



DIN EN ISO 9001:2000  
certified



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**Attention!**  
Product discontinuation  
due to EC RoHS directive  
More info: [www.addi-data.com](http://www.addi-data.com)

Technical description

ADDICOM APCI-7800

8-port serial interface

Edition: 05.02-1/2006

## Product information

This manual contains the technical installation and important instructions for correct commissioning and usage, as well as production information according to the current status before printing. The content of this manual and the technical product data may be changed without prior notice. ADDI-DATA GmbH reserves the right to make changes to the technical data and the materials included herein.

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## Declaration of Conformity

Document-Number/Month-Year: B-25804 / 02.1999

Manufacturer/Importer: ADDI-DATA GmbH  
Dieselstraße 3  
D-77833 OTTERSWEIER

Type: **APCI-7800**

Product description: **Board to be inserted in a PCI 32-bit/5 V slot of a PC  
8-port serial interface  
for SI modules PM232 (-G), PM422(-G), PM485(-G), PMTTY**

The above named product complies with the following European directives:

**Directive 72/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.**

**Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.**

The following norms have been applied:

IEC 61010-1 2002-08

IEC 61326-2 2004

2004/11/10

Date

*H. H. H. H.*

Legally valid signature of the manufacturer

# WARNING

In case of wrong uses and if the board is not used for the purpose it is intended:



◆ people may be injured,



◆ the board, PC and peripheral may be destroyed,



◆ the environment may be polluted

◆ **Protect yourself, the others and the environment!**

◆ **Read carefully the safety precautions (yellow leaflet).**

If this leaflet is not with the documentation, please contact us and ask for it.

◆ **Observe the instructions of the manual.**

Make sure that you do not forget or skip any step. We are not liable for damages resulting from a wrong use of the board.

◆ **Used symbols:**



## **IMPORTANT!**

designates hints and other useful information.



## **WARNING!**

It designates a possibly dangerous situation.

If the instructions are ignored the board, PC and/or peripheral may be destroyed.

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# 1 INTENDED PURPOSE OF THE BOARD

The board **APCI-7800** must be inserted in a PC with PCI 5V/32-bit slots, which is used as electrical equipment for measurement, control and laboratory use as defined in the norm IEC 61010-1.

The PC is to comply with the norm IEC61326 for measurement, control and laboratory use and with the specifications for EMC protection.

Products complying with these specifications bear the CE mark.

The board **APCI-7800** provides the personal computer (PC) with 8-port asynchronous serial interface for the communication with external devices. The operating mode of the interface depends on the SI modules installed.

The board is to be connected to the peripheral through a shielded cable, which shielding should be grounded on both ends.

Minimum specifications of the connection cable:

- metallized plastic hoods
- shielded cable
- cable shield folded back and firmly screwed to the connector housing.

The board supports serial communication through 8 asynchronous serial ports. The intended purpose of the board depends on the following parameters (See Table 1-1).



Table 1-1: Intended purpose depending on the operating mode

Module <sup>1</sup>	Operating mode	Port configuration	Distance between transmitter and receiver <sup>2</sup>	Environment
PM232	RS232	modem control signals connected on the board (through ADDIREG) or externally to the connector	30 m	industry
PM232-G	RS232	modem control signals connected on the board (through ADDIREG) or externally to the connector	30 m	noisy industrial environment
PMTTY	20 mA Current loop	current flows in rest state	1 km	very noisy industrial environment
PM422	RS422		1.2 km	noisy industrial environment
PM422-G	RS422		1.2 km	very noisy industrial environment
PM485	RS485	automatic transmitter control	200 m	industry
		transmitter control DTR, RTS or data bit	1.2 km	noisy industrial environment
PM485-G	RS485	automatic transmitter control	200 m	industry
		transmitter control DTR, RTS or data bit	1.2 km	very noisy industrial environment

<sup>1</sup> PMxxx-G: ex. PM232-G: module for the mode RS 232 with option G (optical isolation)  
PMTTY: module for the mode 20 mA current loop. It is optically isolated as a standard.

<sup>2</sup> The max. lengths are for standard interface cables

## 1.1 Limits of use

If the basic board is used with optically isolated modules and non isolated modules, then the safety built by the creeping distance of 3.2 mm is not ensured for the non isolated modules.

The use of the board in a PC could change the PC features regarding noise emission and immunity. Increased noise emission or decreased noise immunity could result in the system not being conform anymore.

Check the shielding capacity of the PC housing and cable prior to putting the device into operation.

The use of the board according to its intended purpose includes observing all advises given in this manual and in the safety leaflet.

Uses beyond these specifications are not allowed. The manufacturer is not liable for any damages which would result from the non-observance of this clause.

Make sure that the board remains in the protective blister pack **until it is used**.

Do not remove or alter the identification numbers of the board.  
If you do, the guarantee expires.

**For all operating modes**, the signal lines are to be twisted in pairs with GND. Use exclusively connection cable with twisted pairs.

The housing of the peripheral connector

- is to be firmly screwed together with the shield of the cable.
- is to assure a low-resistance connection ( $< 100 \text{ m}\Omega$ ) between the shield and the housing of the PC.

The shield of the cable is to be earthed on both ends.

**The APCI-7800 board is not to be used as safety related part for securing emergency stop functions.**

The emergency stop functions are to be secured separately.  
This securing must not be influenced by the board or the PC.

**The installation of the board APCI-7800 in sites lying under risk of explosion is excluded.**

Make sure that the board remains in its protective blister pack **until it is used**.

Do not remove or alter the identification numbers of the board.  
If you do, the guarantee expires.

## **2 USER**

### **2.1 Qualification**

Only persons trained in electronics are entitled to perform the following works:

- installation
- use,
- maintenance.

### **2.2 Personal protection**

Consider the country-specific regulations about:

- the prevention of accidents
- electrical and mechanical installations
- radio interference suppression.

### 3 HANDLING OF THE BOARD

Fig. 3-1: Correct handling



4 TECHNICAL DATA

4.1 Electromagnetic compatibility (EMC)

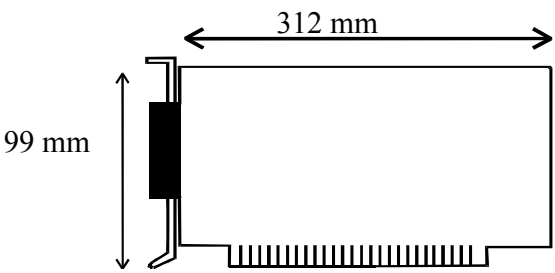
The board has been subjected to EMC tests in an accredited laboratory. The board complies with the limit values set by the norms IEC61326 as follows:

	True value	Set value
ESD (Discharge by contact/air) .....	4/8 kV	4/8 kV
Fields .....	10 V/m	10 V/m
Burst .....	4 kV	2 kV
Conducted radio interferences .....	10 V	10 V
Noise emissions.....	B class	

4.2 Physical set-up of the board

The board is assembled on a 4-layer printed circuit card.

Dimensions:



Width: .....	19.2 mm
Weight: .....	approx. 300 g
Installation in: .....	32/64-bit PCI slot 5 V
Connection to the peripheral <sup>1</sup> :	
ST7809: .....	8 x 9-pol. SUB-D male connector
ST7825: .....	8 x 25-pin SUB-D male connector

<sup>1</sup> Not included in the delivery. Please order separately

### 4.3 Limit values

Max. altitude: ..... 2000 m  
 Operating temperature: ..... 0 to 60°C  
 Storage temperature: ..... -25 to 70°C  
 Relative humidity: ..... 30% to 99% non condensing

#### Minimum PC requirements:

##### PCI BIOS from Version 1.0

Bus speed: ..... < 33 MHz  
 Operating system: ..... Windows NT, 98, 2000, XP

#### Energy requirements:

- Operating voltage of the PC: ..... 5 V  $\pm$  5%
- Current consumption (without load): ..... typ. see table  $\pm$  10%

	APCI-7800
+ 5 V from PC	425 mA

Add to this data the current consumption of the used modules according to the following table:

	PMxxx <sup>1</sup>	PMxxx-G
RS 232	21 mA	48 mA
RS 422	5 mA	42 mA
RS 485	5 mA	54 mA
20 mA	51 mA	-

<sup>1</sup> Module **PMTTY** or **MXTTY (20 mA)** is optically isolated as a standard.

### 4.3.1 RS232

CCITT-Empfehlung: ..... V.24  
 US-Norm EIA: ..... RS 232

#### Without optical isolation (PM 232)

Max. transfer rate: ..... 115.2 kBaud  
 Transfer rate on request..... -  
 ESD protection ..... -

#### With optical isolation (PM232-G)

Max. transfer rate: ..... 115.2 kBaud  
 Transfer rate on request..... -  
 ESD protection ..... 15 kV  
 Creeping distance: ..... 3.2 mm  
 Test voltage: ..... 1000 VAC  
 Short-circuit protection: .....

### 4.3.2 RS422, RS485

CCITT recommendation: ..... V.11  
 US norm EIA: ..... RS422, RS485

#### Without optical isolation (PM422, PM485)

Max. transfer rate: ..... 115.2 kBaud  
 Transfer rate on request..... -  
 ESD protection ..... -  
 Transorb diodes: ..... 400 W  
 Absorption power ..... 1ms  
 Short-circuit protection: ..... PTC

#### With optical isolation (PM422-G, PM485-G)

Max. transfer rate: ..... 115.2 kBaud  
 Transfer rate on request..... -  
 ESD protection ..... -  
 Transorb diodes: ..... 400 W  
 Absorption power ..... 1ms  
 Creeping distance: ..... 3.2 mm  
 Test voltage: ..... 1000 VAC  
 Short-circuit protection: ..... PTC

### 4.3.3 20mA current loop

**PMTTY**

Max. Baudrate: ..... 19.2 kBaud

Transorb diodes: ..... 400 W

Absorption power ..... 1ms

Creeping distance: ..... 3.2 mm

Test voltage: ..... 1000 VAC

Load: ..... 500  $\Omega$

Voltage reversal and short-circuit protection through  
Transorb diodes

The basic board has a transfer rate of max. 115.2 kBd in its standard delivery (with standard quartz). If you wish to transmit at 1MBaud, then the basic board has to be configured again in our house.

