

Pocket ISDN TA

Pocket ISDN TA Internet 700-751-MDM04

Pocket ISDN TA Profi 700-751-MDM05

Manual

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ISDN Terminal Adapter

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1. Introduction

We are very pleased to see that you have bought a HELMHOLZ product and would like to express our appreciation.

This documentation is valid for the products:

- Pocket ISDN TA Internet Hardware version V2.0
 Software version V5.354
- Pocket ISDN TA Profi Hardware version V2.0
 Software version V1.009

The two versions of the Pocket ISDN TA differ as follows:

	Pocket ISDN TA Internet	Pocket ISDN TA Profi
CAPI interface	Yes	No
Multi-PPP	Yes	No
Single-PPP	Yes	Yes
Security Callback	No	Yes
X.25	No	Yes
X.31 in D channel	No	Yes

Note: Please note that you cannot connect to an **analog** modem using an ISDN device for **digital** data transmission.

1.1 Product description

The Pocket ISDN TA connects a PC (or other device with a serial port) to the ISDN network. It provides access to online services like the Internet, AOL/CompuServe and T-Online and is also suitable for remote LAN access. You can see Pocket ISDN TA as a digital replacement for an analog modem.

To work with Pocket ISDN TA you need:

- an ISDN Basic Rate Interface (BRI) (replacing an analog telephone line). You can apply for the basic rate interface (BRI) to your telephone company.
- a PC with a serial RS232 interface (RS232)

The serial port of the PC should be capable of a data rate of up to 115.2 kbps. This might require an additional PC card on older PCs.

With the Pocket ISDN TA Internet, you can increase the data rates to 230.4 kbps through Multilink PPP.

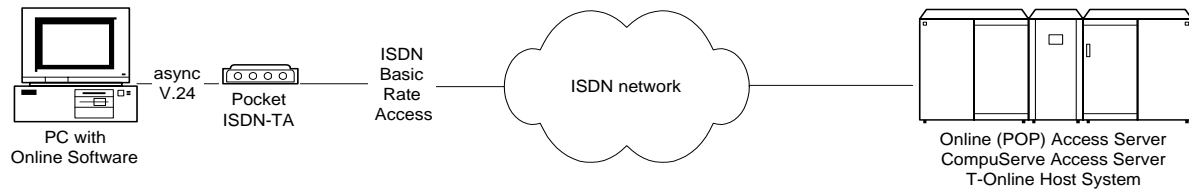
1.2 Internet access

There are three ways of accessing the Internet via ISDN:

- by synchronous PPP or Multilink PPP (only on the Pocket ISDN TA Internet)

- by bit rate adaptation V.120
- by B channel protocol X.75

Which of these you can use depends on the access facilities of your Internet service provider (ISP) or point-of-presence (POP) (see Fig. 1).



1.3 AOL/CompuServe access

AOL/CompuServe is accessed via ISDN by the protocol V.120 or X.75 (see Fig. 1). Which of these you can use depends on the access facilities of your AOL/CompuServe access point. X.75 is the most frequently used common protocol.

1.4 T-Online

T-Online (German Online Service) is accessed via ISDN by the protocol T.70NL / X.75 or synchronous PPP (see Fig. 1).

1.5 Remote LAN access

To access a LAN remotely via ISDN you have to choose the appropriate protocol that is used by the ISDN router on the LAN.

1.6 Service

HELMHOLZ has installed a Windows-NT-Server for test purposes. The Server supports the RAS (Remote Access Service) with full 64 kbps in a single B channel. The RAS service allows you to connect PCs with each other using Windows-2000/NT or Windows9x/ME.

You have to install Dialup Networking on your Windows PC – see the Windows helpdesk on how to install and use this. Please select the TCP/IP protocol on your computer.

The Pocket ISDN TA has to be set to HDLC async to sync (like the configuration for Internet access) by selecting the Modem “TA Internet PPP”.

The ISDN access number is ++49 40 89088 328.

Please use the user name "guest" and password "guest".

1.7 License

The Pocket ISDN TA has the following license number for the connection to the PSTN according to CTR3/A1:

CE-0682 X for Europe (EU), Switzerland, Norway.

Pocket ISDN TA conforms to the European safety requirements IEC 60 950. Please use only the delivered power supply or an original replacement from HELMHOLZ.

Connect the Pocket ISDN TA only to the S0 interfaces with SELV (**S**afety **E**xtra-**L**ow **V**oltage) complying with EN60950.

The Pocket ISDN TA meets the European EMC requirements. EN50081-1, in this case EN55022 Class B, for electromagnetic field emission and EN50082-1 for immunity against electromagnetic interference.

2. Installation

2.1 Items supplied

This packet contains the following items:

- ISDN Terminal adapter Pocket ISDN TA in a desktop box
- Power supply adapter with plug
- ISDN interface cable (S0 cable)
- DTE interface serial cable (RS 232 cable)
- CD with installation software Windows9x/ME/2000 and Windows NT

2.2 Installation

- Connect the serial port (DTE) of the Pocket ISDN TA to the serial port (COM port) of the PC using the supported DTE interface serial cable. Please make sure that the COM port of the PC is not used for other purposes or by other communication programs.
- Connect the ISDN port of the Pocket ISDN TA to the ISDN basic rate interface (BRI) (NTBA) using the ISDN cable supplied.
- Connect the power supply of the Pocket ISDN TA with the power supply adaptor and plug the power supply adaptor into power mains.

Please refer to Chapter 2.5 on selecting the correct plug.

Now the power-up sequence should run.

The Pocket ISDN TA is now ready for use.

Please refer to the next Chapter on configuring the PC for use with the Pocket ISDN TA.

2.3 Windows 9x/ME/2000 software installation

This chapter describes the installation, configuration and use of the Pocket ISDN TA with the Windows 9x/ME/2000 operating system.

The following components will be installed:

- Modem driver in the modem list

2.3.1 Preparation (Windows 9x/ME/2000)

Please check the following requirements before installing the software for Windows 9x/ME/2000:

- PC system with Pocket ISDN TA connected.
- Access to a CD drive and hard disk
- Installed Microsoft Windows 9x/ME/2000 operating system

- Windows 9x CD-ROM (installation diskettes) (not normally required for ME/2000)
- Systeme Helmholtz installation CD

2.3.2 Installation (Windows9x/ME/2000)

1. If the Pocket ISDN TA is connected with Windows9x/ME/2000 while the PC is booting, the plug-and-play feature of the Pocket ISDN TA will be activated and Windows9x/ME/2000 will request an installation disk.
2. At the end of installation you will be shown information about the installed software and modem types.
3. Please select
START -> SETTINGS -> CONTROL PANEL -> MODEMS
Select "Add" and click the "Select modem" button.
4. Click the "Have diskette" button and select the path to the CD and open the file "mdmstpoc .inf" under pocket ISDN\Treiber driver ISDN.
5. Please select the following Pocket ISDN TA modem:
TA +POXX.75
or TA +POXV.110 (for the GSM link only)
6. Select the used COM port and finish to end the installation procedure.

2.4 Windows NT 4.0 software installation

This chapter describes the installation, configuration and use of the Pocket ISDN TA for the Windows NT 4.0 operating system.

The following components will be installed:

- Modem driver in the modem list

2.4.1 Preparation (Windows NT4.0)

Please check the following requirements before installing the software for Windows NT4.0:

- PC system with Pocket ISDN TA connected.
- Access to a CD drive and hard disk
- Installed Microsoft Windows NT operating system
- Windows NT4.0 CD-ROM (Installation disks)

2.4.2 Installation (Windows NT4.0)

1. Please select
START -> SETTINGS -> CONTROL PANEL -> MODEMS
Select "Add" and click the "Select modem" button.
2. Click the "Have diskette" button and select the path to the CD and open the file
"mdmstpoc .inf" under pocket ISDN\Treiber driver ISDN.
3. Please select the following Pocket ISDN TA modem:

TA +POXX.75
or TA +POXV.110 (for the GSM link only)
4. Select the used COM port and finish to end the installation procedure.

