default: <b>3600 seconds</b>	

	Retry-after	Following a failed registration, the standard calls for a 100 second delay before attempting to register again (standard). When "ignore" is set, registration is repeated in increasing intervals (1 second several times, then 2 s, 4s, etc.). Default: <b>standard</b>
	Delete exist. registrar	The current registration is cancelled at the registrar. If this is set to "yes", exclusive registration of ARGUS at the registrar server. Otherwise inclusion in the list of existing registration. Default: <b>yes</b>
<b>Phone settings</b>	RTP port range	SIP signalling and RTP data are transmitted via different ports. The port range used can be adjusted for RTP, e.g. to match a router. Range: 0 to 65535 Default: Start: <b>10000</b> End: <b>20000</b>
	Silence detection	When this setting is "on", ARGUS does not transmit voice packets during pauses in speech. However, this can cause problems in port assignment behind a NAT router. When the setting "not used" is selected, the feature "silence detection" is not communicated to the remote station. However, it remains set. Default: <b>off</b>
	Jitter buffer	Determines whether the size of the jitter buffer is static or adaptive. Default: <b>static</b>  static:           Entry of a static jitter buffer size. Range: 20 to 200 ms nominal: <b>60 ms</b>  adaptive:       Entry of the minimum (min) and maximum (max) jitter buffer size and the initial value (init). Range: 20 to 600 ms Default: min: <b>60 ms</b> init: <b>60 ms</b> max: <b>120 ms</b>

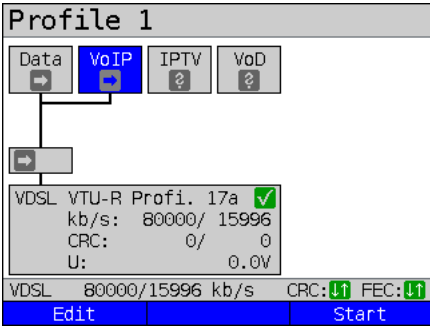
<b>Phone settings</b> (continued)	Codecs	<p>Prepares a list of the speech codecs to be used. For multiple codecs, the order determines the priority.</p> <p> Switches to softkey assignment.</p> <p>&lt;↓&gt; The selected codec is moved down one place in the list.</p> <p>&lt;↑&gt; The selected codec is moved up one place in the list.</p> <p>&lt;Insert&gt; A display with the available voice codecs opens. A voice codec marked with  in this selection menu is inserted in the voice codec list (via the voice codec marked in the list).</p> <p>&lt;Delete&gt; Deletes the marked codec from the list.</p> <p> Adopts the codec priorities.</p> <table><tr><td>Supported Codecs</td><td>G.729 A/B, G.726-40, G.726-32, G.726-24, G.726-16, G.722, G.711 A law, G.711 μ law, G.723.1</td></tr></table>	Supported Codecs	G.729 A/B, G.726-40, G.726-32, G.726-24, G.726-16, G.722, G.711 A law, G.711 μ law, G.723.1
	Supported Codecs	G.729 A/B, G.726-40, G.726-32, G.726-24, G.726-16, G.722, G.711 A law, G.711 μ law, G.723.1		
DTMF settings	<p>Dual-tone multi-frequency (DTMF) is a multifrequency dialling method.</p> <p>Mode: Sets DTMF mode</p> <p>You can choose between "Automatic", "SIP info", "RFC 2833" and "Inband".</p> <p>Default: <b>Automatic</b></p> <p>Duration: Sets the VoIP DTMF timer</p> <p>Range: 40 to 1000 ms.</p> <p>Up to 200 ms in steps of 10, up to 300 ms in steps of 20, up to 1000 ms in steps of 100.</p> <p>Default: <b>80 ms</b></p> <p> Increases or decreases the VoIP DTMF duration.</p>			

STUN server	Use STUN	Use STUN: select yes or no If a NAT router is located between ARGUS and the nearest remote station (gateway), STUN must be used so that ARGUS can determine under which IP address the remote station sees ARGUS. Default: <b>no</b>					
	STUN server	STUN server: address of a STUN server, which must be in the same network (on the same level) as the remote station.					
Rated/tre- shold value	MOS rates value	Entry of MOS setting: The mean opinion score (MOS) assesses the quality of voice data. The MOS quality scale ranges from 5 (excellent) to 1 (bad). On the basis of the set MOS value, ARGUS rates the current VoIP voice link as "OK" (current MOS value achieves MOS setting) or "FAIL". Range: 1.0 to 5.0 Default: <b>4.0</b>					
		value	5	4	3	2	1
		Voice quality	excellent	good	fair	poor	bad
		The MOS value here is stated as MOS <sub>CQE</sub> (conversational quality estimated). The use of a specific codec has a significant influence on this.					
	Jitter threshold	Determines the treshold for the jitter. Range: 0 to 200 ms Default: * ( <b>off</b> )					
	RTP loss threshold	Determines the treshold for the RTP loss treshold. Range: 0 to 100 % Default: * ( <b>off</b> )					
Profile name	Enter/modify name of edited VoIP profile.						

VoIP QoS (Quality of Service)		
<b>Layer 3 DiffServ</b>	Differentiated services: Classification/prioritisation of IP packets (L3)	
<b>RTP (ToS/DSCP)</b>	ToS	Type of service Field for setting the priority in the IP header of the usable data (RTP), see page 121 for further details. Range: 0 to 0xFF Default: <b>18</b>
	DSCP	Differentiated services codepoint Field for setting the priority in the DS field (6 bits) of the usable data (RTP), see page 121 for further details. Range: 0 to 0x3F Default: <b>00</b>
<b>SIP (ToS/DSCP)</b>	ToS	Type of service Field for setting the priority in the IP header of SIP data (signalling), see page 121 for further details. Range: 0 to 0xFF Default: <b>18</b>
	DCSP	Differentiated services codepoint Field for setting the priority in the DS field (6 bits) of the SIP data (signalling), see page 121 for further details. Range: 0 to 0x3F Default: <b>00</b>
<b>Layer 2 VLAN Prio</b>	The VLAN prioritisation on layer 2 is an extension of the Ethernet header.	
<b>RTP VLAN Prio</b>	VLAN prioritisation of usable data (RTP) Range: 0 to 7 Default: <b>0</b>	
<b>SIP VLAN Prio</b>	VLAN prioritisation of SIP data (signalling) Range: 0 to 7 Default: <b>0</b>	

15.1 Starting VoIP telephony

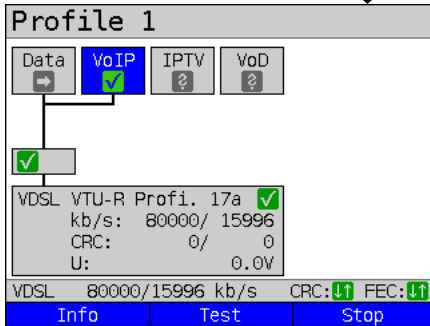
(Example: VDSL access, already active)



Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for VoIP telephony.

**<Edit>** Edits the default virtual line profile.

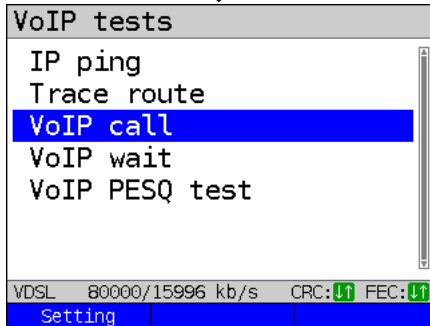



If no xDSL or Ethernet connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

**<Info>** Duration of activation, page 163.

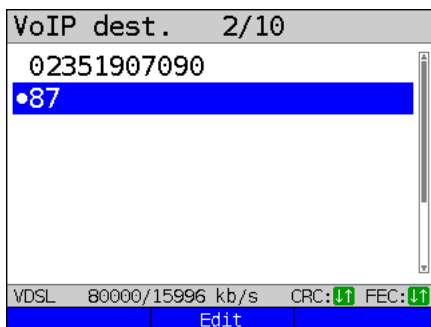
**<Test>** Opens test selection.

**<Stop>** Deactivates the service.



 e.g. select VoIP call

Continued on next page



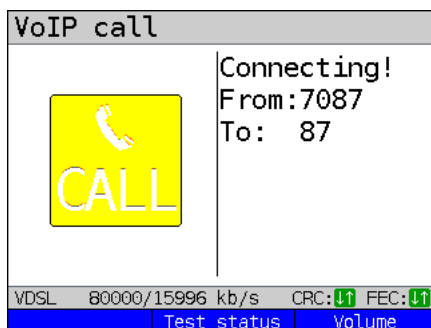
Mark the VoIP destination  
(default is indicated with ●).

Scroll down with the cursor, mark a blank  
line and add a new VoIP destination using  
<Edit>.

<Edit> Edits the VoIP destination  
number.

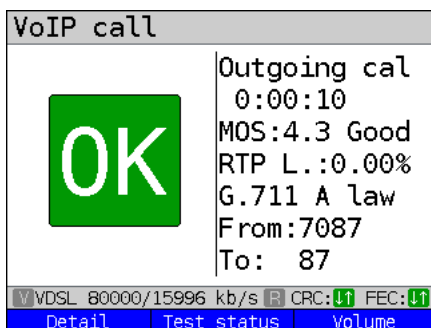


## Initialisation



Connecting

ARGUS displays "own number" (from:  
7087) and the number of the called  
subscriber (to: 87). The called subscriber  
has not yet accepted the call: display  
shows "Connecting!" and yellow CALL  
symbol.



The called subscriber has taken the call  
("Connected!"): ARGUS determines the  
MOS value and displays whether the set  
MOS voice quality value (see page 156) is  
reached ("OK" or "FAIL"). ARGUS also  
displays the classification of the MOS  
value according to ITU-T P.800 (in this  
example "good"), the duration of the  
connection and the currently used voice  
codec (in this example G.711 A law, see  
page 155) are also displayed.

<Detail> Displays the VoIP parameters.

<Test  
status> Displays test status without  
ending the test or starting a new  
test, see page 204.

<Volume> Opens volume control.

Continued on  
next page

Continued on next page,  
second screenshot

Volume

VoIP internal:  
quiet-----loud  
▲

VDSL 80000/15996 kb/s CRC:U↑ FEC:U↑

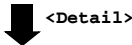
ExternOK

Volume control settings:

<External> Headset mode

<Internal> Earpiece mode

<OK> Adopts settings



VoIP overview

State: OK

RTP	Tx	Rx
MOS (G.107)	---	4.3 ✓
Jitter (ms)	---	0
Loss (%)	---	0.0
VLAN (Prio)	---	---
TOS (hex)	00	B8 !

VDSL 80000/15996 kb/s R CRC:U↑ FEC:U↑

QoSInfo

VoIP overview display (for transmitted and received packets including assessment)

- Status of MOS value (FAR-MOS/MOS)
- Jitter in ms
- RTP loss rate
- VLAN (prio) in hexadecimal
- TOS (hex) in hexadecimal



MOS info

MOS G.107

Current	4.3
Average	4.3
Minimum	4.3
Maximum	4.3
Ideal	4.3

VDSL 80000/15996 kb/s CRC:U↑ FEC:U↑

RTP

Displays MOS information:

- Current MOS
- Average MOS
- Min./max. MOS value
- Ideal MOS (possible MOS without interference, codec-dependent)
- Current and average R-factor according to ITU-T G.107



Back to previous display.

Continued on  
next page



RTP info	
Packets	
Received	2254
Sent	2233
Error counter	
RTP drop	0
RTP error	0
VDSL 80000/15996 kb/s CRC:  FEC:	
RTCP	

Display of further VoIP results:

Packet statistics:

- Received packets (Rx)
- Transmitted packets (Tx)
- Error counter:
  - RTP drop
  - RTP error
- RTP jitter Rx:
  - Current jitter
  - Average jitter
  - Minimum jitter
  - Maximum jitter
- Lost RTP packets (Rx)
  - Total, current, average, min. and max.



Back to display "Outgoing call"

Content of RTCP	
RTP jitter far [ms]	
Current	0
Average	0
Minimum	0
Maximum	0
VDSL 80000/15996 kb/s CRC:  FEC:	
Codec	

RTCP content

Displays the statistics returned by the remote station.

- Current jitter at remote station Rx (far)
- Average jitter at remote station
- Maximum and minimum jitter of remote station
- Lost RTP packets at remote station Rx (far): total, current, average, min. and max.
- Delay calculated from transmission time of RTCP packets (network delay): current, average, min., max.



If the message "no data" appears, that means that the remote station does not support RTCP.

ARGUS displays the available codecs of the remote station.



Continue to display "Outgoing call"

<MOS>

Back to display "MOS info", ring navigation

Codec info	
G.711 A law	
G.711 $\mu$ law	
G.723.1	
VDSL 80000/15996 kb/s CRC:  FEC:	
MOS	

Continued on next page



Return to status screen without ending the test.

VoIP overview		
State: OK		
RTP	Tx	Rx
MOS (G.107)	---	4.3 ✓
Jitter (ms)	---	0
Loss (%)	---	0.0
VLAN (Prio)	---	---
TOS (hex)	00	B8 !
V VDSL 80000/15996 kb/s R CRC: U1 FEC: U1		
QoS		Info

- VoIP overview display (for transmitted and received packets including assessment)
- Status of MOS value (FAR-MOS/MOS)
  - Jitter in ms
  - RTP loss rate
  - VLAN (prio) in hexadecimal
  - TOS (hex) in hexadecimal

QoS info		
	Tx	Rx
VLAN ID	---	---
VLAN prio RTP	---	---
VLAN prio SIP	---	---
RTP TOS (hex)	00	B8 !
SIP TOS (hex)	00	00 ✓
V VDSL 80000/15996 kb/s R CRC: U1 FEC: U1		

- VoIP overview display (for transmitted and received packets including assessment)
- VLAN ID
  - VLAN prio RTP
  - VLAN prio SIP
  - RTP TOS in hexadecimal
  - RTP TOS in hexadecimal



Back to the status screen without stopping the test.

Profile 1			
Data	VoIP	IPTV	VoD
➡	⚙️	?	?
✓			
VDSL VTU-R Profi. 17a ✓			
kb/s: 80000/ 15996			
CRC: 0/ 0			
U: 0.0V			
VDSL 80000/15996 kb/s CRC: U1 FEC: U1			
Info			

ARGUS in status screen.  
Another test is still running using the service VoIP (indicated by the green hammer symbol).



Using the cursor keys, select the service VoIP.

Continued on next page

**Profile 1**

Data VoIP IPTV VoD

✓

VDSL VTU-R Profi. 17a ✓  
 kb/s: 80000/ 15996  
 CRC: 0/ 0  
 U: 0.0V

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

Info Test

**<Test>** Displays the overview of results.

**<Info>** or  Displays the VoIP calling parameters.

**Service VoIP**

Active: 0:01:05

VoIP profile 1

Protocol	SIP
ID	7087

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

Log. SIP

ARGUS displays the duration of the active VoIP service, the protocol used and the user name.

**<SIP>** Display of registration details: status codes, registrar IP, registrar used, outbound proxy/SBC and URI used and more.

**<Log.>** Displays the VoIP service SIP commands, see page 164.

**Service VoIP**

Register state

Registered
SIP code
OK
Registrar
10. 0. 0. 5

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

Before, during and after the connection, ARGUS displays the registration details. The setting "Use register" must be set to "yes".

Continued on  
next page

```

Service VoIP
> SIP register

< Code:401
Unauthorized
> SIP register

< Code:200

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑
Time

```

ARGUS displays the SIP commands in the service VoIP.

For more information ((s. chapter I) VoIP SIP status codes page 379).

**<Time>** Puts a timestamp on all events.

```

Service VoIP
> SIP register
09:33:00:000
< Code:401
09:33:00:010
> SIP register
09:33:00:010
< Code:200

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑

```



The timestamp uses the ARGUS-internal system time, see page 346.

#### Incoming call:

```

Incom. VoIP call

Incom. call!
From:87
To: 7087

VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑
Reject Accept

```

ARGUS can be called while the service VoIP is active. An incoming call is indicated by the yellow CALL symbol. The call can be accepted or refused. For automatic call acceptance, you need to start the specific test "VoIP wait", see page 168.

**<Reject>** Refuses the call.  
Switches to status screen.

**<Accept>** Accepts the call.  
Switches to ARGUS status.

## Overview of VoIP results

### During/after registration:

	<b>Display</b> /description
<b>SIP log</b>	Log showing the exchanged SIP methods and status codes.
<b>Register status</b>	In the "Register status" result screen, ARGUS displays all important registration and registrar information.

### During call/connection:

	<b>Display/</b> Description
<b>MOS value, voice codec</b>	Current <b>MOS value</b> , currently used <b>voice</b> codec.
<b>SIP log:</b>	Log showing the exchanged SIP methods and status codes.
<b>INFO: MOS results:</b>	<b>Threshold:</b> indicates whether the preconfigured MOS threshold is complied with. <b>P.800:</b> Evaluation according to ITU-T P.800 <b>MOS value:</b> current/average/min./max. <b>R-factor:</b> current/average/min./max.
<b>INFO: RTP results</b>	<b>RTP packets:</b> received/sent <b>RTP drop:</b> received packets rejected by the jitter buffer. <b>RTP error:</b> received but defective RTP packets. <b>RTP jitter Rx:</b> current/average/min./max. <i>(Calculated according to RFC 3550 per sec.)</i> <b>RTP packet loss Rx:</b> current/average/minimum/maximum in percent <b>RTP packet loss total:</b> <i>(RTP packets not received)</i>
<b>INFO: RTCP results:</b>  <i>(The contents of the RTCP packets are displayed, provided this is supported by the remote side!)</i>	<b>IP jitter remote side:</b> current/average/minimum/maximum <b>RTP packet loss remote side:</b> current/average/minimum/maximum in percent <b>RTP packet loss remote side Total</b> <b>Network delay:</b> current/average/maximum/minimum <i>(calculated on the basis of RTCP packets)</i>

**15.1.1 VoIP back-to-back**

ARGUS permits a VoIP call to a second terminal device, e.g. another ARGUS unit. To enable calling, both ARGUS instruments must be configured as follows:

	ARGUS 1	ARGUS 2
Access, s. page 25	Ethernet IP based	
Protocol, s. page 90	IP	
IP version, s. page 93	IPv4	
IP mode, s. page 93	Static	
Own IP address, s. page 93	In example 10.0.0.1	In example 10.0.0.2

ARGUS 1



ARGUS 2

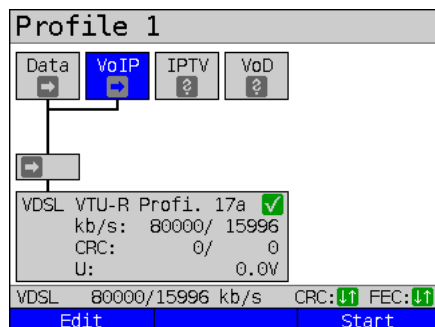


Now enter the IP address of ARGUS 2 in ARGUS 1 as the target telephone number to initiate a VoIP call. The IP address of ARGUS 1 must be entered as the target telephone number in ARGUS 2. The call is connected just as for VoIP-call/VoIP-wait, see page 158.

## 15.2 VoIP wait

In the test "VoIP wait", ARGUS behaves like a VoIP telephone.

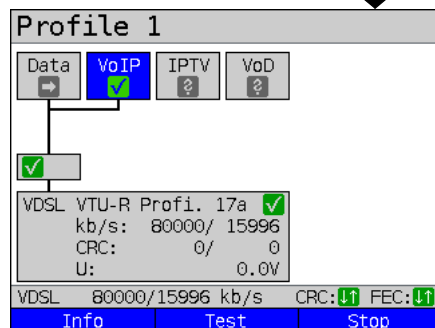
The VoIP call (see page 152) and the VoIP wait parameters must be configured for the VoIP wait test.



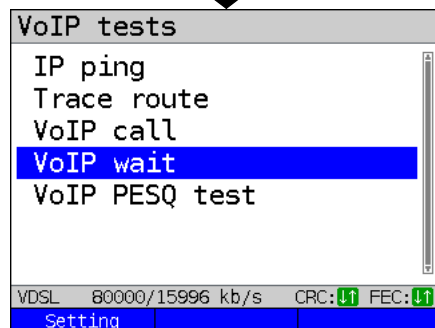
Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for VoIP wait.

**<Edit>** Edits the default virtual line profile.

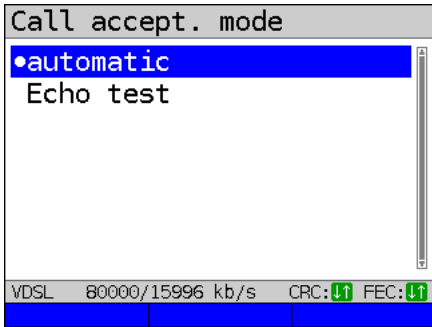


If no xDSL or Ethernet connection is established, ARGUS automatically connects at this point using the default profile (see page 46).



**<Setting>** Opens call acceptance mode for VoIP wait.

Continued on  
next page



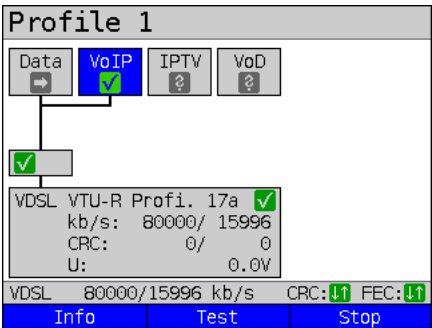
The test VoIP wait offers the following configuration options:

- Automatic
  - Echo test
- Default: **Automatic**

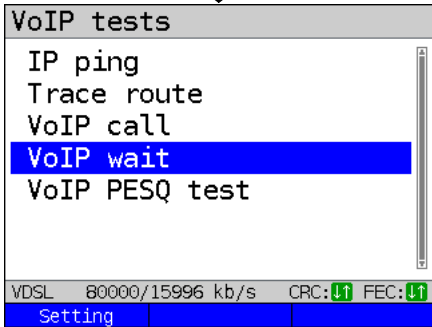


ARGUS uses the user name entered under SIP parameters (see page 152) as its own number.

Start VoIP wait



The service VoIP and the VDSL access are active.

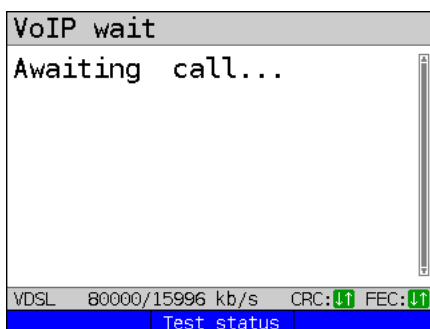


Select VoIP wait

Initialisation

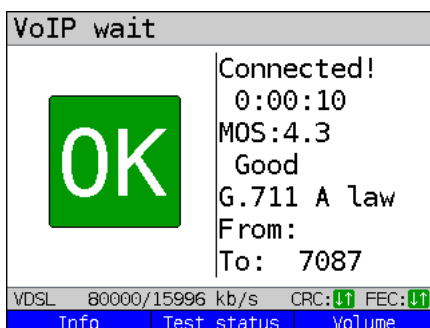
Continued on  
next page





ARGUS waits for a VoIP call.

<Test status> Switches to test status, see page 159.



ARGUS accepts the call automatically (see setting page 168).

The connection parameters are the same as for VoIP call and are explained on page 159 and following.

### Connecting:



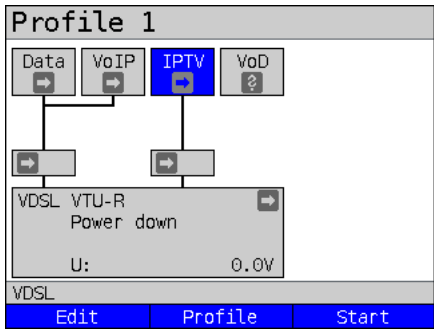
The connection is established as for IP ping. However, pressing "Cancel" initially only disconnects (if a connection existed). ARGUS remains registered with the registrar (service VoIP active) and remains available for the caller (an incoming call can be refused or accepted). Deactivate the service VoIP to terminate registration. However, the established access remains active.

16 IPTV tests

16.1 IPTV

ARGUS requests a datastream from a server (depending on the access type, ARGUS replaces the set-top box ( STB) or modem plus STB) and checks the regularity of the incoming packets, packet loss and the switch-on/switch-over time of the program. You can configure three user-defined IPTV profiles (where the xDSL or Ethernet connection is already established, the connection parameters, e.g. the target value, are locked):

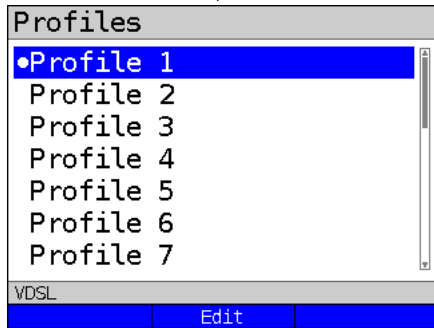
Protocol-independent parameters



ARGUS in status screen.

The IPTV-STB emulation is realised using the service IPTV.  
The following example illustrates the procedure and its special features.

- <Edit> Assign virtual lines to the service IPTV.
- <Profile> See page 32 for profile settings.
- <Start> Starts the service.



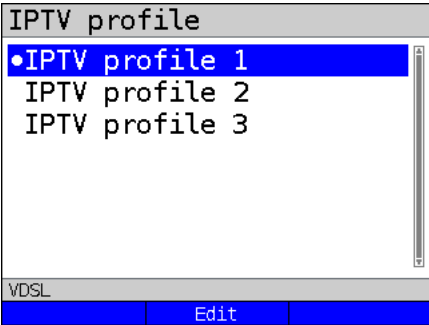
Select the profile you wish to edit. The selected profile appears in the display in blue. The default profile is indicated with a ● in the display. ARGUS adopts the parameters from the preset profiles for establishing the Ethernet or xDSL connection and conducting the IPTV test.



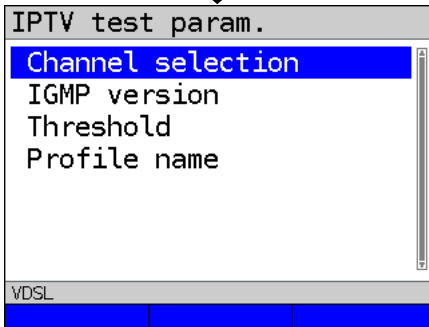
ARGUS uses the marked profile as the preset profile and switches to the menu Settings.



Continued on  
next page



A total of three user-defined IPTV profiles are available.



Edits the marked IPTV profile.

Edits and modifies the marked parameters

Setting	Description
<b>Test parameters:</b>	
<b>IPTV:</b>	You can create a total of three IPTV profiles. <Edit> Activates the profile you wish to edit.
<b>Channel selection</b>	The channel list can be used and edited in all profiles. You can store up to 250 channels. Using the software WINplus/WINanalyse you can also create a configuration conveniently using the PC and load it to ARGUS. Selecting the TV channels for the IPTV test. <Edit> Edits channel
<b>Multicast IP</b>	Specifies the multicast IP. Range: Range 0.0.0.0. to 255.255.255.255 Default: <b>224.0.0.0</b>

<b>Port</b>	Specification of port. Range: 0 to 65535 Default: <b>0</b>
<b>TV station</b>	Enters a TV station name for the IPTV channel.
<b>IGMP version</b>	Version of the management protocol for joining/quitting a multicast group. Range: 2 to 3 Default: <b>3</b>
<b>Thresholds</b>	Establishes the limit values for the IPTV test. When these values are exceeded during the IPTV test, the display shows the test result "FAIL", otherwise "OK". Specifying "*" deactivates the respective limit value check.
<b>IGMP latency</b>	Sets the limit values for the latency (switch-on delay of the program). Range: 0 to 25,000 ms Default: <b>500 ms</b>
<b>Sync error</b>	Establishes the limit values for the sync error. Range: 0 to 10,000 Default: <b>0</b>
<b>PCR jitter</b>	Establishes the limit values for PCR jitter. 0 to 2000 ms Default: <b>100 ms</b>
<b>Error indication</b>	Establishes the limit values for error indication. Range: 0 to 10,000 Default: <b>0</b>
<b>CC error</b>	Establishes the limit values for CC errors. Range: 0 to 10,000 Default: <b>0</b>
<b>CC error rate</b>	Establishes the limit values for the CC error rate. Range: 0.00 % to 100.00 % Default: <b>0.00 %</b>
<b>Audio bytes</b>	Sets the target value for audio bytes. When the measurement falls below this threshold during the IPTV test, the display shows the test result "FAIL", otherwise "OK". Range: 0 to 6,553,600 Default: <b>0</b>

<b>Video bytes</b>	Sets the target value for video bytes. When the measurement falls below this threshold during the IPTV test, the display shows the test result "FAIL", otherwise "OK". Range: 0 to 6,553,600 Default: <b>0</b>
<b>RTP jitter</b>	Establishes the limit values for RTP jitter. Range: 0 to 2000 ms Default: <b>100 ms</b>
<b>RTP sequence errors</b>	Establishes the limit values for sequence errors. Range: 0 to 10,000 Default: <b>0</b>
<b>Current RTP loss rate</b>	Establishes the limit values for the current RTP loss rate. Range: 0.00 % to 100.00 % Default: <b>0.00 %</b>
<b>Total RTP loss rate</b>	Sets the limit values for the RTP loss rate for the entire test. Range: 0.00 % to 100.00 % Default: <b>5.00 %</b>
<b>Profile name</b>	Enters a name for the IPTV profile. See page 27 for details.

### 16.1.1 Multiple virtual lines

ARGUS can use up to 4 virtual lines for the service IPTV. The IGMP virtual lines are used for transmission of the IGMP protocol and virtual lines 1-3 for receiving the video/audio streams.

Overview: selected virtual line profiles

Virtual line

- No virtual line
- Virt. profile 1
- Virt. profile 2
- Virt. profile 3
- Virt. profile 4
- Virt. profile 5
- Virt. profile 6

VDSL

Edit More VLS

<Edit> Edits the selected virt. profile (in this example virt. profile 2), see page 86.

<More VLS> Opens virtual line selection for the service IPTV.

Virtual line

IGMP VL:Virt. profile 2

VL 1: No VL

VDSL

Insert

<Insert> Inserts further virtual profiles.

Profile selection

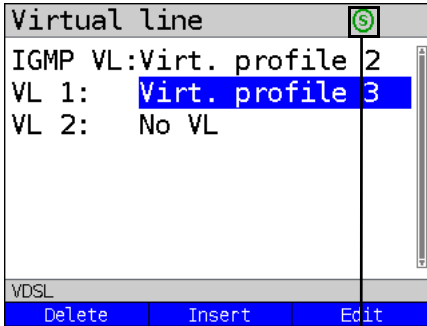
- Virt. profile 1
- Virt. profile 3
- Virt. profile 4
- Virt. profile 5
- Virt. profile 6
- Virt. profile 7
- Virt. profile 8

VDSL

Edit

Adds selected VL profile for the service IPTV.





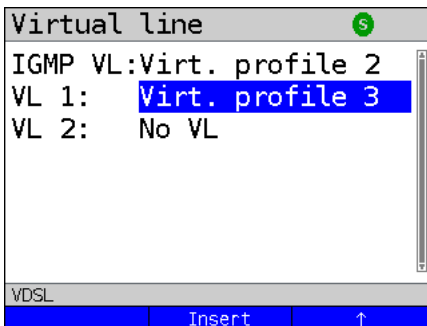
<Delete> Deletes the selected virt. profile (in this example profile 3) from the selection list.

<Insert> Inserts a further virtual profile.

<Edit> Deletes the selected virt. profile (in this example profile 3), see page 86.



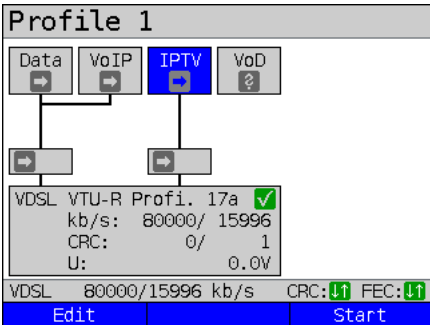
Switches to softkey assignment.



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

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

Starting IPTV

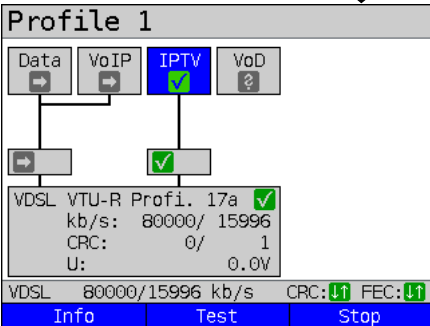


Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for IPTV.

<Edit> Assigns a virtual line is assigned to the service IPTV or edits it.

Activating the service IPTV.

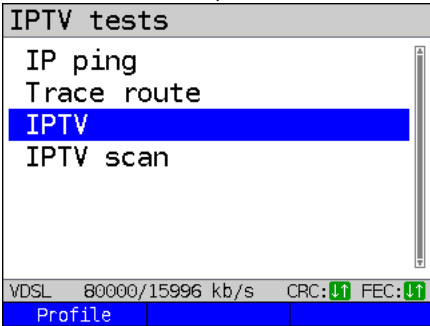


If no xDSL connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

<Info> Duration of activation.

<Test> Opens test selection.

<Stop> Deactivates the service.

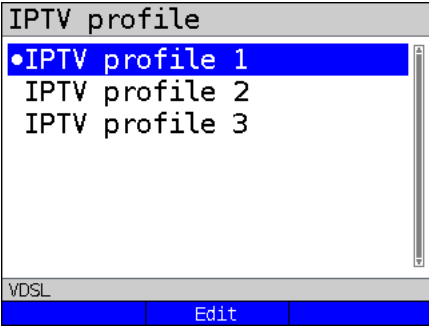


<Profile> Displays the IPTV profiles, see page 171.

Continued on  
next page







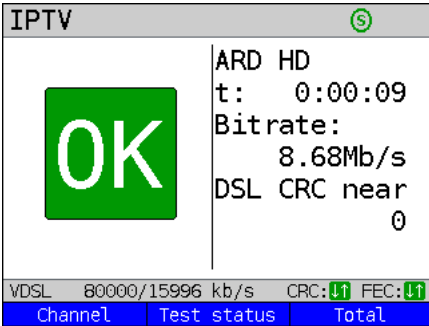
Marks the IPTV profile (default is indicated with ●).

**<Edit>** Edits the marked profile, see page 171 for changes to the individual parameters.



The IPTV test starts automatically.

**IPTV test**



During the test, ARGUS displays the selected IPTV channel, the duration of the test and the current bitrate. If the set limits are exceeded, the IPTV test shows "FAIL" in the display, otherwise "OK". ARGUS displays "FAIL" until the values fall below the threshold again.

**<Channel>** Selects a new channel.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.

**<Total>** Displays all IPTV statistics.

 Cancels test.

Continued on next page

IPTV overall	
<b>Bitrate</b>	
Current	8.73Mb/s
<b>Packet loss</b>	
Sum	0
Packet loss ratio	[%]
Average	0.00
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	
Detail	

Display:

- Current bitrate
- Number of packets lost during the test
- Display of packet loss rate in percent

<Detail> Switches to the IPTV details.

IPTV overall	
<b>Delay factor</b> [ms]	
Current	24
Minimal	17
Maximal	33
Average	23
MLR	[%]
Sum	0.00000
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	
Detail	

Display (MDI according to RFC 4445):

- Displays the current delay factor in ms
- Displays the minimum delay factor in ms
- Displays the maximum delay factor in ms
- Displays the average delay factor in ms
- Displays the media loss rate (MLR) in percent

IPTV info	
<b>Duration</b> 0:00:34	
<b>Channel</b>	
Name	ARD HD
IP	239. 35. 10. 1
Port	10000
VDSL 80000/15996 kb/s CRC: <span style="color: green;">U1</span> FEC: <span style="color: green;">U1</span>	
RTP/UDP	

Display:

- Duration of test
- Displays the name of the selected broadcaster
- Display of broadcaster's IP address
- Display of broadcaster's port
- Display of IGMP latency (switch-on time of program) in ms

<RTP/UDP> Switches to RTP/UDP details, see page 179.

Continued on  
next page

IPTV info		
IGMP latency	[ms]	3
Protocol	ETH/IPv4/UDP/RTP/MPEG-TS	
DSL CRC	n   f	0   0
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
RTP/UDP		

Display

- Display the IGMP latency
- Display the selected IPTV protocol
- Display of DSL-CRC error counter (not for Ethernet), see page 58

IPTV UDP/RTP		
Packet loss		
Current		0
Minimal		0
Maximal		0
Average		0
Sum		0
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
MPEG2		

Display:

- Display of current packet losses
- Display of minimum packet losses
- Display of maximum packet losses
- Display of average packet losses
- Number of packets lost during the test

<MPEG2> Switches to MPEG2 details, see page 180.

IPTV UDP/RTP		
Packet loss ratio [%]		
Current		0.00
Minimal		0.00
Maximal		0.00
Average		0.00
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
MPEG2		

Display:

- Display of current packet loss rate
- Display of minimum packet loss rate
- Display of maximum packet loss rate
- Display of average packet loss rate

Continued on  
next page

IPTV UDP/RTP		
RTP		
Error		0
Seq.error		0
DSL CRC		n   f
	0	n/a
VDSL 80000/15996 kb/s CRC: <span>↑↓</span> FEC: <span>↑↓</span>		
MPEG2		

Display:

- Display of RTP errors
- Display of RTP sequence errors
- Display of DSL CRC error (n/f)

IPTV MPEG2TS		
Bitrate		
Current		8.61Mb/s
Minimal		8.58Mb/s
Maximal		8.87Mb/s
Average		8.70Mb/s
VDSL 80000/15996 kb/s CRC: <span>↑↓</span> FEC: <span>↑↓</span>		
PID Info		

Display:

- Display of current MPEG bitrate
- Display of minimum MPEG bitrate
- Display of maximum MPEG bitrate
- Display of average MPEG bitrate

<PID> Switches to PID details, see page 182.

