



Technical support:
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Technical description

ADDICOM APCI-7501

**4-port serial interface
for the PCI bus**

1st edition 03/1999

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- if the board has not been used for the intended purpose
- improper installation, operation and maintenance of the board
- if the board has been operated with defective safety devices or with not appropriate or non-functioning safety equipment
- nonobservance of the instructions concerning: transport, storage, inserting the board, use, limit values, maintenance, device drivers
- altering the board at the user's own initiative
- altering the source files at the user's own initiative
- not checking properly the parts which are subject to wear
- disasters caused by the intrusion of foreign bodies and by influence beyond the user's control.

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Read carefully this licence before using the software ADDIREG. The right for using this software is given to the customer, if he/she agrees to the conditions of this licence.

- this software can only be used for configuring ADDI-DATA boards.
- copying the software is forbidden (except for archiving/ saving data and for replacing defective data carriers)
- deassembling, decompiling, decoding and reverse engineering of the software are forbidden.
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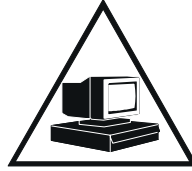
The original version of this manual is in German. You can obtain it on request.

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 absolutely the safety 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 do not assume responsibility for damages resulting from a wrong use of the board.

- **Used symbols**



WARNING!

It designates a possibly dangerous situation.

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



IMPORTANT!

designates hints and other useful information.

- **Any question?**

Our technical support is at your disposal

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1 INTENDED PURPOSE OF THE BOARD

The board **APCI-7501** provides the personal computer (PC) with a 4-port asynchronous serial interface for the communication with external devices.

The board is to be used in a free PCI-5 V / 32 Bit slot. The PC is to comply with the EU directive 89/336/EWG and the specifications for EMC protection.

Products complying with these specifications bear the normed **CE** mark.

Serial data is exchanged with external communication devices through the 37-pin SUB-D male connector of the board **APCI-7501** in RS232 transmission mode.

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

The connection with our standard cable ST010 complies with the minimum specifications as follows:

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

The board supports serial communication through 4 asynchronous serial ports.

The intended purpose of the board depends on the following parameters.

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

Operating mode	Distance between transmitter and receiver	Environment
APCI-7501	max. 30 m	industry
APCI-7501 with option -G (Optical isolation)	max. 30 m	noisy industrial environment

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.

1.1 Limits of use

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.

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 RS232, the signal lines are to be twisted in pairs with GND.

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.

2 USER

2.1 Qualification

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

- installation,
- putting into operation,
- 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 THE BOARD

Fig. 3-1: Wrong handling

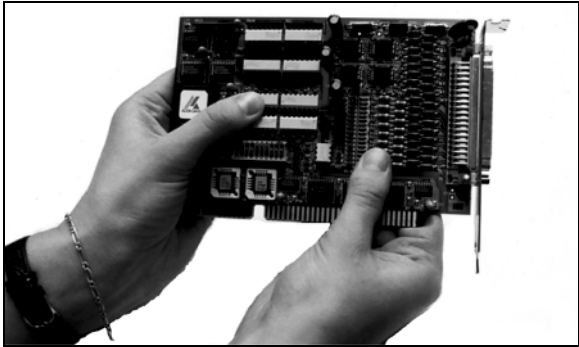
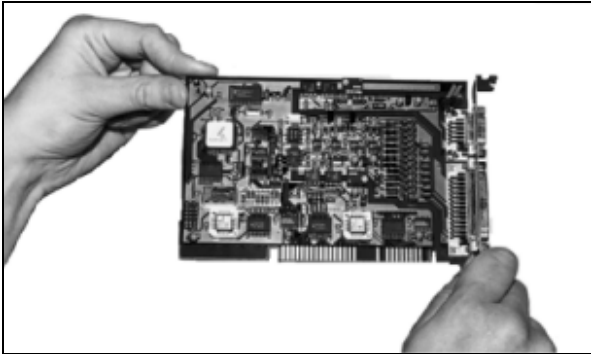


Fig. 3-2: Correct handling



4 TECHNICAL DATA

4.1 Electromagnetic compatibility (EMC)

The board has been subjected to EMC tests in an accredited laboratory in accordance with the norms EN50082-2, EN55011, EN55022. The board complies with the limit values set by the norm EN50082-2 as follows:

	<u>True value</u>	<u>Set value</u>
ESD	4 kV	4 kV
Fields	10 V/m	10 V/m
Burst	4 kV	2 kV
Conducted radio interferences	10 V	10 V
Noise emission		B class



WARNING!

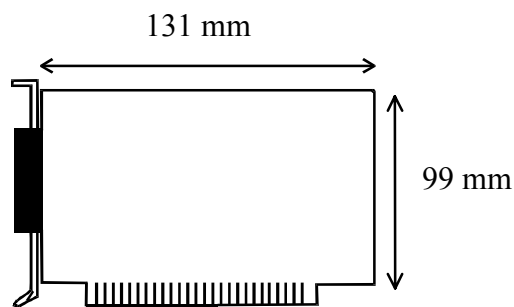
The EMC tests have been carried out in a specific appliance configuration. We guarantee these limit values **only** in this configuration

Consider the following aspects:

- your test program must be able to detect operation errors.
- **your system must be set up** so that you can find out what caused errors.