2.5 Displays and control elements

Please make sure, the Pocket ISDN TA is connected to the serial interface and powered.

The Pocket ISDN TA is now ready to be used with Modem applications (i.e. Microsoft Dial-Up Networking) or CAPI compatible application programs.

At the back of the Pocket ISDN TA you will find the connectors for the following devices:

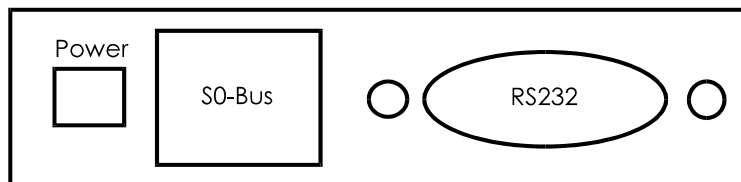


Fig. 2: Rear view of the Pocket ISDN TA

POWER: external power supply

S0-Bus: ISDN interface.

RS232: V.24 interface for DTE, e.g. a PC

You can check the status of the Pocket ISDN TA via 8 LEDs on the front.

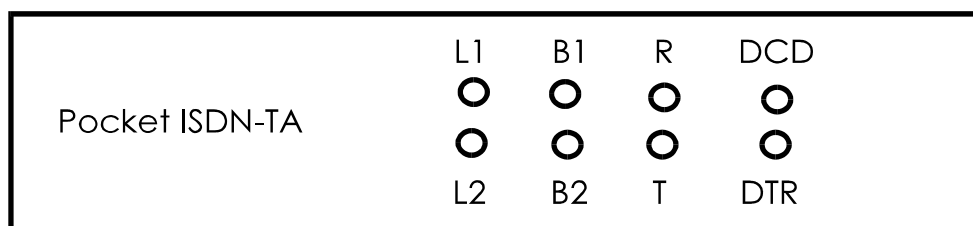


Fig. 3: Front view of the ISDN TA desktop model

The 4 LEDs at the right show the status of the serial interface to the PC:

- R:** shows receiving data activity from the TA and ISDN line
- T:** shows data transmission activity from the terminal
- DTR:** shows the status of DTR line; e.g.: the terminal is trying to connect via the Pocket ISDN TA
- DCD:** indicates the status of the DCD line (V.24); normally shows the connection to an access server.

Both LEDs, **B1** and **B2**, show the connection state of the ISDN B channel: If this LED is ON, the B channel is busy due to an incoming or outgoing connection (data or voice).

Both of the LEDs, **L1** and **L2**, show the overall status of the Pocket ISDN TA in coded form. The following list describes the LED sequence for an error free power-on sequence of the Pocket ISDN TA.

Status	L1	L2
1. Power-on phase, waiting		(about 2 sec)
2. Active phase, ISDN ok		
3. Connected, ISDN data connection established		

LED legend:

- On
- Continuously blinking
- Off

You will find a complete list in the Appendix "LED displays"

3. Using the Pocket ISDN TA with the application software

To use the Pocket ISDN TA with different application software and access points you have to look for the following items:

- Usually you need a contract with the service provider. They can help you to get an appropriate application program to run on your PC.
- The service provider will also supply you with the ISDN access number to call. (This has to be entered in the application program.)
- The parameters of the Pocket ISDN TA, which are described in the next chapter, must match the characteristics of the access point.

3.1 Configuration for the Internet

To access the Internet via ISDN you require a contract with an Internet service provider (ISP) who runs an ISDN access. To configure the Pocket ISDN TA you require the following information from the ISP:

- ISDN access number (to be entered at the PC program)
- Layer 2 protocol, usually the PPP protocol by selecting “Modem Pocket ISDN TA Internet PPP”.
- Access protocol (to be entered at the PC system software or Internet software)

To configure the Internet access software on the PC, you may require some additional information, such as the TCP/IP address, user name, password etc. Please refer to the software manual.

3.1.1 Configuration under Windows 9x/ME/2000

The configuration of the Pocket ISDN TA can depend on the type of access supported by the Internet provider. The following types of access are mostly used for public ISDN access.

- HDLC async to sync conversion
This protocol has to be set up, if the service provider uses an access point where the protocol PPP is running.

Please obtain more information from your Internet provider, if necessary.

3.2 Configuration for AOL/CompuServe

You need a contract with AOL/CompuServe to access the AOL/CompuServe network via ISDN. To configure the Pocket ISDN TA, you require the following information from AOL/CompuServe:

- ISDN access number
- Layer 2 protocol, usually the X.75 protocol (by selecting the TA X.75 modem). Some accesses still use the V.120 B channel protocol. (Select TA V.120 modem.)

For how to select the modem, see also Chapter 2.3.

You can use the CompuServe access by running the CIM software package. For AOL, use the AOL software.

3.3 Configuration for T-Online (Germany only)

To use the T-Online service via ISDN, you have to have a contract with T-Online. To configure the Pocket ISDN TA, you have to set the following parameters:

- ISDN access number, "01910" for a basic rate access.
- The T.70 protocol (set by selecting Pocket ISDN TA T-Online).
- Select the appropriate access type in your T-Online access software (COM port)

Alternatively, another access point for T-Online has been available since summer 1997 (the latest T-Online software package has to be used):

- ISDN access number, "0191011" for a basic rate access.
- The PPP protocol (set by selecting the Pocket ISDN TA HDLC-PPP modem).

4. Configuring the Pocket ISDN TA

The settings of the Pocket ISDN TA for the serial and the S0 interface are called configuration. The Pocket ISDN TA is delivered with default parameters already set. The following section shows how, by using the configuration commands, you can examine the configuration of the Pocket ISDN TA and, if necessary, change it. The values can be stored in the non-volatile memory. This means they will remain unchanged even if the power supply is disconnected.

You can configure the Pocket ISDN TA in the following ways:

- by using the AT commands entered via the locally connected PC.
- by using Pocket ISDN TA Configurator commands entered via the locally connected PC.
- by using Pocket ISDN TA Configurator commands entered via the ISDN line (remote configuration).

Normally the configuration via AT commands is sufficient.

The latter two cases are for more sophisticated configuration, which is described in Chapter Pocket ISDN TA+Configurator command set.

4.1 AT command set

All parameters can be changed by using an extended AT command set described in this chapter.

Please check if the factory setting is appropriate for your requirements. The factory setting is described (highlighted) in the parameter list shown in Chapter "AT command set" (see below).

If you want a configuration other than the default factory setting, please perform the following steps:

- Connect the Pocket ISDN TA to ISDN interface
- Connect the PC's COM port to the DTE interface of the Pocket ISDN TA.
- Plug in the power supply, e.g. Hyperterminal.
- Start a terminal emulation on your PC, please verify that the baudrate setting of the terminal emulation matches that of the TA.
- Set up the parameter of the TA from the terminal emulation and save the parameters using the AT command set.

Example:

To change the used B channel protocol to X.75, please enter the following commands:

ATB10<↵> (set protocol to X.75)

AT&W<↵> (save the new configuration)

- Exit your terminal emulation and start your application program.

With the exception of the command **A/** (Repeat command), all commands begin with the prefix **AT** and are terminated with <↵>. Corrections in a command line are performed with <BACKSPACE>. A command line has a maximum of 80 characters. The command line is automatically canceled by longer input. Blanks are ignored; capital/small letters are not significant.

The parameter settings of the Pocket ISDN TA obtained using the AT commands can be permanently stored (AT&W) and are not lost on resetting or on exiting AT command mode.