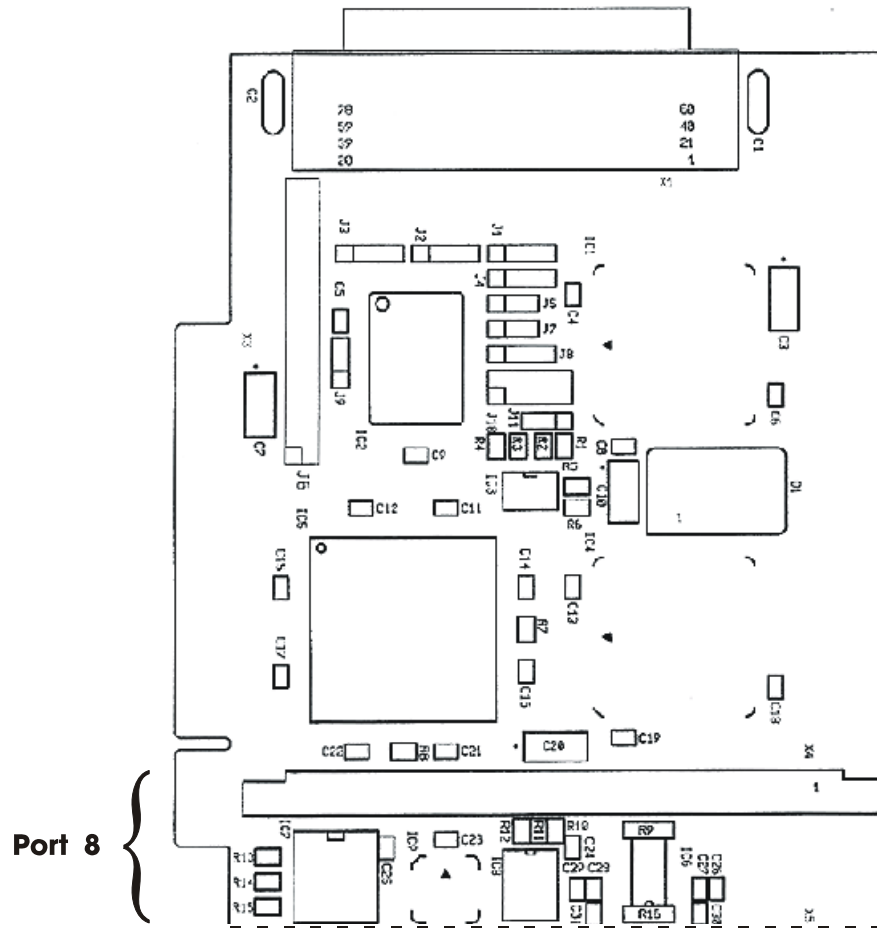
1MBd configuration: Please consider that the divider factors for programming the transfer rate do not comply with the PC standard anymore. The 1M Bd transfer rate can only be programmed with the device drivers delivered with the board.

**RS 485:** transfer at 1 MBaud only works when the transmitter is controlled through DTR, RTS or data bit.

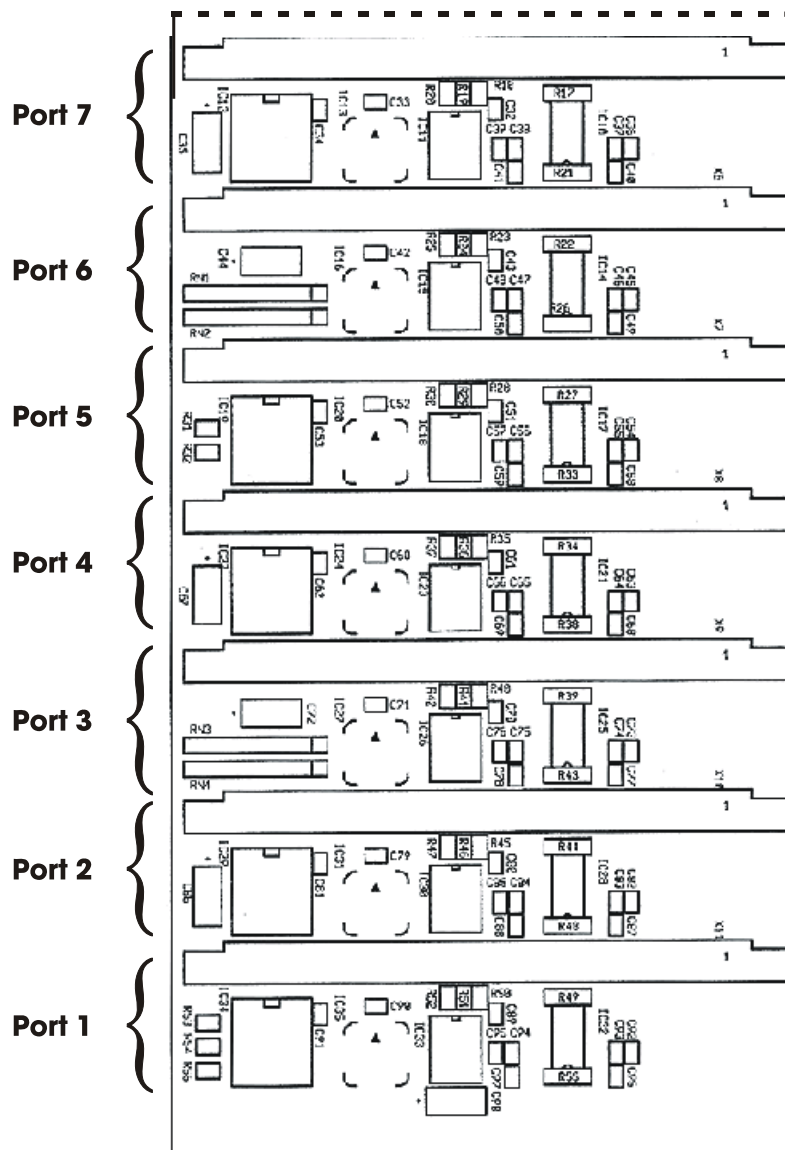


## 4.4 Component scheme

Fig. 4-1: Component scheme of the APCI-7800  
(left side)



**Fig. 4-2: Component scheme of the APCI-7800 (right side)**



## 5 INSTALLATION OF THE BOARD



### **IMPORTANT!**

Do observe the safety precautions (yellow leaflet)!

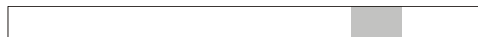
### 5.1 Opening the PC

- ◆ Switch off your PC and all the units connected to the PC.
- ◆ Pull the PC mains plug from the socket.
- ◆ Open your PC as described in the manual of the PC manufacturer.

### 5.2 Selecting a free slot

Insert the board in a free PCI-5V slot (32-bit).

**Fig. 5-1: PCI-5V slot (32-bit)**



**32 bits**

**Remove the back cover of the selected slot** according to the instructions of the PC manufacturer. Keep the back cover. You will need it if you remove the board.

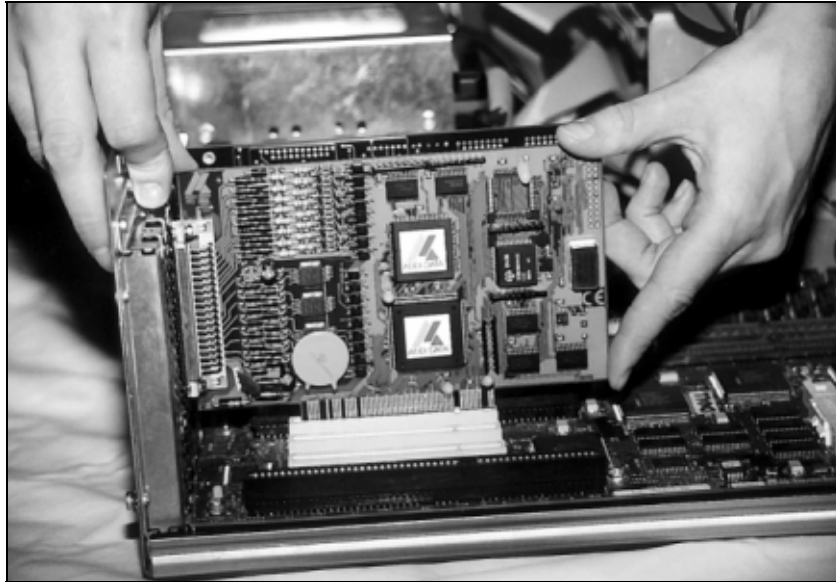
**Discharge yourself from electrostatic charges.**

**Take the board out of its protective pack.**

### 5.3 Plugging the board into the slot

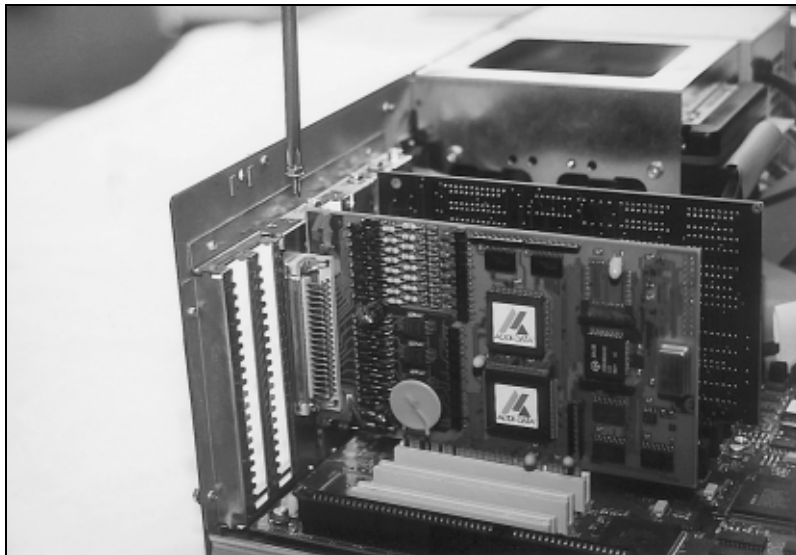
- ◆ Insert the board vertically into the chosen slot.