4.2 Physical set-up of the board

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



Breadth:	19,2 mm
Weight:	156 g
Installation in:	PCI 5 V / 32-bit slot
Connection to the peripheral	37-pin SUB-D male connector

4.3 Options

Option -G: 4-port serial interface with optical isolation

4.4 Limit values

Operating temperature: 0 to 60°C
 Storage temperature: -25 to 70°C
 Relative humidity: 30% to 95% non condensing

Minimum PC requirements:

- operating system: PCI BIOS 1.0,
 MS DOS 6.2 or higher
 - bus speed: up to 33 MHz

Energy requirements:

- operating voltage of the PC: 5V ± 5%
 - current consumption in mA
 (without load); typ: See table ± 5%

	APCI-7501	APCI-7501-G
+ 5 V from PC	315 mA	

CCITT recommendation: V.24
 US norm EIA: RS 232
 Max. transfer rate:
 Standard: 112 kBd
 With High-Speed Driver: up to 1 MBd¹

Safety (Option -G)

Optical isolation: 500 V

¹ ADDI-DATA High-Speed Driver: available for Windows NT on request.

4.5 Component scheme and block diagram

Fig. 4-1: Component scheme of the APCI-7501 board

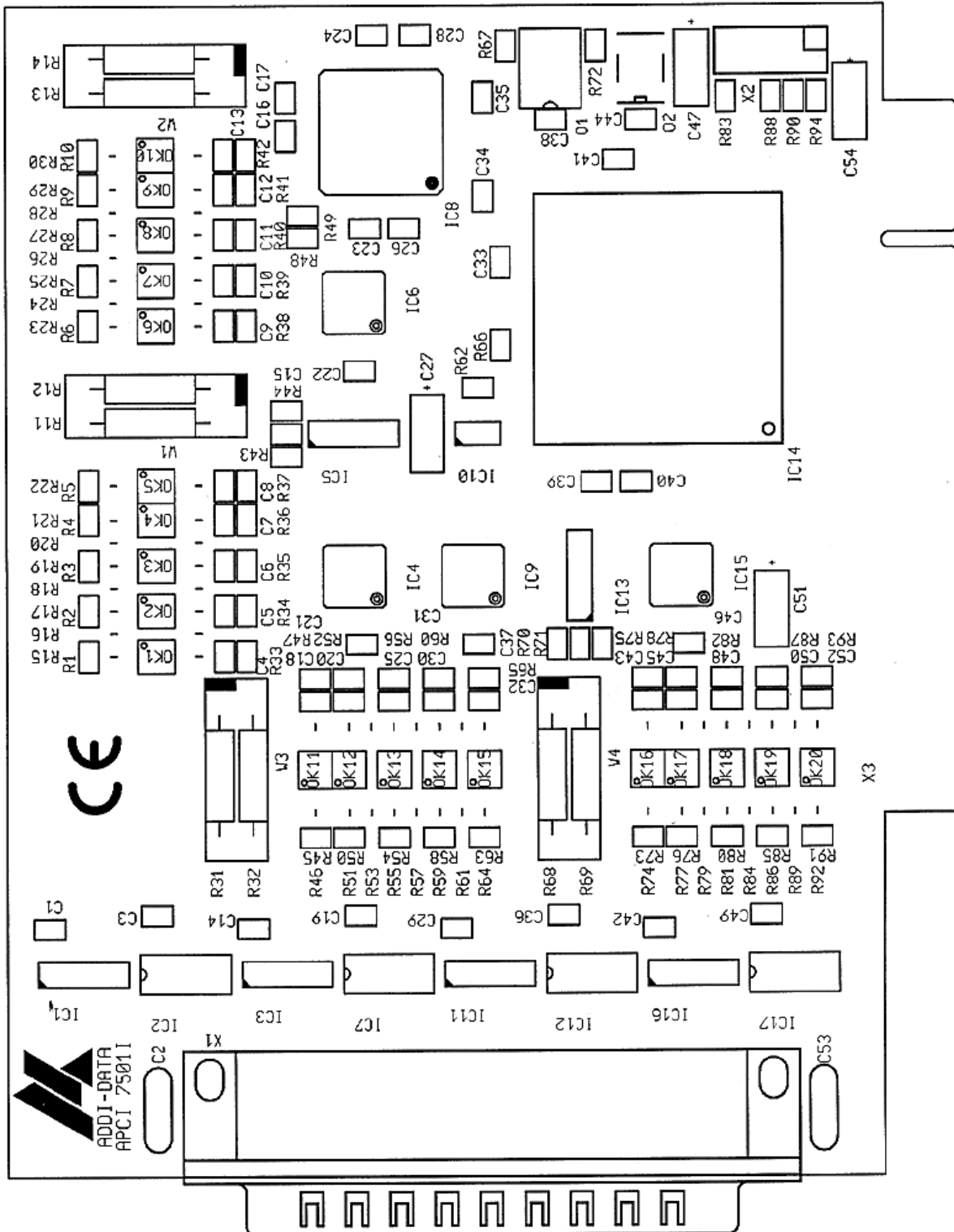
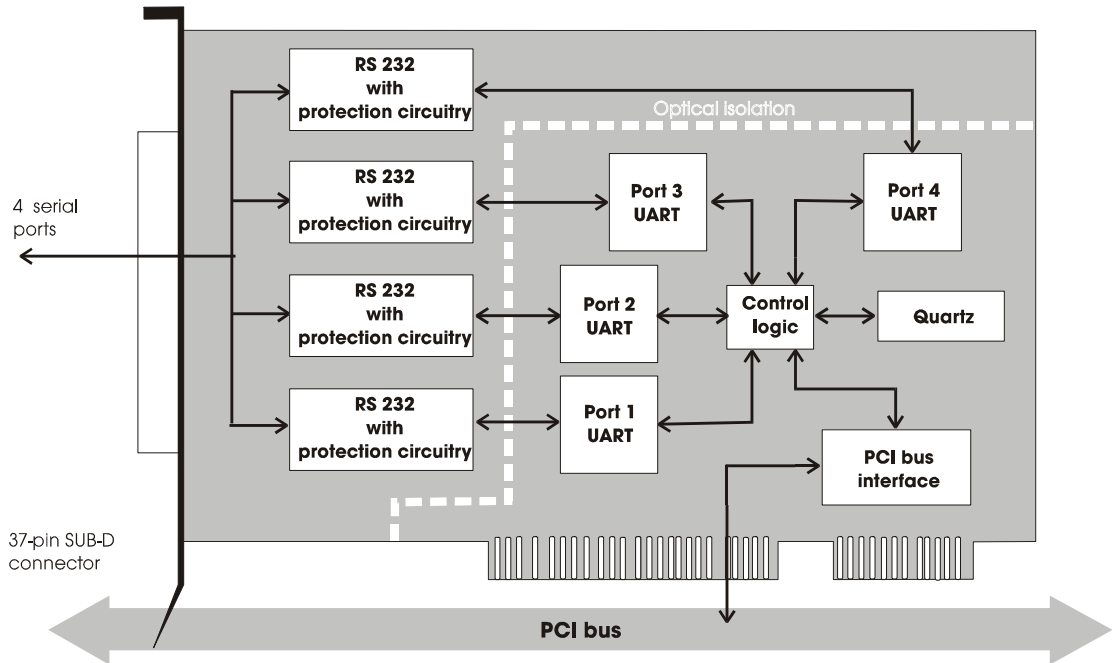


