

TA+PPX

ISDN Terminal Adapter

User manual

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1 Introduction

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

This documentation is valid for the product:

- TA+PPX hardware version V1.0 or higher
Software version V7.011 or higher

1.1 Product description

- The TA+PPX connects a PC (or other device with serial port) to the ISDN. It gives access to online services as the Internet, AOL/CompuServe and T-Online and is also suitable for remote LAN access. You can see it as a digital replacement for an analogue modem.
- To work with TA you need an ISDN Basic Rate Interface (BRI) (replacing an analogue telephone line). The basic rate access can be ordered by your local telephone company or PTT.
- a PC with online software for a modem (see chapter 3)

The serial port of the PC should be capable of a data rate of up to 115.2 kbps (230.4 kbps for Multilink PPP to increase performance). This might require an additional PC card for older PCs.

1.2 Internet Access

There are three ways to access the Internet via ISDN:

- by synchronous PPP or Multilink PPP
- by bit rate adaptation V.120
- by B channel protocol X.75

It depends on the access facilities of your Internet service provider (ISP) or Point-of-presence (POP) which one you may use (see figure 1).

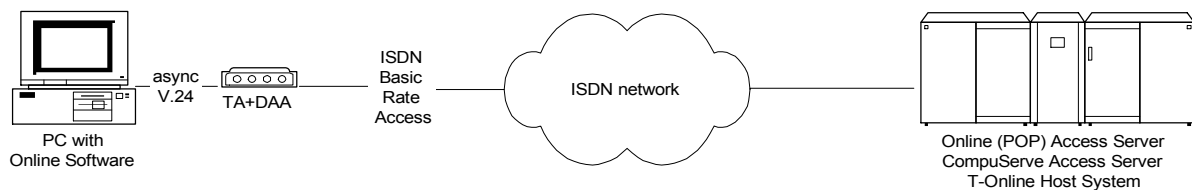


Figure 1: Usage of the TA to access an Online Service

1.3 AOL/CompuServe Access

AOL/CompuServe is accessed via ISDN by the protocol V.120 or X.75 (see picture 1). It depends on the access facilities of your AOL/CompuServe access point which one you have to use (see figure 1). The increasingly common protocol used is X.75.

1.4 T-Online

T-Online (German Online Service) is accessed via ISDN by the protocol synchronous PPP (see figure 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

Stollmann has installed a Windows-NT-Server just for test purposes. The Server supports the RAS (Remote Access Service) with full 64 kbps in one single B

channel. The RAS service gives the possibility to connect PC's using Windows-2000/NT or Windows9x/ME with each other.

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

The 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 number is ++49 40 89088 328.

Please use the username "guest" and password "guest".

1.7 License

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

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

TA is conforming to the European safety requirements IEC 60 950. Please use only the delivered power supply or an original replacement from Stollmann. Connect the TA only to the S0-interfaces with SELV (**S**afety **E**xtra **L**ow **V**oltage) related to EN60950.

The TA is conforming to the European rules of EMC. EN50081-1, here EN55022 Class B, for electromagnetic field emission and EN50082-1 for immunity against electromagnetic interference.

2 Installation

2.1 Contents

This packet contains the following items:

- ISDN Terminal adapter TA in desktop box
- Mains plug power supply adapter
- ISDN interface cable
- DTE interface serial cable
- Disk/CD-ROM with installation software Windows9x/ME/2000/NT4/XP
- This user manual

2.2 Installation procedure

- Connect the serial port (DTE) of the TA to the serial port (COM-port) of the PC by 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 TA to the basic rate interface (BRI) of the ISDN using the delivered ISDN cable.
- Connect the power supply with the TA and plug it into mains.

Please reference to page 11 for selecting the correct plug for interfacing.

Now the power-up sequence described in chapter 2.5 should appear.

The TA is now ready for use; please refer to the next chapter for the configuration to use the PC together with the TA.

2.3 Windows 9x/ME/2000/XP Software Installation

This chapter describes the installation, configuration and usage of the TA for the operating system Windows 9x/ME/2000/XP.

The following components will be installed:

- Modem driver into the modem list
- CAPI 2.0 driver
- Configuration program

2.3.1 Preparation (Windows9x/ME/2000/XP)

Please check the following requirements before installing the software for Windows9x/ME/2000/XP:

- PC-System with connected TA.
- Installed Microsoft Windows 9x/ME/2000/XP operation system
- Windows 9x CD-ROM (typically not required for ME/2000/XP)
- Installation Disk/CD-ROM

2.3.2 Installation (Windows9x/ME/2000/XP)

1. When the TA is connected and power up while booting your PC with Windows9x/ME/2000/XP, the Plug and Play feature of the TA will get active, so Windows9x/ME/2000/XP will request an installation Disk/CD-ROM/folder. If you want to install manually the TA driver, execute the program SETUP.EXE from the installation Disk/CD-ROM/folder. This program leads you through the installation.

The configuration of the TA will be described in the following section. You can skip the configuration of the TA now, if information is missing. The configuration can be done later by using the ISDN configuration generator.

