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Attention!
Product discontinuation
due to EC RoHS directive
More info: www.addi-data.com



Technical description

ADDINUM PA 1610 / 1611

128 TTL inputs / outputs

4th edition 04/2000

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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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- copying the software is forbidden (except for archiving/ saving data and for replacing defective data media)
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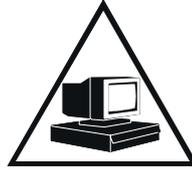
The original version of this manual is in German. You can obtain it on request.

WARNING

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



people may be injured



the board, PC and peripheral may be destroyed



the environment may be polluted

★★★ Protect yourself, the others and the environment ★★★

- **Do read 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 are not liable for damages resulting from a wrong use of the board.

- **Symbols used**



It designates a possibly dangerous situation.

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



IMPORTANT!

designates hints and other useful information.

- **Any question?**

Our technical support is at your disposal



Declaration of Conformity

This declaration is valid for the following product:

**ADDINUM PA 1610
Digital I/O board
with 128 TTL inputs/outputs**

It is made by

ADDI-DATA GmbH
Meß- und Steuerungstechnik
Dieselstraße 3
D-77833 Ottersweier

in sole responsibility and is valid on the understanding that the product is competently installed, used and maintained, according to the respective security regulations as well as to the manufacturer's instructions regarding its intended use.

This declaration states that the product complies with following EC Directives:

- **EWGRL 336/89 of 3.05.1989**
- **EWGRL 31/92 of 28.04.1992**
- **EWGRL 68/93 of 22.07.1993**

This declaration is valid for all units manufactured according to the manufacturing references listed in the form TD1610.020.

Following norms have been applied to test the product regarding electromagnetic compatibility:

- **EN55011/03.91**
- **EN55022/08.94**
- **EN50082-2/03.95**

We point out that

- the conformity and herewith the permission of use expire if the user alters the product without consulting with the manufacturer.
- non-skilled users are to have the operational area of the product and the requirements resulting from it checked prior to putting into operation.
- by using this product in appliances coming under the EC EMC Directive, the user is to make sure they are conform to its regulations prior to putting into operation.
- by using this product in machines / installations coming under the EU Machine Directive, the user is to make sure they are conform to its regulations prior to putting into operation.

A copy of the EMC tests is at your disposal on request.

9 October 1996

Legally valid signature of the manufacturer

1	INTENDED PURPOSE OF THE BOARD	1
1.1	Limits of use	2
2	USER	3
2.1	Qualification	3
2.2	Personal protection	3
3	HANDLING THE BOARD	4
4	TECHNICAL DATA	5
4.1	Electromagnetic compatibility (EMC).....	5
4.2	Physical set-up of the board	5
4.3	Versions	6
4.4	Limit values.....	6
4.5	Module features (32 channels).....	7
5	SETTINGS	8
5.1	Component scheme	8
5.1.1	Figures	8
5.1.2	Plugging of resistor networks.....	10
5.2	Jumper settings	11
5.2.1	Location of the jumpers and settings at delivery	11
5.2.2	Jumper settings	11
	Address decoding	11
	Selection of the channel type.....	12
	Status of the output channels after Reset	12
5.3	Base address	13
5.4	I/O mapping	14
6	INSTALLATION	15
6.1	Inserting the board	16
6.1.1	Opening the PC.....	16
6.1.2	Selecting a free slot	16
6.1.3	Inserting the board.....	17
6.1.4	Closing the PC	17
6.2	Installing the software	18
6.2.1	Software installation under MS-DOS and Windows 3.11	18
6.2.2	Software installation under Windows NT/95/98.....	18

6.3	Board configuration with ADDIREG	19
6.3.1	Program description	19
6.3.2	Registering a new board	22
6.3.3	Changing the registration of a board	23
6.3.4	Removing the ADDIREG program	23
6.4	Software downloads from the Internet	24
7	CONNECTING THE PERIPHERAL	25
7.1	Assignment of the inputs and outputs on the modules	25
7.2	Pin assignment of the connectors for ribbon cables	25
7.3	Connection pin assignment of the SUB-D connector	28
7.4	Connection examples	29
8	STANDARD SOFTWARE	30
	1) i_PA1610_SetBoardAddress (...).....	31
	2) i_PA1610_Read16DigitalInput (...).....	31
	3) i_PA1610_Write16DigitalInput (...).....	32
	4) i_PA1610_CloseBoardHandle (...).....	33
INDEX	A

Figures

Fig. 3-1: Wrong handling.....	4
Fig. 3-2: Correct handling.....	4
Fig. 5-1: Component scheme (right side).....	8
Fig. 5-2: Component scheme (left side).....	9
Fig. 5-3: Socket for resistors	10
Fig. 5-4: Position of the modules and jumpers.....	11
Fig. 5-5: DIP switches S1	13
Fig. 6-1: Types of slots	16
Fig. 6-2: Opening the protective blister packing.....	16
Fig. 6-3: Inserting the board	17
Fig. 6-4: Securing the board to the back cover.....	17
Fig. 6-5: ADDIREG registration program	19
Fig. 6-6: Configuring a new board.....	21
Fig. 7-1: Pin assignment of the inputs and outputs on the modules	25
Fig. 7-2: 34-pin female connector.....	25
Fig. 7-3: FB1610 - 34-pin connector to 37-pin SUB-D connector.....	28
Fig. 7-4: Connection to the screw terminal board PX 901-ZG.....	29

Tables

Table 5-1: Address decoding	11
Table 5-2: Selection of the channel type.....	12
Table 5-3: Status of the output channels after Reset.....	12
Table 5-4: Decoding of the base address 0390H.....	13
Table 5-5: I/O mapping	14
Table 7-1: Signal assignment of the connector - Module 1	26
Table 7-2: Signal assignment of the connector - Module 2.....	26
Table 7-3: Signal assignment of the connector - Module 3.....	27
Table 7-4: Signal assignment of the connector - Module 4.....	27
Table 7-5: Pin assignment of the SUB-D male connector.....	29
Table 8-1: Type Declaration	30

1 INTENDED PURPOSE OF THE BOARD

The board **PA 1610 / PA 1611** is to be used in a free PC ISA slot.
The PC is to comply with the EU directive 89/336/EEC and the specifications for EMC protection.

Products complying with these specifications bear the  mark.

The board **PA 1610 / PA 1611** is the interface between the processing electronics of the PC and internal or external TTL input/output units.
The 16-bit data exchange occurs over the ISA data bus through parallel data input and output.

For the internal connection, the board **PA 1610 / PA 1611** has 128 input/output channels organised in 4 modules. Each module has 32 pins.