Fig. 4-2: Block diagram



5 INSTALLATION

The interrupt line and the base address of the board are set per software through the BIOS of the PC system. Therefore, there are no settings to be made before inserting the board.

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IMPORTANT!

If you want to install simultaneously **several** ADDI-DATA boards, consider the following procedure.

- **Install and configure** the boards one after the other.
You will thus avoid configuration errors.
1. Switch off the PC
 2. Install the **first** board
 3. Start the PC
 4. Install the software (only once)
 5. Configure the board

 6. Switch off the PC
 7. Install the **second** board
 8. Start the PC
 9. Configure the board

etc

You will find additional information to these different steps in the sections 5.1 to 5.4.

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IMPORTANT!

You have installed already **one or more** ADDI-DATA boards in your PC, and you wish to install **an additional** board?

Proceed as if you wished to install one single board.

5.1 Inserting the board

i

IMPORTANT!

Do observe the *safety instructions*.

5.1.1 Opening the PC

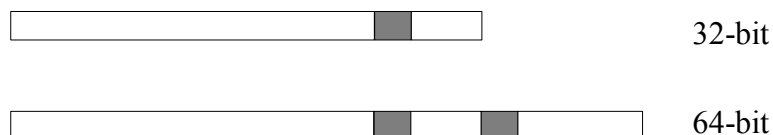
- Switch off your PC and all the units connected to the PC.
- Pull the PC mains plug from the socket.
- Open your PC as described in the manual of the PC manufacturer.

5.1.2 Selecting a free slot

1. Select a free PCI slot.

The following PCI slot types are available for 5V systems:
PCI-5V (32 bit) and PCI-5V (64 bit)

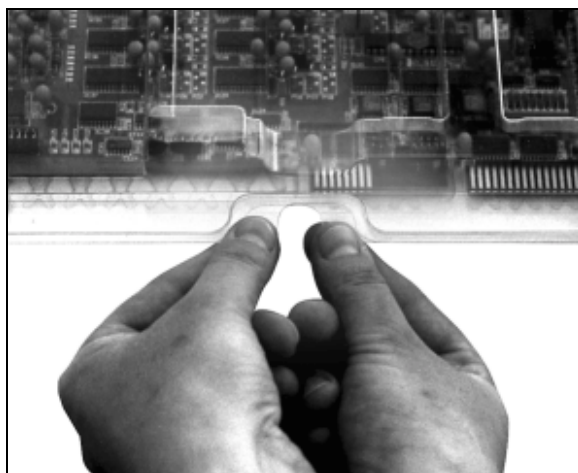
Fig. 5-1: Types of slots



See in the PC manual which types of slots are free.