The installation program creates in addition a program folder with the following program icons:

- **“ISDN TA Manager”**
(configuration program for the ISDN TA)
- **“Readme”**
(shows actual information and changes of the product release)
- **“Server Access”**
(shows the path to the ftp server with latest software files)
- **“TA+PPX Manual”**
(Manual of TA+PPX)
- **“Loopback Test”**
(The Loopback Test is a simple program to check your ISDN adapter installation and your ISDN line.)
- **“Uninstall ...”** icon
(to uninstall the actual software and delete the modems from the modem list)

2.3.3 Uninstallation

If you want to delete the software of the TA from your hard disk, please click on the icon “**Uninstall ...**” from the program folder.

2.4 Windows NT 4.0 Software Installation

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

The following components will be installed:

- CAPI 2.0 driver
- Configuration program

2.4.1 Preparation (WindowsNT4.0)

Please check the following requirements before installing the software for WindowsNT4.0:

- PC-System with connected TA.
- Installed Microsoft Windows NT operation system
- Windows NT4.0 CD-ROM (typically not required)
- Installation Disk/CD-ROM

2.4.2 Installation (WindowsNT4.0)

1. Execute the program SETUP.EXE from the installation disk. This program leads you through the installation.
2. The configuration of the TA will be described in the following section. You can skip the configuration of the TA now, if information is missing. The configuration can be done later by using the TA ISDN Manager.
3. Now you have to add new Modems manually. Please go to
START -> SETTINGS -> CONTROL PANEL -> MODEMS
Select ADD and activate the button "Don't detect my modem, I will select it from a list".

Please choose via the DISKETTE button the path to the TA installation Disk/CD-ROM/folder and open the file “mdmstppx.inf”.

You can select the following TA modems:

- TA Internet PPP
- TA Internet ML-PPP
- TA V.120
- TA X.75

Please note, that every modem has to be installed separately.

4. Select the used COM port and finish to end the installation procedure.

Configuration

Using the *TA+PPX Manager* the configuration parameter of the TA will be set up. If you don't know the correct parameter please contact the provider of your ISDN basic rate interface (telephone company).

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

After providing the settings you can leave the configurator. The TA is now ready to be used with Modem applications (i.e. Microsoft Dial-Up Networking) or CAPI compatible application programs.

2.5 Display and control elements

You can control the status of the TA+PPX via 8 LEDs at the front side

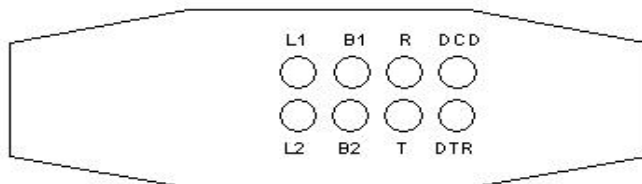


Fig. 2: Front view of the desktop model TA+PPX

At the back of the TA+PPX you will find the connectors for the following devices:

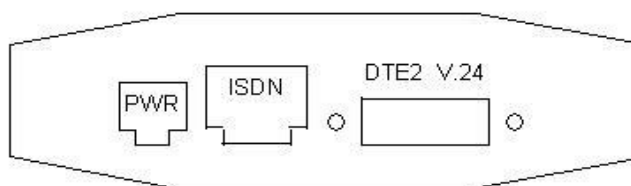


Fig. 3: Back view of the desktop model TA+PPX

PWR:	external power supply
ISDN:	ISDN interface.
DTE:	V.24 interface for DTE, i.e. a PC

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

- R :** shows activity of receiving data from the TA and ISDN line
- T :** shows activity of transmitted data from the terminal

DTR : shows the status of DTR line, i.e. the terminal is trying to connect via the TA

DCD : represents the status of the DCD line (V.24); shows normally the connection to an access server.

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

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

	Status	L1	L2	
1.	Power-On-Phase, wait	⊗	⊕	(about 2 sec)
2.	Active phase, ISDN ok	⊗	○	
3.	Connected, ISDN data connection established	⊗	⊗	

LED Legend: ⊗ On
 ⊕ Continuously blinking
 ○ Off

A complete list you can find in the appendix "LED displays"

3 Using the TA with Application Software

To use the 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 a PC.
- The service provider will also supply you with the ISDN access number to call (has to be entered in the application program).
- The TAs parameter must fit the characteristics of the access point which be recommended in the next chapters.

3.1 Configuration for Internet

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

- ISDN access number (to be entered at the PC program)
- Layer two protocol, usually the protocol PPP by selecting Modem 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 it may be necessary that you need some additional information like TCP/IP address, user name, password etc. Please refer to the software manual.

3.1.1 Configuration under Windows 9x/ME/2000/XP

The configuration of the TA can be dependent of the type of access the Internet provider is supporting. 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 get 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 TA you need the following information from AOL/CompuServe:

- ISDN access number
- Layer two protocol, usually the protocol-type X.75 by selecting Modem TA X.75. Some accesses still use B channel protocol V.120 (select Modem TA V.120).

How to select the modem see also page 9.

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

4 Configuring the TA

The settings of the TA for the V.24 interface and the S₀ interface are called configuration. The TA is delivered with a set of pre-set values. In the following section it will be shown how, by using the configuration commands, you can examine the configuration of the TA and if necessary change it. The values can be stored in non volatile memory; this means they'll remain unchanged even if the power supply is disconnected.