<Info> Switches to IPTV info, see page 178.

IPTV MPEG2TS		
Packets		
Current		798
Minimal		787
Maximal		807
Average		797
Sum		15938
VDSL 80000/15996 kb/s CRC: <span>↑↓</span> FEC: <span>↑↓</span>		
PID Info		

Display:

- Display of current MPEG packets
- Display of minimum MPEG packets
- Display of maximum MPEG packets
- Display of average MPEG packets
- Display of total MPEG packets

Continued on  
next page

IPTV MPEG2TS		
Bytes		
Current		1104468
Minimal		1066482
Maximal		1105826
Average		1090818
Sum		40360284
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑		
	PID	Info

Display:

- Display of current bytes
- Display of minimum bytes
- Display of maximum bytes
- Display of average bytes
- Display of total bytes



IPTV MPEG2TS		
PCR jitter [ms]		
Current		3
Minimal		1
Maximal		4
Average		3
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑		
	PID	Info

Display:

- Current PCR jitter in ms
- Minimum PCR jitter in ms
- Maximum PCR jitter in ms
- Average PCR jitter in ms

The PCR jitter describes the variation of the deviation between the internal clock and the time stamps contained in the MPEG transport stream (PCR) and is used to maintain the correct playing speed.



IPTV MPEG2TS		
CC error		
Current		0
Minimal		0
Maximal		0
Average		0
Sum		0
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑		
	PID	Info

Display:

- Number of current CC errors
- Number of minimum CC errors
- Number of maximum CC errors
- Number of average CC errors
- Sum of CC errors



IPTV MPEG2TS		
CC error ratio		[%]
Current		0.00
Maximal		0.00
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
PID		Info

Display:

- Number of current CC error rate
- Number of maximum CC error rate

The CC error rate is the CC loss rate across all PIDs, i.e. the CC errors of all PIDs are summed and displayed as the error rate.



IPTV MPEG2TS		
Error		
Sync		0
Indicat.		0
DSL CRC		n   f
	0	0
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
PID		Info

Display:

- Display of error sync
- Display of error indication
- Display of DSL CRC error (n/f)



0 PSI PAT		
Bitrate		
Current		1.46Kb/s
Minimal		0.00 b/s
Maximal		2.93Kb/s
Average		1.24Kb/s
VDSL 80000/15996 kb/s CRC: <span>↑↑</span> FEC: <span>↑↑</span>		
Previous		Next

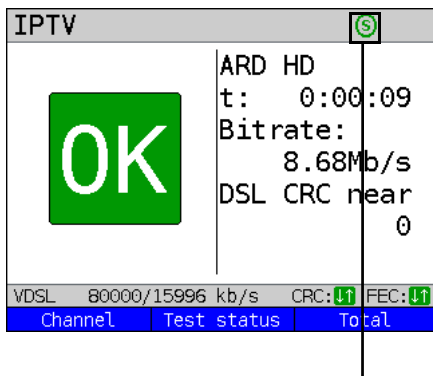
Display of codecs and PIDs

Packet identifiers (PIDs) identify the audio, video and PCR components of each program.

<Previous> Switches to previous overview.

<Next> Switches to next overview.





**<Channel>** Selects a new channel.

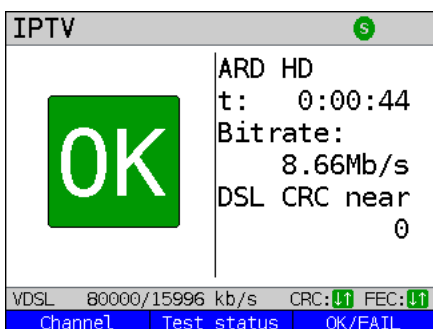
**<Test status>** Displays test status without ending the test or starting a new test, see page 204.



Cancels test.



Toggles softkey assignment.



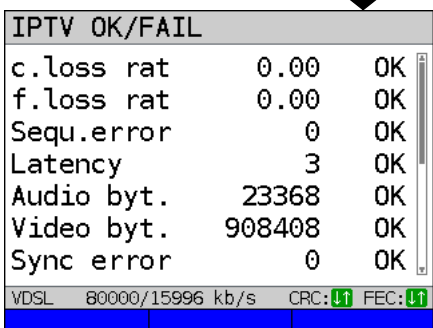
**<Channel>** Selects a new channel.



The IPTV test runs until a new channel is selected.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.

**<OK/FAIL>** OK/FAIL overview of the IPTV test.



Display:

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

IPTV OK/FAIL			
Error ind.	0	OK	
PCR jitter	3	OK	
CC error	0	OK	
CC e.ratio	0.00	OK	
VDSL 80000/15996 kb/s CRC:  FEC:			

Stop IPTV



Stop IPTV test.

**IPTV result**

IPTV overall			
Packet loss			
Sum		0	
Packet loss ratio		[%]	
Average		0.00	
VDSL 80000/15996 kb/s CRC:  FEC:			
			Detail

Displays how many packets were lost during the IPTV test and how high the loss rate is.

Display of further information:

- Minimum delay factor
- Maximum delay factor
- Average delay factor
- Media loss rate (MLR) during the test

<Detail> Displays IPTV test detail information, see page 178 and following.



IPTV overall			
Delay factor [ms]			
Minimal		16	
Maximal		43	
Average		25	
MLR		[%]	
Sum		0.00000	
VDSL 80000/15996 kb/s CRC:  FEC:			
			Detail

Exits results.

For saving results, see IP ping page 125.  
Sends trace file to PC, see page 96.



**Save result?**

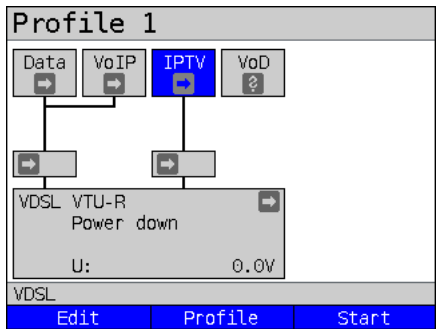


16.2 IPTV scan

ARGUS checks the availability of TV channels. Additionally, ARGUS displays the switchover time between TV channels.

You can create three user-defined scan profiles. The following settings must be saved in the profile for the IPTV scan (when the xDSL or Ethernet connection is already established, the connection parameters, e.g. target value, are locked):

Protocol-independent parameters:



ARGUS in status screen.

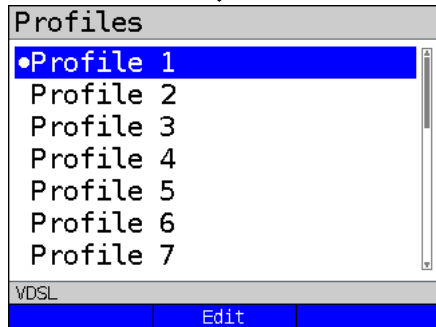
- <Edit>** Assign virtual lines to the service IPTV.
- <Profile>** See page 32 for profile settings.
- <Start>** Starts the service.



Select the profile you wish to edit. The selected profile appears in blue. The default profile is indicated with a ● in the display. ARGUS adopts the parameters from the default profiles for establishing the Ethernet or xDSL connection and conducting the IPTV scan.



ARGUS uses the marked profile as the default profile and switches to the menu Settings.



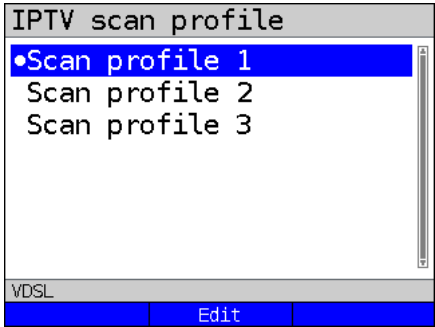
Test parameters



IPTV scan

Continued on next page

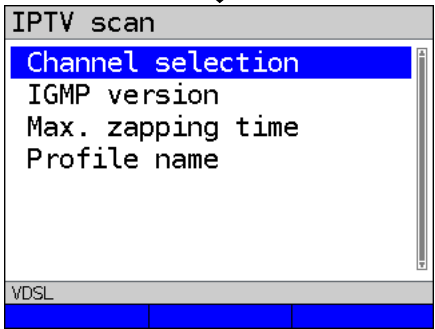




A total of three user-defined scan profiles are available.



Edits the scan marked profile.



Edits and modifies the marked parameters

IPTV scan settings

Setting	Description
<b>Test parameters:</b>	
<b>IPTV scan</b>	You can create a total of three scan profiles. <Edit>Activates the profile you wish to edit.
<b>Channel selection</b>	The channels list can be used and edited in all profiles. You can store up to 250 channels. Using the software WINplus/WINanalyse you can also create a configuration conveniently using the PC and load it to ARGUS. Selecting the TV channels for the IPTV scan:

Channel list

1:ARD HD

2:ZDF

3:WDR

4:

VDSL

DeleteInsertEdit

Channel selection

IPTV channel 4

IPTV channel 5

IPTV channel 6

IPTV channel 7

IPTV channel 8

IPTV channel 9

IPTV channel 10

VDSL

Edit

ARGUS initially displays the TV channels already selected in the set order that was tested for the IPTV scan. If no channels have been selected yet, the list is empty. The list slots can be filled one after another. You can select up to 250 channels.

<Insert> Opens the list with the available channels.

Marks the channel  
Channels already selected do not appear in the channel list (see channel selection display).

<Edit>

Edits the marked channel, see page 171 and following.

- Enter (multicast IP and port number) of TV channel.
- Enter any alias name for the TV channel (e.g. name of broadcaster).

Continued on next page

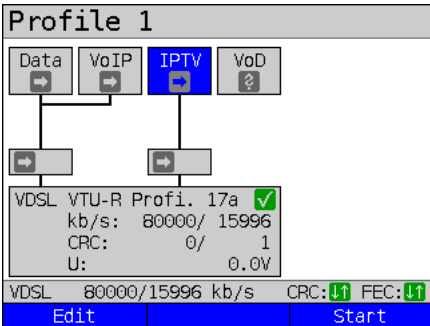
ARGUS 162

187

<div><div><div>Channel list</div><div><div>1:IPTV channel 4</div><div>2:ARD HD</div><div>3:ZDF HD</div><div>4:WDR</div><div>5:</div></div><div>VDSL</div><div><div>Delete</div><div>Insert</div><div>Edit</div></div></div><div><div>Continued on next page</div><div><div></div><div>Shm</div></div></div></div> <div><div>Add the marked TV channel (in this example IPTV channel 4), then add the next channel (in this example IPTV channel 5).</div><div>Once at least two channels have been added to the list, you can change their position in the list using the following softkeys.</div><div>&lt;Delete&gt; Deletes the marked TV channel from the list.</div><div>&lt;Insert&gt; Opens the channel list with the available channels.</div><div>Toggles softkey assignment.</div></div>	
<div><div><div>Channel list</div><div><div>1:IPTV channel 4</div><div>2:ARD HD</div><div>3:ZDF HD</div><div>4:WDR</div><div>5:</div></div><div>VDSL</div><div><div>↓</div><div>Insert</div><div></div></div></div><div><div></div><div>✓</div></div><div>Accepts the channel selection in the order shown.</div></div> <div><div>&lt;↓&gt; The selected channel is moved down one place in the list.</div><div>&lt;↑&gt; The selected channel is moved up one place in the list.</div></div>	
IGMP version	Version of the management protocol for joining/quitting a multicast group (for broadcast TV only). Range: 2 to 3 Default: 3

<b>Max. switch-over time</b>	Entry of max. switchover time (IPTV timeout): This is the time between the request and receipt of an IPTV channel. If the measured timeout exceeds the value set here, ARGUS rates this test as "FAIL". Range: 1 - 25 seconds Default: <b>5 seconds</b>
<b>Profile name</b>	Entry of a name for the IPTV scan profile, see page 27 for details.

Starting the IPTV scan

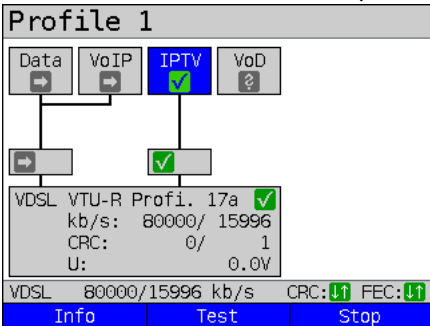


Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for IPTV.

**<Edit>** Assigns a virtual line to the service IPTV or edits it.

Activating the service IPTV.

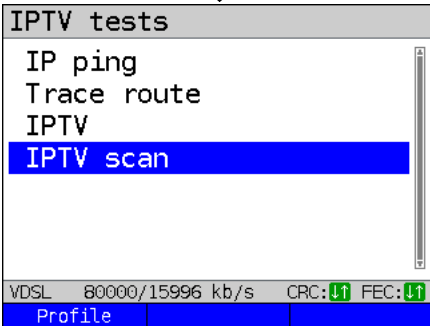


If no xDSL connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

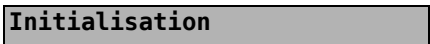
**<Info>** Duration of activation.

**<Test>** Opens test selection.



**<Stop>** Deactivates the service.



**<Profile>** Displays the IPTV scan profiles, see page 186.



**IPTV scan**

IPTV scan	
Zapping time [ms]	
ARD HD	21
ZDF	263
WDR	1972
Minimum	21
Maximum	1972
Average	752
VDSL 80000/15996 kb/s CRC:  FEC: 	
Test status	

The IPTV scan starts automatically.

Displays the time needed to switch between channels. If a TV channel cannot be received within the set interval, ARGUS displays "FAIL".

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.

Exits results display.

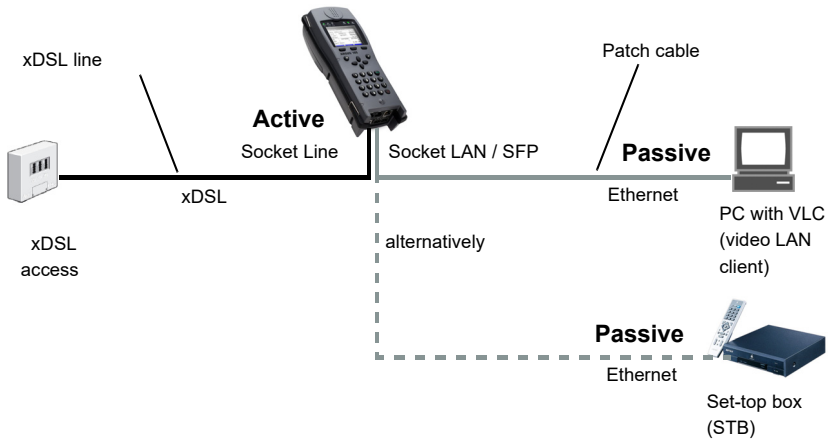


**Save result?**

For saving results, see IP ping page 125.  
Sends trace file to PC, see page 96.

### 16.3 IPTV passive

ARGUS listens for transmitted TV channels without requesting a channel. ARGUS lists the TV channels it detects in a list of multicast IPs and/or channel names.

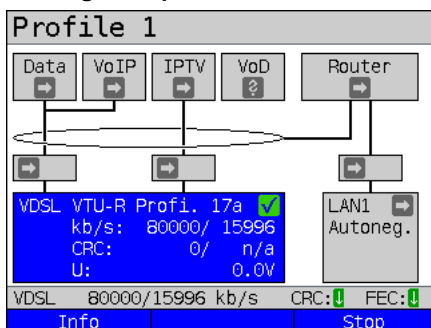


A second ARGUS in STB mode can be connected in place of a PC or STB.

**See page 170 and following for protocol-independent parameters and test parameters for IPTV passive.**



## Starting IPTV passive



Select the router using the cursor and start the test.

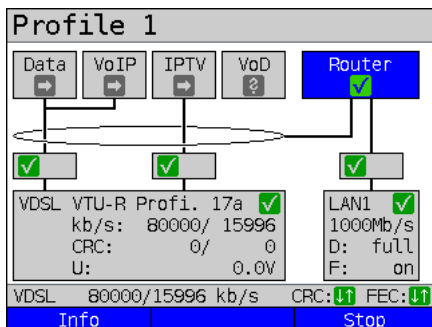


Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for IPTV passive.



IPTV passive can also be run in bridge mode. However, the bridge must be activated first.



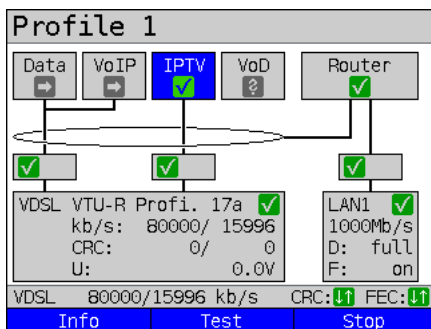
Select the service IPTV using the cursor and activate it.



Router mode is started.

<Info> The duration of router activity is displayed.

<Stop> Stops router mode.

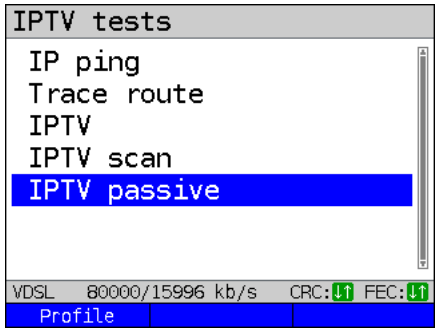


The service IPTV and the router mode are active and the VDSL access is synchronous.

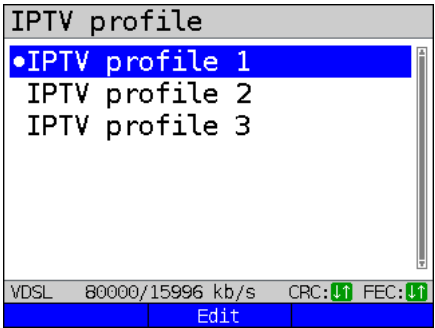


To access the softkey <Test> in bridge mode, switch to the bridge box and activate it. The services are not available in bridge mode.

Continued on next page



**<Profile>** Displays the IPTV passive settings, see page 171.

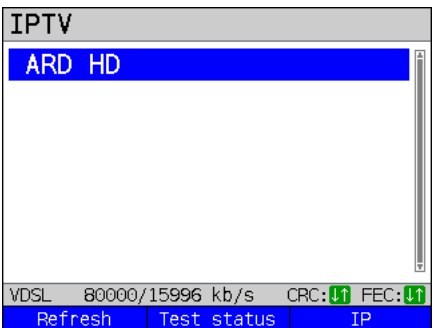


**Marks the IPTV profile**  
(default is indicated with ●).

**<Edit>** Edits the marked profile, see page 171 for changes to the individual parameters.

## Initialisation

ARGUS automatically checks whether IPTV streams are available and displays these.



In this example, one possible stream is displayed.

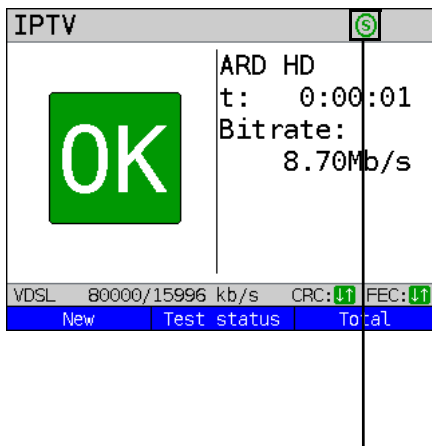
**<Refresh>** Updates the channel list.

**<Test status>** Displays test status without ending the test or starting a new test, see page 204.

**<IP>** Displays the multicast IP of the selected channel.

## Waiting for stream

Continued on  
next page

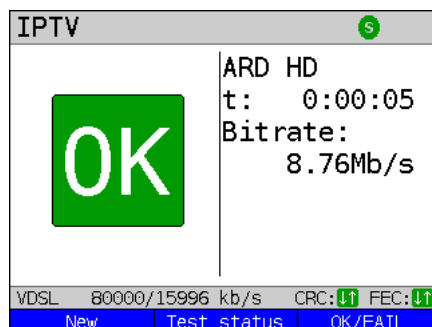


During the test, ARGUS displays the selected IPTV channel, the duration of the test and the current bitrate. If the set limits are exceeded, the IPTV test shows "FAIL" in the display, otherwise "OK". ARGUS displays "FAIL" until the values fall below the threshold again.

- <New>** Starts a new IPTV test or selects another available channel, see page 194.
- <Test status>** Displays test status without ending the test or starting a new test, see page 204.



Toggles softkey assignment.



- <OK/FAIL>** OK/FAIL overview of the IPTV test, see page 183.



Cancels test.

The IPTV result statistics are explained starting on page 178.

16.4 Video on demand (VoD)

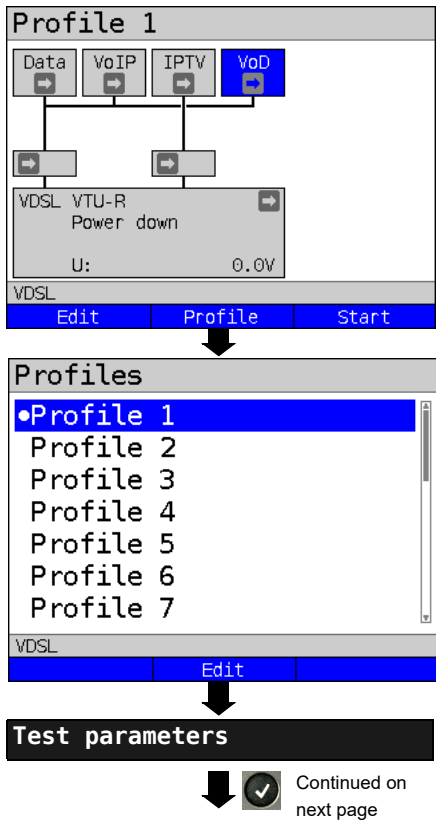
In VoD mode, ARGUS requests a datastream from a VoD server. Depending on the access type, ARGUS replaces the STB or the modem and the STB.

VoD services are often provided using RTSP, as this control protocol additionally supports control functions. However, ARGUS also supports the protocols FTP, HTTP and MMS where needed. During the test, ARGUS monitors the regularity of the incoming packets, the loss of packets, packet and PCR jitter and other possible errors.

Depending on the preset limit values, ARGUS performs an OK/FAIL assessment and shows important metadata regarding the received VoD stream.



You can configure three user-defined VoD profiles (where the xDSL connection is already established, the connection parameters, e.g. the target value, are locked):

Protocol-independent parameters:



ARGUS in status screen.

The VoD test is performed using the service of that name. The following example illustrates the procedure and its special features.

- <Edit>** A virtual line is assigned to the service VoD.
  - <Profile>** See page 32 for profile settings.
  - <Start>** Starts the service.
-  Select the profile you wish to edit. The selected profile appears in the display in blue. The default profile is indicated with a ● in the display. ARGUS adopts the parameters from the default profiles for establishing the Ethernet or xDSL connection and conducting the VoD test.
-  ARGUS uses the marked profile as the default profile and switches to the menu Settings.

## Video on demand



VoD profile

- VoD profile 1
- VoD profile 2
- VoD profile 3

VDSL

Edit

A total of three user-defined VoD profiles are available.

Edits the scan marked VoD profile.



VoD test param

- Type of stream
- Server address
- Port
- File name
- RTSP type
- RTSP server type
- Jitter buffer

VDSL

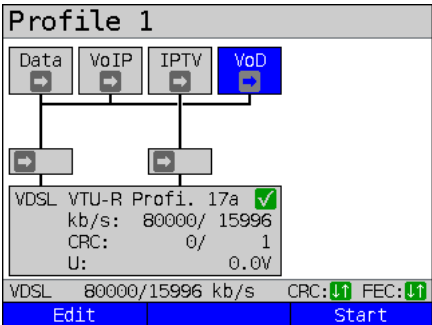
Edits and modifies the marked parameters.



Setting	Description
<b>Test parameters:</b>	
<b>VoD:</b>	You can create a total of three VoD profiles. <edit>Activates the profile you wish to edit.
<b>Type of stream</b>	Select the type of stream. You can select one of the following types: RTSP, HTTP, FTP, MMS Default: <b>RTSP</b>
<b>Server address</b>	Enter the server address from which the stream is to be downloaded. Enter the address using the number keys. Toggle entry using the softkey (meaning of right softkey changes when pressed), see page 121.

<b>Port</b>	Specification of port. Range: 0 to 65535 Default: <b>0</b>
<b>File name</b>	Name of the file to be downloaded from the server, see page 121 for information on using the softkeys.
<b>RTSP type</b>	Type of control protocol: TCP or UDP. Default: <b>TCP</b>
<b>RTSP server type</b>	If the remote station is a standard-compliant VoD server, always set the field "RTSP server type" to "standard". If the remote station uses proprietary features, you can use a different setting (e.g. Kasenna). Default: <b>Standard</b>
<b>Jitter buffer</b>	Size of jitter buffer. Ideally, enter the value from the upstream STB. Range: 0 to 5000 ms Default: <b>300 ms</b>
<b>Threshold values</b>	Sets the limit values for PCR jitter and continuity error (assessment of picture quality). When these values are exceeded during the IPTV test, the display shows the test result "FAIL", otherwise "OK". PCR jitter: - Range: 0 to 10,000 ms - Default: <b>8 ms</b> Continuity error: - Range: 0.0 - 100 percent. - Default: <b>0.1 %</b>
<b>Profile name</b>	Enter a name for the VoD profile. See page 27 for details.

Starting VoD

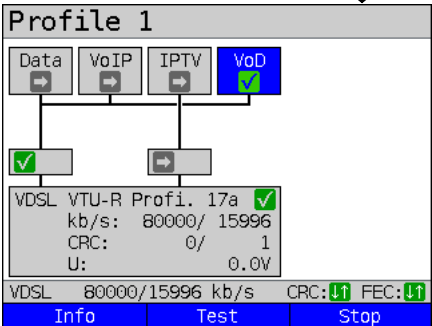


Connecting the service.

The profile selected for xDSL connection (in this example profile 1) is also used for VoD.

<Edit> Assigns a virtual line to the service VoD or edits it.

Start the service VoD.

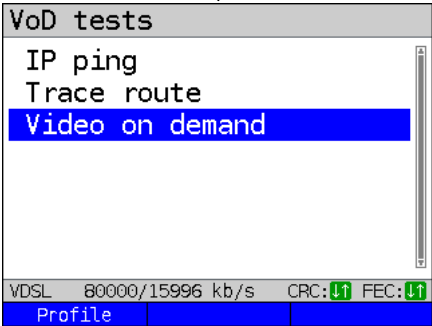


If no xDSL connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

<Info> Duration of activation.

<Test> Opens test selection.

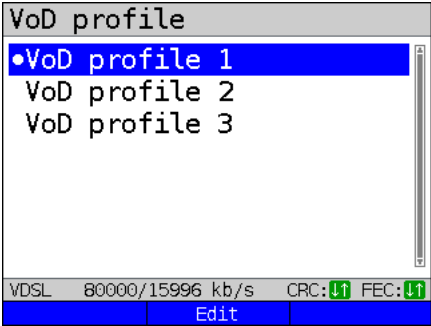
<Stop> Deactivates the service.



<Profile> Displays the VoD profiles, see page 197.

Continued on  
next page





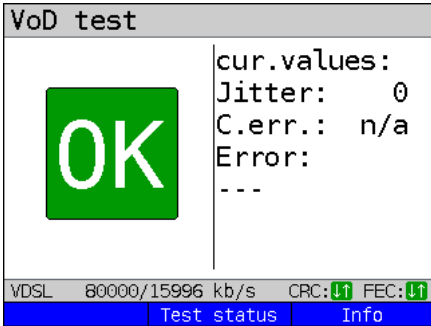
Marks the VoD profile  
(default is indicated with ●).

**<Edit>** Edits the marked profile, see  
page 171 for changes to the  
individual parameters.



The VoD test starts automatically.


**VoD test**



During the test, ARGUS displays the  
current PCR jitter and the continuity  
errors. If the set limits are exceeded, the  
VoD test shows "FAIL" in the display,  
otherwise "OK".  
ARGUS displays "FAIL" until the values  
fall below the threshold again.

**<Test  
status>** Displays test status without ending  
the test or starting a new test, see  
page 204.

**<Info>** Displays the video on demand test  
statistics.

 Cancels test.

Continued on  
next page





Video on demand	
Error code	
	---
PCR jitter [ms]	
Current	0
Maximum	0
VDSL 80000/15996 kb/s CRC: <span style="color: green;">↑↑</span> FEC: <span style="color: green;">↑↑</span>	
UDP	

Display:

- Displays the current error status
- Displays the current and maximum PCR jitter

<UDP> Switches to UDP information, see page 202.



Video on demand	
Continuity error [%]	
Current	n/a
Maximum	n/a
Container type	
	No container
VDSL 80000/15996 kb/s CRC: <span style="color: green;">↑↑</span> FEC: <span style="color: green;">↑↑</span>	
UDP	

Display:

- Displays the current and maximum continuity error in %
- Display of container type



Video on demand	
Stream	
Packets	12194
Bytes	76452086
Cont.error	0
VDSL 80000/15996 kb/s CRC: <span style="color: green;">↑↑</span> FEC: <span style="color: green;">↑↑</span>	
UDP	

Display:

- Display of stream packets
- Display of stream bytes
- Display of stream cont. errors



Continued on  
next page

Video on demand	
Stream bit rate	
Current	8.185 Mb/s
Average	7.461 Mb/s
Minimum	3.848 Mb/s
Maximum	8.552 Mb/s
VDSL 80000/15996 kb/s CRC:U↑ FEC:U↑	
UDP	

Display:

- Current stream bitrate
- Average stream bitrate
- Minimum stream bitrate
- Maximum stream bitrate

VoD RTP/UDP/TCP	
Packets	
Rx	98316
Packet jitter [ms]	
Maximum	0
Current	0
VDSL 80000/15996 kb/s CRC:U↑ FEC:U↑	
Stream	

Display:

- Received packets
- Maximum packet jitter
- Current packet jitter

<stream> Switches to stream information, see page 203.

VoD RTP/UDP/TCP	
RTP	
Lost	0
OOS	0
Error	n/r
VDSL 80000/15996 kb/s CRC:U↑ FEC:U↑	
Stream	

Display:

- Lost RTP packets
- OSS RTP packets
- Number of errored RTP packets

Continued on  
next page

VoD stream	
Video codec	mpgv
Video resolution	---
Video codec name	MPV
Audio codec	
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑	
Info	

Stop VoD test



Display:

- Video codec
- Video resolution
- Video codec name
- Audio codec
- Audio channels
- Audio sampling rate
- Audio bits/sample
- Audio bitrate
- Audio codec name
- Audio codec desc.
- Total runtime
- Author (general)
- Title
- Author (meta)
- Copyright

### VoD result

Video on demand	
Time	[s]
OK	193
Fail	0
Error code	---
VDSL 80000/15996 kb/s CRC:↑↑ FEC:↑↑	
Test status Info	



Save result?

Displays the duration of the test, the result OK or FAIL, and the error status.

The further test results are described starting on page 201.

Exits results.

For saving results, see IP ping page 125.  
Sends trace file to PC, see page 96.

## 17 Parallel tests

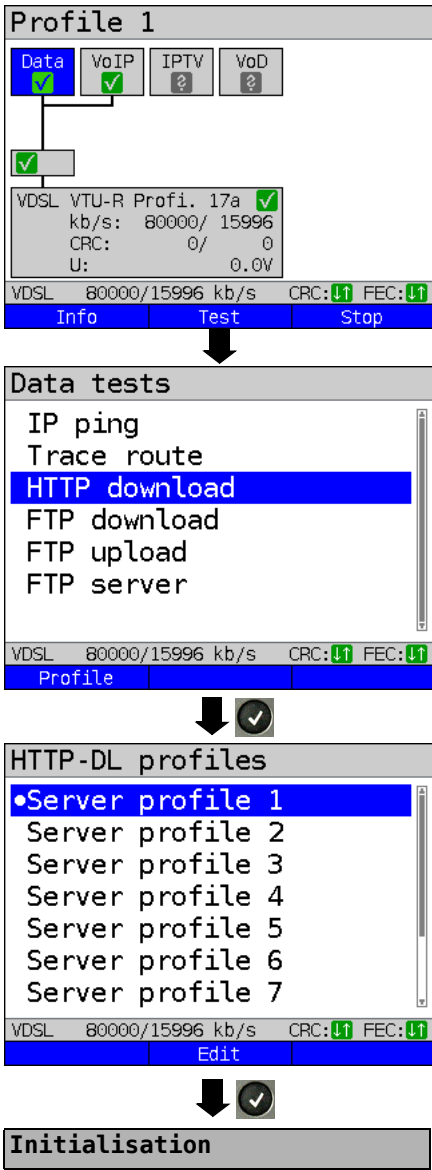
ARGUS permits parallel testing of different IP-based services (Data, VoIP, IPTV and VoD) running on xDSL or Ethernet interfaces.

The settings for each test are described in the respective chapters.

The following tests can be run in parallel. Any combination of the tests listed here is possible.

Service	Test	Remark
Data	IP ping <sup>*1</sup> , see page 120	For these tests, up to 10 tests can be conducted concurrently (incl. tests using the other services).
	Traceroute <sup>*1</sup> , see page 126	
	HTTP download, see page 130	
	FTP download, see page 137	
	FTP upload, see page 139	
	FTP server, see page 143	See remark for VoIP.
VoIP	VoIP call, see page 150	These tests can be combined with any other test. Note that only one VoIP test can be active at any time.
	VoIP wait, see page 168.	
	VoIP PESQ test, see page 290	
IPTV	IPTV, see page 170	These tests can be combined with any other test. Note that only one IPTV test can be active at any time.
	IPTV scan, see page 185	
	IPTV passive, see page 192	
VoD	VoD, see page 196	See remark for IPTV
	<sup>*1</sup> Also possible via the services VoIP, IPTV and VoD.	

The possibility of parallel testing is illustrated using HTTP download and VoIP via the services Data and VoIP. Display and operation for further parallel tests, e.g. IPTV, is performed in the same way as for Data and VoIP.



ARGUS status screen.

The VDSL VTU-R access shown in the example and the services Data and VoIP are active.

- <Info> Duration of activation
- <Test> Opens test selection.
- <Stop> Deactivates the service.



e.g. select HTTP download

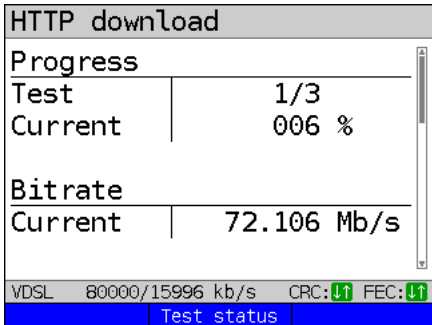
<Profile> Displays the available HTTP download profiles, see page 130.

Mark the server profile:  
(default is indicated with ●).

<Edit> Edits the marked profile, see page 130 for changes to the individual settings.

HTTP download starts automatically.

HTTP download



Display during HTTP download:

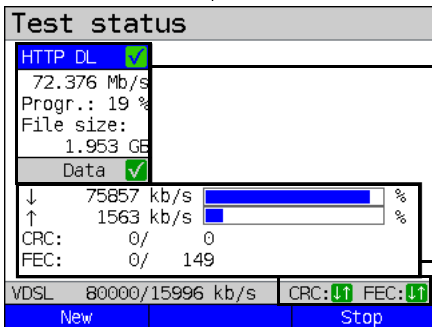
- Current download/total number of downloads, in this example the first download attempt out of three (1/3) is displayed.
- Data transferred so far (in this example 6 %)
- Current net average download rate (in this example 72,106 Mbit/s)

See page 133 for further result parameters.



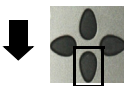
Cancels test

Test status



Display of test status:

- Currently selected test as well as test-dependent result parameters, in this example the current net average download rate, the current progress and the size of the file to be transferred. The display of results depends on the respective test. See the chapter on the individual test for more information on the result parameters.
- The current download in kbit/s is represented as a percentage of the entire downstream range.
- The current upload in kbit/s is represented as a percentage of the entire upstream range.
- Number of CRC and FEC errors in down- and upstream



Cursor down

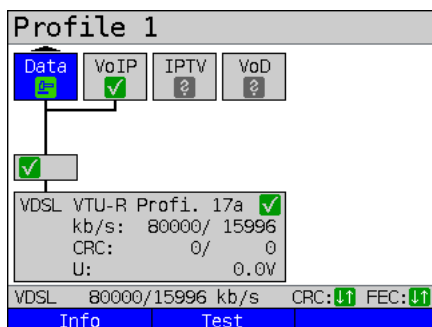


or



Switches to the test result parameters, in this example for HTTP download.

<Stop> Stops the test, in this example HTTP download.



Switch to the service  
VoIP using the cursor  
keys and open test  
selection.

ARGUS in status screen.



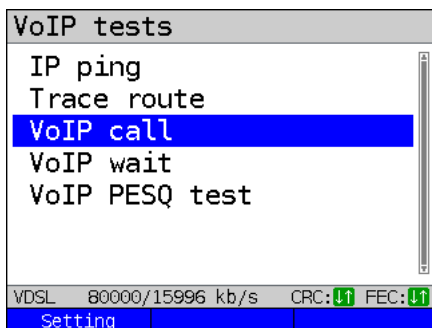
Opening test status

<Info> Duration of activation.

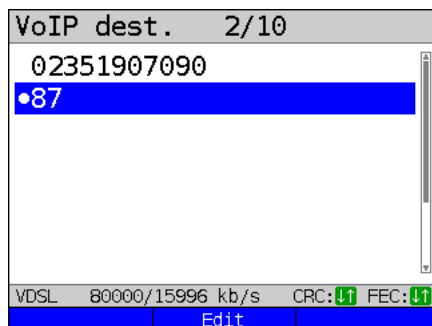
<Test> Opens test selection.