To enter the AT command mode during an active data connection, you must use the following sequence ("Escape sequence"):

at least 1 sec pause <+><+><+> 1 sec pause

The time gap between all three plus signs must not exceed 1 sec.

The escape sequence is transmitted transparently to the remote device.

Commands supported:

Command	Description
A/	<u>Repeat last command line</u> This command repeats the commands of the last entered command line. Note: No prefix AT is required. A/
A	<u>Accept incoming call</u> Using this command, you can accept an incoming call, if automatic call acceptance is not set (register S0 = 0). An incoming call is displayed by the message "RING" or the code "2". Must be the last command in an AT command line. ATA[//<UUS1data>] UUS1data data transmitted with UUS1 signaling

Command	Description
B	<p><u>B channel protocol</u> Transmission protocol for data communication in the B channel.</p> <p>ATB0 V.110 asynchronous (e.g.: for BBS access)</p> <p>ATB3 HDLC async to sync conversion (PPP asynchronous, single link PPP, default) (e.g.: for Internet / dial-up network access)</p> <p>ATB4 HDLC transparent (octets are packed into HDLC frames)</p> <p>ATB5 Byte transparent (raw B channel data)</p> <p>ATB10 X.75-NL (e.g.: for BBS access)</p> <p>ATB13 V.120 (for AOL/CompuServe access)</p> <p>ATB20 X.31 B channel (X.25 B channel, option)</p> <p>ATB21 X.31 D channel (Option)</p> <p>ATB22 T.70-NL-CEPT (for T-Online (videotex) access)</p> <p>ATB23 T.90-NL</p> <p>ATB31 Multilink PPP (ML-PPP)</p>
%B	<p><u>Set local baudrate</u> Sets the local baudrate of the Pocket ISDN TA to the desired value (fix value) or to autodetection. When autodetection is set, the Pocket ISDN TA will recognize the desired baudrate with every new AT command entered via the terminal equipment (PC). With all other settings the PC must use the same baudrate. Must be the last command in an AT command line.</p> <p>AT%B0 Automatic local baudrate detection enabled (autobauding, default)</p> <p>AT%B1 Local baudrate set to 1,200 bps</p> <p>AT%B2 Local baudrate set to 2,400 bps</p> <p>AT%B3 Local baudrate set to 4,800 bps</p> <p>AT%B4 Local baudrate set to 9,600 bps</p> <p>AT%B5 Local baudrate set to 19,200 bps</p> <p>AT%B6 Local baudrate set to 38,400 bps</p> <p>AT%B7 Local baudrate set to 57,600 bps</p> <p>AT%B8 Local baudrate set to 115,200 bps</p> <p>AT%B9 Local baudrate set to 230,400 bps</p> <p>Note: If autobauding is selected (default) and after powering on the TA+POC no AT command is entered, a response from the Pocket ISDN TA (e.g. RING) will be sent with the baudrate 115,200 bps.</p>
CONF	<p><u>Call the Pocket ISDN TA+Configurator</u> Calls the TA+Configurator directly. The configuration prompt "#" is displayed. Exit the TA+Configurator with the "quit" command.</p> <p>ATCONF</p>
&C	<p><u>DCD control</u> Selects the behavior of the DCD control line from the Pocket ISDN TA.</p> <p>AT&C TA control line DCD is always ON</p> <p>AT&C1 DCD ON indicates ISDN connection is established and synchronized (default)</p>

Command	Description
#C	<p><u>Received bearer service</u></p> <p>Shows the bearer service that receiving is being performed with an incoming call in hexadecimal coding <i>hbhb</i>. The value for <i>hbhb</i> (word) is the CIP value as defined in the CAPI 2.0 specification</p>
#C1= <i>hbhb</i>	<p><u>Select bearer service outgoing</u></p> <p>Selects the bearer service that will be sent with an outgoing call The value for <i>hbhb</i> (word) is the CIP value as defined in the CAPI 2.0 specification (default 0000).</p>
#C2= <i>hbhbhbhb</i>	<p><u>Select bearer service incoming</u></p> <p>Selects the bearer services that can be accepted with an incoming call. The definition of <i>hbhbhbhb</i> (double word) is the CIP mask as defined in the CAPI 2.0 specification (default 00000004). Example: AT#C2=00000001: Accepts all incoming calls. Note: Before issuing an outgoing call the command AT#C1 has to be set. To use the predefined services, please set factory defaults with AT&F.</p>
D	<p><u>Initiate outgoing call</u></p> <p>Dials the number (D for Dial). The dial modifier "W", ">", "T", ";", "@" can be freely inserted in the dial string. They have no influence on the dial procedure of the TA. Must be the last command in AT command line. Any character input while the TA is dialing will cancel the dialing procedure.</p> <p>ATD<CALLEDnumber>[/<subaddr>][//<UUS1data>][,X[Pxxx-][R][N<nuipwd>][G<cug>]<X25number>][D<userdata>]]</p> <p>CALLEDnumber: ISDN call number for a dialed B channel connection or X.25 number for X.31 D channel subaddr dialed subaddress UUS1data data transmitted with UUS1 signaling P: use packet size <i>xxx</i> for X.25 connection R: request the facility reverse charging G: access to X.25 closed user group O: Outgoing call from X.25 closed user group N: use NUI and password with call setup allowed chars: a-z, A-Z, 0-9. (overrides setting of nui configuration command) X25number: dialed X.25 call number (X.25 B channel only) D: separator for user data: "D" or ";": user data without protocol ID "P": user data with protocol ID ("01000000")</p> <p>ATDL Dial the last dialed number ATDS=<i>n</i> Dial number <i>n</i> from stored telephone number list (<i>n</i> = 1..3) (See command AT&Z to store numbers) ATD<CALLEDnumber>e Make a call for remote management (see note).</p>

	<p>Note 1: To setup your own subaddress, see configuration command sub.</p> <p>Note 2: Adding an "e" to <i>CALLEDnumber</i> indicates that a connection to the internal remote access of a Pocket ISDN TA will be performed. The X.75 protocol (ATB10) must be used</p>
&D	<p><u>DTR control</u> Selects the behavior of the Pocket ISDN TA, when the DTE control line DTR changes from ON to OFF.</p> <p>AT&D DTE control line DTR setting is ignored</p> <p>AT&D2 DTE control line DTR is evaluated: a dropping signal on the DTR line will disconnect an existing ISDN connection (default).</p> <p>An incoming call will accepted only with DTR active.</p>
E	<p><u>Local echo</u> Selects the local echo in command mode.</p> <p>ATE No local echo</p> <p>ATE1 Local echo on in command phase (default)</p>
&F	<p><u>Load factory defaults</u> Factory default will be loaded, ISDN protocol setting and MSN's will not be overwritten. (To store in non-volatile memory, please use the AT&W command.)</p> <p>AT&F set all parameters concerning data port</p> <p>AT&F1 set all parameters, including ISDN protocols, MSN settings, and password.</p>
H	<p><u>Disconnect</u> Disconnects existing ISDN data connection, after issuing the Escape sequence (see Chapter 5.1).</p> <p>ATH[//<UUS1data>]</p> <p>UUS1data data transmitted with UUS1 signaling</p>
I	<p><u>Display version information</u> Displays different information about version number and settings:</p> <p>ATI1 Returns internal checksum ("64")</p> <p>ATI2 Returns "OK"</p> <p>ATI3 Returns the version string: "TA5.xy.z0"</p> <p>ATI5 Returns the ISDN selected protocol: "0 - DSS1"</p> <p>ATI7 Returns "OK"</p> <p>ATI8 Returns "ERROR"</p> <p>ATI9 Returns the plug-and-play ID string</p> <p>ATI77 Returns the bootloader version string</p> <p>ATI99 Returns the software creation date</p>

