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CE

Technical description

ADDICOM PA 730

1-port serial interface

8th edition 02/1996

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- if the board has been operated with defective safety devices or with not appropriate or non-functioning safety equipment
- non-observance 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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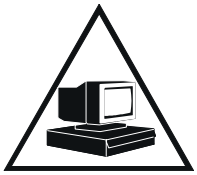
WARNING

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 leaflet (yellow)!**

  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**

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 **PA 730** is an interface between an industrial process and a personal computer (PC).

It 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 CE mark.

Serial data is exchanged with external communication devices through the 25-pin SUB-D connector of the board PA 730 in the chosen transmission mode (RS 232, RS 422, RS 485 or 20 mA current loop).

Communication occurs over a shielded cable whose shielding is earthed on the both sides via metallized plastic hoods. The connection cable is to comply with the following specifications:
- metallized plastic hoods
- shielded cable
- cable shield folded back and firmly screwed to the connector housing.

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. Check the PC's and cable's shielding capacity prior to putting the device into operation.

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

Table 1-1: Operating mode

Operating modes
RS 232 RS 422 RS 485 20mA Current Loop

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

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 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.

Connection to the peripheral
with a shielded cable, twisted in pairs.
Connect the peripheral cable so that the differential lines described in the connector pin assignment with "+" and "-" are twisted in pairs.
Operating mode 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 mΩ) 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 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

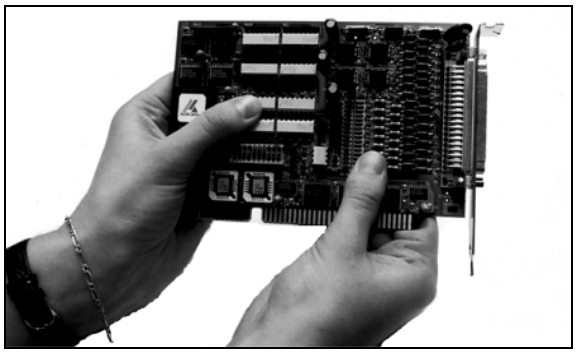
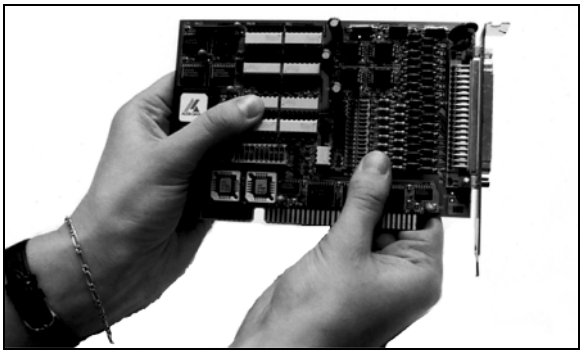


Fig. 3-2: Correct handling



4 SETTING THE BOARD ADDRESS

The PA 730 board can be set to the address areas COM1 or COM2. The following table shows how to set the address :

Designation	Address	Jumper	Interrupt	Jumper
COM1	3F8H	without 14	IRQ4	12-13
COM2	2F8H	with 14	IRQ3	11-12

Before choosing the base address you must be sure that the serial interfaces already settled in your PC will not overlap with the address range of board PA 730. Therefore we advise you to use the program Debug.

It finds out the addresses of the ports that are already adjusted in your PC and recognized by DOS (COM1, COM2 with <= DOS 3.3) (COM1-COM4 with > DOS 4.0).

```
on the screen     C:>
enter             debug<return>
on the screen     -
enter             d 40:0 <return>
on the screen     F8 03  00 00  00  00  00  00    'Address 03F8=COM1
enter             q <return>                      ' Quitt
```

According to this example, COM1 (=03F8) is already configured in your PC. Therefore you must set board PA 730 to the address area COM2.

