ENGLISH

Communicator ISDN 128 External

User's Manual

Version 1.0

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1. Introduction

This Communicator ISDN 128 External bears the European ISDN approval hallmark and may therefore be connected to a standard ISDN line in the countries of the European Community.

This Communicator ISDN 128 External makes available the full 128,000 bps bandwidth of an ISDN connection and is therefore actually at least twice as fast as a normal 56k modem.

Your computer should have a free serial port available with a speed of 115,200 bps. Nearly all computers manufactured after 1995 have this.

Conventions in this manual

<key>	Here you should press key. The name of the key is given between the brackets.
'System'	This is a specific term used in a program; e.g., a term used in Windows.
[DIR]	Text in this font indicates that you are required to type it in.

Additional information will be shown as follows:

Note: *Turn off the computer before connecting the adapter.*

1.1 Minimal system requirements

- 80486 CPU on 66MHz
- Serial 9 or 25 pin port
- 8 MB memory
- 4 MB free hard disk space
- 3.5" FDD
- Communication program
- BRI ISDN line, suitable for S/T interface

2. Safety

Carefully read the following instructions before use:

1. The Communicator ISDN 128 External is intended to be connected to a standard ISDN Basic Rate Interface (ISDN BRI). It should therefore not be connected to an analogue telephone system or to a network. This can cause damage.
2. Only use the adapter in dry areas.
3. Do not connect or disconnect any equipment if the computer is still turned on. This can lead to damage to the equipment.
4. This Communicator ISDN 128 External uses a power supply adapter. Remove the plug from the power socket if you go on holiday or if you are not going to use the adapter for a longer period of time. Do NOT use any other power supply adapter than the one supplied.
5. Do NOT use this power supply adapter for other purposes (such as a walkman, for example). This can cause a fire.

3. Connection

3.1 Unpacking

The box should contain the following components:

- ISDN adapter
- Power supply adapter
- Serial cable
- ISDN telephone cable (RJ45)
- Splitter to RJ11
- Disk with drivers
- This manual

Contact your dealer if anything is missing.

3.2 Connecting to your computer

In order to be able to make use of your Communicator ISDN 128 External, you should connect the adapter to your computer

1. Connect the serial cable to your adapter's RS-232 connector (item 3, Figure 1).
2. Connect the other end of the serial cable to the free serial port on your computer (usually COM2).
3. Connect the ISDN telephone cable to the 'TO LINE' connector (4) of your adapter.
4. The other end of the ISDN telephone cable is connected to the ISDN BRI connection from your telephone company.
5. Connect the RJ45 plug of the splitter to the 'TO PHONE' connector (5) of your adapter
6. Connect your analogue telephone, fax or answering machine to the splitter.
7. Connect the power supply adapter to the power supply connection socket (2) of your adapter.
8. Connect the power supply adapter to the mains supply socket.

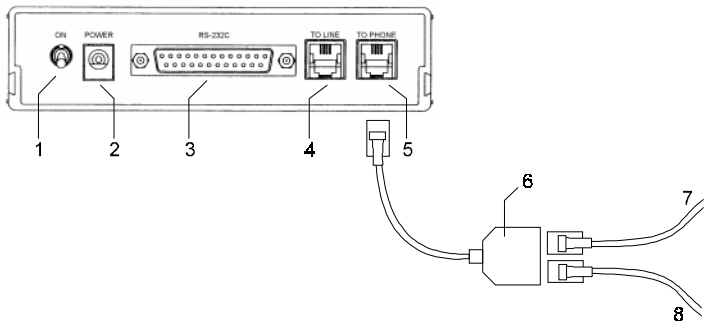

Figure 1: The back panel of your Trust Communicator ISDN

1. On / Off switch
2. Power supply adapter connection
3. RS-232C connection
4. ISDN connection
5. Telephone connection
6. Splitter cable for analogue lines
7. Connection for analogue telephone 1
8. Connection for analogue telephone 2

Note: *The Communicator ISDN 128 External has two outputs for analogue telephone, fax or modem. You can therefore connect an analogue 56k modem to these for services which do not support ISDN.*

4. Operating the Adapter

The Communicator ISDN only has a single switch, the on/off switch at the back. All other settings are set using the software.