Command	Description
&K	<u>Flow control</u> Selects the flow control behavior of the Pocket ISDN TA while in data communication phase. AT&K No local flow control between the DTE and TA is used AT&K Local flow control is set to hardware handshake RTS/CTS (default) AT&K Local flow control is set to software handshake XON/XOFF
#M	<u>Received CLID</u> Shows the called line identification (CLID) that is received with an incoming call – this is the number of the called party addressed on the local S-bus (selected msn). AT#M
N	<u>Set line baudrate V.110</u> Sets the transmission baudrate of the Pocket ISDN TA to the desired value. (Only valid for V.110 asynchronous B channel protocol). ATN0 Line baudrate automatic set (equals to local baudrate or less) ATN1 Line baudrate set to 1,200 bps ATN2 Line baudrate set to 2,400 bps ATN3 Line baudrate set to 4,800 bps ATN4 Line baudrate set to 9,600 bps ATN5 Line baudrate set to 19,200 bps
O	<u>Return to online state</u> If the Pocket ISDN TA is in command mode after issuing an escape sequence out of an existing connection, ATO brings the Pocket ISDN TA back to data phase. Must be the last command in AT command line. ATO
#O	<u>Received CLIP</u> Shows the calling line identification (CLIP) that is received with an incoming call – number of the calling party. AT#O
Q	<u>Suppress results</u> With this command result codes or messages can be suppressed. ATQ Returns status - codes after command input (default) ATQ1 No result codes are returned
&R	<u>CTS control</u> Selects the behavior of the CTS control line from the Pocket ISDN TA. AT&R Pocket ISDN TA control line CTS follows all changes of RTS AT&R1 CTS is always ON (default)

Command	Description
#R	<u>Handle incoming calls</u> Selects the behavior of the Pocket ISDN TA when an incoming call is received. When set, all incoming calls are ignored irrespective of all other settings. AT#R Disable automatic rejection of all incoming calls (default) AT#R1 Enable automatic rejection of all incoming calls
S	<u>Display and set internal S register</u> ATSnn? Show actual values (decimal) of selected register <i>nn</i> ATSnn=xx Set selected register <i>nn</i> to the decimal value <i>xx</i> .
&S	<u>DSR control</u> Selects the behavior of the DSR control line from the Pocket ISDN TA. AT&S Pocket ISDN TA control line DSR is always ON (default) AT&S1 DSR ON indicates ISDN connection is established and synchronized
V	<u>Result format</u> ATV Result is outputs as a number (followed by <.\>) ATV1 Result is output as a text (default)
&V	<u>Display configuration</u> AT&V Displays the actual configuration of AT command setting including stored ISDN numbers AT&V1 Displays the actual configuration of extended AT command setting
W	<u>Extended result codes</u> ATW Result is presented with extended result codes ATW1 Result is presented with extended result codes RING and CONNECT including ISDN address, all others include error causes. Message RINGING will be displayed.
&W	<u>Store active configuration</u> The active configuration will be stored in non-volatile memory. AT&W
X	<u>Reduce result messages</u> Reduces the number of result messages after trying to set up a connection ATX0 "CONNECT" only (without line speed) ATX1 "CONNECT" with line speed, "BUSY", "NO DIALTONE" not used ATX2 "CONNECT" with line speed, "BUSY" not used ATX3 "CONNECT" with line speed, "NO DIALTONE" not used ATX4 "CONNECT" with line speed, all messages used (default).
Z	<u>Load stored settings</u> The active configuration will be reset to the stored configuration. Must be the last command in an AT command line. ATZ
AT&Z	<u>Store phone numbers</u> The command stores four entries (0-4) permanently in the EEPROM. Each

	<p>entry can have up to 35 digits. The entries can be overwritten and must correspond to the dial string as described in the ATD command.</p> <p>AT&Zn=x</p> <p>n is the number of the entry in the lists (from 0 to 3).</p> <p>x is the dial string with the phone number.</p> <p>AT&Z0=xxx is the service number of the mobile phone provider (xxx stands for the number)</p> <p>AT&Z1=xxx entry of the call-back number in the call-back modem (xxx stands for the phone number)</p> <p>AT&Z2=xxx phone number of the mobile phone (xxx stands for the number) for SMS alarms</p>												
#Z	<p><u>Define own MSN</u></p> <p>Defines the MSN <i>nn</i> (multiple subscriber number) for the data port. If the number is set to "" (default), all incoming calls are accepted. The MSN can be displayed by command AT#H or AT&V.</p> <p>AT#Z=nn sets MSN to <i>nn</i></p> <p>AT#Z shows currently set MSN number.</p> <p>The MSN is automatically stored to non-volatile RAM (without issuing command AT&W).</p> <p>Note: If 1TR6 D channel protocol is selected, only one or the last digit is valid.</p>												
DBITS	<p><u>Number of data bits x asynchronous chars (7,8)</u></p> <p>Number of data bits x for asynchronous character (7,default: 8)</p> <p>ATDBITS=x</p>												
PRTY	<p><u>Parity asynchronous chars</u></p> <p>Selects the parity for asynchronous characters.</p> <table><tr><td>0:</td><td>no parity;</td><td>ATPRTY=0</td><td>no parity (default)</td></tr><tr><td>1:</td><td>odd parity</td><td>AT**PRTY=1</td><td>odd parity</td></tr><tr><td>2:</td><td>even parity;</td><td>AT**PRTY=2</td><td>even parity</td></tr></table>	0:	no parity;	AT**PRTY=0	no parity (default)	1:	odd parity	AT**PRTY=1	odd parity	2:	even parity;	AT**PRTY=2	even parity
0:	no parity;	AT**PRTY=0	no parity (default)										
1:	odd parity	AT**PRTY=1	odd parity										
2:	even parity;	AT**PRTY=2	even parity										
**cmds2=40	<p><u>Activate the security call-back function</u></p>												
**acctab1=xxxx	<p><u>Enter the phone number of the local ISDN TAs</u></p> <p>xxx stands for the phone number</p>												
**casnr=xxx	<p><u>Enter the call-back number (local ISDN TA)</u></p> <p>xxx stands for the phone number</p>												
**capa=xxx	<p><u>Setting for the call-back time</u></p> <p>xxx stands for the time in seconds</p>												

4.1.1 ISDN-specific AT commands

Setting special ISDN parameters

(only one command is allowed per AT command)

Command	Description
BSIZE	<p><u>Set B channel block size</u></p> <p>Defines the maximum length <i>x</i> of a data block transmitted or received in B channel (default: BSIZE = 2048).</p> <p>ATBSIZE=x</p> <p>Note: The value will be changed by setting the B channel protocol (ATBx).</p>