Switches to the test result  
parameters, in this example for of  
HTTP download.



e.g. select VoIP call

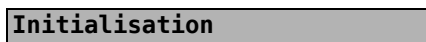


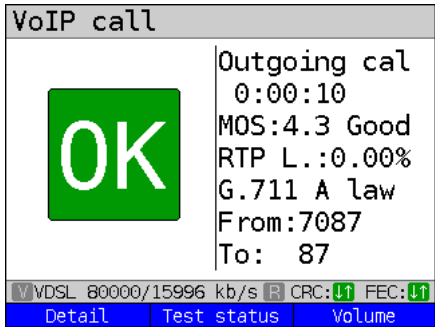
Mark the VoIP destination  
(default is indicated with ●).

Scroll down with the cursor, mark a blank  
line and add a new VoIP destination using  
<Edit>.

<Edit> Edits the VoIP destination  
number.

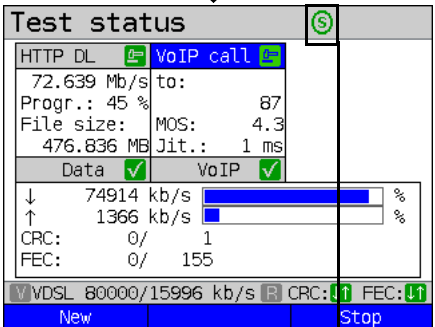
Connecting





The called subscriber has taken the call ("Connected!"), see page 159.

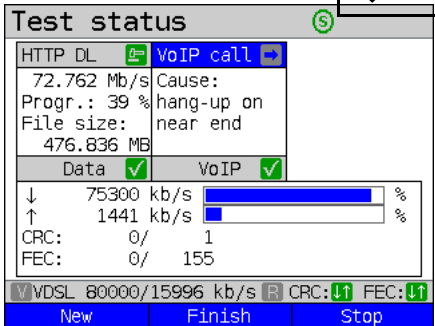
- <Info> Displays the VoIP parameters.
- <Volume> Opens volume control.



ARGUS executes an HTTP download and a VoIP call in parallel.

When more than one test is executed, you can select the tests with the left and right cursor keys. For more than three tests, the test row expands to the right.

- <New> Selects a new single test.
- <Stop> Stops the test, in this example VoIP call. Depending on the test, it can be reinitialised using <Start>. The configuration remains unchanged.
- <Finish all> Stops all tests.
- [Shift] Toggles the softkey assignment.



The VoIP call is stopped.  
 To start a new VoIP call test, the old one must be cleared by pressing [X] twice.

[X] or [G] Switches to the test result parameters, in this example from HTTP download.

- <New> Selects a new single test.
- <Stop> Stops the test.

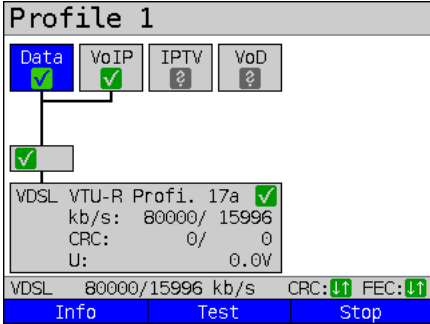




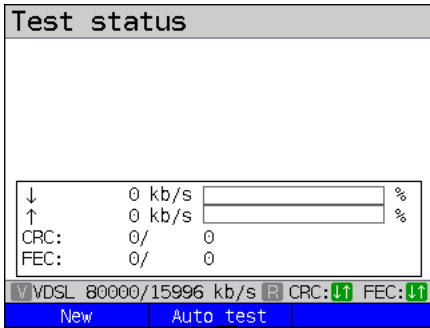
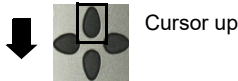
18 Auto tests

Concurrent tests (s. chapter 17 page 204) can also be executed automatically in an auto test. To to this, you can save different test scenarios in up to five auto test profiles.

The same rules as for the individual tests apply for the settings, execution and control. ARGUS in status screen.



Physical layer, virtual line and two of the services are successfully activated.

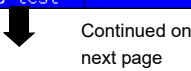


ARGUS in test status

No test has been started yet.

<New> Selects a new individual test.

<Auto test> Opens auto test profiles.



IP auto test pro.

- IP Autotest 1
- IP Autotest 2
- IP Autotest 3
- IP Autotest 4
- IP Autotest 5

VDSL 80000/15996 kb/s R CRC: ↑↑ FEC: ↑↑

Edit

ARGUS lets you preconfigure up to five auto test profiles.

IP auto test pro.

Auto test scenario

Name

VDSL 80000/15996 kb/s R CRC: ↑↑ FEC: ↑↑

Define a scenario. You can configure up to ten individual tests (see page 204).

The number of data tests (e.g. IP ping, download, ...) is limited to ten; IPTV and VoIP each can be selected only once (see page 204).



IP auto test sce.

IP ping

VDSL 80000/15996 kb/s R CRC: ↑↑ FEC: ↑↑

Change Add

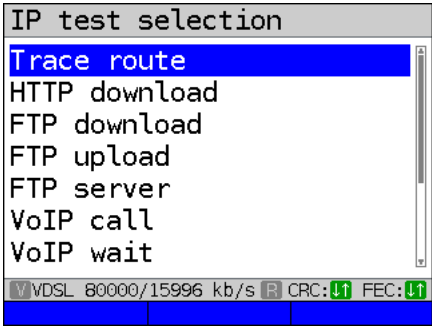
In general, at least one IP ping test is always preconfigured.

**<Change>** Replaces IP-ping with a different test.

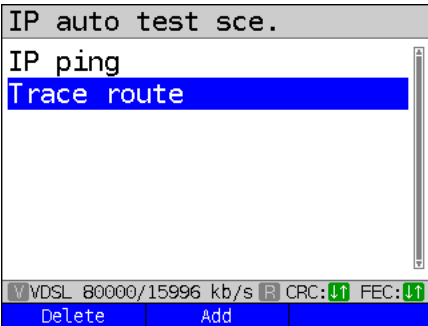
**<Add>** Adds a further test.



Continued on next page

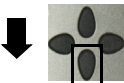
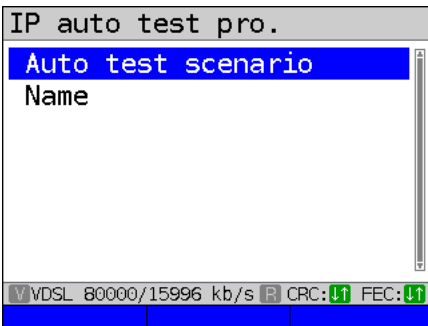


Select the desired test and confirm with



In addition to the IP ping test, a traceroute test is also started automatically and simultaneously via the auto test profile.

**<Delete>** Removes the test from the list.



Cursor down

Continued on  
next page

The scenario is accepted and saved.

IP auto test pro.

Auto test scenario

Name

V VDSL 80000/15996 kb/s R CRC: FEC:



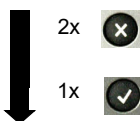
Profile name:

IP Autotest 1

13/24 signs

V VDSL 80000/15996 kb/s R CRC: FEC:

Delete ab>Ab



Test status

IP ping Tracer.

Sent: 1 Hop: 4- 3  
 Rec.: 1 Time: 0.031 s  
 Cur.: 38 ms ---  
 Max: 38 ms

Data	✓	Data	✓
↓	0 kb/s		%
↑	0 kb/s		%
CRC:	0/	0	
FEC:	0/	31	

V VDSL 80000/15996 kb/s R CRC: FEC:

New Stop


Give the auto test a clear name, like "triple-play test" or similar. Use the alphanumeric keyboard.

Exit auto test setup by pressing twice and then start the test with . see page 206 for instructions.



The individual tests are configured as described starting on page 120.

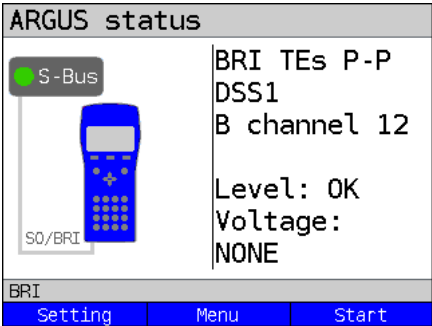
19 Operation on an ISDN Access

 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 to be tested and then switch the ARGUS on. The ISDN settings are made in the chapter 5 Configuring accesses page 25. In this example the ISDN TE mode was selected.

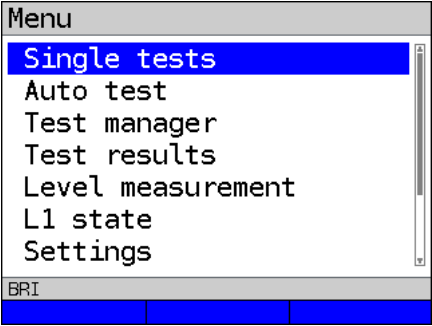
ARGUS State Display




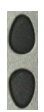

ARGUS State Display, see page 216.

- <Setting> Open the "ISDN settings" menu, see page 218.
- <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).
-  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 214), 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 (P-P 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

In the Access Menu (see page 214), 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.



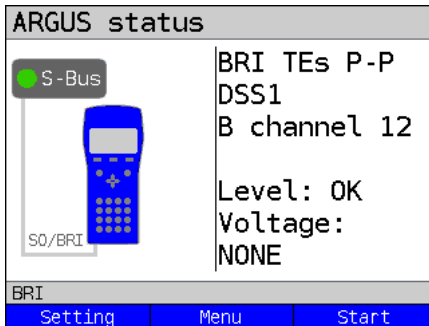
If both modes (P-P / P-MP) are found when Layer 2 on the D channel is checked, the mode must be selected manually (see page 215).

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 219 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 219)
- NTm** NT Simulation Master L1
- TEs** TE Simulation Slave L1
- TEm** TE Simulation 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



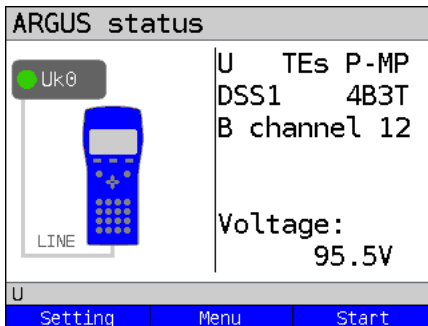
If only one B channel is available, this can have an impact on the service check and the testing of the supplementary services.



**- Level and voltage evaluation**

<b>OK normal</b>	Level/voltage is alright
<b>&lt;&lt;</b>	Level/voltage too low
<b>&gt;&gt;</b>	Level/voltage too high
<b>--</b>	No level/voltage
<b>OK INV</b>	Emergency supply
<b>&lt;Start&gt;</b>	Repeat the B channel test.
<b>&lt;Setting&gt;</b>	Open the "ISDN settings" menu, see page 218.

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.

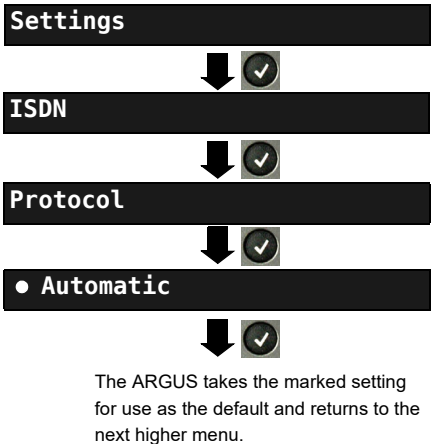
**- ARGUS State Display on a U interface**

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 351.



ARGUS - Main Menu.

Use the cursor keys to select, e.g. protocol.




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.





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: <b>No</b>

<b>Protocol</b>	<p>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.</p> <p>ISDN Protocols:</p> <ul style="list-style-type: none"> <li>- Automatic</li> <li>- DSS1</li> <li>- CorNet-N</li> <li>- CorNet-T (not for the access types "NT P-P" and "NT P-MP")</li> <li>- CorNet-NQ (for the access types "TE P-P" and "NT P-P" only)</li> <li>- QSIG (for the access types "TE P-P" and "NT P-P" only)</li> <li>- VN4</li> </ul> <p>Default setting: <b>Automatic</b></p>
<b>Alerting mode</b>	<p>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.</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <p>With the Manual setting, an incoming call must be answered within 20 seconds or it will be lost.</p> <p>Furthermore, you should note that the remote subscriber will not hear a ringing tone.</p> <p>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.</p> </div> </div> <p>Default setting: <b>Automatic</b></p>
<b>Clock mode</b>	<p>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).</p> <p>Setting:</p> <p>In NT mode:       <b>Master</b></p> <p>In TE mode:       <b>Slave</b></p> <p>Leased line:       <b>Slave</b></p> <p>Any change to this setting will not be saved permanently; it will only apply to the current measurement.</p>

<b>BRI termination</b>	<p>You can add terminating resistors to a BRI access.</p> <p>Setting:</p> <p>In NT mode:       <b><i>Terminating resistor switched in</i></b></p> <p>In TE mode:       <b><i>No terminating resistor is switched in</i></b></p> <p>Leased line:       <b><i>No terminating resistor is switched in</i></b></p> <p>Any change to this setting will not be saved permanently; it will only apply to the current measurement.</p>
<b>Call parameters</b>	<p>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):</p> <p>1. Type of number (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal</p> <p>    Network-side:   Net CGN TON                       Net CDN TON</p> <p>    User-side:       User CGN TON                       User CDN TON</p> <p>    Default setting: <b><i>unknown</i></b></p> <p>2. Numbering Plan for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal:</p> <p>    Network-side:   Net CGN NP                       Net CDN NP</p> <p>    User-side:       User CGN NP                       User CDN NP</p> <p>3. CGN/CDN Subaddress     CGN/CDN Subaddress Type: User specific and NSAP     Default setting: <b><i>User specific</i></b></p> <p>4. UUI (User User Info)</p> <p>*For more information, see Prefix on page 221.</p>
<b>Services</b>	<p>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).</p>

<b>Call acceptance</b>	<p>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.</p> <p>Prerequisite:</p> <ul style="list-style-type: none"> <li>- 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 354).</li> <li>- the incoming call must have a destination MSN</li> </ul> <p>Default setting: <b>all MSN/DDI</b></p>
<b>Voice coding</b>	<p>There are two options for coding voice data in a B channel:</p> <ul style="list-style-type: none"> <li>- <b>A-law</b> (Default setting)</li> <li>- <math>\mu</math>-law</li> </ul>
<b>DTMF / Keypad</b>	<p>DTMF or Keypad setting</p> <p>Default setting: <b>DTMF</b></p>
<b>CUG Index</b>	<p>Enter the CUG index that the ARGUS should use when testing the CUG (Closed User Group) service.</p> <p>Range: 0 to 32 767</p> <p>Default setting: <b>148</b></p>
<b>Keypad</b>	<p>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.</p> <p> Edit the selected Keypad Info. Afterwards, use the keypad to enter the Keypad Info.</p> <p> Save the Keypad Info.</p>
<b>Prefix</b>	<p>Entry of the national or international telephone prefix. The prefix is selected in "Call parameters" under the selection "Type of number", see page 220.</p> <p>National: <b>0 (Default setting)</b></p> <p>International: <b>00 (Default setting)</b></p>
<b>AOC</b>	<p>Set whether the NT simulation charging information is to be transmitted.</p> <p>Default setting: <b>On</b></p>

### 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 be 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 106.

### 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  $1 \times 10^{-7}$ , in other words in long-term operation 1 bit error in 10 million transmitted bits. A higher bit error rate will be especially noticeable in transmitting data.

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

In the bit error 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 230, 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



**BERT**

The procedure for configuring a parameter will be illustrated with a single example. The default settings can be restored at any time (see page 351).





**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
<b>BERT:</b>	
<b>BERT time</b>	<p>You can use the keypad to enter measurement times ranging from 1 minute to 99 hours and 59 minutes (= 99:59).</p> <p> 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 .</p> <p>Default setting: <b>00:00</b> (continuous)</p> <p>In the case of an Autom. Test (<b>see chapter 19.9 Automatic Performance of Multiple Tests, page 250</b>) the ARGUS will automatically set this to a value of 1 minute.</p>
<b>Bit pattern S/T/U</b>	<p>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</p> <p>Default setting: <b>2<sup>11</sup>-1</b></p> <p>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.</p> <p><b>&lt;Delete&gt;</b> Changes the digit before the cursor from 1 to 0</p>
<b>Error level</b>	<p>This is the level used to evaluate whether the BERT had an "acceptable" bit error rate.</p> <p>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.</p> <p>Using the keypad, this parameter can be set to any value from 01 (= <math>10^{-01}</math>) to 99 (= <math>10^{-99}</math>).</p> <p>The default threshold (error level) is <b>10<sup>-06</sup></b> (1E-06). That means that, in the event that the bit error rate is less than <math>10^{-06}</math> (one error in <math>10^6 = 1,000,000</math> sent bits), the bit error rate test will be evaluated as "OK".</p>
<b>HRX value</b>	<p>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 %.</p> <p>Default setting: <b>15 %</b></p>



## BERT Start

Single tests



BERT



BERT start



Enter the phone number



Select service



Select B channel



BERT active

```

2^11          B01
synchronous
Sync.time:    00:00:17
LOS:          0
Error:        0

```

BRI

Reset

TM

Error

ARGUS - Main Menu.

The speed-dialling memory will now open (see page 354). 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.



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

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

<b>&lt;Error&gt;</b>	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).
<b>&lt;TM&gt;</b>	Open the Test Manager, see page 266.
 or <b>&lt;Reset&gt;</b>	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 349, Alarm tone).

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:**

BERT result	
OK	
sent data:	2564kb
sync.time:	00:00:41
Nb. LOS :	0
LOS time :	00:00:00
abs. err.:	0
BRI	
Save	TM
More	



BERT result	
OK	
sent data:	2564kb
sync.time:	00:00:41
Nb. LOS :	0
LOS time :	00:00:00
abs. err.:	0
rel. err.:	0.0
BRI	
Save	TM
More	



BERT G.821		
HRX:	15.00%	OK
EFS:	100.00%	41
ES :	0.00%	0
SES:	0.00%	0
US :	0.00%	0
AS :	100.00%	41
DM :	0.00%	0
BRI		



Scroll through the results

- The evaluation of the results depends on the error threshold (in this example OK), see page 224.
- 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)

<b>HRX</b>	Defines the hypothetical reference connection.
<b>EFS</b>	Error Free Seconds: The number of seconds in which no error occurred.
<b>ES</b>	Errored Seconds: The number of seconds in which one or more errors occurred.
<b>SES</b>	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.
<b>US</b>	Unavailable Seconds: The number of all sequentially adjacent seconds (at least 10 sec) in which $BER > 10^{-3}$ .
<b>AS</b>	Available Seconds: The number of all sequentially adjacent seconds (at least 10 sec) in which $BER < 10^{-3}$ .
<b>DM</b>	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).
<b>LOS</b>	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 354) in the next free memory location (see page 338). If all of the memory locations are used, the ARGUS will request permission to overwrite the oldest test results.

BERT result	
OK	
sent data:	2564kb
sync.time:	00:00:41
Nb. LOS :	0
LOS time :	00:00:00
abs. err.:	0
BRI	
Save	TM More



ARGUS info	
Save test result?	
BRI	
No	Back Yes

Use the keypad to enter the name under which the ARGUS should save the results, for more information see page 338.

BERT - saving the result



BERT start
------------

Display the saved BERT results, see page 339.

**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.

Single tests

ARGUS - Main Menu.



BERT



BERT wait

Activate "BERT wait"



BERT active

2^11

B01

synchronous

Sync.time: 00:00:17

LOS: 0

Error: 0

BRI

Reset

TM

Error

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 266).

For information on the displays shown, see "BERT start" on page 224.



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



### BERT



### B channel loop



#### B-channel loop

wait active

BRI

TM

Menu

ARGUS - Main Menu.

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 266).

**<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 266) the ARGUS will return to the "B channel loop, wait active" display.



Exit the "B channel loop" mode.

#### B-channel loop

B01 Telephony ISDN  
from:123  
to : 1234  
TON:Unknown  
NP :unknown  
CR value: 4  
length/flag: 1/1

BRI

TM

Menu

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 266).

**<Menu>** Open the Main Menu.

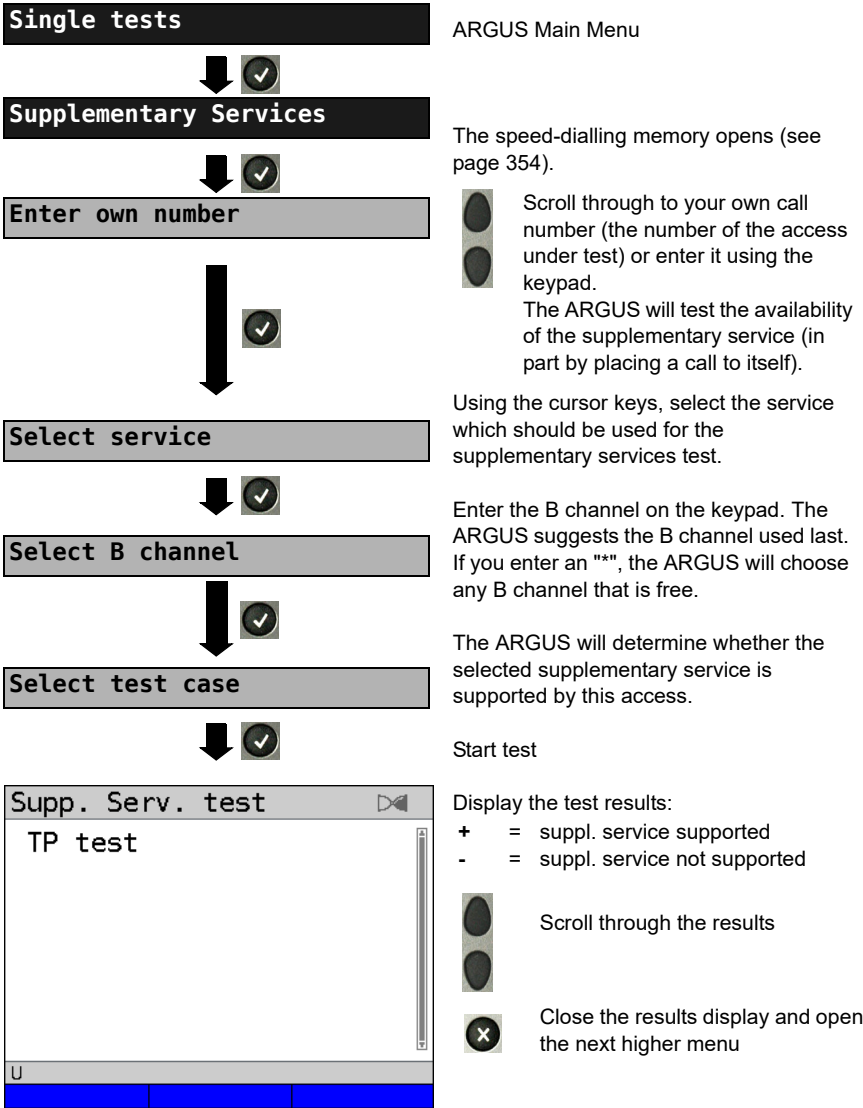


Clear down the B channel loop connection; the B channel loop, however, remains active!


19.5 Supplementary Services Test


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

Suppl. service interrogation in DSS1





Test	Explanation
<b>TP</b>	The ARGUS tests the TP (Terminal Portability) supplementary service by making a self call.
<b>HOLD</b>	The ARGUS tests the HOLD supplementary service by making a self call.
<b>CLIP</b>	<p>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.</p> <p>CLIP: Will the calling subscriber's number be displayed at the called subscriber?  t = CLIP temporarily available  p = CLIP permanently available</p> <p>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</p> <p>COLP: Will the call number of the subscriber who answered be displayed on the caller's phone?</p> <p>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.</p> <p> 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.</p>
<b>DDI</b>	Can a caller directly dial in to an extension on the PBX access under test?
<b>CF</b>	<p>The ARGUS will check whether the 3 supplementary services CFU, CFB and CFNR are supported.</p> <p>CFU: Can this access immediately forward an incoming call?</p> <p>CFB: Can this access forward an incoming call when it is busy; in other words does it support Call Forwarding Busy?</p> <p>CFNR: Can this access forward an incoming call when it is not answered?</p>

	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.
<b>CW</b>	Does the access under test support call waiting?
<b>CCBS / CCBS-T</b>	Will the access under test automatically recall a remote subscriber if the number called was busy?
<b>CCNR / CCNR-T</b>	Will the access under test automatically recall a remote subscriber if the call was not answered?
<b>MCID</b>	Does the access tested allow identification of malicious callers (call tracing)?
<b>3pty</b>	Does the access under test support a three-party conference call? For this test, you need the assistance of a remote subscriber, whose call number must be entered. A connection is necessary.
<b>ECT</b>	Is an explicit call transfer supported by the access under test? For this test, you need the assistance of a remote subscriber, whose call number must be entered. A connection is necessary.
<b>CUG</b>	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.
<b>CD</b>	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.
<b>AOC</b>	The ARGUS checks whether the charges can be sent to the access under test. The test uses a call to oneself to check both AOC-D (AOC during a call) and AOC-E (AOC at the end of a call).
<b>SUB</b>	A call is made to oneself and answered to check the transfer of the sub-address in both directions. Are sub-addresses supported on the access under test?
<b>UUS</b>	Does the access under test support the transfer of user data?

<b>No Screening</b>	If the caller supports CLIP No Screening (CNS) 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.
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## 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 372).

A few error codes and their meaning:

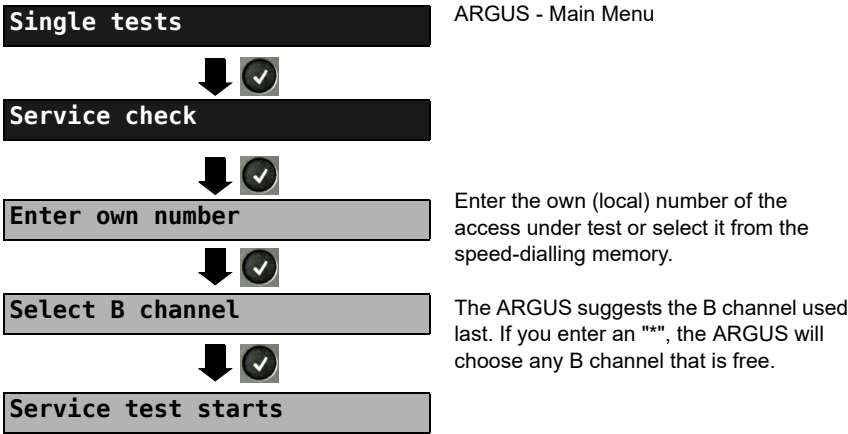
Description	Cause (from network) DSS1	Cause ARGUS internal
no or another access	—	201, 204, 205, 210, 220
wrong or invalid number	1, 2, 3, 18, 21, 22, 28, 88	152, 161, 162, 199
one or more B channels busy	17, 34, 47	—
wrong service	49, 57, 58, 63, 65, 70, 79	—

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 220)	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.





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:

Service check	
Speech	+*162
UDI 64kBit	+*162
3.1 kHz audio	+*162
7 kHz audio	+*162
UDI-TA	+*162
Telephony ISDN	+*162
Fax G3	+*162
BRI	

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.

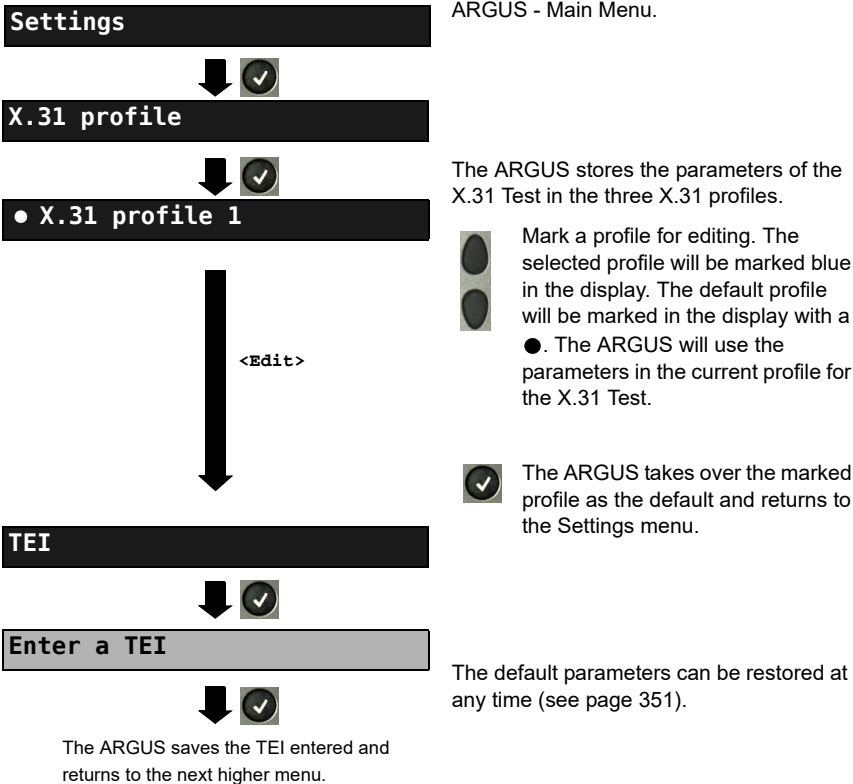
If the outgoing call is not successful, it is not possible to make a statement about an incoming call. Therefore, you will never see “- +” or “- \*” on the display.

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



Setting	Explanation
<b>X.31 profile:</b>	Up to three user-defined X.31 profiles can be created. <Edit> The selected profile will be opened for editing.
<b>Packet number</b>	Number of packets sent Range: 0 to 65 000 Default setting: <b>10</b>
<b>TEI</b>	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: <b>** (automatic)</b>
<b>LCN</b>	Entry (from the keypad) of the LCN (Logical Channel Number) to be used in the X.31 test. Range: 0 to 4095 Default setting: <b>1</b>
<b>Packet size</b>	Size of the data packets: 16, 32, 64, 128 or 256 bytes. Default setting: <b>128 Bytes</b>
<b>Agree packet size</b>	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: <b>No</b>
<b>Window size</b>	Window size of Layer 3, selection of 1 to 7 packets. Default setting: <b>2 Packets</b>
<b>Agree window size</b>	Negotiate between the terminal (DTE) and the network (DCE) an agreement regarding the window size. Default setting: <b>No</b>
<b>Throughput</b>	Data throughput in bits/s: 75, 150, 300, 600, 1200, 2400, 4800 or 9600 bits/s. Default setting: <b>1200 bit/s</b>
<b>Agree throughput</b>	Agree on the data throughput Default setting: <b>No</b>

User data

ASCII data

• ASCII data 1/3

Enter ASCII data

Save ASCII data

Content of the user data

- Format setting for the user data

- Entry of the ASCII data

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).

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>

<ab>AB>

<AB>12>

<Delete>

X

Entry of the digits 0 to 9 plus \* and #

Entry of lowercase characters (e.g. to enter a "C" press the "2" on the keypad three times), plus @, /, -, and .

Entry of the uppercase characters and @, /, - and .

Move the cursor




Delete the character before the cursor

Do not save ASCII data.

240

ARGUS 162



<div> <div>Hex data</div> <div>↓ </div> <div>● Hex data 1/3</div> <div>↓ &lt;Edit&gt;</div> <div>Enter hexadecimal data</div> <div>↓ </div> <div>Save hexadecimal data</div> <div>&lt;Delete&gt;</div> <div></div> </div> <div> <p>- Entry of the hexadecimal data:</p> <p>Select one of the three available memory locations for the hexadecimal data (in this example, the first location 1/3)</p> <p>Use the keypad to enter the hex value. To enter the values "A...F", use the softkey &lt;A...F&gt; (e.g. to enter a "C", press the softkey &lt;A...F&gt; three times). To confirm the entry of the hexadecimal characters A to F press &lt;OK&gt; (the softkey in the middle changes from &lt;Delete&gt; to &lt;OK&gt;).</p> <p>Delete the character before the cursor</p> <p>Do not save the hexadecimal values.</p> </div>	
<b>CUG</b>	Closed User Group. Default setting: <b>No</b>
<b>CUG Index</b>	Coding for Closed User Group Range: min. 0 to 255 max. Default setting: <b>1</b>
<b>D bit</b>	Local: DCE acknowledges data packets, i. e. flow control on local DTE-DCE path. End-to-end: DTE-DTE flow control Default setting: <b>Local</b>
<b>Facilities</b>	Coding for various supplementary services A maximum of 3 facilities can be stored. For instructions, see User data on page 240.
<b>Profile name</b>	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 354). With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.

#### Single tests

ARGUS Main Menu.

#### X.31 Test

#### • X.31 profile 1

Select the profile.

<Edit> Change to the profile parameters (see page 239).

The parameters can be edited.

#### Automatic

#### D channel

Start test

#### X.31 Test

current TEI:

10

previous TEI:

09 NOK

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

BRI

**Test results**

X.31 Test	
TEI	: 02
Schicht 2:	+
Schicht 3:	- 13 67
BRI	

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

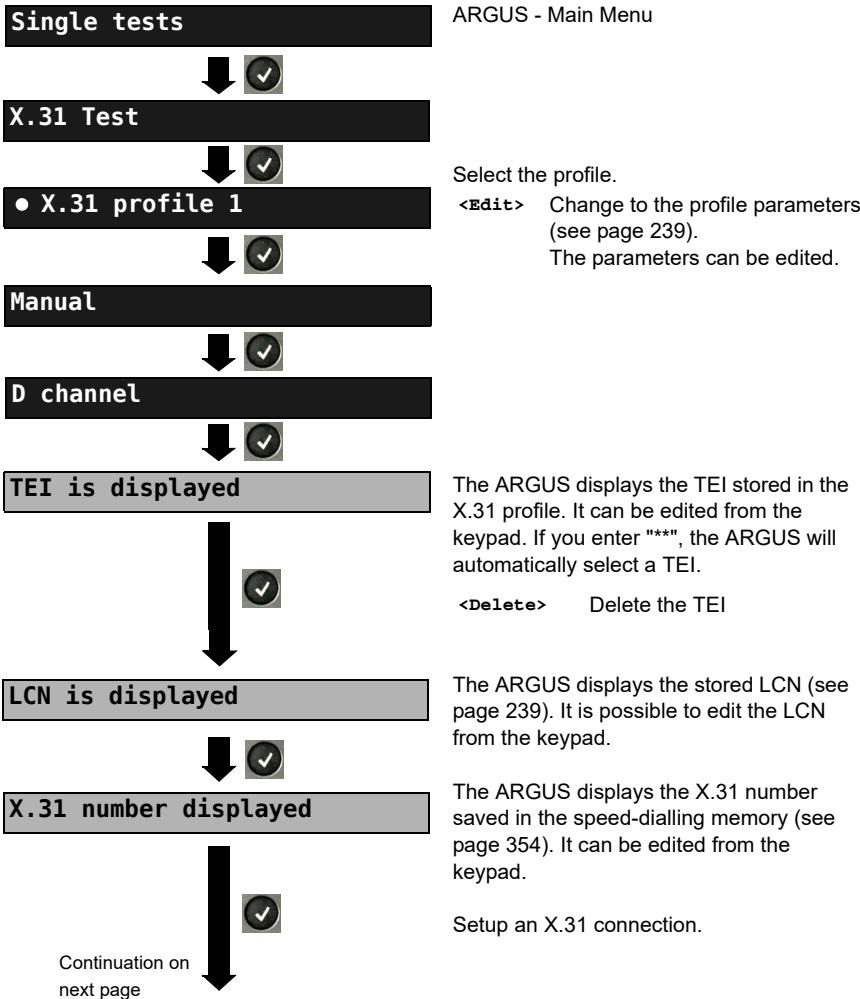
**Layer 3**      + Second test step was successful  
                  - Second test step was not successful  
                  In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above: 13) and the associated diagnostic code, if there is any (see the Appendix page 373).

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.



<b>X.31 (D) test</b>		
X.31 (D) OutCall		
LCN:	1	TEI: 2
to:	123	
BRI		



<b>Save X.31 test?</b>
------------------------

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

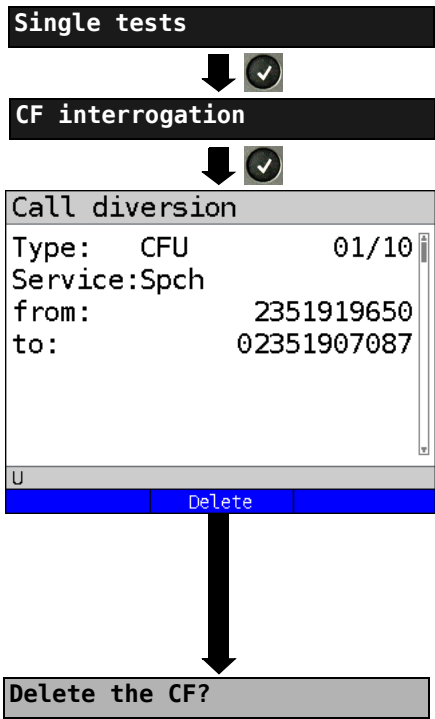
The X.31 connection will be maintained until the user or the remote end clears it. When the X.31 connection is cleared, the ARGUS will automatically clear the D channel connection.

**<Yes>** The ARGUS saves the results (see page 338).

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, CFU)
- 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 (01/10)
- 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.