The Communicator ISDN has indicators at the front. These show, just like an analogue modem, whether there is a connection and whether the adapter is on. The indicators show the following:

Indicator	**Meaning**
PR	On after the Trust Communicator ISDN is switched on.
SD	Blinking if data is being sent.
RD	Blinking if data is being received.
AA	Blinking if there is a call.
A1	POTS1 Is off, blinking or is on if you use the analogue line.
A2	POTS2 Is off, blinking or is on if you use the analogue line.
LNK	On if the ISDN line is in use.
128	Two active channels for MLPPP connection.

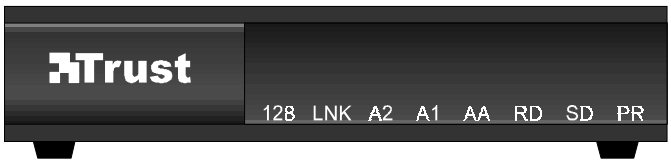

Figure 2: **The front panel of the Trust Communicator ISDN. It shows if there is a connection and whether the line is OK.**

5. Adding the Adapter

Before you add the adapter to Windows you should make sure that the right components have been installed and that the adapter is on.

In Windows 95 / Windows 98:

- Dial-up Networking (Start, Settings, Control Panel, Add/Remove programs -> tab 'Windows Set-up', Communications)
- Dial-up Adapter (Start, Settings, Control Panel, Network)

In Windows NT 4.0:

- Network Environment (remote access to the network)
- Remote Access Service (Start, Settings, Control Panel, Network -> tab Services. For more information, see the Windows NT manual).

5.1 Windows 95 / 98

The Communicator ISDN 128 External complies with the Plug & Play standard and this adapter will be automatically detected when Windows 95 or Windows 98 starts up.

If Windows 95/98 does not detect the adapter, you will have to install it yourself.

1. Go to System Properties (Start, Settings, Control Panel, System) and select the Device Manager.
2. Click on 'refresh'.
3. New hardware is now detected.

When Windows 95 / 98 has found the new hardware insert the diskette in the floppy drive. If the directory for the driver is requested enter 'A:\'.

Windows 98 will ask where to look for the driver. Select the floppy drive option.

5.2 Windows NT 4.0

In Windows NT 4.0 the adapter is installed as follows:

1. Start Windows NT 4.0.
2. Open the Control Panel (Start, Settings, Control Panel).
3. Select ‘Modems’.
4. Select the option ‘Don't detect my modem; I will select it from a list’.
5. Click on 'Next'.
6. Click on 'Have disk'.
7. Enter ‘A:\’ and click on ‘OK’.
8. Select the correct model for your application (see Table 1) and click on ‘Next’ to continue.
9. Select the COM port to which your adapter is connected (usually COM2) and click on ‘Next’ to continue.
10. The files will now be copied and the installation completed. This can take a few moments.
11. Enter the correct data in the screen ‘Location Information’ and click on 'Next' to continue.
12. Click on ‘Finish’ to end the installation.

6. Protocol Settings

The Communicator ISDN 128 External is suitable for various protocols and is set as standard to PPP/MLPPP Mode for use with the Internet.

If the service uses a different mode than PPP/MLPPP you should change this manually using AT commands. Use a terminal or modem program such as Telix for DOS or HyperTerminal in Windows 95 / 98.

Protocol	Suitable for	Set using
V.110 Mode	CompuServe NL CCITT standard	AT!Z=5
V.120 Mode	Direct connection to another Communicator ISDN or CompuServe in UK	AT!Z=6
PPP/MLPPP Mode	Internet Service Provider	AT!Z=9
X.75 Transparent Mode	Direct connection to another Communicator ISDN or T-Online in Germany	AT!Z=10
T.70BTX Mode		AT!Z=22
T.90NL Mode		AT!Z=23

Table 1: Protocol summary

6.1 Setting the Protocol

1. Start a terminal or modem program.
2. Type [AT] and press <Enter>. ‘OK’ appears on your screen.
3. Select from Table 1 the protocol you want to use and type the command in the column ‘Set using’. Then press <Enter>. (Example: To set protocol as V.110 Mode, type [AT!Z=5])
4. Type [AT&W] and press <Enter> to store the change.

