ARGUS
ISDN Manual

Version: valid from 2.60 / **EN**

1 Introduction

When fully equipped, the ARGUS supports a comprehensive range of test functions for not only BRI accesses and POTS, but also for U-interface, E1/PRI, ADSL, VDSL, SHDSL and Ethernet accesses. This manual covers the optional E1/PRI interface.

In addition to TE/NT simulation on a PRI interface, the ARGUS also supports D-channel monitoring on PRI accesses.

Furthermore, it supports tests of digital leased lines including bit error rate tests (BERT) in the D-channel. The MegaBERT expands the bandwidth to 2 Mbit/s - to either 2048 kbit/s (framed) or 1984 kbit/s in time slots 1-31 (2 Mbit unframed). Last but not least, the ARGUS can run a BERT to a remote loopbox or perform an end-to-end measurement to another ARGUS.

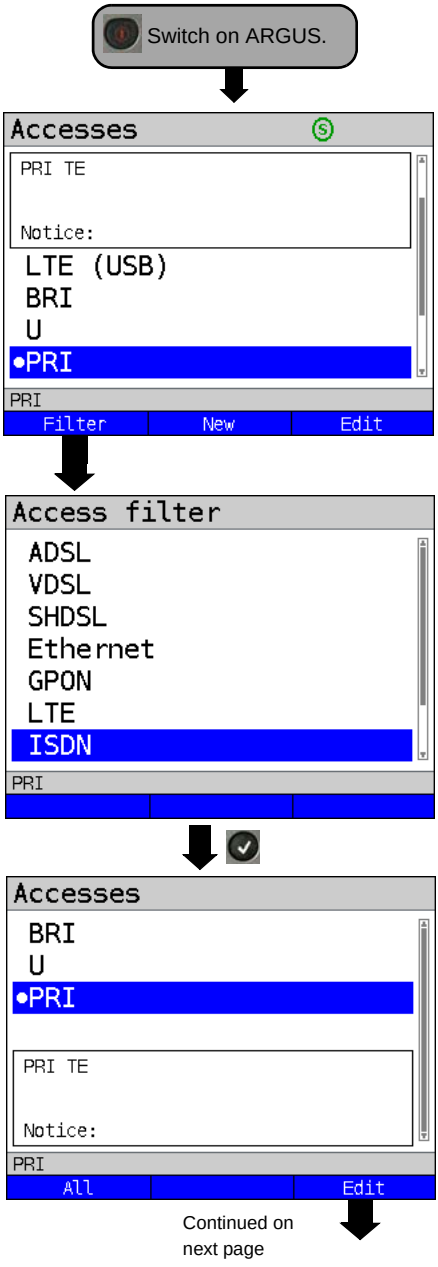
ISDN functions

- 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_{LQO} in conjunction with PESQ server SW

Should you have any further questions, please contact us:

intec Gesellschaft für Informationstechnik mbH
Rahmedestr. 90
D-58507 Lüdenscheid
Tel.: +49 (0) 2351 / 9070-0
Fax: +49 (0) 2351 / 9070-70
www.argus.info/en
support@argus.info

2 Configuring accesses



After powering up, ARGUS displays all configured accesses (up to 100). A default connection is configured for each access type.

The most recently used access is indicated on the display with ● .

ARGUS additionally displays a preview of the selected access settings, see also page 10. The preview window opens after 2 seconds.

<New>	Creates an access, see page 8, Fig. 2.
<Edit>	Edits an access, see page 8, Fig. 1.
	Switches softkey assignment, see page 11.
	Switches to main menu.

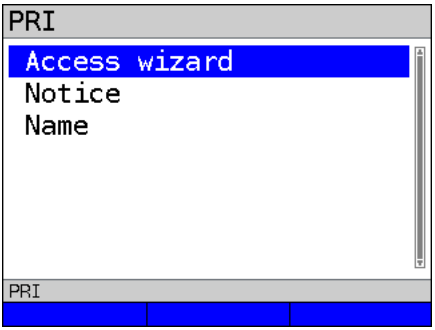
With the **<Filter>**softkey, ARGUS lets you filter all pre-configured accesses according to access type and displays this group.

In this example, ISDN is selected.

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

<All>	Display of all possible accesses, see Fig. 1.
<Edit>	Edits the selected access profile.

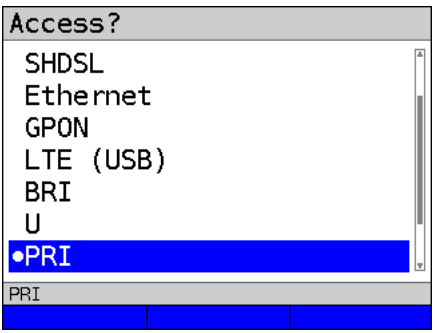
2.1 Access wizard



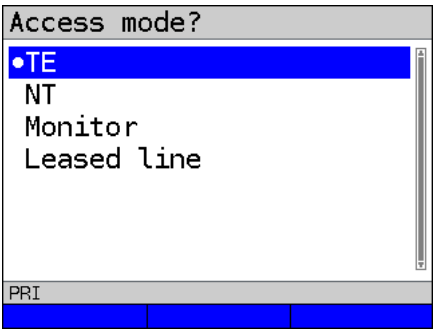
ARGUS switches to the "Accesses" main menu.

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

The query parameters of the access wizard depend on the selected access, see page 10.



Selection of physical interface (here PRI).
- for PRI, see page 85.



ARGUS switches directly to the access mode settings.

Selection of access mode (here PRI TE).

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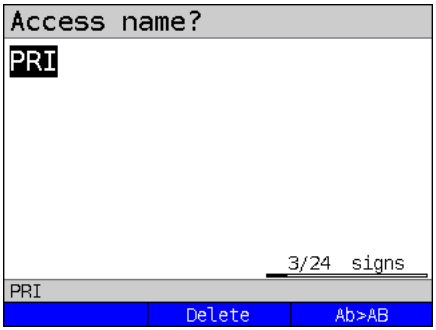
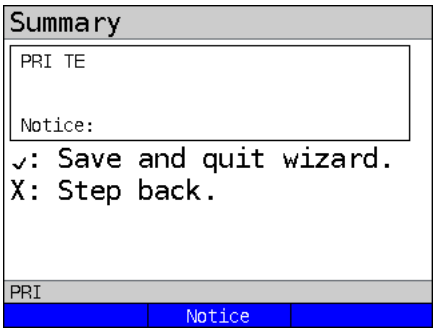


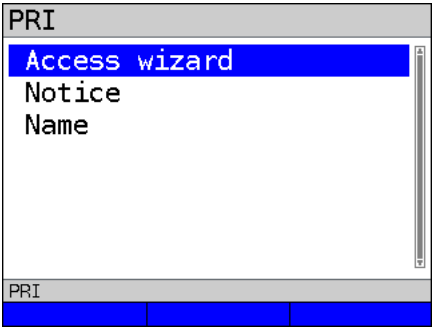
ARGUS displays an access name, depending on the settings you made previously (here PRI).

<Delete>	Deletes access name.
<Ab>AB>	Entry starts with upper-case letters und will be continued with lower-case letters.
<AB>12>	Entry of upper-case letters.
<12>ab>	Entry of numerals 0 through 9 and *, #.
<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.



ARGUS displays a summary and a pre-view of the configuration.

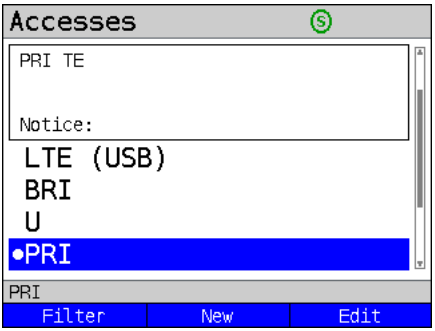
<Notice>	Allows you to make a note, see page 12.
	Save and quit wizard.
	Step back.



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

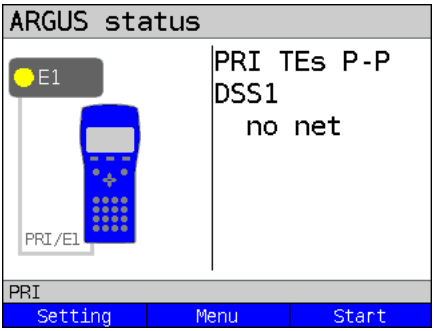
You need to quit the access wizard before ARGUS can use the configured access.

Continued on next page



Select PRI.

Press „OK“ to confirm the selected access, here PRI.



ARGUS switches to the ARGUS status display.

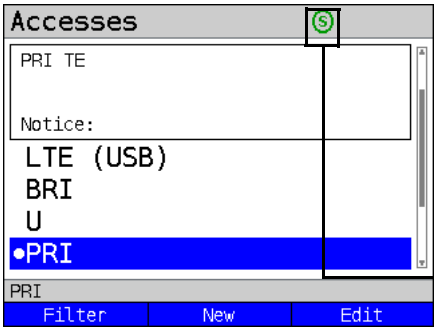
<Conig>	Opens the Menu „PRI settings“, see page 85.
<Menu>	Switches to main menu.
<Start>	Starts B channel test.

ARGUS access wizard

The access wizard conducts and individual query depending on the connection. Each parameter queried depends on the respective previous parameters (from left to right).

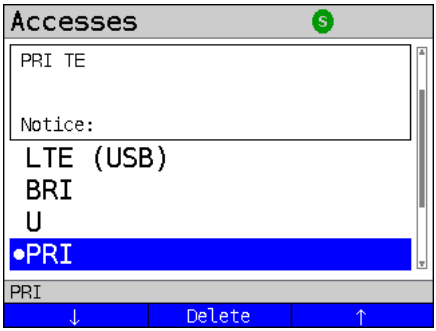
Access / interface	Access mode	L2 mode
BRI U	TE, NT, Leased line, Monitor	Auto.[*1], P-P, P-MP
U	TE, Leased line	Auto.[*1], P-P, P-MP
PRI	TE, NT, Leased line, Monitor	-
[*1] = only for BRI-TE, U-interface-TE		

Sorting the access in the access overview



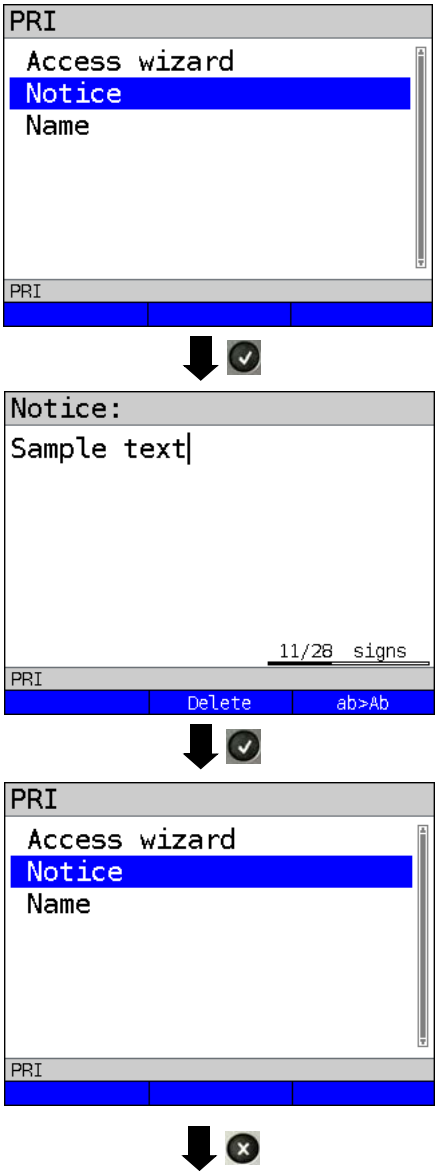
In order to keep frequently used accesses readily available, ARGUS allows you to put the configured accesses in any individual order.

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.

2.2 Notice

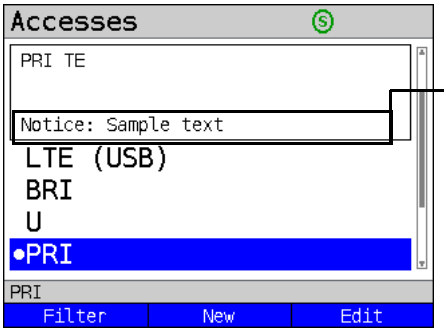


In the preview next to the selected access, ARGUS also displays a freely editable note.
This note can be up to 28 characters long.

In this example, the note "Sample text" is displayed.

<Delete>	Delete access name.
<Ab>AB>	Entry starts with upper-case letters und will be continued with lower-case letters.
<AB>12>	Entry of upper-case letters.
<12>ab>	Entry of numerals 0 through 9 and *, #.
<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.

Press „OK“ to accept the entered note.



The accepted note is linked with the access profile 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 7.
<New>	Creates a new access.
<Edit>	Edits an access.

The access name can be edited as for notices, see page 12.

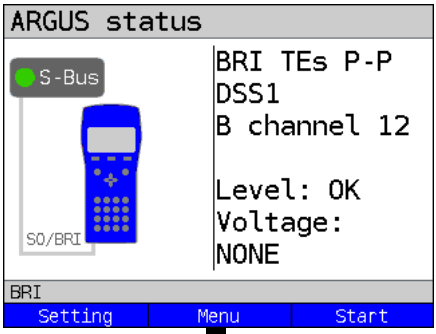
3 Operation on an ISDN Access

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.

3.1 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 2 Configuring accesses page 7. In this example the ISDN TE mode was selected.

ARGUS State Display

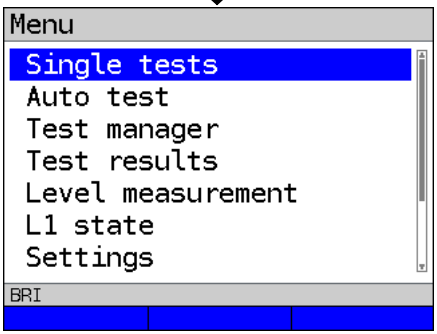


ARGUS State Display, see page 16.

<Setting> Open the "ISDN settings" menu, see page 18.

<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 14), 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 14), 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.

3.2 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.

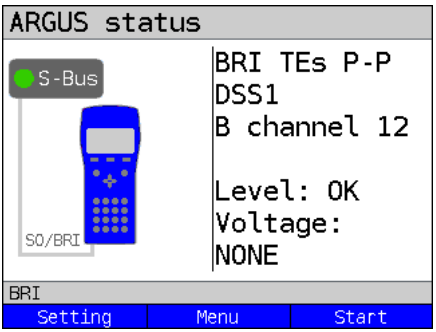
Once Layer 2 has been setup, the "Rx/Tx/L2" LED will light.

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 15).

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 19 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 19)
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

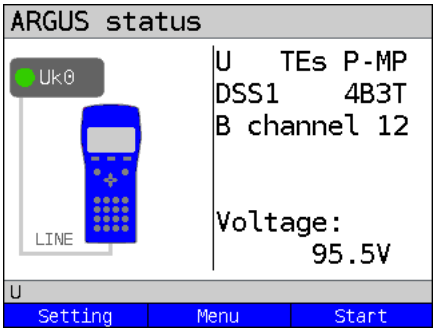
If only one B channel is available, this can have an impact on the service check and the testing of the supplementary services.

- Level and voltage evaluation

OK normal	Level/voltage is alright
<<	Level/voltage too low
>>	Level/voltage too high
--	No level/voltage
OK INV	Emergency supply
<Start>	Repeat the B channel test.
<Setting>	Open the "ISDN settings" menu, see page 18.

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.

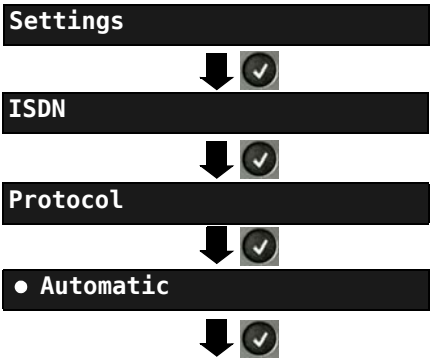
- ARGUS State Display on a U interface



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

3.3 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.



The ARGUS takes the marked setting for use as the default and returns to the next higher menu.

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: ***No***

Protocol	As an alternative to automatic protocol determination, you can also set the Layer 3 D channel protocol manually. If the protocol setting is changed, the ARGUS will save this new setting permanently, i. e. it will use this protocol the next time that it is switched on. ISDN Protocols: - Automatic - DSS1 - CorNet-N - CorNet-T (not for the access types "NT P-P" and "NT P-MP") - CorNet-NQ (for the access types "TE P-P" and "NT P-P" only) - QSIG (for the access types "TE P-P" and "NT P-P" only) - VN4 Default setting: ***Automatic***
Alerting mode	You can specify whether, for an incoming call on a S-Bus point-to-point access, the ARGUS should only display the access number without extension or the complete number with extension. When set to "Manual", the ARGUS will display the extension. Incoming calls will be signaled. When the ARGUS accepts a call, it will send the Layer 3 "Alert" message. The digits of the extension that have been sent by this point will be displayed.  With the Manual setting, an incoming call must be answered within 20 seconds or it will be lost. Furthermore, you should note that the remote subscriber will not hear a ringing tone. If it is set to “Automatic”, the ARGUS will only display the access number without extension or, depending on the configuration of the access in the exchange, it may not display the number called at all. Default setting: ***Automatic***
Clock mode	This parameter sets where the clock will be generated in the case of a S-Bus access. You can either specify that the ARGUS generates the clock (Master) or that it is the slave of a clock generated at the other end (Slave). Setting: In NT mode: ***Master*** In TE mode: ***Slave*** Leased line: ***Slave*** Any change to this setting will not be saved permanently; it will only apply to the current measurement.

BRI termination	You can add terminating resistors to a BRI access. Setting: In NT mode: ***Terminating resistor switched in*** In TE mode: ***No terminating resistor is switched in*** Leased line: ***No terminating resistor is switched in*** Any change to this setting will not be saved permanently; it will only apply to the current measurement.
Call parameters	Four different parameters can be set for (ISDN) calls generated on both the network-side (ARGUS in NT mode) and on the user-side (ARGUS in TE mode): 1. Type of number (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal Network-side: Net CGN TON Net CDN TON User-side: User CGN TON User CDN TON Default setting: ***unknown*** 2. Numbering Plan for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal: Network-side: Net CGN NP Net CDN NP User-side: User CGN NP User CDN NP 3. CGN/CDN Subaddress CGN/CDN Sudaddress Type: User specific and NSAP Default setting: ***User specific*** 4. UUI (User User Info) *For more information, see Prefix on page 21.
Services	Up to three user-specified services (user spec. 1 to user spec. 3) can be entered and saved. For each "user spec. service“, you must enter the info-elements BC, HLC and LLC in hexadecimal (switch with the left softkey). To do so, use the keypad and the A . . F softkey (e.g. to enter a "C", press the softkey three times; for an "F", press it six times).

Call acceptance	If the ARGUS is set to "own MSN/DDI" and is in TE mode on a P-MP access, it will only signal those calls which are placed to the MSN (on a P-P access, the DDI) of the access under test. If set to “all MSN/DDI”, the ARGUS signals all calls. Prerequisite: - the own number must be entered in the speed-dialling memory under "own number" (see "Saving call numbers in the speed-dialling memory" on page 141). - the incoming call must have a destination MSN Default setting: ***all MSN/DDI***
Voice coding	There are two options for coding voice data in a B channel: - ***A-law*** (Default setting) - µ-law
DTMF / Keypad	DTMF or Keypad setting Default setting: ***DTMF***
CUG Index	Enter the CUG index that the ARGUS should use when testing the CUG (Closed User Group) service. Range: 0 to 32 767 Default setting: ***148***
Keypad	A maximum of three Keypad Infos can be stored. First use the vertical cursor keys to select one of the three available memory locations for Keypad Infos. **<Edit>** Edit the selected Keypad Info. Afterwards, use the keypad to enter the Keypad Info.  Save the Keypad Info.
Prefix	Entry of the national or international telephone prefix. The prefix is selected in "Call parameters" under the selection "Type of number", see page 20. National: ***0 (Default setting)*** International: ***00 (Default setting)***
AOC	Set wheter the NT simulation charging information to be transmitted. Default setting: ***On***

Starting functions with the numeric keys / key combinations
Using the ARGUS keypad, you can start important functions / tests directly, regardless of the menu that the ARGUS is currently showing. If a function is called where the ARGUS expects the entry of a digit, pressing a number key will be interpreted as the expected input. The assignment of functions to the numeric keys can also viewed on the ARGUS display. Open the Main Menu and select "Help" or press number key "1". An overview of the available key combinations can be found in the main manual.

3.4 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 1×10^{-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.

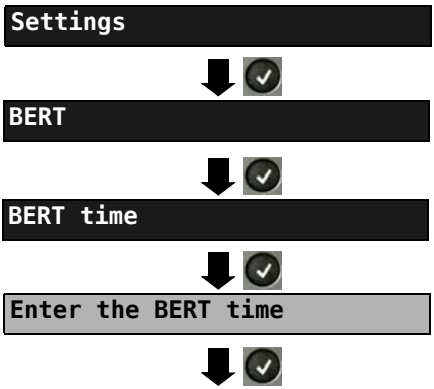
2. **BERT with a loopbox**

   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 30, 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



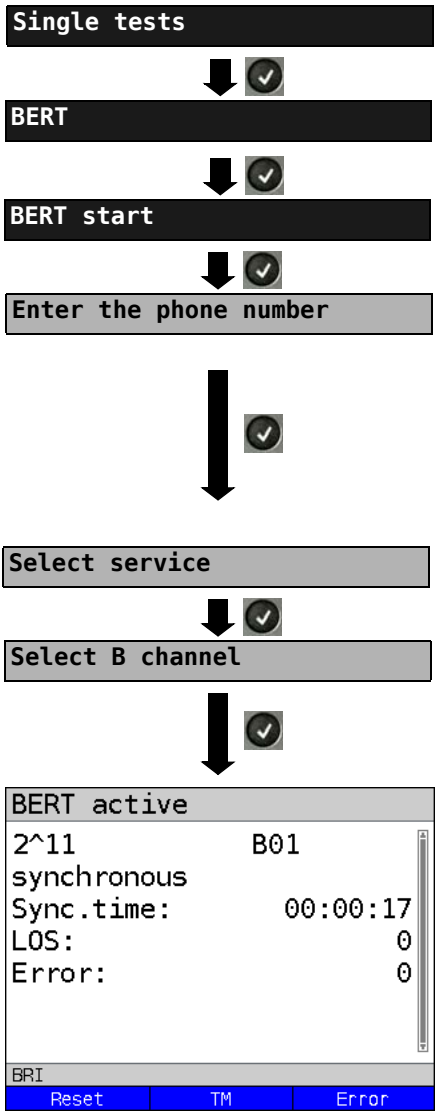
ARGUS - Main Menu

The procedure for configuring a parameter will be illustrated with a single example. The default settings can be restored at any time.

The ARGUS sets the value entered as the default BERT time and returns to the next higher menu.