5 MODES

The module can be operated in the modes RS232, RS422, RS485 and current loop. Setting is carried out via jumpers :

```
V 24              : jumper 1-2
RS422, RS485      : jumper 3-4
                    without jumper 1-2

Current loop      : jumper 4-5
                    without jumper 1-2
```

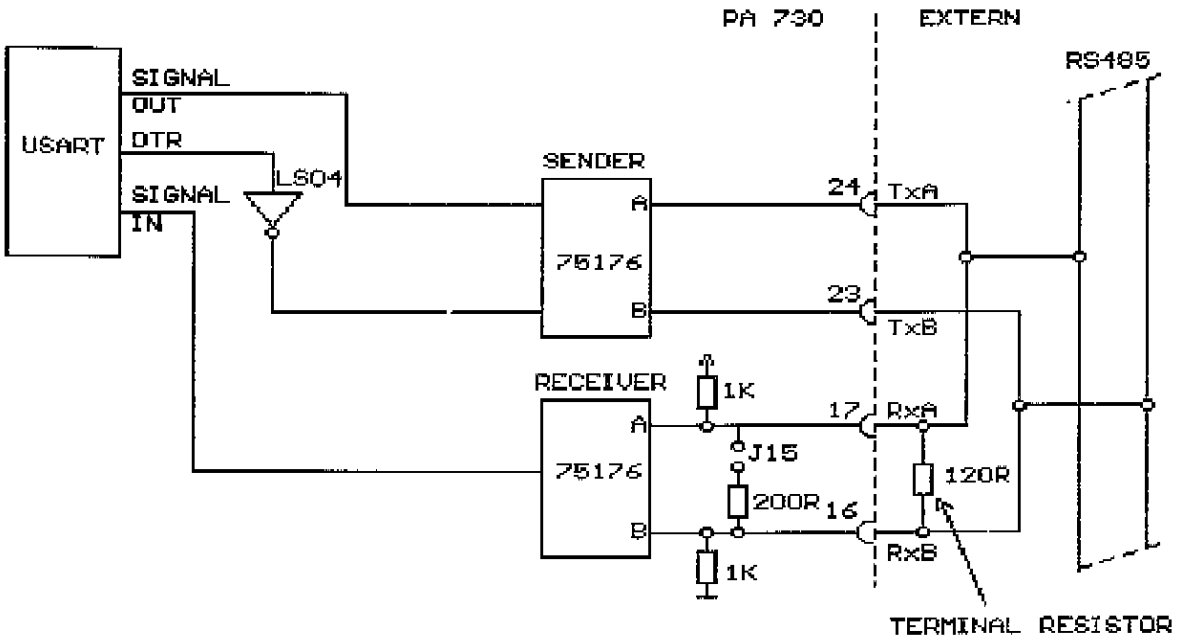
RS422, RS485:
After system reset, the driver is blocked (inactive) and the receiver is enabled. For sending again the driver must be enabled with the DTR signal as follows.

Ex.:

```
port [Modem_CTRL]: = port [Modem_CTRL] or $01;   (* Driver enable     *)
port [Modem_CTRL]: = port [Modem_CTRL] and $FE; (* Driver disable     *)
```

Modem_CTRL = Base address +4

RS 485:
You can add a 120 ohm resistor between A and B (receiver). Jumper J15 must be open. The diagram below shows the necessary cabling.



Important !
Jumper J15 is adjusted when the board is on the end of the line. See block diagram in the appendix.

6 MEANING OF THE JUMPERS

14.....; with jumper, Adr. 02F8H, COM2
; without jumper, Adr. 03F8H, COM1
11-12 .....; interrupt IRQ3, COM2
12-13 .....; interrupt IRQ4, COM1
4- 5 .....; current loop
1- 2 .....; RS232
3- 4 .....; RS422
3- 4 .....; RS485

Important !

In current loop, RS422 and RS485 the free pins of the front edge plug are to be connected as follows :

4 → 5 (RTS ---> CTS)
20 → 6, 8, 22 (DTR ---> DSR, CD, RI)

7 ASSIGNMENT OF THE 25-POL. MIN-D PLUG

Pin	Signal	Meaning	
2	TxD	Transmitted Data	
3	RxD	Received Data	
4	RTS	Request to Send	
5	CTS	Clear to Send	
6	DSR	Data set Ready	
7	GND	Signal Ground	
8	CD	Carrier Detect	
18	(+)	Receive current loop data	
20	DTR	Data Terminal Ready	
22	RI	Ring Indicator	
25	(-)	Receive current loop return	
24	(A)	RS422 Transmit	
23	(B)	RS422 Transmit	RS 485 : Transmit and Received
17	(A)	RS422 Received	lines have to be connected in
16	(B)	RS422 Received	parallel as shown in chapter 3
9	(+)	+VEXT external current supply	
10	(+)	+XMITCL	
11	(+)	-XMITCL	
12	(-)	loop GND	

8 CONNECTION EXAMPLES IN CURRENT LOOP MODE

Current loops can be connected to 3 different active operating modes:
1. Jumper 7-9: current loop active with 5V of PC
2. Jumper 7-6: current loop active with 12V of PC
3. Jumper 7-8: current active with external voltage on pin 9 of a 25pin. SUB-D pin connector

In active mode (PA 730 provides constant current) as well as in passive mode (opposite side provides constant current), please make sure that the current flowing in the current loop is 20mA.