For the external connection, the 4 connectors for ribbon cable are connected to the 37-pin SUB-D male connector through the ribbon cable set **FB1610**.

For the connection to the peripheral, we recommend using the **ADDI-DATA** standard cable **ST010**.

The configuration of the input and output channels is modular.
Each module can be configured so that all 32 pins are set either as inputs or outputs.

Data exchange is supported through the driver functions.

All driver functions are intended to be used in a program written specially for the application of the board **PA 1610 / PA 1611**.

- The **TTL outputs** lead the 16-bit data bus information to the pins defined through driver function.
- The **TTL inputs** acquire digital signal states as follows:
the input information is loaded through the corresponding driver function as a numerical value in a memory cell of the PC.

Please only use the board :

- in conditions providing absolute security
- in a closed housing which is adequately protected against environmental influences
- **with the accessories** we recommend

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 board PA 1610 / PA 1611 is not to be used for securing emergency stop functions.



WARNING!

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

The tested appliance configuration is at your disposal on request.

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.

Make sure that the board remains in the protective blister packing **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 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

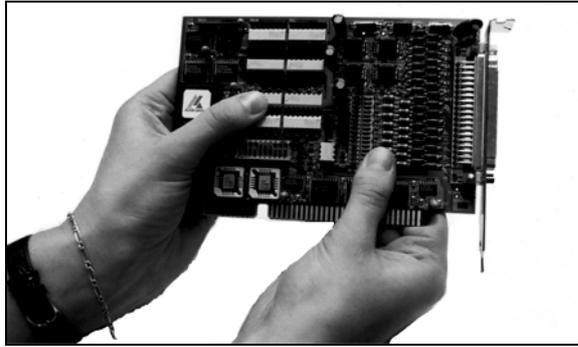
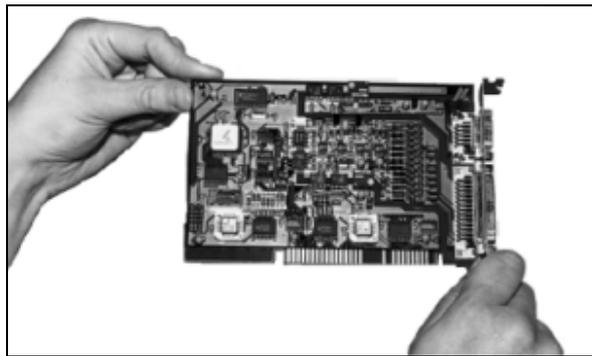


Fig. 3-2: Correct handling



4 TECHNICAL DATA

4.1 Electromagnetic compatibility (EMC)

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

	<u>Real value</u>	<u>Set value</u>
ESD.....	8 kV	4 kV
Fields	10 V/m	10 V/m
Burst.....	4 kV	2 kV
Conducted radio interferences	10 V	10 V



WARNING!

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

The tested appliance configuration is at your disposal on request.

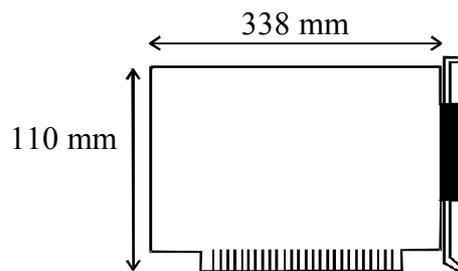
Consider the following aspects:

- 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 2-layer printed circuit card.

Dimensions:



Weight : approx. 100g

Installation in : AT slot

Connection to the peripheral:
 ST010/ST011
 FB1610

37-pin SUB-D male connector
 Shielded round cable
 Set of 4 ribbon cables
 - 3 x 34-pin female to 37-pin SUB-D male connector with bracket
 - 1 x 34-pin female to 34-pin female connector for the onboard connection to the front connector

4.3 Versions

Version	Transil diodes
PA 1610	-
PA 1611	●

4.4 Limit values

Operating temperature: 0 to 60°C
 Storage temperature: -10 to 70°C
 Relative humidity: up to 80 % non condensing

Minimum PC requirements:

- Operating system: MS DOS, Windows 3.1x, NT, 95, 98
 - Bus system: ISA
 - Number of slots required: 1 AT slot and
 3 additional slots for front connectors

Energy requirement:

- Operating voltage: +5 V from PC
 - Current consumption: approx. 1.5 A

Inputs and outputs: 128 TTL inputs and outputs
 4 independent modules with
 each 32 TTL input/output channels

I/O address range: 16 bytes
 Access: 16-bit
 Programmation: through I/O read or write commands
 Driver type: LS 445
 Max. input and output voltage: TTL level
 LS output driver:
 LOW: 24 mA
 HIGH: - 15 mA
 Short-circuit output current: max. -225 mA
 Signal delay: 70 ns

Addressing through DIP switches S1 and jumper J5.

- With the reset signal, the outputs can be reset to logic "1" or "0" (Jumper J10).

4.5 Module features (32 channels)

- Each module has 32 pins
- Each module has 1 x 34-pin male connector for ribbon cable
- The modules are configured independently from each other
- All input/output channels have sockets for pullup and pulldown resistors (+ 5 V and 0 V).
- Length of the connection cable: 0.5 to 3 m

5 SETTINGS

5.1 Component scheme

5.1.1 Figures

Fig. 5-1: Component scheme (right side)