You can configure the TA in the following ways:

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

Normally the configuration via AT commands is sufficient.

4.1 AT command set

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

Please check if the factory setting will fit with your environment. The factory setting is described (highlighted) in the parameter list shown in chapter "AT command set" (see below).

If you want another configuration as set in the factory default setting, please do the following steps:

- Connect the TA to ISDN interface
- Connect the com-port from the PC to the DTE interface of the TA.
- Connect the power supply to the mains socket.
- Start a terminal emulation on your PC, please verify that the baudrate setting of the terminal emulation fits those of the TA.
- Set up the parameter of the TA from the terminal emulation and save the parameter 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)

- Leave 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 done with <BACKSPACE>. A command line has a maximum of 80 characters. The command line is automatically cancelled by longer input. Blanks are ignored, capital/small letters are not significant.

The parameter settings of the TA obtained when using the AT commands can be permanently stored (AT&W) and are not lost by resetting or by leaving the 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 may not exceed 1 sec.

The escape sequence is transmitted transparent to the remote device.

By using initialization strings to configure the TA which includes more than one parameter to be configured please follow the examples below:

- Initialization string includes standard AT commands:
AT&F&D2&C1E0&W

By using a special configuration command (at**<cmd>) in the initialization string you have to set a semicolon <;> in case that additional commands will follow.

- Initialization string includes special AT commands:
AT&F****BR=8;**&D2&C1E0&W

Supported commands:

A/	Repeat last command line
-----------	--------------------------

This command repeats the commands of the last entered command line.

Note: No prefix **AT** is required.

A/

A	Accept incoming call
----------	----------------------

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

B B channel protocol

Transmission protocol for data communication in the B channel.

ATB0 : Async V.110

ATB3 : HDLC async to sync conversion
(PPP asynchronous, single link PPP, default
i.e. for Internet / dial-up network access)

ATB4 : HDLC transparent (octets are packed into HDLC frames)

ATB5 : Byte transparent (raw B channel data)

ATB10 : X.75-NL (i.e. for BBS access)

ATB13 : V.120 (for AOL/CompuServe access)

ATB22 : T.70-NL-CEPT (for T-Online (videotex) access)

ATB23 : T.90-NL

ATB31 : Multilink PPP (ML-PPP)

ATB32 : AO/DI and Multilink PPP (optional)

ATB33 : X.75 B-channel bundling (optional)

%B Set local baudrate

Sets the local baudrate of the TA to the desired value (fix value) or to autodetection. When autodetection is set, the TA will recognize the desired baudrate with every newly entered AT command by 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.

AT%B0 Automatic local baudrate detection enabled (autobauding, default)

AT%B1 Local baudrate set to 1200 bit/s

AT%B2 Local baudrate set to 2400 bit/s

AT%B3 Local baudrate set to 4800 bit/s

AT%B4 Local baudrate set to 9600 bit/s

AT%B5 Local baudrate set to 19200 bit/s

AT%B6 Local baudrate set to 38400 bit/s

AT%B7 Local baudrate set to 57600 bit/s

AT%B8 Local baudrate set to 115200 bit/s

AT%B9 Local baudrate set to 230400 bit/s

Note: If autobauding is selected (default) and after powering on the TA+POC no AT command is entered, a response from the TA (i.e. RING) will be sent with the baudrate 115200 bit/s.

CONF Enter TA+Configurator

Enters directly into the TA+Configurator, the configuration prompt "#" will be displayed. Leave the TA+Configurator with the command "quit".

ATCONF

&C DCD control

Selects the behavior of the DCD control line from the TA.

AT&C TA control line DCD is always ON

AT&C1 DCD ON indicates ISDN connection is established and synchronized (default)

#C Received bearer service

Shows the bearer service that is received with an incoming call in hexadecimal coding *hbhb*.

The value for *hbhb* (word) is the CIP value as defined in the CAPI 2.0 specification, , also to be found via Stollmann URL <http://www.stollmann.de>.

AT#C

#C1=hbhb Select bearer service outgoing

Selects the bearer service that will be sent with an outgoing call

The value for *hbhb* (word) is the CIP value as defined in the CAPI 2.0 specification (default 0000).

Example: an outgoing call as a voice call: AT#C1=0004.

#C2=hbhbhbhb Select bearer service incoming

Selects the bearer services that can be accepted with an incoming call. The definition of *hbhbhbhb* (double word) is the CIP mask as defined in the CAPI 2.0 specification (default 00000004).

Example: AT#C2=00030012 : Accept analogue incoming calls

AT#C2=00000001 : Accept all incoming calls.

Note: Before issuing an outgoing call the command AT#C1 has to be set.

To use the predefined services please setup factory defaults (AT&F).

D Initiate outgoing call

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.

ATD<CALLEDnumber>[/<subaddr>]

CALLEDnumber: ISDN call number for a dialled B channel connection
subaddr dialled subaddress

ATD<CALLEDnumber>e Make a call for remote management (see note).

Note1: To setup the own subaddress see configuration command **sub**.