2. **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.
3. **Discharge yourself from electrostatic charges.**
4. **Take the board out of its protective blister pack.**

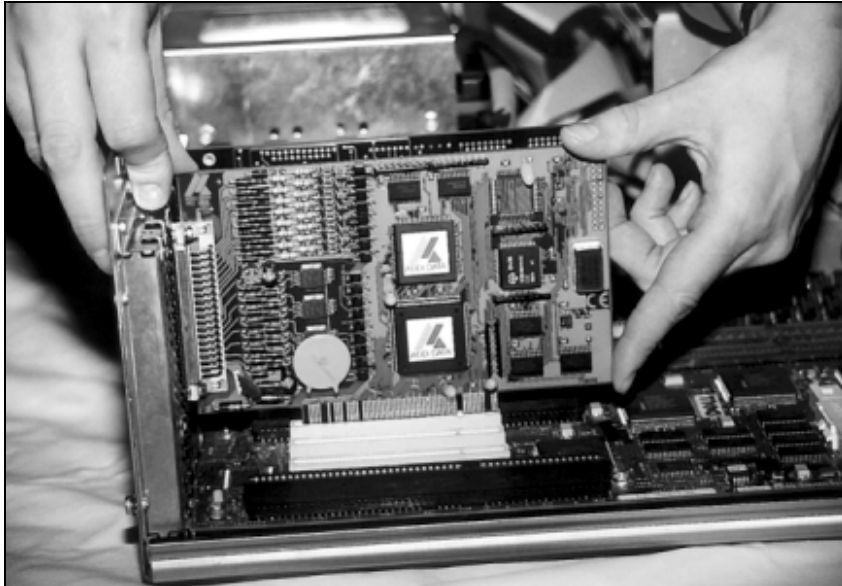
Fig. 5-2: Opening the protective blister pack



5.1.3 Plugging the board into the slot

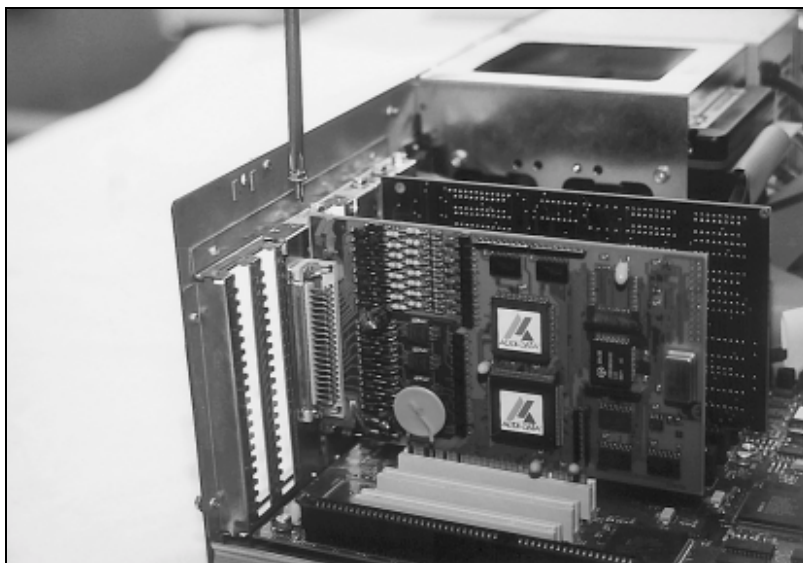
- Discharge yourself from electrostatic charges.
- Insert the board vertically into the chosen slot.

Fig. 5-3: Inserting the board



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

Fig. 5-4: Fastening the board at the back cover



- Tighten all the loosen screws.

5.1.4 Closing the PC

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

5.2 Installing the software

The CD contains:

- ADDIREG for Windows NT 4.0 and Windows 95,
- Standard software for the ADDI-DATA boards:
 - 16-bit for MS-DOS and Windows 3.11
 - 32-bit for Windows NT/95.

5.2.1 Installation under MS-DOS and Windows 3.11

To install the board under MS-DOS, the "ADDI-DATA software driver" is available on request.

5.2.2 Installation under Windows NT / 95

- Select the directory PCI7501\32bit\Disk1.
- Start the set-up program "setup.exe" (double click)
- Select one of the 3 parameters
 - 1- typical
 - 2- compact
 - 3- custom

Proceed as indicated on the screen and read attentively the "Software License" and "Readme".

In "custom", you can select your operating system.

The installation program gives you further instructions.

5.3 Configuration of the board with ADDIREG

The ADDIREG registration program is a 32-bit program for Windows NT 4.0 and Windows 95.

With this program, the user can registrate all hardware information which are necessary for the management of ADDI-DATA PC-boards.