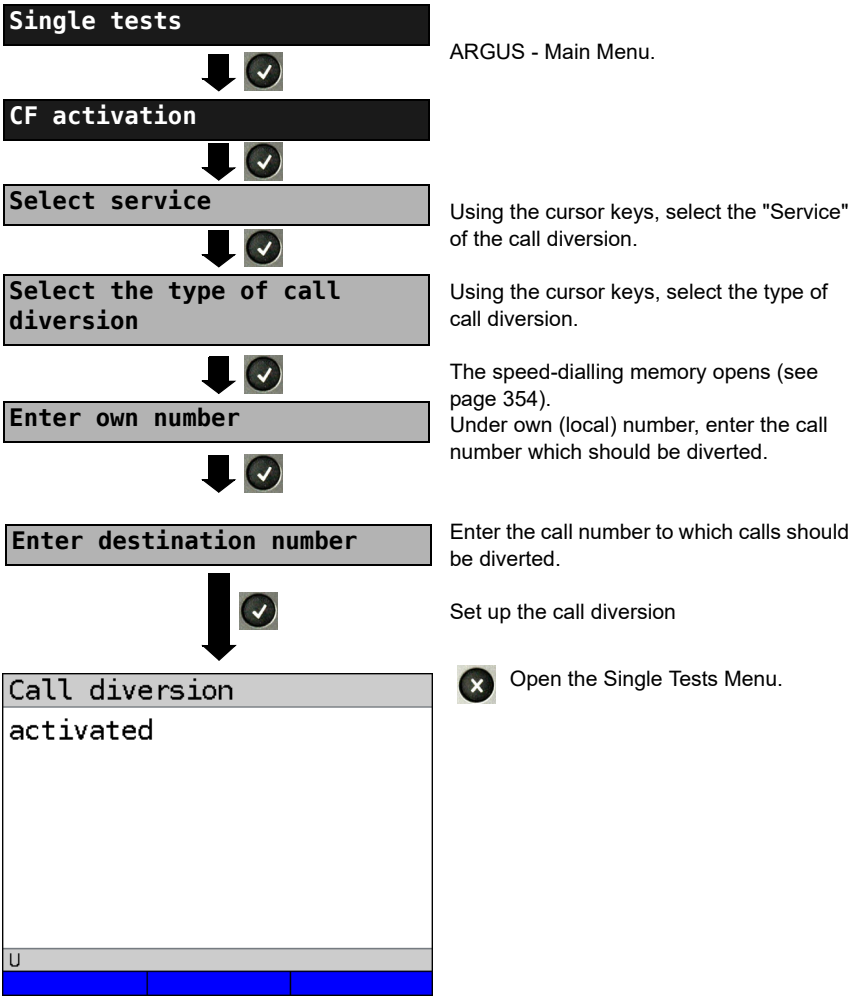
Some PBXs or exchanges do not permit the use of the mechanism used (by the ARGUS) for the interrogation of the call diversions for all MSNs or they return a negative acknowledgement of the interrogation of call diversions, implying that no call diversions have been set up. In the event of a negative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

<b>Bearer Service</b>	<b>Abbreviation</b>
All services	<b>A11</b>
Speech	<b>Spch</b>
Unrestricted Digital Information (data telecommunications)	<b>UDI</b>
Audio 3.1 kHz	<b>A3k1H</b>
7 kHz audio	<b>A7KHz</b>
Telephony 3.1 kHz	<b>Te131</b>
Teletext	<b>TTX</b>
Fax Group 4	<b>FaxG4</b>
Video syntax based	<b>ViSyB</b>
Video Telephony	<b>ViTe1</b>
Telefax Groups 2/3	<b>FaxG3</b>
Telephony 7 kHz	<b>Te17k</b>

CF Activation

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





## 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 354).

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



**Call diversion deleted**

Delete call diversion



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 223) should be checked before the automatic test series is begun.

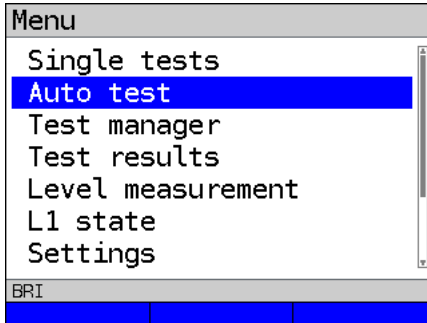
Using the ARGUS WINplus or WINanalyse software, the test results can be saved on a Windows PC. On the PC, WINplus / WINanalyse can be used to generate a comprehensive report that can then be printed, sent by e-mail and/or archived. The ARGUS automatically performs the following sequence of single tests:

#### **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

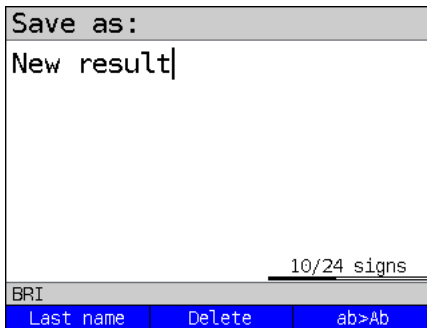
#### **On a BRI S/T or U interface leased line (permanent circuit)**

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

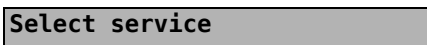
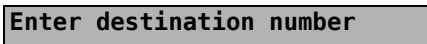


ARGUS - Main Menu


Select Auto test.



Select the memory location. For each memory location used, the ARGUS will display the name assigned to the memory location (in this example, New result).



**Start the automatic test**

Press the  on the numeric keypad to directly access a memory location. A indirection through the main menu is not necessary.

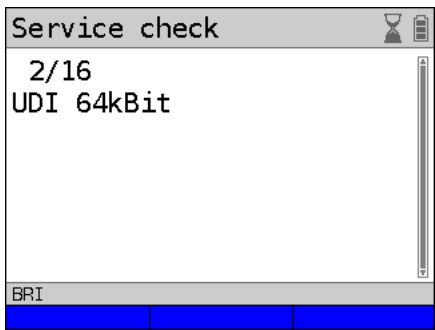
#### In TE mode:

Enter the "Own number"; on accesses using the DSS1 protocol you must also enter a "remote number".

Select service (required for Supp.Serv.test and BERT).

During the test sequence, the ARGUS will display the single test currently running.

**Terminating the test (early):**



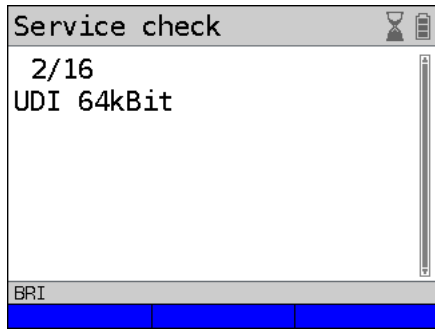
**Interrupt test**



Open the  
next higher menu.

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.

**Skipping individual tests:**



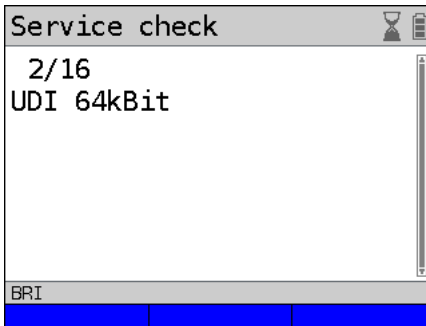
**Stop current test**



In this case, the  
ARGUS will execute  
the next single test.

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

Stop the current 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

**Test - resuming**



The ARGUS repeats the "interrupted" single test (in the example: a Service check).

**For information on displaying the test results, see page 339.**

### 19.10 Connection

The ARGUS can set up a connection for the following services:

<b>Service</b>	<b>Display</b>
Speech	<b>Speech</b>
Unrestricted Digital Information (data telecommunications)	<b>UDI 64kBit</b>
3.1 kHz audio	<b>3.1 kHz audio</b>
7 kHz audio	<b>7 kHz audio</b>
Data transfer with tones & displays	<b>UDI-TA</b>
Telephony	<b>Tel. ISDN</b>
Telefax Groups 2/3	<b>Fax G3</b>
Fax Group 4	<b>Fax G4</b>
Combined text and facsimile communication	<b>Mixed</b>
Teletex Service basis mode	<b>Teletex</b>
International interworking for Videotex	<b>Videotex</b>
Telex	<b>Telex</b>
OSI application according to X.200	<b>OSI</b>
7 kHz Telephony	<b>7 kHz</b>
Video telephony, first connection	<b>Videotel. 1</b>
Video telephony, second connection	<b>Videotel. 2</b>
Three user-specified services (see, page 220)	<b>User-specified 1 to 3</b>

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.

### Single tests

### Connection

### Overlap sending

### Select service

### B channel select

### Outgo.call

```
B01 Telephony ISDN
from:02351919650
to :
CR value:      4
length/flag:   1/0
```

BRI

TM

Volume

Continuation on  
next page

### 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 257)
- Redialling (see page 258)
- Keypad dial (see page 262).

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 354 (from:)
- The number dialled (to:)
- Other information depending on the access, e.g. TON and NP

**<TM>** Start the Test Manager, see page 266.

**<Volume>** Set the volume

 or  Cancel setup

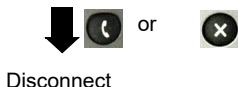
Connection		
B01 Telephony ISDN		
from:02351919650		
to :		
AOC:		
	0.100	EURO
CR value:	5	
length/flag:	1/0	
BRI		
	TM	Volume

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



Disconnect

<TM> Start the Test Manager, see page 266.

<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.

**Single tests**

ARGUS - Main Menu

**Connection**

<Call no.> Open the call number entry dialog

**En-bloc**

**Enter the phone number**

The speed-dialling memory opens (see page 354).

Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

**Select service**

The ARGUS will open the Outgo. call display, operation like by overlap sending.

**B channel select**

Enter the B channel on the keypad (for details on entry, see "Overlap sending").

**Outgo.call**

B01 Telephony ISDN  
from:02351919650  
to :  
CR value: 4  
length/flag: 1/0

For more information on the displays and operation, see Overlap sending page 255.

BRI

TM

Volume

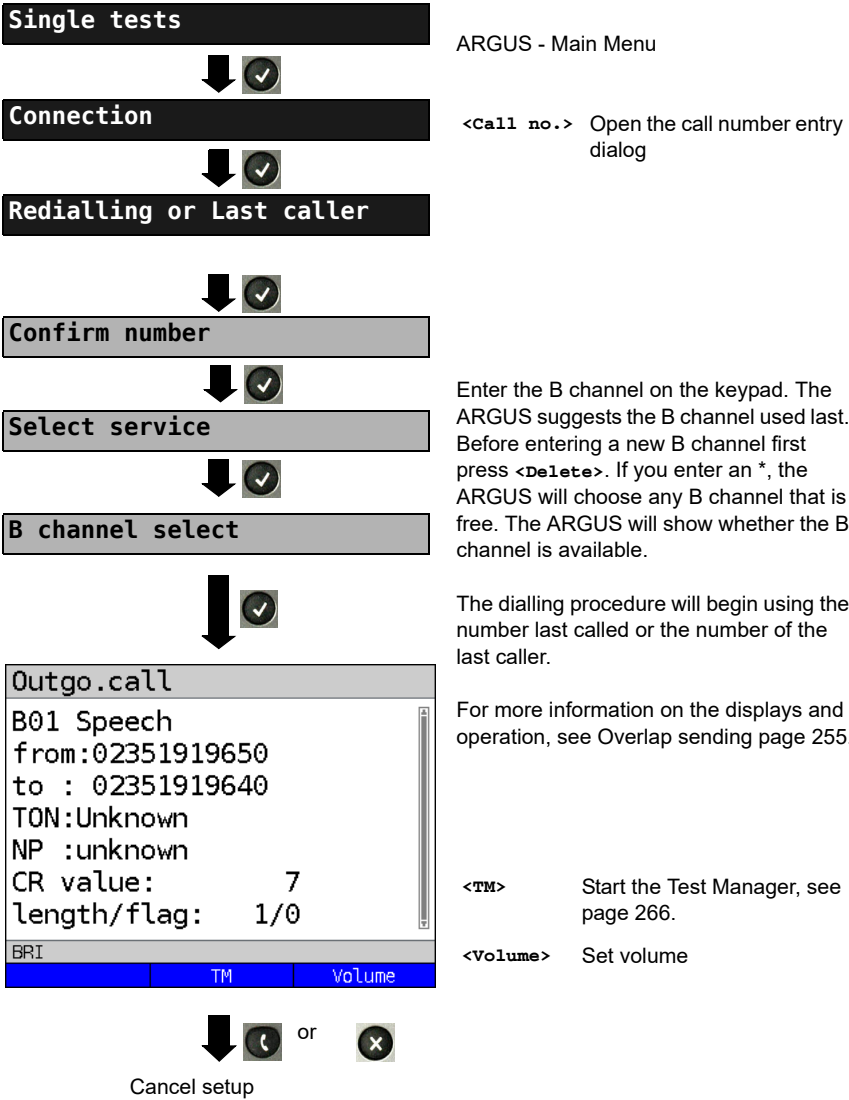
<TM> Start the Test Manager, see page 266.

<Volume> Set volume

Cancel setup

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.



## Incoming Call

An incoming call can be taken at any time even when a test (e.g. a BERT) is in process (see page 267). 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 221) 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 354) and the incoming call has a destination MSN.

Incom.call	
B01 Speech	
from:02351919640	
to :	
CR value:	4
length/flag:	1/1
BRI	
Reject	Accept

Reject call

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 219).

Accept call

Connection	
B01 Speech	
from:02351919640	
to :	
CR value:	4
length/flag:	1/1
BRI	
TM	Volume

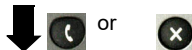
Depending on the type of access additional information will be displayed (in the example, CR value and length/flag).



The call number of the last incoming call will be saved in the "Last caller" memory location.

<TM> Start Test Manager, see page 266.

<Volume> Set volume.



Disconnect

The ARGUS displays the cause of the disconnect (see page 260).

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

Connection

B01 Speech  
from:02351919640  
to :  
CR value: 4  
length/flag: 1/1

BRI

TM

Volume



Call clearing

Active clearing  
Location: user  
CR value: 4  
length/flag: 1/1

BRI

TM

Volume

- <TM> Start Test Manager, see page 266
- <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:

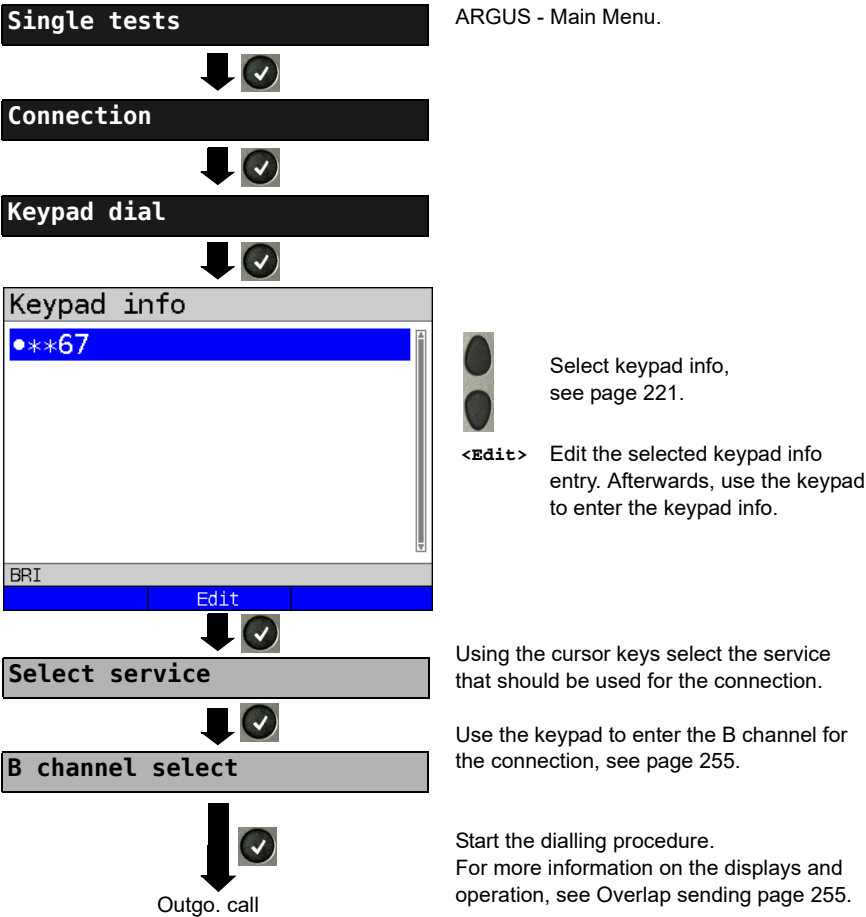
Reason	Display	Explanation
255	Active clearing	Clearing User actively initiated the disconnection
Length 0	Normal clearing	Cause element with Length 0
01	unalloc. number	Signals “No access under this call number”
16	Normal clearing	Normal clearing
17	User busy	The number called is busy
18	No user respond	No answer from the number called
19	Call time too long	Call time too long

<b>21</b>	Call reject	The call is actively rejected
<b>28</b>	Wrong number	Wrong call number format or call number is incomplete
<b>31</b>	Norm. clearing	Unspecified "normal class" (Dummy)
<b>34</b>	No B chan.avail.	No circuit / B channel available
<b>44</b>	Req.chan.unavail	Requested B channel not available
<b>50</b>	Req.fac.not subs	Requested supplementary service (facility) not subscribed
<b>57</b>	BC not authoriz.	Requested bearer capability is not enabled
<b>63</b>	Srv./opt.n.avail	Unspecified for "Service not available" or "Option not available"
<b>69</b>	Req.fac.not impl.	Requested facility is not supported
<b>88</b>	Incompat. Dest.	Incompatible destination
<b>102</b>	Timer expired	Error handling routine started due to time-out
<b>111</b>	Protocol error	Unspecified for "protocol error class"
<b>127</b>	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 372).

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.



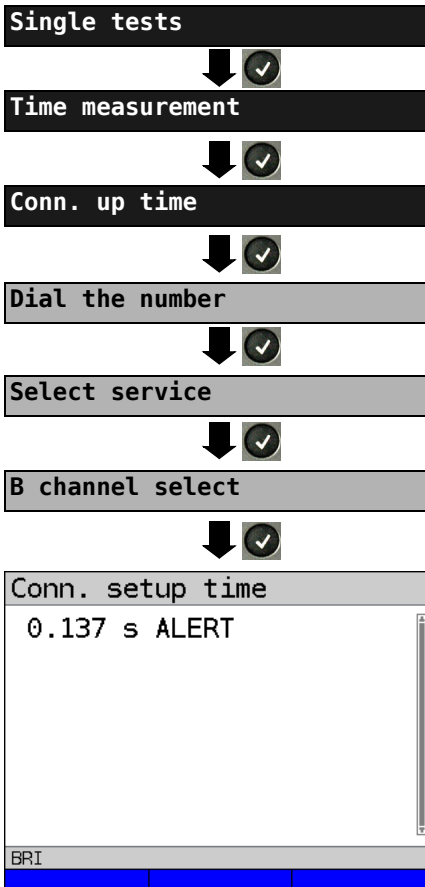
## 19.11 Time Measurement

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.



ARGUS Main Menu

The speed-dialling memory opens (see page 354). 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

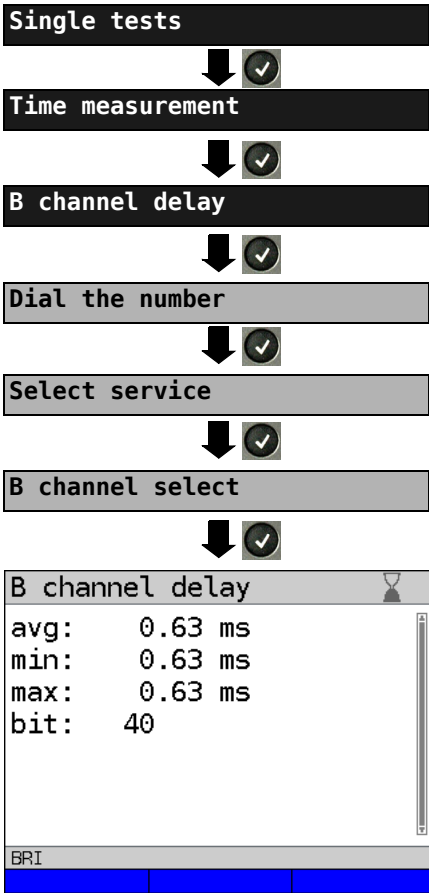
Display:

- 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 370) 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 354). 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  $\mu$ s 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

### Time measurement

### Interchannel delay

### Enter remote number

The speed-dialling memory opens (see page 354).

Use the cursor keys to scroll to desired the number or enter a new number.

### Select service

Perform measurement

**Interchan.delay**

avg:	0.13 ms
min:	0.13 ms
max:	0.13 ms
bit:	8

BRI

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.

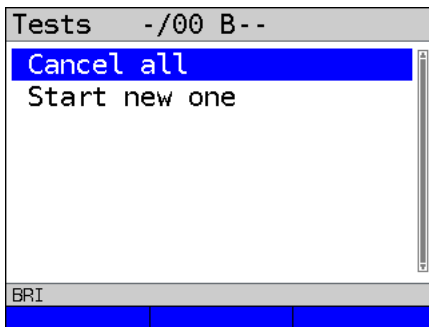
If the measurement cannot be performed (e.g. because the call number entered was wrong or no B channel is free) the ARGUS will display the corresponding cause. If the ARGUS does not receive the data back in the B channel within 13 seconds, it will display the message "No loop".

### 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

Connection	
B01 Speech	
from:02351919640	
to :	
CR value:	4
length/flag:	1/1
BRI	
	TM
	Volume

Example:

There is a connection on B channel 1.

**Start new one**

**Single tests**


**Bit error rate test**

**BERT active**

2^11	B01
synchronous	
Sync.time:	00:00:17
LOS:	0
Error:	0
BRI	
Reset	TM
	Error

**Outgoing call**

Open the  
Connection display.

Open the Test Manager (can also be opened by pressing the -key).

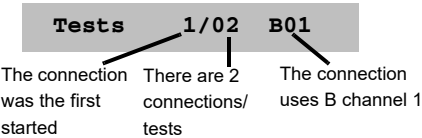
Select the desired test (e.g. bit error rate test, BERT).

Start BERT, the connection is still setup.

For information on running a BERT, see page 224.

Open the Test Manager, mark "Outgoing connection".

An example of the display



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 254). 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.

Incom.call	
B01 Speech from:02351919640 to : CR value: 4 length/flag: 1/1	
BRI	
Reject	Accept

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.

Connection	
B01 Speech from:02351919640 to : CR value: 4 length/flag: 1/1	
BRI	
TM	Volume

Mark "BERT outgoing".

Switch to BERT.

BERT outgoing	
	
	
BERT active	

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

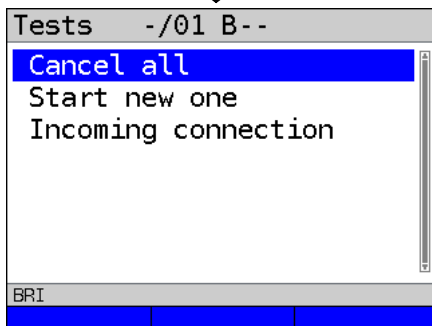
**Test Manager**

ARGUS - Main Menu.



Open the Test Manager

<TM> Opens the Test Manager directly in  
or the Single Tests Menu if a  
connection has already been setup  
or if the ARGUS is running a test.



All tests will be terminated and  
all connections cleared down.

### 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?

#### L1 State

ARGUS - Main Menu

#### L1 status

TE: info 3

NT: info 4

BRI

New

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

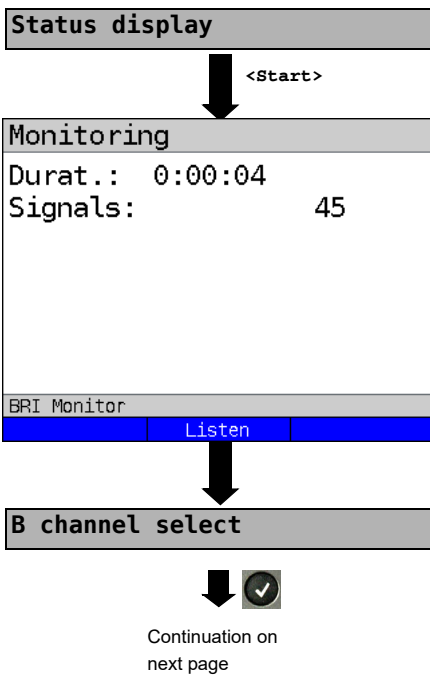


Close the display and open the Main Menu.

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.

The Monitor settings are made in the chapter 5 Configuring accesses page 25.



Monitoring is not yet active!

Start monitoring

The ARGUS displays the recording time in h:min:sec and the number of recorded signals.



Stop monitoring.

Listening-in on voice data

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.



Monitoring		
Durat.: 0:00:20		
Signals:		170
BRI Monitor		
	Mute	

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.

**Display call parameters**

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

Status display

Monitoring is not active!

<Menu>

Listening-in

Network-side

B channel select

Listening-in

It is possible to passively listen-in on the network-side, the terminal-side or both sides.

Enter the B channel from the keypad (first press <Delete>) or use the cursor keys to set it.



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 219). 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 status

 S-Bus



SO/BRI

BRI LLs

Level: OK  
 Voltage:  
 NONE

BRI Leased Line

Setting

Menu



B channel select



Setup the telephone connection



Disconnect

The Leased line settings are made in the chapter 5 Configuring accesses page 25.

**<Setting>** ISDN parameter configuration, see page 218.

Enter the B channel from the keypad (first press **<Delete>**) or use the cursor keys to set it.

The ARGUS will display the B channel used and the duration of the leased line (in h:min:sec).

**<Volume>** Set the volume

**<TM>** Start the Test Manager, see page 267.  
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 223. 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 222, Parameter settings, page 224), however, you need not enter call numbers or select a service.

**Single tests**



**Bit Error Rate Test**



**BERT start**



**B channel (64k)**

Continuation on  
next page



In the case of a BRI in end-to-end mode (see page 223 and page 230), it is also possible to run a BERT in the D channel with HDLC framing (channel selection: D channel).

**B channel select**

BERT active	
2^11	B01
not synchronous	
Sync.time:	00:00:00
LOS:	0
Error:	0
BRI Leased line	
Reset	TM
Error	

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 266.

<Error> Insert artificial bit errors to test the reliability of the BERT.



Stop the BERT  
Display the test results, see page 339.

For information on saving the test results, see page 229.

### 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**



Activate loopbox

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).

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.

Single tests

ARGUS - Main Menu

Time measurement

B channel delay

B channel select

First press <Delete> and enter the B channel on the keypad, or use the cursor keys to set it.

Perform measurement

B channel delay

Display:

```
avg:    0.63 ms
min:    0.63 ms
max:    0.63 ms
bit:    40
```

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  $\mu$ s to send a bit).

BRI

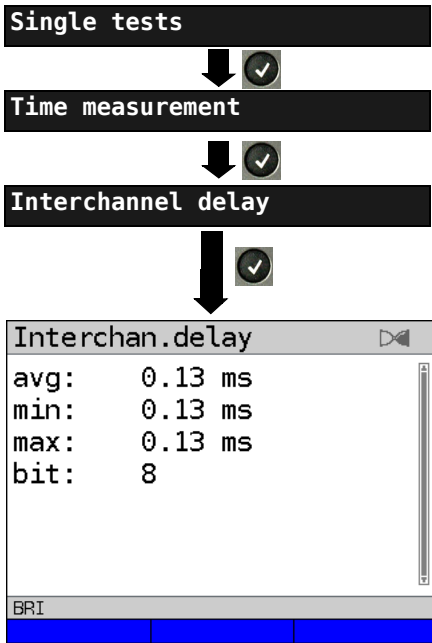
The measurement will be repeated in cycles (continuous measurement).



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.

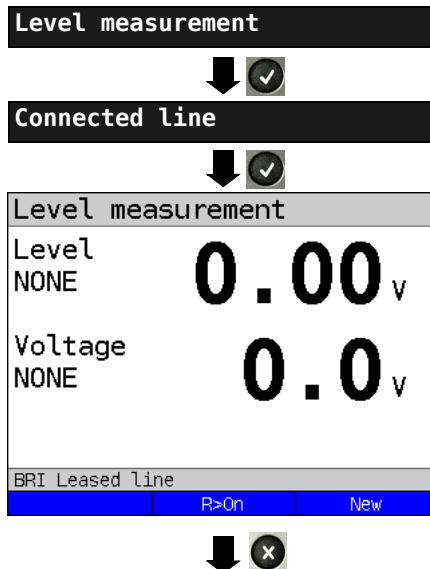


## 19.16 Level Measuring on an ISDN Access

### 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.



Stop measuring level.  
Open the Level measuring  
menu.

ARGUS - Main Menu

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 <sup>+20 %</sup> <sub>-33 %</sub> i.e. from 0.9 V to 0.5 V)

None No level

Evaluation of the feed voltage:

**voltage OK** Normal feed  
**Normal** (40 V <sup>+4,25 %</sup> <sub>-13,75 %</sub> i.e. from  
**voltage** 41.7 V to 34.5 V)

**Voltage OK** The (inverted phantom) feed  
**Feed voltage** is alright (OK).

**Voltage** No feed (Voltage)  
**None**

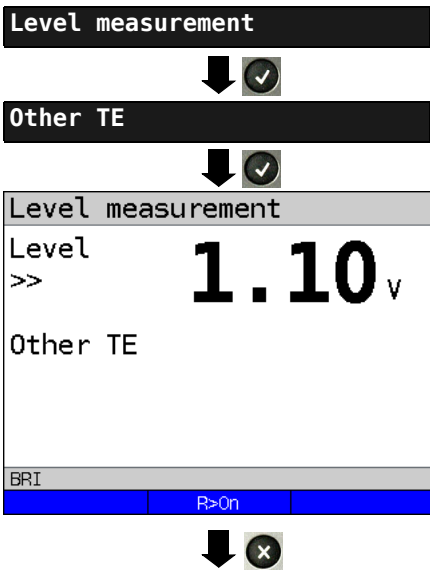
<R>On> 100 Ω resistor switched in

<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.



Stop measuring level.  
Open the Level measurement  
menu.

ARGUS - Main Menu

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 <sup>+20 %</sup> <sub>-33 %</sub> 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

## 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.

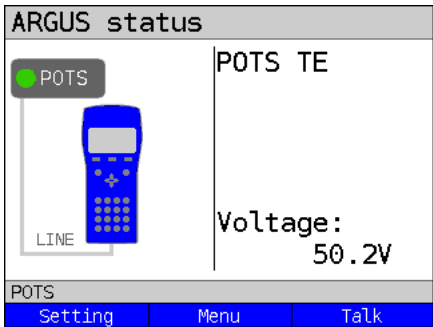
20 Operation on a POTS access

 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. The POTS settings are made in the chapter 5 Configuring accesses page 25. In this example the POTS TE mode was selected:

ARGUS State Display



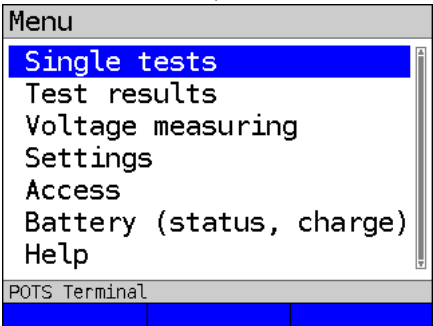
The ARGUS displays the voltage on the line when it is "on hook" (not busy).  
Positive voltage: Polarity on a+; on b- (red wire is a, black wire is b)  
Negative voltage: Polarity on a-; on b+

**<Setting>** Opens the Settings menu for POTS parameters, see page 285.

**<Menu>** Open the Main Menu

**<Call>** For information on setting up a call, see page 287.

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:** Open the Main Menu and select "Help" or press number key "1". An overview of the possible key combinations can be found on page 106.

## 20.2 POTS Settings

It is possible to configure the following "POTS Settings". The default settings can be restored at any time (see page 351).

Setting	Explanation
<b>POTS</b>	
<b>Dial mode</b>	Selection of the dial mode: DTMF or pulse dialling Default setting: <b>DTMF</b>
<b>CLIP Mode</b>	Select the transfer procedure used to pass the call number:  <div> <b>FSK</b>            CLIP via FSK  (Frequency Shift Keying)  For Germany and some other places in Europe </div> <div> <b>DTMF</b>           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). </div> Default setting: <b>FSK</b>
<b>DTMF parameter</b>	Settings for the three parameters Level, Duration and Interval of the DTMF signals generated during POTS (analog) operation.
<b>Level</b>	Setting the DTMF level: The level can 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: <b>-3 dB</b>
<b>Time</b>	Setting the DTMF time: Range: 40 to 1000 ms Default setting: <b>80 ms</b> Use the cursor keys to raise or lower the setting:  <div> 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 </div>

<b>Interval</b>	Setting the interval between two DTMF characters: Range: 40 to 1000 ms Default setting: <b>80 ms</b> 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
<b>Defaults</b>	Restores the default settings: Level = -3 dB, Time = 80 ms, Interval = 80 ms
<b>FLASH time</b>	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: <b>80 ms</b> 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 353.

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.

Single tests



POTS telephony

to :02351907087

POTS

Clear

Call no.

R

 or press the  key


Clearing the connection

For information on the ARGUS in the "POTS telephony" access mode, see page 284.

The ARGUS - Main Menu


- <Call>

Setup the connection:
- or





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.

POTS call

02351907087

CLIP mode: FSK

POTS

Accept


If the access supports CLIP, the ARGUS will display the number of the caller (for information on CLIP mode, see page 285).

<Accept>

or



Accept call

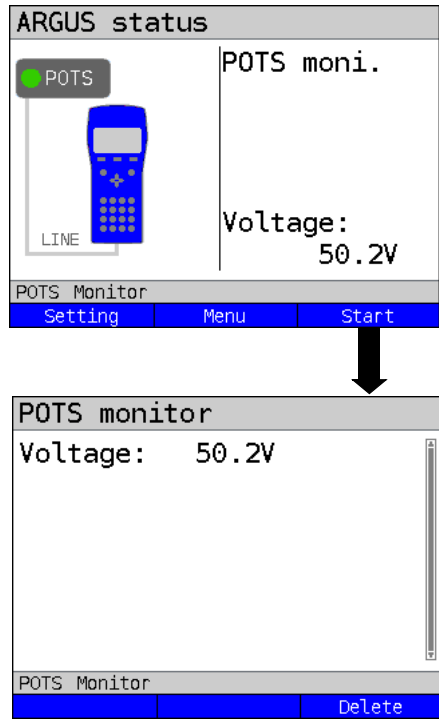


The call number received will be saved in the "Last caller" memory location.

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.

The POTS monitor settings are made in the chapter 5 Configuring accesses page 25.



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.

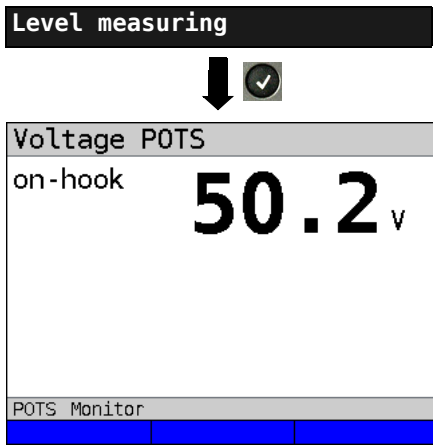


Stop monitoring and the ARGUS will open the State Display.



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 objectively assess voice quality, ARGUS performs a Perceptual Evaluation of Speech Quality (PESQ) analysis according to ITU-T P.862 directly on an ISDN, POTS, xDSL or on Ethernet. The PESQ test is only available for interfaces that have previously been enabled (e.g. ISDN option).

The PESQ analysis is not performed by ARGUS directly but by a PESQ server, which has its own telephone number. ARGUS is connected directly to the subscriber access and loops a standardised voice recording to the server.

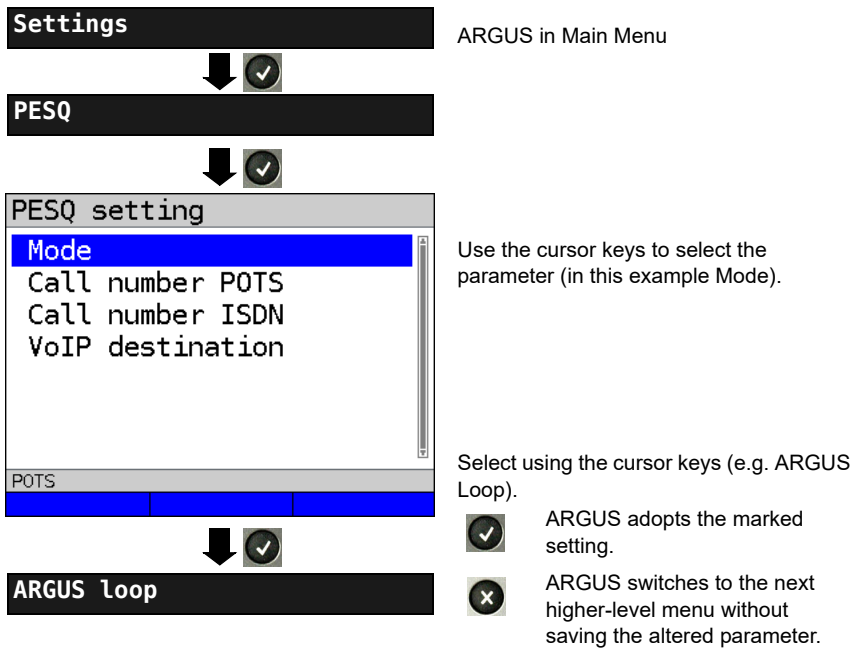
To assess the talker side, ARGUS transmits the voice recording to the server, which returns the calculated PESQ value to ARGUS. ARGUS shows the PESQ value directly in the display.

To assess the talker and listener sides, the voice recording is initially sent from the server to ARGUS, then looped back to the server.



**The entire network to be tested including all its gateways and other components must be RFC2833-compliant.**

21.1 PESQ configuration



Setting	Description
<b>PESQ:</b>	
<b>Mode</b>	Loop: Evaluation of talker and listener side. ARGUS receives the voice recording from the server and loops this back to the server.
	Sending: Evaluation of talker side. ARGUS transmits the voice recording to the server.
<b>Call number POTS</b>	Enter the server number for the PESQ test at the POTS interface. Selection via the POTS speed dial list.
<b>Call number ISDN</b>	Enter the server number for the PESQ test at the ISDN interface. Selection via the ISDN speed dial list.
<b>VoIP destination</b>	Enter the server number for the PESQ test at the xDSL interface and on Ethernet. Selection via the list of VoIP destinations.