You will find a complete list of the AT commands in appendix A.

7. Creating a Dial-up Connection

In order to be able to make use of your Communicator ISDN 128 External you should create a Dial-Up Connection. The installation procedure is different for Windows 95 and Windows NT.

7.1.1 Windows 95 / 98

1. Go to the 'Dial-Up Networking' window (My Computer, Dial-Up Networking).
2. Double click the 'Make New Connection' icon
3. Enter a name for your connection in the window which appears. (Example: Trust ISDN 128 External)
4. Select the correct device from the list. (Trust Communicator ISDN 128 External MLP PnP) and click on 'Next' to continue.
5. Enter the ISDN telephone number of your Internet Service Provider (ISP). Click on 'Next' to continue.
6. Click on 'Finish' to end the installation.

7.1.2 Windows NT

1. Open the 'Dial-Up Networking' screen (Start, Programs, Accessories, Dial-Up Networking).
2. When the message 'The phonebook is empty' appears on your screen click on 'OK' to continue. In all other cases click on 'New' to make a new connection.
3. In the window that appears enter the name of your connection (Example: Trust ISDN 128 External) and click on 'Next'.
4. Select all server options in the 'Server' window and click on 'Next'.
5. Enter the telephone number for your ISP and click on 'Next'.
6. Click on 'Finish' to end the installation.

7.2 Connection with Two Lines (128 kbps)

In order to get a connection with 2 lines (maximum speed 128kbps), the protocol should be set to MLPPP/PPP (see Table 1, Chapter 6).

The two telephone numbers should be separated by an 'a'.

64k connection	12345
128k connection	12345a12345

Some providers block 128k connections. Where providers normally support 128k the connection sometimes falls back to 64k when it is very busy.

Example: *If the telephone number of the service is 12345, you should enter 12345a12345 for a 128k connection.*

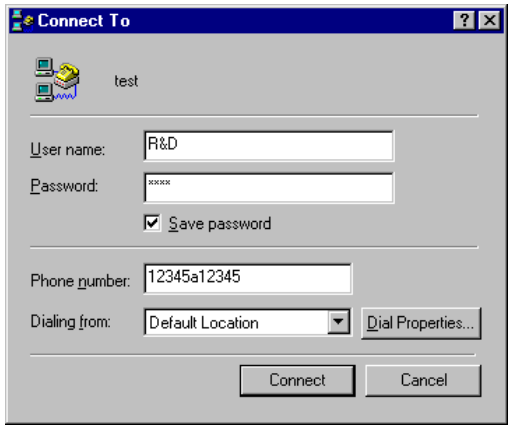

Figure 3: Entering the telephone number for a 128k connection

8. Software

No communications program is supplied with the Communicator ISDN 128 External.

The Communicator ISDN 128 External can only connect to other ISDN adapters. You should check in advance if the service you are trying to contact can use ISDN.

When surfing the Internet the Trust Communicator ISDN has worked well with Microsoft Internet Explorer 3.x and 4.x and the Netscape programs.

***Note**:* *The current version of this Trust Communicator ISDN 128 External does not work with RVS-Com or other CAPI Software.*

9. Troubleshooting

If your Communicator ISDN 128 External does not work correctly you may be able to fix the problem by checking the following items.

Check the following:

- Are all cables connected properly (see Chapter 3)?
- Do you have the correct network settings?
- Do you have the correct adapter settings?

Ensure that you have the latest version of the driver. You can download drivers from the Trust Internet site (www.trust.com).

Testing the adapter under Windows 95 / Windows 98

You can check in Windows 95 / 98 whether the adapter and its communications port are correctly configured.

1. Click on Start, Settings, Control Panel, Modems.
2. Select the tab 'Diagnostics'.
3. Select the adapter in the list with the associated port.
4. Click on 'More info...'.
5. If the adapter is working correctly a list with adapter information appears after a few moments.
6. If the adapter is not on the list or if Windows 95 / 98 gives an error message at 'More info...", check the settings of your COM port and re-install the adapter.