5.3.1 Program description

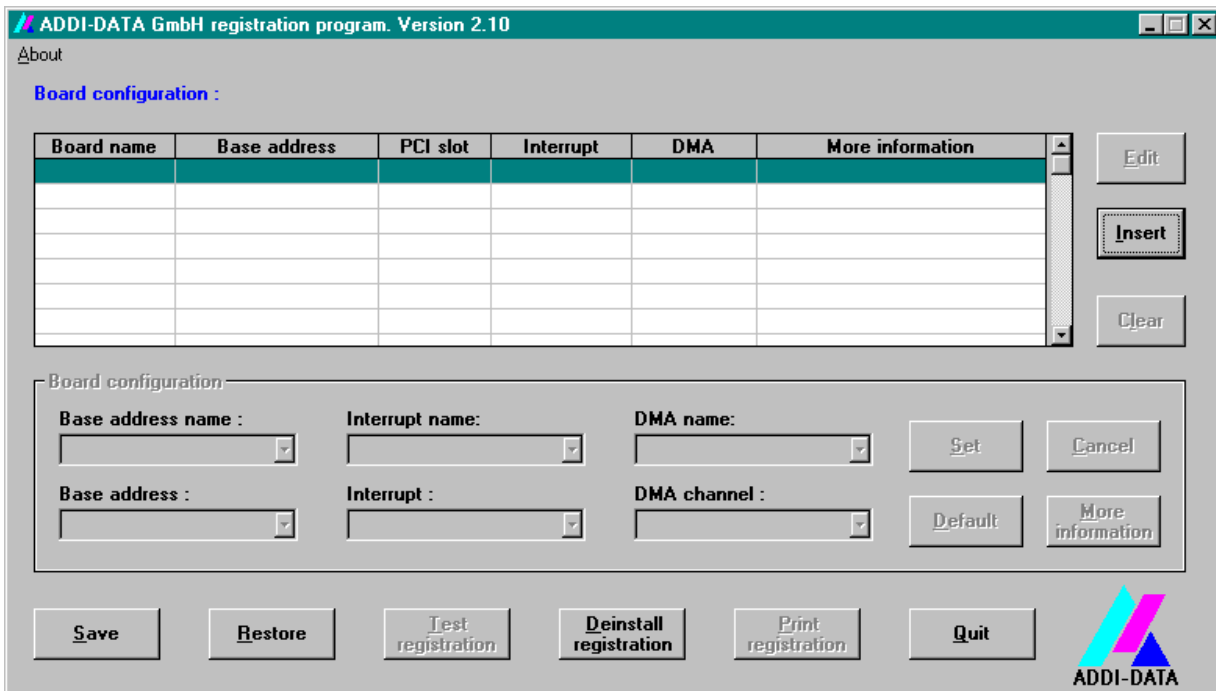
i

IMPORTANT!

Insert first the ADDI-DATA board you want to registrate before you start the ADDIREG program.

Once the board is installed, the registration can be tested.
By call-up of the program the following screen is displayed.

Fig. 5-5: ADDIREG registration program



Screen explanation:

Table:

The table in the middle lists the registered boards and their respective parameters.

Board name:

Names of the different registered boards (e.g.: APCI-7501).
When you start the program for the first time, no board is registered in this table.

Base address:

Selected base address of the board.

PCI slot:

Used PCI slot. If the board is no PCI board, the message "NO" is displayed.

Interrupt:

Used interrupt of the board. If the board uses no interrupt, the message "Not available" is displayed.

DMA:

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

More information:

Additional information like the identifier string (e.g.: PCI1500-50) or the installed COM interfaces.

Text boxes:

Under the table you will find 6 text boxes in which you can change the parameters of the board.

Base address name:

When the board operates with several base addresses (One for port 1, one for port 2, etc.) you can select which base address is to be changed.

Base address:

In this box you can select the base addresses of your PC board. The free base addresses are listed. The used base addresses do not appear in this box.

Interrupt name:

When the board must support different interrupt lines (common or single interrupts), you can select them in this box.

Interrupt:

Selection of the interrupt number which the board is to use.

DMA name:

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

DMA channel:

Selection of the used DMA channel.

Buttons:

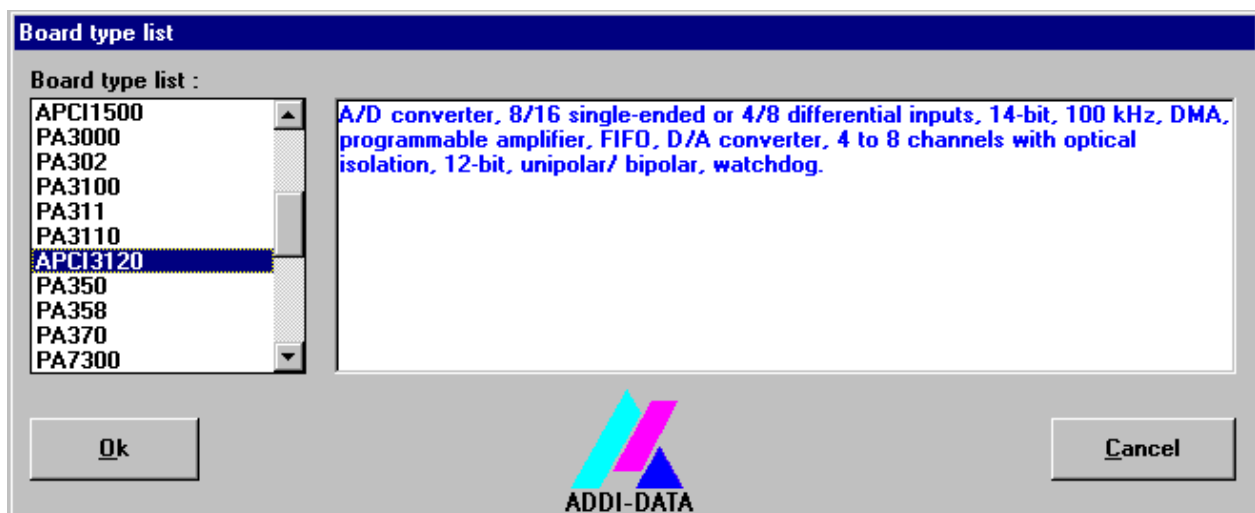
Edit¹:

Selection of the highlighted board with the different parameters set in the text boxes. Click on Edit to activate the data or click twice on the selected board.

Insert:

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

Fig. 5-6: Inserting a new board



All boards you can registrate 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.

¹ "x": Keyboard shortcut. e.g.: "Alt + e" for Edit

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:

You can change the board specific parameters like the Identifier string, the COM number, the operating mode of a communication board, etc...