Following electric data for the transmitter circuit are given:

Series resistor of the voltage supply: Rx = 47 ohm

Series resistor at the transmitting resistor: Ry = 100 ohm

Voltage drop at the transmitting resistor: UCE = 0,5V

Following electric data for the receiver circuit of the board is given:

Voltage drop at the receiver diode: typ. UDIODE = 1,2V

The resistance value RCL needed for defining current in the transmitting or receiving current loop can be calculated with regard to the voltage supply (the active mode is set) with the Ohm's law.

Exemple: voltage supply 12V, UF = voltage drop at the receiver circuit of the opposite side (for exemple PLC).

active transmission:

$$R_{CL} = \frac{\text{voltage supply} - U_F - U_{CE}}{20mA} - (R_x + R_y)$$

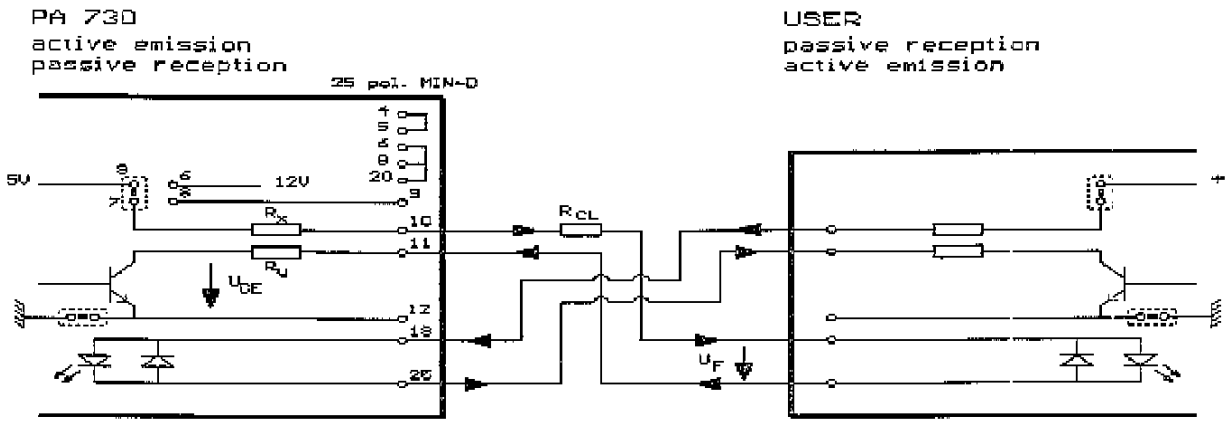
$$R_{CL} = \frac{12V - U_F - 0,5V}{20mA} - 147 \text{ ohm}$$

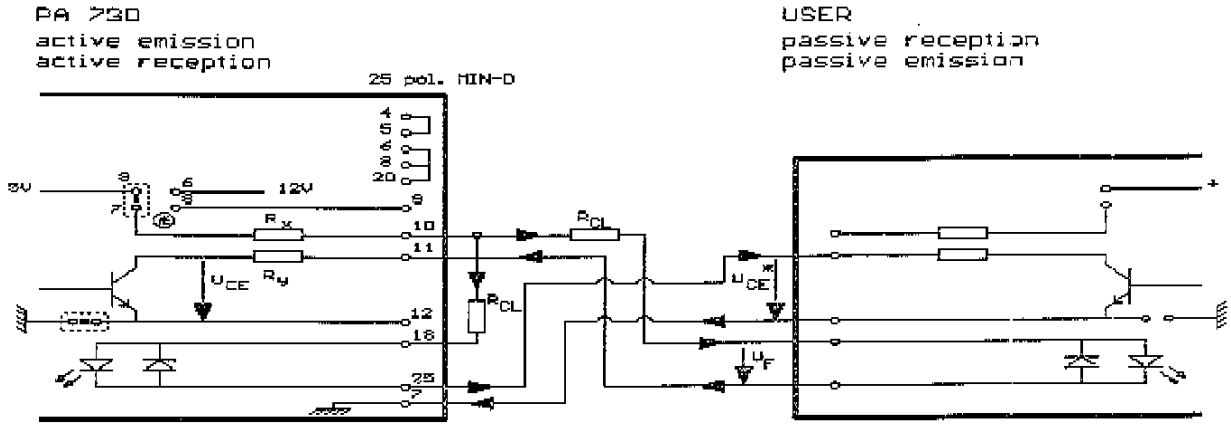
active reception:

$$R_{CL} = \frac{\text{voltage supply} - U_F - U_{CE}^*}{20mA} - R_x$$

$$R_{CL} = \frac{12V - 1,2V - U_{CE}^*}{20mA} - 147 \text{ ohm}$$

* U_{CE} = voltage drop at the transmitter of the opposite side


PA 730
active emission
passive reception
25 pol. MIN-D
USER
passive reception
active emission
5V
12V
R_x
R_y
R_{CL}
U_{CE}
U_F
GND
+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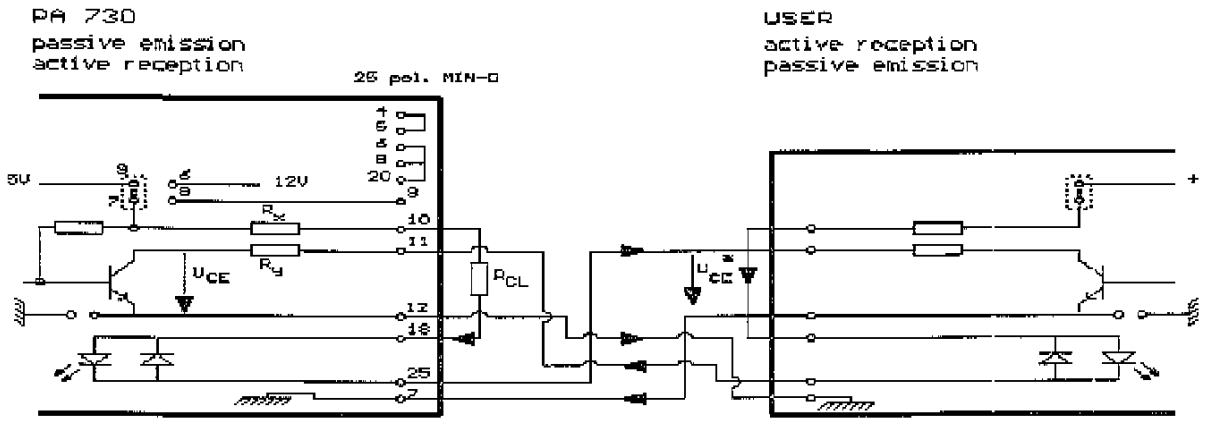
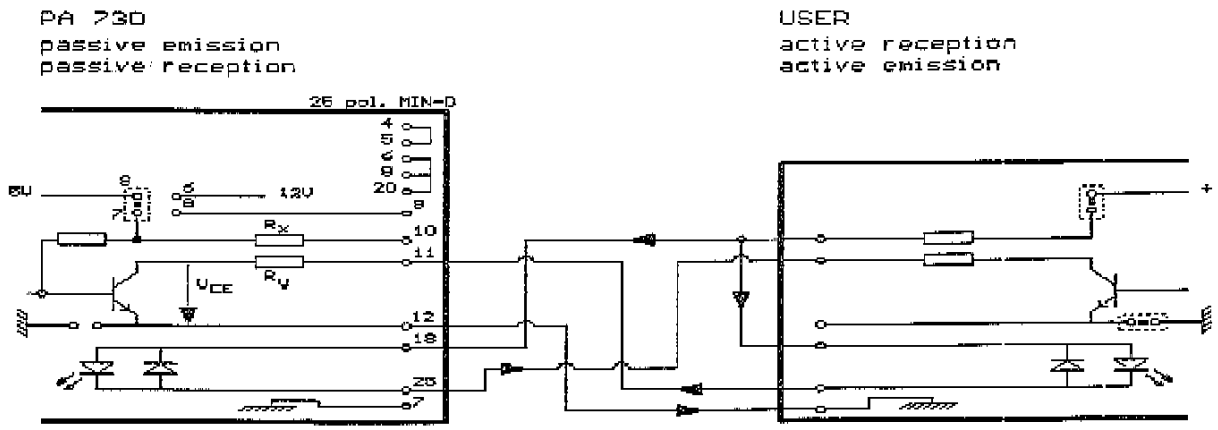
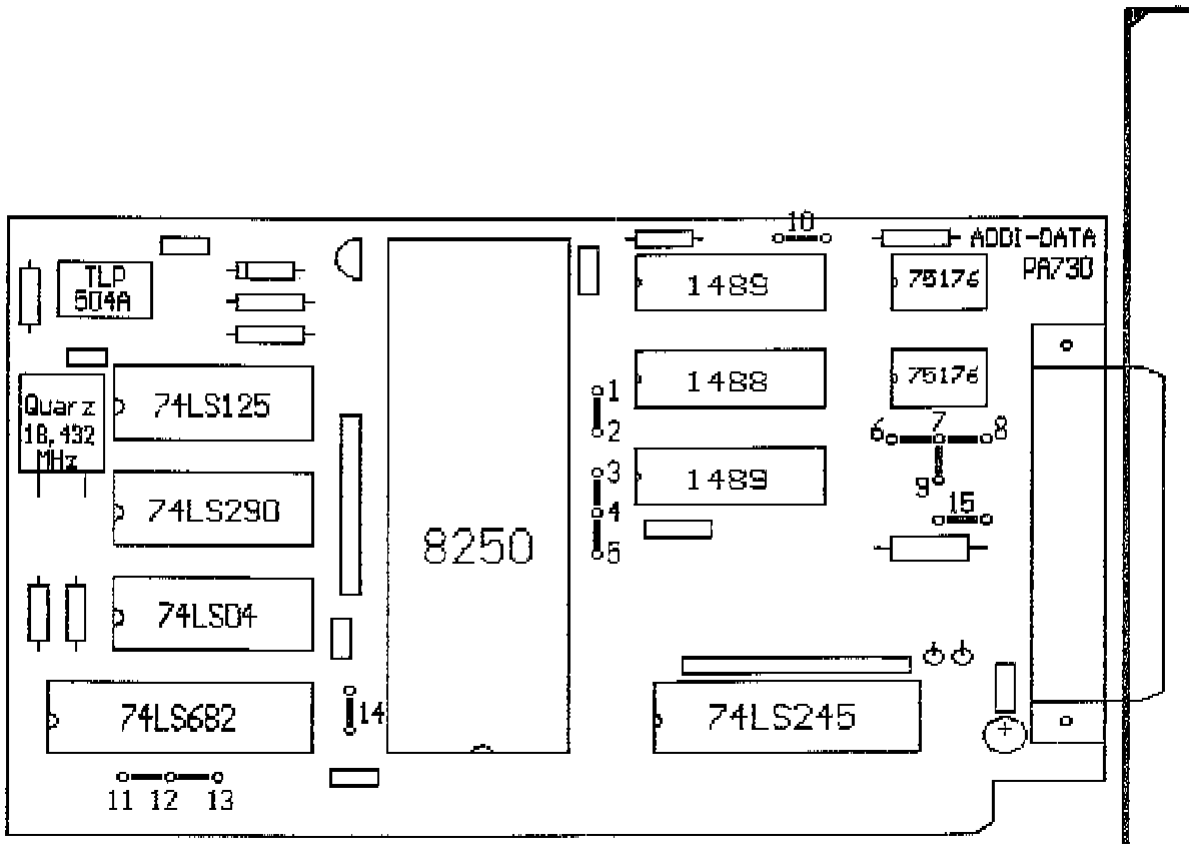

PA 730
passive emission
active reception
26 pol. MIN-D
USER
active reception
passive emission
5V
12V
R_x
R_y
V_{CE}
R_{CL}
U_{CC}
+


PA 730
passive emission
passive reception
26 pol. MIN-D
USER
active reception
active emission
5V
12V
R_x
R_y
V_{CE}
+

9 APPENDIX

9.1 Component scheme



Jumper:
1-2: RS232
3-4: RS422
3-4: RS485
4-5: Current Loop

Interrupt:
11-12: IRQ 3 (COM2)
12-13: IRQ 4 (COM1)
14: with jumper: COM2 (2F8H)
14: without jumper: COM1 (3F8H)

Power Supply for Current Loop:
7-6: +12V
7-8: External
7-9: +5V
10: International Ground to CL
15: Terminator Resistor to RS422 Receiver Line

9.2 Block diagram