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Technical description

**ADDICOM PA 780**

Parallel interface

2<sup>nd</sup> edition 02/1997

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- 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
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- not checking properly the parts which are subject to wear
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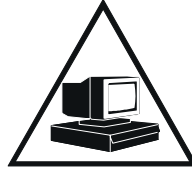
***The original version of this manual is in German. You can obtain it on request.***

# 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 manual, 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**



**WARNING!**

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

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# 1 INTENDED PURPOSE OF THE BOARD

**Do read the safety advices on the yellow leaflet, before going on with this chapter.**

The board **PA780** is intended to be used in a personal computer (PC), which is equipped with free ISA slots. The PC is to comply with:

- the low-voltage directive 73/23/EEC
- the EMC directive 89/336/EEC
- and specifications for protection.

Products complying with these specifications bear the  mark.

The board works in the normal mode as a standard printer port (SPP) without 8-bit return channel. The data to be printed come from the PC's memory cells via data bus on board **PA780**. They are afterwards transmitted to the printer.

The printer is also subjected to EU directives, so that the  mark is necessary.

The requirements of the EMC directive are different if the board is used at home or in the industry.

- **Please check** in what field PC and printer are to be used. They must both comply with the emission specifications for homes (EN55022 B-class).

The board **PA780** complies as well with the requirements for homes.

In the PS2-mode you can make the data bus highly impedant with bit PCD of the Control Register. Bi-directional data exchanges are thus possible.

## *Connecting the printer*

- **Please use** for connecting the printer a high quality parallel cable complying with IEEE 1284.

On both sides the cable shielding should have an all-around contact with the metallized connector housings. A pull relief is advisable and in most cases necessary.

Consider that the connection cable must be able to be screwed firmly to the board. The transition resistance in the connected state between the board's bracket and the connector housing at the free cable end should be low-impedant ( $< 50\text{m } \Omega$ ).

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.

The use of the board according to its intended purpose includes observing all advices given in the *Technical description* and in the *Safety* leaflet.

## 1.1 Limits of use

The use of appliances (printer, PC...) which are not CE-certified is not comprised in the intended purpose.

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

The CE certification of individual appliances (PC, board, printer) does not mean necessarily that the whole system is conform.

**Our boards are not to be used 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.

**Our boards are not to be used in relation with alive keeping devices or systems, as far as it has not been agreed in the written form.**

Make sure that the board remains in the protective bag **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 intitled to perform the following works:

- installation,
- use,
- maintenance.

### **2.2 Personal protection**

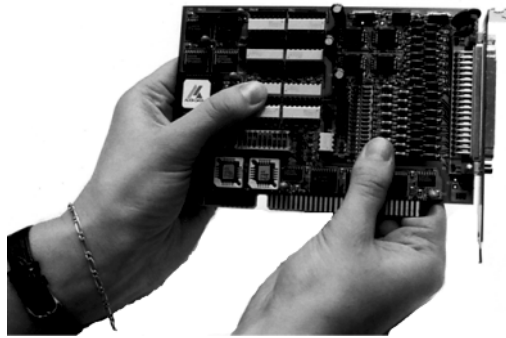
Consider the country-specific regulations about

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

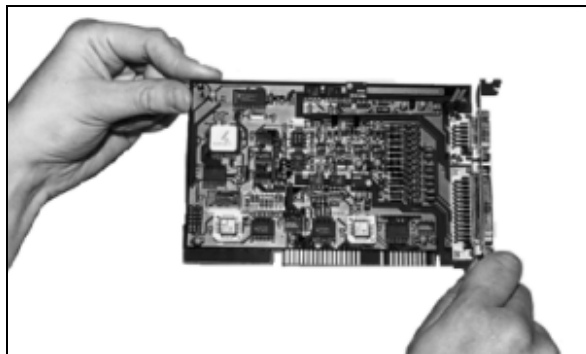


### 3 HANDLING THE BOARD

**Fig. 3-1: Wrong handling**



**Fig. 3-2: Correct handling**



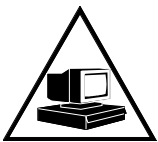
## 4 TECHNICAL DATA

The following features are specified but not guaranteed.

### 4.1 Electromagnetic compatibility (EMC)

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

	<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 emissions .....		B-class



#### **WARNING!**

The EMC tests have been carried out in a specific appliance configuration. We guarantee these limit values **only** in this configuration. <sup>1</sup>

#### **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.

Approximate card dimensions without components	Length:	108 mm
	Height:	63 mm
Approximate card dimensions with components	Length:	126 mm
	Height:	63 mm
	Breadth:	18 mm
Weight:	100 g	
Installation in:	XT/AT slot	
Connection to the peripheral	25-pin SUB-D connector	

<sup>1</sup> we transmit our appliance configuration on request.