21.2 PESQ test on xDSL or Ethernet access via VoIP

You need to first start VoIP telephony before you can perform the PESQ test on xDSL or Ethernet. For details on configuring the VoIP parameters, see the chapter VoIP tests, page 150.

Starting VoIP telephony (example: operation on VDSL interface)

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a

kb/s: 80000/ 15996

CRC: 0/ 1

U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

EditStart

Profile 1

DataVoIPIPTVVoD

VDSL VTU-R Profi. 17a

kb/s: 80000/ 15996

CRC: 0/ 1

U: 0.0V

VDSL 80000/15996 kb/s CRC: FEC:

InfoTestStop

VoIP tests

IP ping

Trace route

VoIP call

VoIP wait

VoIP PESQ test

VDSL 80000/15996 kb/s CRC: FEC:

Setting

Continued on next page

Connecting the service.

**<Edit>** Assigns a virtual line to the service VoD or edits it.

If no xDSL connection is established, ARGUS automatically connects at this point using the default profile (see page 46).

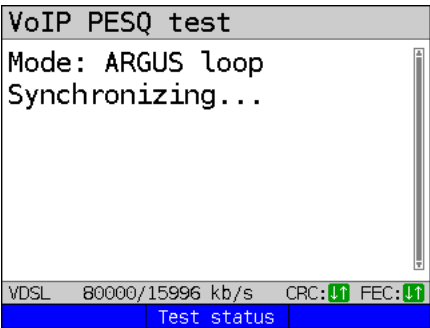
**<Info>** Displays the VDSL connection parameters.

**<Stop>** Disconnects the VDSL connection.

**<Setting>** Displays the PESQ settings, see page 290.

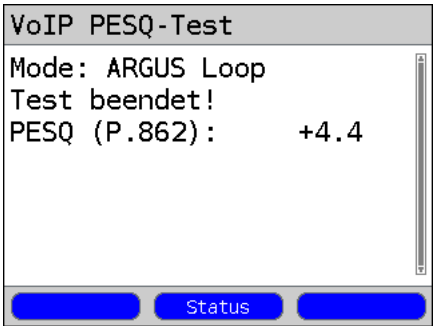
Synchronisation  
with PESQ server

ARGUS dials the number entered under "VoIP destination" in the PESQ parameters.



<Test status> Displays test status without ending the test or starting a new test, see page 204.

Test result:



ARGUS displays the set mode (in this example ARGUS loop) and the PESQ value calculated according to ITU-T P.862.

The PESQ quality scale ranges from +4.5 (excellent) to -0.5 (bad). These values may be assessed analogously to the MOS values (see page 156).

Exits results.

Save result?

For saving results, see IP ping page 125. Sends trace file to PC, see page 96

### 21.3 PESQ test on an ISDN access

Single tests



PESQ test



Select the service



Enter the B-channel



Select the PESQ server

Synchronising  
with the PESQ server



ISDN PESQ-Test

Mode: ARGUS Loop

Test läuft!

1
2
3

ARGUS in the main menu (BRI or U-interface) must be selected as the access.

Select a voice service, e.g. ISDN telephony.

Enter the B-channel using the number keys. ARGUS suggests the B-channel last used. Press <Delete> before entering a new B-channel. Entering \* causes ARGUS to select a free B-channel. ARGUS indicates whether the B-channel is available.

ARGUS dials the number entered under "ISDN number" in the PESQ parameters.

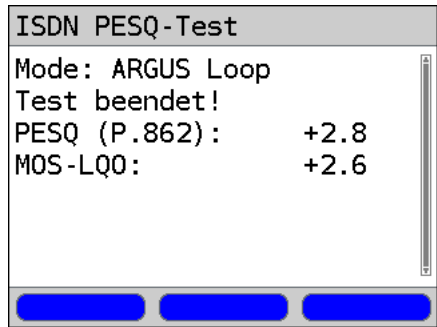


In the event of synchronisation problems, varying the DTMF parameters may lead to a solution. Under the menu option "POTS", you can also change the corresponding DTMF parameters

- Level
- Duration
- Inter-digit interval

for PESQ and ISDN.

Test result:



ARGUS displays the set mode (in this example ARGUS Loop) and the calculated PESQ value according to ITU-T P.862 as well as the POTS MOS<sub>LQO</sub> (LQO = Listening Quality Objective) according to ITU-T P.800.1.

The PESQ quality scale ranges from +4.5 (excellent) to -0.5 (bad). These values may be assessed analogously to the MOS values (see page 156).



Save result?

ARGUS saves the result in memory under the first free record number; you can enter a record name of your choice (default: New result) using the number keys.

21.4 PESQ test on an POTS access

Single tests

ARGUS in main menu (POTS must be selected as the access).



PESQ test

ARGUS dials the number entered under "Number POTS" in the PESQ parameters.



Select the PESQ server



Observe the information under (s. chapter. 21.3 PESQ test on an ISDN access page 294).

Synchronising with the PESQ server



POTS PESQ test running

The test result is displayed as described for the PESQ test on the ISDN interface.

22 Copper tests

In the Access menu, ARGUS offers the menu option "Copper tests", which enables you to investigate the physical properties of the line.

This chapter briefly describes how to use the various functions. It is not possible to describe the interpretation of the results in the customary detail here. As the results are usually provided in graph form, they can only be interpreted correctly in conjunction with a knowledge of the line being measured. ARGUS supports this using a variety of aids, such as the Zoom and Cursor functions.

**Note:**

The Ethernet cable tests (including Ethernet-TDR) are described in chapter „23 Ethernet cable tests“ (see page 329).

22.1 R measurement

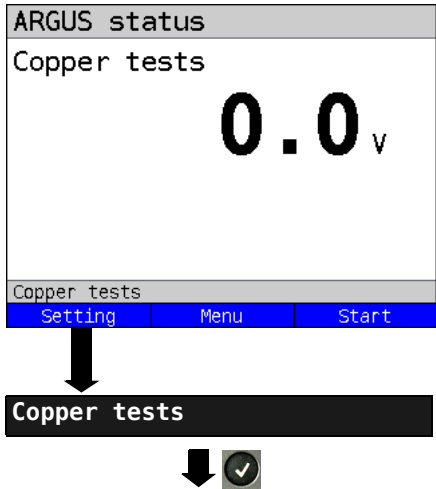
When connected to the test points via the Line socket, ARGUS continuously measures resistance and displays the results in real time.



**The line must be de-energised and voltage free for R measurement!**

**R measurement is a two-wire measurement that measures the loop resistance (short-circuit) between Tip(a) and Ring(b).**

The chapter "Configuring accesses", page 29, explains how to set up the access type "Copper tests".



ARGUS in the status display.  
Any DC voltage on the line is indicated here.

- <Setting> Switches to Copper/cable test settings..
- <Menu> Switches to main menu.
- <Start> Directly accesses "Single tests" menu.

Continued on next page



22.1.1 Wire types

Wire types/VoP

•PE 0.5 AWG24

PP 0.5 AWG24

Pulp 0.4 AWG26

Pulp 0.5 AWG24

Pulp 0.6 AWG22

PIC 0.4 AWG26

PIC 0.5 AWG24

Copper tests

Edit



Selects the wire types to be configured.

<Edit> Edits the wire-type parameters.

Wire type param.

Speed of propagation

Line resistance

Capacitance

Name

Copper tests



Setting	Description
Wire type/VoP	
Propagation speed	<p>To determine the distance, the calculation must take into account a correction value dependent on the wire type that specifies the ratio of the pulse propagation speed in the cable to the speed of light in a vacuum (<math>c_0 = 299.792458 \text{ m}/\mu\text{s}</math>).</p> <p>For many cable types, the pulse time is also specified in V/2.</p> <p>Minimum: <math>45.0 \text{ m}/\mu\text{s}</math> (VoP in %: 30)</p> <p>Maximum: <math>149.7 \text{ m}/\mu\text{s}</math> (VoP in %: 99.9)</p> <p>Default: <b><math>98.9 \text{ m}/\mu\text{s}</math> (VoP in %: 66.0)</b></p> <p>The choice of propagation speed as VoP or V/2 is saved.</p>
Line resistance	<p>Sets the line resistance per kilometer.</p> <p>Range: <math>20 \text{ }\Omega/\text{km}</math> to <math>200 \text{ }\Omega/\text{km}</math></p> <p>Default: <b><math>80 \text{ }\Omega/\text{km}</math></b></p>

Capacitance	Sets the capacitance (operating (mutual) capacitance) per kilometer. Range: 35 nF/km to 100 nF/km Default: <b>39 nF/km</b>
Name	Enter the name of the wire type. Default: <b>PE 0.5 AWG24</b>



The configured cable types are also used for RC measurement and TDR measurement.

#### List of preconfigured default wire types:

No.	Name	Wire diameter (mm)	Line resistance (Ohm/km)	Mutual capacitance (nf/km)	VoP (%)	Note
1	PE 0.5 AWG24	0.5	80	39	66.0	Outdoor cable, Polyethylene, air filled
2	PP 0.5 AWG24	0.5	80	39	66.0	Outdoor cable, Polypropylene, air filled
3	Pulp 0.4 AWG26	0.4	150	36	60.0	Outdoor cable, conductor with pulp jacket, air filled
4	Pulp 0.5 AWG24	0.5	80	39	67.0	Outdoor cable, conductor with pulp jacket, air filled
5	Pulp 0.6 AWG22	0.6	65	38	68.0	Outdoor cable, conductor with pulp jacket, air filled
6	PIC 0.4 AWG26	0.4	150	36	64.0	Outdoor cable, conductor with plastic jacket, air filled
7	PIC 0.5 AWG24	0.5	80	39	66.0	Outdoor cable, conductor with plastic jacket, air filled
8	PIC 0.6 AWG22	0.6	65	38	67.0	Outdoor cable, conductor with plastic jacket, air filled
9	PIC 0.9 AWG19	0.9	29	34	72.0	Outdoor cable, conductor with plastic jacket, air filled
10	Jelly 0.9 AWG19	0.9	29	34	68.0	Outdoor cable, petroleum/jelly filled cable
11	Filled 0.4 AWG26	0.4	150	36	58.0	Outdoor cable, filled
12	Filled 0.5 AWG24	0.5	80	39	60.0	Outdoor cable, filled

13	Filled 0.6 AWG22	0.6	65	38	62.0	Outdoor cable, filled
14	PTFE/Teflon 0.5 AWG24	0.5	80	39	67.0	Outdoor cable, conductor with teflon jacket
15	Wire type 15	-	80	49	66.7	default, editable
16	Wire type 16	-	80	49	66.7	default, editable
17	Wire type 17	-	80	49	66.7	default, editable
18	Wire type 18	-	80	49	66.7	default, editable
19	Wire type 19	-	80	49	66.7	default, editable
20	Wire type 20	-	80	49	66.7	default, editable

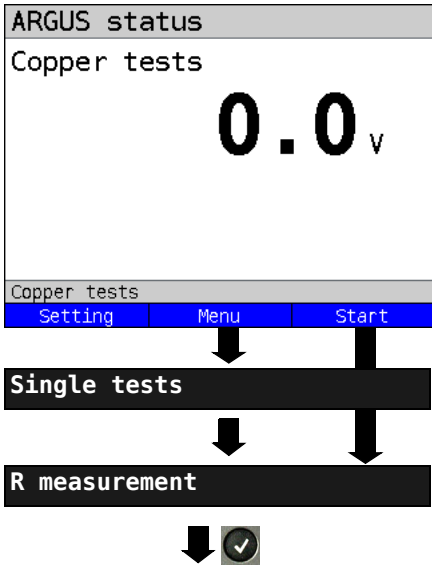
Conversion of AWG to mm and mm to AWG:



$$d_{mm} = 0,127 \text{ mm} \times 92^{\frac{36-AWG}{39}}$$

$$AWG = -39 \times \log_{92} \left( \frac{d_{mm}}{0,127 \text{ mm}} \right) + 36$$

22.1.2 Starting R measurement



ARGUS status display.  
Any DC voltage on the line is indicated here.

- Max. measuring range: 200 V
- Resolution: 0.1 V
- Accuracy: ±2 %.

Before starting the RC measurement disconnect any voltage on the line.

- <Menu> Switches to main menu.
- <Start> Directly accesses the single test menu or starts the RC measurement (depending on options).

Select one of the Copper tests:

- Copper box
- R measurement
- RC measurement
- etc.

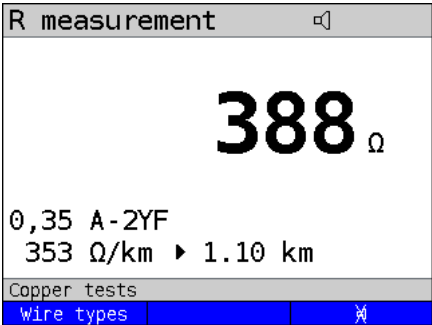
Start the desired copper test directly by selecting it.  
In this example, R measurement.

Initialisation

The R measurement starts automatically.

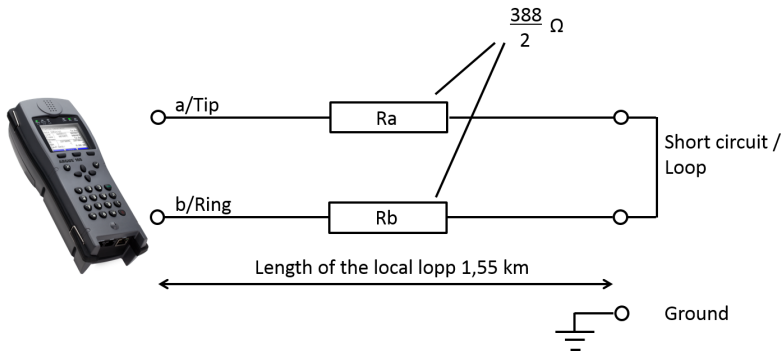


Loop:



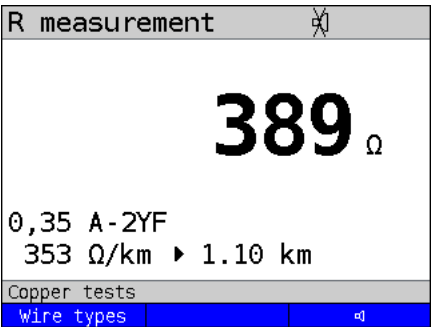
In this example, the R measurement shows a resistance of 388 Ω . This is the resistance for the entire core system, in which the a-core (tip) and the b-core (ring) are short-circuited (loop). This makes the two cores equivalent to a single core with a length of  $388 \Omega / 353 \Omega / \text{km} = 1.1 \text{ km}$ , see equivalent circuit diagram.

Equivalent circuit diagram:



Loop resistance = 2x resistance

ARGUS always calculates the length of the circuit.



ARGUS generates a signal tone for a resistance < 20 Ω.



Deactivate signal tone

22.2 RC measurement

ARGUS conducts a resistance test (loop) and a capacitance test (open). ARGUS is connected to the test points via the socket Line. Switch on ARGUS.

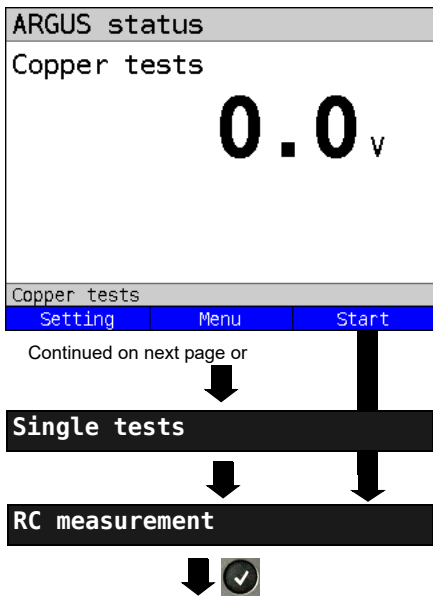


**The line must be de-energised and voltage free for RC measurement!**

**When testing capacitance, note that the measured capacitance value can be falsified if a large capacitance is connected in series with a resistor.**

**RC measurement is a two-wire measurement that measures the loop resistance (short-circuit) and the capacitance (open line) between Tip(a) and Ring(b).**

The chapter "Configuring accesses", page 29, explains how to set up the access type "Copper tests".



ARGUS status display.  
Any DC voltage on the line is indicated here.

- Max. measuring range: 200 V
- Resolution: 0.1 V
- Accuracy:  $\pm 2\%$ .

Before starting the RC measurement disconnect any voltage on the line.

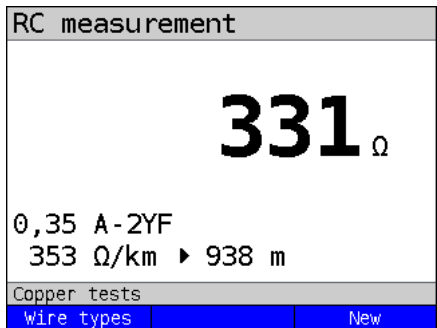
- <Menu>** Switches to main menu.
- <Start>** Directly accesses the single test menu or starts the RC measurement (depending on options).

Select one of the Copper tests:

- Copper box
- R measurement
- RC measurement
- etc.

Start the desired copper test directly by selecting it.  
In this example, RC measurement.

Loop:



ARGUS first measures the resistance. ARGUS determines the capacitance when it detects an open line (infinite resistance).

ARGUS displays the resistance. The capacitance is not displayed because a loop is used in this example. ARGUS also determines the approximate line length, see equivalent circuit diagram page 300.



Browse through the wire types.

<Wire types>

Switches to the wire types.

<New>

Repeats measurement.

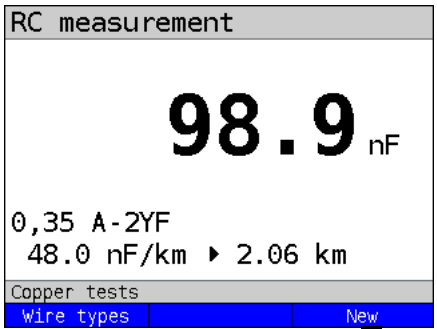


Switches to status display.

Resistance test: 20 Ω to 100 kΩ  
Accuracy: 20 Ω ≤ R ≤ 100 Ω: ±10 %  
R > 100 Ω: ±2 %

Repeat test

Open line:



ARGUS displays the capacitance. The resistance is outside the possible range (> 100 kΩ).



Browse through the wire types.

<Wire types>

Switches to the wire types.

<New>

Repeats measurement.



Switches to status display.

Capacitance test: 1 nF to 1 μF  
Test accuracy: ±5 %

Repeat test

22.3 Line scope

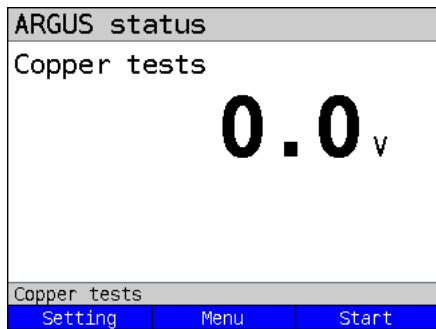
With the line scope, ARGUS performs a real-time analysis on the connected line. The high-ohm line scope can e.g. be patched into an existing link between modem and DSLAM. You can display the results in either the time or frequency range (FFT).



The voltage on the line may not exceed 200 V DC or 100 V<sub>pp</sub> AC.

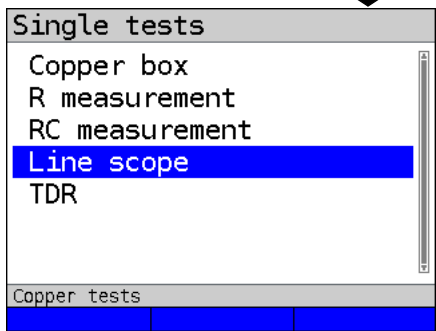
22.3.1 Starting the line scope

The chapter "Configuring accesses", page 29, explains how to set up the access type "Copper tests".



ARGUS status display.  
Any DC voltage on the line is indicated here.

- <Menu> Switches to main menu.
- <Start> Directly accesses "Single tests" menu.



- Select one of the Copper tests.
- Copper box
  - R measurement
  - RC measurement
  - Line scope
  - TDR

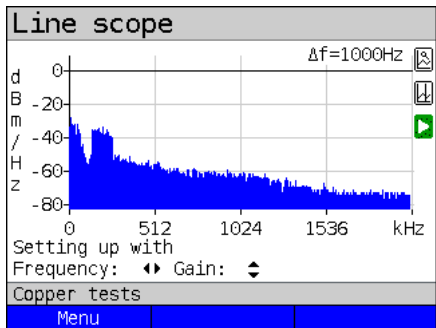
Start the desired copper test directly by selecting it.

Continued on  
next page



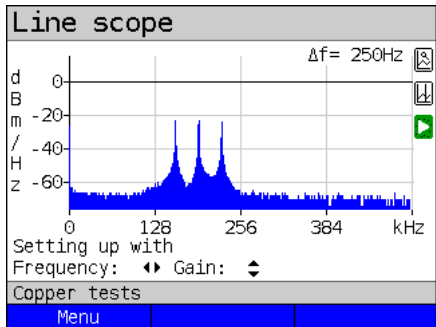
In this example, the line scope.

Line scope status display



The line scope can identify a variety of states or occurrences on the line. This example shows the ADSL (Annex B) connection with ISDN-U interface established between the modem and DSLAM. The line scope is located in direct proximity to the modem, as it is particularly effective upstream in the spectrum. If the upstream were significantly less than the downstream, it would be in direct proximity to DSLAM.

<Menu> Opens the graph function, see page 306



Finding the modem:

In addition to the general state of the line/connection, a variety of events can be detected. In this example, we can see the handshake tones that a modem connected to the line sends periodically in order to establish a connection with the DSLAM. This also reveals whether or not an active modem is connected to the other end of the line.

In addition to the wanted signals such as the DSL spectrum or the handshake tones, the line scope can also detect unwanted signals such as temporary interference sources (real-time operation) or peculiarities in noise (with respect to background noise).

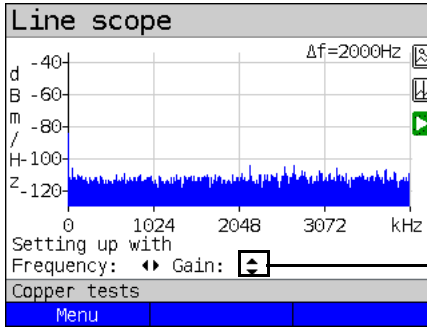
Connection example without probe:





**Gain:**

To ensure optimum detection of different signals, match the gain (y-axis) with the reduction of the frequency range shown (x-axis). ARGUS always begins with the lowest gain (-26 dB in the frequency range up to 3 MHz). Measuring range: -130 to +10 dBm/Hz.

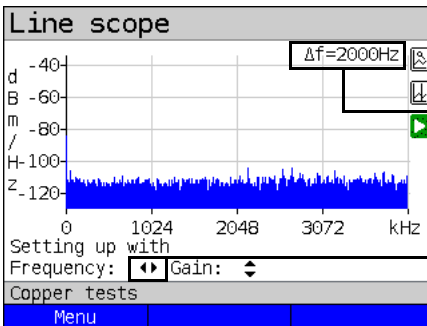


Gain-Y: Gain settings:  
-26 dB, -20 dB, 0 dB, 20 dB

ARGUS displays all measurement results as dBm/Hz values. These values are only comparable with others when the resolution of the measured frequency band is taken into account, as here the total energy of the frequency band is determined "per Hz". The bandwidth ARGUS is measuring is indicated in the display as  $\Delta f$ .

**Frequency range:**

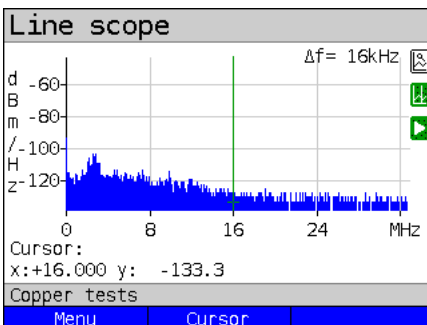
A frequency range of from 20 kHz to 30 MHz is available for measurement; the resolution varies depending on the selected range.



The bandwidth  $\Delta f$  at the top right in the display shows which frequency range is being shown in the display.

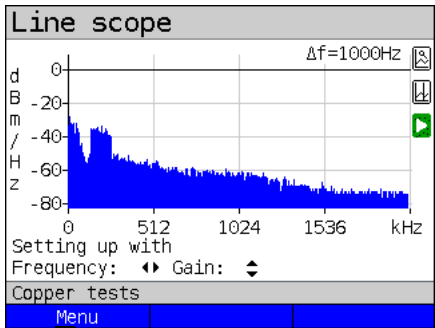


Frequency-X: Setting the displayed frequency range. Every press of the cursor key halves, respectively doubles the displayed range.

**Example:**


In a measuring range up to 32.768 MHz, up to 2048 values can be displayed, so:  $\Delta f = 32,768 \text{ MHz} / 2048 \text{ values} = 16 \text{ kHz}$ . Consequently, a y-value marked by the cursor and displayed (in this example 16 MHz) is the mean (in this example -133.3 dBm/Hz) across the frequency range of 16 MHz -  $\Delta f/2$  to 16 MHz +  $\Delta f/2$ , or 15.992 MHz to 16.008 MHz.

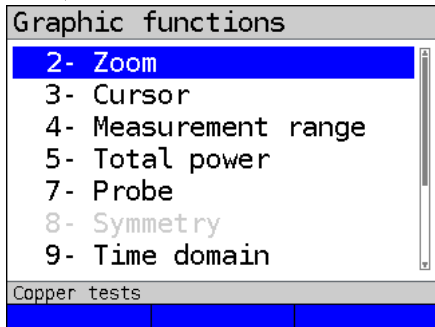
22.3.2 Graph functions







The graph functions Zoom and Cursor enable detailed analyses of the graphs.

**<Menu>** Opens graph functions.

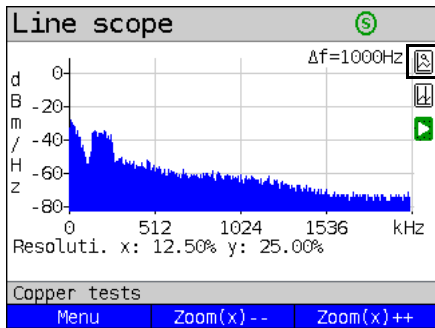
Press  in the status display (in the graph) to save the results and stop the line scope.



The "Graphic functions" menu opens:


-  Exits the menu without changing.
-  You can also use this number key to activate the Zoom function within a graph.
-  The function of the cursor is described on page 307.
-  Accepts the selection and returns to the graph.

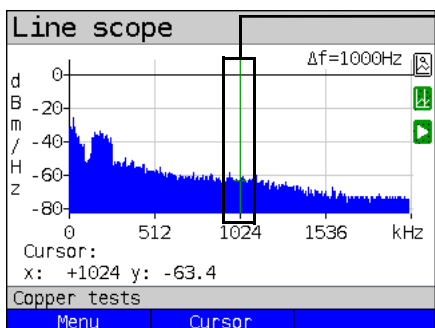
Zoom (2):



The magnifying glass shown in the display rests on a white background. It has not yet been zoomed. When the magnifier is over a dark background, the graph is zoomed.

- <Zoom(x) ++>** Magnifies the middle section of the graph (100%).
- <Zoom(x) -->** Not yet zoomed! Reverses **<Zoom(x) ++>** and resets magnification.

 lets you toggle the meaning of the softkeys and choose between x-axis and y-axis zoom, see page 52.

**Cursor (3):**

When the Cursor function is started, a green cursor line appears in the middle of the graph.

**<Cursor>** You can toggle the cursor on and off as needed using the Cursor softkey after activating it in the menu.

The values of the graph for the position under the cursor are displayed in the graph as follows:

**x:** +1024 kHz (accuracy  $\pm 1\%$ )

**y:** -63.4 dBm/Hz (accuracy  $\pm 2 \text{ dB}$ )

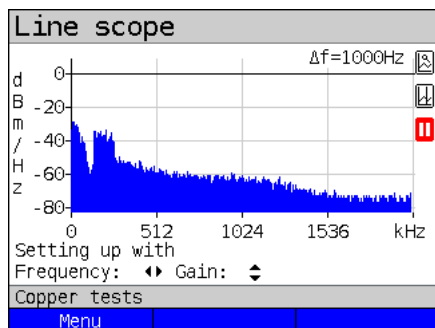


When the Stop function (see page 312) is activated, you can move the cursor faster.




You can use the left and right cursor keys to move the cursor to any position on the graph to measure it. Briefly pressing a cursor key causes the cursor to jump to by one position in the graph. When the cursor key is held down, the steps the cursor covers in the graph become progressively larger.

The zoom function and the cursor function can also be combined. For example, you can determine a certain value using the cursor more easily when you have previously zoomed in on a specific range. However, the starting position of the cursor can vary.

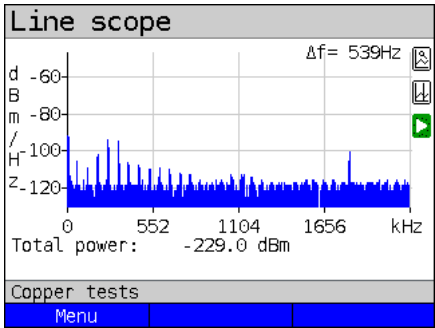
**Measuring range (4):**

When the line scope starts, it is in the measuring range in the status display. You can set the frequency range (x) and the gain (y) in the measuring range. If you have hidden the measuring range in order to work with the cursor or zoom, you can restore it:

**<Menu>**

or  Restores measuring range.

**Total power (5):**



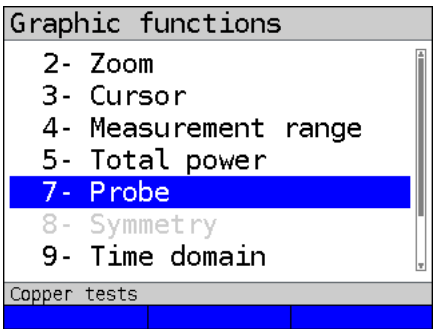
ARGUS displays the total power. The total power is the sum of all individual power measurements ( $\Delta f$ ) over the entire visible range, in this example -299 dBm over 2.2 MHz.

<Menu>



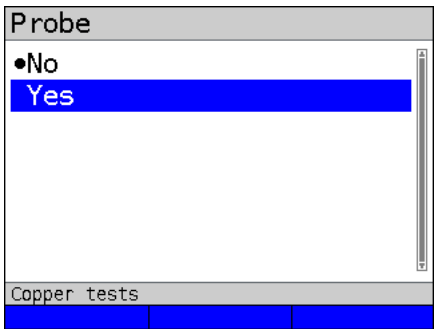
Restores total power display

**Probe (7):**



The line scope is high-ohm.  
Input impedance: 3.6 k $\Omega$   
Input capacitance: 30 pF

However, even with the line scope you may also need to use a high-ohm probe (ARGUS Active Probe).



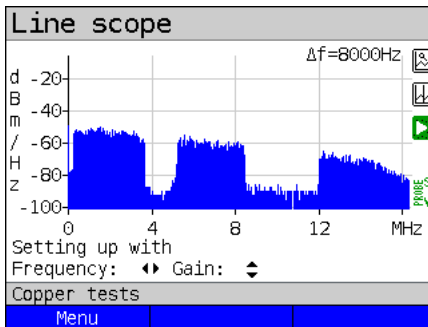
**ARGUS Active Probe II:**

Input impedance: 70 k $\Omega$   
Input capacitance: 1 pF  
Functions: Symmetry/asymmetry toggling

After connecting the probe, you can switch it on using this menu.



To activate the probe, see page 315.

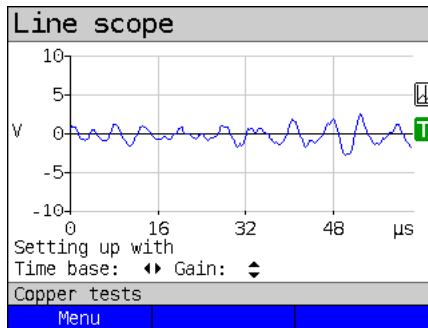
**Symmetry (8):**

Once the probe has been switched on and detected, you can switch between symmetric and asymmetric operation using Symmetry.

In asymmetric operation, the useful signal is hidden so that you see only noise and any interference sources (see example illustration).



Symmetry/asymmetry toggling

**Time domain (9):**

<Menu>



Opens time domain

In the line scope, you can switch from the frequency range to the time domain. In this respect, the line scope operates like an oscilloscope that permits display of AC voltages from 0 to 40 V<sub>pp</sub> with a resolution of 2 mV<sub>pp</sub>.

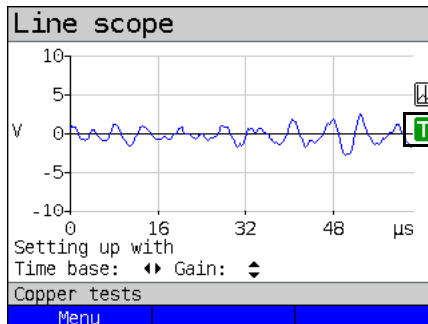
This makes it easy to recognize different AC voltage signals, e.g. the square-wave signal of an E1 access.



The gain and time base can be set using the horizontal and vertical cursor keys analogous to the frequency range.



The cursor functions are also available in the time domain for analysing the signal. However, there is no zoom function.

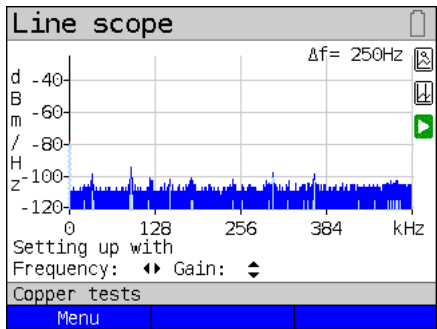



If ARGUS detects that the connected signal regularly exceeds a certain threshold, ARGUS tries to trigger automatically in response to this so as to optimally display the signal in the time domain.

The trigger symbol is green.

If no signal is present or the level is too low, the trigger symbol is red. ARGUS does not trigger.

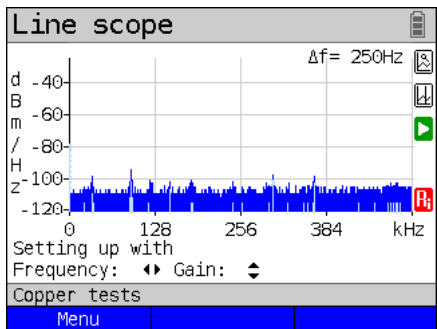
Peak hold (min/max) (0):




The peak-hold function can be additionally activated using the number key .

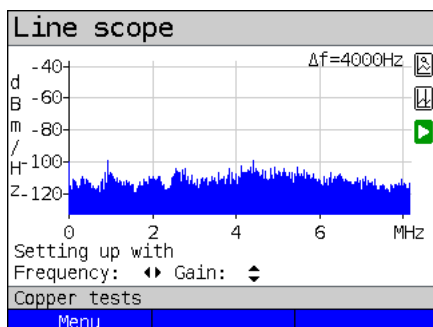
When the peak-hold function is used, positive (blue) and negative (yellow) peaks are shown graphically. The result is a blue curve of maxima and a yellow curve of minima over time. The instantaneous values continue to be displayed in red. In the maximum values in particular, sporadic fliers (interference pulses) are visible and permit comparison between different lines (e.g. particularly clearly with the aid of a suitable clip-on ammeter).

100 Ohm Input resistance (#):



Particularly when using a suitable clip-on ammeter, it may be necessary to adjust the input resistance of the line monitor (input impedance, see page 308). The red symbol  indicates that the line monitor is operating with an input resistance of 100  $\Omega$ .

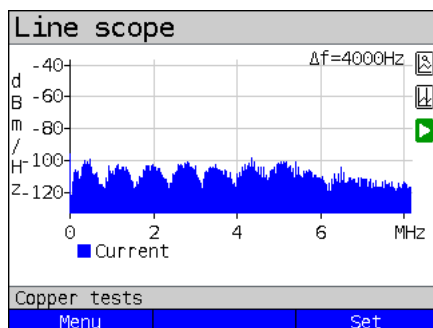
## Reference curve (\*0):



&lt;Menu&gt; or

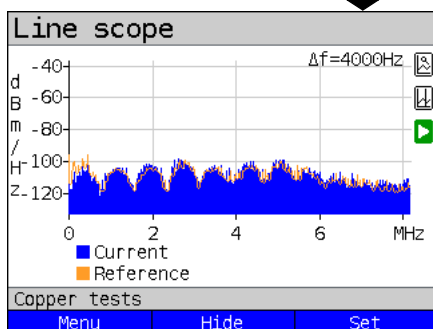


Restores reference curve function.



&lt;Set&gt;

Set reference curve.



When the reference curve is set, an orange line is displayed in the graph.

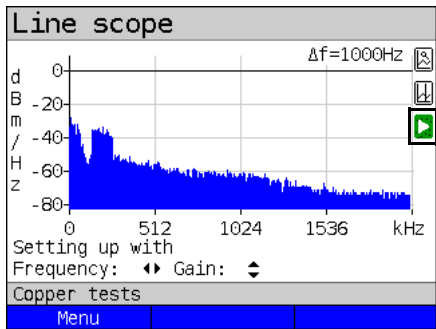
&lt;Hide&gt;

Hide reference curve.


&lt;Set&gt;

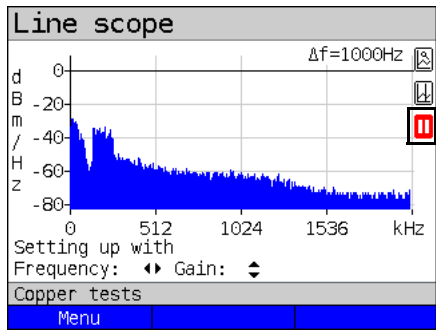
Set a new reference curve.