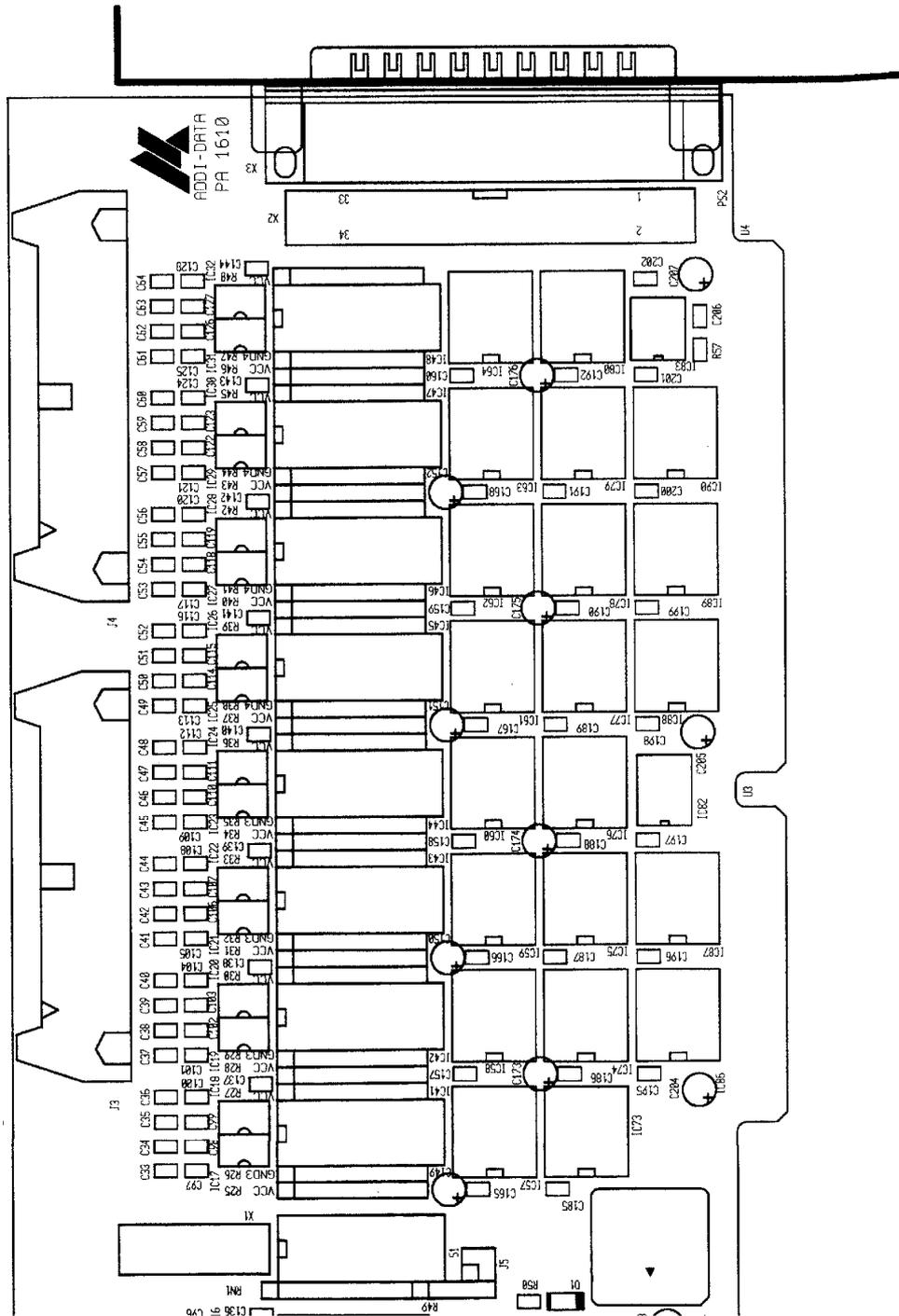
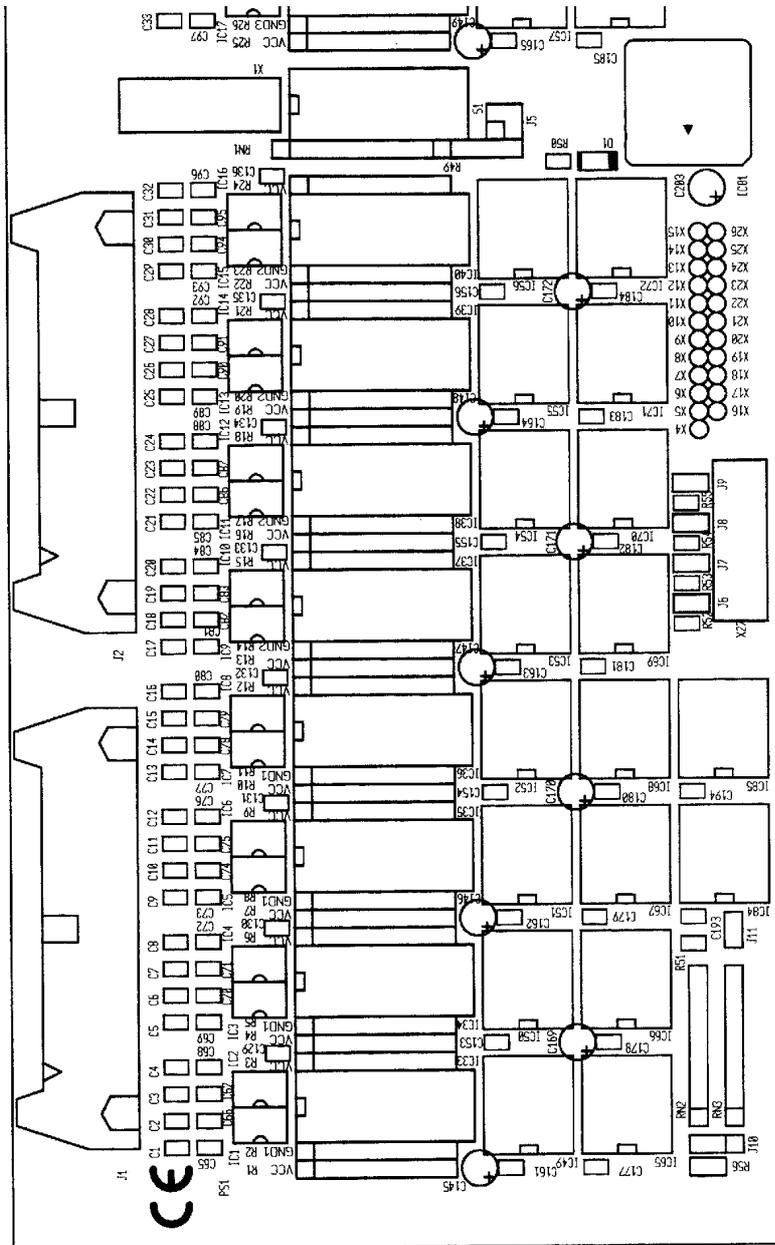
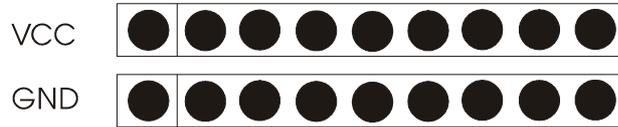


Fig. 5-2: Component scheme (left side)

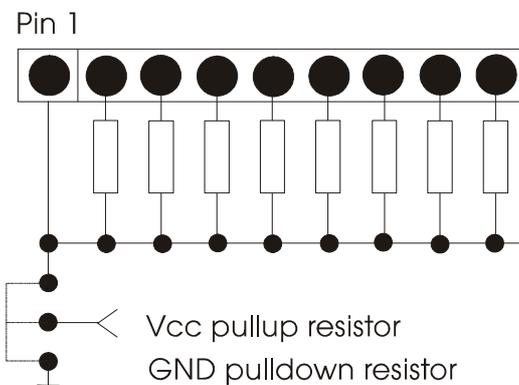


5.1.2 Plugging of resistor networks

Fig. 5-3: Socket for resistors



VCC Socket for pullup resistors
 GND 1-4 Socket for pulldown resistors



Pin 1 is either

- the common pin for the 8 pullup resistors (Vcc)
- the common pin for the 8 pulldown resistors (GND)