Setting	Explanation
BERT:	
BERT time	You can use the keypad to enter measurement times ranging from 1 minute to 99 hours and 59 minutes (= 99:59).  If the time is set to 00:00 (= BERT with unlimited measurement time), the BERT will not stop automatically. In this case, the BERT must be terminated manually by pressing the  . Default setting: ***00:00*** (continuous) In the case of an Autom. Test ***(see chapter 3.9 Automatic Performance of Multiple Tests, page 50)*** the ARGUS will automatically set this to a value of 1 minute.
Bit pattern S/T/U	This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a S-Bus or U interface access. Several predefined bit patterns are available Default setting: 2^{11}-1 Additionally, it is also possible to enter a 16 bit long pattern of your choice in binary: Use the horizontal cursor keys to move the cursor right or left. **<Delete>** Changes the digit before the cursor from 1 to 0
Error level	This is the level used to evaluate whether the BERT had an "acceptable" bit error rate. If the BERT has a bit error rate, which exceeds this error level, the ARGUS will display a "NO" (Not OK) as the test result. Using the keypad, this parameter can be set to any value from 01 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is 10^{-06} (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^6 = 1,000,000 sent bits), the bit error rate test will be evaluated as "OK".
HRX value	Setting the HRX value (Hypothetical reference connection, see the ITU-T G.821). Using the keypad, you can enter a value ranging from 0 to 100 %. Default setting: ***15 %***

BERT Start



ARGUS - Main Menu.

The speed-dialling memory will now open (see page 141). 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:

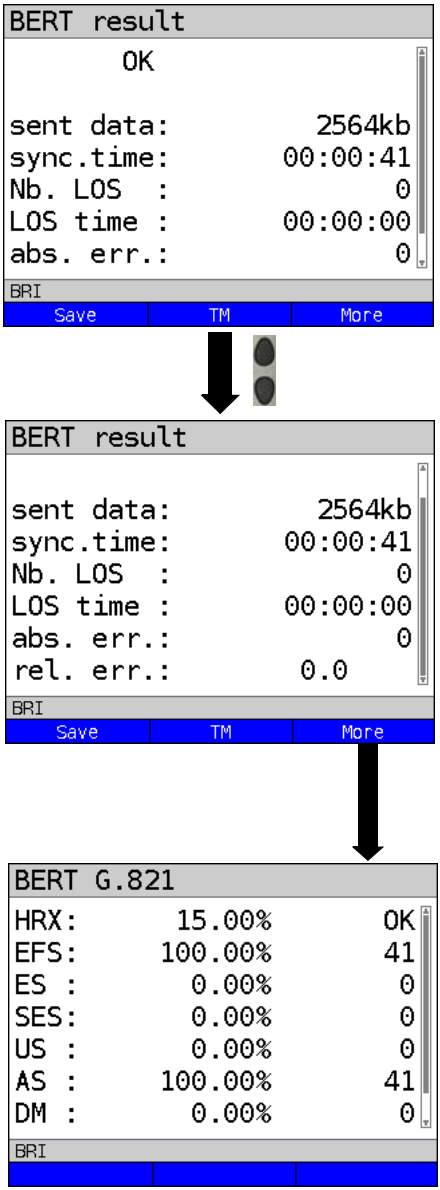
- The bit pattern and B channel / bit rate used
- The synchronicity of the bit pattern (in this example, synchron)
- Sync. time in h:min:s (time in which the ARGUS can sync to the bit pattern)
- LOS counter: shows the absolute number of synchronization losses. Synchronization is lost at an error rate greater than or equal to 20 % within a period of a second.
- The number of bit errors that have occurred

<Error>	The ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).
<TM>	Open the Test Manager, see page 66.
 or **<Reset>**	Restarts the BERT. The test time and number of bit errors will be reset.
	Stop BERT

If the ARGUS has been so configured and a bit error is detected, this will be signaled by a brief alarm; in the event that the synchronisation is lost, a constant alarm will sound.

After the BERT is over, the ARGUS will display the cause and the location which initiated the disconnect. If the test ran normally, the ARGUS will display “Active clearing” on this line.

BERT results:



Scroll through the results

- The evaluation of the results depends on the error threshold (in this example OK), see page 24.
- 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 · 10^{-7} = 0.00000097)

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

All values are given as relative values (in percentages) as well as in absolute figures.
The ARGUS evaluates the measurement results to determine whether they satisfy the threshold limits defined in the CCITT G.821; with consideration of the defined hypothetical reference connection HRX (displaying OK or NO (Not OK)).

Scroll through the results

Return to the previous display

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

HRX Defines the hypothetical reference connection.

EFS Error Free Seconds:
The number of seconds in which no error occurred.

ES Errored Seconds:
The number of seconds in which one or more errors occurred.

SES Severely Errored Seconds:
The number of seconds in which the bit error rate is greater than 10^{-3}. In one second, 64,000 bits are transferred, thus BitErrorRate (BER) = 10^{-3} equates to 64 bit errors.

US Unavailable Seconds:
The number of all sequentially adjacent seconds (at least 10 sec) in which BER > 10^{-3}.

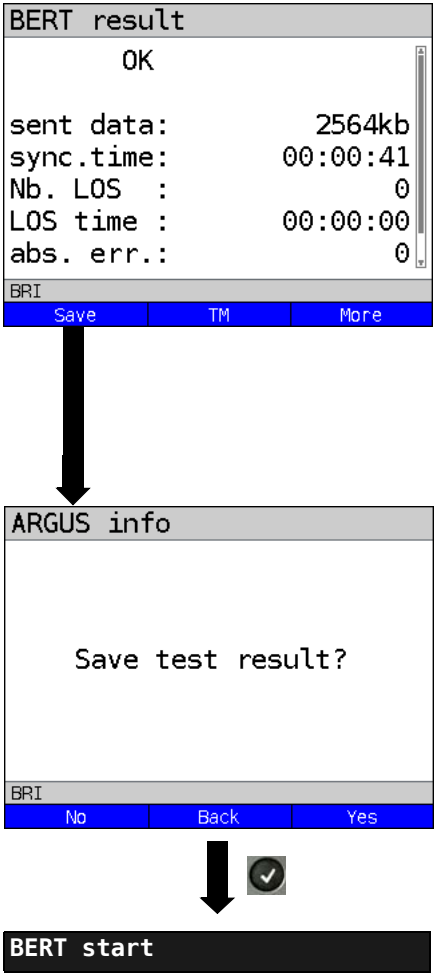
AS Available Seconds:
The number of all sequentially adjacent seconds (at least 10 sec) in which BER < 10^{-3}.

DM Degraded Minutes:
The number of minutes in which the bit error rate is greater than or equal to 10^{-6}. In one minute, 3,840,000 bits are transferred, thus a BER = 10^{-6} corresponds to 3.84 bit errors (3 errors = OK (no degraded minutes), 4 errors = NO (Not OK) (Degraded Minutes).

LOS Loss of Synchronize:
Synchronization is lost at an error rate greater than or equal to 20% within a period of a second. The absolute number of synchronization losses will be shown.

BERT saving

The ARGUS can store the results of several BERTs. The ARGUS saves the results together with the date, time and call number of the access under test (if this number has been entered as the "own" number in the speed-dialling memory, see page 141) in the next free memory location. If all of the memory locations are used, the ARGUS will request permission to overwrite the oldest test results.

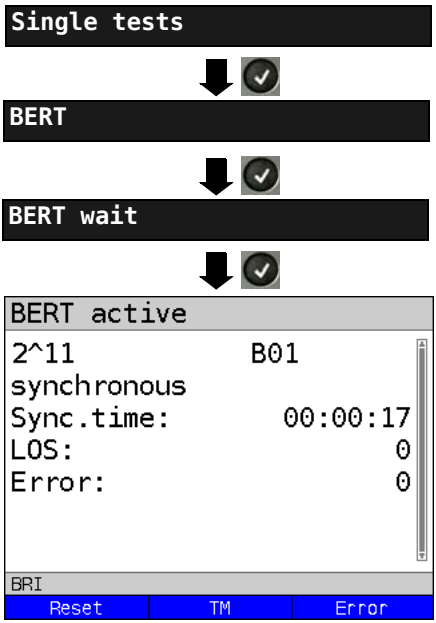


Use the keypad to enter the name under which the ARGUS should save the results.

BERT - saving the result

BERT wait

In “BERT wait” mode, the ARGUS will wait for the BERT at the remote end. This is required for an end-to-end test.



ARGUS - Main Menu.

Activate “BERT wait”

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

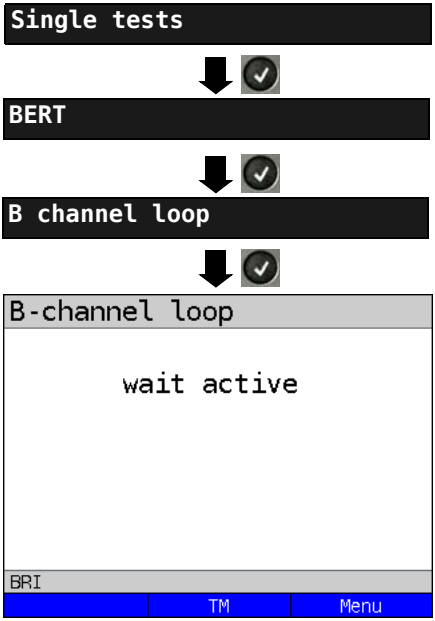
<TM> Opens the Test Manager (see page 66).

For information on the displays shown, see "BERT start" on page 24.

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.



ARGUS - Main Menu.

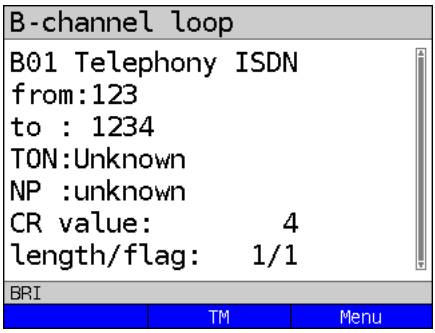
Activate a "B channel loop"

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 66).

<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 66) the ARGUS will return to the "B channel loop, wait active" display.

Exit the "B channel loop" mode.



Display shown after accepting a call:

- B channel used and service
- The caller's number (from:)
- The number dialled (to:)
- If available: TON, NP, UUS etc.

<TM> Opens the Test Manager (page 66).

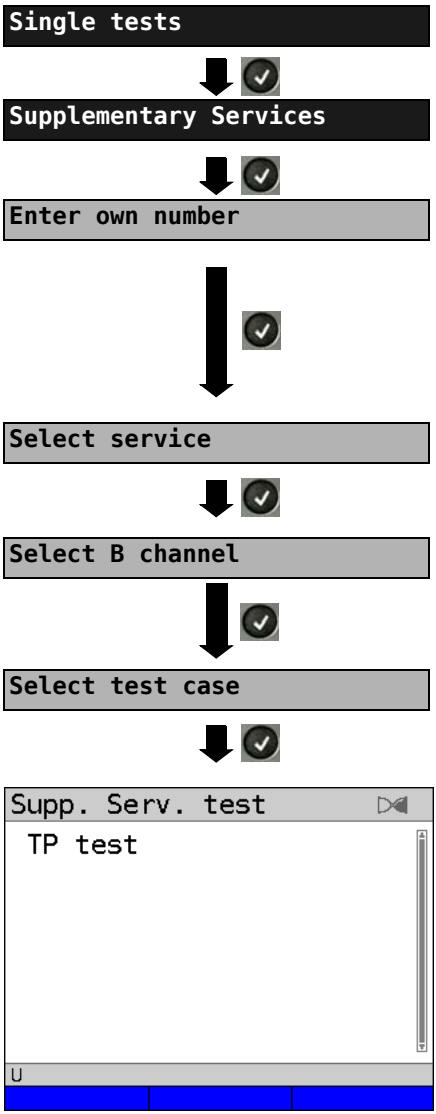
<Menu> Open the Main Menu.

Clear down the B channel loop connection; the B channel loop, however, remains active!

3.5 Supplementary Services Test

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

Suppl. service interrogation in DSS1



ARGUS Main Menu

The speed-dialling memory opens (see page 141).

Scroll through to your own call number (the number of the access under test) or enter it using the keypad.
The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

Using the cursor keys, select the service which should be used for the supplementary services test.

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. If you enter an "*", the ARGUS will choose any B channel that is free.

The ARGUS will determine whether the selected supplementary service is supported by this access.

Start test

Display the test results:

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

Scroll through the results

Close the results display and open the next higher menu

Test	Explanation
TP	The ARGUS tests the TP (Terminal Portability) supplementary service by making a self call.
HOLD	The ARGUS tests the HOLD supplementary service by making a self call.
CLIP	The ARGUS checks, one after the other, whether the 4 supplementary services CLIP, CLIR, COLP and COLR are supported. To do so, the ARGUS will setup as many as three calls to itself. CLIP: Will the calling subscriber's number be displayed at the called subscriber? t = CLIP temporarily available p = CLIP permanently available CLIR: Will the display of calling subscriber's number at the called subscriber be suppressed or is it possible to temporarily suppress the display? If the ARGUS displays an *, it is not possible to determine the availability of the service, since no CLIP has been setup. t = CLIR temporarily available p = CLIR permanently available COLP: Will the call number of the subscriber who answered be displayed on the caller's phone? COLR: Will the display of the call number of the subscriber who answered be suppressed on the caller's phone or is it possible to temporarily suppress the display? If the ARGUS displays an *, it is not possible to determine the availability of the service, since no COLP has been setup. ⚠ The suppl. services CLIP, CLIR, COLP and COLR will be tested in pairs. If CLIR or COLR is set up permanently, it is not possible to make a clear assessment.
DDI	Can a caller directly dial in to an extension on the PBX access under test?
CF	The ARGUS will check whether the 3 supplementary services CFU, CFB and CFNR are supported. CFU: Can this access immediately forward an incoming call? CFB: Can this access forward an incoming call when it is busy; in other words does it support Call Forwarding Busy? CFNR: Can this access forward an incoming call when it is not answered?

⚠	In the CF test, the ARGUS attempts to set up a call diversion to the call number that is in the speed-dialling memory location for “remote call number 1” (see "Saving call numbers in the Speed-dialling Memory" on page 24). When performing a CF test, the ARGUS will report an error if this location does not contain a valid call number to which it is possible to divert a call.
CW	Does the access under test support call waiting?
CCBS / CCBS-T	Will the access under test automatically recall a remote subscriber if the number called was busy?
CCNR / CCNR-T	Will the access under test automatically recall a remote subscriber if the call was not answered?
MCID	Does the access tested allow identification of malicious callers (call tracing)?
3pty	Does the access under test support a three-party conference call? For this test, you need the assistance of a remote subscriber, whose call number must be entered. A connection is necessary.
ECT	Is an explicit call transfer supported by the access under test? For this test, you need the assistance of a remote subscriber, whose call number must be entered. A connection is necessary.
CUG	The ARGUS then uses a self call to check whether the access under test belongs to a closed user group.
CD	An incoming call will be diverted immediately. This form of call diversion differs from the others in that it is invoked on a call-by-call basis, and is not preconfigured to a specific destination.
AOC	The ARGUS checks whether the charges can be sent to the access under test. The test uses a call to oneself to check both AOC-D (AOC during a call) and AOC-E (AOC at the end of a call).
SUB	A call is made to oneself and answered to check the transfer of the sub-address in both directions. Are sub-addresses supported on the access under test?
UUS	Does the access under test support the transfer of user data?

No Screening	If the caller supports CLIP No Screening (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.

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 149).

A few error codes and their meaning:

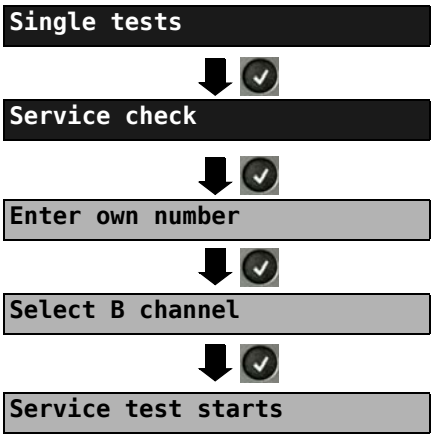
Description	**Cause (from network) DSS1**	**Cause ARGUS internal**
no or another access	__	201, 204, 205, 210, 220
wrong or invalid number	1, 2, 3, 18, 21, 22, 28, 88	152 ,161, 162, 199
one or more B channels busy	17, 34, 47	___
wrong service	49, 57, 58 ,63 , 65, 70, 79	___

3.6 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 20)	**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.



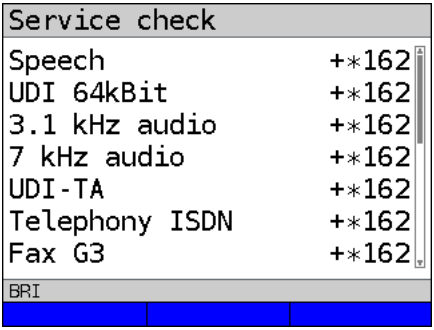
ARGUS - Main Menu

Enter the own (local) number of the access under test or select it from the speed-dialling memory.

The ARGUS suggests the B channel used last. If you enter an "*", the ARGUS will choose any B channel that is free.

There are PBXs that use separate call numbers for incoming and outgoing calls. In this case, for the Service tests, you can enter a “remote” call number that does not match the “own” number that is stored in the ARGUS. If the Service check should extend outside of the local exchange, it is possible to perform the Service check in an end-to-end mode. In this case, you must enter the remote call number for a second terminal device. The ARGUS will then automatically check whether the remote terminal can accept the call under the various services – in other words, whether it is “compatible” with these services. In the test results, the second part (second +, - or *) refers to the answer from the remote exchange.

Test results:



The ARGUS will display the results of the test once it is done. The ARGUS makes a distinction between outgoing calls (the first +, - or *) and incoming calls (the second +, - or *).

- **+** = suppl. service supported
- **-** = suppl. service not supported
- * = No definite assessment can be made so an error code is displayed. In such case, it is recommended that you have someone place a call to the access under test using this service.

Scroll through the results

Close the results display and open the next higher menu.

Interpreting the test results:

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

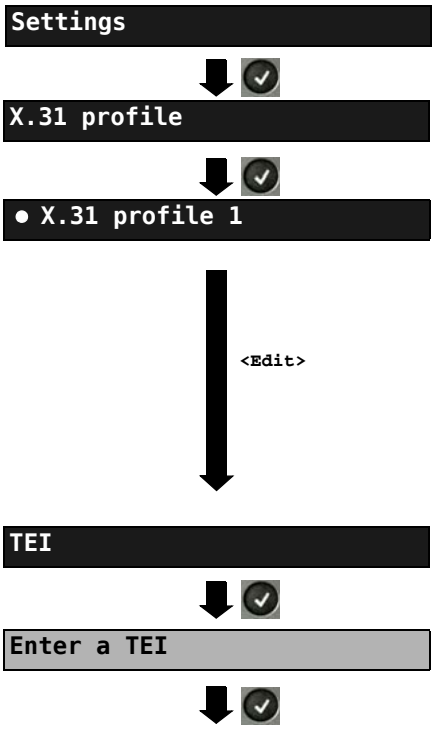
If the outgoing call is not successful, it is not possible to make a statement about an incoming call. Therefore, you will never see “- +” or “- *” on the display.

3.7 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



ARGUS - Main Menu.

The ARGUS stores the parameters of the X.31 Test in the three X.31 profiles.

Mark a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the current profile for the X.31 Test.

The ARGUS takes over the marked profile as the default and returns to the Settings menu.

The default parameters can be restored at any time.

The ARGUS saves the TEI entered and returns to the next higher menu.

Setting	Explanation
X.31 profile:	Up to three user-defined X.31 profiles can be created. **<Edit>** The selected profile will be opened for editing.
Packet number	Number of packets sent Range: 0 to 65 000 Default setting: ***10***
TEI	Entry (from the keypad) of the TEIs (Terminal Endpoint Identifier) to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI. Range: min. 0 to a max. of 63 Default setting: ***** (automatic)***
LCN	Entry (from the keypad) of the LCN (Logical Channel Number) to be used in the X.31 test. Range: 0 to 4095 Default setting: ***1***
Packet size	Size of the data packets: 16, 32, 64, 128 or 256 bytes. Default setting: ***128 Bytes***
Agree packet size	Negotiate with the network side (DCE) regarding the data packet size. If the desired data packet size is larger than the default, this parameter should be set to “yes”. Default setting: ***No***
Window size	Window size of Layer 3, selection of 1 to 7 packets. Default setting: ***2 Packets***
Agree window size	Negotiate between the terminal (DTE) and the network (DCE) an agreement regarding the window size. Default setting: ***No***
Throughput	Data throughput in bits/s: 75, 150, 300, 600, 1200, 2400, 4800 or 9600 bits/s. Default setting: ***1200 bit/s***
Agree throughput	Agree on the data throughput Default setting: ***No***

User data

Content of the user data

- Format setting for the user data
- Entry of the ASCII data

ASCII data

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).

● ASCII data 1/3

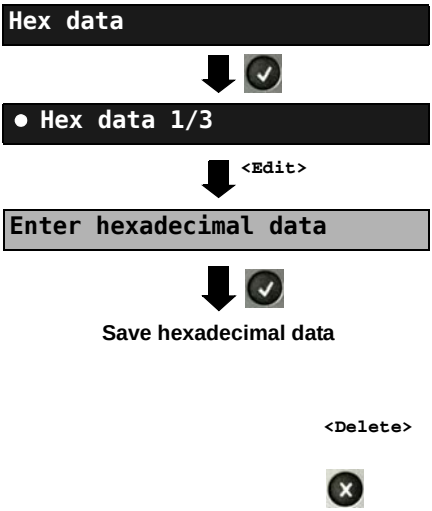
<Edit>

Enter ASCII data

Save ASCII data

Use the numeric keypad to enter the ASCII data.When the right softkey is pressed it assumes a different meaning and thus influences the entries made from the keypad (letters or digits):

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of lowercase characters (e.g. to enter a “C” press the “2” on the keypad three times), plus @, /, -, and .
<AB>12>	Entry of the uppercase characters and @, /,- and .
	Move the cursor
<Delete>	Delete the character before the cursor
	Do not save ASCII data.



- Entry of the hexadecimal data:

Select one of the three available memory locations for the hexadecimal data (in this example, the first location 1/3)

Use the keypad to enter the hex value. To enter the values "A...F", use the softkey **<A..F>** (e.g. to enter a "C", press the softkey **<A..F>** three times). To confirm the entry of the hexidecimal characters A to F press **<OK>** (the softkey in the middle changes from **<Delete>** to **<OK>**).

<Delete> Delete the character before the cursor

Do not save the hexadecimal values.

CUG	Closed User Group. Default setting: ***No***
CUG Index	Coding for Closed User Group Range: min. 0 to 255 max. Default setting: ***1***
D bit	Local: DCE acknowledges data packets, i. e. flow control on local DTE-DCE path. End-to-end: DTE-DTE flow control Default setting: ***Local***
Facilities	Coding for various supplementary services A maximum of 3 facilities can be stored. For instructions, see User data on page 40.
Profile name	Use the keypad to enter the profile name for the X.31 profile. The ARGUS will later display this name for the profile.