Note1: Adding an "e" to **CALLEDnumber** indicates that a connection to the internal remote access of a TA shall be performed, the protocol X.75 (ATB10) has to be used.

&D DTR control

Selects the behavior of the TA, when the DTE control line DTR changes from ON to OFF.

AT&D	DTE control line DTR setting is ignored
AT&D2	DTE control line DTR is evaluated: dropping the DTR line by the DTE will disconnect an existing ISDN connection (default). An incoming call will accepted only with DTR active.

E Local echo

Selects the local echo in command mode.

ATE	No local echo
ATE1	Local echo on in command phase (default)

&F Load factory defaults

Factory default will be loaded, ISDN protocol setting and msn's will not be overwritten. (for storing in non volatile memory please use the command AT&W).

AT&F	setup all parameter concerning data port
AT&F1	setup all parameter including ISDN protocols, msn settings and passwords.

H Disconnect

Disconnects existing ISDN data connection, after issuing the Escape sequence (see page 16).

ATH

I Display version information

Displays different information about version number and settings:

- AT1 Returns the "Modem"-type; name of the terminal adapter ("TA")
- AT11 Returns internal checksum ("64")
- AT12 Returns "OK"
- AT13 Returns version string: "V7.xyz"
- AT14 Returns manufacturers name: "Stollmann E+V GmbH"
- AT15 Returns ISDN selected protocol: "0 - DSS1"
- AT16 Returns copyright string: "(c) Copyright Stollmann GmbH"
- AT17 Returns "OK"
- AT18 Returns "ERROR"
- AT19 Returns plug and play ID string
- AT177 Returns Bootloader version string
- AT199 Returns software creation date

&K Flowcontrol

Selects the flow control behavior of the TA while in data communication phase.

- AT&K No local flow control between the DTE and TA is used
- AT&K3** Local flow control is set to hardware handshake RTS/CTS (default)
- AT&K4 Local flow control is set to software handshake XON/XOFF

#M Received CLID

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

O Return to online state

If the TA is in command mode after issuing an escape sequence out of an existing connection, ATO brings the TA back to data phase.

Must be the last command in AT command line.

ATO

#O Received CLIP

Shows the calling line identification (CLIP) that is received with an incoming call – number of the calling party.

AT#O

Q Suppress results

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 CTS control

Selects the behavior of the CTS control line from the TA.

AT&R TA control line CTS is following all changes of RTS
AT&R1 CTS is always ON (default)

S Display and set internal S register

ATSnn? Show actual values (decimal) of selected register *nn*
ATSnn=xx Set selected register *nn* to the decimal value *xx*.

&S DSR control

Selects the behavior of the DSR control line from the TA.

AT&S TA control line DSR is always ON (default)
AT&S1 DSR ON indicates ISDN connection is established and synchronized

V Result format

ATV Result is presented as numbers (followed by <↵>)
ATV1 Result is presented as text (default)

&V Display configuration

AT&V Displays the actual configuration of AT command setting

AT&V1 including stored ISDN numbers
Displays the actual configuration of extended AT command setting

W Extended result codes

ATW Result is presented without 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 Store active configuration

The active configuration will be stored in non volatile memory.
AT&W

X Reduce result messages

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 Load stored settings

The active configuration will be reset to the stored configuration.
Must be the last command in an AT command line.
ATZ

#Z Define own msn

Defines the msni and msno *nn* (multiple subscriber number) for the data port.

If the number is set to "*" (default), all incoming calls are acceptable.
The msn can be displayed by command AT&V.

AT#Z=*nn* set msni and msno to *nn*

The msn is automatically stored to non volatile ram (without issuing command AT&W).

Note: If 1TR6 D channel protocol is selected, only one or the last digit is valid.

****DBITS** Number of data bits x asynchronous chars (7,8)

Number of data bits x for asynchronous character (7,default: 8)

AT**DBITS=*x*

****PRTY** Parity asynchronous chars

Selects the parity for asynchronous characters.

0: no parity; 1: even parity; 2: odd parity

AT**PRTY=0 No parity (default)

AT**PRTY=1 Even parity

AT**PRTY=2 Odd parity

4.1.1 ISDN specific AT commands

Setting up special ISDN parameter:

(only one command is allowed per AT command)

****msni** Define own msn incoming calls

Defines the msn *nn* (multiple subscriber number) for incoming calls to the data port.
If the number is set to "*" (default), all incoming calls are acceptable.

AT**msni=*nn* set msn to *nn*

AT**msni shows currently set msn number.

The msni is automatically stored to non volatile ram (without issuing command AT&W).

****msno** Define own msn outgoing calls

Defines the msn *nn* (multiple subscriber number) for outgoing calls from the data

port. This number is presented at the called side.
If the number is set to blank (default), the presented number is the main number of the ISDN access.

AT**msno=*nn* set msn to *nn*
AT**msno shows currently set msn number.

The msno is automatically stored to non volatile ram (without issuing command AT&W).

****BSIZE** Set B channel block size

Defines the maximum length *x* of a data block transmitted or received in B channel (default: BSIZE = 2048).

AT**BSIZE=*x*

Note: The value will be changed by setting the B channel protocol (ATBx).