Fig. 5-2: Inserting the board



- ◆ Fasten the board to the rear of the PC housing with the screw which was fixed on the back cover.

Fig. 5-3: Fastening the board at the back cover



- ◆ Tighten all the loosen screws.

### 5.4 Closing the PC

- ◆ Close your PC as described in the manual of the PC manufacturer.

## 6 SOFTWARE

In this chapter you will find a description of the delivered software and its possible applications.



### **IMPORTANT!**

Further information for installing and uninstalling the different drivers is to be found in the delivered description **"Instatlations instructions for the PCI bus"**.

A link to the corresponding PDF file is available in the navigation pane (Bookmarks) of Acrobat Reader.

The board is supplied with a driver CD-ROM (CD 1) containing:

- ADDICOM programming samples with API function for the ADDI-DATA boards in 32 bits.
- ADDIREG for Windows NT 4.0



### **IMPORTANT!**

If you run the board unter Windows XP/2000/98, the ADDIREG configuration programm shall not be used.

The device manager of Windows XP/2000/98 sets the configuration of the inserted board.

## 6.1 Board registration unter Windows NT



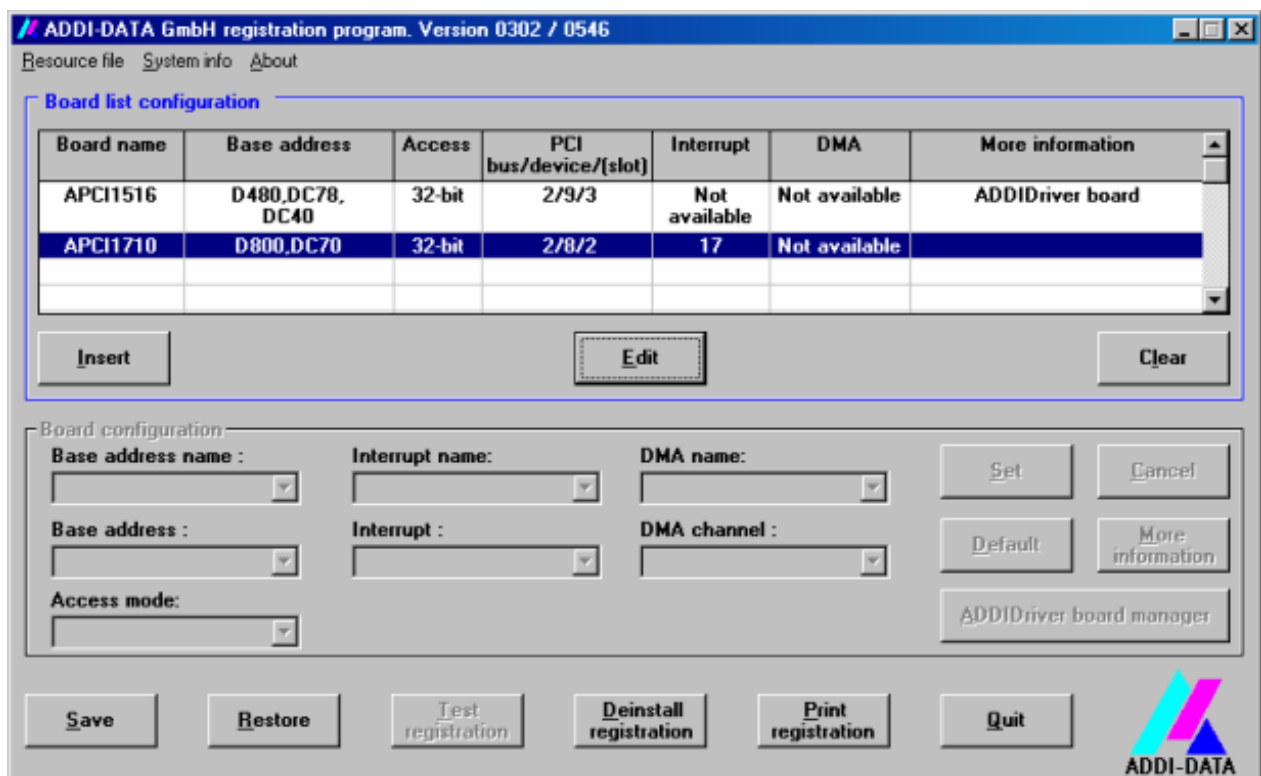
### IMPORTANT!

First insert the board to be registered, before you start ADDIREG.

If the board is not inserted in the PC, the registration cannot be tested.

When starting ADDIREG, the following window is displayed:

Fig. 6-1: ADDIREG registration program (example)



**Table:****Board name:**

Names of the different registered boards (e.g.: APCI-1710). When you start the program for the first time, no board is registered in this table.

**Base address:**

Selected base address of the board. For PCI boards the base address is allocated through BIOS.

**Access:**

Selection of the access mode for the ADDI-DATA digital boards.  
Access in 8-bit or 16-bit or 32-bit mode.

**PCI bus/device/(slot):**

Number of the used PCI bus, slot, and device. If the board is no PCI board, the message "NO" is displayed.

**Interrupt:**

Used interrupt of the board. If the board supports no interrupt, the message "Not available" is displayed. **For PCI boards the interrupt is allocated through BIOS.**

**DMA (ISA boards only):**

Indicates the selected DMA channel or "Not available" if the board uses no DMA or if the board is no ISA board.

**More information:**

Additional information like the identifier string or the installed COM interfaces. It also displays whether the board is programmed with ADDIDRIVER or if a **PCI DMA** memory is allocated to the board.

**Text boxes:****Base address name:**

Description of the used base addresses for the board. Select a name through the pull-down menu. The corresponding address range is displayed in the field below (Base address).

**Interrupt name:**

Description of the used IRQ lines for the board. Select a name through the pull-down menu. The corresponding interrupt line is displayed in the field below (Interrupt).

**DMA name (for ISA boards only):**

When the board supports 2 DMA channels, you can select which DMA channel is to be changed.

**DMA channel (for ISA boards only):**

Selection of the used DMA channel.

## Buttons:

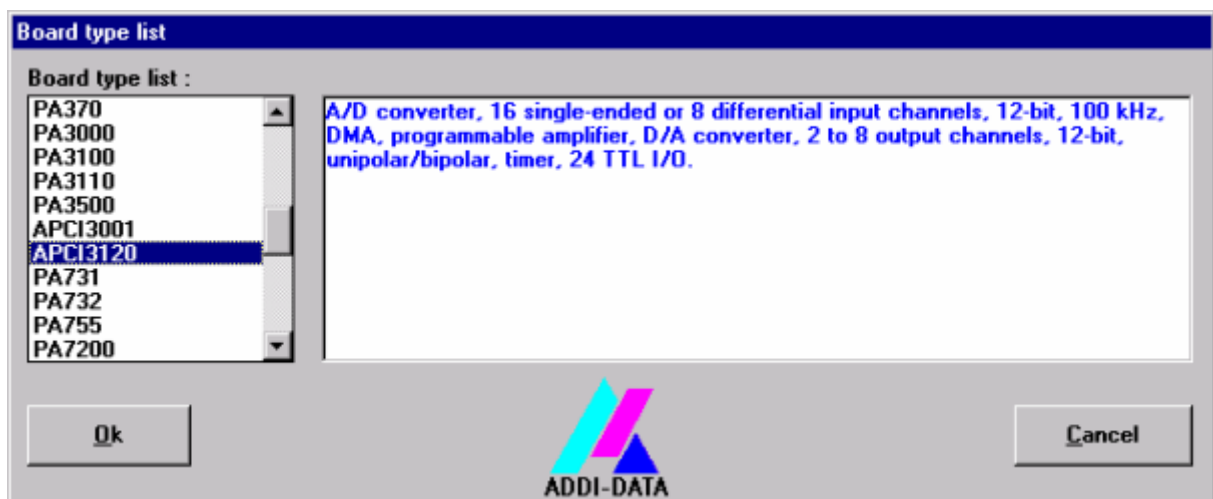
### Edit:

Selection of the highlighted board with the different parameters set in the text boxes.

### Insert:

When you want to insert a new board, click on "Insert". The following dialog window appears:

**Fig. 6-2: Board list under ADDIREG**



All boards you can register are listed on the left. Select the wished board. (The corresponding line is highlighted).  
On the right you can read technical information about the board(s).  
Activate with "OK"; You come back to the former screen.

### Clear:

You can delete the registration of a board. Select the board to be deleted and click on "Clear".

### Set:

Sets the parametered board configuration. The configuration should be set before you save it.

### Cancel:

Reactivates the former parameters of the saved configuration.

### Default:

Sets the standard parameters of the board.

### More information (not available for the boards with ADDIPACK)

You can change the board specific parameters like the identifier string, the COM number, the operating mode of a communication board, etc... (See 6.1.1)

If your board does not support these information, you cannot activate this button.



**IMPORTANT!**

The configuration is only set once you activated it with OK **and** confirm through "Set" and then "Save" in the main window of ADDIREG.

**ADDIDriver Board Manager (for ADDIPACK boards only)**

Under Edit/ADDIDriver Board Manager you can check or change the current settings of the board set through the ADDEVICE Manager. ADDevice Manager starts and displays a list of all resources available for the virtual board.

**Save:**

Saves the parameters and registers the board.

**Restore:**

Reactivates the previous parameters and registration.