LLC	<p><u>Set low layer compatibility (LLC)</u></p> <p>Defines the LLC value for outgoing calls in hexadecimal format. In some situations, a specific LLC value is required to pass detailed information about the B channel protocol used to the called party. This can be done by setting the LLC to a fix value.</p> <p>An empty parameter has to be entered by "-" (default: LLC is empty).</p> <p>Example:</p> <p>Deletes the LLC value: AT<u>LLC=-<↓></u></p> <p>Entry of a new LLC value: AT**<u>LLC=8890<↓></u></p> <p>Note: The value will be changed by setting the B channel protocol (ATBx).</p>
DTE	<p><u>Set B channel Layer 2 address</u></p> <p>Selects the Layer 2 link addresses. Only valid for protocols that are HDLC based (X.75, LAPB).</p> <p>ATDTE=0 Calling end responds as DTE, called end responds as DCE (default, X.75 standard)</p> <p>AT**DTE=1 TA responds as DTE (own addr = 01)</p> <p>AT**DTE=3 TA responds as DCE (own addr = 03)</p> <p>Note: The value will be changed by setting the B channel protocol (ATBx).</p>
ISDN	<p><u>Select D channel protocol</u></p> <p>Selects ISDN D channel protocol to the ISDN line. The protocol must match the protocol running on the ISDN line; otherwise a connection cannot be established.</p> <p>Note: After changing and storing the ISDN protocol the Pocket ISDN-TA has to be reset by switching is power off and on (alternately, you can use the AT&WRESET command).</p> <p>AT**ISDN=0 Selects DSS1 (Euro-ISDN) (default)</p> <p>AT**ISDN=5 Selects Bellcore National ISDN-1/2 (USA) (option)</p> <p>AT**ISDN=6 Selects NTT INS-NET (Japan) (option)</p> <p>AT**ISDN=7 Selects AT&T 5ESS (USA) (option)</p> <p>AT**ISDN=8 Selects VN-4 (France) (option)</p> <p>AT**ISDN Shows the selected ISDN protocol</p> <p>AT**?ISDN Shows the available ISDN protocols</p>

Command	Description
K	<u>Set Layer 2 window size</u> Sets window size x layer 2 protocol B channel: $x = 1 \dots 7$, default: 7 ATK=x The default value is dependent of the selected B channel protocol.
PTP	<u>Set ISDN interface type</u> ATPTP=0 selects multipoint mode (to connect ISDN terminals, default) AT**PTP=1 selects point-to-point mode (to connect ISDN switching systems)
RPWD	<u>Password remote configuration</u> Sets password for remote configuration to nn (1..32 chars) ATRPWD=nn Default: no password.
SPID1, SPID2	<u>Set SPID (Option)</u> For ISDN lines in the U.S. you have to set the SPID. You can obtain it from your ISDN provider. ATSPID1=xxxx Sets SPID 1 AT**SPID2=xxxx Sets SPID 2
<cmd>	<u>Execute configuration command</u> Executes a configuration command. AT<cmd>

4.1.2 AT commands and S registers

Command	Description
S0	0: No automatic call acceptance, acceptance of an incoming call is controlled by the data terminal (command ATA after RING) 1: Immediate call acceptance by the terminal adapter (default) 2..n: Call acceptance through the terminal adapter after n "RING" messages. Note: The time between two ring messages can be configured using the TA-configuration command "ringtimer" (default = 5 sec.)
S1	Ring counter (read only)
S2	Escape character (default = 43h)
S3	Return character (default = 0Dh)
S4	Line feed character (default = 0Ah)
S5	Backspace character (default = 1Ah)
S7	Wait time for carrier (sec) (default = 30 s)
S9	Enable PNP functionality for Windows 95 (default=1, enabled)
S16	Last CAPI/ISDN error cause that occurred
S90	Last incoming ISDN calling number (CLIP)
S91	0: Default: 1: all unknown AT commands will be answered with OK. 2: Windows 2000 compatibility: some AT commands will be answered with OK (see list below), unknown AT

	commands will be answered with OK .
--	--

Windows2000 AT command set change:

ATNxxx all commands **ATNxxx** will respond **OK** without any functionality behind it. V.110 baudrates can be set with **AT**BRN**.

ATBxxx All commands **ATBxxx** will respond **OK** without any functionality behind it. The B-channel protocol settings can be set with **AT**PROT**.

AT\Nxxx All commands **AT\Nxxx** will respond **OK** without any functionality behind it. The B-channel protocol settings can be set with **AT**PROT**.

4.1.3 AT result codes

Result codes (numerical and verbose):

Code	Text	Meaning
0	OK	Command completed, no error
1	CONNECT <rn>	Connection established (rn = call number of remote site)
2	RING <rn>	Indicates an incoming call (SETUP received)
3	NO CARRIER <xx>	No synchronization (xx = ISDN error cause)
4	ERROR	Illegal command or error that can not be indicated in any other way
5	CONNECT 1200 <rn>	Connection, line speed 1.2 kbps (V.110)
6	NO DIALTONE <xx>	No access to ISDN network (xx = ISDN error)
7	BUSY <xx>	Number busy (xx = ISDN error cause)
8	NO ANSWER <xx>	No connection; called number can not be reached (xx = ISDN error cause)
10	CONNECT 2400 <rn>	Connection, line speed 2.4 kbps (V.110)
11	CONNECT 4800 <rn>	Connection, line speed 4.8 kbps (V.110)
12	CONNECT 9600 <rn>	Connection, line speed 9.6 kbps (V.110)
16	CONNECT 19200 <rn>	Connection, line speed 19.2 kbps (V.110)
19	CONNECT 64000 <rn>	Connection, line speed 64 kbps
-	RINGING <rn>	Outgoing call is ringing at called site

Phone number display:

<rn> = phone number of remote site

In AT command mode, phone number display (does not belong to the AT command standard) can be activated by issuing the ATV2 or ATV3 command. If this is activated, the phone number of the caller is shown with the Connect or Ring message (in pointed brackets), depending on the signaling in the D channel.

If the Pocket ISDN TA is used in the public network, the phone number of the remote site (including area code) is displayed.

Example: CONNECT 64000 <040890880>

Error cause display:

<xx> = ISDN release (error) cause, hexadecimal

Example: NO CARRIER <#34F0>

In AT command mode, error cause display (does not belong to the AT command standard) can be activated by issuing the ATV2 or ATV3 command. The shown error causes use the coding defined by the CAPI definition. ISDN error causes from the ISDN network are always coded as 34xxH, where xx represents the hexadecimal version of the ISDN error cause (see Chapter 6.2). All other causes are CAPI error causes (see Chapter 6.3).

4.2 ISDN access control

Using these commands you can setup a table, to allow only specific callers to obtain a connection to the Pocket ISDN TA.

If this list is empty (default) or one entry is set to asterisk (*), any incoming call will be accepted.

Every incoming call that does not match one of the entries of acctab will be ignored. The received calling party number is compared with every entry beginning at the last digit and stopping when the shorter number has been completely compared.

acctab x nn/ss	sets entry number x to ISDN number nn and subaddress ss
acctab x -	clears entry number x
acctab x *	allows all incoming calls to be accepted
acctab x	shows entry number x
acctab	shows all entries

Maximum number of entries = 5; x = 1..5

Maximum length of ISDN number = 20 digits

Maximum length of subaddress = 20 digits

The ISDN number nn can contain wildcards:

* : represents one or more digits

? : represents exactly one digit

Note: If a subaddress is set, the received calling subaddress must be identical to the subaddress that is set.

Examples:

acctab1 1234567890	accepts only specified number
acctab2 *456*	accepts all numbers with 456 somewhere in the middle
acctab3 ? 2345678 ??	accepts all number with 2345678 in the middle preceded by one digit and followed by two digits.
acctab2 *1234/987	accepts all numbers that end with 1234 and have the subaddress 987
acctab3 *	accepts all incoming calls without subaddress
acctab3-	clears entry no. 3

Note: If you are not sure, in which format the calling number will be presented in an incoming call, use the ATV2 command to view the format of the calling number in the ring message. This number can be entered in the acctab.

4.3 Security callback

Note: This function only applies to the Pocket ISDN TA Profi

With the security callback, the called Pocket ISDN TA can make an automatic call to a pre-set number.

4.3.1 How it works

The local Pocket ISDN TA attempts to establish a data connection with the Remote ISDN TA. The Remote ISDN TA compares the phone number of the incoming call (from the local TA) with the phone numbers entered its “access table”(acctab). If the phone numbers match, the numbered in the entry for the call-back number (casnr) is called back after the call-back time (capa) has elapsed. Otherwise, the call is rejected.

The “security callback” function is deactivated with parameter **cmds2=40** or with **cmds2=0**.