****DTE** Set B channel Layer 2 address

Selects the Layer 2 link addresses. Only valid for protocols that are HDLC based (X.75, LAPB).

ATDTE=0** Calling side reacts as DTE,
 called side reacts as DCE (default, X.75 standard)
AT**DTE=1 TA reacts as DTE (own adr = 01)
AT**DTE=3 TA reacts as DCE (own adr = 03)

Note: The value will be changed by setting the B channel protocol (ATBx).

****ISDN** Select D channel protocol

Selects ISDN D channel protocol to the ISDN line. The protocol must fit the protocol running on the ISDN line otherwise a connection cannot be set up.

Note: after changing and storing the ISDN protocol the TA has to be reset by powering it off and on (alternately you can use the command AT&W**RESET).

ATISDN=0** Select DSS1 (Euro-ISDN) (default)

AT**ISDN=5 Select Bellcore National ISDN-1/2 (USA) (optional)
AT**ISDN=6 Select NTT INS-NET (Japan) (optional)
AT**ISDN=7 Select AT&T 5ESS (USA) (optional)
AT**ISDN=8 Select VN-4 (France) (optional)
AT**ISDN Show selected ISDN protocol

AT?ISDN** Show available ISDN protocols

****G711LAW** Set coding for voice connections

Selects the coding for voice type connections.

ATG711LAW=0** automatic durch D channel protocol

ATG711LAW=1** coding fix to a-law

ATG711LAW=2** coding fix to μ -law

Note: changing the isdn protocol sets up the g711law to a predefined default:

isdn = 0,8 : coding = a-law

isdn = 5,6,7 : coding = μ -law

AT&F does not change the setting of g711law.

****K** Set Layer 2 window size

Sets window size x layer 2 protocol B channel: x = 1 ..7, default: 7

ATK=x**

The default value is dependent of the selected B channel protocol.

****PTP** Set ISDN interface type

ATPTP=0** select multipoint mode (to connect ISDN terminals, default)

ATPTP=1** select point to point mode (to connect ISDN switching systems)

****RPWD** Password remote configuration

Sets password for remote configuration to *nn* (1..32 chars)

ATRPWD=nn**

Default: empty.

****SPID1, SPID2** Set SPID (Option)

For ISDN lines in the U.S. you have to set the SPID. You get it from your ISDN provider.

ATSPID1=xxxx** Set SPID 1

ATSPID2=xxxx** Set SPID 2

****<cmd>** Execute configuration command

Executes one configuration command.

AT**<cmd>

4.1.2 AT command S register set

- 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.)
- S2** Escape Character (default = 43h)
- S3** Carriage Return Character (default = 0Dh)
- S4** Line Feed Character (default = 0Ah)
- S5** Backspace Character (default = 1Ah)
- S7** Wait time for Carrier (sec) (default = 30 sec)
- S9** Enable PNP functionality for Windows95 (default=1, enabled)
- S16** Last occurred CAPI/ISDN error cause
- 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:

ATBxxx All commands ATBxxx 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
1	CONNECT <rn>	Connection established (<i>rn</i> = call number of remote site)
2	RING <rn>	Indicates an incoming call (SETUP received)
3	NO CARRIER <xx>	No synchronization (<i>xx</i> = ISDN error cause)
4	ERROR	Illegal command or error that can not be indicated otherwise
5	CONNECT 1200 <rn>	Connection, line speed 1.2 kbps (V.110)
6	NO DIALTONE <xx>	No access to ISDN network (<i>xx</i> = ISDN error)

7	BUSY <xx>	Number engaged (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

Call number display:

<rn> = call number of remote site

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

If the TA is used at the public network then the call 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 turned on by issuing the command ATV2 or ATV3. 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 page 32). All other causes are CAPI error causes (see page 34).

4.2 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 typically has to be enabled by the ISDN service provider and may be charged additionally.

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

The functionality Subaddressing can be used with the dialling procedures AT-command set and automatic call.

Examples:

ATDisdnnumber[/subaddr]

isdnumber	Dialling called party number
subaddr	Called subaddress

RING [<rn>[/subaddr]]

CONNECT [<rn>[/subaddr]]

rn	Calling party number
subaddr	Calling party subaddress

The own subaddress (calling subaddress) can be setup using the configuration command **sub**.

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

4.3 Using Multilink PPP

To enable Multilink PPP handling within the TA please enable protocol ML-PPP: **ATB31** resp. **prot = 31**.

ML-PPP may be used with two different authentication protocols during the link establishment phase:

- PAP (password authentication protocol, RFC 1334),
- CHAP (challenge handshake authentication protocol, RFC 1994) with variants
 - MD5 according to RFC 1321,
 - Microsoft Chap according to RFC 2433.

The simpler PAP transmits the user password as clear text over the line, whereas CHAP uses encryption. Which protocol is actually used depends on

- the local PC: if the dialup network configuration requests password encryption only CHAP will be used,
- the remote host configuration: it may (e.g.) allow both PAP and CHAP, CHAP only etc..