**Test registration:**

Controls if there is a conflict between the board and other devices installed in the PC. A message indicates the parameter which has generated the conflict. If no conflict has occurred, "Test of device registration OK" is displayed.

**Deinstall registration:**

Deinstalls the registrations of all boards listed in the table and deletes the entries of the boards in the Windows Registry.

**Print registration:**

Prints the registration parameter on your standard printer.

**Quit:**

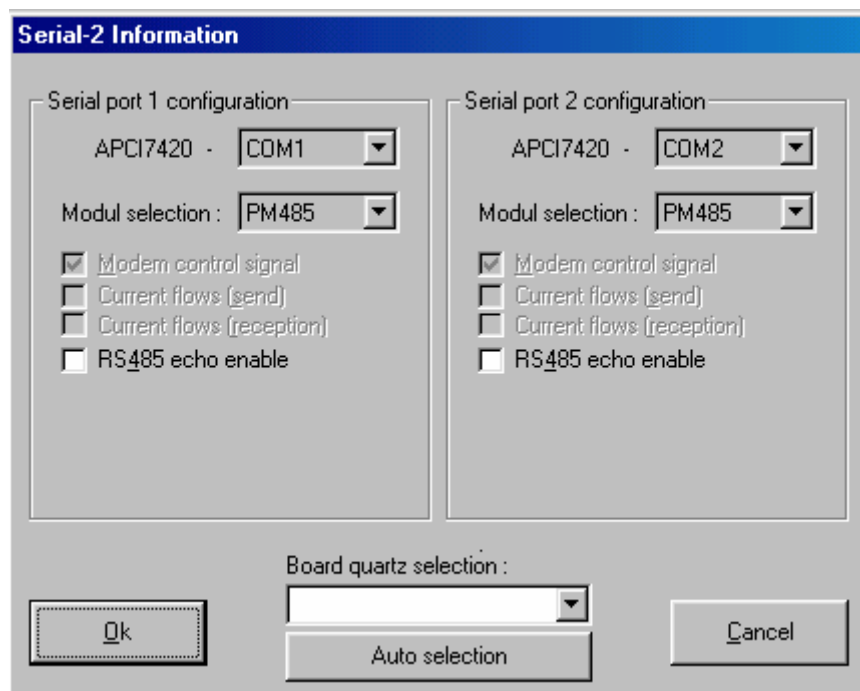
Ends the ADDIREG program.

### 6.1.1 "More information" dialog box for serial interfaces

ADDIREG can differentiate a PCI serial interface from the other standard PCI boards.

The following figure is the example of 2 serial interfaces. If you use the standard driver for Windows, you can select the COM number. Several options like "Module selection" and the different parameters can only be activated if the functions are available.

**Fig. 6-3: Communication board**



**i**

#### **IMPORTANT!**

You can change the quartz frequency only if you have required the option "Quarz modification" on your board.

In "Board quartz selection" you can adapt the quartz frequency (in Hz). The ADDI-DATA boards are set with a standard quartz frequency of 1843200 Hz.

### 6.1.2 Registering a new board



#### **IMPORTANT!**

To register a new board, you must have administrator rights. Only an administrator is allowed to register a new board or change a registration.

- ◆ **Call up the ADDIREG program.**

The Fig. 6-1 is displayed on the screen.

- ◆ **Click on "Insert". Select the wished board.**
- ◆ **Click on "OK".**

The default address, interrupt and the other parameters are automatically set in the lower fields. The parameters are listed in the lower fields. If the parameters are not automatically set by the BIOS, you can change these parameters. Click on the wished scroll function(s) and choose a new value.

- ◆ **Activate your selection with click.**
- ◆ **Once the wished configuration is set, click on "Set".**
- ◆ **Save the configuration with "Save".**

You can test if the registration is "OK".

This test controls if the registration is right and if the board is present.

If the test has been successfully completed you can quit the ADDIREG program.

The board is initialised with the set parameters and can now be operated. In case the registration data is to be modified, it is necessary to boot your PC again.

A message asks you to do so. When it is not necessary you can quit the ADDIREG program and directly begin with your application.

### 6.1.3 Changing the registration of a board



#### **IMPORTANT!**

To register a new board, you must have administrator rights. Only an administrator is allowed to register a new board or change a registration.

- ◆ **Call up the ADDIREG program.**
- ◆ **Select the board to be changed.**

The board parameters (Base address, DMA channel, ..) are listed in the lower fields.

- ◆ Click on the parameter(s) you want to set and open the scroll function(s).
- ◆ Select a new value. Activate it with a click.
- ◆ Repeat the operation for each parameter to be modified.
- ◆ Once the wished configuration is set, click on "Set".
- ◆ . Save the configuration with "Save".

You can test if the registration is "OK". This test controls if the registration is right and if the board is present. If the test has been successfully completed you can quit the ADDIREG program.

The board is initialised with the set parameters and can now be operated. In case the registration data is to be modified, it is necessary to boot your PC again. A message asks you to do so. When it is not necessary you can quit the ADDIREG program and directly begin with your application.

## Registration test

Under "Test registration" you can test if the registration is "OK". This test controls if the registration is right and if the board is present. If the test has been successfully completed you can quit the ADDIREG program. The board is initialised with the set parameters and can now be operated.

In case the registration data is to be modified, it is necessary to boot your PC again. A message asks you to do so. When it is not necessary you can quit the ADDIREG program and directly begin with your application.

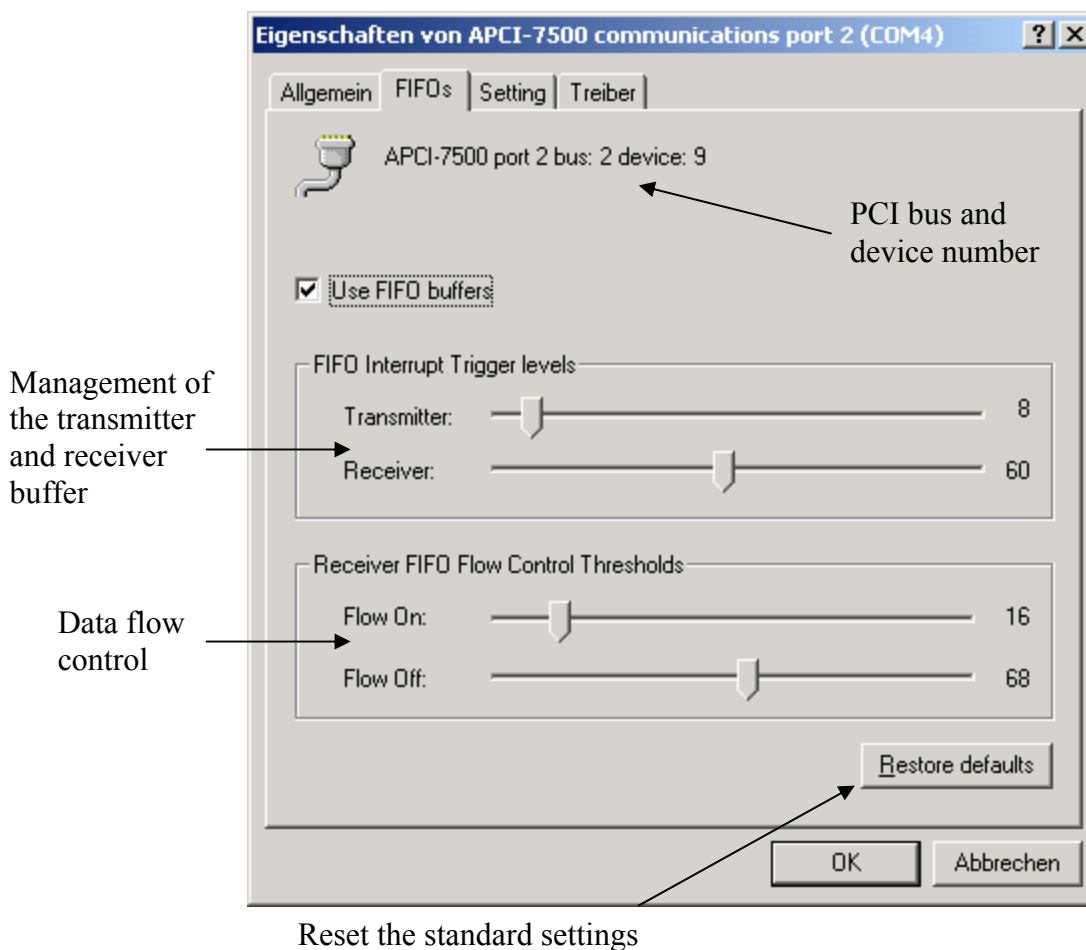
## 6.2 Configuration under Windows XP/2000/98

In the Windows device manager you can set the different interfaces according to your requirements through double clic.