Run/Hold



You can stop and restart a running test (realtime mode) at any time.

-  Test running
-  Stop test

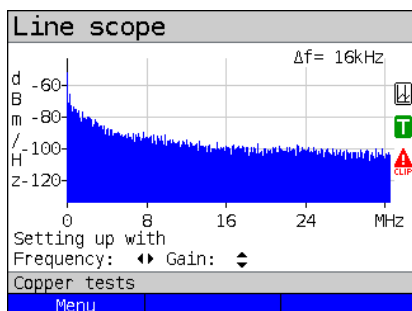


-  Test is stopped
-  Restart test



**Clipping:**

Frequency range:

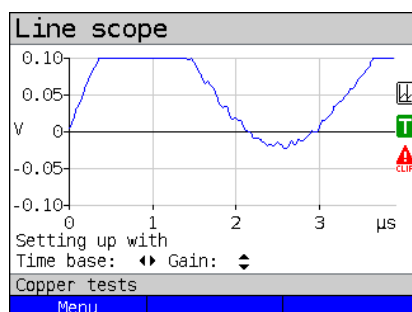


If the signal at the line scope input is too strong or the gain in the frequency range and time domain are displayed as too large, the input stage of the line scope is over-driven.

In this case, ARGUS displays the clipping

symbol .

Time domain:



The displayed signal is clipped both in the frequency range and the time domain. You can remedy this by reducing the gain.

**Saving test results without terminating the line scope**

You can save your results of the measurement without disconnecting in the same way as for VDSL, see page 66.

### 22.4 Active Probe

The ARGUS Active Probe is an active, high-impedance probe that can be passively patched into an existing connection without interfering with it.




In spite of the high impedance probe, it can cause transient losses of existing connections when it is patched in.

The ARGUS Active Probe II is designed to be used with the ARGUS line scope. The high-ohm line scope (input impedance 3.6 k $\Omega$ ) can also be used without the ARGUS Active Probe II (see page 306).

#### 22.4.1 Active Probe II

The ARGUS Active Probe II has the following technical specifications:

- Input impedance: 70 k $\Omega$
- Input capacitance: 1 pF
- Frequency range: 10 kHz to 30 MHz ( $\pm 1.5$  dB)
- Attenuation, symmetrical 14.5 dB
- 2 x 4 mm banana plug sockets (spacing 12 mm)
- Data transmission to ARGUS via RJ45 lead (pins 4/5)
- Supply voltage: 5 V via ARGUS USB-host interface and USB cable

The Active Probe II can be operated in both symmetric and asymmetric mode. You can switch between these two operating modes using the hotkey  or via the menu. See page 309, line scope for an application example.

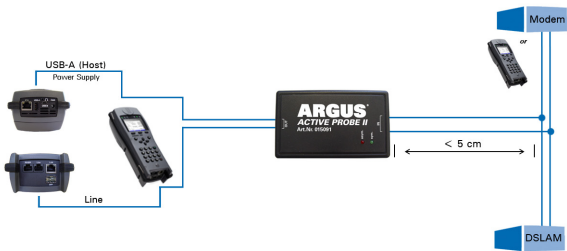
**The Active Probe II:**



22.4.2 Connecting the Active Probe II

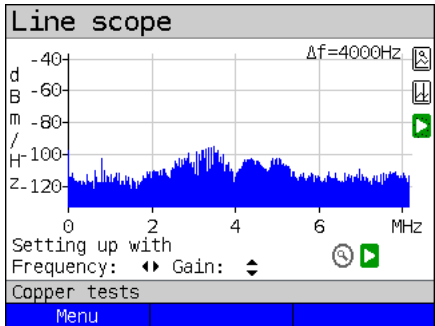
Connect ARGUS to the Active Probe II via the Line socket and the USB-A interface (host). ARGUS supplies the Active Probe with a voltage of 5 V via the USB host interface. Connect the Active Probe to the line to be tested (in this example Active Probe II between modem and DSLAM) using a lead that is as short as possible (< 5 cm).

Connection example:



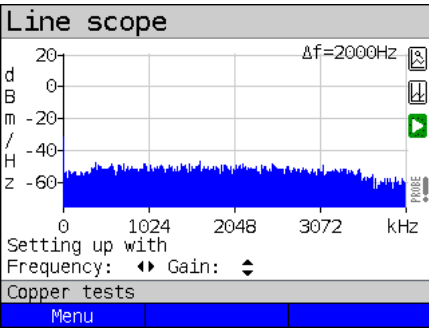
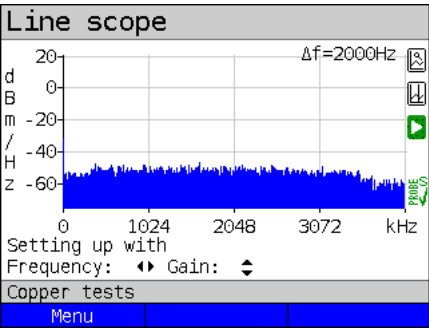
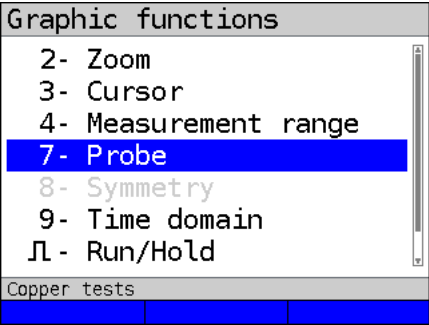
The connection cable and adapter supplied with the device have been designed to be as short as possible. The Active Probe II should be operated using leads that are as short as possible. To obtain optimum measurement results, it is important for the Active Probe to be connected in direct proximity to the line to be tested. Every extension of these connecting leads increases the input capacitance of the Active Probe, which can falsify the measurement results. Even the positions of the two leads in relation to each other can falsify the results as the lengths increase. When the Active Probe is used as supplied, ARGUS automatically subtracts the additional attenuation from the measurement results.

22.4.3 Starting Active Probe II (example with line scope)



After starting a test (in this example with Line scope), you can open the Probe menu using the graph functions or the number key **7**.

Continued on  
next page



Opens the Probe menu directly.

Select "yes" to use the probe. ARGUS then switches on the supply voltage to the USB-A interface and automatically subtracts the additional damping caused by the Active Probe from the measuring results.

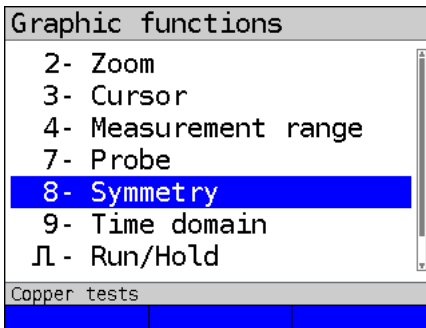
When the Active Probe is active and properly supplied from ARGUS, the green LED on the probe lights up.



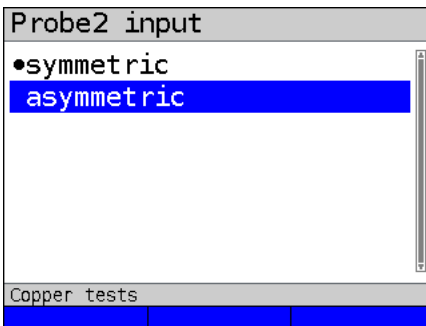
Activation of the probe can take up to 10 seconds.


A green tick mark in the lower right of the display indicates during a test that the Active Probe is connected correctly.

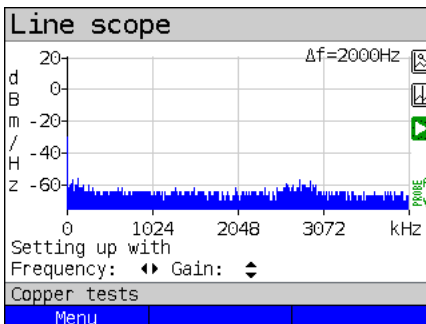
If the Active Probe is not connected correctly and thus not detected by ARGUS or intentionally deactivated via the Probe menu, ARGUS displays an exclamation point in the lower right of the display.

**Toggling symmetry/asymmetry:**

See the Line scope description on page 309 for an example for toggling symmetry/asymmetry.



Once the test is started and Active Probe II activated, you can toggle the probe input between symmetric and asymmetric operation using the number key .



When switched to asymmetric mode, ARGUS displays possible interference sources and the line noise. The usable signal is hidden.


**Saving test results without terminating the Line scope**


You can save your results of the measurement without disconnecting in the same way as for VDSL, see page 66.

22.5 TDR

The TDR function enables you to determine line lengths in realtime or localise interference sources. Correct interpretation of the pulses displayed by ARGUS permits e.g. detection of stub lines, poor contacts or short-circuits. For this purpose, ARGUS transmits a pulse on the connected line and displays its reflection response.

 **The line may not carry a DC voltage greater than 200 V DC and must be free of AC voltage components.**

 The result of a TDR measurement in the ARGUS display may give the impression of multiple interference sources on the line. It is recommended that you eliminate the first interference source on the line and then repeat your measurement. It is possible that the first interference source caused one or more reflections, which can greatly falsify the reflection at the second interference source. Often, there is no second interference source on the line.

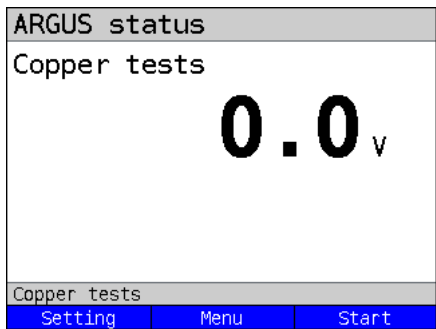
 ARGUS generates a reflection at approx. 3 m. To precisely measure short lines and avoid this reflection, using e.g. a 5 m long connection lead is recommended. The pulse continues to be displayed in the graph but using the cable ensures that this is not on the line.

22.5.1 TDR settings

The chapter "Configuring accesses", page 29, explains how to set up the access type "Copper tests".

22.5.2 Starting TDR

The chapter "Configuring accesses", page 29, explains how to set up the connection type "Copper tests".




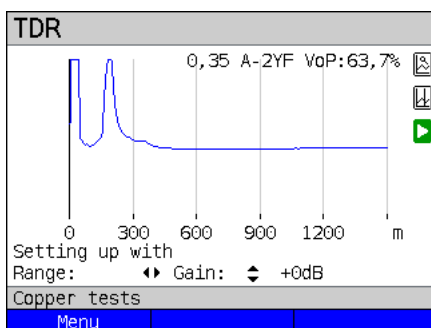
ARGUS status display.  
ARGUS indicates any DC voltage on the line.

- <Setting> Switches to the settings for the wire-type list, see page 297.
- <Menu> Switches to main menu.
- <Start> Directly accesses "Single tests" menu.



Select and start TDR.

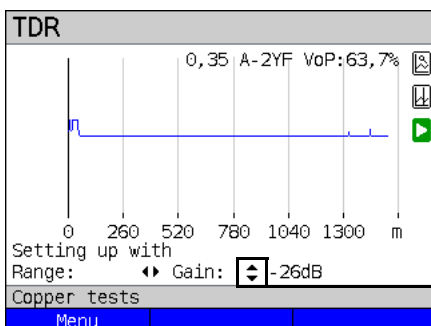
Continued on  
next page 

**TDR status display:**

ARGUS displays possible interference sources on the copper twisted pair directly.

In this example, after the input pulse (starting at 0 meters) we can see a second pulse that spikes at approx. 150 m. This can indicate a 150 m long line that is open at its end.

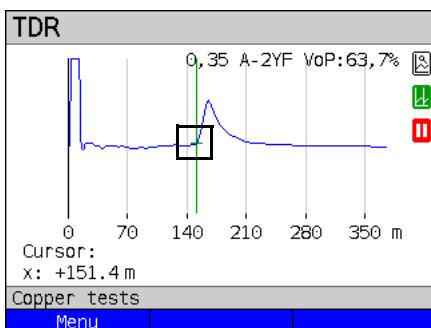
The adjustable range, the gain and the graph functions permit more detailed analysis.

**Gain:**

To ensure optimum detection of pulse reflections, match the function for adjusting the gain (y-axis) with the reduction/enlargement of the range shown (x-axis). ARGUS always starts with the lowest gain (-26 dB) at a range of 1500 meters.



Gain-Y: Sets the gain  
from -26 dB, -20 dB, 0 dB, +14 dB  
+24 dB, +34 dB, +44 dB

**Range:**

The measurements with the TDR can take place in a measuring range of from 3.5 to 6000 meters. The resolution is approx. 0.3 % of the displayed measuring range.

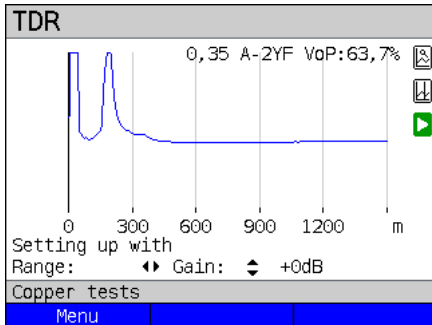


The accuracy is approx.  $\pm 2\%$  of the measuring range. When determining the distance, try to determine the start of a pulse where possible, and not the relative maximum.



Range-X: Sets the displayed measuring range. Every press of the cursor key halves or doubles the displayed range.


## 22.5.3 Graph functions

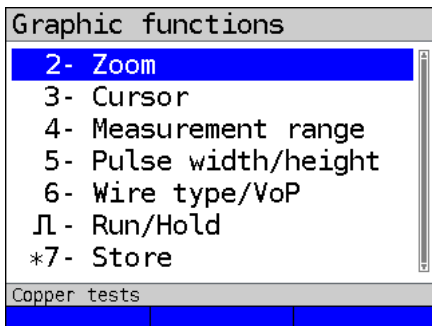


The graphic functions Zoom and Cursor enable detailed analyses of the graphs.

<Menu> Opens graph functions



Press  in the status display (in the graph) to save the results and stop the TDR function.



The Graph functions menu opens.



Exits the menu without changing.



You can also use this number key to activate the Zoom function within a graph.

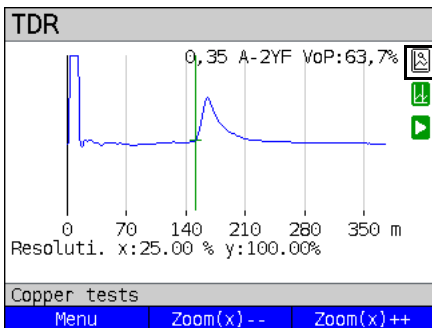


The function of the cursor is described on page 321.



Accepts the selection and returns to the graph.

Zoom (2):



The magnifying glass shown in the display rests on a white background.

It has not yet been zoomed.

When the magnifier is placed over a dark background, the graph is zoomed.

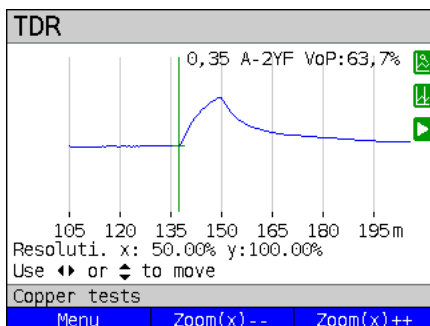
<Zoom(x)++> Enlarges the middle section of the graph (100%).

<Zoom(x)--> Not yet zoomed! Reverses <Zoom(x)++> and resets magnification.

When zooming, the y-axis always remains at 100 %. No y-axis zoom is available.

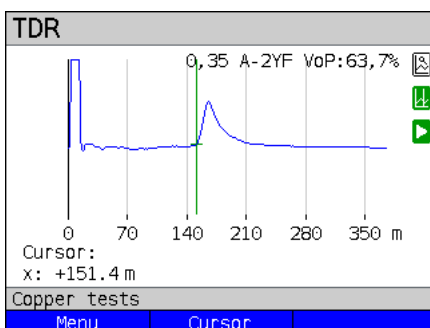
Continued on  
next page





You can vary the graph size from 25% to 100% using the zoom softkeys. This doubles or halves the resolution. When concurrently using the cursor, you can precisely localise the reflection on the measured line.

### Cursor (3):



When the Cursor function is started, a green cursor line appears in the middle of the graph.

**<Cursor>** You can toggle the cursor on and off as needed using the Cursor softkey after activating it in the menu.

The values of the graph for the position under the cursor are displayed below the graph:

**x:** +151.4 m



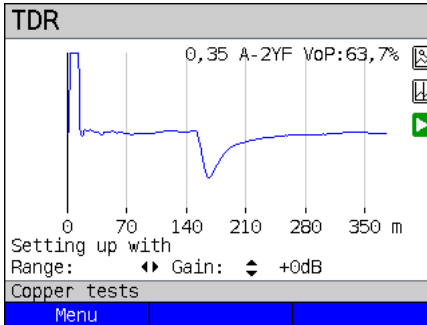
When the Stop function (see page 324) is activated, you can move the cursor faster.



Use the left and right cursor keys to move the cursor to any position on the graph to measure it. Briefly pressing the cursor key causes the cursor to jump to a new position in the graph. When the cursor key is held down, the steps the cursor covers in the graph become progressively larger.

The Zoom function and the Cursor function can also be combined. For example, you can determine a certain value using the cursor more easily when you have previously zoomed in on a specific area. However, the starting position of the cursor can vary.

### Measuring range (4):



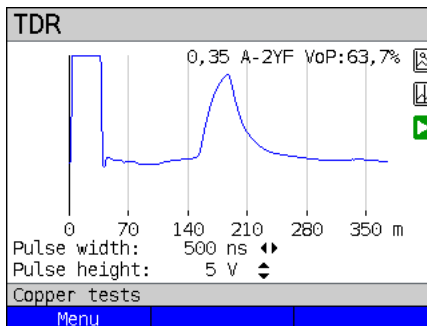
When the TDR function starts, it is in the measuring range in the status display. You can set the range (x) and the gain (y) in the measuring range. If you have hidden the measuring range in order to work with the cursor or zoom, you can restore it:

<Menu>



Restores the measuring range

### Pulse width/height (5):



You can configure the width and height of the pulse that ARGUS outputs to the line.



Configuring the pulse

### Height:

The pulse height sets the level of the pulse ARGUS outputs to the line in volts. The default value is **5 V**, but can be increased to 20 V. In principle, it is recommended that you increase the pulse height as the distance increases.

On short, very noisy lines as well, increasing the pulse can make the reflection stand out better against the noise, for a more reliable interpretation.

### Width:


The pulse width sets the duration of the pulse ARGUS outputs to the line in nanoseconds (ns). The default value is **500 ns**, but you can increase this up to 2000 ns (2  $\mu$ s) depending on the measuring range. Just like a more powerful pulse, a longer pulse contains more energy, and thus is generally more suitable for use on longer lines. However, a longer pulse can also conceal important reflections, which can then no longer be correctly interpreted.

Wire types (6):

The absolute VoP value must always be less than 1. However, ARGUS always displays this in percent. In a wire with a VoP value of 0.7, a signal propagates at 70 % of the speed of light ( $c_0$ ).

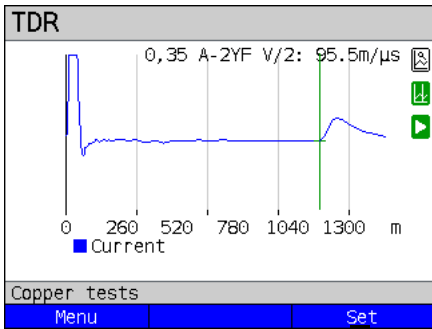
For many cable types, the pulse time is also specified in V/2:  $V/2 = VoP [\%] * 1.5$ . In this example, the V/2 value would come to 95.5 m/μs for a VoP of 0.637 resp. 63.7 %.

A typical patch cable has e.g. a VoP of 0.667 resp. 66.7%, which corresponds to a V/2 of exactly 100 m/μs.



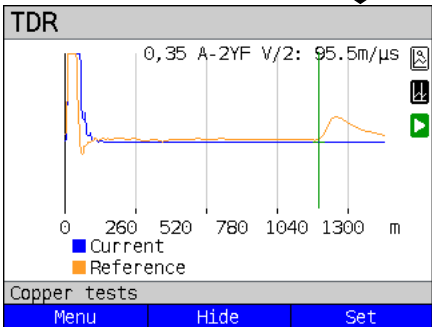
To measure e.g. building wiring precisely, it is important to set the correct VoP value. You can determine the correct VoP using a reference cable of known length before the measurement.

Reference curve (\*0):



In this example, the line is open at 143.3 m (reference value).

<Set>      Set reference curve.

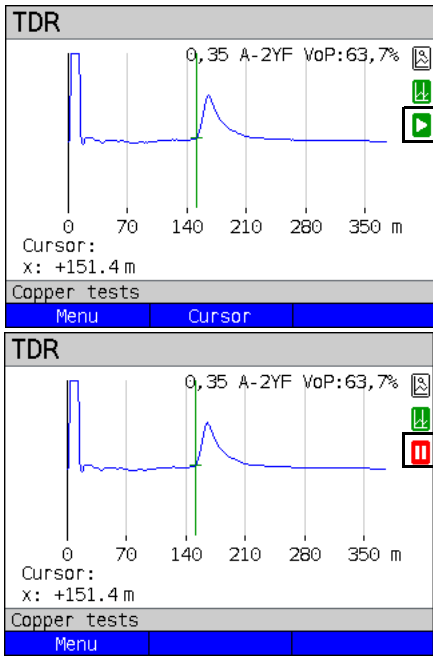


When the reference curve is set, an orange line is displayed in the graph. In this example, the line is terminated.


<Hide>      Hide reference curve.


<Set>      Set a new reference curve.


Start/stop




You can stop and restart a running test (realtime mode) at any time.

 Test running

 Stop test

 Test is stopped

 Restart test

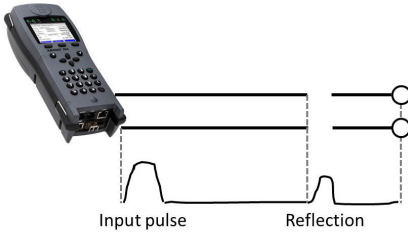
**Saving test results without terminating the TDR**

You can save your results of the measurement without disconnecting in the same way as for VDSL, see page 66.

### 22.5.4 Examples

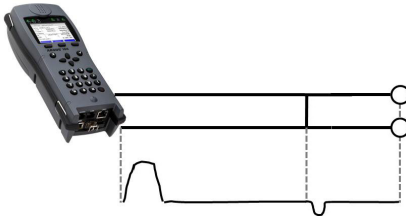
The following signal forms can help you in interpreting the reflection responses that ARGUS displays.

#### Examples:



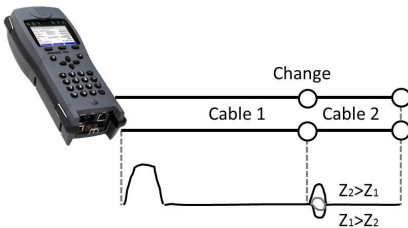
#### Open cable

The reflected pulse is positive. No proximate interference sources or the far end of the line can be seen.



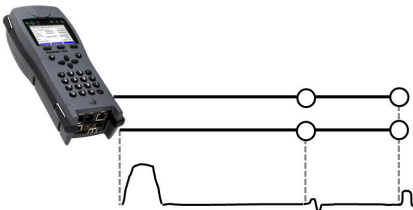
#### Short-circuit

The reflected pulse is negative. No proximate interference sources or the far end of the line can be seen.



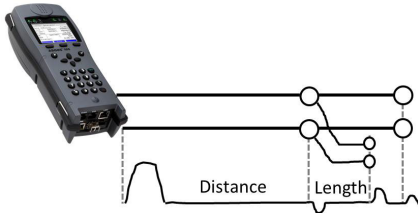
#### Mismatch

Different line cross-sections were used. The greater the mismatch, the greater the amplitude of the reflection.



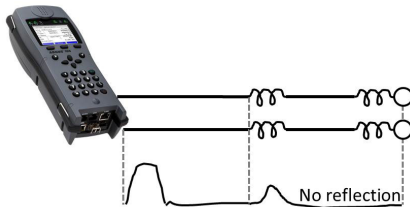
#### Poor contact point

A poor contact between two lines distorts the reflection into an S-shape. The worse the contact, the greater the reflection.



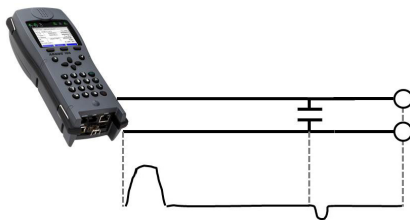
### Stub line

The beginning of a stub line appears in the form of a negative reflection, followed by a positive reflection corresponding to the length of the stub line when the end of the stub line is open.



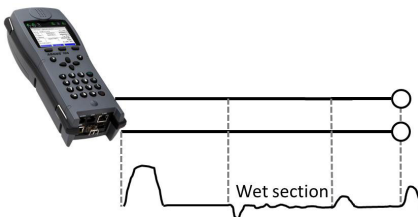
### Loading coils

Loading coils deployed on the line are optimally designed for transmitting voice frequencies. They do not let DSL signals through. The TDR function enables you to detect the first coil in a line. The reflection is positive with a long tail in the direction of the end of the line. The following faults cannot be detected.



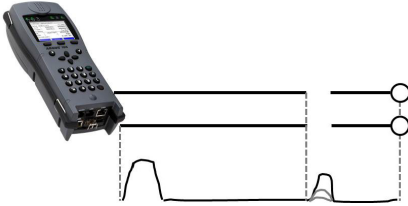
### Capacitive network

Like a short-circuit, the reflection from a capacitive network is negative.



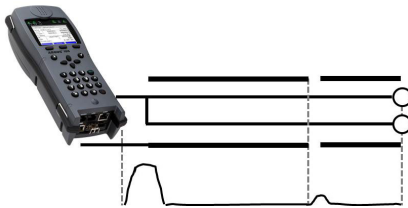
### Moisture

Moisture penetrating the cable has the same effect on the reflection as a stub line. However, the zone between the negative and positive reflection appears significantly noisier than for a normal stub line.



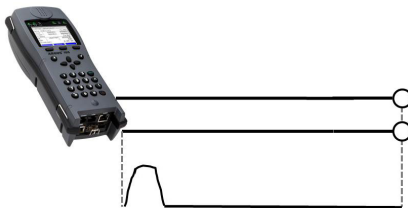
### Loose/intermittent contact

Realtime operation is extremely suitable for detecting intermittent contacts. The amplitude of the positive reflections varies depending on the intermittent contact frequency.



### Open shielding

Broken or open cable shielding can be detected by connecting the "a" and "b" cores to ARGUS via one contact and the shielding to a second. The reflection looks like an open line.



### Correct line termination

When the line is properly and correctly terminated, the pulse generated by ARGUS is completely absorbed. No further reflections are visible.





## 23 Ethernet cable tests



The local loop must be voltage-free.

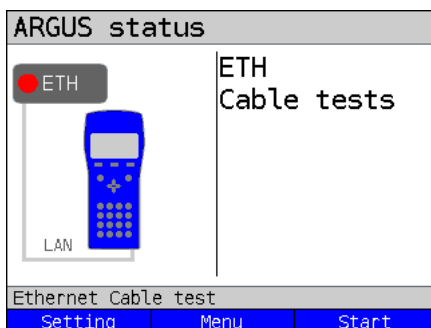


The Ethernet cable tests can only be performed on the LAN interface.

### 23.1 Configuring the Ethernet interface

Connect the local loop to the ARGUS socket "LAN" and switch on ARGUS. The chapter "Configuring the local loop", page 29, explains how to set up the connection type "Ethernet Cable Test".

#### Status screen



**Test not yet started:  
red LED in display!**

Meaning of LED image in display:  
Red LED: no test started

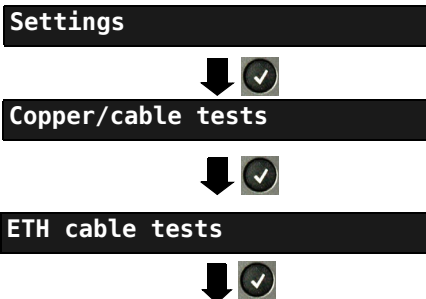
**<Setting>** Opens the Ethernet cable test setup, see page 329.

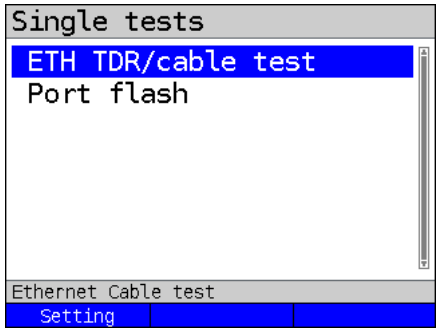
**<Menu>** Switches to main menu.

**<Start>** Starts the Ethernet cable test, see page 331.

### 23.2 Ethernet cable test settings

You can configure the following "Ethernet parameters". You can restore the default settings at any time (see page 353). The following example is used to illustrate how to modify a parameter.





Select e.g. ETH/TDR cable test.

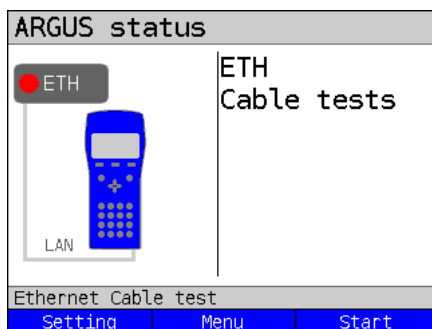


Setting	Description
<b>ETH TDR/cable tests:</b> Configuring the cable test parameters.	
<b>Propagation speed</b>	<p>To determine the distance, the calculation must take into account a correction value dependent on the wire type that specifies the ratio of the pulse propagation speed in the cable to the speed of light in a vacuum (<math>c_0 = 299.792458 \text{ m}/\mu\text{s}</math>).</p> <p>For many cable types, the pulse time is also specified in V/2.</p> <p>Minimum: <math>45.0 \text{ m}/\mu\text{s}</math> (VoP in %: 30)</p> <p>Maximum: <math>149.7 \text{ m}/\mu\text{s}</math> (VoP in %: 99.9)</p> <p>Default: <b><math>98.9 \text{ m}/\mu\text{s}</math> (VoP in %: 66.0)</b></p> <p>The choice of propagation speed as VoP or V/2 is saved.</p>
Line resistance	<p>Sets the line resistance per kilometer.</p> <p>Range: <math>20 \text{ }\Omega/\text{km}</math> to <math>200 \text{ }\Omega/\text{km}</math></p> <p>Default: <b><math>80 \text{ }\Omega/\text{km}</math></b></p>
Capacitance	<p>Sets the capacitance (operating (mutual) capacitance) per kilometer.</p> <p>Range: <math>35 \text{ nF}/\text{km}</math> to <math>100 \text{ nF}/\text{km}</math></p> <p>Default: <b><math>39 \text{ nF}/\text{km}</math></b></p>
Name	<p>Enter the name of the wire type.</p> <p>Default: <b><i>PE 0.5 AWG24</i></b></p>
<b>ETH port flash</b>	
<p>Interval that ARGUS keeps the port active before performing a link disconnect. The disconnect time depends on the switch.</p> <p>Range: 1 - 5 seconds</p> <p>Default: <b>1 s</b></p>	

## 23.3 Ethernet cable test

The Ethernet cable test checks for faults in LAN cabling. ARGUS interprets the measurement result and determines whether this indicates an open line, a short-circuit or a mismatch.

### 23.3.1 Starting Ethernet cable test

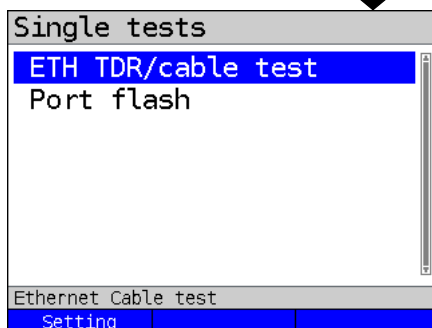


ARGUS in the status line.

**<Setting>** Opens the Ethernet cable test settings, see page 330.

**<Menu>** Opens the main menu.

**<Start>** Starts Ethernet cable test.

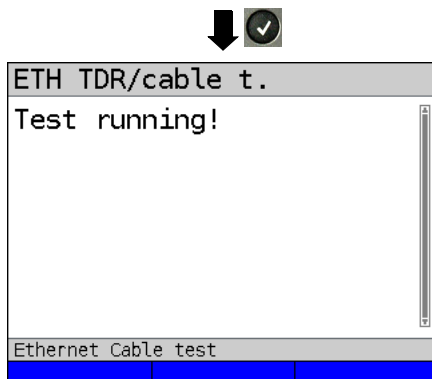


Select one of the Ethernet tests:

- ETH TDR/cable test
- ETH port flash

Start the desired Ethernet test directly by selecting it.

In this example, this is the ETH/TDR cable test.



The Ethernet TDR should always be measured at both ends of the cable. This reveals e.g. contact problems at the remote line end in the second, twisted test, as this type of fault can not be distinguished from the line end.

The Ethernet TDR/cable test is executed.

ETH TDR/cable t.				
Pin	State	[m]	r	
1-2	OK	-	-	-
3-6	OK	-	-	-
4-5	OK	-	-	-
7-8	OK	-	-	-
Mode: First peak				
Wire t.: Wire type 1				
Ethernet Cable test				
		Max	New	



ETH TDR/cable t.				
Pin	State	[m]	r	
1-2	OK	-	-	-
3-6	OK	-	-	-
4-5	OK	-	-	-
7-8	OK	-	-	-
Mode: Maximum peak				
Wire t.: Wire type 1				
Ethernet Cable test				
		First	New	

The cable test was executed with "First peak" mode.

Display:

- Pin pair
- Status of respective pin pair
- Display of distance to fault.
- Reflection coefficient

In this example, the line is correctly terminated. ARGUS returns "OK" for all cores.

**<Max>** Switches the measuring mode to "Maximum peak".

**<New>** Starts a new test.



If no line is connected, the device may deliver false results.



The Ethernet cable test is standard-compliant to a length of 100 m.

**Example measurements:**

ETH TDR/cable t.			
Pin	State	[m]	r
1-2	Open	49.3	+0.328
3-6	Open	51.7	+0.320
4-5	Open	50.1	+0.312
7-8	Open	50.9	+0.335
Mode: First peak			
Wire t.: Wire type 1			
Ethernet Cable test			
		Max	New

**Open end**

In this example, the line is open on all pairs. ARGUS locates the fault in the area from 49.3 m to 51.7 m.

This indicates that the line is open at approx. 50 m.

ETH TDR/cable t.			
Pin	State	[m]	r
1-2	Short	50.1	-0.320
3-6	Open	51.7	+0.320
4-5	Open	50.1	+0.312
7-8	Short	51.7	-0.320
Mode: First peak			
Wire t.: Wire type 1			
Ethernet Cable test			
		Max	New

**Short**

In this example, the line is short-circuited between pairs 1-2 and 7-8. ARGUS displays the value "Short" as the status.

ETH TDR/cable t.			
Pin	State	[m]	r
1-2	Short	50.1	-0.312
3-6	IM>115	51.7	+0.187
4-5	IM>115	50.9	+0.179
7-8	Short	50.9	-0.328
Mode: First peak			
Wire t.: Wire type 1			
Ethernet Cable test			
		Max	New

**Mismatch**

This example shows a mismatch ( $>115\ \Omega$ ) at pairs 3-6 and 4-5. This indicates an open cable end or an impedance transition  $>115\ \Omega$ .

ETH TDR/cable t.			
Pin	State	Dist.	r
1-2	Short	50.1m	-0.312
3-6	Z<85	51.7m	+0.187
4-5	Z<85	50.9m	+0.179
7-8	Short	50.9m	-0.328
Mode: First peak			
Wire t.: Wire type 1			
Ethernet Cable test			
		Max	New

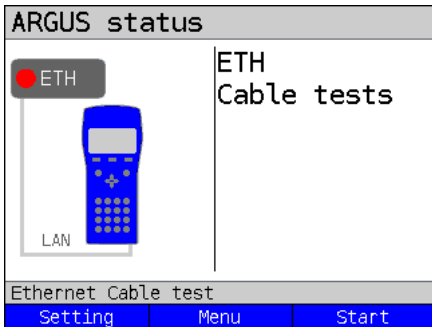
**Mismatch**

This example shows a mismatch ( $<85\ \Omega$ ) at pairs 3-6 and 4-5. This indicates a short or an impedance transition  $<85\ \Omega$ ..

## 23.4 Ethernet port flash

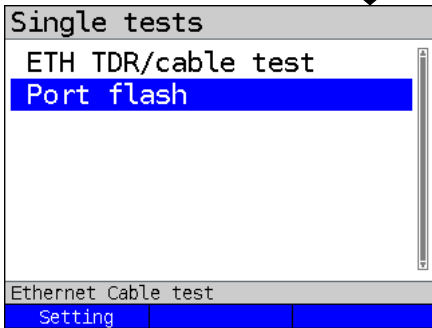
ARGUS can identify the port currently in use on the Ethernet switch using the test "Ethernet port flash". To facilitate identification, the flash frequency at the switch can be set in ARGUS.

### 23.4.1 Starting Ethernet port flash



ARGUS in the status line.

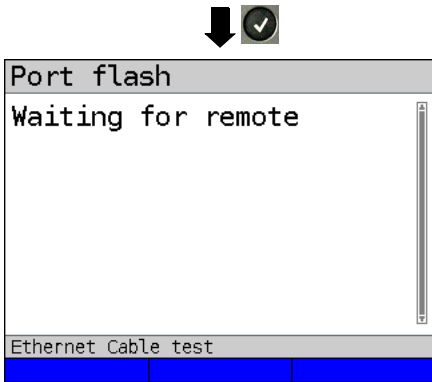
- <Setting> Opens the Ethernet cable test settings, see page 330.
- <Menu> Opens the main menu.
- <Start> Starts Ethernet cable test.