4.3.1 Restrictions on Windows95

The CHAP protocol requires that the local side (PC or TA) responds with the proper, encrypted password when ever requested by the remote host. Since Windows95 does not respond on repeated requests CHAP can be used on the second link only if the TA knows the password. It must be stored in the TA's NVRAM:

- Enter "**at**chappwd=<password>**" to input your password in the TA.
Warning: The input echo is shown in clear text, it should be hidden from unauthorized persons. Nevertheless, commands as "**AT&V1**" display the password as a sequence of asterisks ("**").
- Enter "**AT&W**" to store the setting in the TA.

If the password *chappwd* is not stored on the TA (or is wrong) and remote and/or local dialup network configuration require password encryption, the second link will be physically established for a short time, and will then be disconnected. As a consequence the Multilink option is disabled for the current connection.

4.3.2 Call Bumping

A ML-PPP connection uses both B-channels of the S bus. To accept an incoming call (i.e. for 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 S 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”.

4.3.3 Bandwidth on demand ("BOD"), AO/DI (special firmware required)

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

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

AO/DI: With selecting AO/DI the PPP/TCP/IP transmission will use the D channel with X.31 protocol (ATB32) and enhance the ISDN throughput by switching to one or two B channel connections automatically:

- if the throughput of the internet connection is higher than a definable value a first B channel connection will be established automatically and used for data transfer. The traffic in the D channel will be stopped.
- if the throughput of the internet connection is lower than a definable value the B channel connection will be disconnected automatically and all traffic will be sent through the D channel.

Settings BOD:

```
at**bod=0           disable BOD (default)
at**bod=1           enable BOD
at**bodiv=<incrValue> Throughput level to add 2nd B channel connection
                    (in kbit/s) (default=40)
at**bodit=<incrTime> duration that bodiv has been reached to add 2nd b
                    channel (in secs) (default=30)
at**boddv=<decrValue> Throughput level to release 2nd B channel connection
                    (in kbit/s) (default=40)
at**boddv=<decrTime> duration that boddv has been reached to release
                    2nd b channel (in secs) (default=30)
```

Settings AO/DI:

atb32	enable AO/DI
at**nr=##	
at**dbodiv=<incrValue>	Throughput level to use 1 st B channel connection (in kbit/s) (default=6)
at**dbodit=<incrTime>	duration that dbodiv has been reached to use 1 st B channel (in secs) (default=10)
at**dboddv=<decrValue>	Throughput level to release 1 st B channel connection (in kbit/s) (default=20)
at**dboddt=<decrTime>	duration that dboddv has been reached to release 1 st b channel (in secs) (default=180)

4.4 Software update

The TA uses a Flash-EPROM to store the software. This software can be updated from a local connected PC via the COM port.

4.4.1 Software update

Please fulfil the following steps to update the TA (*via AT-Cmds*):

- Get a new software release for the 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 (i.e. HyperTerminal).
- Enter the AT command "at**flash".
- Wait for end of erasing the Flash-EPROM 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 and select the new software.
- After completion you will get the information whether the software update ended successfully or erroneous.
- Give the TA about 20 seconds to activate the new software.
- Due to new functionality the last stored configuration setting may be lost, please check before using. To set factory default values please use the command "at&f1".

Please fulfil the following steps to update the TA (*via TA+PPX Manager*):

- Start TA+PPX Manager and press the "Update firmware" button (follow the "Update firmware" instruction to upload a new firmware)

5 Diagnostic and error messages

For the diagnostic of erroneous situations the following functionality is supported. Please check first the behavior of LED displays, if an ISDN connection can not be established. Refer to list of LED displays on page 37.

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*, whereas the last two digits *xx* represent the ISDN cause in hexadecimal coding. The meaning can be taken from the following tables ISDN causes (see page 32).

5.2 Table of ISDN 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 unacceptable	6
7 / 0x87	Call awarded and being delivered in an established channel	6
16 / 0x90	Normal clearing	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
31 / 0x9F	Normal disconnect, unspecified	3

Cause Decimal / Hexadecimal	Meaning	Translation to AT result codes
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 presently available	3
63 / 0xBF	Service or option not available, 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

Cause Decimal / Hexadecimal	Meaning	Translation to AT result codes
98 / 0xE2	Message not compatible with call state or message type non-existent or not implemented	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 causes and their explanation

Coding of the CAPI cause in hexadecimal form.

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 cause (see page 32)

6 Appendix

A1: Technical data:

One V.24 channel:

functional:	V.24
electrical:	V.28
mechanical:	9 pin DSUB connector (female)

Transmission speeds:

DTE:	1200 – 230400 bit/s (asynchronous)
B channel:	2 x 64000 bit/s (synchronous)

Character representation:

8Bit no Parity, 1 stop bit
7Bit 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 (W x H x D)

Switching power supply unit:

Model: SAW02-5.0-500
Blank denote cord output
Rated input voltage: 100-240Vac
Rated input current: 100mA
Rated frequency: 50/60 Hz
Rated output Voltage: 5Vdc
Rated output current: 500mA
Protection class: II
Max. ambient temperature: 40°C
Tested according to: EN60950-1/A11:2004

A2: LED displaysActive 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 channels**

○	B channel offline ; ISDN connection not established
⊗	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 page 31).