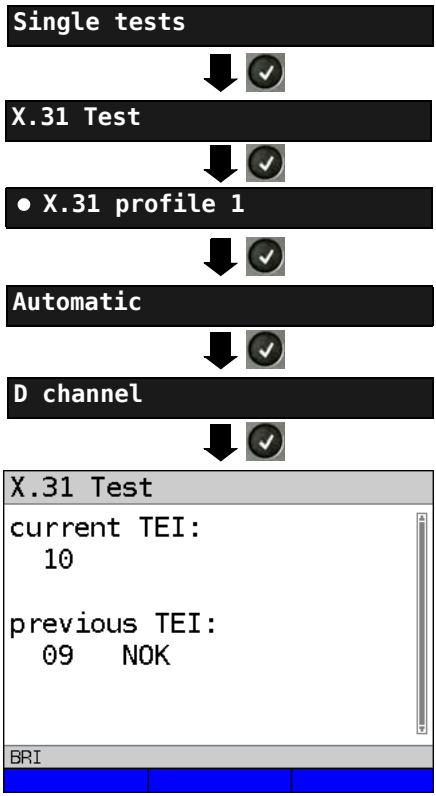
Automatic X.31 Test

D channel

The “automated X.31 Test in D channel“ consists of two steps:

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

Second step: For each TEI with which X.31 is possible on Layer 2, a "CALL_REQ" packet will be sent and then the ARGUS will wait for an answer. Beforehand, the ARGUS will request the entry of the X.25 access number, which will be saved in speed-dialling memory under X.31 test number. With the entry of the X.25 access number, you can - if you wish - select a logical channel (LCN) other than the default.



ARGUS Main Menu.

Select the profile.

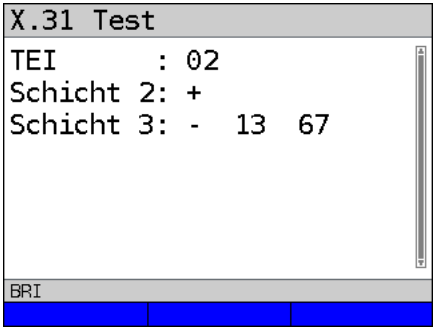
<Edit> Change to the profile parameters (see page 39).
The parameters can be edited.

Start test

The test can take up to 4 minutes.
The ARGUS will display the currently tested TEI, the previously tested TEI and the results:

OK = X.31 is available for this TEI
NOK = X.31 is not available for this TEI

Test results



The ARGUS will check whether the X.31 service is available for Layer 3 for the TEIs found in Step 1.
Example: Test results

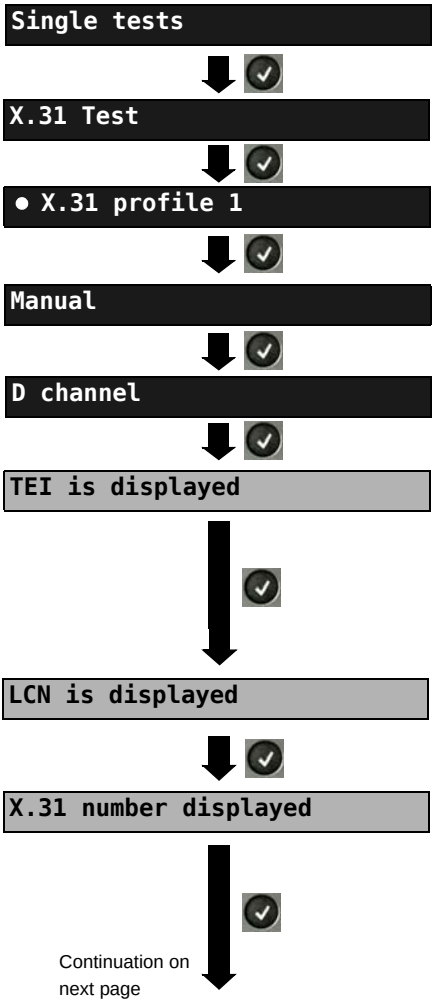
TEI 02		The first valid TEI is 02.
Layer 2	**+**	First test step was successful
	-	First test step was not successful
Layer 3	**+**	Second test step was successful
	-	Second test step was not successful In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above: 13) and the associated diagnostic code, if there is any (see the Appendix page 150).

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.



ARGUS - Main Menu

Select the profile.

<Edit> Change to the profile parameters (see page 39).
The parameters can be edited.

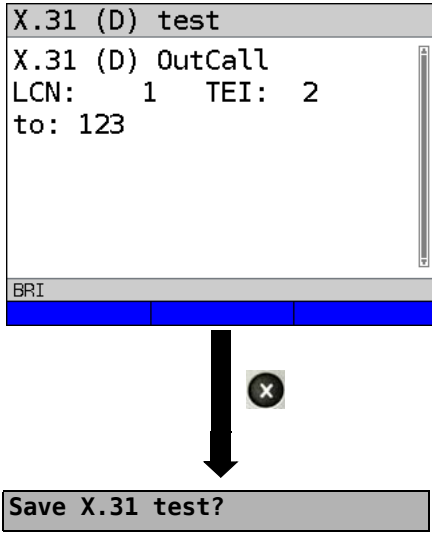
The ARGUS displays the TEI stored in the X.31 profile. It can be edited from the keypad. If you enter "**", the ARGUS will automatically select a TEI.

<Delete> Delete the TEI

The ARGUS displays the stored LCN (see page 39). It is possible to edit the LCN from the keypad.

The ARGUS displays the X.31 number saved in the speed-dialling memory (see page 141). It can be edited from the keypad.

Setup an X.31 connection.



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

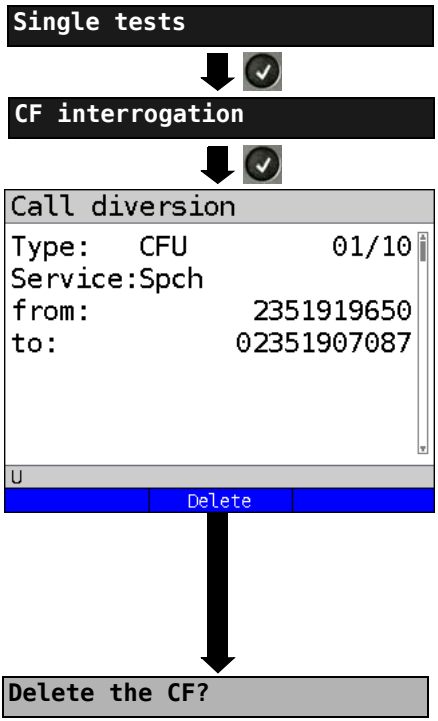
The X.31 connection will be maintained until the user or the remote end clears it. When the X.31 connection is cleared, the ARGUS will automatically clear the D channel connection.

<Yes>	The ARGUS saves the results.

3.8 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.

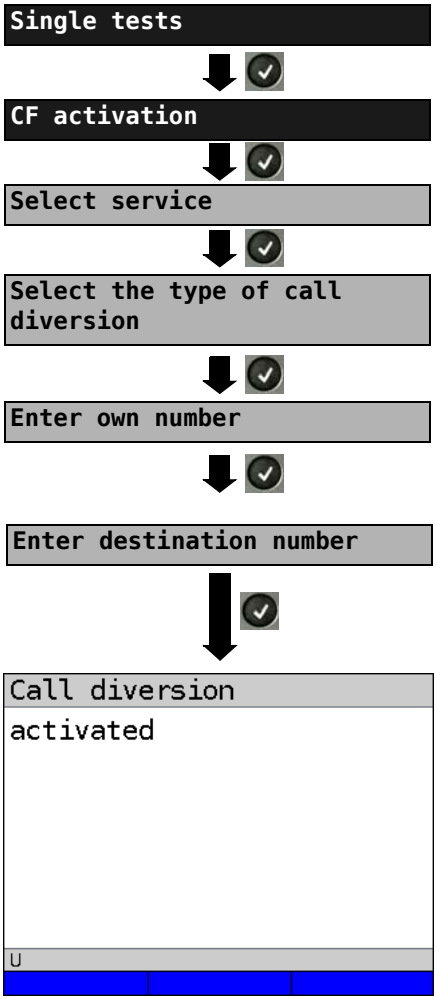
Some PBXs or exchanges do not permit the use of the mechanism used (by the ARGUS) for the interrogation of the call diversions for all MSNs or they return a negative acknowledgement of the interrogation of call diversions, implying that no call diversions have been set up. In the event of a negative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

Bearer Service	**Abbreviation**
All services	**All**
Speech	**Spch**
Unrestricted Digital Information (data telecommunications)	**UDI**
Audio 3.1 kHz	**A3k1H**
7 kHz audio	**A7KHz**
Telephony 3.1 kHz	**Tel31**
Teletext	**TTX**
Fax Group 4	**FaxG4**
Video syntax based	**ViSyB**
Video Telephony	**ViTel**
Telefax Groups 2/3	**FaxG3**
Telephony 7 kHz	**Tel7k**

CF Activation

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



ARGUS - Main Menu.

Using the cursor keys, select the "Service" of the call diversion.

Using the cursor keys, select the type of call diversion.

The speed-dialling memory opens (see page 141).
Under own (local) number, enter the call number which should be diverted.

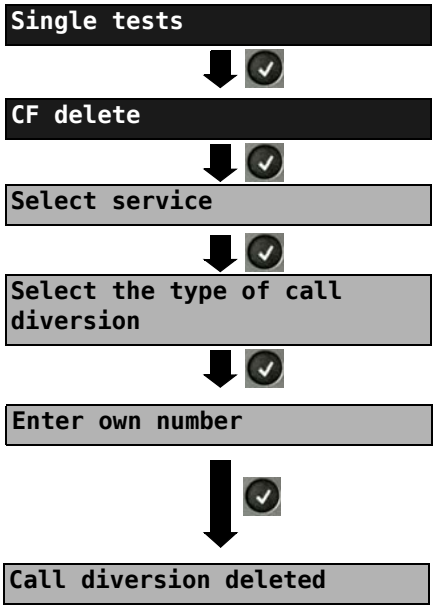
Enter the call number to which calls should be diverted.

Set up the call diversion

Open the Single Tests Menu.

CF Delete

The ARGUS can clear selected call diversions setup in the exchange.



ARGUS - Main Menu.

Using the cursor keys, select the "Service" of the call diversion.

Using the cursor keys, select the type of call diversion.

The speed-dialling memory opens (see page 141).
Under "Own number", enter the call number which should no longer be diverted.

Delete call diversion

Open the Single Tests Menu.

3.9 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 23) should be checked before the automatic test series is begun.

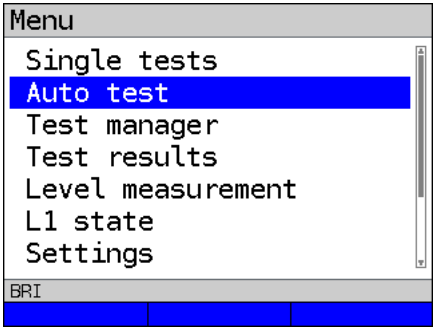
Using the ARGUS WINplus or WINanalyse software, the test results can be saved on a Windows PC. On the PC, WINplus / WINanalyse can be used to generate a comprehensive report that can then be printed, sent by e-mail and/or archived. The ARGUS automatically performs the following sequence of single tests:

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

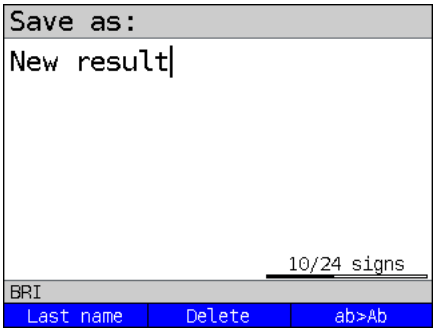
On a BRI S/T or U interface leased line (permanent circuit)

- 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).

Press the 4 on the numeric keypad to directly access a memory location. A indirection through the main menu is not necessary.

Enter own (local) number

In TE mode:
Enter the “Own number”; on accesses using the DSS1 protocol you must also enter a “remote number”.

Enter destination number

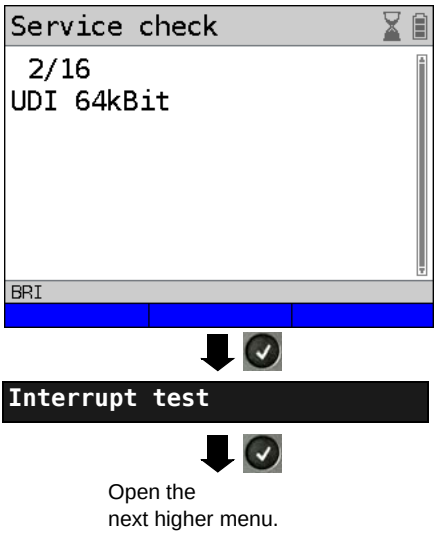
Select service
(required for Supp.Serv.test and BERT).

Select service

During the test sequence, the ARGUS will display the single test currently running.

Start the automatic test

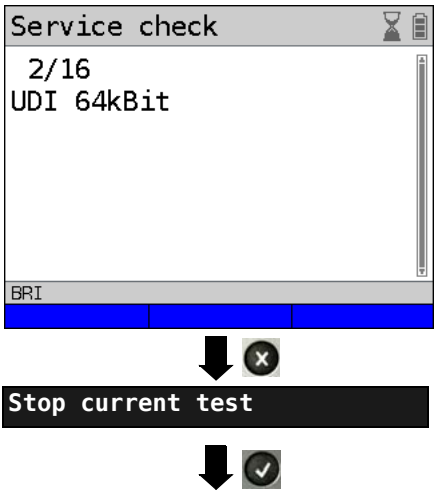
Terminating the test (early):



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:

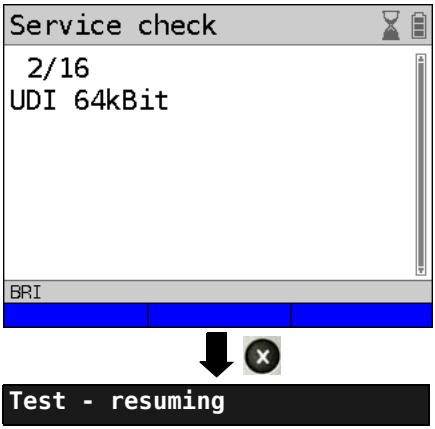


In this case, the ARGUS will execute the next single test.

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

The ARGUS repeats the “interrupted” single test (in the example: a Service check).

3.10 Connection

The ARGUS can set up a connection for the following services:

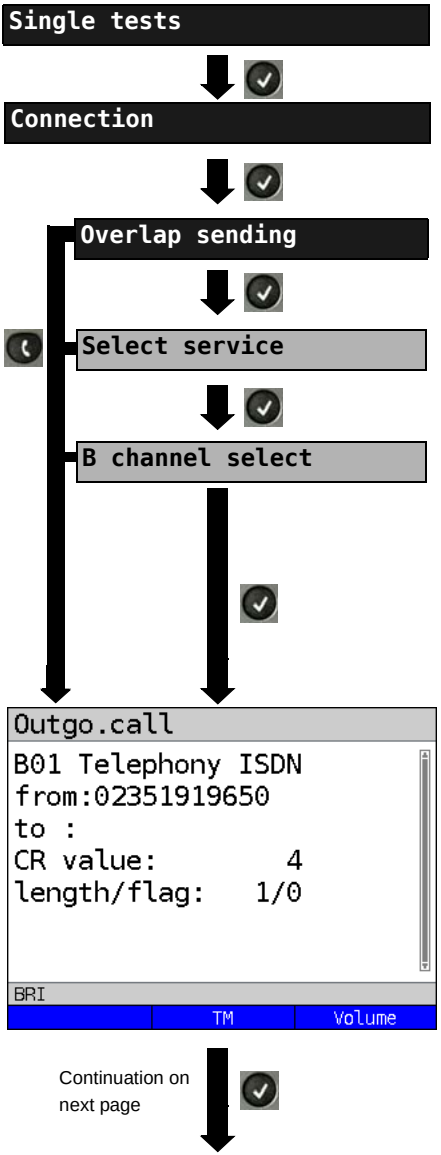
Service	Display
Speech	**Speech**
Unrestricted Digital Information (data telecommunications)	**UDI 64kBit**
3.1 kHz audio	**3.1 kHz audio**
7 kHz audio	**7 kHz audio**
Data transfer with tones & displays	**UDI-TA**
Telephony	**Tel. ISDN**
Telefax Groups 2/3	**Fax G3**
Fax Group 4	**Fax G4**
Combined text and facsimile communication	**Mixed**
Teletex Service basis mode	**Teletex**
International interworking for Videotex	**Videotex**
Telex	**Telex**
OSI application according to X.200	**OSI**
7 kHz Telephony	**7 kHz**
Video telephony, first connection	**Videotel. 1**
Video telephony, second connection	**Videotel. 2**
Three user-specified services (see, page 20)	**User-specified 1 to 3**

A headset or the integrated handset can be used as a phone during a telephone connection.

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

Overlap sending (outgoing call)

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



ARGUS - Main Menu

<Call no.> Open the call number entry dialog

The ARGUS will open the Connection display.
Besides overlap sending (as shown on the left), one of the following can be selected here
- En-bloc sending (see page 57)
- Redialling (see page 58)
- Keypad dial (see page 62).

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

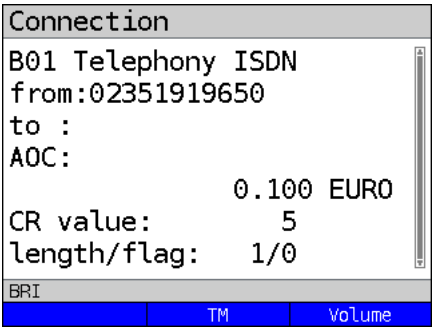
Enter the call number on the keypad. Display:

- B channel and service
- The number in the speed-dialling memory under “own number”, see page 141 (from:)
- The number dialled (to:)
- Other information depending on the access, e.g. TON and NP

<TM> Start the Test Manager, see page 66.

<Volume> Set the volume

or Cancel setup



or

Disconnect

The connection is setup using B channel 1.

Depending on the type of access other information will be displayed.
- Subaddress of the caller (SUB)
- Destination number
- User-User Information (UUI)
- Display Information
- Type of number (TON)
- Numbering plan (NP)
- Units for charges

<TM> Start the Test Manager, see page 66.

<Volume> Set the volume

- Display Advice of Charges (AOC):

If the charges are not given in units, rather directly as currency, the ARGUS will display the current charges in currency. If, in DSS1, the call charges are not provided in accordance with the DIN ETS 300182 standard, rather in the form of the information element DISPLAY (DSP), the ARGUS will display the DISPLAY message's character string.

Note regarding the entry of the own call number

Separate the extension from the access number with a # (e.g. 02351 / 9070-40 is entered on the ARGUS as: 023519070 #40). For an outgoing call, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number, only the extension (DSS1-CGPN).
A '#' at the beginning of a call number is treated as a valid character. A '#' at the end of the own call number instructs the ARGUS to not send the caller's number for outgoing calls (CGPN or OAD).

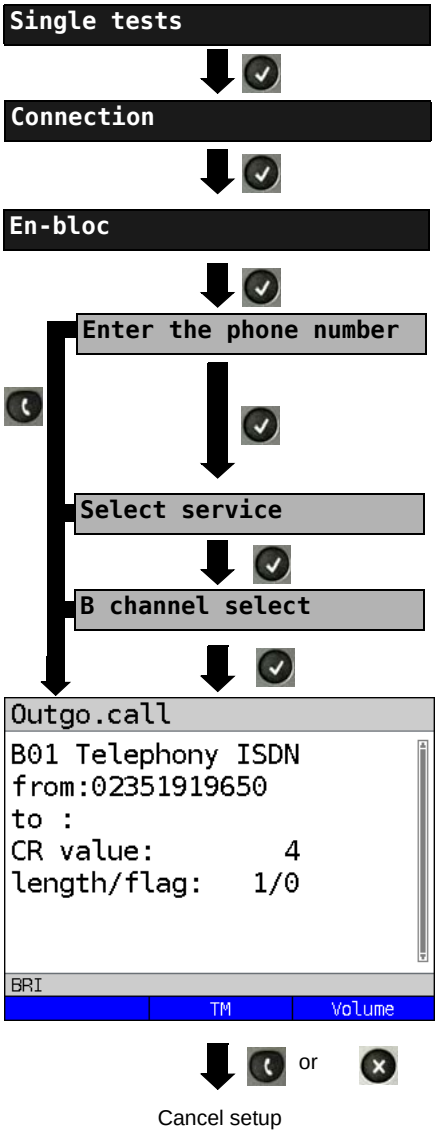
Simplified overlap sending using the telephone key

pressed once: The ARGUS will open the Connection/Overlap window directly regardless of the currently open menu.

depressed again: A dial tone will be heard and once the call number is entered, the call will be setup.

En-bloc sending (outgoing call)

In en-bloc sending, the ARGUS sends the entire dialling information in one block.



ARGUS - Main Menu

<Call no.> Open the call number entry dialog

The speed-dialling memory opens (see page 141).
Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

The ARGUS will open the Outgo. call display, operation like by overlap sending.

Enter the B channel on the keypad (for details on entry, see “Overlap sending”).

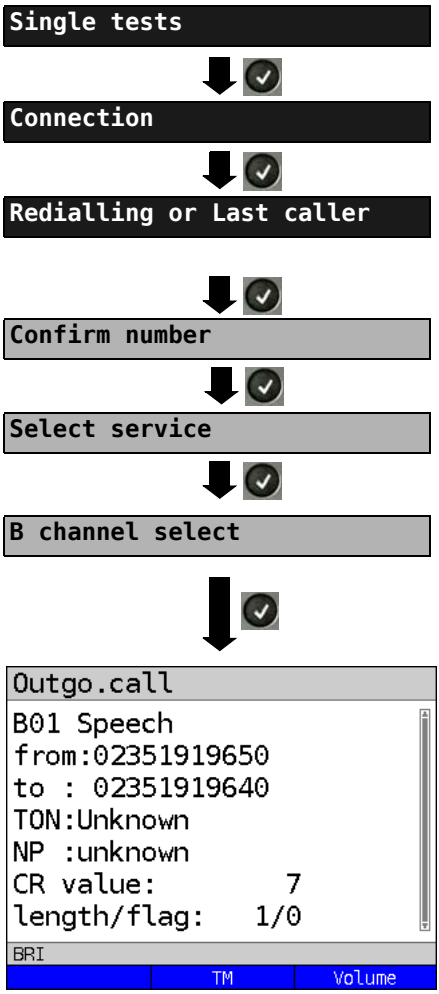
For more information on the displays and operation, see Overlap sending page 55.

<TM> Start the Test Manager, see page 66.

<Volume> Set volume

Redialling (outgoing call) + Last caller (incoming call)

The ARGUS will set up a call using the last number dialled or the number of the last caller.



ARGUS - Main Menu

<Call no.> Open the call number entry dialog

Enter the B channel on the keypad. The ARGUS suggests the B channel used last. Before entering a new B channel first press **<Delete>**. If you enter an *, the ARGUS will choose any B channel that is free. The ARGUS will show whether the B channel is available.