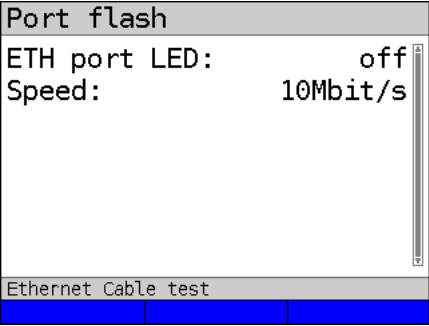
Select one of the Ethernet tests:

- ETH TDR/cable test
- ETH port flash

Start the desired Ethernet test directly by selecting it.  
In this example ETH port flash.



The Ethernet port flash test is executed.



The test "ETH port flash" has been executed.

Display:

- Indication whether the port LED is flashing (in example "off").
- Link speed attained.

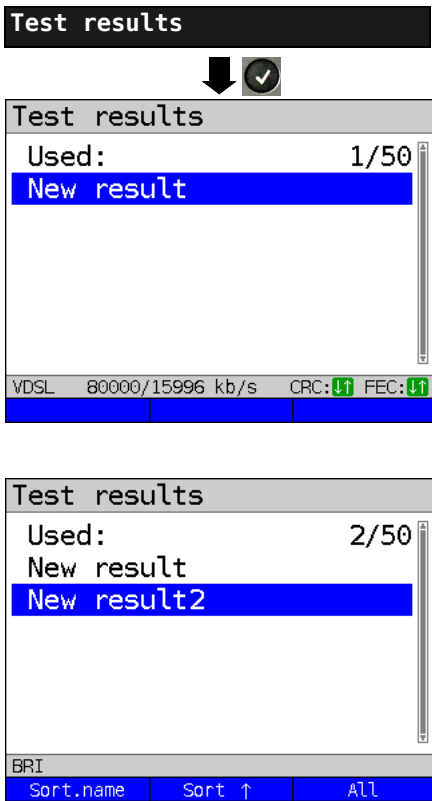


24 Test results


The saved test data are displayed either in the ARGUS display or on the PC. You can transfer the results to the PC, where the software WINplus / WINanalyse generates a detailed measurement log (along with other functions).

ARGUS stores the test results together in 50 definable save slots. The system suggests "New result" as the default save name. The saved test results are also deleted when all configuration settings are reset.

The functions ("View", "Rename", "Send to PC", "Delete") in the Test results menu refer to one test result. You must thus first select a save slot with a test result:



ARGUS in Main Menu

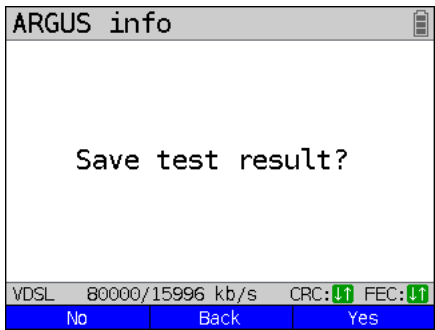
When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .

ARGUS displays the name of the stored result and the number of occupied slots.

When multiple test results are saved, ARGUS lets you sort them by name and time (as in this example). You can also sort them manually.

- <Sort time> Sorts test results by time.
- <Sort ↑> The marked test result is moved up one place in the list.
- <Sort ↓> The marked test result is moved down one place in the list.
- <All> Deletes all test results or send to PC.

24.1 Saving test results

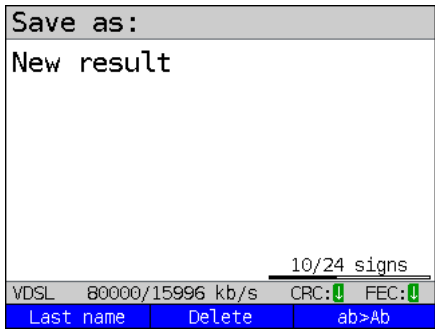






You can save the result after the end of a test or after disconnecting a connection.

ARGUS saves the test result in the first free slot. If all slots are occupied, you need to manually select a slot to overwrite.

ARGUS proposes "New result" as the save name.

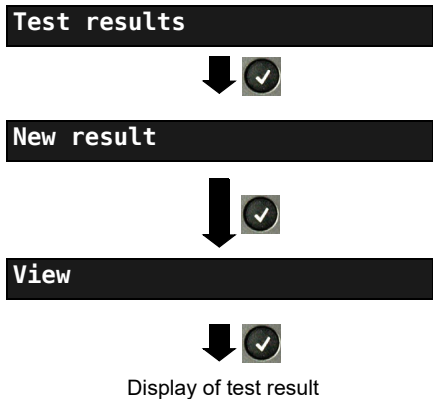
You can accept the displayed save name or enter a new one using the number keys. The right softkey changes its meaning when pressed, affecting your entry. You can enter up to 24 characters. ARGUS displays the number of characters used so far.




- <Last name>** ARGUS suggests the last save name used.
- <Ab>AB>** Entry begins with upper-case letters and continues in lower-case.
- <AB>12>** Entry of upper-case letters.
- <12>ab>** Numerical entry.
- <ab>AB>** Entry of lower-case letters.
-  Entry of special characters, e.g. @, /, -, ., \*, ?, %, =, &, ! etc.
-  Entry of special characters e.g. \_, :, +, # etc.
- <Delete>** Deletes the place in front of the cursor.
-  Moves cursor
-  Don't save result, return to previous display.


Save result

24.2 Displaying saved test results



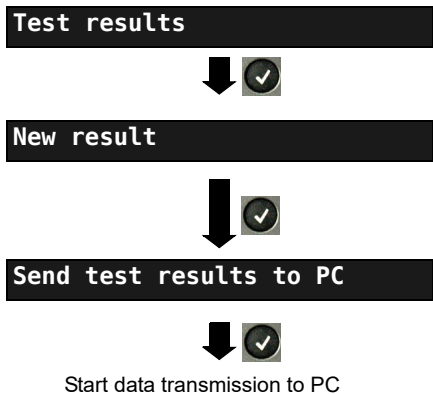
ARGUS in Main Menu

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .


 Select a save slot (in this example selection of the first slot with the save name "New result").


24.3 Sending test results to a PC

You can send the test results to a PC for viewing and archiving. Connect ARGUS (ARGUS socket "USB-B") to the interface of your PC using the cable supplied with the device and start the software WINplus or WINanalyse.



ARGUS in Main Menu

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .


 Select a save slot (in this example selection of the first slot with the save name "New result"). All test results are transmitted.

24.4 Delete test results



The test result is deleted.

ARGUS in Main Menu

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .



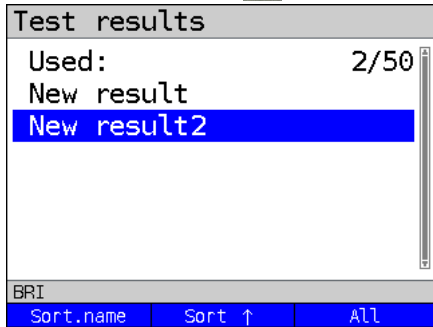
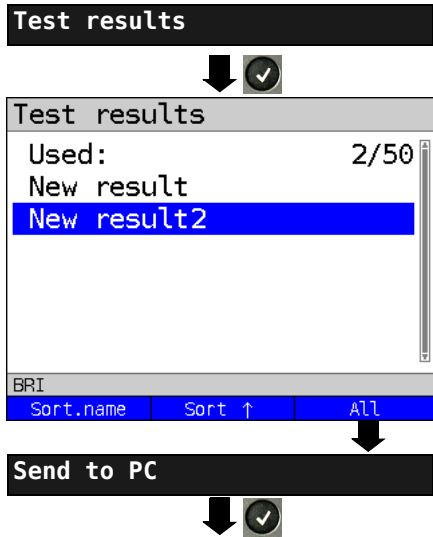
Select a save slot (in this example selection of the first slot with the save name "New result").

Deletes the test result stored in the selected slot.


To deletes all test results, see on page 353 "Restoring the factory settings".

24.5 Sending all test results to PC

ARGUS transfers all saved test results to the connected PC. Connect ARGUS to the PC and start ARGUS WINplus or WINanalyse.



ARGUS in Main Menu

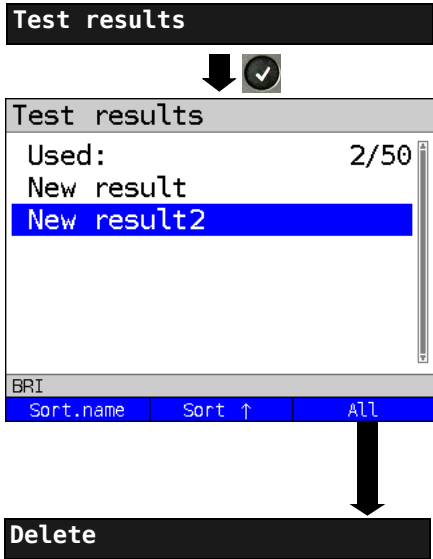
When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .


Start data transmission to PC

24.6 Deleting all test results

ARGUS deletes all saved test results from its internal memory.

ARGUS in Main Menu

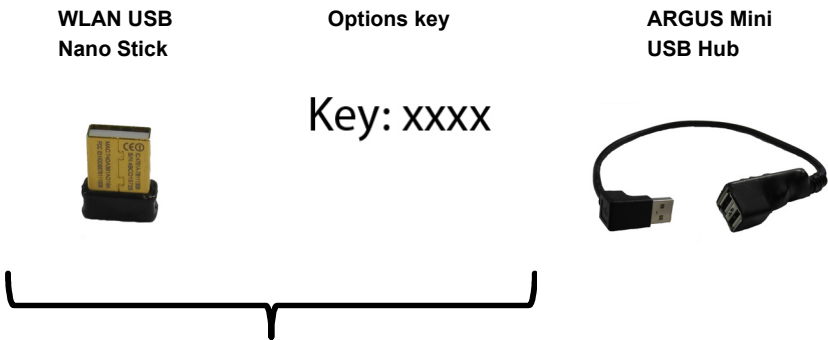


When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .


Confirm the security prompt with `<yes>`; all 50 possible test results are deleted.


25 WLAN

You can make your ARGUS WLAN-capable with the ARGUS-WLAN option (Article no.: 016250) or the ARGUS-WLAN kit (Article no.: 016251). The WLAN-option and the WLAN kit each contain a USB nano WLAN stick and an options key (see "Software option", page 350). You must enter this in ARGUS one time.



WLAN option  
(Article no.: 016250)

- 

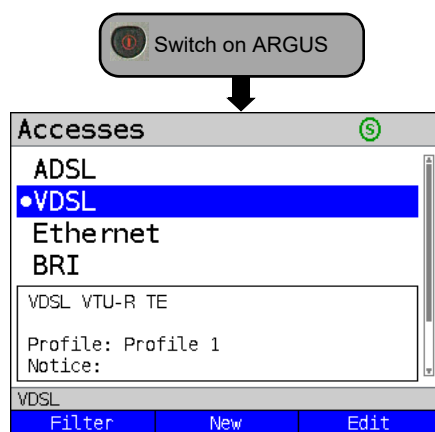
You only need the WLAN kit (or the ARGUS USB mini-hub) if your ARGUS only has one USB host interface and you wish to connect two USB devices (e.g. WLAN + ARGUS Copper Box).
- 

Always insert your USB devices in the hub first before you power up ARGUS.

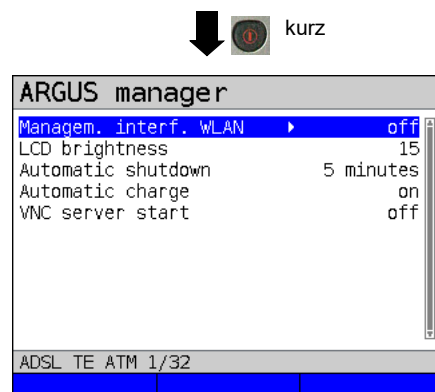
Technical features:

USB nano-stick	
Interface	USB 2.0 type A
Antenna	internal
WLAN standard	IEEE 802.11 b/g/n
Encryption	WPA2

## 25.1 Starting WLAN

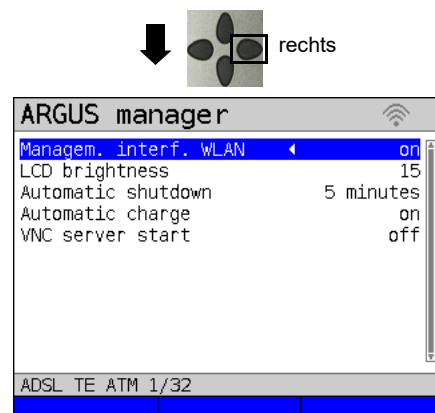



Access list or any point in the menu.



ARGUS manager display

- M-interface ETH / WLAN, see page 347
- LCD brightness, see page 346
- Automatic shutdown, see page 349
- Auto. charge, see page 355
- VNC server start, see page 347



You can activate/deactivate or change settings using the cursor key .

The WLAN interface is now activated.

See page 347 for WLAN settings such as SSID, password, channel, etc.

The WLAN interface is now activated. ARGUS is now in access-point mode (ARGUS-AP). The WLAN symbol in the status line is green .

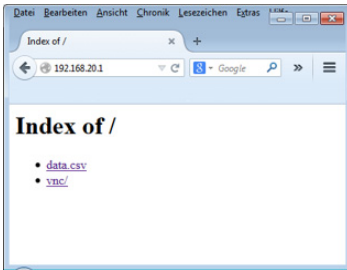
You can set up a WLAN connection with ARGUS by selecting the WLAN access with the name Argus162\_SerialNumber on a smart phone, tablet or laptop and entering the password stored in ARGUS.



Electronic job management applications can also access ARGUS and pick up measurements using WLAN.

### 25.2 Test results via WLAN

If for example a laptop has a working WLAN connection with ARGUS, you can open the Web server by entering the IP address of the ARGUS unit (see page 348) or myargus.info in your browser's address bar.



The test results with the name data.csv can be opened directly or saved on the laptop. You can also use this functionality to save, delete and rename measurement logs. For this, you require a WebDAV application/app on your PC/laptop or smart phone/tablet.



The .csv file contains the connection parameters of the last measurement conducted.

The command "VNC" lets you control ARGUS remotely via your browser.



You may first need to activate the VNC server on ARGUS, see page 347.



Further information regarding the VNC server is available on request.



The ARGUS Web server has its own SSL certificate (myargus.info), which permits https:// access.

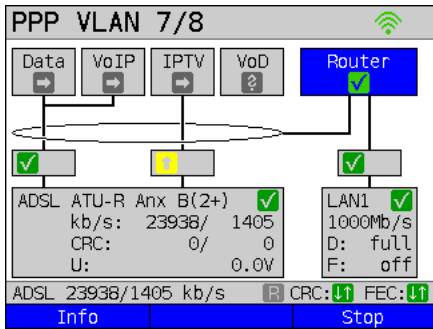


You can also access ARGUS using WebDAV via myargus.info. By this means, you can download measurement logs in .amp format directly from ARGUS via Ethernet or WLAN.




25.3 WLAN in router mode

When the ARGUS WLAN interface is active, it is always connected directly with the ARGUS router. If you want to use ARGUS as a true WLAN access point (ARGUS-AP) and e.g. start a download with this device as the gateway, you must first start a DSL access (ADSL, VDSL, see page 46).



If the router (see diagram) has been started, both WLAN and LAN are connected to the ARGUS router.

The smart phone, tablet or laptop can use ARGUS as an access point. All applications such as data, VoIP or video that can be run e.g. on a smart phone can now be executed to test the connecting devices via ARGUS - thus replacing all customer devices.

 WLAN and LAN are not linked via an Ethernet bridge. Each requires its own configuration. They may not be configured identically. A test from WLAN to LAN or vice-versa is not possible.


26 ARGUS settings

ARGUS can be custom-configured for special requirements. The default values are restored using "Reset" (see page 353).


26.1 Configuring the device

Changing a device setting is described using the setting "Alarm tone" as an example.


Settings

↓ 


Device

↓ 

Alarm tone


↓ 

● Off

↓ 


ARGUS adopts the marked setting as the default.

ARGUS in Main Menu


When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .

Select a setting (e.g. Alarm tone) using the cursor keys.

The default is indicated with a ● in the display.










Mark the desired setting. The marked setting is highlighted in blue in the display.






Return to next-higher level menu without saving setting change.

Setting	Description
Menu language	Select the operating language Default: <i>depends on country</i>
LCD brightness	Sets display contrast: 16 contrast levels are possible. You can increase or decrease the contrast using the cursor keys. The vertical arrow shows where the current contrast lies in the range from low to high contrast.
Date / time setting	Enter the date, time, time offset and daylight savings time via the number keys. Switch between the lines using the up and down cursor keys. Change the three following settings, from top to bottom, so that all settings take effect:  Time offset:    Set the time offset (coordinated world time: UTC-12 to UTC+14) for your time zone here. UTC+1 is the setting for central Europe.

<b>Management interface</b>	Daylight savings time:	If central European time is selected, ARGUS calculates with a total time offset of UTC +2 during the summer months.
	Date / time:	<p>To set the time manually, enter the correct time in your time zone using the ARGUS number keys. In automatic time setting, ARGUS automatically reads the time from a preconfigured time server.</p> <p>Default: <b>0.de.pool.ntp.org</b></p> <p>This can be changed to a different server. The prerequisite is that ARGUS can connect to the internet. Carry out e.g. a ping test (e.g. ping www.argus.info).</p> <p>The time you enter runs on the built-in ARGUS realtime clock until the power supply is interrupted. When ARGUS is switched off and the batteries removed, the clock continues to run for a few days on its internal buffer. The time is undefined as soon as the buffer is exhausted, and must be set again.</p>
	Start management interface	<p>Determines whether the management interface is used. If WLAN was selected as the management interface, ARGUS operates as a WLAN router, see page 348.</p> <p>Depending on the selected interface, ARGUS displays either a WLAN or an Ethernet symbol.</p> <p>WLAN:  WLAN is not active (gray)</p> <p> WLAN is active (green)</p> <p>Ethernet:  Ethernet is selected</p> <p>Default: <b>off</b></p>
	VNC server	<p>Start VNC Default: <b>off</b></p> <p>VNC scaling Determines the scaling used to display the ARGUS screen on the PC. Range: Factor 1 - Factor 4 Default: <b>Factor 2</b></p>
	WLAN	<p>When WLAN is grayed out, the management interface must first be halted (see above) by setting "Start management interface" to off. Then restart it again.</p>
	SSID	<p>The service set identifier (SSID) is a user-definable name with which ARGUS can be identified as a network. Your SSID can also be displayed using the keyboard shortcut  and </p> <p>Default: <b>Argus162_SerialNumber</b></p>

			<b>Password</b> If WLAN was selected as the management interface (see page 349), mobile devices log in using a password query. The password (default: <b>argus162</b> ) can also be displayed using the keyboard short-cut  and  .
			<b>Channel</b> Selects the WLAN channel on which the WLAN stick transmits. Range: Channel 1 to 11 Default: <b>1</b>
			<b>DHCP server</b> Settings for the DHCP server: - Starting and ending IP address Range: Range 0.0.0.0. to 255.255.255.255 Default: (assignment see RFC 3330) Start: <b>192.168.10.30</b> End: <b>192.168.10.40</b> - Domain name, see "User name" page 92 for details - Duration of reservation for IP addresses Range: 1 - 99999 seconds Default: <b>240</b>
		<b>Interface</b>	<b>Interface</b> Selection of the management interface (Ethernet or WLAN). Default: <b>ETH</b>
			<b>IP address</b> ARGUS IP address Range: 0.0.0.0 to 255.255.255.255 Default: <b>192.168.20.1</b> (for issuing see RFC 3330)
			<b>Netmask</b> IP netmask Range: 0.0.0.0 to 255.255.255.255 Default: <b>255.255.255.0</b> (issuing see RFC 3330)
			<b>Gateway</b> Gateway IP address Range: 0.0.0.0 to 255.255.255.255 Default: <b>0.0.0.0</b> (assignment see RFC 3330)


<b>Ring volume</b>	<p>You can set the volume of the ring tone ARGUS uses to signal an incoming call.</p> <p>For one thing, you can adjust the initial volume.</p> <ul style="list-style-type: none"> <li>- Default: <b>Level 1</b> (very quiet)</li> </ul> <p>You can also adjust the end volume.</p> <ul style="list-style-type: none"> <li>- Default: <b>Level 7</b> (very loud)</li> </ul> <p>For an incoming call, ARGUS begins with the initial volume (very quiet) and increases the volume with each ring until it reaches the final volume level (very loud).</p>	
<b>Alarm tone</b>	<p>ARGUS generates alarm tones in different situations, e.g. as soon as a bit error occurs in BERT or ARGUS has synchronised with an xDSL access, and when error counters reach high counts.</p>	
	Short - long	Successfully synchronised
	Long - short	Lost synchronisation
	Short - short	Error counter spike (the tone relates only to the last second. Only one tone sounds even when multiple errors are displayed.)
	<p>The setting "off" suppresses all alarm tones.</p> <p>Default: <b>off</b></p>	
<b>Jingle</b>	<p>An ARGUS jingle is played after the device powers up and initialises.</p> <p>Default: <b>off</b></p>	
<b>Power management</b>	<p>Automatic off: Sets the no-activity period after which ARGUS switches to power-saving mode when the power supply is not connected. When power-saving mode is turned off entirely, ARGUS will display a warning that switching off power-saving mode reduces the battery time the next time it is powered up. You can deactivate this warning with the "X" key. &lt;on&gt; cancels deactivation.</p> <p>Default: <b>after five minutes</b></p>	
<b>Company address</b>	<p>Entry of the customer address for the measurement log. Each configuration item permits up to 29 characters.</p>	
	Company name	Default: */*
	Street	Default: */*
	ZIP/City	Default: */*
	Phone number	Default: */*

<b>Software option</b>	<p>Activates a software option. You must enter an activation key via the keypad. A variety of options can be activated in ARGUS; each one requires entry of a 20-digit code via the number keys. This code will be provided on request.</p> <div><p>There are also codes for resetting options. You should only enter these codes when you understand what they do.</p></div>
<b>ARGUS manager</b>	<p>You can also access the ARGUS manager via the  key.</p>
<div><div><div>ARGUS manager</div><div><div>Managem. interf. WLAN ▶ off</div><div>LCD brightness 15</div><div>Automatic shutdown 5 minutes</div><div>Automatic charge on</div><div>VNC server start off</div></div><div>ADSL TE ATM 1/32</div></div><div><p>Display ARGUS manager</p><ul style="list-style-type: none"><li>- Managem. interface ETH/WLAN, see page 348</li><li>- LCD brightness, see page 346</li><li>- Automatic shutdown, see page 349</li><li>- Automatic charge, see page 355</li><li>- VNC server start, see page 347</li></ul><p>Use the cursor keys  to activate / deactivate or change the settings.</p></div></div>	

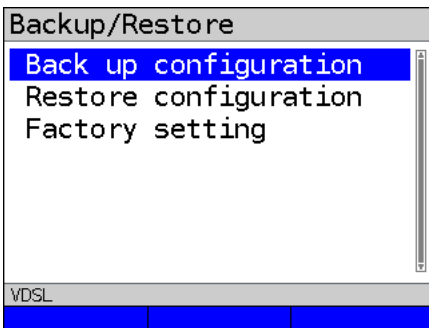
## 26.2 Backing up and restoring settings

With ARGUS, you can back up all settings (speed dial memory, PPP user name, PPP password, IP addresses, profile names, user-specific details, keypad information and more) and restore them if needed.

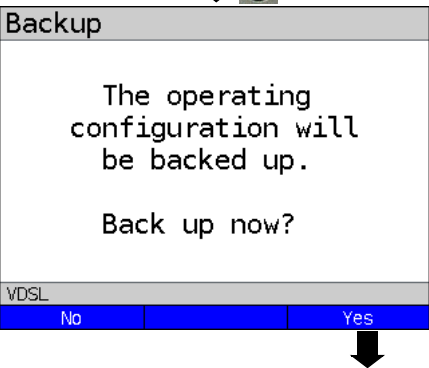
### Backing up settings

A black rectangular button with the word "Settings" in white text.

ARGUS in Main Menu

A black rectangular button with the text "Backup/restore" in white text. A downward arrow and a checkmark icon are positioned above the button.  
A dialog box titled "Backup/Restore" with a scrollable list containing three options: "Back up configuration" (highlighted in blue), "Restore configuration", and "Factory setting". At the bottom, there is a "VDSL" label and a blue bar with three buttons.  

All settings made in ARGUS are backed up unchanged and can thus be restored later.

A dialog box titled "Backup" with the text "The operating configuration will be backed up." and "Back up now?". At the bottom, there is a "VDSL" label and a blue bar with three buttons, the rightmost of which is labeled "Yes". A downward arrow is positioned below the "Yes" button.

Backup

Enter security keyword  
to back up operating  
configuration:

VDSL



Enter the security password to back up or restore settings. You can obtain this from your Technical Support or directly from intec (see page 10).



Backup/Restore

Back up configuration

Restore configuration

Factory setting

VDSL

The settings are now backed up and can be restored as necessary.

Restoring settings

Backup/Restore

Back up configuration

Restore configuration

Factory setting

VDSL

Select "Restore settings"



and



Restores the saved test settings.



If no settings have been backed up, this function has the same effect as "Restore factory setting", see page 353. A security password is not required.



Restore now?



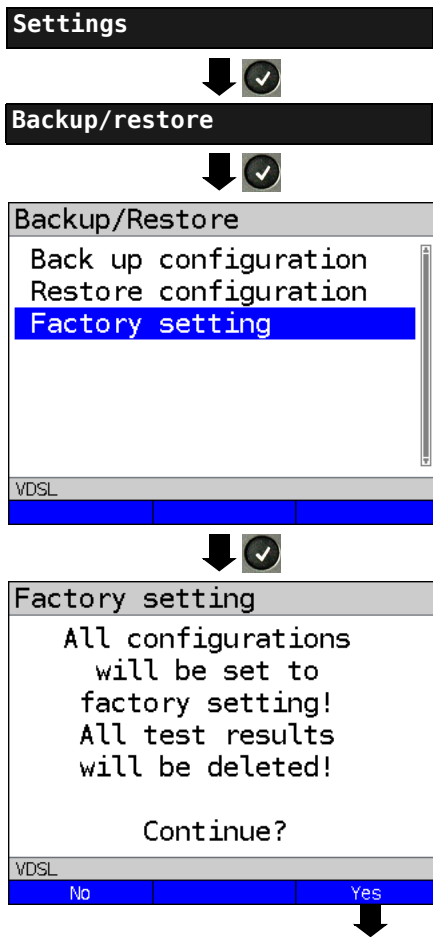


26.3 Restoring the factory settings

ARGUS resets all settings to the factory defaults.






The speed-dial memory, PPP user name and password, IP addresses, profile-names, user-specific services, keypad information and all test results stored in ARGUS are erased.






The following steps are performed as for "Backup settings", see page 351.

All parameters are reset to the factory defaults.

 and  ARGUS jumps directly to the security prompt.

 Enter the security password to delete all settings. You can obtain this from Technical Support or directly from intec (see page 10).

 and  Restores the saved test settings.

 If no settings have been backed up, this function has the same effect as "Restore factory defaults", see page 352.

26.4 Saving numbers in the speed dial memory

You can save ten 24-digit numbers in the speed dial memory.



The own number of the test access must be entered in the first speed dial slot (display shows own number); this is important in particular for the automatic services test on ISDN accesses). In the speed dial menu, you can jump to the end of the list by moving up one slot from the top entry.

You can store remote numbers in the slots "Remote numbers 1 to 8". In the slot "X.31 test number", ARGUS expects the X.25 access number for the X.31 test (see page 238).

Settings

↓

Numbers

↓

Entering a number

↓

ARGUS saves the number and switches to the next higher level menu.

ARGUS in Main Menu

Scroll down to the desired speed dial slot. Enter the number using the keypad.

<Delete> Deletes the space when the cursor is behind the last character, otherwise deletes the character under the cursor.

Switches to the next higher-level menu without saving the number.



When entering the own number with and extension (operating ARGUS on a PBX), note the following: The extension is separated from the number using a "#". For outgoing calls, ARGUS uses the entire number (without "#") as the destination address (CDPN resp. DAD) and the number after the "#", i.e. the extension, as the sender address (CGPN resp. OAD). A "#" at the beginning of a number is treated as a valid digit.

Example: 02351/9070-40 is entered as 023519070#40.

If the number ends with "#", later calls are made without CGPN resp. OAD. This is important for some PBXs.

## 27 Using the battery pack

### Changing the battery pack

Power down ARGUS and disconnect the power adapter. Then release the knurled screw securing the battery pack.

### Handling the battery pack



ARGUS may only be operated using the battery pack supplied with the device; connecting other power supply units to the contacts of the device will damage ARGUS.

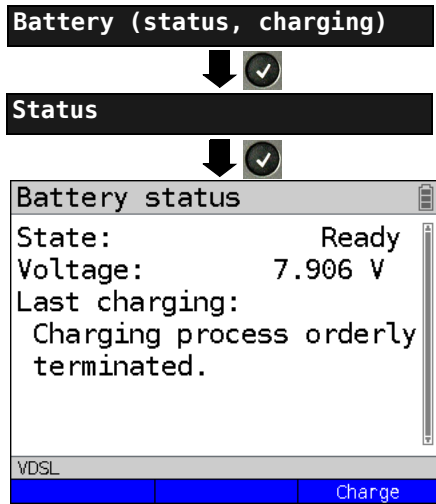
- Only charge the supplied battery pack in ARGUS.
- Do not use the ARGUS battery pack in other devices.
- Active charging of the battery pack and automatic charging (on by default) may only be carried out in a temperature range of 0 °C to +40 °C.
- Charge the battery pack completely at least once a month (even if the device has not been used for a longer period!).
- The lithium ion battery pack should be stored with a charge of 40 to 60 %. When storing the device for longer periods, you should refresh this charge level every six months. To prevent full discharge, remove the battery pack from the device for long-term storage.  
To maximise battery life, do not store the battery long-term at temperatures above +50 °C.
- See the chapter Safety information (page 11) for detailed information on using and transporting the lithium ion battery pack safely.

### Automatic charging of the battery pack when ARGUS is powered down

ARGUS automatically charges the battery pack as soon as the device is powered down when the power adapter is connected and the battery voltage is too low. During charging, ARGUS displays "Charging battery" in the display. Hold down the power button to switch ARGUS off before the batteries are charged. ARGUS remains powered up after the battery pack is fully charged.

Status

ARGUS indicates the current state of the battery graphically in the display when no power adapter is connected. A battery symbol flashes in the display when it is down to a power reserve of approx. 8 minutes (depending not the operating mode). Tone errors, and in extreme cases malfunctions, can occur in this period. Connect the power adapter. ARGUS can recharge the battery completely when the power adapter is connected. The ARGUS power pack does not require manual discharge. A complete charging process can take up to approx. 6 hours.



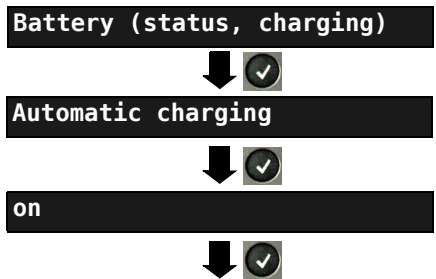
ARGUS in Main Menu

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with . Connect the power adapter! Start the charging process.

During the charging process, ARGUS displays the current status and the voltage.

**<Charge>** Starts the charging process.

Automatic battery charging in the background



ARGUS in Main Menu

When ARGUS is in the selection list for preconfigured accesses, you can switch to the abbreviated main menu with .

ARGUS charges the battery automatically in the background when the mains adapter is connected as soon as the battery status falls below a threshold value (battery symbol in display)

ARGUS adopts this setting and switches to the next higher level menu.

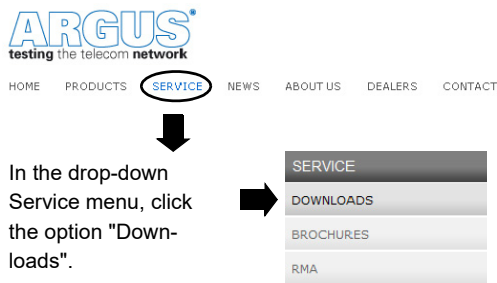


When ARGUS is disconnected from the power adapter before that battery is completely charged, ARGUS does not automatically continue charging when it is subsequently reconnected because the charge is no longer below the threshold.

28 Firmware update

You can download firmware files online free of charge at [www.argus.info/service](http://www.argus.info/service) and then upload them to ARGUS.  
Go to the Web page [www.argus.info](http://www.argus.info).

Click the menu option "Service" (highlighted in blue here) in the navigation bar.



In the drop-down Service menu, click the option "Down-loads".

This opens up a product overview.

DOWNLOADS

Download area

Download user manuals, an overview of menu and test leads, data sheets, brochures, PC software and our free firmware updates.

Choose your Tester:

ARGUS 165	ARGUS 125
ARGUS 162	ARGUS 126
ARGUS 155	ARGUS 145
ARGUS 152	ARGUS 42
ARGUS 151	ARGUS 41 plus
ARGUS Copper Box	ARGUS 44
ARGUS 42 plus	ARGUS 43
ARGUS 42 basic	ARGUS 28
ARGUS 3u IT	ARGUS 26
ARGUS 3u plus	ARGUS 25
ARGUS 3u basic plus	ARGUS 10
ARGUS 145 plus	ARGUS 3u basic
ARGUS 142	ARGUS 3u
ARGUS 141	
ARGUS accessoires brochure	
WINplus/WINanalyse	
ARGUS Update-Tool	

Select your ARGUS device.

Once you select your device, you are automatically taken to the firmware updates. Select your country-specific firmware variant.



The screenshot shows the ARGUS 162 website. At the top, there is a navigation bar with links: HOME, PRODUCTS, SERVICE, NEWS, ABOUT US, DEALERS, CONTACT. On the right, there are dropdown menus for PRODUCTS and INTERFACES, and a search bar. Below the navigation bar, there is a large image of the ARGUS 162 device. To the right of the image, the text reads: **ARGUS® 162**  
ADSL + VDSL combi tester  
The ADSL + VDSL combi tester ARGUS 162 verifies VDSL2, ADSL and Gigabit Ethernet (Cu + SFP) and supports copper and Triple Play tests on top.

Below the image, there is a table with two columns: ARGUS 162 and DOWNLOADS / FIRMWARE. The table lists various firmware and configuration files for download.

ARGUS 162	DOWNLOADS / FIRMWARE
OVERVIEW	For each update, please use the newest <b>Update-Tool</b> . Necessarily, follow the instructions in the <b>Update-Tool Manual</b> . Please download only the version to your device, which is exclusively provided for your model. Otherwise you can cause damage, that will lead to a repairing with costs.
TECHNICAL DETAILS	
DOWNLOADS:	
DATASHEET	 <b>ARGUS 162 Firmware (V 1.51 / German)</b> 011_ARGUS 162_Firmware_D_V_1_51.zip (19.61 MB)
MANUAL	 <b>ARGUS Beispielkonfiguration (V 05.2013 / German)</b> 012_ARGUS Beispielkonfiguration_D_V_05_2013.zip (6.54 KB)
PC SOFTWARE	
FIRMWARE	
PROFESSIONAL ARTICLE	 <b>ARGUS 162 Firmware (V 1.51 / English)</b> 021_ARGUS 162_Firmware_U_V_1_51.zip (19.6 MB)
ACCESSORIES BROCHURE	 <b>ARGUS 162 Firmware (V 1.51 / French)</b> 031_ARGUS 162_Firmware_F_V_1_51.zip (19.6 MB)

At the bottom left of the table, there is a [BACK](#) link.

When you select your variant, a browser dialogue opens that enables you to save the firmware to your local PC. The following steps are explained in the WINanalyse manual and in the update tool instructions.

### Important information on updating your ARGUS firmware



- Never under any circumstances update ARGUS when it is operating in battery mode.
- Connect ARGUS to the power adapter before uploading the update file from the PC.
- An ARGUS USB cable is required for updating (USB cable with mini-USB plug).
- You should back up the configuration and measurement logs to a PC before performing an update.
- Do not disconnect ARGUS from the PC during the update.
- Do not switch off ARGUS during the update.
- Be sure to observe the messages in the ARGUS display, and not just the instructions of the update tool on the PC.
- The update is only complete when the update tool displays the corresponding message on the PC and ARGUS starts with the "normal" startup screen after being restarted by the update tool.
- ARGUS only powers back up when you click one of the two buttons ("Back to step 1" or "Exit program") at the end of the update.



If problems occur because of a failure to follow these instructions, repeat the update process up to three times. Each repetition makes it possible to overwrite further faulty software components.



When connecting an ARGUS Copper Box, it can occur that ARGUS automatically initialises the Copper Box with the correct firmware in order to avoid compatibility issues. This can take a moment.