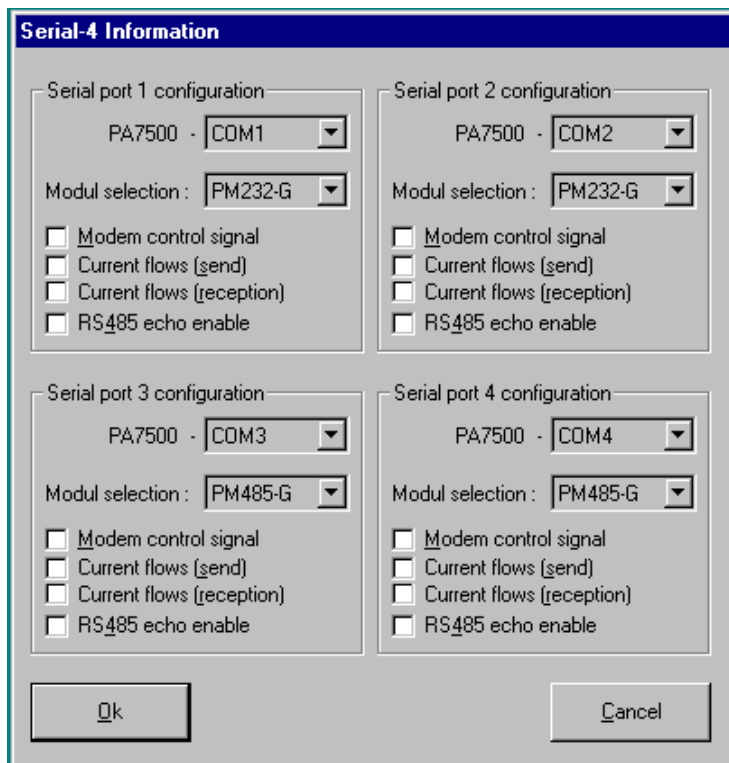
If your board does not support these information, you can not activate this button.

Notice: ADDIREG makes the difference between PCI boards and communication boards.

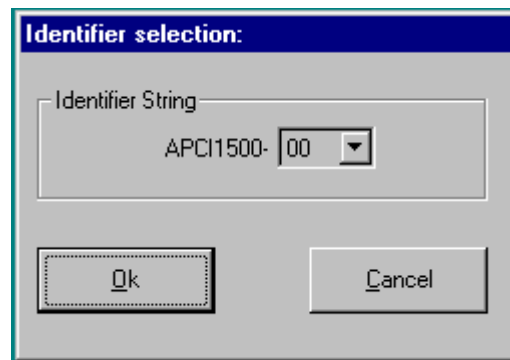
Communication boards:

The following figure is the example of 4 serial interfaces.

Fig. 5-7: Communication board



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. 5-8: PCI boards

With this option you can select the identifier string by entering the corresponding number and activating with "OK".

With one click on "cancel" you can select the former string.

Save:

Saves the parameters and registrate the board.

Restore:

Reactivates the last saved parameters and registration.

Test registration:

Controls if there is a conflict between the board and other devices.

A message indicates the parameter which has generated the conflict. If there is no conflict, "OK" is displayed.

Deinstall registration:

Deinstalls the registrations of all board listed in the table.

Print registration:

Prints the registration parameter on your standard printer.

Quit:

Quits the ADDIREG program.

5.3.2 Registrating a new board

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IMPORTANT!

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

- Call up the ADDIREG program. The figure 5-5 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.

5.3.3 Changing the registration of a board

i

IMPORTANT!

To registrate a new board, you must have administrator rights. Only an administrator is allowed to registrate 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.

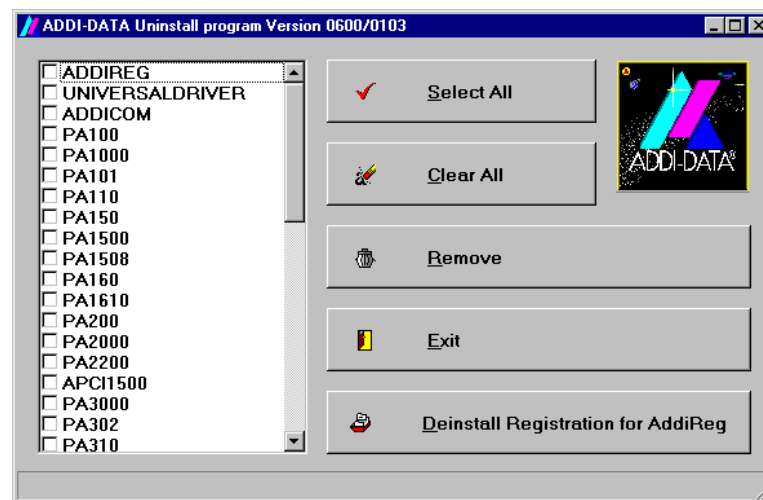
If the test has been successfully completed you can quit the ADDIREG program. The board is initialised with the set parameters and can now be operated.

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.

5.3.4 Removing the ADDIREG program

- Start the ADDI-UNINSTALL program.

Fig. 5-9: The ADDI-UNINSTALL program



- Select the software or the driver to be deinstalled. Click within the corresponding check box.
- Click on "Remove". Proceed as indicated until the complete removal of the program.