Problem	**Cause**	**Possible Solution**
PR indicator not burning	Adapter is not on.	Turn on the adapter.
	Adapter is not connected properly.	Plug the adapter into the power point
Adapter does not respond	Serial cable is not connected properly.	Connect the serial cable.
	COM port defect.	Let your dealer replace your COM port.

LNK is not on after the number has been dialled	ISDN cable is not connected	Connect your ISDN cable to your adapter and to the ISDN BRI.
The ‘128’ indicator does not come on	Telephone number not set for 128k connection	Set your telephone number again for 128k (Chapter 6)
	Protocol MLPPP/ PPP mode not set	Set the protocol to MLPPP/PPP mode.
	Your ISP does not support 128k connection	Use another ISP or do not use the 128.

If these suggestions do not fix the problem contact your dealer or the Trust Helpdesk. For the problem to be solved quickly you will need the following details:

- Brand and type of your adapter
- Brand and type of your computer
- Name, language and version of your operating system
- Driver version
- A clear description of the problem

10. Specifications

Trust Communicator ISDN External

ISDN connection	S/T connection ITU-T I.430
ISDN norm	DSS1 (Euro-ISDN)
Protocol B-channel	PPP asynchronous-synchronous HDLC transparent
	ITU-T V.120/64000 bps
	ITU-T X.75/T.70NL
DTE rate	1200 - 115200 bps (asynchronous)
Data structure	8 data bits;1 or 2 stop bits; no parity
B channel rate	64000 bps (synchronous)
Connection to computer	ITU-T V.24/EIA-232D/DB25 connection
Commands	AT commands, PAD (ITU-T X.3/X.28/X.29)
Transfer rate	115200 to 1200 asynchronous
Operation	Half duplex or full duplex
Extra memory	Modifiable non-volatile memory for storing one configuration profile
Connection requirements	ISDN-2 (standard)

Appendix A: AT Command Set

With the exception of the A/ command all of commands begin with the prefix AT and are terminated with <Enter>. Corrections in a command line are done with <Backspace>. A command line has a maximum of 4O characters, the command line is automatically cancelled by longer input. Blanks are ignored, capital or small letters are not significant.

The parameter settings of the TA obtained via using the AT commands are permanently stored by typing AT&W and are not lost by reset 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.

Appendix A.1: AT-Commands

/ Repeats the previous command.

A Answer incoming calls

Dn Places an originating call. If the call is rejected, an appropriate response such as "NO CARRIER”, "BUSY" OR "NO DIALTONE" will be displayed command mode will be re-entered. The commands "**DT**" and "**DP**" are identically as the "**D**" command.
The dialled string may contain the characters. When two telephone numbers are required (such as MLPPP) the two dial strings are separated by a "A". In the case of sub-addressing, the sub-address is separated from the telephone number by an "*". For Win95, "A" separator is recommended

DS DIAL using saved number

E0 Disable character echo in command state
E1 Enable character echo in command state (default)

F0 The V.110 network baud rate will track the DCE baud rate to a maximum of 38.400 (default)
F1 300 bps for V.110
F2 1.200 bps for V.110
F3 2.400 bps for V.110
F4 4.800 bps for V.110

F5 9.600 bps for V.110
F6 19.200 bps for V.110
F7 38.400 bps for V.110

H Hung-up

I0 Product identification
I1 EPROM checksum
I3 Model function
I6 Version product name

O Go back to connection state from escape mode

Q0 Return response codes after command input (default)
Q1 Do not return response codes

Sr=n Set register value
This command is used to alter an internal "modem" register. This command supports three different means of accessing S-register values:

Decimal form: Sr=d -Set register “r" to decimal value “d”.
Sr? -Display value of register “r” in decimal.

Examples:
```
S23=39
OK
S23?
39
OK
```

Hexadecimal form: Sr:=x - Set register “r” to hexadecimal value “x”
Sr:? - Display register “r” in hexadecimal.