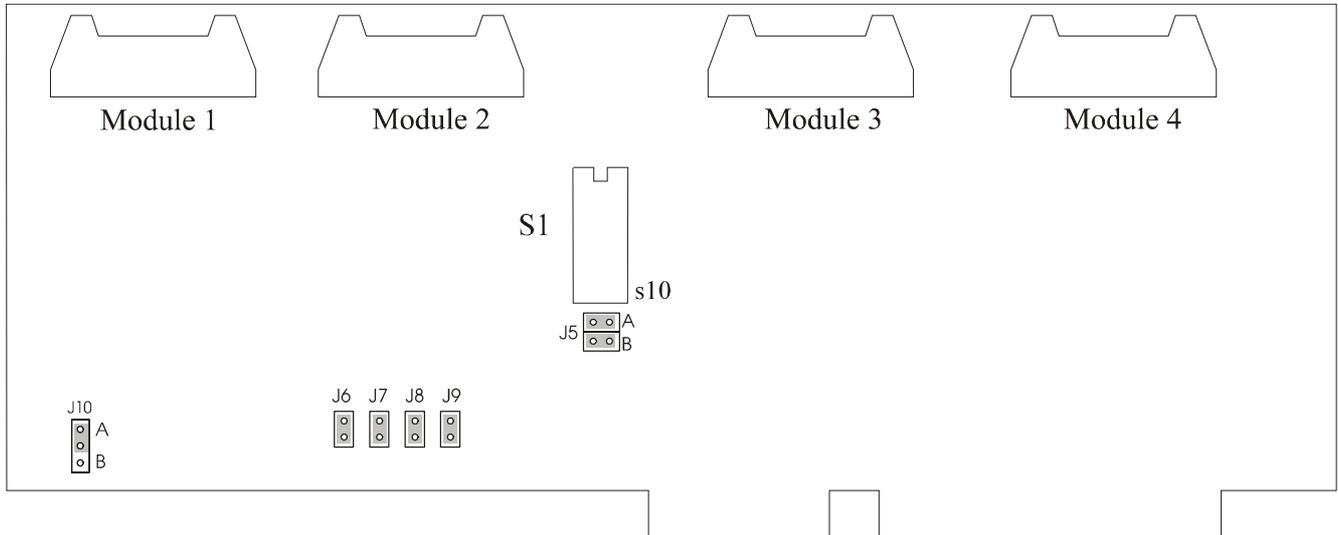
i

IMPORTANT!
Caution when plugging the resistor networks.
 The common pin is marked with a ●.

5.2 Jumper settings

5.2.1 Location of the jumpers and settings at delivery

Fig. 5-4: Position of the modules and jumpers



5.2.2 Jumper settings



IMPORTANT!

J5-A. This means that jumper J5 is set in A position.

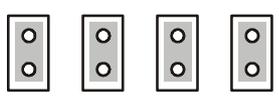
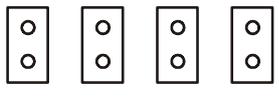
Address decoding

Table 5-1: Address decoding

Jumper position	Function	Delivery
J5  A	decoding of the address bits A14 and A15 to logic "0"	✓
J5  B	decoding of the address bits A14 and A15 to logic "1"	

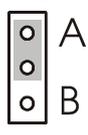
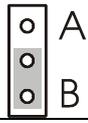
Selection of the channel type

Table 5-2: Selection of the channel type

Jumper position	Function	Delivery
<p>J6 J7 J8 J9</p> 	<p>The output channels are configured as follows: J6: outputs 1-32 J7: outputs 33-64 J8: outputs 65-96 J9: outputs 97-128</p>	✓
<p>J6 J7 J8 J9</p> 	<p>The input channels are configured as follows: J6: inputs 1-32 J7: inputs 33-64 J8: inputs 65-96 J9: inputs 97-128</p>	

Status of the output channels after Reset

Table 5-3: Status of the output channels after Reset

Jumper position	Function	Delivery
<p>J10</p> 	Logic "1" after reset	✓
<p>J10</p> 	Logic "0" after reset	

5.3 Base address



WARNING!

If the base address is set wrong, the board and/or the PC may be damaged.

Before installing the board

The base address is set at delivery on the address 0390H.

Check that

- the base address is free
- the address range (16 I/O addresses) required by the board is not already used by the PC or by boards already installed in the PC.

If the base address and/or the address range **wrong**,

- **select** another base address with the DIP switches S1 and the jumper J5

The base address must be set between 0000H and FFFFH.

As an example, the address 0390H is decoded in the following figure.

Table 5-4: Decoding of the base address 0390H

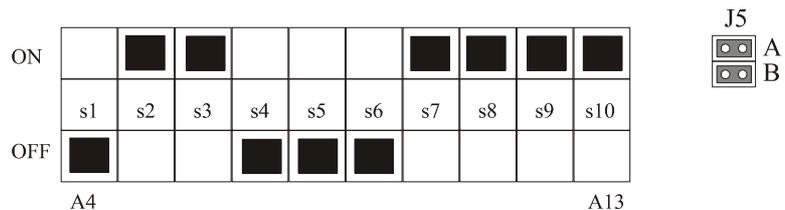
	MSB												LSB			
Decoded address bus	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
Hex base address to be set	0				3				9				0			
Binary base address to be set	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
DIP switch S1 Logic "0" = ON Logic "1" = OFF	*	*	s10	s9	s8	s7	s6	s5	s4	s3	s2	s1	X	X	X	X
Jumper J5 Logic "0" = set Logic "1" = not set	J5-A	J5-B	*	*	*	*	*	*	*	*	*	*	X	X	X	X

X: Decoded address range of the board
*: Cannot be set through this component

Fig. 5-5: DIP switches S1

IMPORTANT!

You will find the switch s1 on the left side of the block of DIP switches.



5.4 I/O mapping

Table 5-5: I/O mapping

I/O 1-16	Base address +0
I/O 17-32	Base address + 2
I/O 33-48	Base address + 4
I/O 49-64	Base address + 6
I/O 65-80	Base address + 8
I/O 81-96	Base address + 10
I/O 97-112	Base address + 12
I/O 113-128	Base address +14

6 INSTALLATION

i

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 (once is enough)
 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 6.1 to 6.5.

i

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.

6.1 Inserting the board

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IMPORTANT!