**29 Appendix****A) Abbreviations****Characters**

<b>1TR6</b>	Signalling protocol (D-channel protocol) for national ISDN of the former German national PPT (Bundespost)
<b>2B1Q</b>	2 binary 1 quaternary - line code
<b>3PTY</b>	Three party service
<b>4B3T</b>	4 binary 3 ternary - a modified monitored sum 43-code (MMS43)
<b><math>\Delta f</math></b>	Bandwidth
<b><math>\Omega</math></b>	Ohm (electrical resistance)

**A**

<b>A</b>	Ampere (electrical current)
<b>A3K1H</b>	Audio 3.1 kHz
<b>A7kHz</b>	Audio 7 kHz
<b>AAL</b>	ATM adaptation layer
<b>AC</b>	Alternating Current or Access Server
<b>ADSL</b>	Asymmetric Digital Subscriber Line
<b>AI</b>	Action indicator
<b>AIT</b>	Application information table
<b>AMP</b>	ARGUS measurement protocol
<b>ANSI</b>	American National Standards Institute
<b>Anx.</b>	Annex
<b>AOC</b>	Advice of charge
<b>AOC-D</b>	Advice of charge Charging information during the call
<b>AOC-E</b>	Advice of charge Charging information at the end of the call
<b>APL</b>	("Anschlusspunkt Linie") Service termination point
<b>AS</b>	Available second
<b>ASCII</b>	American Standard Code for Information Interchange
<b>ATM</b>	Asynchronous Transfer Mode
<b>ATU-R</b>	ADSL Transceiver Unit
<b>Auto-MDI-X</b>	Automatic Medium Dependent Interface Crossing
<b>Avg</b>	Average
<b>AWG</b>	American Wire Gauge
<b>AWS</b>	("Anrufweiterschaltung") Call forwarding (1TR6)

**B**

<b>BC</b>	Bearer capability
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<b>BER</b>	1. Basic Encoding Rules 2. Bit error rate
<b>BERT</b>	Bit error rate test
<b>BR</b>	Bridge
<b>BRAS</b>	Broadband access server
<b>BRI</b>	Basic rate interface
<b>C</b>	
<b>C</b>	Celsius
<b>c<sub>0</sub></b>	Speed of light
<b>CALL PROC</b>	CALL PROCeeding message
<b>CAT</b>	Conditional access table
<b>CC</b>	Continuity counter
<b>CCBS</b>	Completion of calls to busy subscriber
<b>CCNR</b>	Call complete no response
<b>CD</b>	Call deflection
<b>CDN</b>	see also CDPN
<b>CDPN</b>	CalleD party number
<b>CF</b>	Call forwarding
<b>CFB</b>	Call forwarding busy
<b>CFNR</b>	Call forwarding no reply
<b>CFU</b>	Call forwarding unconditional
<b>CGN</b>	see also CDPN
<b>CGPN</b>	CallinG party number
<b>CLIP</b>	1. Calling Line Identification Presentation 2. Clipping
<b>CLIR</b>	Calling Line Identification Restriction
<b>CNS</b>	CLIP-no screening
<b>CO</b>	Central office
<b>Codec</b>	Coder decoder
<b>COLP</b>	Connected Line Identification Presentation
<b>COLR</b>	Connected Line Identification Presentation
<b>CONN</b>	CONNect message
<b>CONN ACK</b>	CONNect ACKnowledge message
<b>CQE</b>	Conversational Quality Estimated
<b>CR</b>	Call reference
<b>CRC</b>	Cyclic redundancy check
<b>CT</b>	Call transfer
<b>CUG</b>	Closed user group
<b>CW</b>	Call waiting

<b>D</b>	
<b>DAD</b>	Destination address (1TR6)
<b>dB</b>	Decibel
<b>dBm/Hz</b>	Performance measurement with the reference quantity 1 mW (milliwatt) per hertz
<b>DC</b>	Direct Current
<b>DCE</b>	Data communication equipment
<b>DDI</b>	Direct dialling in
<b>DDM</b>	Digital diagnostic mode
<b>DF</b>	Delay factor
<b>DFU</b>	("Datenfernübertragung") Remote data transmission
<b>DHCP</b>	Dynamic Host Configuration Protocol
<b>DiffServ</b>	Differentiated services
<b>DIN</b>	Deutsches Institut für Normung - German Institute for Standardization
<b>DISC</b>	DISConnect message
<b>DL</b>	Download
<b>DM</b>	("Dienstmerkmal") Service
<b>DMT</b>	Discrete Multitone Transmission
<b>DNS</b>	Domain Name System
<b>DPBO</b>	Downstream power backoff
<b>DSCP</b>	Differentiated services codepoint
<b>DS</b>	DownStream band
<b>DSL</b>	Digital Subscriber Line
<b>DSLAM</b>	Digital Subscriber Line Access Multiplexer
<b>DSS1</b>	Digital Subscriber Signalling System No. 1
<b>DTE</b>	Data Terminal Equipment
<b>DTMF</b>	Dual Tone Multi Frequency
<b>DTU</b>	Data Transmission Unit
<b>E</b>	
<b>E1</b>	Primary Rate Interface
<b>EAZ</b>	("Endgeräteauswahlziffer") Local calling number (1TR6)
<b>EC</b>	European Community
<b>ECT</b>	Explicit call transfer
<b>E-DSS1</b>	European Digital Subscriber Signalling System Number 1
<b>EFS</b>	Error Free Seconds
<b>EIT</b>	Event Information Table
<b>ElektroG</b>	Elektro- und Elektronikgerätegesetz, German law governing electrical and electronic devices
<b>EMC</b>	Electromagnetic compatibility
<b>EN</b>	European standard
<b>EoA</b>	Ethernet over ATM

<b>EOC</b>	Embedded operations channel
<b>ES</b>	Errored seconds
<b>ete</b>	end-to-end
<b>ETH</b>	Ethernet
<b>ETSI</b>	European Telecommunications Standards Institute
<b>F</b>	
<b>F</b>	Farad (unit of electrical capacitance)
<b>Fax G3</b>	Telefax group 3
<b>Fax G4</b>	Telefax group 4
<b>FEC</b>	Forward error correction
<b>FFT</b>	Fast Fourier transform
<b>FSK</b>	Frequency shift keying
<b>FTP</b>	File Transfer Protocol
<b>FV</b>	("Festverbindung") leased line
<b>FW</b>	Firmware
<b>G</b>	
<b>GB</b>	Gigabyte
<b>Gbit/s</b>	Gigabits per second
<b>GBG</b>	("Geschlossene Benutzer Gruppe") Closed user group
<b>G.hs</b>	ITU-T G.994.1 handshake procedure
<b>GigE</b>	Gigabit Ethernet
<b>H</b>	
<b>h</b>	hour
<b>HD</b>	High definition
<b>HDLC</b>	High-level data link control
<b>HEC</b>	Header error checksum
<b>hex</b>	Hexadecimal
<b>HLC</b>	High layer compatibility
<b>HLOG</b>	Amplitude of transmission function per tone
<b>HOLD</b>	Call hold
<b>HRX value</b>	Hypothetical reference value
<b>HTTP</b>	Hypertext Transfer Protocol
<b>HVT</b>	("Hauptverteiler") Main distribution frame
<b>Hz</b>	Hertz (measuring unit of frequency)
<b>I</b>	
<b>IAD</b>	Integrated access device
<b>ID</b>	Identifier
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>IGMP</b>	Internet Group Management Protocol
<b>INFO</b>	INFormation Message
<b>INP</b>	Impulse noise protection

<b>IP</b>	Internet Protocol
<b>IPCP</b>	Internet Protocol Control Protocol
<b>IPoA</b>	Internet Protocol over ATM
<b>IPoE</b>	Internet Protocol over Ethernet
<b>IPTV</b>	Internet Protocol Television
<b>ISDN</b>	Integrated Services Digital Network
<b>ISO</b>	International Standards Organization
<b>ISP</b>	Internet service provider
<b>ITSP</b>	Internet telephony service provider
<b>ITC</b>	Independent TC
<b>ITU</b>	International Telecommunication Union
<b>K</b>	
<b>KB</b>	Kilobyte
<b>KVZ</b>	("Kabelverzweiger") Cable branch box
<b>kbit/s</b>	Kilobits per second
<b>L</b>	
<b>L1</b>	Layer 1 in the OSI reference model
<b>L2</b>	Layer 2 in the OSI reference model
<b>L3</b>	Layer 3 in the OSI reference model
<b>LAN</b>	Local Area Network
<b>LAPD</b>	Link access procedure for D-channels
<b>LCD</b>	Liquid crystal display
<b>LCN</b>	Logical channel number
<b>LCP</b>	Link Control Protocol
<b>LED</b>	Light-emitting diode
<b>LLC</b>	Low layer compatibility
<b>LOS</b>	Loss of synchronize
<b>LOSWS</b>	Loss of sync word seconds
<b>LQ</b>	Line qualification
<b>LQO</b>	Listening quality objective
<b>M</b>	
<b>m</b>	Meter
<b>MAC</b>	Media Access Control
<b>MB</b>	Megabyte
<b>Mbit/s</b>	Megabits per second
<b>MCID</b>	Malicious call identification
<b>MDF</b>	Main distribution frame (see also HVT)
<b>MDI</b>	Media Delivery Index (RFC 4445)
<b>min.</b>	Minute
<b>MLR</b>	Media loss rate
<b>MMS</b>	Microsoft Media Server Protocol

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<b>Modem</b>	Modulator-demodulator
<b>MOS</b>	Mean opinion score (ITU-T P.800)
<b>MPEG</b>	Moving Picture Experts Group
<b>MSA</b>	Multiple source agreement
<b>MTU</b>	Maximum Transmission Unit
<b>mV<sub>pp</sub></b>	Millivolt peak-to-peak
<b>N</b>	
<b>n/a</b>	not available
<b>n/r</b>	not received
<b>n/u</b>	not used
<b>NAT</b>	Network address translation
<b>NGN</b>	Next generation network
<b>NIT</b>	Network information table
<b>NOK</b>	Not OK
<b>NP</b>	Numbering plan
<b>NSAP</b>	Network service access point
<b>NSF</b>	Network specific facilities
<b>NT</b>	Network termination
<b>NTBA</b>	Network termination for ISDN basic rate access
<b>NTR</b>	Network timing reference
<b>O</b>	
<b>OAD</b>	Origination address (1TR6)
<b>OAM</b>	Operation, Administration and Maintenance
<b>OM</b>	Omni mode
<b>OoS</b>	Out of Sequence
<b>OSI</b>	Open Systems Interconnection
<b>OUI</b>	Organizationally unique identifier
<b>P</b>	
<b>P/N</b>	Part number
<b>PABX</b>	Private automatic branch exchange
<b>PADI</b>	PPPoE active discovery initiation
<b>PADO</b>	PPPoE active discovery offer
<b>PADR</b>	PPPoE active discovery request
<b>PADS</b>	PPPoE active discovery session confirmation
<b>PADT</b>	PPPoE active discovery termination
<b>PAM</b>	Pulse amplitude modulation
<b>PAP</b>	Password Authentication Protocol
<b>PAT</b>	Program association table
<b>PC</b>	Personal computer
<b>PCR</b>	Program clock reference
<b>PD</b>	Protocol discriminator

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<b>PDU</b>	Protocol data unit
<b>PE</b>	Polyethylene
<b>PESQ</b>	Perceptual evaluation of speech quality (ITU-T P.862)
<b>PIC</b>	Plastic-insulated conductor
<b>PID</b>	Packet identifier
<b>PLR</b>	Packet loss ratio
<b>PMT</b>	Program map tables
<b>POTS</b>	Plain old telephone service (PSTN)
<b>P-P</b>	Point-to-point
<b>P-MP</b>	Point-to-multipoint
<b>PMMS</b>	Power measurement modulation session
<b>PMS</b>	Physical media specific
<b>PP</b>	Polypropylene
<b>PPP</b>	Point-to-Point Protocol
<b>PPPoA</b>	Point-to-Point Protocol over ATM
<b>PPPoE</b>	Point-to-Point Protocol over Ethernet
<b>PPTP</b>	Point-to-Point Tunneling Protocol
<b>PRI</b>	Primary rate interface
<b>PSD</b>	Power spectral density
<b>PSI</b>	Program specific information
<b>PTFE</b>	Polytetrafluoroethylene
<b>PWR</b>	Power
<b>Q</b>	
<b>Q in Q</b>	IEEE 802.1.ad, S-VLAN
<b>QLN</b>	Quiet line noise
<b>QoS</b>	Quality of service
<b>R</b>	
<b>RC</b>	Resistance (R) and capacitance (C)
<b>REIN</b>	Repetitive electrical impulse noise
<b>REL</b>	RELease message
<b>REL ACK</b>	RELease ACKnowledge message
<b>REL COMPL</b>	RELease COMPLete message
<b>RF</b>	Radio frequency
<b>RFC</b>	Request for comments
<b>RJ</b>	Registered jack (standardised socket)
<b>RoHS</b>	Restriction of Hazardous Substances
<b>RT</b>	Router
<b>RTCP</b>	Real-Time Control Protocol
<b>RTP</b>	Real-Time Transport Protocol
<b>RTSP</b>	Real-Time Streaming Protocol
<b>Rx</b>	Received

<b>S</b>	
<b>s</b>	second
<b>S/N</b>	Serial number
<b>SBC</b>	Session Border Controller - Outbound Proxy
<b>SCI</b>	Sending complete indication
<b>SDT</b>	Service description table
<b>SES</b>	Severely errored second
<b>SFF</b>	Small form factor
<b>SFP</b>	Small form factor pluggable
<b>SHINE</b>	Single high impulse noise event
<b>SIN</b>	Service indicator (1TR6)
<b>SIP</b>	Session Initiation Protocol
<b>SNR</b>	Signal-to-noise ratio
<b>SNRM</b>	Signal-to-Noise ratio margin
<b>Spch</b>	Speech
<b>SSL</b>	Secure Sockets Layer
<b>STB</b>	Set-top box
<b>STUN</b>	Session Traversal Utilities for NAT
<b>SUB</b>	Subaddressing
<b>SUSP</b>	SUSPend message
<b>T</b>	
<b>T</b>	Trigger
<b>TAL</b>	("Teilnehmeranschlussleitung") Subscriber line
<b>TC</b>	1. Trellis code 2. Transmission convergence
<b>TCP</b>	Transmission Control Protocol
<b>TC-PAM</b>	Trellis-coded pulse amplitude modulation
<b>TDM</b>	Time division multiplex
<b>TDR</b>	Time domain reflectometry
<b>TDT</b>	Time and date table
<b>TE</b>	TErминал, terminal equipment
<b>TEI</b>	Terminal endpoint identifier
<b>Tel31</b>	Telephony 3.1 kHz
<b>Tel7k</b>	Telephony 7 kHz
<b>TLS</b>	Transport Layer Security
<b>TM</b>	Test manager
<b>ToN</b>	Type of Number
<b>ToS</b>	Type of service
<b>TP</b>	Terminal portability
<b>TS</b>	1. Technical specification 2. Transport stream

<b>TTX</b>	Teletext
<b>Tx</b>	Transceived
<b>U</b>	
<b>UDP</b>	User Datagram Protocol
<b>UL</b>	Upload
<b>URI</b>	Uniform Resource Identifier
<b>URL</b>	Uniform Resource Locator
<b>US</b>	VDSL: Upstream band
<b>USB</b>	Universal Serial Bus
<b>UTC</b>	Coordinated Universal Time
<b>UII</b>	User-user info
<b>UUS</b>	User-to-user signalling
<b>V</b>	
<b>V</b>	Volt
<b>V/2</b>	Pulse propagation time
<b>VC</b>	Virtual channel
<b>VCC</b>	1. Virtual channel connection 2. Voltage at the common collector
<b>VCI</b>	Virtual channel identifier
<b>VC-MUX</b>	Virtual circuit multiplexing
<b>VDSL</b>	Very High Speed Digital Subscriber Line
<b>ViSyB</b>	Video syntax-based
<b>ViTel</b>	Video telephony
<b>VLAN</b>	Virtual Local Area Network
<b>VL</b>	Virtual line
<b>VLC</b>	Video LAN client
<b>VNC</b>	Virtual Network Computing
<b>VoD</b>	Video on demand
<b>VoIP</b>	Voice over Internet Protocol
<b>VoP</b>	Velocity of propagation
<b>VPI</b>	Virtual path identifier
<b>V<sub>pp</sub></b>	Volt peak-to-peak
<b>VTU-R</b>	VDSL transceiver unit
<b>W</b>	
<b>WAN</b>	Wide Area Network
<b>WEEE</b>	Waste Electrical and Electronic Equipment
<b>www</b>	World Wide Web
<b>X</b>	
<b>xDSL</b>	Collective term for the different DSL variants
<b>xTU-C</b>	xDSL Transceiver Unit - Central Office
<b>xTU-R</b>	xDSL Transceiver Unit



	<b>Z</b>
<b>Z</b>	Apparent resistance

**B) Vendor identification numbers**

<b>Abbreviation</b>	<b>Manufacturer</b>
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

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

**D) ARGUS Error Messages (DSS1)**

<b>ERROR Number</b>	<b>Cause</b>	<b>Description</b>
<b>0</b>	Network	The network is not in a state defined for DSS1. This may, however, occur in connection with normal clearing on a PBX.
<b>1 to 127</b>	Network	DSS1 causes
<b>150</b>	ARGUS	An error occurred during the supplementary service test. Frequent cause: no response from network
<b>152</b>	ARGUS	The CF-Test was started with the wrong own number.
<b>153</b>	ARGUS	No HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty).
<b>154</b>	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
<b>161</b>	ARGUS	The party called did not answer within the prescribed time (approx.10 sec)
<b>162</b>	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
<b>163</b>	ARGUS	The Auto-Test could not setup a connection and therefore the AOC-D supplementary service could not be tested.
<b>170</b>	ARGUS	During the Suppl.services test, a call came in without a B channel (call waiting). Therefore, it was not possible to accept the call and test.
<b>199</b>	ARGUS	A call number was entered.
<b>200</b>	ARGUS	Internal error
<b>201</b>	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)
<b>204</b>	ARGUS	a) Layer 2 connection has been cleared down b) No response to SETUP c) Layer 2 connection could not be setup
<b>205</b>	ARGUS	Reestablish the Layer 2 connection
<b>206</b>	ARGUS	The selected B channel is already busy.
<b>210</b>	ARGUS	No response to the clear-down (REL sent, no REL_CMP/REL_ACK received from network)
<b>220</b>	ARGUS	Remote end signaled that it is in State 0.
<b>245</b>	ARGUS	Keypad sent via ESC, but no response was received from network
<b>250</b>	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**

<b>ARGUS Display</b>	<b>Description</b>
<b>External fault:</b>	
<b>Negotiation err</b>	Cannot negotiate the network protocol for PPPD, so the remote site is not reachable.
<b>Idle release</b>	Connection was terminated, since there was no activity.
<b>Time out rel</b>	Connection was terminated, since the maximum connection time elapsed.
<b>PPP: Echo req. error</b>	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.)
<b>Hanging up rel</b>	Disconnected by remote site.
<b>Loopback erro</b>	The setup of the PPP connection was cancelled, since a loopback was detected.
<b>Authent. Error</b>	Authentication error: Wrong user name or password - rejected by remote site.
<b>PADO timeout</b>	No PADO packets received.
<b>PADS timeout</b>	No PADO packets received.

## F) Error message: Download test

ARGUS Display	Description
<b>External fault:</b>	
<b>Http redir.error</b>	Fault: Too many HTTP redirects.
<b>http: no response</b>	No answer from HTTP server.
<b>Http serv.error</b>	HTTP server has returned an error. (for details see the table below "HTTP Error Messages")
<b>Http encod.error</b>	Due to an encoding problem, data transfer with HTTP is not possible.
<b>Ftp open error</b>	Error when opening the FTP connection.
<b>Ftp login error</b>	FTP login error. Wrong user name or password or anonymous login not supported.
<b>Ftp passiv err.</b>	FTP server does not support passive transmission mode.
<b>Ftp rec. error</b>	FTP receive error.
<b>Network error</b>	Network error
<b>Ftp error</b>	General FTP error.
<b>URL error</b>	Fault: No HTTP or FTP URL specified.
<b>Socket error 2</b>	Error when connecting a socket. The server's HTTP service is not available.
<b>Http Head.error</b>	Error in the header of the requested HTTP file.
<b>Ftp no file</b>	FTP download error: No such file or directory found.
<b>Unknown address</b>	Unknown host address. Possible cause: Error in the address entered, DNS resolution not working or network not accessible.
<b>Unknown download error</b>	Unknown download error

**G) HTTP status codes:**

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



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

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

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

In the event that you are interested in the sources licensed under GPL or LGPL, please contact [support@argus.info](mailto:support@argus.info). A machine-readable copy of the source code can be obtained from intec Gesellschaft für Informationstechnik mbH for a minimal fee - to cover the cost of physically copying the code. This offer is valid for 3 years.

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## K) Index

### A

Abbreviations .....	360
Access	
ADSL .....	37
Ethernet .....	72
ISDN .....	214
POTS .....	284
S-Bus .....	215
U-interface .....	215
Access filter .....	25
Access mode .....	19, 22
Access wizard .....	26
Accuracy .....	302
Active Probe II .....	314
Connecting Active Probe II .....	315
Connection example .....	315
Starting Active Probe II .....	315
ADSL	
Access mode .....	37, 45, 70
Access parameters .....	285
Annex A .....	30
Annex A auto .....	30
Annex A/M auto .....	30
Annex B .....	30
Annex B auto .....	30
Annex J .....	30
Annex L .....	30
Annex M .....	30
Bridge .....	68
Configuration .....	30, 39
Connecting .....	46
Data rate .....	49
Determining connection parameters .....	45
Disconnecting .....	65
Display bit distribution .....	51
Display error counters .....	50
Display quiet line noise .....	56
Display trace data .....	49
Displaying stored test results .....	67
mode .....	30
Modem trace display .....	47
Profile configuration .....	46
Rated / threshold value .....	39
Router .....	70
Save results .....	65
Selecting interface .....	38
Set value .....	39

Status screen .....	38
Supported standards .....	17
Alarm tones .....	349
Alias www address .....	131
Appendix .....	360
ARGUS	
Control panel .....	16
Dimensions .....	16
Display dimensions .....	16
General Error Messages .....	378
Inputs and outputs .....	16
MAC addresses .....	40, 97
Settings .....	346
Switching on .....	18
Weight .....	16
ARGUS Manager .....	350
ARGUS status .....	106
ASCII .....	94
ATM .....	81, 90
Bitrate .....	58, 60
OAM ping .....	117
Statistics .....	97
Tests .....	114
with Ethernet .....	90
Attainable data rate .....	58, 60
Attenuation .....	58
Authentication .....	152
Auto test .....	210
Auto tests .....	210
Automatic charging .....	12, 14, 355
Autonegotiation .....	74, 76

## B

Background illumination .....	16
Basic package .....	1
Battery pack .....	11
Active charging .....	12, 14, 355
Attaching .....	23
Automatic charging .....	355, 356
Changing .....	355
Charge level .....	355
Charger .....	14
Charging temperature range .....	12, 14, 355
Long-term storage .....	14, 355
Protective function .....	14
Storage .....	355
Transport .....	14
Transportation information .....	12
Using .....	355
Bits/tonne .....	51



BRAS statistics .....	97
BRI/PRI/E1 .....	16, 17, 214
Bridge tap .....	58
HLOG .....	57, 58
Rule of thumb .....	58

## C

Cable	
Patch .....	68, 70, 72
xDSL .....	45, 68, 70
Cable tests .....	329
Caller ID .....	152
Capacitance .....	298, 330
Capacitance test .....	301
Charging temperature .....	16
Charging the battery .....	12, 14, 23, 355
Checksum errors .....	124
Codec .....	155, 161
Collisions .....	76
Company address .....	349
Concurrent tests .....	210
Configuring accesses .....	25
Conformity declaration .....	12
Connection	
BRI .....	22
Copper .....	22
Ethernet .....	22
ISDN .....	22
U-interface .....	22
xDSL .....	22
Connection type .....	170
Connections	
Bottom .....	22
Top .....	21
Continuity error .....	198
Copper tests .....	290, 296
Country code .....	64
CRC .....	59, 61
Current delay .....	92
Cursor function .....	53

## D

Data .....	81
Data log .....	96
Date entry .....	346
DDM .....	77
Declaration of conformity .....	16
default wire types .....	298
Delete test results .....	340
DHCP .....	93

---

Auto .....	42, 43, 93
Client .....	93, 94
Server .....	93, 95
Timeout .....	94
User class information .....	94
User-defined option .....	94
Vendor ID .....	94
Vendor info .....	94
DiffServ .....	157
DIN EN 50419 .....	13
Display illumination .....	18
Displaying test results .....	339
Disposal .....	13
DNS server .....	94
Download .....	130
Error Messages .....	375
Download file name .....	130
Download rate .....	133, 137, 206
DSCP .....	157
DSL	
Introduction .....	37
Router .....	42
DTMF .....	285
DTMF settings .....	155
Dual .....	42, 43, 93
Duplex	
Full .....	74
Half .....	74

## E

Earpiece mode .....	160
Elec.length@1MHz .....	63
Electrical length .....	63
Electromagnetic compatibility .....	12, 16
ElektroG .....	13
EN60950-1 .....	16
Encapsulation .....	91
Energy-saving mode .....	12
EoA .....	90
Error counters	
Reset .....	60
Ethernet	
Access type .....	72
Establishing connection .....	74, 75
Flow control .....	74
Mismatch .....	74
Statistics .....	75, 77
Transmission speed .....	22
Ethernet cable test parameters .....	330
Ethernet statistics .....	97

ETR .....	63
Extended operation .....	12

## F

FEC .....	59, 61
File size .....	130
Filter .....	25
Finding the modem .....	304
Firewall .....	70
Flow control .....	74
Fragmentation .....	122
FTP download .....	102, 135
Result .....	138
FTP server .....	102, 143
FTP upload .....	102, 139
Result .....	142, 148, 149

## G

Gateway IP .....	93
Graphic functions .....	105
Grayed-out elements .....	86

## H

Headset .....	16
Headset connection .....	21
Headset mode .....	160
HEC .....	59
Help .....	106
Hexadecimal entry .....	40
Hidden menu options .....	1
HLOG/tone .....	57
Hops .....	126
Hotkey assignment .....	104, 106
Hotkeys .....	104
HRX .....	227
HTTP download .....	102, 130
Parallel .....	131
Result .....	134
Test parameters .....	130
HTTP status codes .....	376
Humidity .....	16

## I

IGMP version .....	188
Index .....	383
Initial operation .....	23
INP .....	59, 61
INP REIN .....	63
INP SHINE .....	63
intec Gesellschaft für Informationstechnik mbH .....	10
Interleave delay .....	59, 61
Internet telephony service provider .....	152

---

Introduction .....	7
IP .....	90, 351, 353
Own .....	93
IP ping .....	102, 120
Assigned configuration .....	100
Results .....	123
Save results .....	125
test parameters .....	120
IP statistics .....	97
IP tests .....	120
IP version .....	93
IPoA .....	90
IPTV .....	102
Audio bytes .....	172
CC error .....	172
CC error rate .....	172
Channel selection .....	187
Current RTP loss rate .....	173
Error indication .....	172
IGMP latency .....	172
IGMP version .....	172
Jitter buffer .....	198
PCR jitter .....	172
Profile .....	170, 171, 185
Profile name .....	173, 198
RTP jitter .....	173
RTP sequence errors .....	173
Scan .....	185
Scan max. switchover time .....	189
Scan profile .....	185, 189
Scan settings .....	187
Server address .....	197
Sync error .....	172
Test parameters .....	171
Tests .....	170
Total RTP loss rate .....	173
Type of stream .....	197
video bytes .....	173
VoD .....	196
IPTV line .....	83
IPTV passive .....	192
IPTV scan .....	102
Test parameters .....	187
IPv4 .....	93
IPv6 .....	42, 43, 95, 100, 120
ISDN .....	214
Access mode .....	216
Alerting mode .....	219
Anschluss-Modus .....	214
AOC .....	221

---

---

ARGUS State display .....	214
B channel delay .....	264
B channel loop .....	231
BERT characteristic values .....	228
BERT HRX value .....	224
BERT results .....	227
BERT Settings .....	224
BERT wait .....	230
Bit error rate test .....	222
Bit Error Rate Test on a Leased Line .....	276
BRI termination .....	220
Bus configuration .....	216
Bus status .....	217
Call acceptance .....	221
Call Forwarding .....	246
Call parameters .....	220
CAUSE Messages .....	370, 372
CF Activation .....	248
CF Delete .....	249
CF Interrogation .....	246
Charge information in NT mode .....	260
CLIP No Screening .....	234
Clock mode .....	219
Connection setup time .....	263
CUG Index .....	221
D channel protocol .....	216
Description of the Supplemental Service .....	233
Display Advice of Charges (AOC) .....	256
DSS1 .....	232, 370
DTMF / Keypad .....	221
Emergency supply .....	217
En-bloc sending .....	257
Error Messages .....	372
Incoming Call .....	259
Interchannel delay .....	265
Keypad .....	221
L1 permanent? .....	218
L1 state .....	271
Last caller .....	258
Leased Line .....	275
Leased Line Loopbox .....	278
Leased Line Time Measurement .....	279
Level and voltage evaluation .....	217
Level measurement .....	281
Line resistor .....	220
List of services .....	236
Managing multiple tests .....	266
Meaning of the LEDs .....	215
Monitor .....	272
NT Simulation .....	215

---

Overlap sending .....	255
own call number .....	256
Passive listening-in .....	274
Performing Several Tests Simultaneously .....	250
Prefix .....	221
Protocol .....	219
Redialling .....	258
Repeat B channel test .....	214
Select the interface .....	214
Service check .....	236
Service test results .....	237
Services .....	220
Settings .....	218
Setup the connection .....	254
Supplementary Services Test .....	232
Supplementary Services Tests - error messages .....	235
Supported standards .....	17
TE simulation .....	215
Telephony on a leased line .....	275
Test Manager .....	107, 231, 266
Testing features using the keypad .....	262
The availability of the B channels .....	216
Time measurement .....	263
Type of access .....	216
Voice codec .....	221
X.31 Configuration .....	239
X.31 D-channel .....	242
X.31 Error Messages .....	373
X.31 Test .....	238

## J

Jingle .....	349
Jitter buffer .....	154

## K

Key .....	16
Back .....	19
Enter .....	18
Handset .....	19
Level .....	19
Power .....	18
Shift .....	20
Keys .....	
Cursor .....	19
Keypad .....	18

## L

Latency mode .....	58
Layer 1 .....	36
Layer 2 parameters .....	80
Layer 2/3 settings .....	82
Layer 3 parameters .....	80

Layer-1 box .....	36, 49, 69, 84
LCD brightness .....	346
LED image .....	45, 68, 70
LEDs .....	18
Ethernet access .....	22
Level key .....	19
Line attenuation .....	58, 61
Line interference .....	51
Line length .....	302
Line resistance .....	297, 330
Line scope .....	299, 301, 303
Clipping .....	313
Connection example .....	304
Cursor .....	306
Frequency range .....	305
Gain .....	305
Graph functions .....	306
Measuring range .....	307
Start/stop .....	312
Starting the line scope .....	303
Status display .....	304
Zoom .....	306
Line-scope	
Reference curve .....	311
Listen port .....	153
Lithium .....	14
Lline socket .....	17
Local loop acceptance log .....	10
Long form .....	50
Loop	
Ethernet connection .....	112
Layer .....	108
layer 1 (L1) .....	108
layer 2 (L2) .....	108
Own IP address .....	111
Protocol-independent parameters .....	108
Starting .....	112
Loop attenuation .....	61
Loudspeaker .....	18
Lower case .....	92
Lower-case .....	27, 34, 121, 338
Lower-case letters .....	66

## M

MAC address .....	40
Main menu .....	214, 284
Measurement log .....	337, 358
Microphone .....	18
Mini-USB .....	21
MOS .....	150, 160

MOS setting .....	156
MOS value .....	165
Multicast IP .....	171

## N

Netmask .....	93
Network delay .....	165
Notice .....	34
Number block .....	19
numeric entry .....	19

## O

OAM .....	117
OAM cell type .....	117
Operating language .....	346
Operating temperature .....	16
Operation	
Quick-start guide .....	18
Optical level .....	77
Option	
Function .....	1
Oscilloscope .....	309
Outbound proxy .....	152
Output power .....	58, 61
Overview .....	49
Overview of tests .....	104

## P

Packet response time .....	124
PADI .....	99
PADO .....	99
PADR .....	99
PADS .....	99
PADT .....	99
Parallel tests .....	204
PCR jitter .....	198
PESQ .....	290
Physical layer .....	36, 80, 81
Pin assignment	
.....	22
POTS .....	284
ARGUS State Display .....	284
CLIP .....	285
Dialing mode .....	285
DTMF parameters .....	285
FLASH time .....	286
Incoming Call .....	287
Level .....	285
Level measuring .....	289
Monitor .....	288
Outgoing Calls .....	287
Settings .....	285



Setup the connection .....	287
Power adapter .....	16
Connector .....	21
Power management .....	349
Power supply .....	16
Power-saving mode .....	24
PPP .....	80, 90, 93, 351, 353
Error Messages .....	374
Profile .....	80, 82, 87, 92
Statistics .....	97
Trace .....	98
PPPoA .....	90
PPPoE .....	90
PPTP .....	72, 90, 93
Printout .....	10
Probes .....	126
Profile name .....	351, 353
Profile types .....	82, 83
Profiles .....	82
Protection functions .....	12
Protocol .....	90
Protocol statistics .....	97
Provider code .....	64
Pulse dial .....	285
PWR .....	21

## Q

QLN/tone .....	56
QoS .....	157
Qualify .....	153
Quiet line noise (QLN) .....	56

## R

R measurement .....	296
RC measurement .....	301
Loop .....	300, 302
Open line .....	302
Real-time clock .....	24
Reg. expire .....	153
Registrar .....	152
Regulations for hazardous materials .....	14
Relative capacity .....	58, 60
Remote port .....	153
Repeat B channel test .....	215
Resistance test .....	301
Resync .....	60, 62
Retranmission (G.INP) .....	60, 62
Retry-after .....	154
Return of old equipment .....	13
R-Factor .....	150, 160
Rights .....	2

Ring volume .....	349
RoHS conformity .....	16
RoHS Directive .....	13
Router	
SIP port .....	43
RTCP .....	165
RTCP statistics .....	162
RTP .....	150, 165
RTP port range .....	154
RTP statistics .....	161
RTSP server type .....	198
RTSP type .....	198

## S

Safety information .....	11
Headset .....	11
USB-host interface .....	11
Save name .....	338
Saving Call Numbers .....	234
Saving numbers .....	354
Saving test results .....	338
S-Bus .....	214, 215
Sending test results to PC .....	339
Server address .....	130
Server profile .....	130
Service	
Start .....	84, 88
Service Data .....	83
Service data .....	83
Service IPTV .....	83
Service statistics .....	103
Service VoD .....	83
Service VoIP .....	83
Services .....	80, 81, 102
Session border controller (SBC) .....	152
Set IP .....	92
SFF .....	77
SFP .....	77
Showtime .....	62
Showtime no sync .....	62
Signal attenuation .....	61
Silence detection .....	154
SIP .....	150
SIP domain .....	153
SIP log .....	165
SIP trunk .....	153
SNR margin .....	59, 61
SNR/tone .....	56
Softkeys .....	20, 23
Dual function .....	20

Software .....	10
Software Licenses .....	382
Software option .....	350
Software updates .....	8
Speed dial memory .....	354
Standards .....	17
Static IP .....	93
Status screen .....	36, 75, 80, 81, 102, 106
STB .....	170, 192
Storage temperature .....	16
Stub line .....	58
Rule of thumb .....	58
Support .....	10
Symbols .....	82
Symmetry .....	309
Symmetry/asymmetry toggling .....	309
.....	317
System information in DSLAM .....	60

## T

TDR	
Cursor .....	321
Examples .....	325
Gain .....	319
Graph functions .....	320
Measuring range .....	322
Propagation speed .....	297, 330
Pulse width/height .....	322
Range .....	319
Reference curve .....	323
Start/stop .....	324
Starting TDR .....	318
Status display .....	319
TDR settings .....	318
VoP .....	297
Zoom .....	320
Test accuracy .....	302
Test results .....	337, 353
Tests .....	102
Timeout .....	114, 126
Timestamp .....	47
Toggling asymmetry .....	309
Toggling symmetry .....	309
ToS .....	157
Traceroute .....	102, 126
Results .....	129
Test parameters .....	126
Transmission function .....	57

## U

U-interface .....	214, 215
-------------------	----------

UN directive .....	14
Update .....	358
Update tool .....	358
Upload file name .....	130
Upload file size .....	130
Upper case .....	92
Upper-case .....	27, 34, 121, 338
USB	
Client interface .....	16, 21
Host interface .....	16, 21
User agent .....	153
User safety .....	16

## V

VDSL	
Carrier set .....	41
Disconnecting .....	76, 79
Display connection parameters .....	49
Profile .....	49
Rated / treshold value .....	40
Save results .....	76, 79, 113
Supported profiles .....	17
Supported standards .....	17
Vectoring mode .....	42
VDSL connection parameters .....	49
Vendor far .....	60, 63
Vendor near .....	60, 63
Version .....	63
.....	1, 60
Virtual line .....	80
Activating .....	84
Settings .....	90
Virtual lines .....	80, 81
Additional .....	85
Examples .....	89
Multiple .....	174
VL default configuration .....	83
VL profile .....	102
VL profiles .....	80, 82
VLAN .....	80, 91
VLAN ID .....	44, 91, 109, 110
VLAN prioritisation .....	157
VLAN priority .....	91, 109, 110
VLAN TPID .....	92
VoD .....	196
Profile .....	196, 197
RTSP .....	197
Test parameters .....	197
VoD line .....	83
Voice codec .....	159, 165

Voice quality .....	159
VoIP	
Call .....	158, 207
Call acceptance .....	168
destination .....	159, 207
DiffServ .....	157
DS field .....	157
DSCP .....	157
Echo test .....	168
MOS value .....	159
Profile name .....	156
QoS .....	157
Register status .....	165
Results .....	165
SIP status codes .....	379
STUN server .....	156
Test parameters .....	152
Tests .....	150
ToS .....	157
volume .....	159, 208
VoIP account .....	151
VoIP call .....	102
VoIP PESQ test .....	102
VoIP wait .....	102, 164, 167
Voltage	
DC voltage range .....	17
Voltage measuring range .....	17
VoP .....	297
VPI/VCI .....	80, 90
VPI/VCI scan .....	114
Results .....	115

## W

Wavelength .....	78
Website .....	10
WEEE .....	13
WINanalyse .....	10, 337
WINplus .....	10, 337
Wire type list .....	297

## X

x-axis	
Frequency .....	54
Tones .....	54
x-axis labelling .....	54
X-axis zoom .....	51, 306
xDSL	
Bridge .....	37
Router .....	37

## Y

Y-axis zoom .....	52, 306
-------------------	---------

---

## Z

Zoom .....	52
------------	----