ONLY 1 call-back attempt is possible.

4.3.2 Parameterization

Before you parameterize the **“Security Callback”** function, you must parameterize the customer-specific default settings. See Chapter “Starting up the ISDN TA”

4.3.2.1 Local ISDN TA

Setting the local MSN (your own phone number)

`at**msn=xxx` (xxx stands for the phone number)

Setting for the baudrate

`AT%bx` (x stands for the baudrate selected; see Chapter: Overview of the most important basic commands)

Saving the settings

`at&w`

4.3.2.2 Remote ISDN TA

Setting the local MSN (your own phone number)

`at**msn=xxx` (xxx stands for the phone number)

Setting for the type of connection

`at**ptp=x` x=0 Point-to-multipoint ISDN connection
 x=1 Point-to-point ISDN connection

Setting for the baudrate

`AT%bx` (x stands for the baudrate selected; see Chapter: Overview of the most important basic commands)

Activating the security call-back function:

`at**cmds2=40`

Entering the phone number of the local ISDN TA:

`at**acctab1=xxxx` (xxx stands for the phone number)

Entering the call-back number (local ISDN TA):

`at**casnr=xxxx`

Setting for the call-back time

`at**capa=xx` (xx in seconds)

Saving the settings

`at&w`

4.4 User-to-user signaling UUS1

With outgoing and incoming calls the transmission of user-to-user-data (UUS1 data) can be performed using the ISDN supplementary service UUS1. The UUS1 data are transmitted transparently from the calling party to the called party before the B channel connection is fully established. Please note, that this ISDN service normally has to be enabled by the ISDN service provider and may be charged for additionally.

See the command ATD in AT command set:

Example: **ATDisdnnumber[//<UUS1-data>]**
 (PAD:) **X25number[!<ISDNnumber>[//<UUS1data>]]**
 “//”: separator for UUS1 data

The UUS1 data have a maximum length of 128 Bytes and will be interpreted as ASCII characters.

Incoming UUS1 data are represented as extensions of the RING and CONNECT message.

AT: RING [<rn>] [//<UUS1-data>]
 CONNECT [<rn>] [//<UUS1-data>]
 PAD: <X.25addr>I<isdnnumber>[//<UUS1-data>]
 COM

Note: Display of UUS1 data has to be enabled by ATW1 command.

The data are represented as ASCII characters.

An incoming call can be accepted (S0 register set to 0) by an ATA or rejected by an ATH combined with the transmission of UUS1 data (AT only):

ATA [//<UUS1-data>]
ATH [//<UUS1-data>]

Examples:

ATD1234567890//userdata#010203*ende
RING //userdata
RING // #01020304

4.5 Subaddressing

With outgoing and incoming calls the transmission of subaddresses can be performed using the ISDN supplementary service SUB. The subaddress is transmitted transparently from the calling party to the called party before the B channel connection is fully established.

Please note, that this ISDN service normally has to be enabled by the ISDN service provider and may be charged for additionally.

The subaddress is separated from the called number by an “/”.

The subaddressing functionality can be used with the dialing procedures of the AT command set, PAD X.3 and automatic call.

Examples:

ATDisdnnumber[/subaddr]
 isdnnumber **dialing called party number**
 subaddr **called subaddress**

RING [<rn>[/subaddr]]

CONNECT [<rn>[/subaddr]]

rn called number

subaddr called subaddress

Your own subaddress (calling subbaddress) can be set using the **sub** configuration command.

Note: The subaddress can be entered additionally into all tables that contain ISDN numbers for dialing or checking an ISDN address.

4.6 Using Multilink PPP

Note: This chapter only applies to the Pocket ISDN TA Internet.

Only for the 5353 and 5354 checksums – recognizable by the last four digits of the bar code

To enable Multilink PPP handling within the Pocket ISDN TA please enable the ML-PPP B channel protocol: atb31 rsp. prot = 31.

ML-PPP may be used with different authentication procedures during the call up of the line. One of these is CHAP. You may enable ML-PPP CHAP by the following steps:

- Enter “**at**chappwd=<password>**” to input your password in the Pocket ISDN TA.
- Enter “**AT&W**” to store the setting.

After that, it is possible to establish a ML-PPP connection using CHAP authentication. If the server does not support CHAP, automatic fallback to PAP is performed.

You can control the settings by typing “AT&V1”.

Warning: Since the password is shown in plain text, it may be also be viewed by unauthorized persons.

4.6.1 Details on Multilink PPP

The following authentication protocols (AP) currently are supported on the Pocket ISDN TA with Multilink PPP (ML-PPP):

- Password Authentication Protocol (PAP)
- Challenge Handshake Authentication Protocol (CHAP) with the variants
- MD5 according to RFC 1321
- Microsoft Chap according to RFC 2433

PAP exchanges the password in plain text format in the B-channel, whereas CHAP encrypts the password according to the algorithms described in the RFCs mentioned above. For CHAP the password has to be stored in the Pocket ISDN TA in addition to the setting in the Dial-up Network under Windows 95. Under Windows 98/ME/2000 this is not necessary.

The following basic rules apply when the Pocket ISDN TA is configured to run ML-PPP:

1. If the remote end requests (in the Link Control Protocol LCP ConfigRequest) an AP that the Pocket ISDN TA can handle, the request is forwarded to local end.
2. If the remote side requests an AP that the Pocket ISDN TA cannot handle, the Pocket ISDN TA suggests the safest protocol depending on its capabilities:
 - PAP if no password *chappwd* is locally stored,
 - CHAP/MS-CHAP MD5, if a password *chappwd* is locally stored.This step may be repeated a limited number of times only, if this number exceeds, the Pocket ISDN TA falls back to single link operation until the next connection is tried.
3. Once the local end rejects (with a LCP ConfigNak), an AP that has been suggested by the Pocket ISDN TA as an alternative (see previous rule), the Pocket ISDN TA falls back to single link operation until the next connection is tried. Local and remote end may negotiate any AP they like.
4. At the end of the link establishment procedure, the negotiated AP is checked and, if supported, is used for the second link too. If the final AP is not supported, the second link is not established, the Pocket ISDN TA falls back to single link operation until the next connection is tried.

Note that some hosts are very strict. For example, if PAP is proposed by the Pocket ISDN TA due to the lack of a locally stored password *chappwd*, they simply hang up the connection without any chance to negotiate anything else. In these cases, the Pocket ISDN TA should be configured for single link PPP operation, or, alternatively, the *chappwd* should be supplied and stored on the Pocket ISDN TA.

4.6.2 Call bumping

An ML-PPP connection uses both B-channels of the S0 bus. To accept an incoming call (i.e. for voice telephony) during a ML-PPP session one B-channel has to be released. This is called “call bumping”.

To enable call bumping, proceed as follows:

- Activate call waiting on the S0 bus. It has to be activated in the ISDN switch and is a feature of the ISDN line you ordered.
- Open the “properties” of the dial-up link you are using for ML-PPP and “additional settings”. Enter “**at**cm1p = 1**” as an additional parameter.

If there is an incoming call during an ML-PPP session, the Pocket ISDN TA will drop one B-channel and an ISDN telephone attached to the S0 bus can accept the call.

4.6.3 Bandwidth on demand ("BOD")

Enabling this feature will cause the TA+PP2 to use the Multilink PPP protocol to enhance the ISDN throughput by automatically using the second B channel:

- if the throughput of the internet connection is higher than a definable value a second B channel connection will be automatically established and used for data transfer.

- if the throughput of the internet connection is lower than a definable value the second B channel connection will be disconnected automatically.