Please do observe the *safety instructions*.

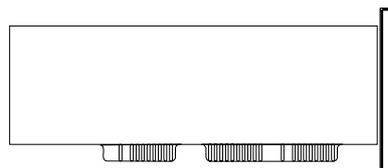
6.1.1 Opening the PC

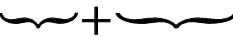
- Switch off your PC and all the units connected to the PC.
- Pull the PC's mains plug from the socket.
- Open your PC as described in the manual of the PC manufacturer.

6.1.2 Selecting a free slot

1. Select a free AT slot

Fig. 6-1: Types of slots



AT = 
 XT = 

The board can be installed in an EISA slot under certain conditions.

2. **Remove the back cover of the selected slot** according to the instructions of the PC manufacturer. Keep the back cover in order to be able to close the PC properly if you wish to remove the board.
3. **Discharge yourself from electrostatic charges**
4. **Take the board from its protective blister packing.**

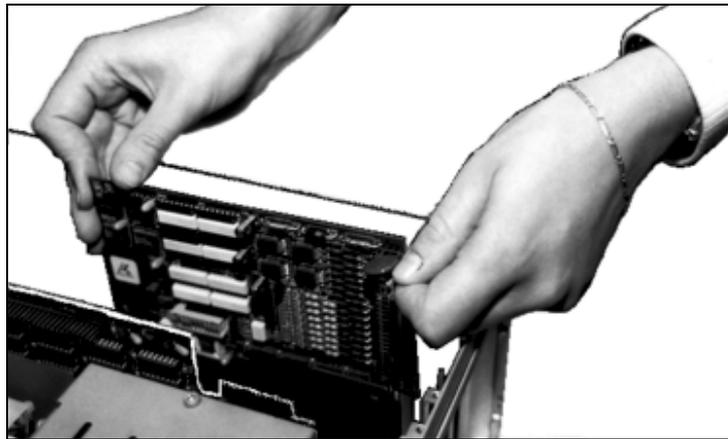
Fig. 6-2: Opening the protective blister packing



6.1.3 Inserting the board

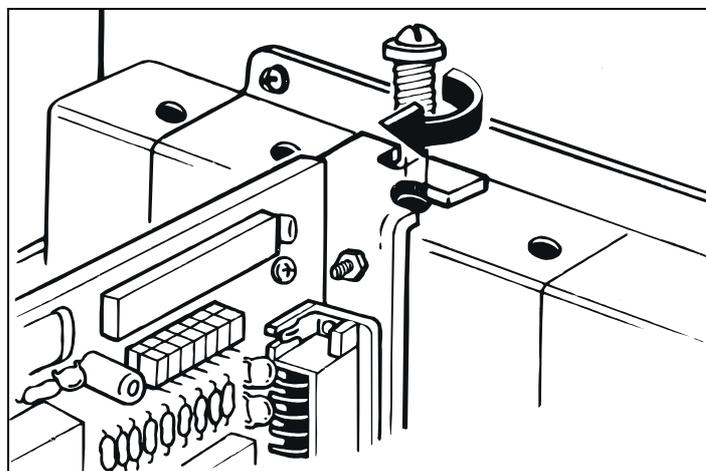
- Discharge yourself from electrostatic charges.
- Insert the board vertically into the chosen slot.

Fig. 6-3: Inserting the board



- Secure the board to the rear of the PC housing with the screw which held the back cover.

Fig. 6-4: Securing the board to the back cover



- Tighten all loosen screws.

6.1.4 Closing the PC

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

6.2 Installing the software

The board is delivered with a CD-ROM which contains ADDIREG for Windows NT 4.0 and Windows 95/98

You can download the latest version of the ADDIREG program from the Internet:

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

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

The CD also contains standard software for the ADDI-DATA boards:

- 16-bit for MS-DOS and Windows 3.11
- 32-bit for Windows NT/95/98.

6.2.1 Software installation under MS-DOS and Windows 3.11

- Copy the contents of PA1610\16bit on a disk.
If several disks are to be used, the directory contents is stored in several sub-directories (Disk1, Disk2, Disk3...).
- Insert the (first) disk into a drive and change to this drive.
- Enter <INSTALL>.

The installation program gives you further instructions.

6.2.2 Software installation under Windows NT/95/98

- Select the directory PA1610\32bit\Disk1 corresponding to the board.
- 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 the "Software License" and "Readme".

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

The installation program gives you further instructions.

6.3 Board configuration with ADDIREG

The ADDIREG registration program is a 32-bit program for Windows NT 4.0 and windows 95/98.

The user can registrate all hardware information necessary to operate the ADDI-DATA PC boards.



IMPORTANT!

If you use one or several resources of the board, you cannot start the ADDIREG program.

6.3.1 Program description



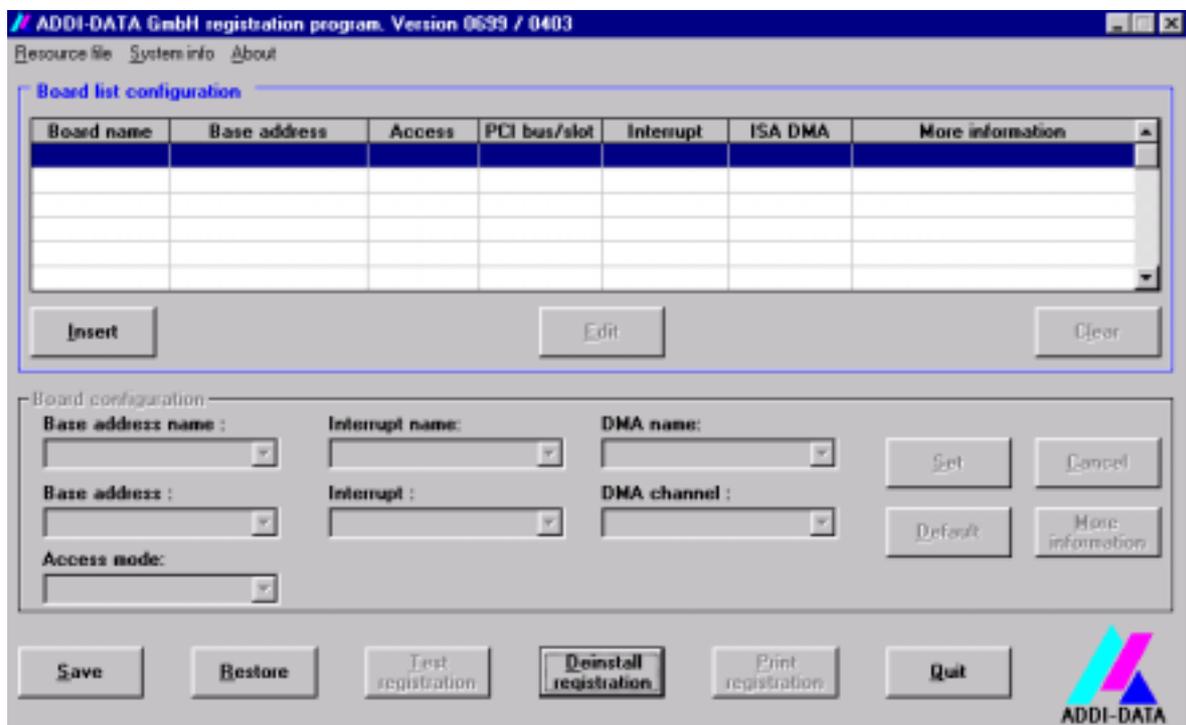
IMPORTANT!