### 4.3 Limit values

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

**Minimum PC requirements:**

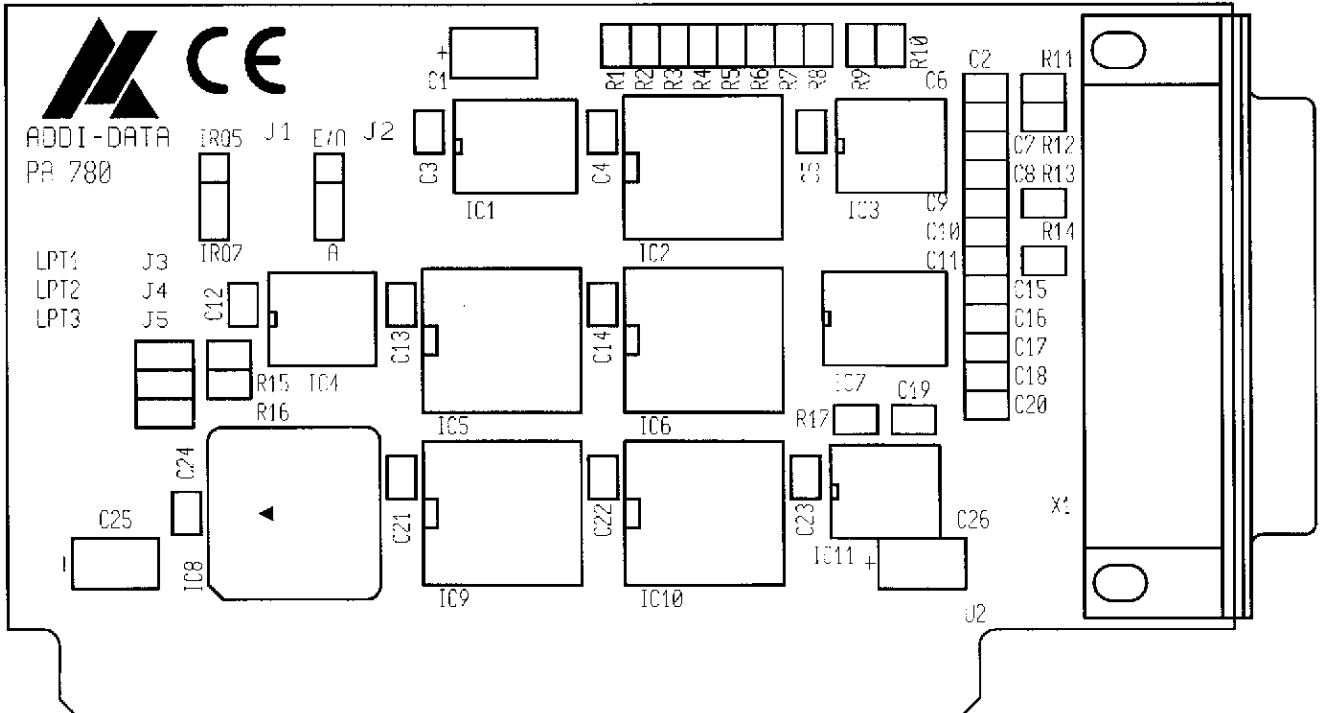
- operating system ..... MS DOS 3.3 or >  
Windows 3.1  
- bus speed ..... 8 MHz