Uninstall ADDIREG

- Click on "Deinstall registration for AddiReg".
- Proceed as indicated until the complete removal of ADDIREG. The ADDIREG entries in the Windows registry are deleted.

5.4 Error analysis per Internet

Do not hesitate to visit us or e-mail your questions.

Our Internet page is accessed:

- per e-mail: info@addi-data.de or hotline@addi-data.de
- per Internet : <http://www.addi-data.de> or <http://www.addi-data.com>

Free software downloads

You can download the latest version of the standard software for the **APCI-7501**.

6 CONNECTING THE PERIPHERAL

6.1 Connector pin assignment

Fig. 6-1: 37-pin SUB-D male connector

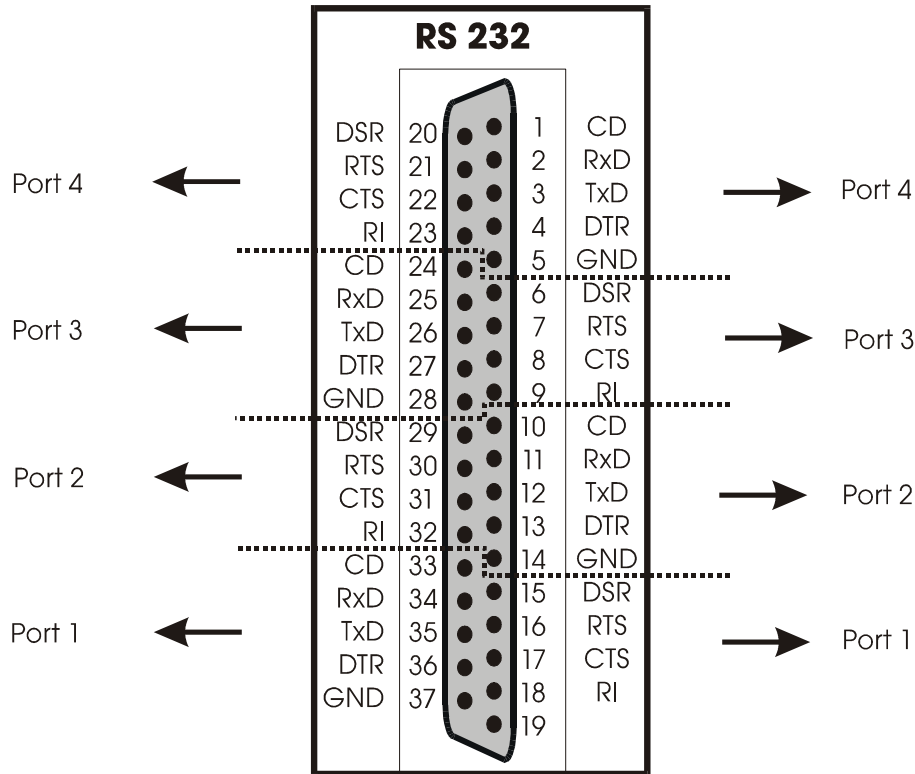


Table 6-1: Assignment of the port 1

Pin	Signal	Mode / Meaning
15	DSR	Data set ready
16	RTS	Request to send
17	CTS	Clear to send
18	RI	Ring indicator
33	CD	Data carrier detect
34	RxD	RS 232 received data
35	TxD	Transmitted data
36	DTR	Data terminal ready
37	GND	Signal ground

6.2 Connection cables

Fig. 6-2: Connection cable ST074 (4 x 25-pin)