The dialling procedure will begin using the number last called or the number of the last caller.

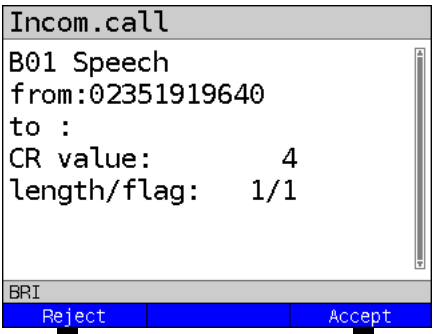
For more information on the displays and operation, see Overlap sending page 55.

<TM> Start the Test Manager, see page 66.

<Volume> Set volume

Incoming Call

An incoming call can be taken at any time even when a test (e.g. a BERT) is in process (see page 67). 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 21) 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 141) and the incoming call has a destination MSN.



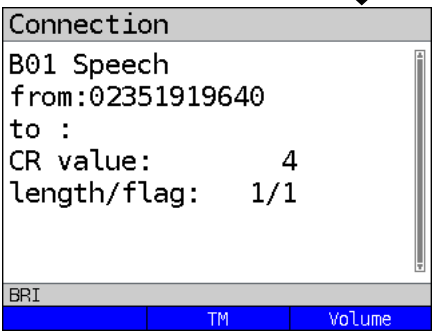
Reject call

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 19).

Accept call



Depending on the type of access additional information will be displayed (in the example, CR value and length/flag).

The call number of the last incoming call will be saved in the "Last caller" memory location.

<TM> Start Test Manager, see page 66.

<Volume> Set volume.

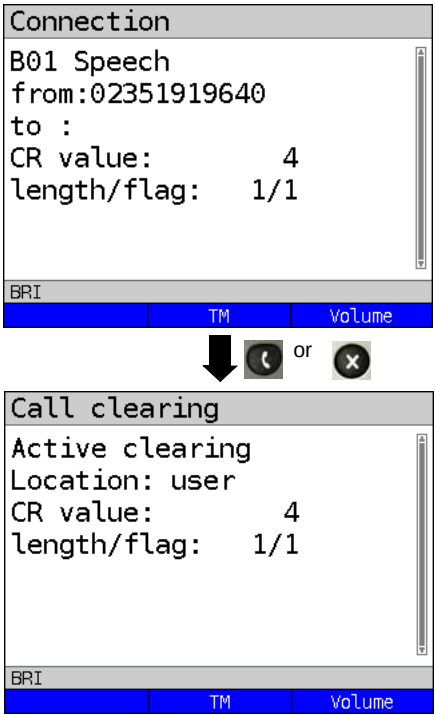
Disconnect

The ARGUS displays the cause of the disconnect (see page 60).

Charge information in NT mode:

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

Clear (disconnect) the connection



<TM>	Start Test Manager, see page 66
<Volume>	Set volume

The ARGUS will display the cause (see the table below) of the disconnect (e.g. Normal clearing) and the location where the cause occurred (e.g. subscriber).
Depending on the access, additional information will be displayed (in this example, Units).

The following causes are shown in clear text:

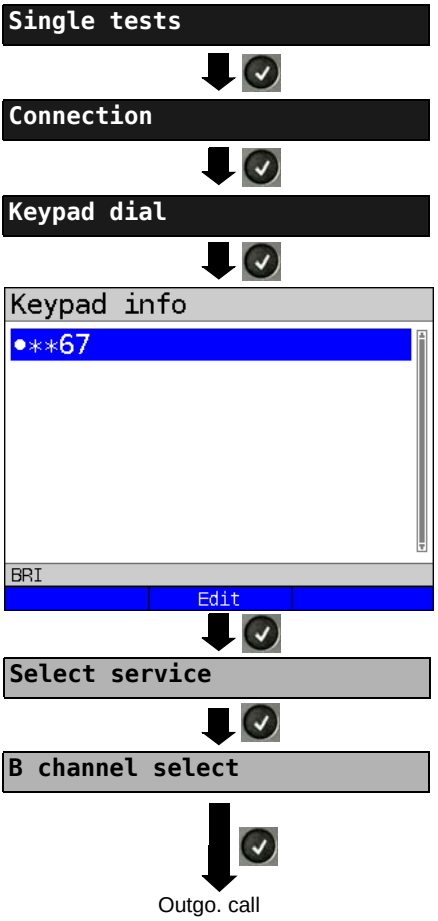
Reason	Display	Explanation
255	Active clearing	Clearing User actively initiated the disconnection
Length 0	Normal clearing	Cause element with Length 0
01	unalloc. number	Signals “No access under this call number”
16	Normal clearing	Normal clearing
17	User busy	The number called is busy
18	No user respond	No answer from the number called
19	Call time too long	Call time too long

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

Other causes are not shown in clear text, rather as decimal codes (see ”ARGUS Error Messages (DSS1)" on page 149).

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.



ARGUS - Main Menu.

Select keypad info,
see page 21.

<Edit> Edit the selected keypad info entry. Afterwards, use the keypad to enter the keypad info.

Using the cursor keys select the service that should be used for the connection.

Use the keypad to enter the B channel for the connection, see page 55.

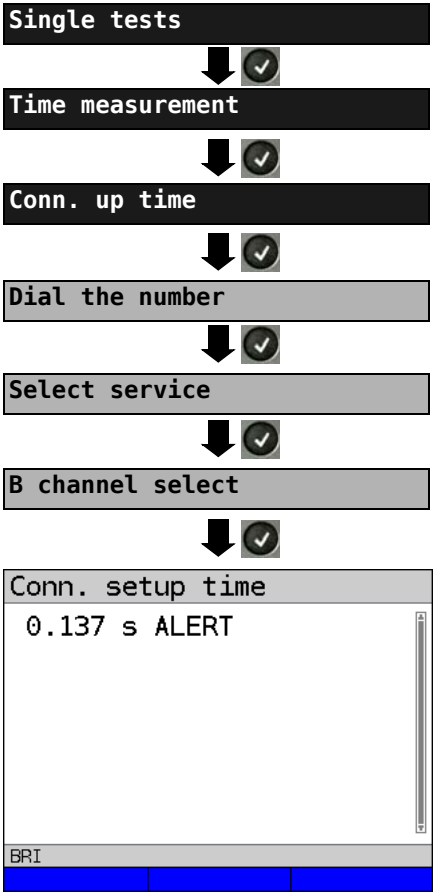
Start the dialling procedure.
For more information on the displays and operation, see Overlap sending page 55.

3.11 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 141). Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

Enter the B channel on the keypad

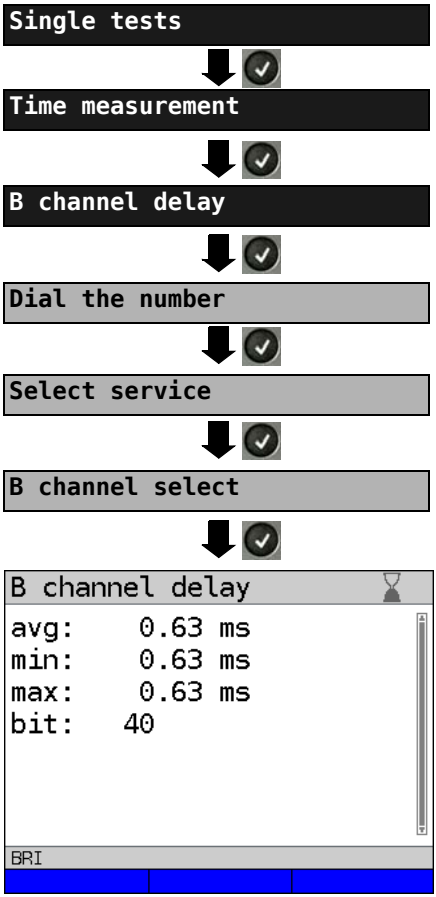
Perform measurement

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 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 141).
Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

Enter the B channel on the keypad

Perform measurement

Display

avg:	average B channel delay
min:	shortest B channel delay
max:	longest B channel delay
bit:	The average B channel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

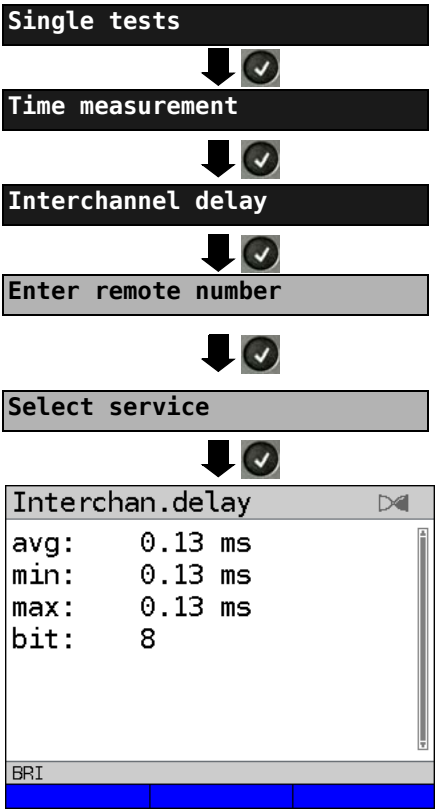
The measurement will be repeated in cycles (continuous measurement).

Stop measurement, the ARGUS will display the last measurement.

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B channel is free) the ARGUS will display the corresponding cause. If the ARGUS does not receive the data back in the B channel within 13 seconds, it will display the message “No loop”.

Interchannel delay

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



ARGUS Main Menu

The speed-dialling memory opens (see page 141).
Use the cursor keys to scroll to desired the number or enter a new number.

Perform measurement

avg:	average interchannel delay
min:	shortest interchannel delay
max:	longest interchannel delay
bit:	The average interchannel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µsto send a bit).

The measurement will be repeated in cycles (continuous measurement).

Stop measurement.The ARGUS will display the last measurement.

If the measurement cannot be performed (e.g. because the call number entered was wrong or no B channel is free) the ARGUS will display the corresponding cause. If the ARGUS does not receive the data back in the B channel within 13 seconds, it will display the message “No loop”.

3.12 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.

ARGUS - Main Menu

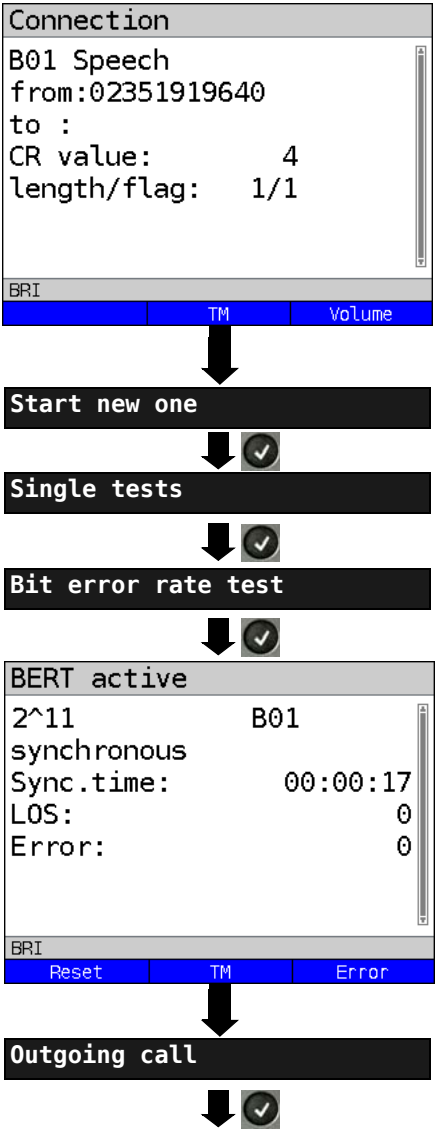
Open the Test Manager

<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



Open the Connection display.

Example:
There is a connection on B channel 1.

Open the Test Manager (can also be opened by pressing the 6 -key).

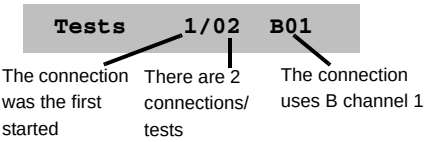
Select the desired test (e.g. bit error rate test, BERT).

Start BERT, the connection is still setup.

For information on running a BERT, see page 24.

Open the Test Manager, mark “Outgoing connection”.

An example of the display



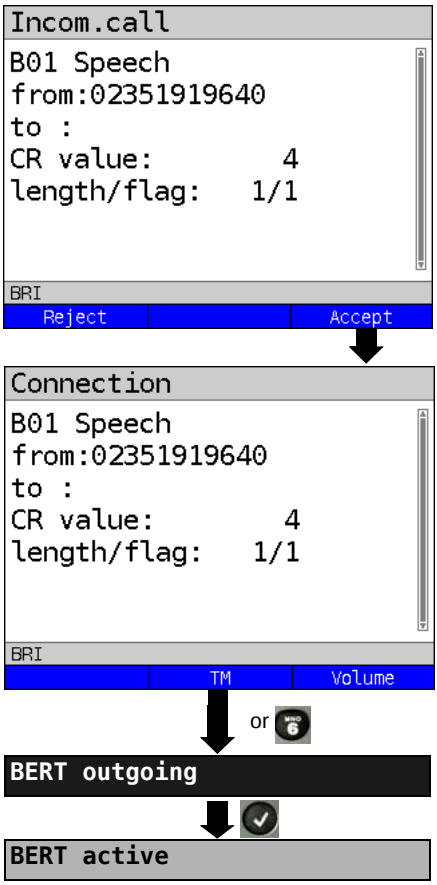
If a test (or connection) is canceled (or cleared), the ARGUS will return to the Test Manager if there is another test (or connection) running in the background.

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 54). The incoming call can be accepted without influencing the currently running BERT.
If either the “B channel loop” or the “BERT wait” function is active, the call will be accepted automatically.



While running a BERT, the ARGUS displays information about an incoming call.

<Reject> Reject the incoming call. The ARGUS will switch to the BERT.

Accept call
The BERT will continue in the background.

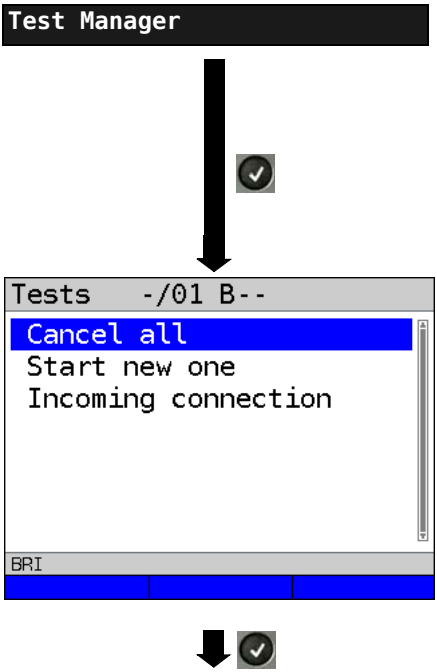
Mark “BERT outgoing”.

Switch to BERT.

The connection remains active in the background, the handset is assigned to the connection.

The handset will be assigned to the appropriate currently active connection. The assignment of the handset to a given connection is also retained in the background.

End All Currently Running Tests or Connections



ARGUS - Main Menu.

Open the Test Manager

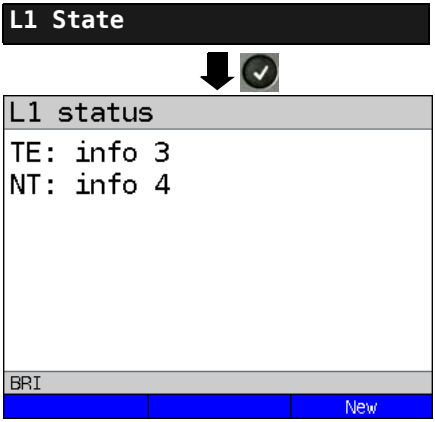
<TM> or 

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.

All tests will be terminated and all connections cleared down.

3.13 The L1 State of an S-Bus Access

The ARGUS displays the current status of Layer 1: i. e. which signal does the remote end receive and which signal does the ARGUS receive?



ARGUS - Main Menu

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

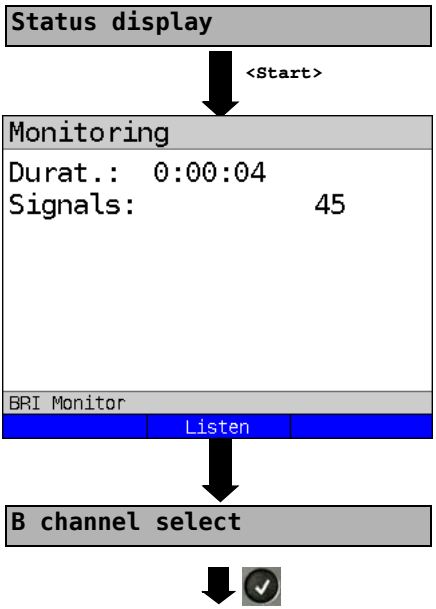
<New> Layer 1 will be setup again

Close the display and open the Main Menu.

3.14 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 2 Configuring accesses page 7.



Monitoring is not yet active!

Start monitoring

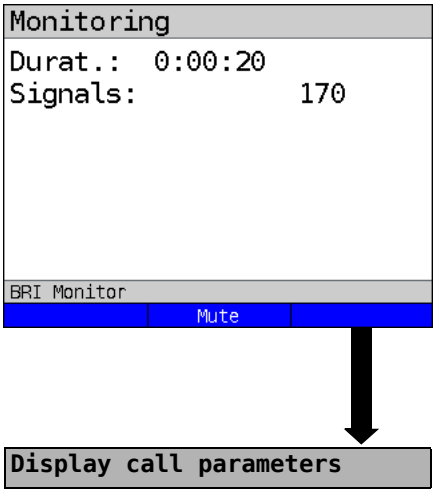
The ARGUS displays the recording time in h:min:sec and the number of recorded signals.

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.

Continuation on next page



Listening-in on voice data
(Direction: Net --> User) possible.

<Mute>	To stop listening
<Talk>	Parallel call display while monitoring The ARGUS searches all of the D channel signals sent for a SETUP. If a SETUP is detected, the **<Call>** softkey will be displayed.

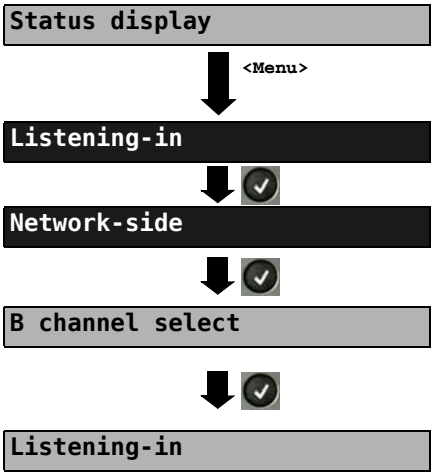
The ARGUS displays the call parameters of the last SETUP received.
Display:

- Call direction (N -> U for Net -> User)
- B channel used
- Service
- Own number (from:)
- Destination number (to:)

Depending on the type of access additional information will be displayed.

- Sub-address (SUB)
- User-User-Info (UUI)
- DSP messages
- Type of number (TON)
- Numberin Plan (NP)

Listening-in when monitoring is not active



Monitoring is not active!

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.

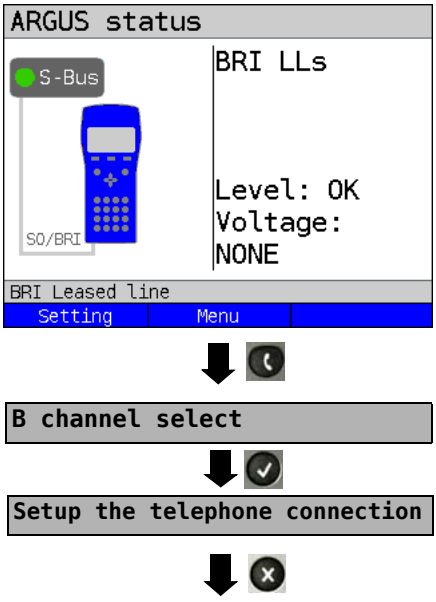
Stop listening-in and open the Main Menu.

3.15 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 19). 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



The Leased line settings are made in the chapter 2 Configuring accesses page 7.

<Setting> ISDN parameter configuration, see page 18.

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

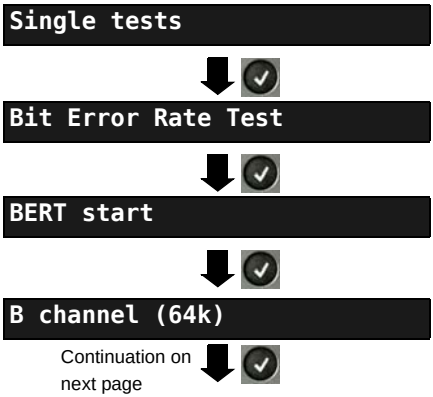
<TM> Start the Test Manager, see page 67.
Another connection can be setup.

Alternatively, the connection can be setup via Connection in the Single Tests Menu.

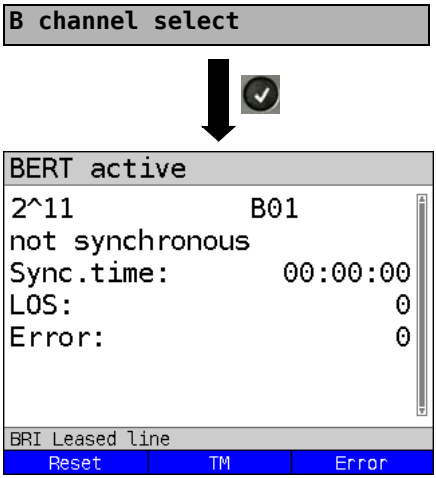
Bit Error Rate Test

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 23. 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 22, Parameter settings, page 24), however, you need not enter call numbers or select a service.



In the case of a BRI in end-to-end mode (see page 23 and page 30), it is also possible to run a BERT in the D channel with HDLC framing (channel selection: D channel).



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:

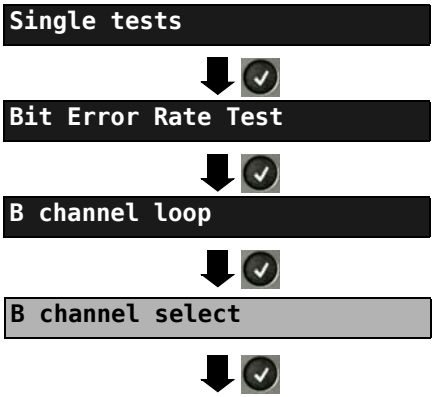
- The bit pattern and channel used
- The synchronicity of the bit pattern (in this example, synchron)
- Sync. Time in h:min:s
  The time in which the ARGUS can sync to the bit pattern.
- LOS
  Synchronization is lost at an error rate greater than or equal to 20 % within a period of a second. The absolute 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 66.
<Error>	Insert artificial bit errors to test the reliability of the BERT.
	Stop the BERT Display the test results.