Start the device manager of your operating system under Start/(Settings)/Control panel/System

In the "FIFO" register the following settings are possible:

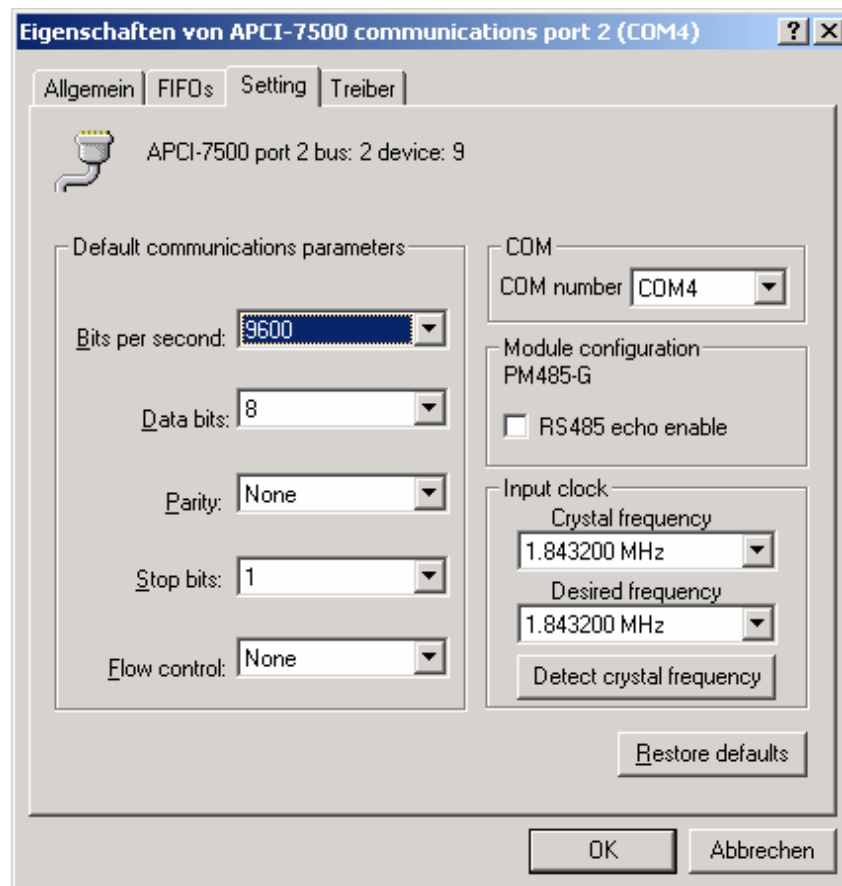
**Fig. 6-4: FIFO settings with the Device Manager**



In "Setting" you adapt the operating mode to the used interface.

You can select the quartz frequency for example and decide whether the modem control signals for RS232 are internally connected.

Fig. 6-5: Setting example with the Device Manager: RS485



### 6.3 Board test

You can test if your board is not correctly installed with a shorting plug and the test software MTTY.

The setup file for the test software MTTY is supplied on the CD-ROM under CD/MMTTY. The program is described in chapter 8.

### 6.4 Questions and software downloads on the web

Do not hesitate to e-mail us your questions.

per e-mail: **info@addi-data.de** or **hotline@addi-data.de**

#### Free downloads of standard software

You can download the latest version of the software for the board **APCI-7800**.

<http://www.addi-data.com>

**i**

#### IMPORTANT!

Before using the board or in case of malfunction during operation, check if there is an update of the product (technical description, driver). The current version can be found on the internet or contact us directly.

## 7 CONNECTING THE PERIPHERAL

### 7.1 Connector pin assignment

Fig. 7-1: 78-pin SUB-D male connector

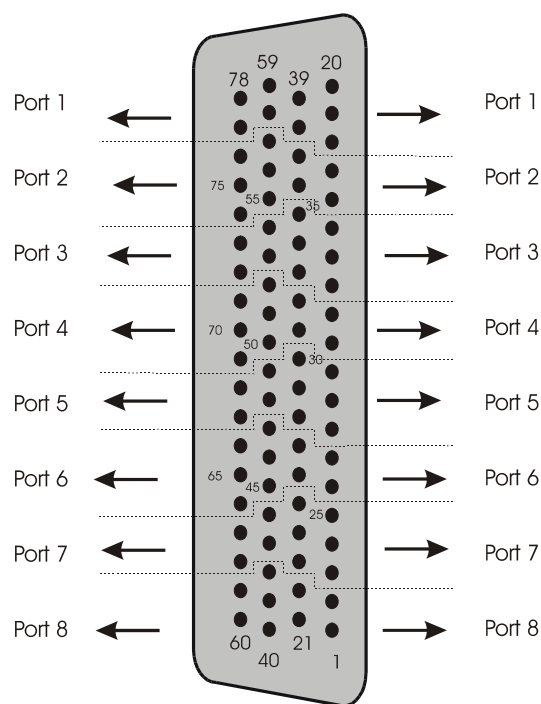


Table 7-1: Pin assignment of port 1

Pin	RS 232	RS 422	RS 485	Current Loop
20	TxD	RA	Tx / Rx +	+RCV-CL-DATA
19	RxD	TB		-XMIT-CL-DATA
18	GND			GND
39	RTS			Tsource
38	CTS			Rsource
59	DCD	TA		+XMIT-CL-DATA
58	DSR	100Ω	120Ω	
78	DTR	Rab		
77	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-2: Pin assignment of port 2

Pin	RS 232	RS 422	RS 485	Current Loop
75	TxD	RA	Tx / Rx +	+RCV-CL-DATA
76	RxD	TB		-XMIT-CL-DATA
57	-			
74	GND			GND
56	RTS			Tsource
55	CTS			Rsource
37	DCD	TA		+XMIT-CL-DATA
36	DSR	100Ω	120Ω	
17	DTR	Rab		
16	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-3: Pin assignment of port 3

Pin	RS 232	RS 422	RS 485	Current Loop
14	TxD	RA	Tx / Rx +	+RCV-CL-DATA
15	RxD	TB		-XMIT-CL-DATA
35	-			
13	GND			GND
34	RTS			Tsource
33	CTS			Rsource
54	DCD	TA		+XMIT-CL-DATA
53	DSR	100Ω	120Ω	
73	DTR	Rab		
72	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-4: Pin assignment of port 4

Pin	RS 232	RS 422	RS 485	Current Loop
70	TxD	RA	Tx / Rx +	+RCV-CL-DATA
71	RxD	TB		-XMIT-CL-DATA
69	GND			GND
52	-			
51	RTS			Tsource
50	CTS			Rsource
32	DCD	TA		+XMIT-CL-DATA
31	DSR	100Ω	120Ω	
12	DTR	Rab		
11	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-5: Pin assignment of port 5

Pin	RS 232	RS 422	RS 485	Current Loop
9	TxD	RA	Tx / Rx +	+RCV-CL-DATA
10	RxD	TB		-XMIT-CL-DATA
8	GND			GND
30	-			
29	RTS			Tsource
28	CTS			Rsource
49	DCD	TA		+XMIT-CL-DATA
48	DSR	100Ω	120Ω	
68	DTR	Rab		
67	RI	RB	Tx / Rx -	-RCV-CL-DATA



Table 7-6: Pin assignment of port 6

Pin	RS 232	RS 422	RS 485	Current Loop
65	TxD	RA	Tx / Rx +	+RCV-CL-DATA
66	RxD	TB		-XMIT-CL-DATA
64	GND			GND
47	-			
46	RTS			Tsource
45	CTS			Rsource
27	DCD	TA		+XMIT-CL-DATA
26	DSR	100Ω	120Ω	
7	DTR	Rab		
6	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-7: Pin assignment of port 7

Pin	RS 232	RS 422	RS 485	Current Loop
4	TxD	RA	Tx / Rx +	+RCV-CL-DATA
5	RxD	TB		-XMIT-CL-DATA
3	GND			GND
25	-			
24	RTS			Tsource
23	CTS			Rsource
44	DCD	TA		+XMIT-CL-DATA
43	DSR	100Ω	120Ω	
63	DTR	Rab		
62	RI	RB	Tx / Rx -	-RCV-CL-DATA

Table 7-8: Pin assignment of port 8

Pin	RS 232	RS 422	RS 485	Current Loop
60	TxD	RA	Tx / Rx +	+RCV-CL-DATA
61	RxD	TB		-XMIT-CL-DATA
40	GND			
42	RTS			Tsource
41	CTS			Rsource
22	DCD	TA		+XMIT-CL-DATA
2	DTR	Rab		
21	DSR	100Ω	120Ω	
1	RI	RB	Tx / Rx -	-RCV-CL-DATA

TA: Tx422+      RA: Rx422+  
TB: Tx422-      RB: Rx422-

## 7.2 Connection cables

Fig. 7-2: Connection cable ST7809 (8 x 9-pin)