Insert the ADDI-DATA boards to be registered before starting the ADDIREG program.

If the board is not inserted, the user cannot test the registration.

Once the program is called up, the following dialog box appears.

Fig. 6-5: 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-3120).

When you start the program for the first time, no board is registered in this table.

Base address:

Selected base address of the board.

Access:

Selection of the access mode for the ADDI-DATA digital boards.

Access in 8-bit or 16-bit.

PCI bus / 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.

ISA DMA:

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

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 uses.

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:

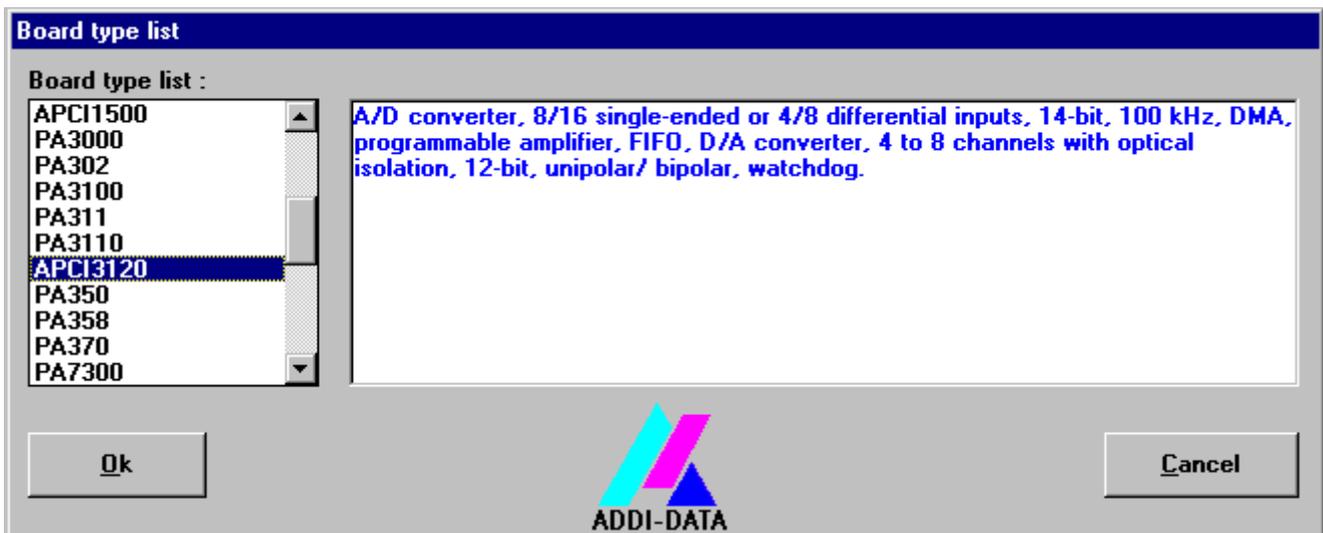
Edit ¹:

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. 6-6: Configuring 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.

Clear:

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

Set:

Sets the parameterised 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...

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

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

Save:

Saves the parameters and registers 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.

6.3.2 Registering a new board

i

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 figure X-X 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 them. Click on the wished scroll function(s) and choose a new value. Activate your selection with a 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.

6.3.3 Changing the registration of a board

i

IMPORTANT!

To change the registration of a 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.

6.3.4 Removing the ADDIREG program

The ADDI_UNINSTAL program is delivered on the CD-ROM.

- Install the ADDI_UNINSTAL program on your computer.
- Start the ADDIREG program and click on "Deinstall registration"
- Quit ADDIREG
- Start the ADDI_UNINSTAL program
- Proceed as indicated until the complete removing of ADDIREG.

You can also download the program from Internet.

6.4 Software downloads from the 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>

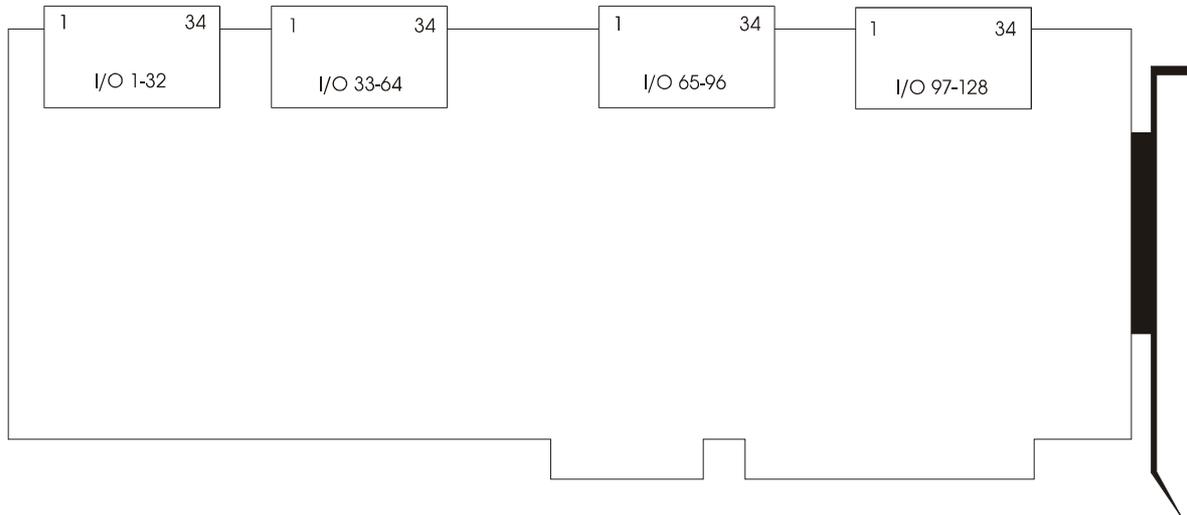
Free driver downloads

You can download the latest version of the device driver for the board **PA 1610**.