Examples:
```
S23:=E2
OK
S23:?
E2
OK
```

Binary form: Sr:=x -Set register “r", bit “p”, to binary value “b”
Sr:? - Display register “r” in binary.

Examples: S23.?

10010100
OK
S23.?
00010100
OK

Sr? QUERY of register

V0 Display results in numeric form
V1 Display results in verbose form (default)

X0 base responses (default)
X1 extended responses
X2 extended ISDN responses

Z The active configuration will be reset to stored configuration.

&CO DCD always on
&C1 DCD on after connection (default)

&Dn DTR operation
&D2 Terminates the call after delay specified in S25 when DTR drops (default)

&F Recall factory default

&K0 Disables flow control
&K3 Enables RTS/CTS Flow Control (default)
&K4 Enables XON/XOFF Flow Control
&K5 Enables Transparent XON
&K6 Enables RTS/CTS and XON/XOFF

&MO Asynchronous mode (default)
&M1 Async/Sync mode
&M2 Synchronous mode

&PO Allow CHAP Negotiation
&P1 Disable CHAP Negotiation

&RO CTS tracks RTS
&R1 CTS on (default)

&SO DSR on
&S1 DSR on after connection

&V Display current configuration

&W Store current configuration in non-volatile memory

&Z Store phone number

!Z=n Set operating protocol
5 = V. 120 Mode
6 = V. 110 Mode
9 = PPP/MLPPP Mode
10 = X.75 Transparent Mode
22 = T.70BTX Mode
23 = T.90NL Mode

***Nn** Set UART Baud Rate
***NA** Enable Auto baud (all other values disable) for UART
***N0** 300 bps fixed for UART baud rate
***N1** 1.200 bps fixed for UART baud rate
***N2** 2.400 bps fixed for UART baud rate
***N3** 4.800 bps fixed for UART baud rate
***N4** 9.600 bps fixed for UART baud rate
***N5** 19.200 bps fixed for UART baud rate
***N6** 38.400 bps fixed for UART baud rate
***N7** 57.600 bps fixed for UART baud rate
***N8** 76.800 bps fixed for UART baud rate
***N9** 115.200 bps fixed for UART baud rate
***N10** 7.200 bps fixed for UART baud rate
***N11** 14.400 bps fixed for UART baud rate
***N12** 28.800 bps fixed for UART baud rate
***N13** 38.400 bps fixed for UART baud rate
***N14** 153.600 bps fixed for UART baud rate
***N15** Reserved
***N16** Reserved
***N17** Reserved

Appendix A.2: Register Description

S0 0-255. 0 disables Auto_Answer; a non-zero value will Auto_Answer an in coming call.

S2 0-127. The “escape-character”, in decimal. The default is 43 (”+")

S3 0-127. The “carriage return", or command terminator character. The default is 13 (<CR>).

S4 0-127. The “line feed” character. The default is 10 (<LF>).

S5 0-127. The “backspace” character. The default is 8 (<BS>).

S12 0-255. Number of milliseconds for escape characters. The default is 50.

S14 This register is bit-mapped for use with various options. The default is 138.

Bit 0 - Ext.baud rates
- 0 - 38400
- 1 - 19200

Bit 1 - Command echo (ATE Command)
- 0 - no echo
- 1 - echo

Bit 2 - Result codes (ATQ Command)
- 0 - enabled
- 1 - disabled

Bit 3 - Verbose mode (ATV Command)
- 0 - terse
- 1 - verbose

Bit 4 - Abort code
- 0 - On
- 1 - Off

Bit 5 - Not Used
Bit 6 - Not Used
Bit 7 - Originate / Answer
- 0 - answer
- 1 - originate

S21 This register is bit-mapped oft use with various options. The default is 19.

Bit 1 -0- Not Used
Bit 2 - CTS behaviour
- 0 - CTS on
- 1 - CTS track RTS

Bit 4 - 3 - DTR behaviour
- 00 - DTR ignored
- 01 - reserved
- 10 - DTR falling terminates call

Bit 5 - DCD behaviour
- 0 - DCD on
- 1 - DCD on after connection

Bit 6 -DSR behaviour
- 0 - DSR on
- 1 - DSR on after Connection

Bit 7 - Reserved

S22 0-255 This register provides a “bit-map" of options for result code usage.