LED Legend:

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

A3: Pinout of the ISDN connector

Pinout of the 8 pin ISDN S-interface connector (RJ45) (ITU I.430/ISO 8877)

Pin	Signal (S ₀)
1	Not connected
2	Not connected
3	Tx+ (Transmit +)
4	Rx+ (Receive +)
5	Rx- (Receive -)
6	Tx- (Transmit -)
7	Not connected
8	Not connected

A4: Pinout of the V.24/V.28 interface TA (DSUB 9)

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

A5: Pinout of the V.24/V.28 interface TA (DSUB 25):

Pin	V.24/V.28			I/O	TEXT
	ITU	DIN	EIA		

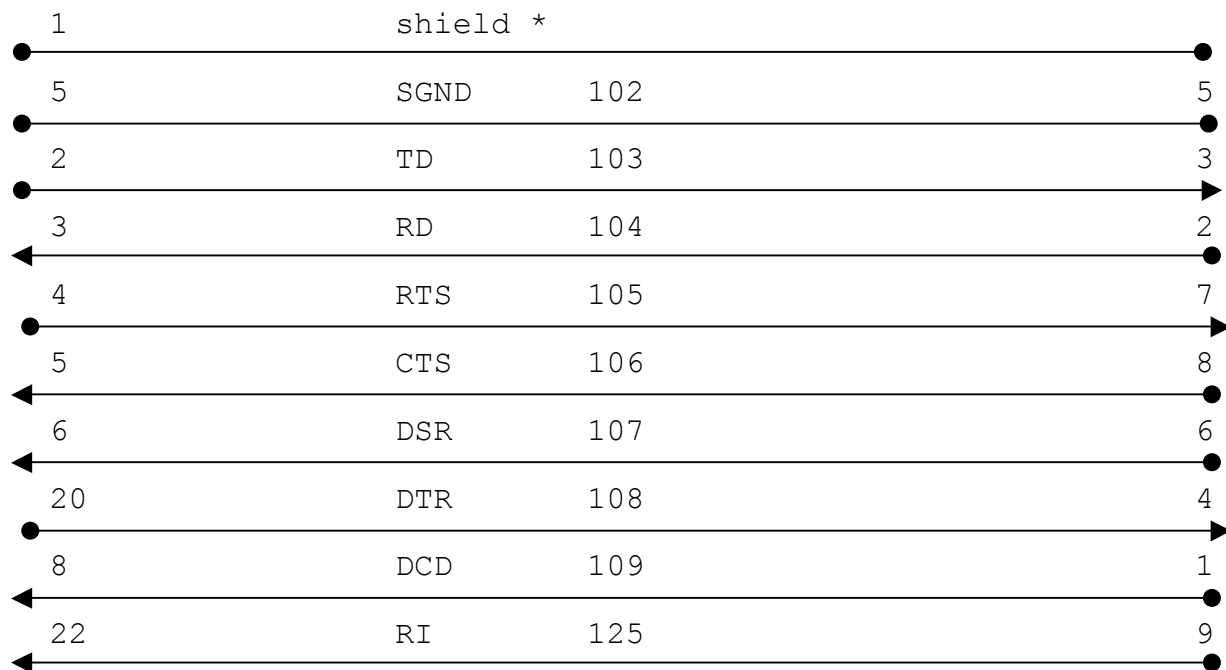
Pin	V.24/V.28			I/O	TEXT
	ITU	DIN	EIA		
1	101	E1		---	Protective ground
2	103	D1	T D	I	Transmit data
3	104	D2	R D	O	Receive data
4	105	S2	RTS	I	Request to send
5	106	M2	CTS	O	Clear to send
6	107	M1	DSR	O	Data set ready
7	102	E2		---	Signal ground
8	109	M5	DCD	O	Data carrier detect
20	108/1 108/2	S1.1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

A6: Cable layout for connection of terminals with 25 pin connectors (male or female) to a TA