7 CONNECTING THE PERIPHERAL

7.1 Assignment of the inputs and outputs on the modules

Fig. 7-1: Pin assignment of the inputs and outputs on the modules



Pin 1 is marked with a Δ on the connector.

7.2 Pin assignment of the connectors for ribbon cables

Fig. 7-2: 34-pin female connector

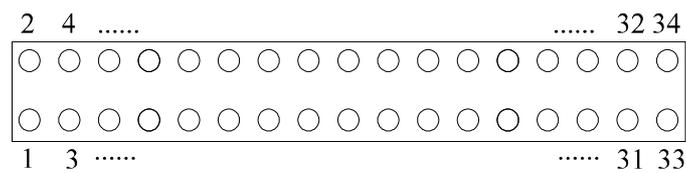


Table 7-1: Signal assignment of the connector - Module 1

Signal	Pin No						
I/O 1	1	I/O 9	9	I/O 17	17	I/O 25	25
I/O 2	2	I/O 10	10	I/O 18	18	I/O 26	26
I/O 3	3	I/O 11	11	I/O 19	19	I/O 27	27
I/O 4	4	I/O 12	12	I/O 20	20	I/O 28	28
I/O 5	5	I/O 13	13	I/O 21	21	I/O 29	29
I/O 6	6	I/O 14	14	I/O 22	22	I/O 30	30
I/O 7	7	I/O 15	15	I/O 23	23	I/O 31	31
I/O 8	8	I/O 16	16	I/O 24	24	I/O 32	32
						GND	33
						GND	34

Table 7-2: Signal assignment of the connector - Module 2

Signal	Pin No						
I/O 33	1	I/O 41	9	I/O 49	17	I/O 57	25
I/O 34	2	I/O 42	10	I/O 50	18	I/O 58	26
I/O 35	3	I/O 43	11	I/O 51	19	I/O 59	27
I/O 36	4	I/O 44	12	I/O 52	20	I/O 60	28
I/O 37	5	I/O 45	13	I/O 53	21	I/O 61	29
I/O 38	6	I/O 46	14	I/O 54	22	I/O 62	30
I/O 39	7	I/O 47	15	I/O 55	23	I/O 63	31
I/O 40	8	I/O 48	16	I/O 56	24	I/O 64	32
						GND	33
						GND	34

Table 7-3: Signal assignment of the connector - Module 3

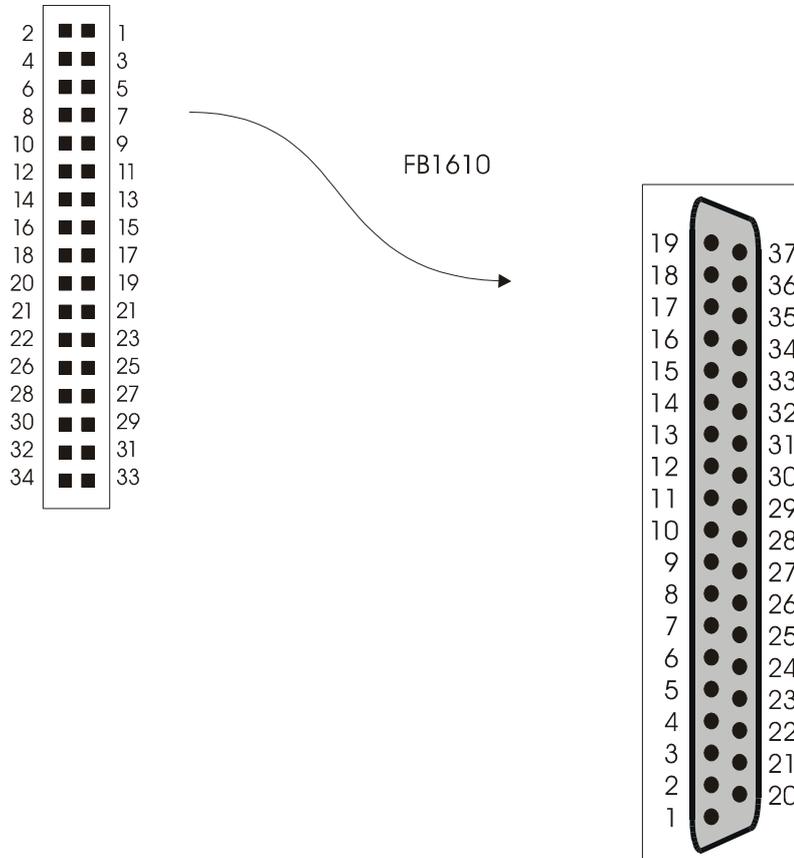
Signal	Pin No						
I/O 65	1	I/O 73	9	I/O 81	17	I/O 89	25
I/O 66	2	I/O 74	10	I/O 82	18	I/O 90	26
I/O 67	3	I/O 75	11	I/O 83	19	I/O 91	27
I/O 68	4	I/O 76	12	I/O 84	20	I/O 92	28
I/O 69	5	I/O 77	13	I/O 85	21	I/O 93	29
I/O 70	6	I/O 78	14	I/O 86	22	I/O 94	30
I/O 71	7	I/O 79	15	I/O 87	23	I/O 95	31
I/O 72	8	I/O 80	16	I/O 88	24	I/O 96	32
						GND	33
						GND	34

Table 7-4: Signal assignment of the connector - Module 4

Signal	Pin No						
I/O 97	1	I/O 105	9	I/O 113	17	I/O 121	25
I/O 98	2	I/O 106	10	I/O 114	18	I/O 122	26
I/O 99	3	I/O 107	11	I/O 115	19	I/O 123	27
I/O 100	4	I/O 108	12	I/O 116	20	I/O 124	28
I/O 101	5	I/O 109	13	I/O 117	21	I/O 125	29
I/O 102	6	I/O 110	14	I/O 118	22	I/O 126	30
I/O 103	7	I/O 111	15	I/O 119	23	I/O 127	31
I/O 104	8	I/O 112	16	I/O 120	24	I/O 128	32
						GND	33
						GND	34