For information on saving the test results, see page 29.

Loopbox

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



Activate loopbox

ARGUS - Main Menu

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).

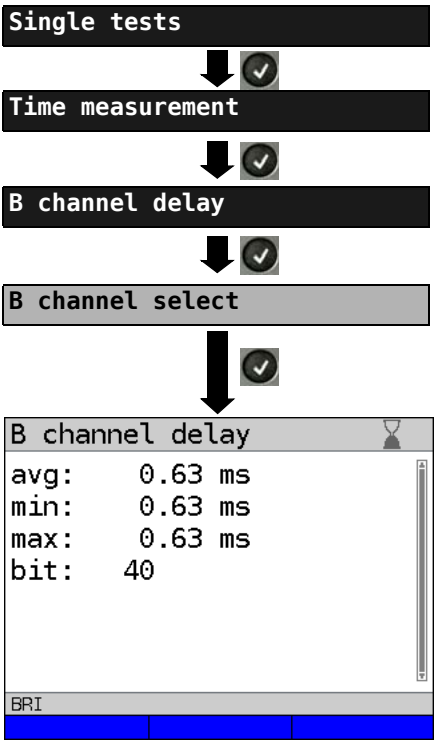
The ARGUS will display the B channel used and how long the loopbox has been activated (in h:min:sec).

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.



ARGUS - Main Menu

First press **<Delete>** and enter the B channel on the keypad, or use the cursor keys to set it.

Perform measurement

Display:

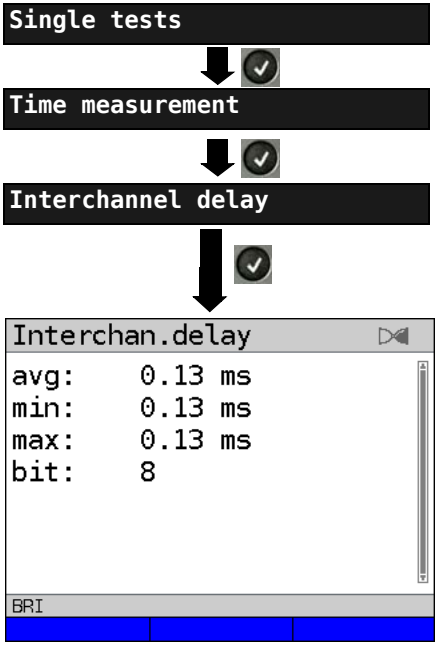
avg:	average B channel delay
min:	shortest B channel delay
max:	longest B channel delay
bit:	The average B channel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

The measurement will be repeated in cycles (continuous measurement).

Stop measurement, the ARGUS will display the last measurement.

Interchannel delay

The ARGUS will send the B channel data to a loopbox which will then send it back on the same channel. The ARGUS measures the propagation delay for the data on each of the B channels and determines the difference between the two propagation delays (interchannel delay). If the ARGUS does not receive the data back in the B channel in about 13 seconds, it will display the message “No loop”.
The measurement (continuous measurement) must be terminated manually.



ARGUS - Main Menu

Perform measurement

Display:

avg:	average interchannel delay
min:	shortest interchannel delay
max:	longest interchannel delay
bit:	The average interchannel delay in bits (multiples of the time required to send a bit at 64 kbit/s, it takes 15.26 µs to send a bit).

The measurement will be repeated in cycles (continuous measurement).

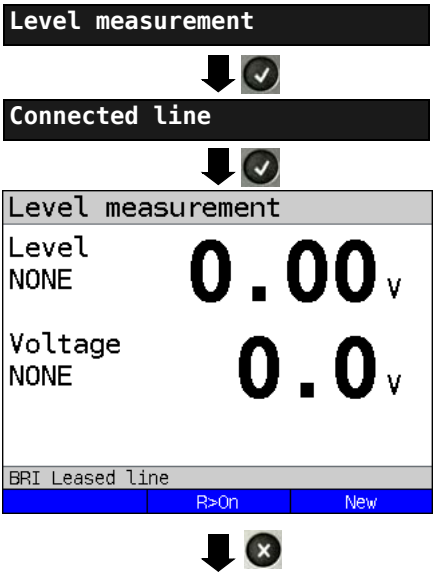
Stop measurement, the ARGUS will display the last measurement.

3.16 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.



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 $^{+20\,\%}_{-33\,\%}$ i.e. from 0.9 V to 0.5 V)
None	No level

Stop measuring level.
Open the Level measuring menu.

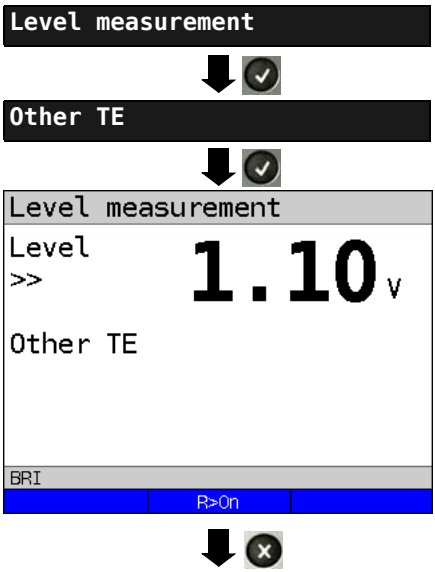
Evaluation of the feed voltage:

Voltage OK Normal voltage	Normal feed (40 V $^{+4,25\,\%}_{-13,75\,\%}$ i.e. from 41.7 V to 34.5 V)
Voltage OK Feed voltage	The (inverted phantom) feed is alright (OK).
Voltage None	No feed (Voltage)

<R>On>	**100** Ω resistor switched in
<R>Off>	**100** Ω resistor switched off
<New>	Setup Layer 1 again

Level measurement other TE

In TE mode, the ARGUS will measure the level of a terminal connected in parallel. In this case, the ARGUS is passive. Layer 1 must be activated on the terminal. The ARGUS updates its measurement continuously.



ARGUS - Main Menu

Start measurement

The ARGUS displays the level and an evaluation of the useful signal:

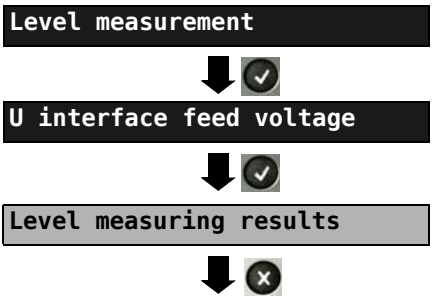
<<	Level is too low
>>	Level is too high
OK	Level is in order (0.75 V $^{+20\ \%}_{-33\ \%}$ i.e. from 0.9 V to 0.5 V)
None	No level

Stop measuring level.
Open the Level measurement menu.

<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



ARGUS - Main Menu

Start measurement

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

Stop measuring level.
Open the Level measuring menu.

4 Connection for a PRI network

Since there is no commonly accepted standard for the connections in the 2 Mbit sector, you will be confronted with different forms of connectors depending on the type of terminal and the network termination used.

The ARGUS changes the connector pin assignments automatically in accordance with the mode, TE or NT. Additionally, it is also possible to change the pin assignments manually in the L1-Status menu.

4.1 Pin Assignment on the ARGUS (BRI/PRI/E1)

In TE mode, the ARGUS sends on lines 4 and 5, in NT-Mode on 1 and 2 (see illustration). An adapter cable, which is suitable for the PRI network/system to be tested, can be connected using the RJ45-RJ45 adapter.

ARGUS RJ45 connector (WE8/4) RJ45 connector (WE8/4)

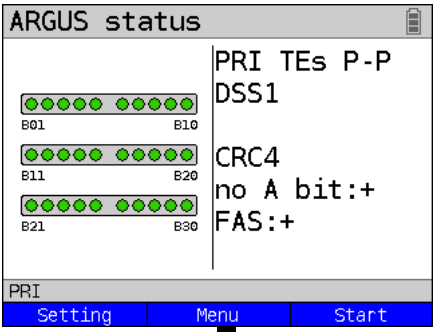
PIN	PIN	Function	
		NT	TE
1	1	Tx	Rx
8	2	Tx	Rx
2	4	Rx	Tx
7	5	Rx	Tx

5 Operation on a PRI Access

5.1 Configuring the PRI Interface and Access Mode Settings

Use the included connection cable to connect the ARGUS "BRI/PRI/EI" jack to the access to be tested and then switch the ARGUS on. The PRI settings are made in chapter 2 Configuring accesses page 7. In this example the PRI TE mode was selected.

ARGUS State display



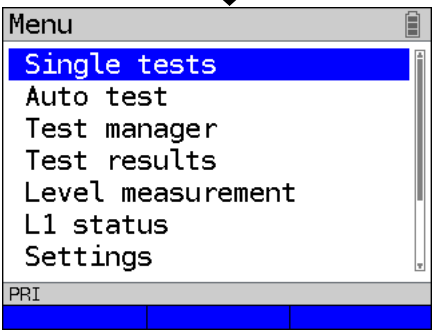
<Start> Start the B-channel test

<Config> Open the "PRI Setting" menu.

Open L1 state

<X> Switch the pin assignment (will not be displayed until the Level key is pressed)

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).

5.1.1 TE Simulation of a Primary Rate Interface

In the Access mode menu (see page 86), select the desired simulation mode:

- **TE P-P (point-to-point)**

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

5.1.2 NT Simulation of a Primary Rate Interface

In the Access mode menu (see page 86), select the desired simulation mode:

- **NT P-P (point-to-point)**

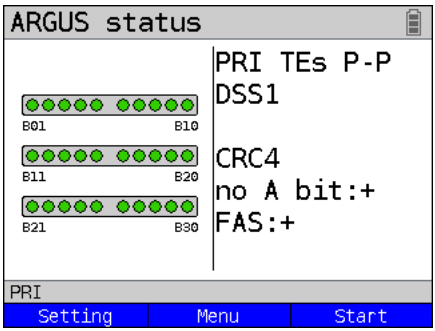
  Afterwards, the access and the protocol stack will be initialized in accordance with the selected setting.

5.2 Initialization Phase including B-Channel Test

Initialization on a PRI network

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

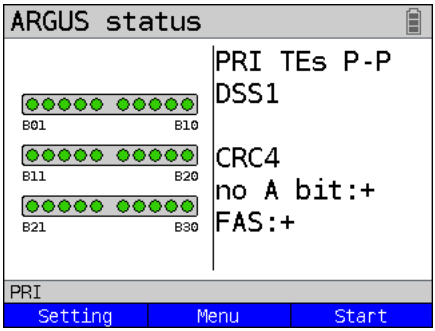
The ARGUS will begin to automatically determine the access configuration. After Layer 2 is setup, the “L2” LED will also light.
The ARGUS will, regardless of the mode of operation (TE or NT mode), determine the D-channel protocol and attempt to setup Layer 3.



During this phase, the ARGUS displays the A bit of the remote side and the FAS. The protocol can only be determined when the A bit is not set (+).
The FAS (Frame Alignment Signal) indicates whether the ARGUS could correctly synchronize with the incoming 2 Mbit data stream’s alternating frame identification word or message word and the, perhaps present, CRC4-superframe structure.

Press the **<Start>** softkey to have the ARGUS begin to test the availability of all 30 B-channels one after the other by occupie the B-channels.. If the ARGUS can place a call on a B-channel, it will be assumed that the B-channel is available in both directions; the B-channel test cannot distinguish between alternating and exclusively "outgoing" B-channels. If the connection is rejected, the B-channel will be identified as unavailable. In the case of a cause, which indicates that the B-channel is occupied, the connection will be tried up to two times and, if a connection can still not be setup, it will then be marked as unavailable.

Example:
The status display on a PRI access

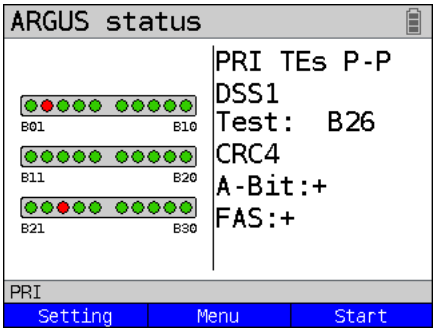


The ARGUS will display the following:
- Type of access
- Access Mode
- Bus configuration
- D-channel protocol

- The availability of the B-channels
  Available B-channels: green circle
  is indicated by three rows
  of red or green circles.

B-channel 1 is at the upper left
B-channel 30 is at the lower right
In the example, all 30 B-channels are available and can be used for outgoing or alternating connections.
- CRC4-monitoring, A-Bit, FAS

B-channel test – example:

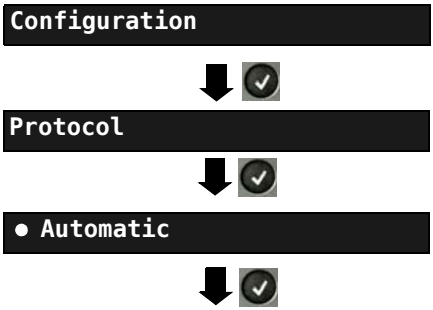


The ARGUS is in TE-Simulation Slave mode.
B-channel 2 and 23 are not available or are busy. This state is indicated in the display by the red circles. Green circles are used to indicate the available B-channels.

If the ARGUS is not properly connected (e.g. incorrect cabling) or the network is not in order, the ARGUS will display “No Net”.

5.3 Configuring the PRI Parameters

The following PRI parameters can be configured as needed. The procedure for configuring a parameter will be illustrated with a single example: It is possible to restore the default settings for the parameters (see the ARGUS main Manual).



The 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 PRI connection.

The ARGUS will use the marked setting as the default and return to the next higher menu.

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

Setting	Explanation
Protocol	Instead of allowing the ARGUS to automatically determine the protocol (setting: Automatic), it is also possible to manually set the Layer-3 D-channel protocol. The ARGUS will save the protocol setting permanently, i.e. it will use this protocol the next time that it is switched on. Default setting: ***Automatic***
Alerting mode	You can specify whether, for an incoming call on a PRI point-to-point access, the ARGUS should display only the access number without extension or the complete number with extension. If it is set to “Manual”, the ARGUS will display the extension (an incoming call will be signaled. The ARGUS will send the Layer 3 message “Alert” when it accepts the call. The digits of the extension that have been sent by this point will be displayed.).  With the Manual setting, an incoming call must be answered within 20 seconds or it will be lost. Furthermore, you should note that the remote subscriber will not hear a ringing tone. If it is set to “Automatically”, the ARGUS will only display the access number without extension or, depending on the configuration of the access in the exchange, it may not display the number called at all. Default setting: ***Automatic***
Clock mode	This parameter sets where the clock will be generated in the case of a BRI or PRI access. You can either specify that the ARGUS generates the clock (is Master) or that it is the slave of a clock generated at the other end (Slave). Default setting: NT mode ***Master*** TE mode ***Slave*** Leased line ***Slave*** This setting will not be saved permanently, rather only applies for the current measurement.

<table>
<tr><td>PRI termination</td><td>Depending on the transmission technique (75 Ohm coaxial-cable or twisted-pair cable with an impedance of 120 Ohms) used, the PRI termination resistor must be selected accordingly.

The default setting is country-specific and corresponds to the system most common in the respective country:
Germany, Austria, England, the Netherlands, France: 120 Ohm

Spain, Italy, Greece: 75 Ohm</td></tr>
<tr><td>PRI haul mode</td><td>The ARGUS can set the sensitivity on a PRI access.

By default, “short haul” will be suggested.

short haul: Normal sensitivity, i.e. signal reception with cable attenuation of up to ca. -10 dB.

long haul: Increased sensitivity, i.e. signal reception with cable attenuation of up to ca. -35 dB. This corresponds to a distance of 1600 m with 22 AWG twisted pair cable.

When using greater sensitivity (“long haul” mode) on longer lines, feedback on the line can cause faulty synchronisation.</td></tr>
<tr><td>Sa5 bits</td><td>The ARGUS can set the Sa5 bits on a PRI access. By default, the Sa5 bits are set to 0000.

The Sa5 bits have no significance between an NTPM and a PBX system.

This setting will not be saved permanently, rather only applies for the current measurement.

Sa5 coding | Meaning | Meaning
0000 | Network -> Terminal | Terminal -> Network
1111 | Direction code | Ack. for loop command
---------- Direction code</td></tr>
</table>

<table>
<tr><td>Sa6 bits</td><td>The ARGUS can set the Sa6 bits on a PRI access.
By default, they are set to 0000.
This setting will not be saved permanently

<table>
<tr><th>Sa6 coding</th><th>Meaning</th><th>Meaning</th></tr>
<tr><td>0000</td><td>Network -> Terminal
Setting for normal operation (default)</td><td>Terminal -> Network
Setting for normal operation, idle (default)</td></tr>
<tr><td>1010</td><td>Switches a loop in the NTPM.
In the permanent circuit mode, a BERT can then be performed using the loop setup there.
Important: The ARGUS must be set to “Leased line” even if it is a dialup access!</td><td>----------</td></tr>
<tr><td>1111</td><td>Switches a loop in the LEPM.
In the permanent circuit mode, a BERT can then be performed using the loop setup there. Important: The ARGUS must be set to “Leased line” even if it is a dialup access.</td><td>AIS on U_2 (incoming side) of the NTPM</td></tr>
</table>
</td></tr>
<tr><td>A bit</td><td>Using the ARGUS, you can set the A bit on a PRI access.
By default, it is preset to A=0 (automatic).
This setting will not be saved permanently</td></tr>
<tr><td>CRC4 mode</td><td>CRC4 monitoring can be switched on or off manually.
By default, it is preset to CRC4.
This setting will not be saved permanently</td></tr>
</table>

Call parameters	Two different parameters can be set for calls generated (on a PRI access) on both the network-side (ARGUS in NT mode) and on the user-side (ARGUS in TE mode): 1. Type of number (TON) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal Network-side: Net CGN TON / Net CDN TON Default setting: ***Automatic*** 2. Numbering Plan (NP) for the CGN (=CGPN) or CDN (=CDPN) element of a SETUP signal Network-side: Net-CGN-NP/ Net-CDN-NP User-side: User CGN NP / User CDN NP 3. CGN/CDN Subaddress CGN/CDN Subaddress type: User specific and NSAP Default setting: ***User specific*** 4. UUI (User User Info)
Services	Up to three user-specific services (user spec.1 to user spec.3) can be entered and saved. The three Info elements, BC, HLC and LLC (switch using the left softkey) must be entered for each user specific service in hexadecimal using the keypad and softkeys **<A ... F>** (e.g. to enter a C press the softkey three times, to enter an F press it six times).
Call acceptance	If the ARGUS is set to “own MSN/DDI“ and is in TE mode on a P-P access, it will only signal those calls which are placed to the DDI of the access under test. If set to “all MSN/DDI”, the ARGUS signals all calls. The prerequisite for this is (This setting will be saved permanently): The own call number must be entered in speed-dialing memory under "own number" (see the ARGUS main Manual) Default setting: ***all MSN/DDI***.
Voice coding	Two codes are available for coding voice data in a B-channel (this setting will be reset to the default when the ARGUS is switched off): µ-law and ***a-law*** (default setting)

5.4 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 1×10^{-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 PRI connection.

In the bit error rate test, the tester establishes a PRI 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 the ITU-T G.821 standard.

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.

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

The BERT can be performed in three different ways:

1. **BERT in an extended self call**

   A remote number is not needed, since the ARGUS sets up the PRI connection to itself. In this case, the ARGUS requires two B-channels for the test.

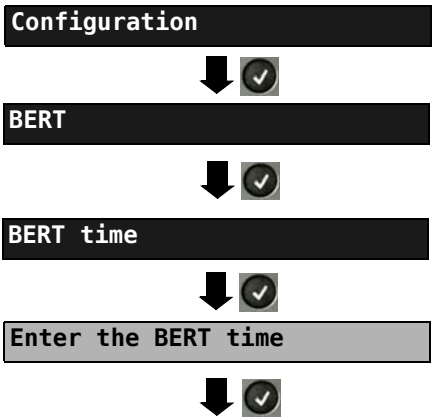
2. **BERT with a loopbox**

   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 102 BERT wait) A bit pattern is sent to this remote tester. Independent of the received bit pattern, the remote tester uses the same algorithm to generate the bit-pattern that it sends back. Therefore, both directions are tested independently.

5.4.1 Setting the BERT Parameters



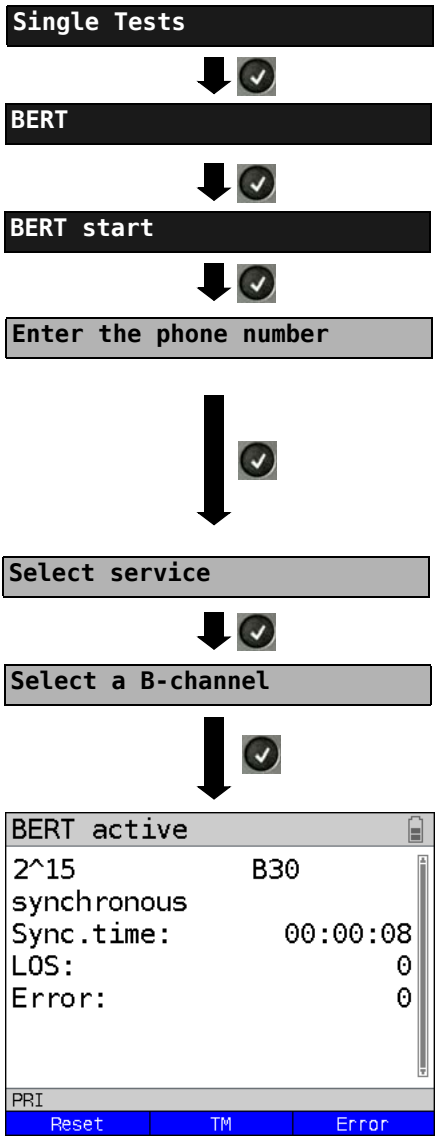
The ARGUS - Main menu

The procedure for configuring a parameter will be illustrated with a single example: The default settings for the parameters can be restored at any time (see the ARGUS main Manual).

The ARGUS sets the value entered as the default BERT time and returns to the next higher menu.

Setting	Explanation
BERT time	You can use the keypad to enter measurement times ranging from 1 minute to 99 hours and 59 minutes (= 99:59).  If the time is set to 00:00 (=BERT with unlimited measurement time), the BERT will not stop automatically. In this case, the BERT must be terminated manually by pressing the  . Default setting: ***1 minute***
Bit pattern PRI	This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a PRI access (see “Bit patt. BRI/U”). (2^{15}-1= ***default setting***).
Error level	This is the level used to evaluate whether the BERT had an "acceptable" bit error rate. If the BERT has a bit error rate, which exceeds this error level, the ARGUS will display a "NO" as the test result. Using the keypad, this parameter can be set to any value from 01 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is ***10***$^{-06}$ (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^6 = 1,000,000 sent bits), the bit error rate test will be evaluated as OK.
HRX value	Setting the HRX value (Hypothetical Reference Connections, see the ITU-T G.821) Using the keypad, you can enter a value ranging from 0 to 100%. Default setting: ***15 %***

5.4.2 BERT start



The ARGUS - Main menu

The ARGUS opens the speed-dialing memory (see the ARGUS main Manual). 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-dialing
< ↑ > memory.