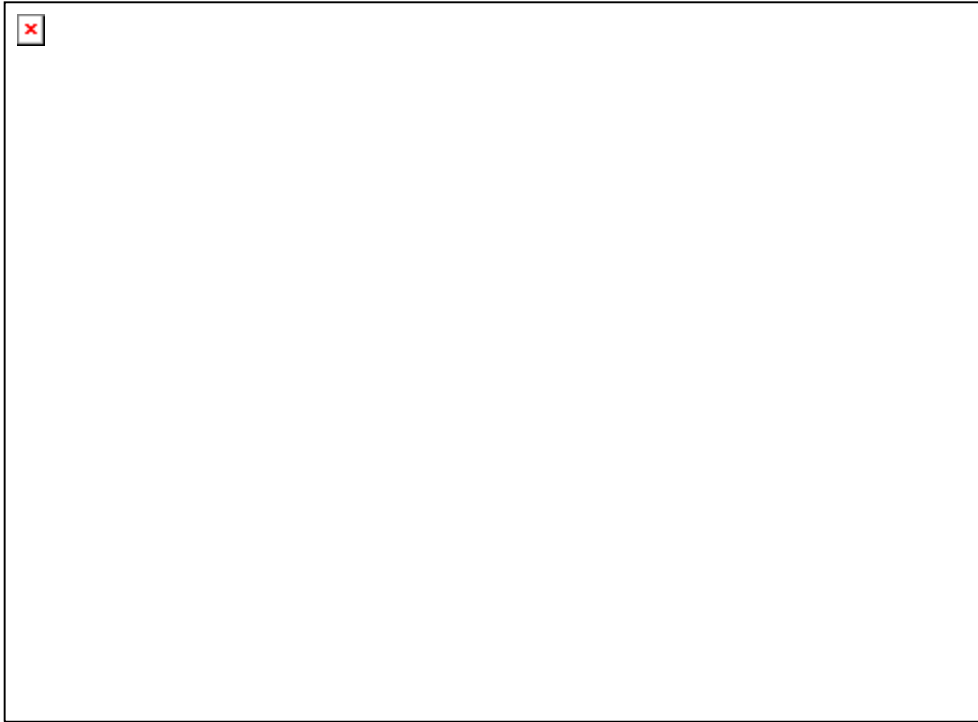
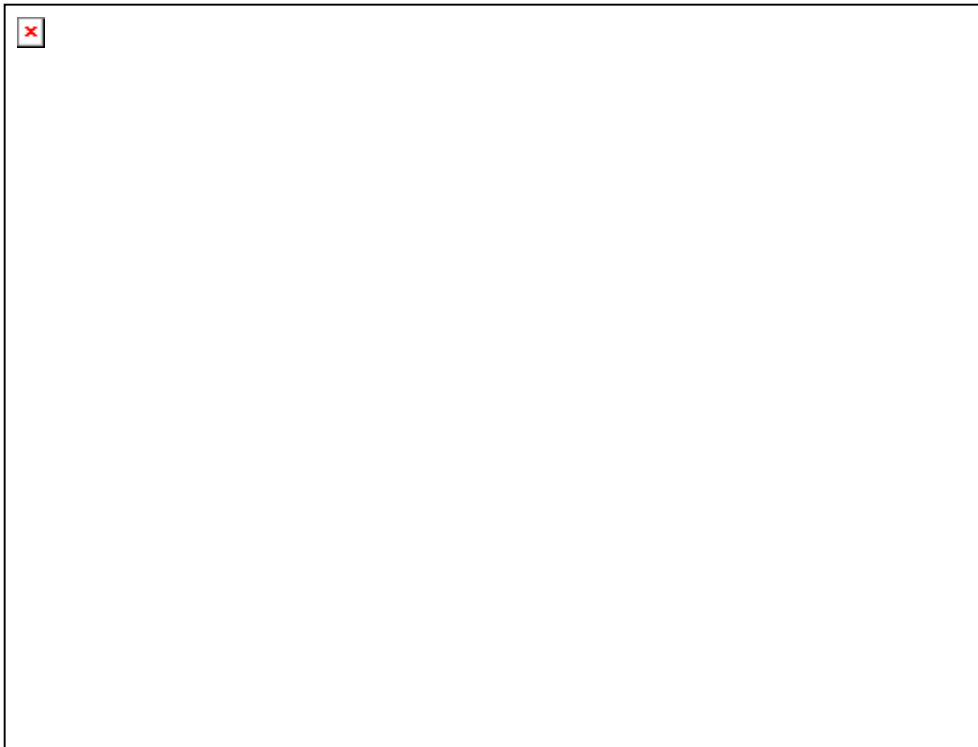


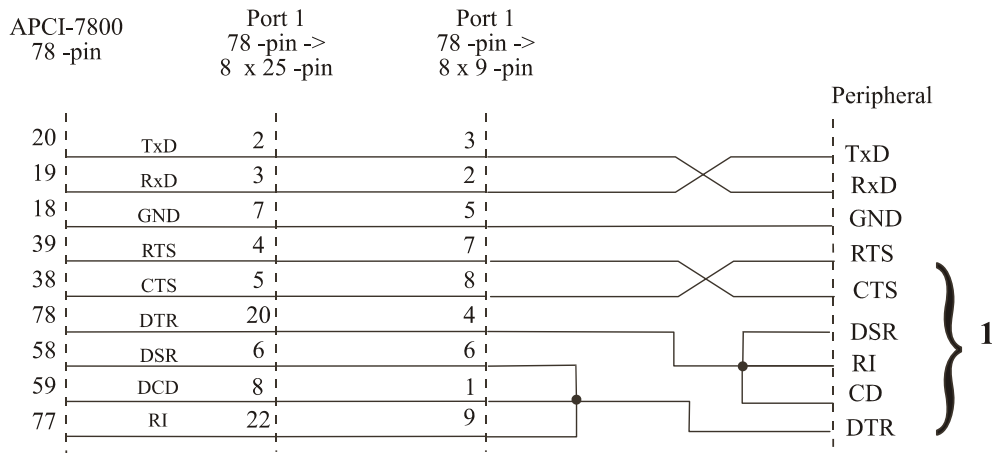
Fig. 7-3: Connection cable ST7825 (8 x 25-pin)



## 7.3 Connection examples

### 7.3.1 RS232 cabling

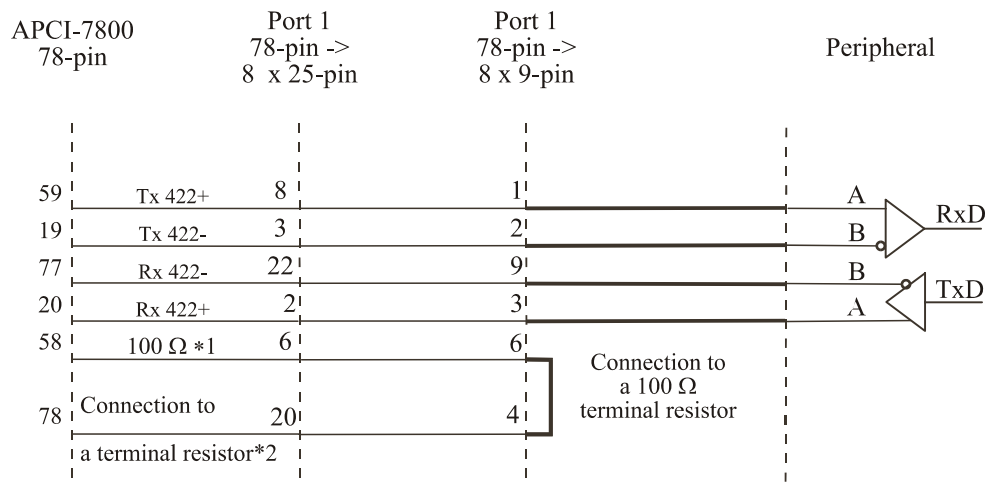
Fig. 7-4: RS232 cabling



1 If the modem control signals are not used, they must be either connected on the board (settings through ADDIREG) or externally driven to the connector via solder bridge.

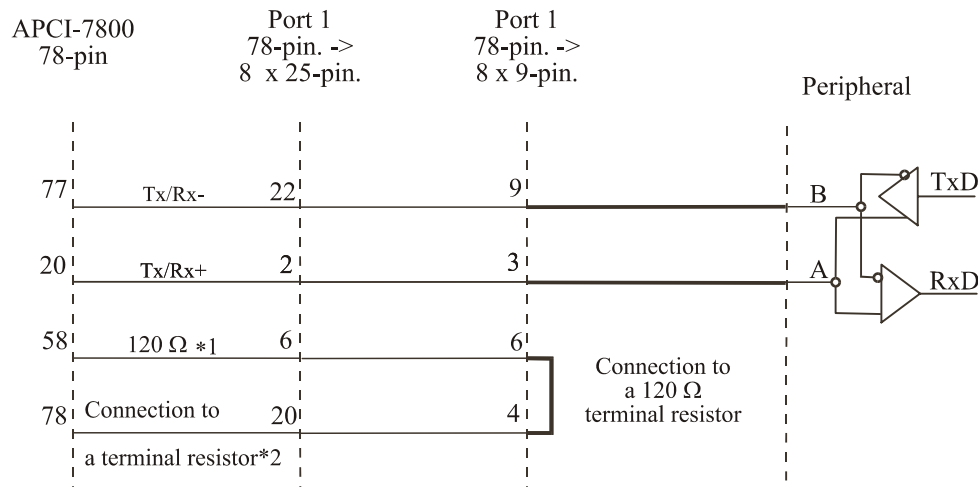
### 7.3.2 RS422 cabling

Fig. 7-5: RS422 cabling



### 7.3.3 RS485 cabling

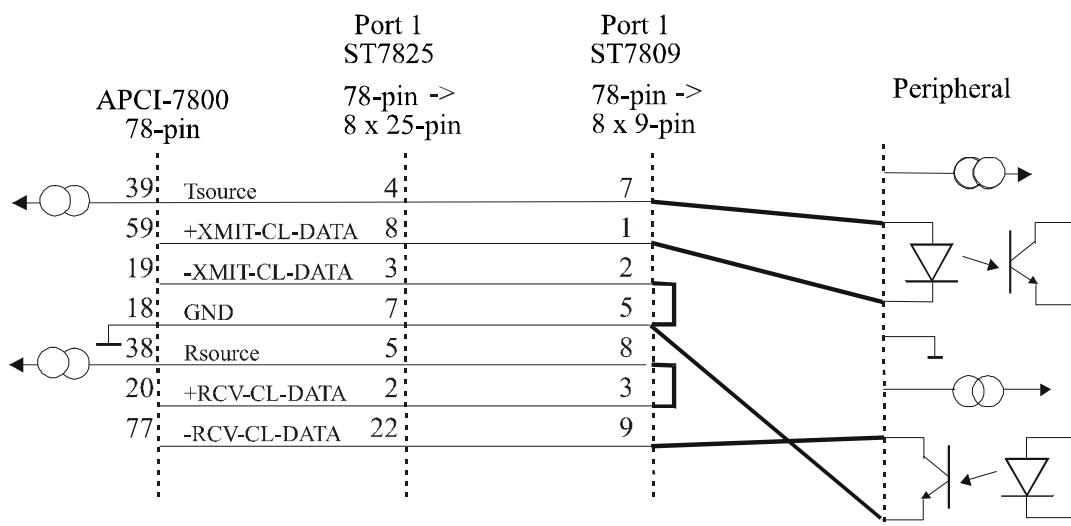
Fig. 7-6: RS485 cabling



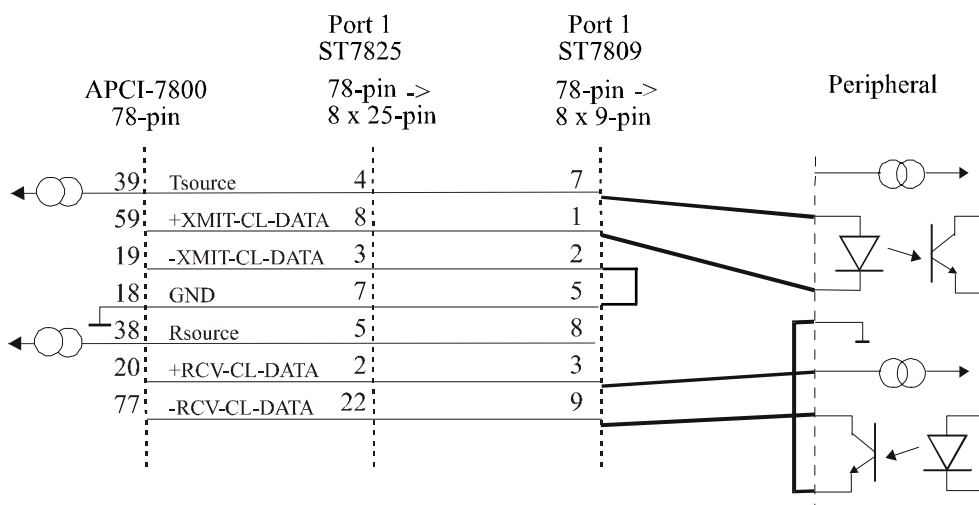
### 7.3.4 Current loop (20 mA) cabling

**Active / passive :** When a transmitter and a receiver communicate, one of them has to supply the necessary current. If the transmitter supplies the current, it is active. The receiver is passive. In reverse, if the receiver supplies the current, it is active.