**Energy requirements:**

- operating voltage of the PC: ..... 5V ± 5%

### 4.4 Component scheme

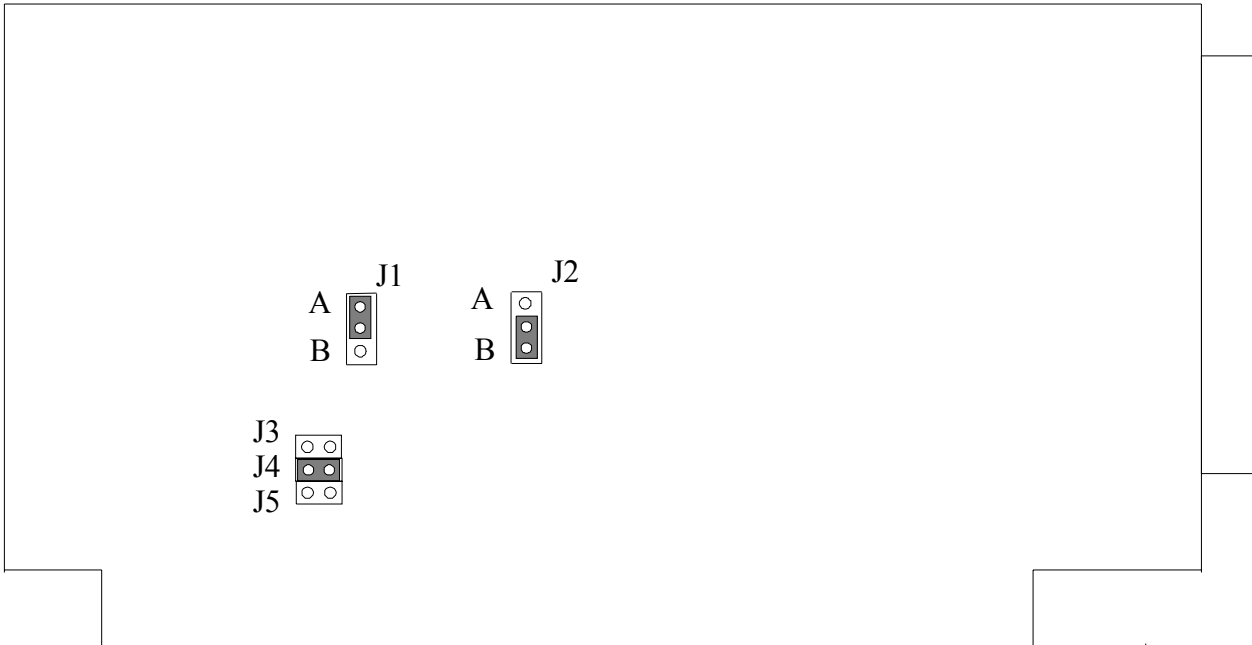
Fig. 4-1: Component scheme



## 5 INSTALLATION

### 5.1 Jumper configurations

#### 5.1.1 Jumper location - configurations at delivery



#### 5.1.2 Jumper configurations depending on the function

Table 5-1: Jumper configurations depending on the function

Designation	Position	Function	At delivery
J1	A	IRQ5	✓
J1	B	IRQ7	
J2	A	E/A <sup>1</sup>	
J2	B	A	✓
J3		LPT1	
J4		LPT2	✓
J5		LPT3	

<sup>1</sup> Data register can be programmed as input or output register

## 5.2 I/O map

### 5.2.1 Data register (Base +0)

Bit 7	6	5	4	3	2	1	Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

### 5.2.2 Status register (Base +1)

Bit 7	6	5	4	3	2	1	Bit 0
$\overline{\text{BUSY}}$	$\overline{\text{ACK}}$	PE	SLCTIN	$\overline{\text{ERROR}}$	1	1	1

BUSY = 0 Printer not ready for reception  
 ACK = 0 Printer ready for reception  
 PE = 1 No paper  
 SELCTIN = 0 Printer not ready for operation  
 ERROR = 0 Error while printing


### 5.2.3 Control register (Base +2)

Bit 7	6	5	4	3	2	1	Bit 0
1	1	PCD	IRQE	SELECT	$\overline{\text{INIT}}$	AUTO FEED	STROBE

PCD Parallel Control Direction Bit  
only relevant in the PS2-mode

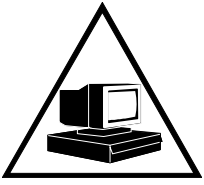
You configure the PS2-mode with jumper J2 :

J2 Data register works like  
 a bi-directional TTL-I/O-  
 register



PCD = 1 Data input through the data lines of the printer  
 PCD = 0 Data output through the data lines of the printer  
 IRQE = 1 Interrupt when ACK is low  
 SELECT = 1 Select the printer  
 INIT = 0 Initializing the printer  
 AUTOFEED Re-readable control lines for handshake  
 between the PC and the printer  
 STROBE Control line for handshake

### 5.3 Base address



#### **WARNING!**

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

#### *Before installing the board*

The base address is set at delivery on LPT2 (i.e. address 0278H).

- **Check**, that
  - the base address is free
  - the address range (3 I/O addresses ) required by the board is not already used by the PC or by boards already installed in the PC.

The base address or the address range **are wrong?**

- **Set** the base address on LPT1 or LPT3

You will find in the next table the different address ranges and their corresponding jumper setting.