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

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

BERT start

After the connection has been setup and synchronized in both the send and receive directions, the ARGUS will display:

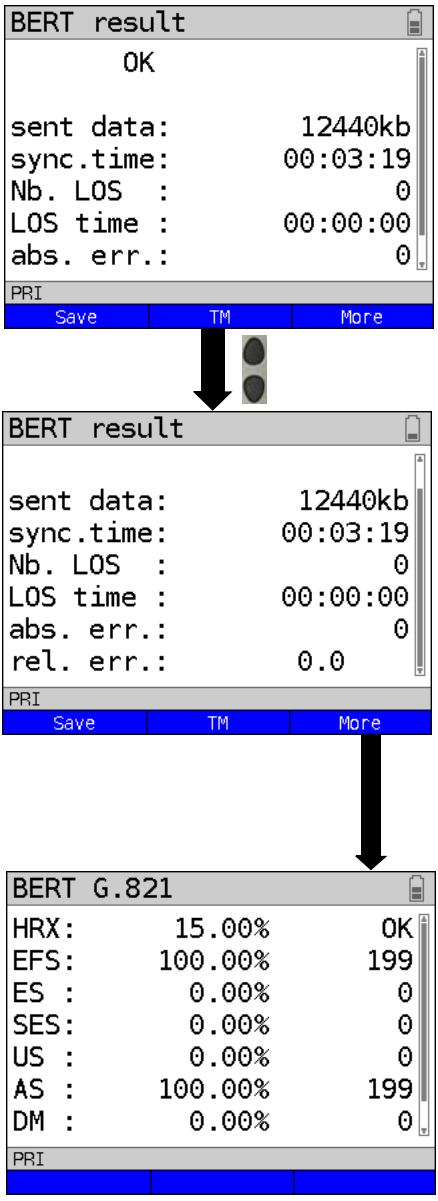
- the bit pattern and B-channel / bit rate used
- Synchronicity of the bit pattern (in the example, synchron)
- Sync.time in h:min:sec (The time in which the ARGUS can sync to the bit pattern)
- LOS-counter: shows the absolute number of synchronisation losses. synchronisation is lost at an error rate greater than or equal to 20 % within a period of a second.
- The number of bit errors that have occurred

<Error>	The ARGUS will generate an artificial bit error, which can be used to test the reliability of the measurement (in particular for end-to-end tests).
<TM>	Opens the Test Manager, see page 136
0-Key or **<Reset>**	Restarts the BERT. The test time and number of bit errors will be reset.
	Stop the BERT

When a bit error is detected the ARGUS will sound a brief alarm. When synchronisation has been lost, the ARGUS will sound a constant alarm (see the ARGUS main Manual), if one has been configured earlier.

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:



To scroll through the results

- The evaluation of the results depends on the error threshold that you set (in the example, OK).
- sent data (data transferred) (K = 1024 bits, k = 1000 bits)
- sync.time in h:min:sec (The time in which the ARGUS can sync to the bit pattern)
- Nb. LOS (counter) synchronisation is lost at an error rate greater than or equal to 20 % within a period of a second. The absolute number (Nb.) of synchronisation losses will be shown.
- 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: 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 in percentages and absolute values.
The ARGUS evaluates whether the test results satisfy the limits specified in the G.821 under consideration of the reference connection (HRX).
(The display will show either OK or NO).

To scroll through the results

Return to the previous display

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

HRX Defines the hypothetical reference connection

EFS Error Free Seconds:
The number of seconds in which no error occurred.

ES Errored Seconds:
The number of seconds in which one or more errors occurred.

SES Severely Errored Seconds:
The number of seconds in which the bit error rate is greater than 10^{-3}.
In one second, 64,000 bits are transferred, thus BitErrorRate (BER) = 10^{-3} equates to 64 bit errors.

US Unavailable Seconds:
The number of all sequentially adjacent seconds (at least 10 sec) in which BER > 10^{-3}.

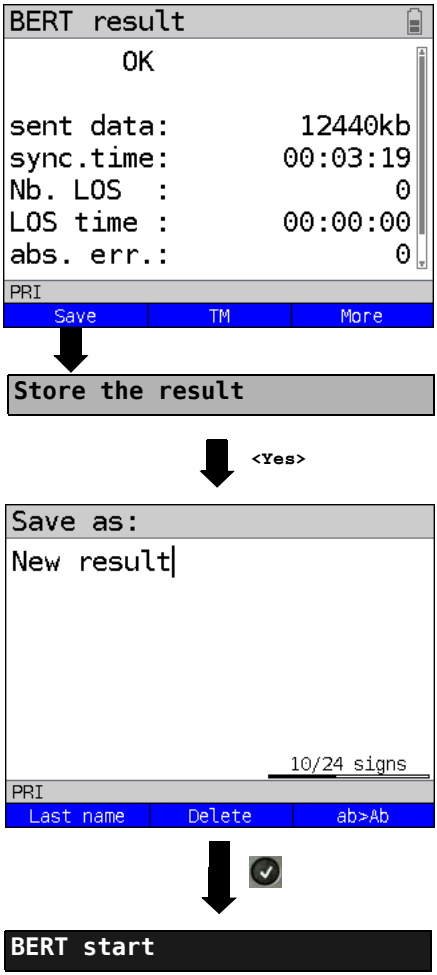
AS Available Seconds:
The number of all sequentially adjacent seconds (at least 10 sec) in which BER < 10^{-3}.

DM Degraded Minutes:
The number of minutes in which the bit error rate is greater than or equal to 10^{-6}.
In one minute, 3,840,000 bits are transferred, thus a BER = 10^{-6} corresponds to 3.84 bit errors (3 errors = NO (no degraded minutes), 4 errors = OK (Degraded Minutes).

LOS Loss of Synchronize:
synchronisation is lost at an error rate greater than or equal to 20 % within a period of a second.
The absolute number of synchronisation losses will be shown.

5.4.3 BERT saving

The ARGUS can store the results of several BERTs. The ARGUS saves the results together with the date, time and call number of the access under test (if this number has been entered as the "own" number in the speed-dialing memory, see the ARGUS main Manual) in the next free memory location. If all of the memory locations are used, the ARGUS will select the oldest test results to be overwritten.

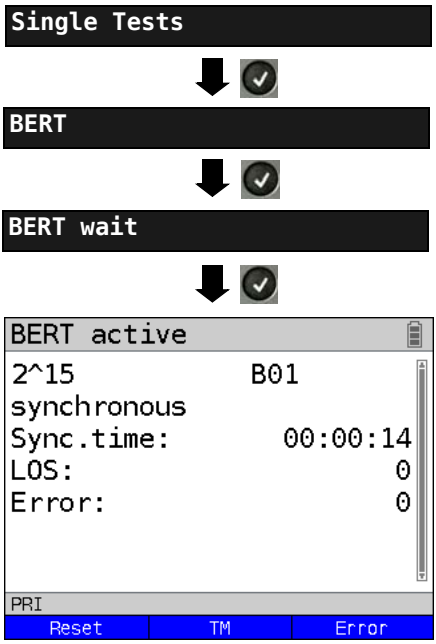


Using the numeric keys, enter the name under which the ARGUS should save the results (see the ARGUS main Manual). By default, the ARGUS will use the call number last used as the record name.

Save BERT results

5.4.4 BERT wait

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



The ARGUS - Main menu

Activate "BERT wait“

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

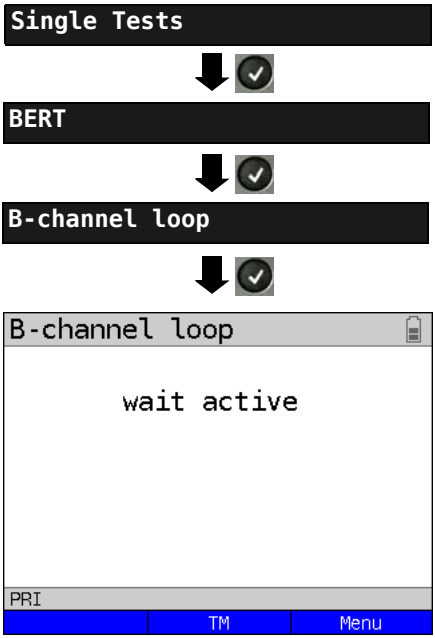
<TM> Opens the Test Manager (page 136)

For information on the displays shown, see "BERT start“ on page 97.

Display BERT results

5.4.5 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.



The ARGUS - Main menu

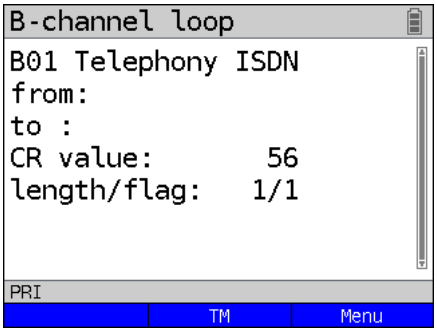
Activate a “B-channel loop”
The ARGUS will wait for a call. Any incoming call (regardless of the service) will be taken immediately. The ARGUS will switch a loop back in the B-channel that is specified by the exchange and then send (loop) the received bit pattern back to the caller/sender.

<Menu> Open the Main menu:
the “B-channel loop” remains active.
A second B-channel loop connection can be started from this menu or from the **<TM>**.
From the **<TM>** (see page 136) the ARGUS will return to the "B-channel loop wait active" display.

<TM> Opens the Test Manager (page 136)

Exit “B-channel loop” mode

Display shown after taking a call:



- B-channel used and service
- The caller's number (from:)
- The number dialed (to:)
- If available: TON, NP, UUI etc.

<TM> Opens the Test Manager (page 136)

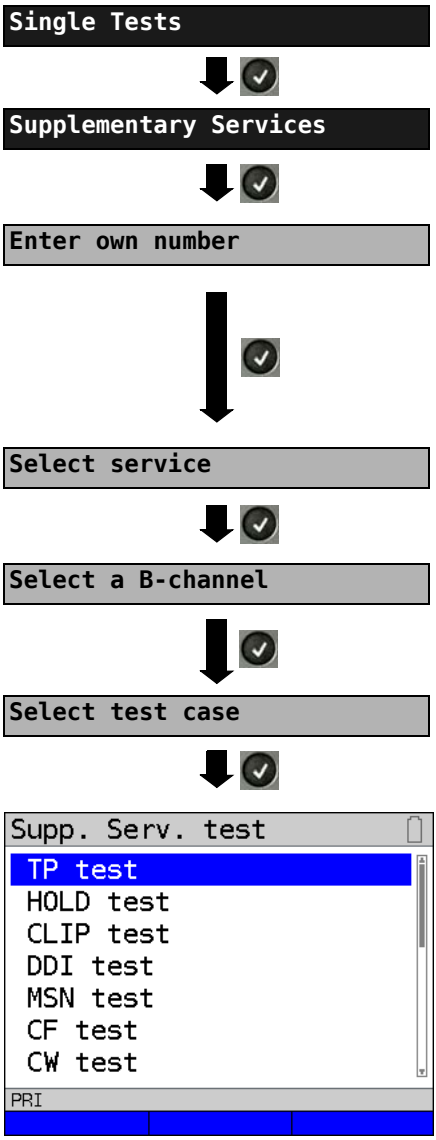
<Menu> Open the Main menu.

Clear down the B-channel loop connection, the B-channel loop, however, remains active!

5.5 Supplementary Services Test

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

5.5.1 Supplementary Services on DSS1



The ARGUS - Main menu

The speed-dialing memory will open (see the ARGUS main Manual).

< ↓ > < ↑ > Scroll through to your own call number (the number of the access under test) or enter it using the keypad.
The ARGUS will test the availability of the supplementary service (in part by placing a call to itself).

Using the cursor keys, select the service which should be used for the supplementary services test.

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

Select the supplementary service, which the ARGUS should determine whether it is supported by this access.

Start test

Display the test results:

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

To scroll through the results

Close the results display.
Open the next higher menu.

5.5.2 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" (see the ARGUS main Manual).

5.6 Service Tests

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

Service	Name displayed on the ARGUS
Language	**Language**
Unrestricted Digital Information (data telecommunications)	**UDI 64kbit**
Audio 3.1 kHz	**3.1kHz audio**
Audio 7 kHz	**7 kHz audio**
Unrestricted Digital Information with Tones & Announcements	**UDI-TA**
Telephony	**Telephony PRI**
Telefax Groups 2/3	**Fax G3**
Fax Group 4	**Fax G4**
Combined text and facsimile communication	**Mixed Mode**
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	**User-specified 1 to 3**

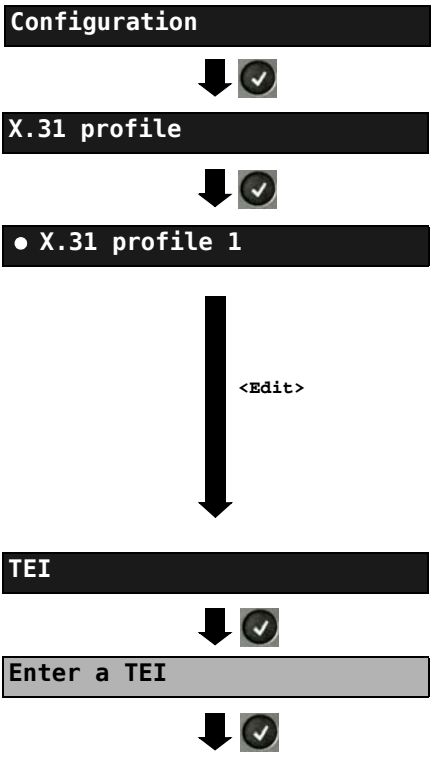
(see the ARGUS main Manual)

5.7 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 remote 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.

5.7.1 Setting the X.31 Parameters



The ARGUS saves the TEI entered and returns to the next higher menu.

The ARGUS - Main menu

The ARGUS stores the parameters for the X.31 in the three X.31 profiles.

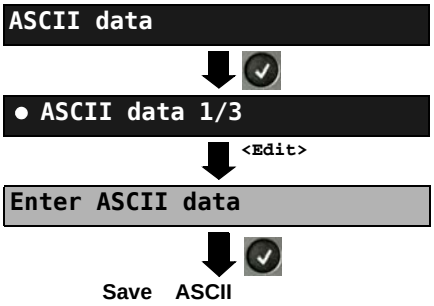
Mark a profile for editing. The selected profile will be marked blue in the display. The default profile will be marked in the display with a ●. The ARGUS will use the parameters in the current profile for the X.31 test.

The ARGUS takes over the marked profile as the default and returns to the Settings menu.

It is possible to restore the default settings for the parameters (see the ARGUS main Manual).

Setting	Explanation
X.31 profile:	
Packet number	Number of packets sent Default setting: ***10***
TEI	Entry (from the keypad) of the TEIs (Terminal Endpoint Identifier) to be used in the X.31 test. If you enter **, the ARGUS will automatically select a TEI. Minimum 0 to a maximum of 63
LCN	Use the keypad to enter the LCN (Logical Channel Number) to use in the X.31 test. Default setting: ***1***
Packet size	The size of the data packets Default setting: ***128 Bytes***
Agree Packet size	Negotiate with the network side (DCE) regarding the data packet size. If the desired data packet size is larger than the default, this parameter should be set to “yes”. Default setting: ***No***
Window size	Window size of Layer 3 Default setting: ***2 Packets***
Negotiate window size	Negotiate between the terminal (DTE) and the network (DCE) an agreement regarding the window size. Default setting: ***No***
Throughput	Data throughput in bits/sec Default setting: ***1200 bit/s***
Agree Throughput	Throughput agreed Default setting: ***No***

User data Content of the user data: Format setting of the user data:

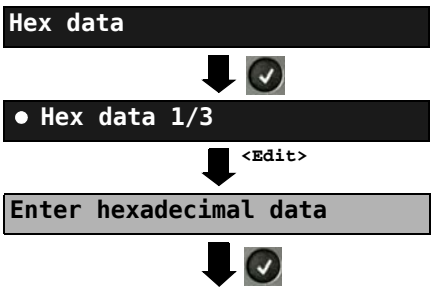


- Entry of the ASCII data

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:

<12>ab>	Entry of the digits 0 to 9 plus * and #
<ab>AB>	Entry of the lowercase characters and @, /, -, and . (e.g. to enter a “c” press the “2” on the keypad three times)
<AB>12>	Entry of the uppercase characters and @, /, - and .
	Move the cursor
<Delete>	Delete the character before the cursor
	Do not save ASCII data.



Entry of the hexadecimal data:

Select one of the three available memory locations for the hexadecimal data (in this example, the first location 1/3)

Use the keypad to enter the hex value. To enter the values A...F, use the softkey **<A...F>** (e.g. to enter a C, press the softkey **<A..F >** three times). To confirm the entry, press **<OK>** (the softkey in the middle changes from **<Delete>** to **<OK>**).

<Delete>	Delete the character before the cursor
	Do not save the hexadecimal values.

D bit	Local: DCE acknowledges data packets, i.e. flow control on local DTE-DCE path End-to-end: DTE-DTE flow control Default setting: ***Local***

Facilities	Coding for various supplementary services A maximum of 3 facilities can be stored.
Profile name	Use the keypad to enter the profile name for the X.31 profile. The ARGUS will later display this name for the profile.

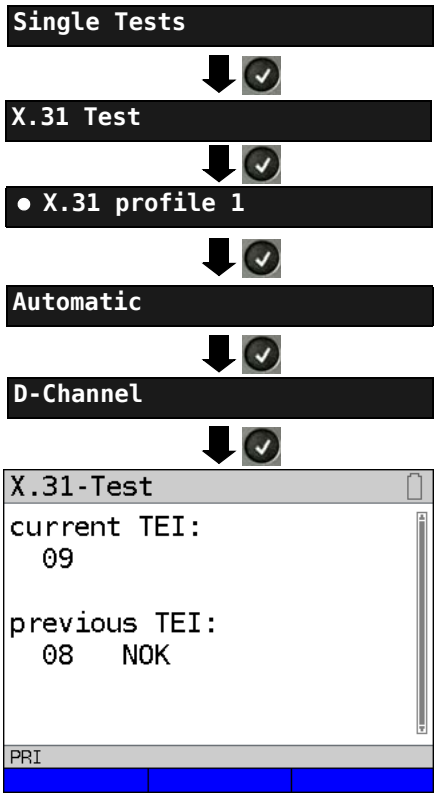
5.7.2 Automatic X.31 Test

D-Channel

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

1. 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 checks all of the TEIs from 0 to 63 one after the other. All the TEIs, which support X.31service on Layer 2, will be displayed.

2. 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-dialing memory under X.31 test number. With the entry of the X.25 access number, you can – if you wish – select a logical channel (LCN) other than the default.



The ARGUS - Main menu

Select the profile

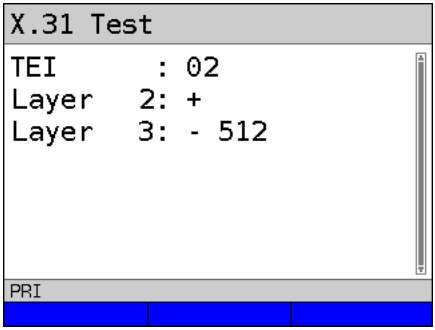
<Edit> Change to the profile parameters
The parameters can be edited.

Start test

The start up procedure can take up to 4 minute. The ARGUS will display the currently tested TEI, the previously tested TEI and the results:

OK = X.31 is available for this TEI
NOK = X.31 is not available for this TEI

Test results



The ARGUS will check whether the X.31 service is available for Layer 3 for the TEIs found in Step 1.
Example: Test results

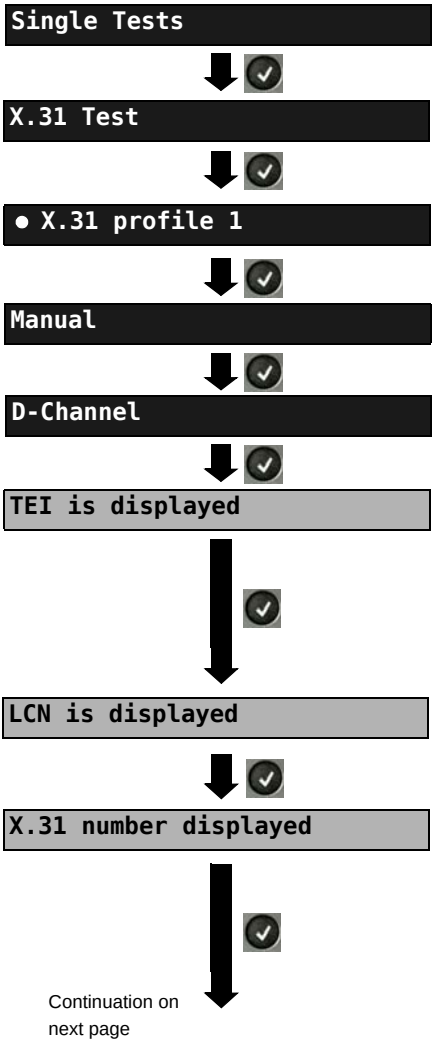
TEI 02		The first valid TEI is 02.
Layer 2	**+**	1. Test step was successful
	-	1. Test step was not successful
Layer 3	**+**	2. Test step was successful
	-	2. Test step was not successful In this case, the ARGUS will display the relevant X.31 cause for the failure (in the example above: 512) and the associated diagnostic code if there is one.

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

5.7.3 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.



The ARGUS – Main menu

Select a profile.

<Edit> Change to the profile parameters
The parameters can be edited.

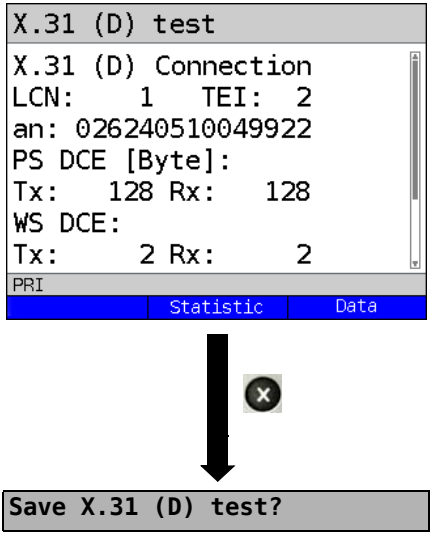
The ARGUS displays the TEI stored in the X.31 profile. It can be edited from the keypad. If you enter „**“, the ARGUS will automatically select a TEI.

<Delete> Delete the TEI

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

The ARGUS displays the X.31 number saved in the speed-dialing memory. It can be edited from the keypad.

Setup a X.31 connection.



The ARGUS will display the LCN, the TEI, the X.31 number and the negotiated connection parameters.

<Data>	Sends a predefined data packet
<Stat.>	Press STAT. to display the L1/L2/ L3 statistics.
<L2>	To scroll to the L2 statistics
<L3>	To scroll 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.