<code>at**bod=0</code>	disable BOD (default)
<code>at**bod=1</code>	enable BOD
<code>at**bodiv=<incrValue></code>	throughput level to add second B channel connection (in kbps) (default=40)
<code>at**bodit=<incrTime></code>	duration in which bodiv must be reached to add second B channel (in secs) (default=30)
<code>at**boddv=<decrValue></code>	throughput level to release second B channel connection (in kbps) (default=40)
<code>at**boddv=<decrTime></code>	duration in which boddv must be reached to release second B channel (in secs) (default=30)

Note: *Call Bumping ("cmlp") has higher priority than Bandwidth On Demand.*

4.7 Software update

The Pocket ISDN TA uses a Flash-EPROM on which operating software is stored for software updates. This software can be updated from a local connected PC via the COM port.

4.7.1 Software update

Please perform the following steps to update the Pocket ISDN TA:

- Get a new software release for the Pocket ISDN TA from your supplier and copy it to your PC.
- Start a terminal emulation on your PC with the capability to run an X-Modem file transfer (e.g. HyperTerminal).
- Enter the AT command "at**flash".
- Wait until the Flash-EPROM has been erased and the prompt to start your X-Modem transfer.
- Start the 1kX-MODEM file transfer (send file or upload) by selecting the Transfer / Send File menu point in your terminal emulation (e.g.: Hyperterm). Select the new software and press the <Send> button.
- After completion you will be shown whether the software update was completed successfully or with error.
- Give the Pocket ISDN TA about 20 seconds to activate the new software.
- Because of the new functionality, the last new configuration settings may be lost. Please check this first. To set factory default values, use the command "at&f1".

5 Diagnostics and error messages

For diagnostics in case of error, the following functionality is supported.

Please first check the behavior of LED displays, if an ISDN connection cannot be established. Refer to list of LED displays in Chapter A.2.

5.1 Error messages from AT command set

When the extended result messages are selected using the command `ATV2` ISDN error codes are displayed in addition to the standard AT result messages.

ISDN error causes from the ISDN network are always coded as `34xxH`, where the last two digits `xx` represent the ISDN error cause in hexadecimal coding. The meaning can be taken from the following tables ISDN error causes.

5.2 Table of ISDN error causes and their explanation (DSS1)

Cause decimal / hexadecimal	Meaning	Translation to AT result codes
1 / 0x81	Unallocated (unassigned) number	3
2 / 0x82	No route to transit network	3
3 / 0x83	No route to destination	3
6 / 0x86	Channel unavailable	6
7 / 0x87	Call awarded and being delivered in an established channel	6
16 / 0x90	Normal disconnect, unspecified	3
17 / 0x91	User busy	7
18 / 0x92	No user responding	8
19 / 0x93	No answer from user (user alerted)	8
20 / 0x94	No answer from user (device off)	8
21 / 0x95	Call rejected	8
22 / 0x96	Number changed	3
26 / 0x9A	Non selected user clearing	3
27 / 0x9B	Destination out of order	8
28 / 0x9C	Invalid number format	3
29 / 0x9D	Facility rejected	3
30 / 0x9E	Response to STATUS ENQUIRY	3

Cause decimal / hexadecimal	Meaning	Translation to AT result codes
31 / 0x9F	Normal disconnect, unspecified	3
34 / 0xA2	No circuit/channel available	7
38 / 0xA6	ISDN network out of order	6
41 / 0xA9	Temporarily failure	6
43 / 0xAB	Access information discarded	6
44 / 0xAC	Requested circuit/channel not available	6
46 / 0xAE	Precedence call blocked	6
47 / 0xAF	Resource unavailable, unspecified	6
49 / 0xB1	Quality of service unavailable	3
50 / 0xB2	Requested facility not subscribed	3
53 / 0xB5	Outgoing calls barred within CUG	3
55 / 0xB7	Incoming calls barred within CUG	3
57 / 0xB9	Bearer capability not authorized	3
58 / 0xBA	Bearer capability not implemented	3
63 / 0xBF	Service or option not implemented, unspecified	3
65 / 0xC1	Bearer capability not implemented	3
66 / 0xC2	Channel type not implemented	3
69 / 0xC5	Requested facility not implemented	3
70 / 0xC6	Only restricted digital information bearer capability is available	3
79 / 0xCF	Service or option not implemented, unspecified	3
81 / 0xD1	Invalid call reference value	3
82 / 0xD2	Identified channel does not exist	3
83 / 0xD3	A suspended call exists, but this call identity does not	3
84 / 0xD4	Call identity in use	3
85 / 0xD5	No call suspended	3
86 / 0xD6	Call having the requested call identity has been cleared	
87 / 0xD7	User not member of CUG	3
88 / 0xD8	Incompatible destination	3
90 / 0xDA	Non-existent CUG	3
91 / 0xDB	Invalid transit network selection	3
95 / 0xDF	Invalid message, unspecified	3
96 / 0xE0	Mandatory information element missing	3
97 / 0xE1	Message type non-existent or not implemented	3
98 / 0xE2	Message not compatible with call state	3
99 / 0xE3	Information element /parameter non-existent or not implemented	3
100 / 0xE4	Invalid information element contents	3
101 / 0xE5	Message not compatible with call state	3
102 / 0xE6	Recovery on timer expiry	3
103 / 0xE7	Parameter non-existent or not implemented, passed on	3
111 / 0xEF	Protocol error, unspecified	6
127 / 0xFF	Network interworking error, unspecified	6

5.3 CAPI error causes and their explanation

Hexadecimal coding of the CAPI error cause.

0000	No error
0001	NCPI ignored
0002	Flags ignored
0003	Alert already sent
1001	Too many applications
1002	Logical block size too small
1003	Buffer exceeds 64k
1004	Message buffer size too small
1005	Too many logical connections
1006	Reserved1
1007	Message could not be accepted
1008	Register OS Resource Error
100a	External Equipment not supported
100b	External Equipment only
1101	Bad application ID
1102	Illegal cmd or message length
1103	Message queue full
1104	Message queue empty
1105	Message lost
1106	Unknown notification
1107	Message not accepted
1108	OS Resource Error
1109	CAPI not installed
2001	Bad State
2002	Illegal Identifier
2003	Out of PLCI
2004	Out of NCCI
2005	Out of LISTEN
2006	Out of Fax Resources
2007	Illegal Message Parameters
3001	B1 protocol not supported
3002	B2 protocol not supported
3003	B3 protocol not supported
3004	B1 protocol param not supported
3005	B2 protocol param not supported
3006	B3 protocol param not supported
3007	B Prot combination not supported
3008	NCPI not supported
3009	Unknown CIP value
300a	Flags not supported
300b	Facility not supported
300c	Data length not supported
300d	Reset procedure not supported
3301	Layer1 protocol error
3302	Layer2 protocol error, i.e. DTE address not correct, TEI not correct

3303	Layer3 protocol error
3304	Another application got the call
3311	Fax remote station is not fax
3312	Fax training failed
3313	Fax disconnect before transfer
3314	Fax disconnect remote abort
3315	Fax disconnect remote procedure
3316	Fax disconnect local transmitter underrun
3317	Fax disconnect local receiver overflow
3318	Fax disconnect local abort
3319	Fax illegal transmit data
34xx	Error cause from the ISDN line, xx represents the ISDN error cause, section 4.2

6. Appendix

A.1 Technical data

One V.24 channel:

functional: V.24

electrical: V.28

mechanical: 9-way DSUB connector (female)

Transmission speeds:

DTE: 1200 – 15,200 bps (asynchronous)
1200 – 230,400 bps (asynchronous) (Pocket ISDN
Internet only)

B channel: 2 x 64,000 bps (synchronous)

Character representation:

8 bits, no parity, 1 stop bit

7 bits, even/odd parity, 1 stop bit

Character synchronization:

asynchronous

Operating mode:

half duplex or full duplex

ISDN interface:

basic rate interface according to ITU I.430 (RJ45)

Physical dimensions:

desktop casing: 230 x 50 x 200 mm (WxHxD)

A.2 LED displays

Active states:

L1	L2	Status	
⊗	⊕ (2sec)	Power-On-Phase	Wait
⊕ (1x1s)	○	ISDN not ok	Check ISDN interface/ -connector
⊗	○	Active phase	ISDN ok, no ISDN connection established
⊗	⊘	Call active	ISDN Connection will be established
⊗	⊕	Synch active	Waiting for B channel synchronization
⊗	⊗	Connected	Data connection is established

B1,B2

	Status B channel	
○	B channel offline	
⊗	B channel online	ISDN connection established

Error states:

L1	L2	Status	
○	○	TA not ok	Hardware error, TA repair necessary
⊕	○	ISDN not ok	Check ISDN interface/ -connector
○	⊕ (nx1s)	TA not ok	Hardware error, TA repair necessary
⊕	⊕	B1, B2 flashing	Bootloader aktive, no operational firmware programmed. Use command at**flash to download firmware with 115200 Bd,N81 (see Chapter 4.6).