**Table 5-2: Address ranges and the corresponding jumper setting**

Designation	Address	Jumper	Interrupt	Jumper
LPT1	0378H	J3	IRQ 7	J1 Pos.B
LPT2	0278H	J4	IRQ 5	J1 Pos.A
LPT3	03BCH	J5		

## 5.4 Inserting the board

**i**

**IMPORTANT!**

Please follow absolutely the *safety instructions*.

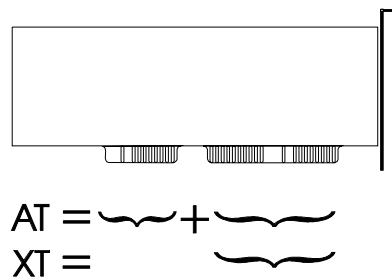
### 5.4.1 Opening the PC

- 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.

### 5.4.2 Selecting a free slot

1. Select a free XT or AT slot.

**Fig. 5-1: Slot types**



Should the occasion arise, the board can also be used in EISA slots under observance of certain conditions.

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 from its protective blister pack.**

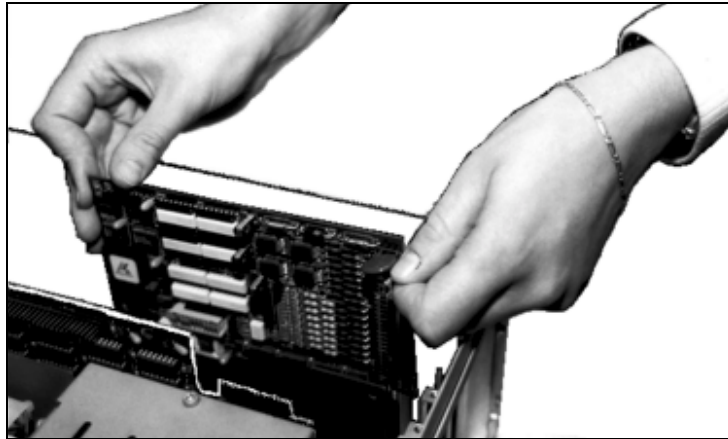




### 5.4.3 Inserting the board

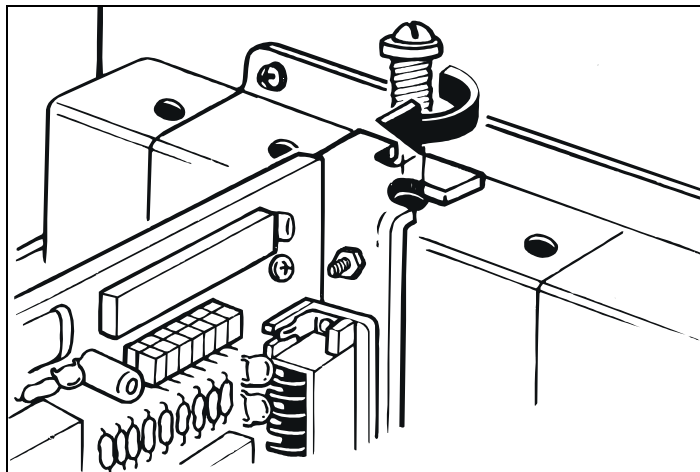
- Discharge yourself from electrostatic charges
- Insert the board vertically into the chosen slot.

**Fig. 5-2: Inserting the board**



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

**Fig. 5-3: Securing the board at the back cover**



- Tighten all the loosed screws.

### 5.4.4 Closing the PC

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

## 6 OPERATING THE BOARD

Generally LPT1 and LPT2 are recognized automatically as printer port addresses by the PC's BIOS.

Prior to inserting board **PA780** in your PC, please check what printer port address is free.

### 6.1 Finding out a free address range

- Refer to the manual of the operating system for displaying and modifying the settings of the system control.

*You use a DOS operating system?*

Under DOS you find out as follows what printer port addresses are occupied:

```

on the screen      c:>
enter              debug ↵
on the screen      -
enter              d40:8 ↵
on the screen      -d40:8
                   0040:0000      7803 7802...
                   ...           ...
enter              q
    
```

In this example LPT1 and LPT2 are already occupied. You have to configure the board on LPT3.

### 6.2 Checking the board's detection

Insert the board in the PC. Verify the settings of the system control again.

Your operating system should have now recognized the base address of board **PA780**.