5.8 Connection display

The ARGUS can setup a connection for the following services:

Service	Display
Language	**Language**
Unrestricted Digital Information (data telecommunications)	**UDI 64kBit**
Audio 3.1 kHz	**3.1 kHz audio**
Audio 7 kHz	**7 kHz audio**
Unrestricted Digital Information with Tones & Announcements	**UDI-TA**
Telephony	**Telephony PRI**
Telefax Groups 2/3	**Fax G3**
Fax Group 4	**Fax G4**
Combined text and facsimile communication	**Mixed Mode**
Teletex Service basis mode	**Teletex**
International interworking for Videotex	**Videotex**
Telex	**Telex**
OSI application according to X.200	**OSI**
7 kHz Telephony	**Tele. 7 kHz**
Video telephony, first connection	**Video telephony 1**
Video telephony, second connection	**Video telephony 2**
Three user-specific services	**User-specified 1 to 3**

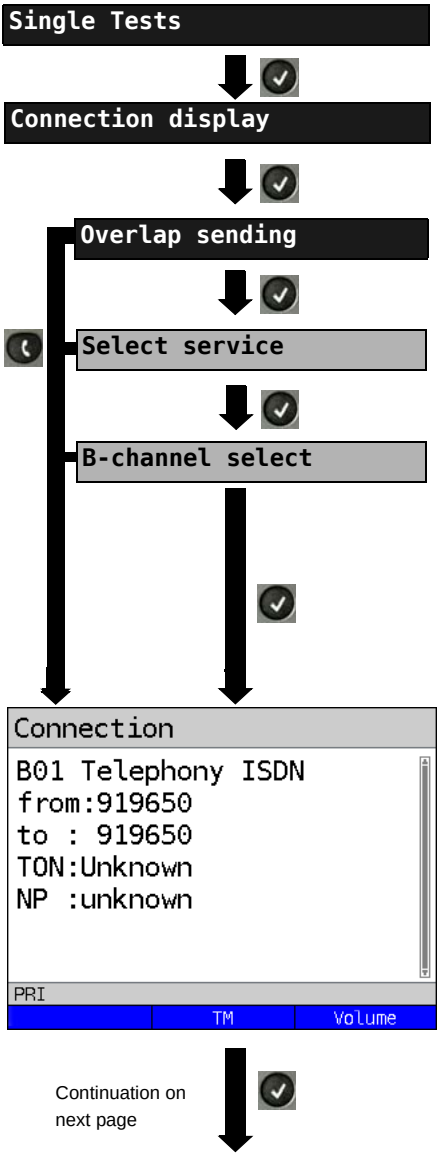
(see the ARGUS main Manual)

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.



The ARGUS - Main menu

The ARGUS will open the Connection display
Where Overlap sending (such as links) as well as
- En-block sending (see below)
- Redialing (see below)
- Keypad dialing

are available.

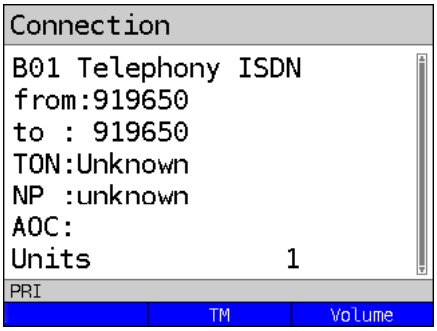
Select the service to be used for the connection.
Enter the B-channel on the keypad. The ARGUS selects the B-channel used last. To enter a new B-channel, first press **<Delete>**. If you enter an *, the ARGUS will choose any B-channel that is free.
The ARGUS will show whether the B-channel is available.
Setup the connection
Enter the number on the keypad.
Display:

- B-channel and service
- The number that is stored in the speed-dialing memory under "Own number", see the ARGUS main Manual (from:)
- The number dialed (to:)
- Other information depending on the access, e.g. TON and NP

<TM> Starts the Test Manager (page 136)

<Volume> Setting the volume

or Cancel setup



or

Disconnect

The connection is setup using B-channel 1.

Depending on the type of access other information will be displayed.
- Subaddress of the caller (SUB)
- Destination number
- User-User Information (UUI)
- Display Information
- Type of number (TON)
- Numbering Plan (NP)
- Units for charges

<Volume>	Setting the volume
<TM>	Starts the Test Manager (see page 136)

Displaying Advice of Charges (AOC)

If the charges are not given in units, rather directly as currency, the ARGUS will display the current charges in currency. If, in DSS1, the call charges are not provided in accordance with the DIN ETS 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

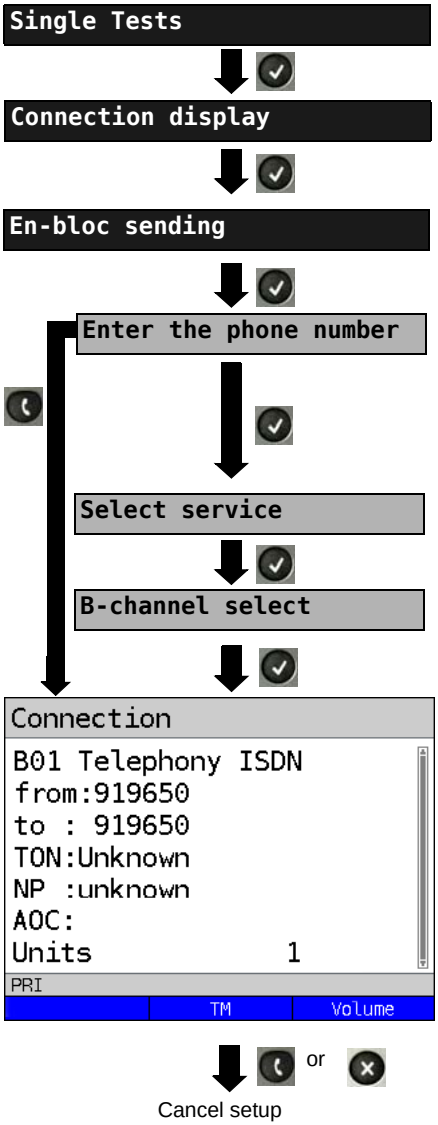
Separate the extension from the access number with a # (e.g. 02351 / 9070-40 is entered on the ARGUS as: 023519070 #40). For an outgoing call, the ARGUS uses the entire call number (without #) as the number called (CDPN or DAD) and, for the calling number, only the extension (DSS1-CGPN or 1TR6-OAD).
A '#' at the beginning of a call number is treated as a valid character. A '#' at the end of the own call number instructs the ARGUS to not send the caller's number for outgoing calls (CGPN or OAD).

Simplified overlap signaling using the telephone key

depressed:	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 dialing information in one block.



The ARGUS - Main menu

The ARGUS opens the speed-dialing memory (see the ARGUS main Manual). Use the cursor keys to scroll to desired the number or reenter the number on the keypad.

The ARGUS will open the Connection display.
For more information see overlap sending which is similar.

Enter the B-channel on the keypad (for details on entry, see “Overlap sending”).

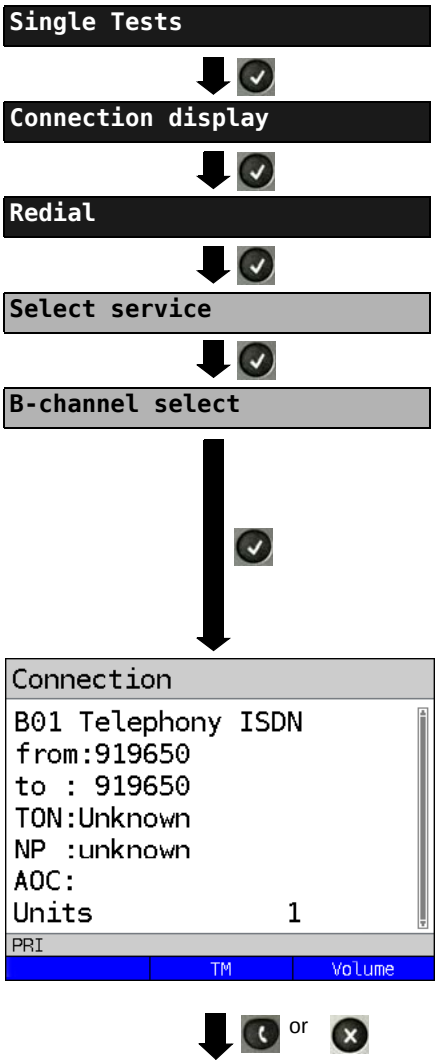
Start the dialing procedure

For more information on the displays and operation, see overlap sending.

<Volume>	Setting the volume
<TM>	Starts the Test Manager (page 136)

Redial (outgoing call)

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



Cancel setup

The ARGUS – Main menu

Enter the B-channel on the keypad. The ARGUS suggests the B-channel used last. To enter a new B-channel, first press **<Delete>**. If you enter an *, the ARGUS will choose any B-channel that is free. The ARGUS will show whether the B-channel is available.

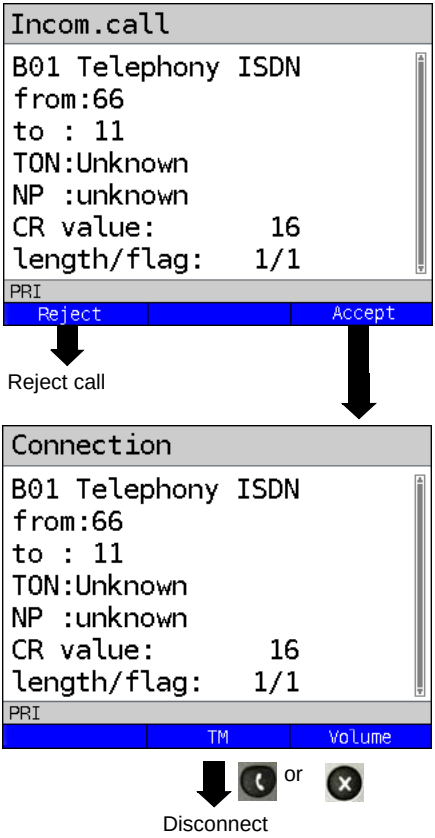
The dialing procedure will begin using the number which was dialed last.

For more information on the displays and operation, see overlap sending.

<Volume>	Setting the volume
<TM>	Starts the Test Manager (see page 136)

Incoming Call

An incoming call can be taken at any time even when a test (e.g. a BERT) is in process (see page 137). The ARGUS will signal an incoming call with an audible tone and a message on the display. The function Accept call (see the ARGUS main Manual) can be configured so that, on a P-P access, the ARGUS will only signal incoming calls that are placed to its own call number. This function can only be used when the own call number has been entered into the speed-dialing memory (see the ARGUS main Manual) and the incoming call has a call number.



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 the ARGUS main Manual).

To take the call.

Depending on the access, additional information will be displayed (in this example, TON and NP).

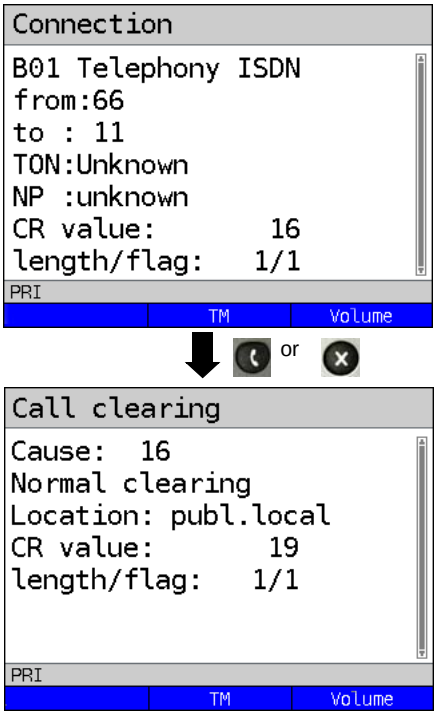
<Volume>	Setting the volume
<TM>	Starts the Test Manager (see page 136)

The ARGUS displays the cause of the disconnect (see page 120).

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).

5.9 Clear down (disconnect) the connection



<Volume> Setting the volume

<TM> Starts the Test Manager (see page 136)

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:

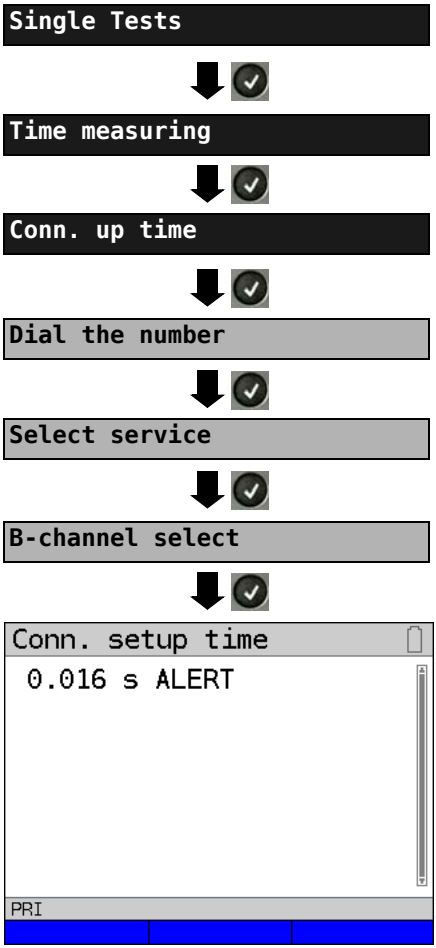
Reason	Display	Explanation
255	Active clearing	Clearing User actively initiated the disconnection
Length 0	Normal disconnect	Cause element with length 0
01	unalloc. number	No access under this call number
16	Normal disconnect	Normal disconnect
17	User busy	The number called is busy
18	No user respond	No answer from the number called
19	Call time too long	Call time too long
21	Call reject	The call is actively rejected

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

Other causes will not be displayed in plain text but will instead be shown as decimal numbers (see "CAUSE Messages - DSS1 Protocol” on page 16).

5.10 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.



The ARGUS – Main menu

The ARGUS opens the speed-dialing memory (see the ARGUS main Manual). 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:

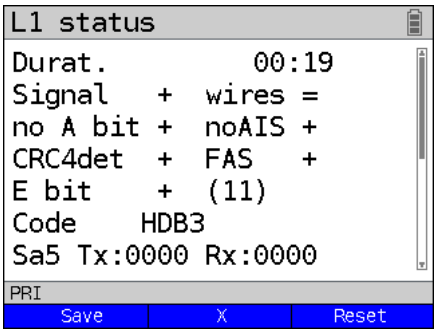
- Connection setup time in seconds
- L3 message received when the connection has been fully setup

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 the ARGUS main Manual) will be displayed.

5.11 The L1 Status of a PRI Access

The ARGUS displays the Layer 1 alarms and messages, which provide detailed information regarding the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).

The ARGUS - Main menu



The ARGUS displays the time that has elapsed since the ARGUS was initially started or it was last reset in minutes and seconds (00:19).
The measurement time and all Layer 1 alarms and messages are updated continuously.

Use the cursor keys to scroll

<X> The PRI relay for the Rx/Tx pin assignment will be toggled to its other position, regardless of the state that it was in before.
This function is only available in the L1 status menu if there is currently no signal. The state of the relay will remain unchanged when you close the L1 status menu.
wires = means that Rx/Tx are normal
wires X means that Rx/Tx are inverted

<RESET> Reset the History function and all counters.

<SAVE> Save results (see the ARGUS main Manual)

OK symbol: +

Error symbol: -

History symbol: ! This indicates that, regardless of the current state of the access (+ or -), an error occurred during the test period.

The meaning of the individual displays:

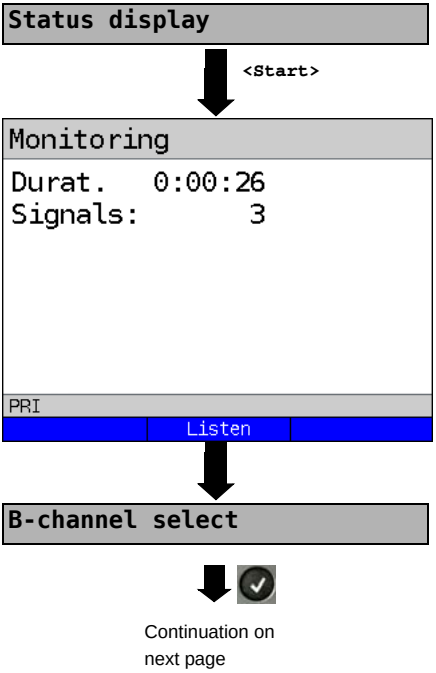
Signal	The ARGUS has received the correct send signal from the remote end (access or terminal depending on whether operating in TE-Simulation or NT-Simulation mode) and indicates this by displaying a +. If the Rx and Tx are on the usual wires, a "**=**" will be shown after wires; if they are swapped, an "**x**" will be shown instead.
FAS	Frame Alignment Signal Indicates whether the ARGUS could correctly synchronize with the incoming 2 Mbit data stream's alternating frame identification word or message word and the, perhaps present, CRC4-superframe structure.
CRC4 det	If CRC4-monitoring is active for the access or the terminal and the ARGUS is able to synchronize itself to the CRC4 superframe, it will indicate this by displaying "CRC det +". If "CRC det –" is displayed together with "Signal +" and "FAS +", this indicates that no CRC4 is active. To prevent power up effects (transients), we recommend that you set the display and counter to a defined initial state with a **<Reset>**.
Code HDB3	Display the transmission code used (currently set to HDB3)
noA-Bit	The remote end uses the A-Bit to signal whether the circuit is available on their receive side. noA-Bit + means A = 0: Idle state noA-Bit - means A = 1: Return direction is not available
noAIS	**A**larm **I**ndication **S**ignal) AIS will be set if a component on the transmission line determines that the signal they have received is faulty (e.g., in the event, that they lose frame synchronisation) and has sent a Time -1 (= AIS) to indicate this. "noAIS = +:" no AIS occurred.
Sa5-Bit (Rx,Tx)	The "Sa5-Bit (Rx)" sent by the ARGUS can be configured in the Configuration menu (See "Sa5 bits" on page 91)
Sa6-Bit (Rx,Tx)	The "Sa6-Bit (Rx)" sent by the ARGUS can be configured in the Configuration menu (See "Sa6 bits" on page 92)
E-Bit	With the two E-Bits, E1 and E2, the remote end will report any CRC4-errors that it finds on its receive side in the first or second.submultiframe (the E-Bit will be set to 0). "E-Bit11+:" if both E-Bits are set to 1, no error occurred "E-Bit11+!:" A CRC4-error was found (indicated by the "!"), however the circuit is in largest part OK (see the E-Bit counter Ecnt or the CRC4 error counter CRCErr)

Ecnt	The E-Bit counter counts the individual E-Bit error messages; i.e. all cases where a faulty CRC4 submultiframe was received (counts at a maximum of 1 kHz)
CRC Err	The CRC4 error counter totals the number of CRC4 submultiframes in which errors were detected.
CRC rel	Shows the CRC4 error rate, in other words, the number of faulty CRC4 frames relative to the total number of CRC4 frames received.
Code Err	Counter for the detected HDB3 transmission code errors
Code rel	Transmission code error rate
Frm. Err	Counter for faulty 2Mbit frames.

When running a MegaBERT unframed in leased line mode, if the menu L1 status is opened (via the  -Key or the Test Manager), the display will only show the parameters Signal and noAIS.

5.12 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.



Continuation on next page

Monitoring is not yet active!

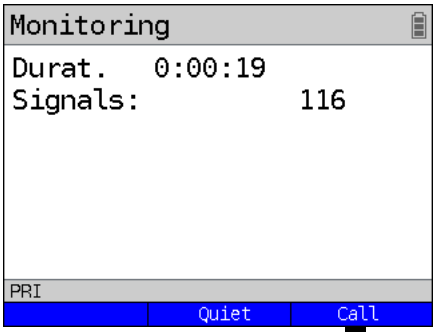
Start monitoring

The ARGUS displays the recording time (duration) in h:min:sec and the number of recorded signals.

Stop monitoring.

Listening-in on voice data

Enter the B-channel from the keypad (first press **<Delete>**) or use the cursor keys to set the B-channel. The ARGUS will switch the handset to this B-channel.



Display call parameters

Can listen-in on voice data (direction: Network -----> User).

<Quiet>	To stop listening
<Call>	Parallel call display while monitoring The ARGUS searches all of the D-channel signals sent for a SETUP. If a SETUP is detected, the **<Talk>** softkey will be displayed.

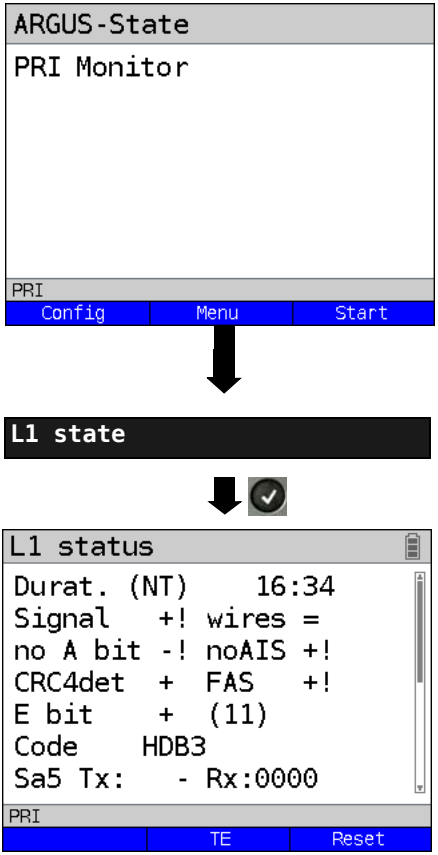
The ARGUS displays the call parameters of the last SETUP received.

As soon as a change occurs, the ARGUS will send a time-stamped report of the following alarms/states to the PC, which will evaluate them:
- Signal
- FAS
- CRC4det
- A bit
- AIS

The ARGUS will check the following values and counters every second and, in the event of a change, will pass them on the PC:
- Sa5-Bit (Rx)
- Sa6-Bit (Rx)
- E-Bit
- Ecnt
- CRC Err.
- Cod.Err.
- Fram.Err.

Display of the L1 Status in PRI Monitor mode

The L1 status function is only available in PRI Monitor mode. The Layer 1 alarms and messages are presented in several windows and allow detailed assessments of the state of the PRI access and the transmission line (For further information, see the CCITT/ITU guidelines G.703 and G.704).



The ARGUS in the PRI Monitor Mode Monitoring is not active.

Display of the "NT-side parameters"
Use the cursor keys to scroll through the display

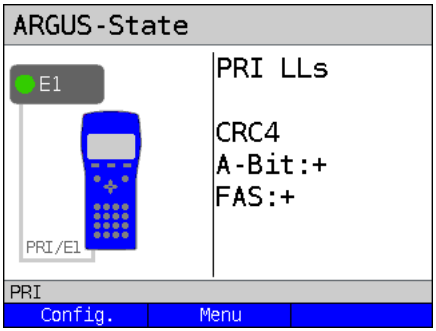
<TE>	Switch to “L1 status TE”; the “TE-side parameters” will be displayed
<Reset>	Reset the History function
	Quit. The ARGUS will open the Main menu.