- 0 - Display CONNECT Message Only.
- 64 - Display standard CONNECT Message.
- 112 - Display Enhanced ISDN CONNECT messages

S23 This register is bit-mapped to control baud rate and parity as follows

Bit 0 - Not Used

Bits 3 - 1 - Baud rate

- 000 - 300 bps
- 001 - Use extended baud rate sets
- 010 - 1.200 bps
- 011 - 2.400 bps
- 100 - 4.800 bps
- 101 - 9.600 bps
- 110 - 19.200 bps
- 111 - 38.400 bps

Bits 4 - 5 - Parity

- 00 - Even
- 01 - Space
- 10 - Odd
- 11 - Mark/None

Bits 7 - 6 - Extended baud rates

- 00 - 57.600 bps*
- 01 - 78.400 bps
- 10 - 115.200 bps
- 11 - Use other baud rates noted in S24.

S24 This register is bit-mapped to control autobaud and extra baud rates. The default is 192.

Bits 3 - 0 - Extra baud rates.

- 0000 - 7.200 bps
- 0001 - 14.400 bps
- 0010 - 28.800 bps
- 0011 - 153.600 bps
- 0100 - 230.400 bps
- 0101 - 460.800 bps
- 0110 - 921.600 bps
- 0111 - 1111 - Reserved

Bit 4 - 6 - reserved

Bit 7 - Autobaud select

- 0 - Disabled
- 1 - Enabled

S25 0-255. Delay for DTR management. The default is 5.

S26 0-255. Delay for CTS tracking RTS. The default is 1.

S27 This register is bit-mapped to handle protocol options. The default is 4.

Bits 1 - 0 - Async/sync
- 00 - Asynchronous*
- 01 - Asyn&Sync
- 10 - Synchronous
- 11 - Synchronous

Bit 2 - Supported Telephone Numbers
- 0 - one number
- 1 - multi-numbers

Bit 3 - Reserved

Bits 5 - 4 - V.110 clock
- 00 - internal*
- 01 - extemal

Bit 7 - 6 - Reserved

S32 XON flow control character. The default is 17.

S33 XOFF flow control character. The default is 19.

S37 This register is bit-mapped to handle V.110 network rates. The default is 0.

Bit 3 - 0 - Baud rate
- 0000 - follow DCE baud rate to maximum
- 0001 - 300 bps
- 0010 - 1.200 bps
- 0011 - 2.400 bps
- 0100 - 4.800 bps
- 0101 - 9.600 bps
- 0110 - 19.200 bps
- 0111 - 38.400 bps
- 0111 - 1111 - Reserved

Bits 7 - 4 -Reserved

S39 This register stores the Flow Control Selection. The default value is 3.

- 0 - No Flow Control
- 1 - Reserved
- 2 - Reserved
- 3 - RTS/CTS Flow Control
- 4 - XON/XOFF Flow Control
- 5 - Transparent Flow Control
- 6 - Both RTS/CTS and XON/XOFF Flow Control
- 255 - 7 - Reserved

S40 This register stores the POTS Dialling Time-out Selection. The default value is 5.

S54 Number of rings to wait before disconnect if S0=0.The default is 30.

Appendix A.3: Result Codes

0	OK	16	CONNECT 19200
1	CONNECT	17	CONNECT 38400
2	RING	18	CONNECT 48000
3	NOCARRIER	19	CONNECT 56000
4	ERROR	20	CONNECT 64000
5	CONNECT 1200	21	CONNECT 57600
6	NO DIALTONE	22	CONNECT 76800
7	BUSY	23	CONNECT 115200
8	NO ANSWER	24	CONNECT 7200
9	CONNECT 600	25	CONNECT 14400
10	CONNECT 2400	26	CONNECT 28800
11	CONNECT 4800	27	CONNECT 153600
12	CONNECT 9600	28	CONNECT 230400
13	CONNECT VOICE	29	CONNECT 460800
15	(aborted)	30	CONNECT 921600