### 6.3 Printing

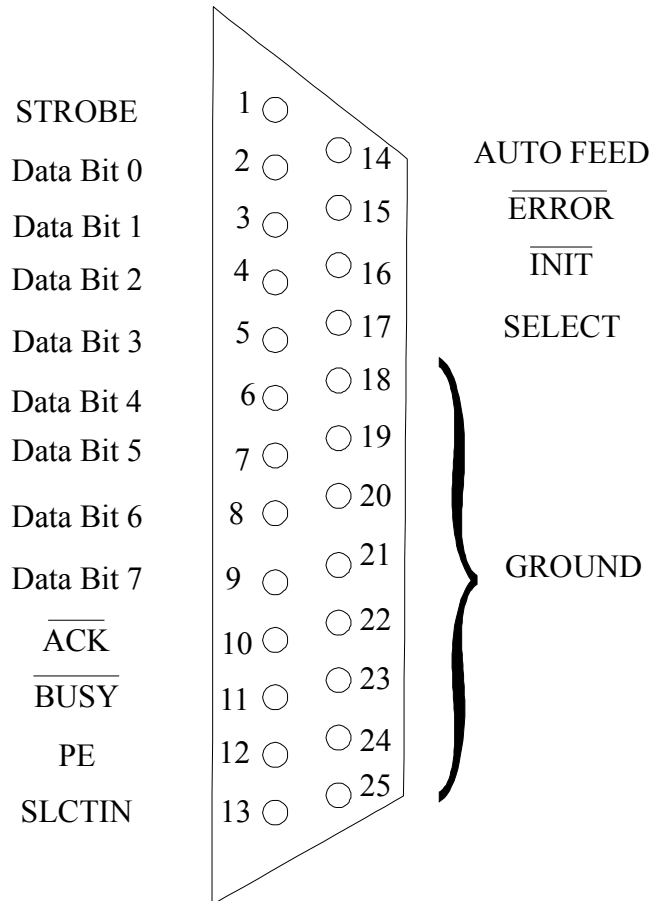
The board is ready for operation after having switched on the PC. It needs no software initialization.

If you use a DOS command for printing, the printer port address will be asked. If you wish to print from an application like Winword, you have to check that the printer driver is set on the base address of the board **PA780**.



# 7 CONNECTING THE PERIPHERAL

## 7.1 Connector pin assignment

Fig. 7-1: 25-pin SUB-D connector



## GLOSSARY

<b>AT</b>	Designates a PC-technology with a 16-bit wide data bus.
<b>Base</b>	Base address of the board = Beginning of the board's address range. e.g. Your board needs 16 bytes of memory. If you configure the board on the address 0300H, the address range should be free between 0300H and 031FH.
<b>Bit</b>	Smallest digital information unit. 8 bits equal 1 byte.
<b>BIOS</b>	Abbreviation for Basic Input Output System. The BIOS controls: - communication between the micro processor and the peripheral, - different functions (e.g. system messages).
<b>Byte</b>	1 byte = 8 successive bits.
<b>DOS</b>	Name of an operating system for PCs.
<b>EMC</b>	Electromagnetic compatibility
<b>EISA</b>	Abbreviation for „Extended Industry Standard Architecture“. An EISA slot is compatible to ISA boards.
<b>EN</b>	European norm
<b>H</b>	Abbreviation für „hexadecimal“. Designates a number of the 16 system. The decimal numbers 0 to 16 are expressed as follows in hexadecimal: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, 10. In the text hexadecimal numbers are preceded by a zero and followed by an „H“.
<b>IRQ</b>	Abbreviation for „Interrupt Request“ This signal indicates that a peripheral appliance wants to send or receive data, and that they are led to the microprocessor over an IRQ line. To every peripheral connection must be assigned a separate IRQ number. Example: to COM1 (first serial interface of the computer) is assigned standardly the IRQ number IRQ4. Two appliances can have the same IRQ assignment, but they can not be responded simultaneously.
<b>ISA</b>	Abbreviation for „Industry Standard Architecture“. Bus architecture for PCs
<b>Jumper</b>	Removable short-circuit bridges for hardware configurations.   two-pin jumper is set.   three-pin jumper is not set.
<b>LPTX</b>	The MS-DOS designations for the computer's printer connections are called LPT1, LPT2 and LPT3.
<b>PC</b>	Personal Computer

<b>PCI</b>	Abbreviation for „Peripheral Components Interconnect“. Bus architecture with a 32-bit or 64-bit data bus
<b>PS2</b>	Abbreviation for Personal System/2.
<b>Register</b>	Over a register is exchanged information between two communication partners (e.g. PC and printer).
<b>SPP</b>	Standard Printer Port = parallel printer interface.
<b>XT</b>	Predecessor of AT: only 8-bit data bus and less interrupt channels.