7.3 Connection pin assignment of the SUB-D connector

Fig. 7-3: FB1610 - 34-pin connector to 37-pin SUB-D connector



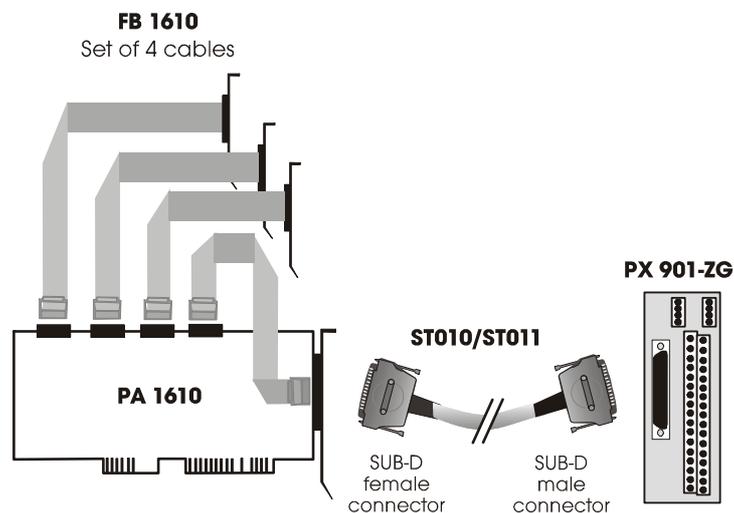
Pin 1 is marked with a Δ on the 34-pin connector.
 (i.e. if the red cable leads is on the left-hand side, pin 1 is on the upper left-hand corner of the connector.)

Table 7-5: Pin assignment of the SUB-D male connector

Pin number on the ribbon cable	Pin number on the SUB-D male connector	Pin number on the ribbon cable	Pin number on the SUB-D male connector
1	36	17	28
2	17	18	9
3	35	19	27
4	16	20	8
5	34	21	26
6	15	22	7
7	33	23	25
8	14	24	6
9	32	25	24
10	13	26	5
11	31	27	23
12	12	28	4
13	30	29	22
14	11	30	3
15	29	31	21
16	10	32	2
		33	20
		34	1

7.4 Connection examples

Fig. 7-4: Connection to the screw terminal board PX 901-ZG



8 STANDARD SOFTWARE

i

IMPORTANT!

Note the following conventions in the text:

Function: "i_PA1500_SetBoardAddress"

Variable *ui_Address*

Table 8-1: Type Declaration

	Borland C	Microsoft C	Borland Pascal	Microsoft Visual Basic Dos	Microsoft Visual Basic Windows
VOID	void	void	pointer		any
BYTE	Unsigned char	unsigned char	byte	integer	integer
INT	int	int	integer	integer	integer
UINT	unsigned int	unsigned int	word	long	long
LONG	long	long	longint	long	long
PBYTE	Unsigned char *	unsigned char *	var byte	integer	integer
PINT	int *	int *	var integer	integer	integer
PUINT	Unsigned int *	unsigned int *	var word	long	long
PCHAR	char *	char *	var string	string	string

1) i_PA1610_SetBoardAddress (...)

Syntax:

<Return value> = i_PA1610_SetBoardAddress (UINT ui_BaseAddress, PBYTE pb_BoardHandle)

Parameters:

- Input:

UINT ui_BaseAddress: Base address of the **PA 1610**

- Output:

PBYTE pb_BoardHandle Handle¹ of board **PA 1610** to use the functions

Task:

Checks if the board **PA 1610** is present and stores the base address. A handle is returned to the user which allows to use the following functions. Handles allow to operate several boards.

Return value:

0: No error

-1: Not available base address

-2: Board not present

-3: No handle is available for the board (up to 10 handles can be used)

2) i_PA1610_Read16DigitalInput (...)

Syntax:

<Return value> = i_PA1610_Read16DigitalInput (BYTE b_BoardHandle, INT i_Port, PUINT pui_ReadValue)

Parameter:

- Input:

BYTE b_BoardHandle Handle of the **PA 1610**

INT i_Port Number of the 16-bit input port to be read

- Output:

PUINT pui_ReadValue State of the digital inputs

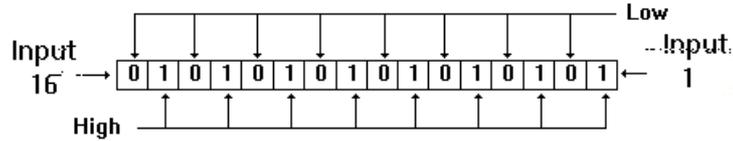
Task:

Indicates the state of a 16-bit port. The variable b_Port passes the port which is to be read (1 to 8).

¹ Identification number of the board

Example:

i_Port = 1
 pl_InputValue = 5555 Hex



A voltage is present on the inputs 1, 3, 5, 7, 9, 11, 13, 15 .
 A voltage is not present on the inputs 2, 4, 6, 8, 10, 12, 14, 16.

Return value:

- 0: No error
- 1: The handle parameter of the board is wrong
- 2: The parameterised port number is wrong

3) i_PA1610_Write16DigitalInput (...)

Syntax:

<Return value> = i_PA1610_Write16DigitalInput
 (BYTE b_BoardHandle,
 INT i_Port,
 UINT ui_WriteValue)

Parameters:

- Input:

BYTE	b_BoardHandle	Handle of the PA 1610
INT	i_Port	Number of the output port to be written (1 to 8)
LONG	l_Value	Output value (0 to 65535)

- Output:

No output signal has occurred.

Task:

Sets the outputs of one 16-bit port. The variable b_Port passes the port which is to be written (1 to 8).

Return value:

- 0: No error
- 1: The handle parameter of the board is wrong
- 2: The port number is wrong

4) i_PA1610_CloseBoardHandle (...)**Syntax:**

<Return value> = i_PA1610_CloseBoardHandle (BYTE b_BoardHandle)

Parameter:**- Input:**

BYTE b_BoardHandle Handle of the **PA 1610** board

- Output:

No output signal has occurred.

Task:

Releases the board handle. Blocks the access to the board.

Return value:

0: No error

-1: The handle parameter of the board is wrong

INDEX

- ADDIREG 19–24
 - changing the configuration 23
 - removing 23
- base address 13
- board
 - insertion 5, 16, 17
 - mechanical set-up 5
 - secure 17
 - version 6
 - weight 5
- board handling 4
- component scheme 8, 9
- connection
 - examples 29
 - peripheral 25
- DIP switches 13
- EMC 5
- I/O mapping 14
- installation 15–24
 - software 18
- intended purpose 1
- jumper
 - location 11
 - settings 11
- limit values 6
- module
 - features 7
 - pin assignment 25
- PC
 - close 17
 - open 16
 - remove the back cover 16
 - slot selection 16
- pin assignment
 - connector 25
 - module 25
 - SUB-D connector 28
- resistor networks 10
- settings 8–14
 - delivery 11
 - I/O mapping 14
 - jumper 11
- slot
 - selection 16
- software
 - downloads 24
 - installation 18
- standard software 30–33
- technical data 5–7
- use
 - limits of 2
- user 3
- version 6