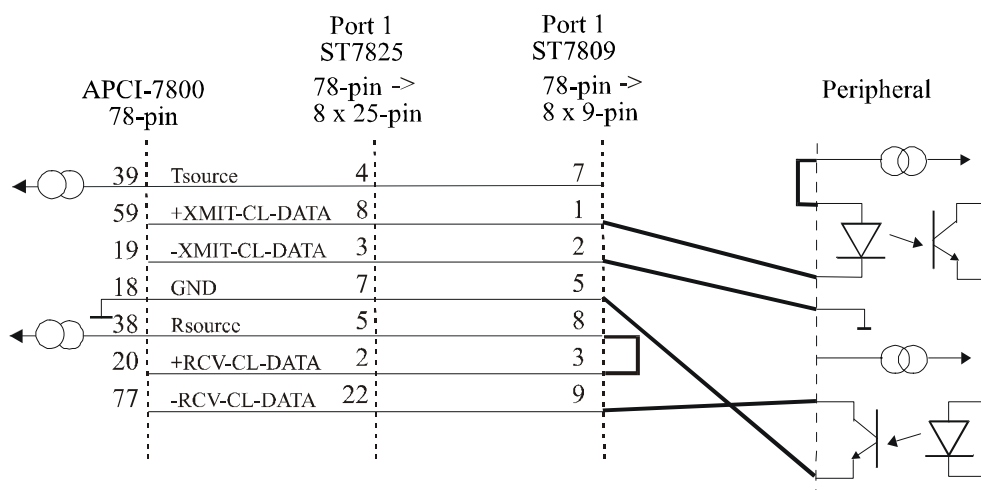
Fig. 7-7: Active transmission/active reception



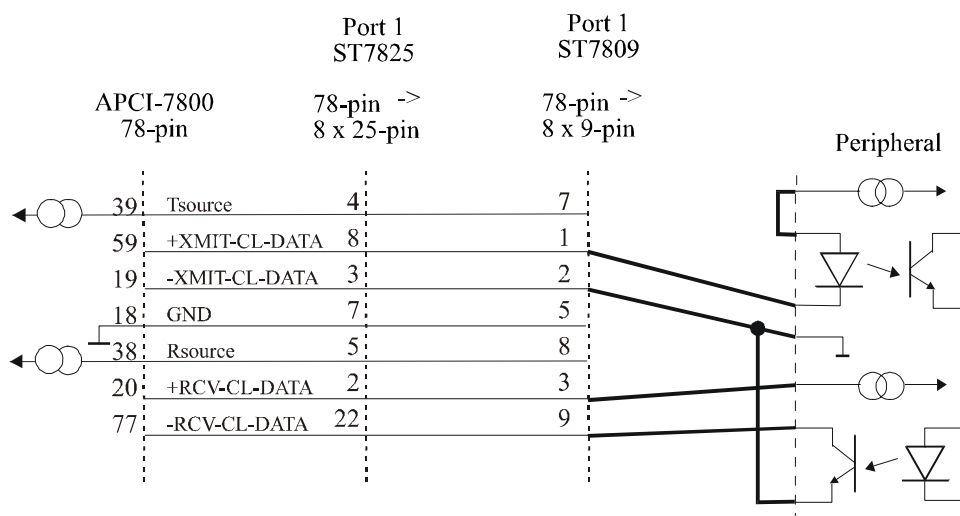
**Fig. 7-8: Active transmission/passive reception**



**Fig. 7-9: Passive transmission/active reception**



**Fig. 7-10: Passive transmission/passive reception**



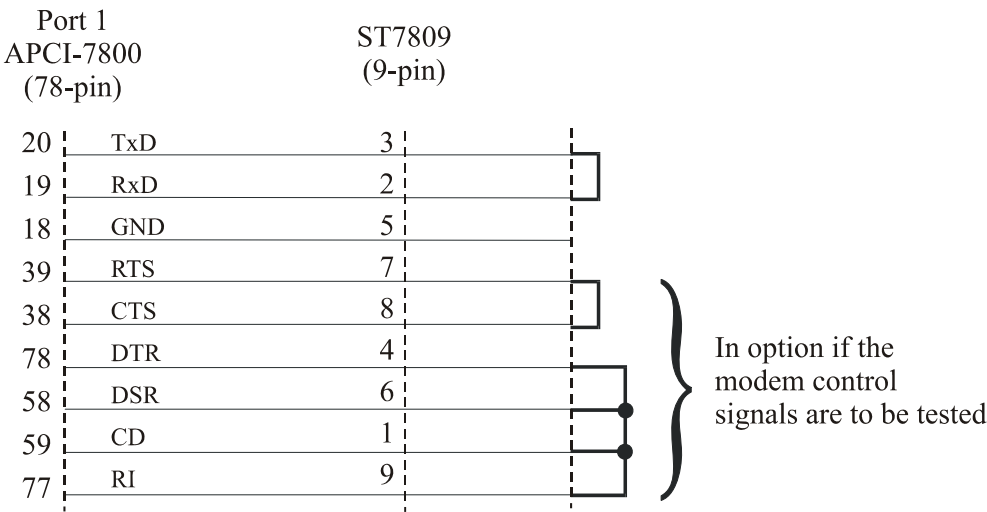
# 8 TESTING THE BOARD

## 8.1 Connecting a shorting plug

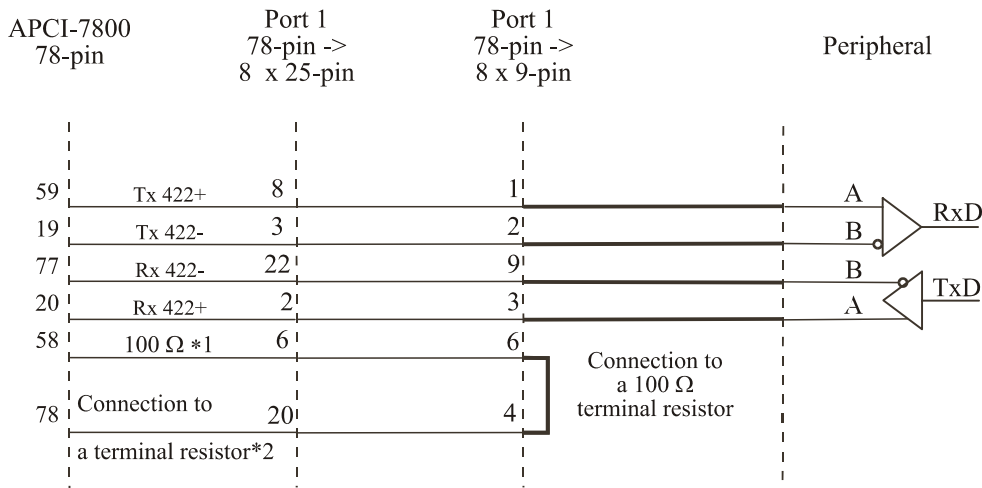
When using the shorting plug described below and the test program **MTTTY** you can carry out a self-test on the board.

Please note the signal connection of the different ports through the 9-pin shorting plug for the test.

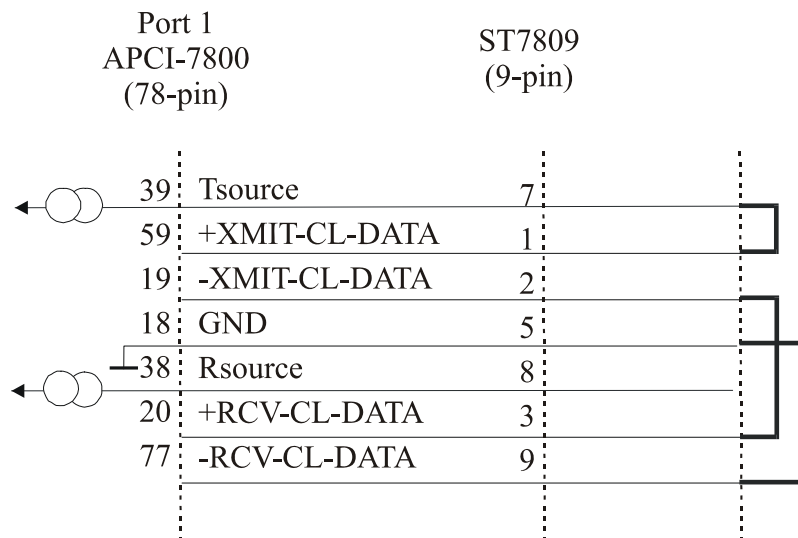
**Fig. 8-1: Connection of the shorting plug for the RS422 mode**