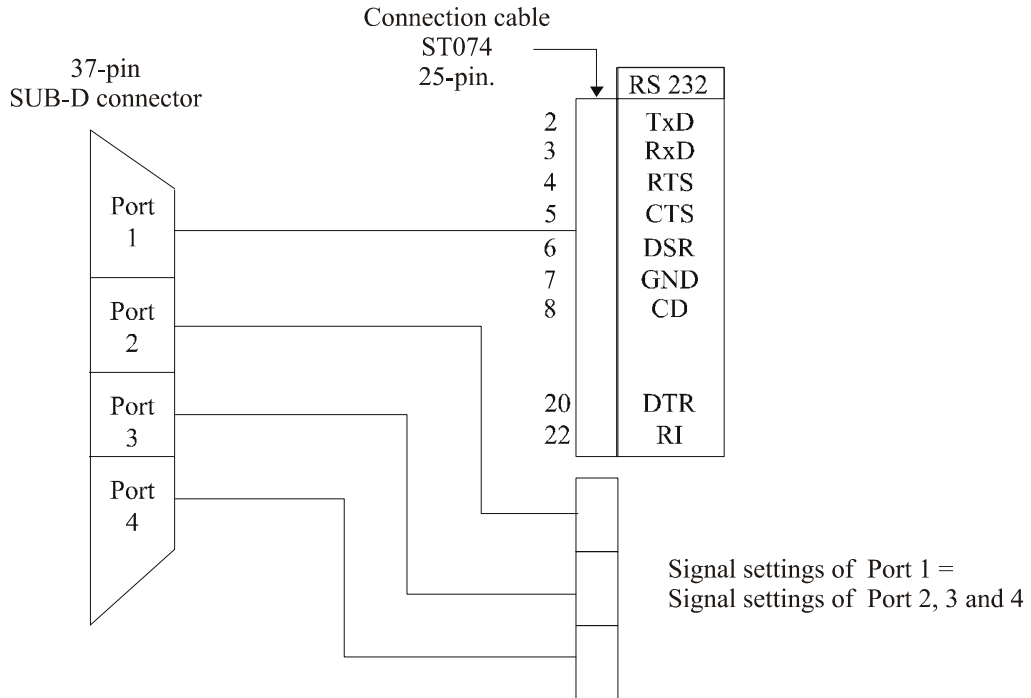
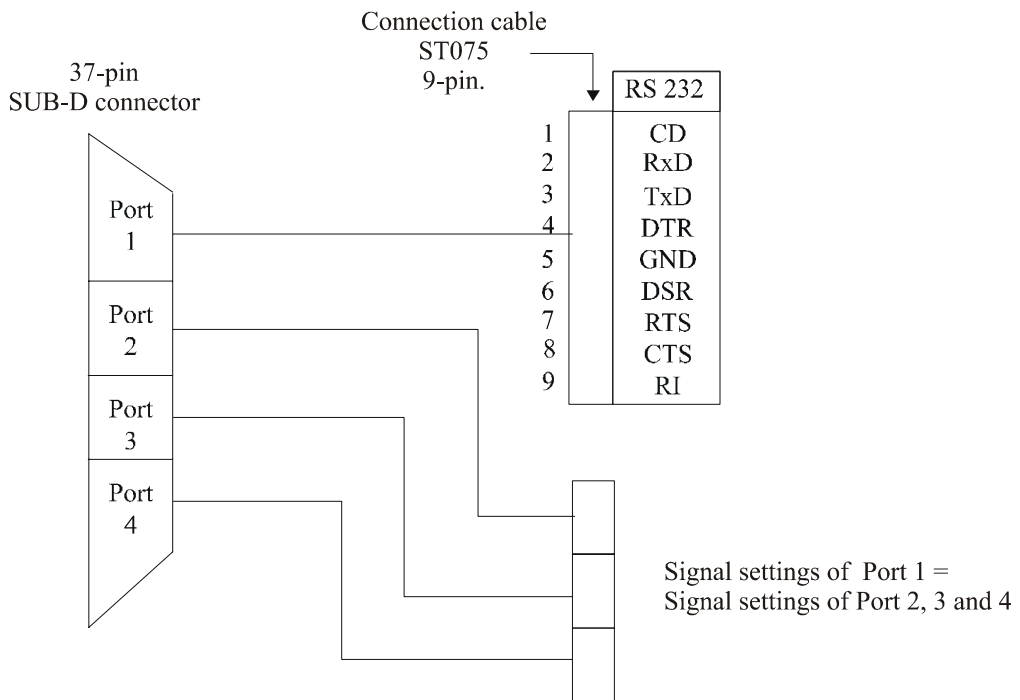
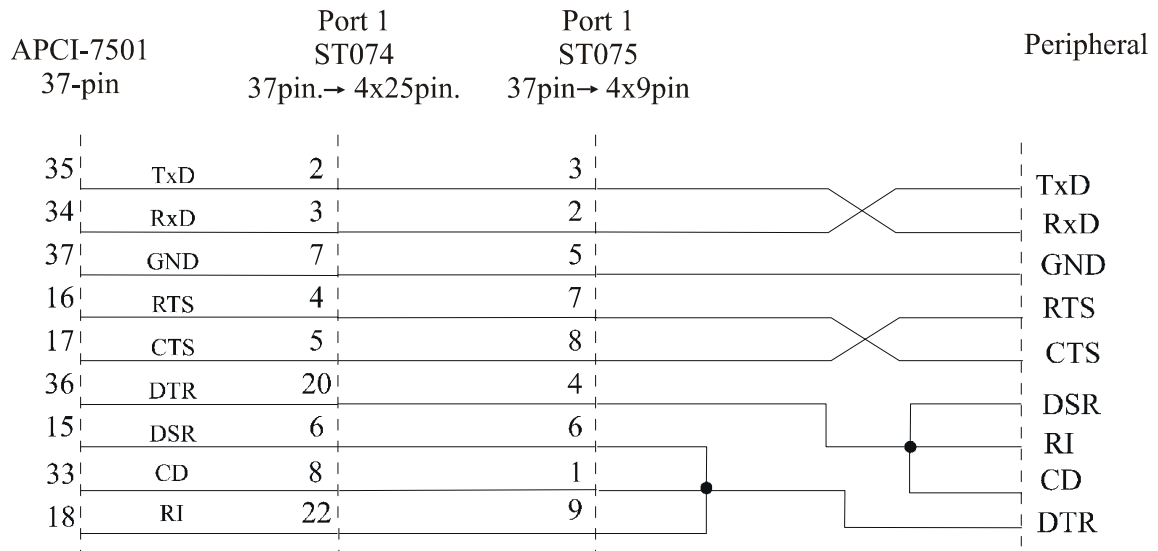


Fig. 6-3: Connection cable ST075 (4 x 9-pin)



6.3 Connection examples

Fig. 6-4: RS 232 cabling



7 STANDARD SOFTWARE

To install the 4 ports of the **APCI-7501** please use the standard drivers which are delivered with Windows NT 4.0 and windows 95. You can read additional information about the Windows API functions for the settings and the use of the serial interfaces in the delivered manual:

"SERIAL COMMUNICATION in WIN32"

Moreover you will find application examples in Delphi 2.0 and VC ++ 5.0.

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