5.13 Leased line on a PRI access

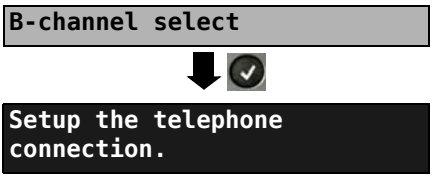
Besides dial-up connections to any subscriber, PRI also supports the use of permanent circuits switched to a specific remote location (leased lines). These leased lines (permanent circuits) are available after setting up Layer 1, in other words after synchronizing both terminals by exchanging HDLC-frames. The location where the clock is generated can be selected . A quick 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 permanent circuit (leased line) must use the same channel.

5.13.1 Telephony



<Config> Configuring the PRI parameters



Enter the B-channel from the keypad (first press **<Delete>**) or use the cursor keys to set the B-channel.

The ARGUS will display the B-channel used and the duration of the leased line (in h:min:sec).

Disconnect

<Volume> Set the volume

<TM> Start the Test Manager (see page 137).
Another connection can be setup.

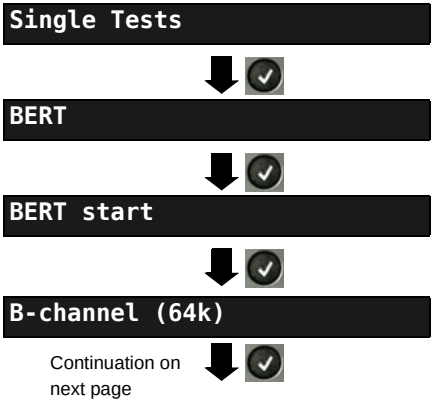
Continuation on next page

Alternatively, the connection can be setup via Connection in the Single tests menu.

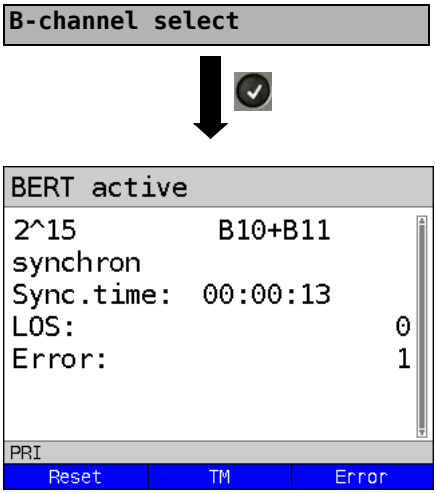
5.13.2 Bit error rate Test

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. Parameter settings (see page 95).
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, you simply need not enter call numbers or select a service.



In the case of a PRI access in end-to-end mode (see page 129), a BERT can be run:
- in the D-channel
- in a B-channel
  (Select channel: B-channel (64k))
- in two B-channels
  (Select channel: B-channel (128k))
- MegaBERT framed
  (optional: in all B-channels and in the D-channel)
- MegaBERT unframed
  (optional: all B-channels, the D-channel and time slot 0).



Enter the B-channel from the keypad (first press **<Delete>**) or use the cursor keys to set the B-channel.

Start BERT (128k-BERT)

During the BERT, the display shows:

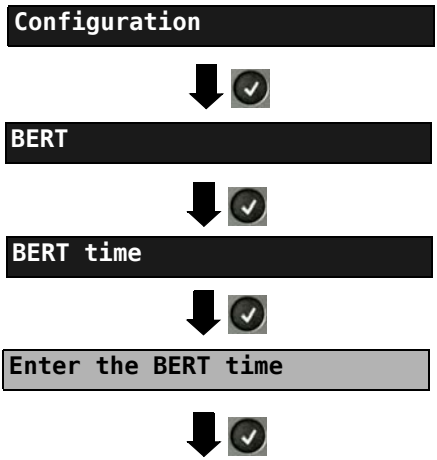
- The bit pattern and channel / bit rate used
- Synchronicity of the bit pattern (in the example, synchron)
- Sync.time in h:min:sec
  The time in which the ARGUS can sync to the bit pattern
- LOS
  synchronisation is lost at an error rate greater than or equal to 20 % within a period of a second. The absolute number of synchronisation losses will be shown.
- Error: The bit errors that have occurred.

<Error>	Insert artificial bit errors to test the reliability of the BERT.
<Reset>	The test time and number of bit errors will be reset.
<TM>	Open the Test Manager (see the ARGUS main Manual)
	Stop the BERT Display the test results (see the ARGUS main Manual).

Saving Test Reports
(see the ARGUS main Manual)

5.13.3 Configuration: BERT

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



The ARGUS - Main menu

Use the keypad to enter the duration of the BERT.

The ARGUS will return to the "BERT config." menu without making any changes.

The ARGUS saves the settings and returns to the next higher menu.

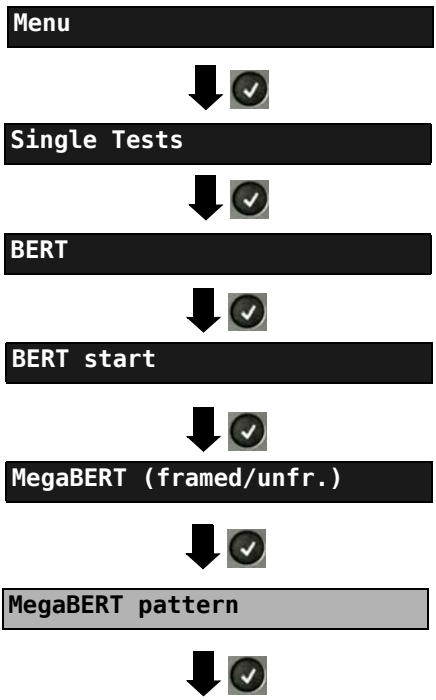
Settings for the BERT:

Display Name on the ARGUS	Remark
BERT time	You can enter measurement times ranging from 1 minute (default setting) to 99 hours and 59 minutes (= 99:59). If the time is set to 00:00 (=BERT with unlimited measurement time), the BERTwill not stop automatically. In this case, the user must terminate the BERT (by pressing the).
Bit pattern PRI	This function is used to select the bit pattern to be sent cyclically by the ARGUS to perform a BERT on a PRI access (see "Bit patt. BRI/U"). (2^{15}-1= default setting).

Error level	This is the level used to evaluate whether the BERT had an "acceptable" bit error rate. If the BERT has a bit error rate, which exceeds this error level, the ARGUS will display a "NO" as the test result. Using the keypad, you can enter a value ranging from 01 (= 10^{-01}) to 99 (= 10^{-99}). The default threshold (error level) is 10^{-06} (1E-06). That means that, in the event that the bit error rate is less than 10^{-06} (one error in 10^{6} = 1,000,000 sent bits), the bit error rate test will be evaluated as OK.
HRX value	Setting the HRX value (Hypothetical Reference Connections, see the ITU-T G.821) Using the keypad, you can enter a value ranging from 0 to 100 %.

Setting the MegaBERT bit pattern

The various MegaBERT bit patterns that are available can be called up in "Leased line" mode as follows:



A distinction is made between two types of MegaBERT in the channel selection:
- MegaBERT framed (31 B-channels)
- MegaBERT unframed (32 B-channels)

The ARGUS will save the setting and start the single test.

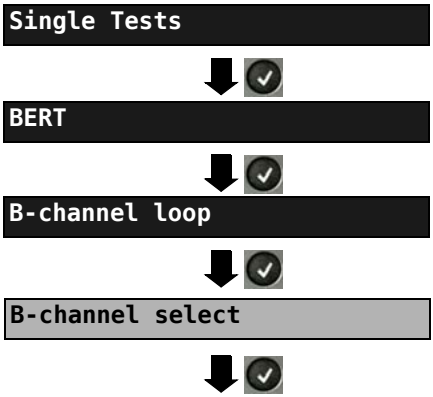
Menu for selecting the bit pattern to be used for a MegaBERT:
In a BERT, the ARGUS will repeatedly send the following bit pattern.

Display on the ARGUS	Remark
2^15-1	32767-bit pseudo-random test sequence in accordance with ITU-T O.150 5.3 (longest sequence of zeros = 15)
2^15-1 inverted	The ARGUS will send the bit pattern described above inverted.
2^20-1/QRSS	1048575-bit pseudo-random test sequence in accordance with ITU-T O.150 5.5 (longest sequence of zeros = 14)
2^20-1/QRSS inverted	The ARGUS will send the bit pattern described above inverted.
Constant NULL	The ARGUS will only send nulls (zeros).
Constant ONE	The ARGUS will only send ones.

5.13.4 Loopbox

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

The ARGUS - Main menu



Activate loopbox

Select channel:
The ARGUS will loop on either one B-channel (channel selection: B-channel) or all B-channels and the D-channel (channel selection: All framed).
In addition, the channel selection "All unframed" can be select:
in which case the ARGUS will loop all B-channels, the D-channel and time slot 0.

The ARGUS will display the B-channel used and how long the loopbox has been activated (in h:min:sec).

Deactivate the loopbox.

5.14 Managing Multiple Tests on a PRI 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.

The ARGUS – Main menu

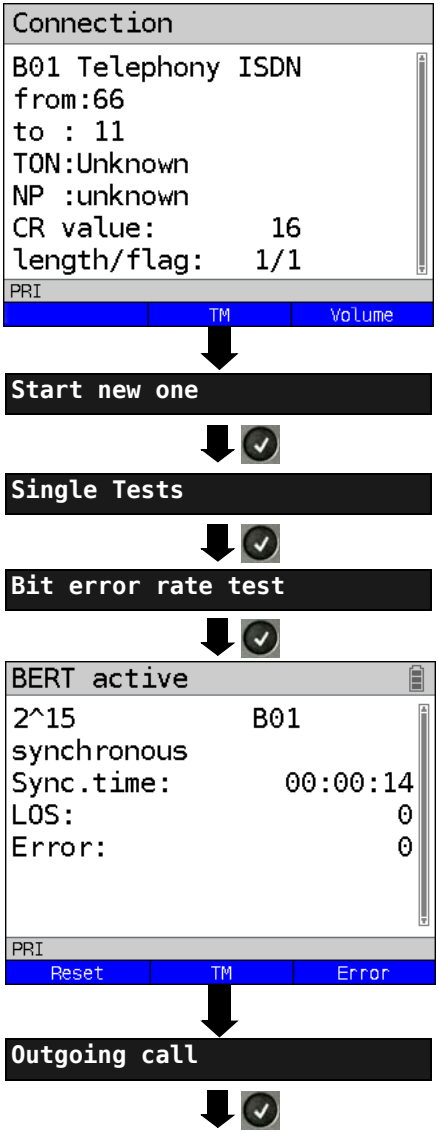
Open the Test Manager

<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.

5.14.1 Starting Several Tests to Run Simultaneously

Starting a new test or connection during an existing connection



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

Open the Test Manager (can also be opened by pressing the "6" on the keypad).

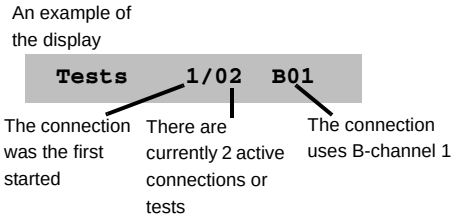
Select desired test
(e.g. bit error rate test, BERT)

Start BERT, the connection is not yet setup.

For information on running a BERT, see page 97

Open the Test Manager.
Mark “Outgoing connection”

Open the
Connection 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.

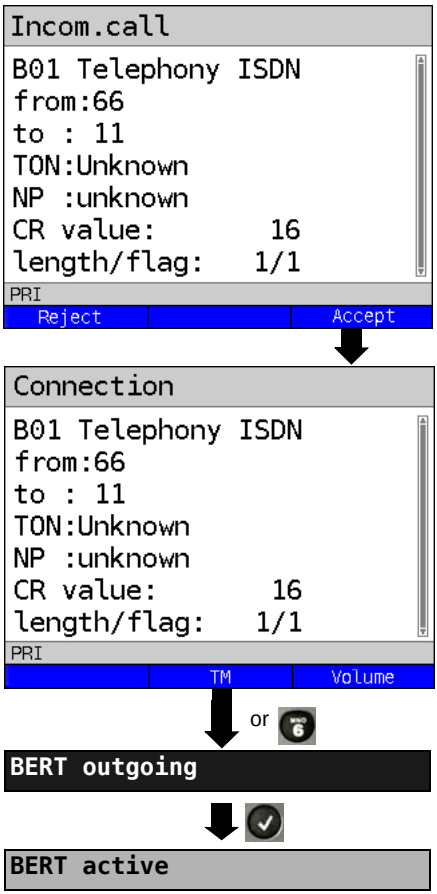
Some tests use so many resources that they cannot be run in every combination with other tests. In this case, the ARGUS will display the message “Test not possible at this time”.

Test/ Connection display.	**Number of times that a test or connection can be started at the same time**	**Switching to another test is possible**
Incoming call	30	Yes
Outgoing call	30	Yes
BERT	2	Yes
Loop	2	Yes
Service tests	1	No
Suppl.serv.test	1	No
Time measurement	1	No
CF Interrogation / Active / Clear	1	No

5.14.2 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 114). 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.



BERT is running.

While running a BERT, the ARGUS displays information about an incoming call.

<Reject> Reject the incoming call. The ARGUS will open the BERT display.

Accept the call.
The BERT will continue in the background.

Mark "BERT outgoing".

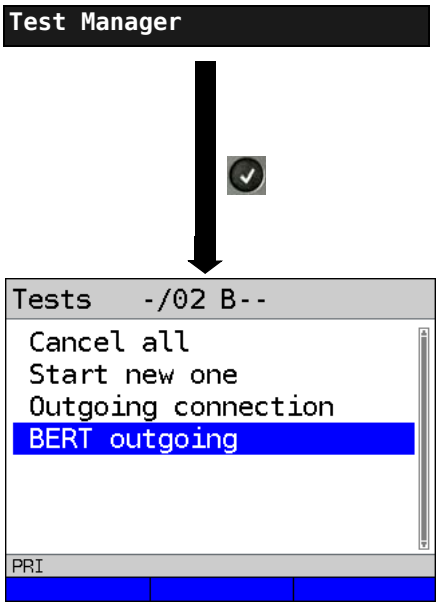
Switch to BERT.

The connection remains active in the background, the handset is assigned to the connection.

The handset will be assigned to the currently active connection. The assignment of the handset to a given connection is also retained in the background.

5.14.3 End All Currently Running Tests or Connections

The ARGUS - Main menu



Open the Test Manager

<TM> or 6 — 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.

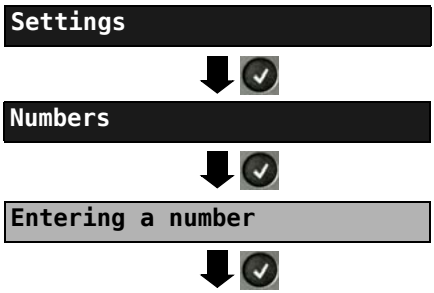
All tests will be terminated and all connections cleared down.

5.15 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 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 248).



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.

ARGUS saves the number and switches to the next higher level menu.

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.

6 Appendix

A) Acronyms

	Zeichen
1TR6	Signalling protocol (D-channel protocol) for national ISDN of the former German national PPT (Bundespost)
2B1Q	2 binary 1 quaternary - line code
3PTY	Three party service
4B3T	4 binary 3 ternary - a modified monitored sum 43-code (MMS43)
	A
A3k1H	Audio 3.1 kHz
A7kHz	Audio 7 kHz
A-Bit	Alarm Bit
AIS	Alarm Indication Signal
AMP	Argus measurement report
AOC	Advice of charge
AOC-D	Advice of charge Charging information during the call
AOC-E	Advice of charge Charging information at the end of the call
APL	("Anschlusspunkt Linie") Service termination point
ASCII	American Standard Code for Information Interchange.
Avg	Average
AWS	("Anrufweiterschaltung") Call forwarding (1TR6)
	B
BC	Bearer Capability
BERT	Bit Error Rate Test
BRI	Basic Rate Interface (in Germany the S_0 interface)
	C
CCBS	Completion of calls to busy subscriber
CCNR	Call complete no response
CD	Call deflection
CDN	see also CDPN
CDPN	CalleD Party Number
CF	Call Forwarding
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	1. Calling Line Identification Presentation 2. Clipping

CLIR	Calling Line Identification Restriction
CNS	CLIP-no screening
CONN	CONNect Message
CR	Call reference
CRC	Cyclic Redundancy Check
CT	Call transfer
CUG	Closed User Group
CW	Call waiting
	D
DAD	Destination address (1TR6)
D-Bit	Data Bit
dB	Decibel
DCE	Data Communication Equipment
DDI	Direct Dialling In (dialling in to an extension directly)
DE	German
DFU	("Datenfernübertragung") Remote data transmission
UDI	Unrestricted Digital Information (data telecommunications)
UDI-TA	Unrestricted Digital Information with Tones & Announcements
DIN	Deutsches Institut für Normung e. V.
DISC	DISConnect message
DM	Supplementary services (Dienstmerkmal)
DSS1	Digital Subscriber Signalling System No. 1
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTU	Data Transmission Unit
	E
E1	Primary Rate Interface (PRI)
EAZ	("Endgeräteauswahlziffer") Local calling number (1TR6)
E-Bit	Error-Bit
Ecnt	E-Bit Counter
ECT	Explicit call transfer
E-DSS1	European Digital Subscriber Signalling System Number 1
EFS	Error Free Seconds
ES	Errored Seconds
ETSI	European Telecommunications Standards Institute
	F
FAS	Frame Alignment Signal
Fax G3	Fax Group 3
Fax G4	Fax Group 4
	G
GBG	("Geschlossene Benutzer Gruppe") Closed user group

GmbH	German Limited Liability Company
	H
HDB3	High Density Bipolar of order 3
HDLC	High-Level Data Link Control
HEX	Hexadecimal value
HLC	High Layer Compatibility
HOLD	Call hold
HRX value	Hypothetical reference connection
HTTP	Hyper-Text Transfer Protocol
HVT	("Hauptverteiler") Main distribution frame (MDF)
	I
INFO	INFOrmation Message
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
	K
KVZ	("Kabelverzweiger") Cable branch box
	L
L1	Layer 1 in the OSI reference model
L2	Layer 2 in the OSI reference model
L3	Layer 3 in the OSI reference model
LAPD	Link access procedure for D-channels
LCN	Logical Channel Number
LED	Light-Emitting Diode
LEPM	Line End for Primary Multiplex (Rate Interface)
LLC	Low Layer Compatibility
LOS	Loss of synchronisation
LOSWS	Loss of sync word seconds
	M
m	Meter
MCID	Malicious call identification
MegaBERT	Mega Bit Error Rate Test
Modem	Modulator-demodulator
MSN	Multiple Subscriber Number
	N
NGN	Next Generation Network
NP	Numbering Plan
NOK	Not OK
NSAP	Network Service Access Point
NT	Network Termination
NTBA	Network termination for ISDN basic rate access
NTPM	Network Termination Primary Multiplex

	O
OAD	Origination address (1TR6)
OSI	Open Systems Interconnection
	P
PABX	Private automatic branch exchange
PC	Personal Computer
PESQ	Perceptual evaluation of speech quality (ITU-T P.862)
P-P	Point-to-point
P-MP	Point-to-Multipoint
PRI	Primary Rate Interface (German S_{2M} interface)
PSI	Program Specific Information
PWR	Power
	Q
QRSS	Quasi Random Signal Sequence
	R
REL	RELease message
REL ACK	RELease ACKnowledge message
REL COMPL	RELease COMPLete message
RJ	Registered jack (standardised socket)
Rx	Receive
	S
Sa	Vertical transmission channels
SES	Severely Errored Second
SIN	Service indicator (1TR6)
Spch	Speech
SUB	Subaddressing
SUSP	SUSPend message
	T
TAL	("Teilnehmeranschlussleitung") Subscriber line
TDT	Time and date table
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier
Tel31	Telephony 3.1 kHz
Tel7k	Telephony 7 kHz
TM	Test Manager
TON	Type of Number
TTX	Teletext
Tx	Transmit
	U
U_{2an}	U_2 Interface
U-interface	Basic Rate Interface (U-Interface access)

US	Unavailable Second
USB	Universal Serial Bus
UUI	User-User-Info (UUI)
UUS	User-to-user signalling
	V
ViSyB	Video Syntax Based
ViTel	Video-Telephony
	X
X.25	ITU-T X.25 Protocol Standard
X.31	ITU-T X.31 Protocol Standard
	Z
ZWR	See SRU

B) CAUSE-Messages – DSS1 Protocol

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

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

C) ARGUS Error Messages (DSS1)

ERROR Number	Cause	Description
0	Network	The network is not in a state defined for DSS1. This may, however, occur in connection with normal clearing on a PBX.
1 to 127	Network	DSS1 causes
150	ARGUS	An error occurred during the supplementary service test. Frequent cause: no response from network
152	ARGUS	The CF-Test was started with the wrong own number.
153	ARGUS	No HOLD is available, but HOLD is required to test the supplementary service (ECT, 3pty).
154	ARGUS	CLIR or COLR could not be tested, since CLIP or COLP is not available
161	ARGUS	The party called did not answer within the prescribed time (approx.10 sec)
162	ARGUS	A call was setup to a remote subscriber, instead of being setup – as was expected – to your own number.
163	ARGUS	The Auto-Test could not setup a connection and therefore the AOC-D supplementary service could not be tested.
170	ARGUS	During the Suppl.services test, a call came in without a B channel (call waiting). Therefore, it was not possible to accept the call and test.
199	ARGUS	A call number was entered.
200	ARGUS	Internal error
201	ARGUS	Network did not confirm acceptance of the call (CONN sent, no CONN_ACK received from network)
204	ARGUS	a) Layer 2 connection has been cleared down b) No response to SETUP c) Layer 2 connection could not be setup
205	ARGUS	Reestablish the Layer 2 connection
206	ARGUS	The selected B channel is already busy.
210	ARGUS	No response to the clear-down (REL sent, no REL_CMP/ REL_ACK received from network)
220	ARGUS	Remote end signaled that it is in State 0.
245	ARGUS	Keypad sent via ESC, but no response was received from network
250	ARGUS	FACility was sent, but no response was received from network

X.31 Test – Error messages

X.31 Causes

0 to 255	Network	See ISO 8208: 1987(E) Table 5- Coding of the clearing cause field in clear indication packets, page 35
257	ARGUS	No answer from network (to a CALL-REQUEST or a CLEAR-REQUEST)
258	ARGUS	Unexpected or wrong answer from network (no CALL-CONNECTED or CLEAR-INDICATION as answer to CALL-REQUEST)
259	ARGUS	The network has indicated in a DIAGNOSTIC message that the logical channel is invalid. Origin: No (=1) or a wrong LCN was set.
512	ARGUS	It was not possible to determine an internal or external cause. Origin: Layer 2 could not be setup or remote end does not support X.31
65535	ARGUS	The X.31 Layer 3 test was not performed. The error can only occur in a test log.

X.31 Diagnostic (only for a cause less than 256)

0 to 255	Network	See ISO 8208: 1987(E) Figure 14a page 121 Figure 14b page 123 et seq. And/or CCITT Recommendation X.25, Annex E

D) Index

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