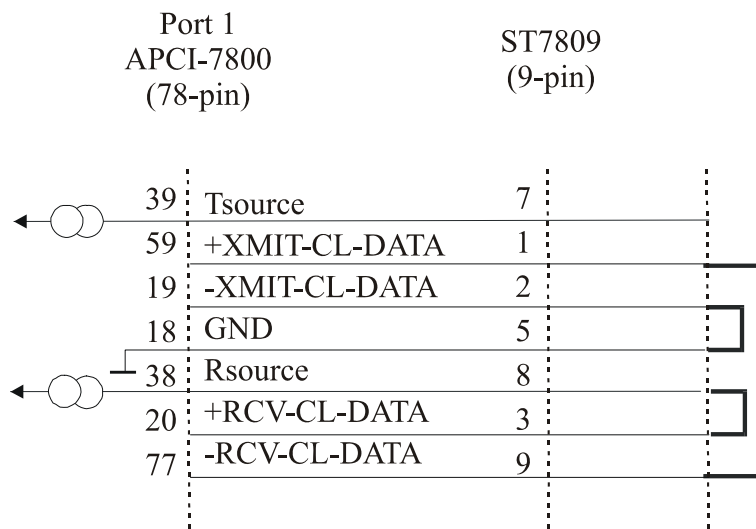
**Fig. 8-2: Connection of the shorting plug for the RS422 mode**



**Fig. 8-3: Connection of the shorting plug for the 20 mA current loop active transmission/passive reception**



**Fig. 8-4: Connection of the shorting plug for the 20 mA current loop passive transmission/active reception**



## 8.2 Testing the board with the MTTY program

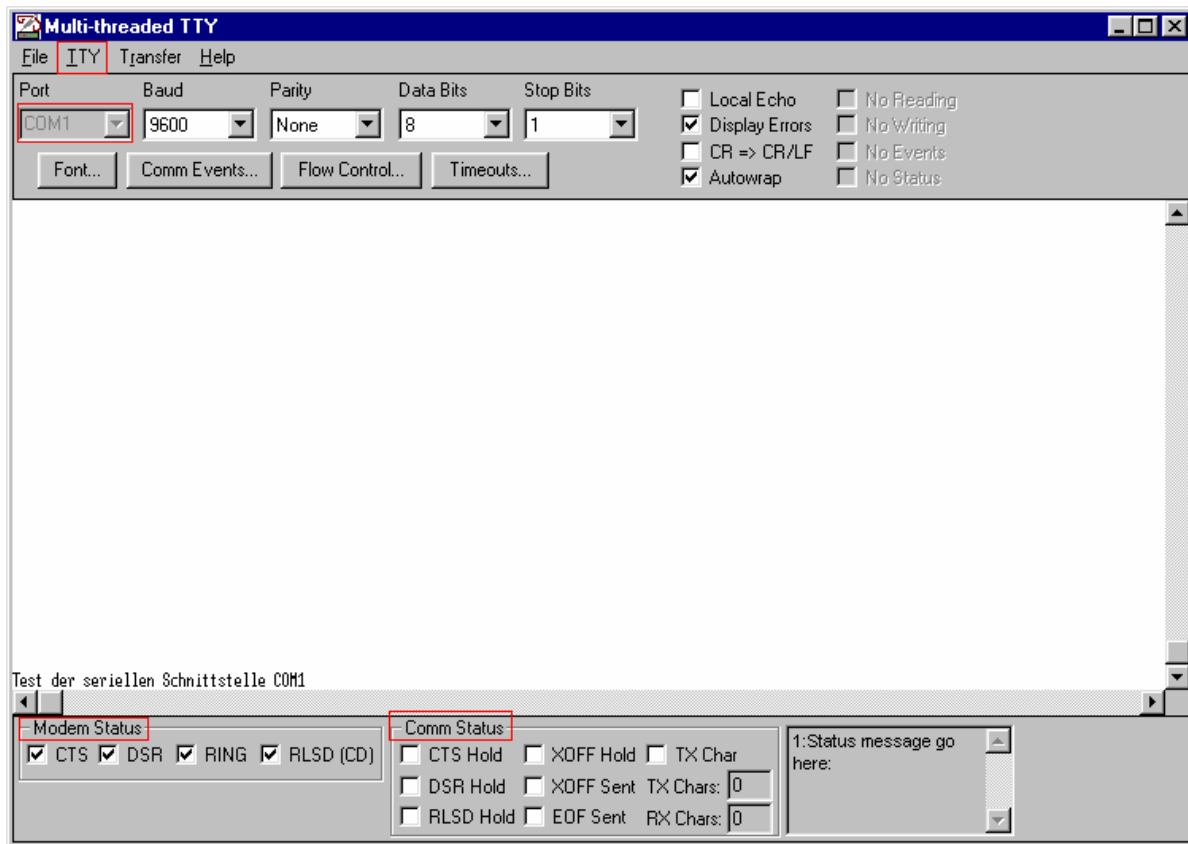
### RS422, RS232 and 20 mA Current Loop

#### ◆ Install the program on your PC.

The program is delivered on the ADDI-DATA driver CD-RoM CD1. Under CD/MTTTY start the setup.exe file.

The following windows opens.

Fig. 8-5: The MTTY program



#### ◆ Select the right COM interface under "Port".

#### ◆ Connect it with "File/Connect".

If the shorting plug is connected, each key stroke (= Data transmission) must result in the corresponding key character displayed on the screen (= Data reception). If the test is successfully carried out, the board works.

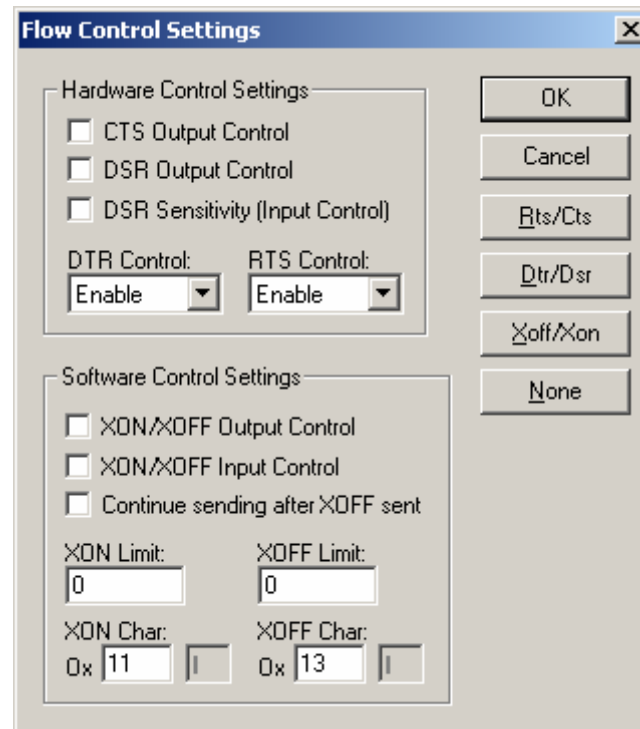
Once the port is initialised the state of the "Modem Control Signals" can be read in *Modem Status*. If the RTS signal is set, the CTS state is displayed under Modem Status. For DTR the 3 other fields are set.



In the above menu under "TTY/Flow Control" you can configure the Handshake of the Modem Control Signals according to your application (See figure below). The settings are displayed in the field "Comm Status".

The field at the bottom right of the main window is a text field for error or state indication messages.

**Fig. 8-6: Handshake configuration for the board test**



## RS485



### IMPORTANT!

For testing the RS485 mode, the shorting plug is not used.

This operating mode must be first set through ADDIREG or in the Device Manager of Windows 2000.

- ◆ In the ADDIREG main window click on "More Information".

The window for the communication board (See Fig. 6-4) is displayed.

- ◆ Select "RS485 ECHO enable" for the required COM and click on OK.

- ◆ In main windows confirm the configuration with "Set" and "Save".

or

- ◆ In Device Manager of Windows 2000 select "RS485 ECHO enable" in the "Setting register" and confirm with "OK".

Start MTTTY and test through key stroke if the interface works correctly.

## 9 REPLACING THE MODULES



### IMPORTANT!

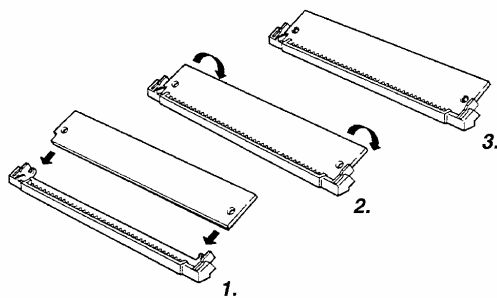
We advise you to send us the board if a module is to be replaced.

If you wish to effect the replacement yourself, consider the following:

- Observe the possible combinations according to the intended purpose of the board.
- Do observe the *Security advises*.
- Insert/remove the module carefully according to the following illustrations.

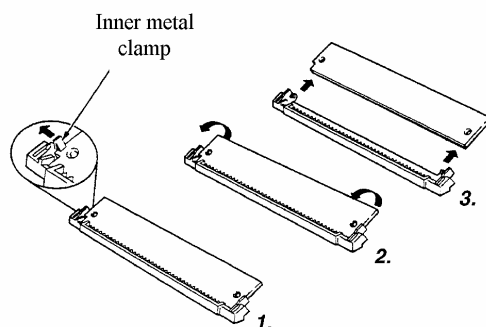
### 9.1 Replacing the SI modules

Fig. 9-1: Inserting the SI module



1. Hold the SI-module so that its connector is directed toward the guide rail in the centre of the socket.
2. Pull the SI-module downward until it clicks in place.
3. The SI-module is installed on the board. If the module is not properly installed, take it out and install it again.

Fig. 9-2: Removing a SI module



1. Bend the inner metal clamp carefully apart, until the SI-module can be removed from the socket.
2. Remove the SI-Module from the socket.