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

V.24 device

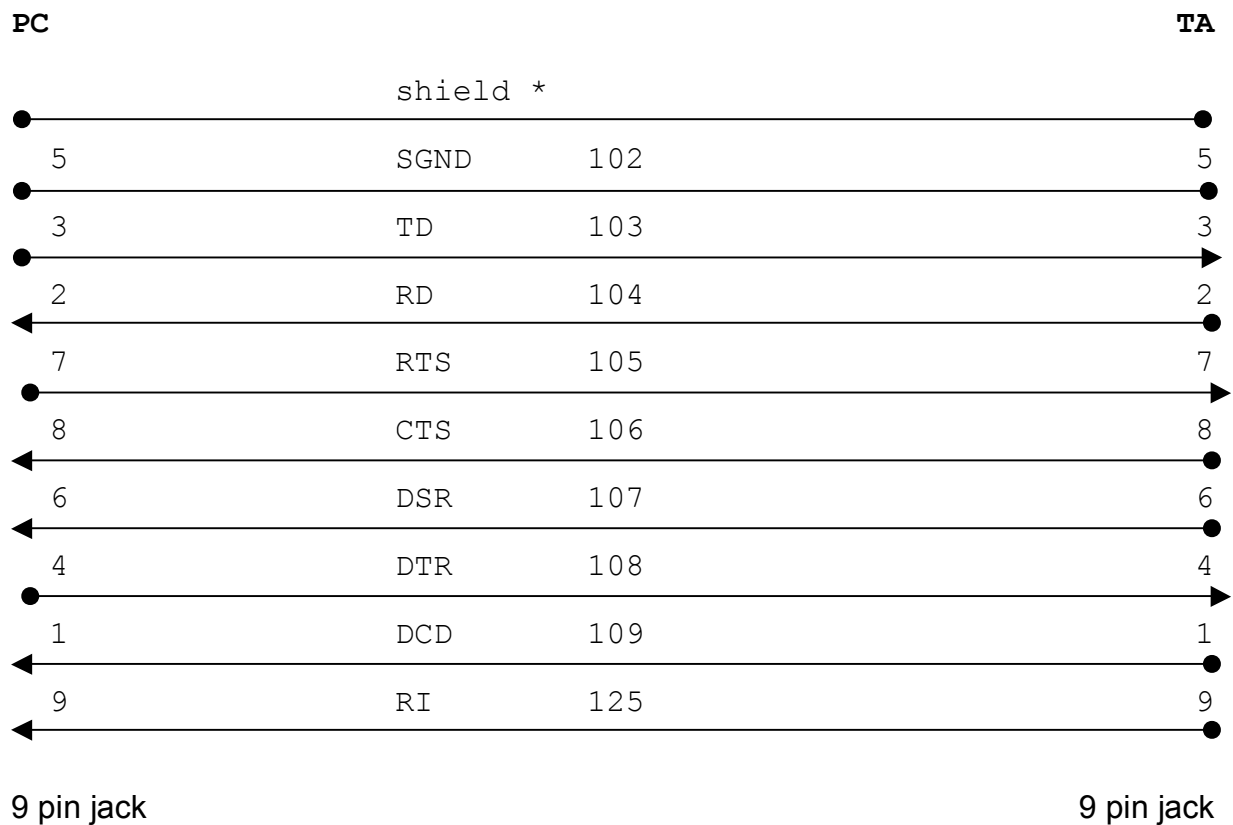
TA



25 pin jack

9 pin jack

Attention: allowed cable length < 15m.
 for transmission speeds > 19.200 bit/s < 2m.
 * necessary if cable length > 2m

A7: Cable layout to connect a PC with 9 pin male plug through a serial COM-port to a TA

Attention: allowed cable length < 15m.
for transmission speeds > 19.200 bit/s < 2m.
* necessary if cable length > 2m

7 Declaration of conformity

Konformitätserklärung gemäß dem Gesetz über Funkanlagen und Telekommunikationsendeinrichtungen (FTEG) und der Richtlinie 1999/5/EG (R&TTE)

Declaration of Conformity in accordance with Radio and Telecommunications Terminal Equipment Act (FTEG) and Directive 1999/5/EC (R&TTE Directive)

Stollmann E+V GmbH Mendelssohnstr. 15, 22761 Hamburg /
Hr. Jensen

Hersteller/Verantwortliche Person // The manufacturer / responsible person

erklärt, daß das Produkt
declares that the product

TA+POX alias TA+POCX alias TA+PPK alias TA+PPX

Telekommunikationseinrichtung mit Verwendungszweck: ISDN BRI Terminal Adapter
Telecommunications terminal equipment with intended purpose: ISDN BRI Terminal Adapter

bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen des §3 und den übrigen einschlägigen Bestimmungen des FTEG (Artikel 3 der R&TTE) entspricht.
complies with the essential requirements of §3 and the other relevant provisions of the FTEG (Article 3 of the R&TTE Directive), when used for its intended purpose

Gesundheit und Sicherheit gemäß §3(1)1.(Artikel 3 (1) a))
Health and safety requirements pursuant to §3(1)1.(Article 3(1)a))

angewendete harmonisierte Normen
harmonised standards applied
EN 60 950: 2000

Schutzanforderungen in Bezug auf die elektromagnetische Verträglichkeit §3(1)2, Artikel 3(1)b))
Protection requirements concerning electromagnetic compatibility §3(1)(2), (Article 3(1)b))

angewendete harmonisierte Normen
harmonised standards applied

EN 55 022: 1998 + A1 (2000) Class B
EN 55 024: 1999

See Test Report EMV Services No. 02/2028-7

Maßnahmen zur Sicherung der Operabilität
Measures for maintaining operability

angewendete harmonisierte Normen
harmonised standards applied

ETS TBR3/A1

Ort, Datum
Place & date of issue

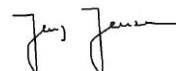
Hamburg, 09.12.2002

Firmenstempel
Firm stamp

Stollmann E+V GmbH
Mendelssohnstr. 15
22761 Hamburg

Name, Unterschrift
Name and signature

i.A. Jens Jensen



8 History

Version	Release Date	By	Change description
8.03	13.06.2007	NH	Added: Declaration of conformity Added: Technical data of power supply Fixed: Some format errors
R09_d01	05.09.2007	FH	New version numbering system Added: Chapter 8 "History" Added: "Life Support Policy"

History

Life Support Policy

This Stollmann product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. Stollmann customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Stollmann for any damages resulting.

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