LED legend:

⊗	On	
⊘	occ	short on, long off Cycle 1 sec
⊕	fl	long on, short off Cycle 1 sec
⊕	(<i>nxms</i>)	continuous blinking: <i>n</i> times every <i>m</i> seconds
○	Off	

A.3 Pinout of the ISDN connector

Pinout of the ISDN jack (RJ45) (ITU I.430/ISO 8877)

Pin	Signal (S0)
1	Not connected
2	Not connected
3	Tx+ (Transmit +)
4	Rx+ (Receive +)
5	Rx- (Receive -)
6	Tx- (Transmit -)
7	Not connected
8	Not connected

A.4 Pinout of the V.24/V.28 interfaces TA (DSUB 9 jack)

Pin	V.24/V.28			I/O	TEXT
	ITU	DIN	EIA		
1	109	M5	DCD	O	Data carrier detect
2	104	D2	R D	O	Receive data
3	103	D1	T D	I	Transmit data
4	108/1 108/2	S1.1 S1.2	DTR	I	Data terminal ready
5	102	E2	GND	---	Signal ground
6	107	M1	DSR	O	Data set ready
7	105	S2	RTS	I	Request to send
8	106	M2	CTS	O	Clear to send
9	125	M3	RI	O	Ring indicator

A.5 Pinout of the V.24/V.28 interfaces TA (DSUB 25 jack)

Pin	V.24/V.28			I/O	TEXT
	ITU	DIN	EIA		
1	101	E1		---	Protective ground
2	103	D1	T D	I	Transmit data
3	104	D2	R D	O	Receive data
4	105	S2	RTS	I	Request to send
5	106	M2	CTS	O	Clear to send
6	107	M1	DSR	O	Data set ready
7	102	E2		---	Signal ground
8	109	M5	DCD	O	Data carrier detect
20	108/1 108/2	S1.1 S1.2	DTR	I	Data terminal ready
22	125	M3	RI	O	Ring indicator

A.6 Cable assignment of the 9 to 25-way RS232 cable

Only the cable with a male connector at the terminal end is shown. The pin configuration for the female connector is the same.

V.24 device				TA
1	shield *			
5	SGND	102		5
2	TD	103		3
3	RD	104		2
4	RTS	105		7
5	CTS	106		8
6	DSR	107		6
20	DTR	108		4
8	DCD	109		1
22	RI	125		9
25-way jack				9-way jack

Attention: permitted cable length < 15m.
 for transmission speeds > 19,200 bps < 2m.
 * necessary if cable length > 2m

1. Parameters not longer contained in V1.009 (TA+POX)

+ v25bisout: 0

+ casnr: (Security callback)

+ spid1: (because 'ISDN=5.7' is not implemented)

+ spid2: (because 'ISDN=5.7' is not implemented)

2. Parameters newly implemented in V1.009 (TA+POX)

+ x25dprefix: (are required for the 'prot=25,26' protocol)

+ forcex25: 0 (are required for the 'prot=25,26' protocol)

+ a100: (are required for the 'prot=25,26' protocol)

+ a200: (are required for the 'prot=25,26' protocol)

+ a300: (are required for the 'prot=25,26' protocol)

+ a400: (are required for the 'prot=25,26' protocol)

+ noibro1: (are required for the 'prot=25,26' protocol)

+ noibro2: (are required for the 'prot=25,26' protocol)

+ glmsni: 0 (call acceptance, if no 'called party number' is provided, specially for the Austrian ISDN network)

+ ox25nr: (equivalent to the previous parameter 'xnr')

+ v110dft: 0 (used for V.110 Prot. the format 8,N,1 in B channel / V110 data format transparent)

+ sbsize: 0 (uses a different serial data block length than the B channel 'bsize')

Module: - capitr (CAPI trace has been implemented; integral part of the trace module)

+ cmtrc: 0

+ cmtrclen: 32

3. AT parameter settings that have changed from V5.384 (TA+POC) to V1.009 (TA+POX)

AT command	POC	POX
ATI0	TA+POC	TA+POX
ATI3	V5.384	V1.009
ATI9	(' \$STO1004\1234AB89\MODEM\ STO1004\TA+POC2E)	(' \$STO1009\1234AB89\MODEM\ STO1009\TA+POX4D)
ATI99	POCa000 V5.384 Jan 4 2002 10:22:43	POXa010 V1.009 Jun 22 2004 15:38:00

AT command: AT&V (after AT&F)

+ POC:

ACTIVE PROFILE:

B10 E1 Q0 V1 W0 X4 &C1 &D2 &K3 &R1 &S0 %B0 #R0

S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:030 S09:000

S16:0000H S90: S91:000

+ POX:

ACTIVE PROFILE:

B10 E1 Q0 V1 W0 X4 &C1 &D2 &R1 &S0 %B0 #R0

S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:030 S09:001

Differences:

* POC: S9:000, AT&K3

* POX: S9:001, (AT&K is not displayed)

4. Configuration parameter settings that have changed from V5.384 (TA+POC) to V1.009 (TA+POX)

Configuration commands:

POC	POX
rstmsg: 1	rstmsg: 0
x25mb: 0	x25mb: 1
cpl3: 10 cpua: 3 cpua2: 0	cpl3: 0 cpua: 0 cpua2: 0
trcnsk: 0000000700020500	trcnsk: 000000770072050004

5. Available settable parameter settings

Available command sets <cmds>:

<u>Parameter</u>	<u>POC</u>	<u>POX</u>
0	ATcmd	ATcmd
1	PAD X.3	PAD X.3
2	V.25bisAsync	Not included
6	HotlineDtr	HotlineDtr
7	HotlineTxd	HotlineTxd
8	ConnectAlways	ConnectAlways
10	Configurator	Configurator
12	Not included	IncomingCallsOnly

Available protocols <prot>:

<u>Parameter</u>	<u>POC</u>	<u>POX</u>
0	V.110	V.110
3	Async HDLC	Async HDLC
4	HDLC transp.	HDLC transp.
5	Byte transp.	Byte transp.
10	X.75 SLP	X.75 SLP
13	V.120 async	V.120 async
20	X.25 B	X.25 B
21	X.31 D	X.31 D
22	T.70NL	T.70NL
23	T.90NL	T.90NL
25	IBRO30 with X25	IBRO30 with X25
26	IBRO30 with X31	IBRO30 with X31
40	External	Not included

Available D channel protocols <isdn>:

<u>Parameter</u>	<u>POC</u>	<u>POX</u>
0	DSS1	DSS1
1	1TR6	1TR6
5	NI12	Not included
6	JATE	Not included
7	AT&T	Not included
8	VNx	VNx