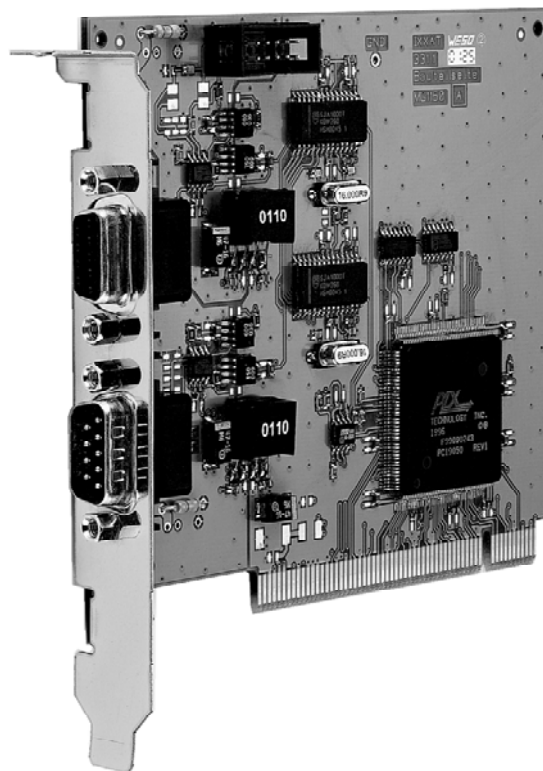


# PC-I 04/PCI

## Passiv PC/CAN Interface

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# 1 Introduction

## 1.1 Overview

Congratulations on your purchase of the IXXAT-PC-CAN-interface PC-I 04/PCI, a high-quality electronic component developed and manufactured according to the latest technological standards.

This handbook is intended to familiarize you with your interface, also referred to in the following as PC-I 04/PCI. Please read this handbook before beginning with the installation.

Among other things, the handbook describes the hardware architecture of the interface, knowledge of which is necessary for creating your own drivers.

If you are using the interface with the IXXAT-driver VCI or other IXXAT-software, you can leave out Sections 4 and 5.

## 1.2 Features

The most important technical features are as follows:

- Constructed as PCI-plug-in card
- 32 bit memory-mapped access (1024 byte storage space and 128 byte I/O address space are required for the CAN controller)
- Basic address and interrupt via plug'n'play PCI-Bios
- One or two CAN-circuits with Philips SJA1000 with 16 MHz cycle time
- CAN-bus connection according to ISO 11898-2 High Speed on board (as an option galvanically isolated)
- Bus connection carried out separately for each CAN-controller
- Option of one or two CAN-protective circuits on the board (CAN-reactor to suppress faults and short spikes on the CAN-leads)
- Pin assignment according to CiA/DS-102
- Electro-magnetically compatible PCB design (4-layer multilayer)

### 1.3 Block diagram

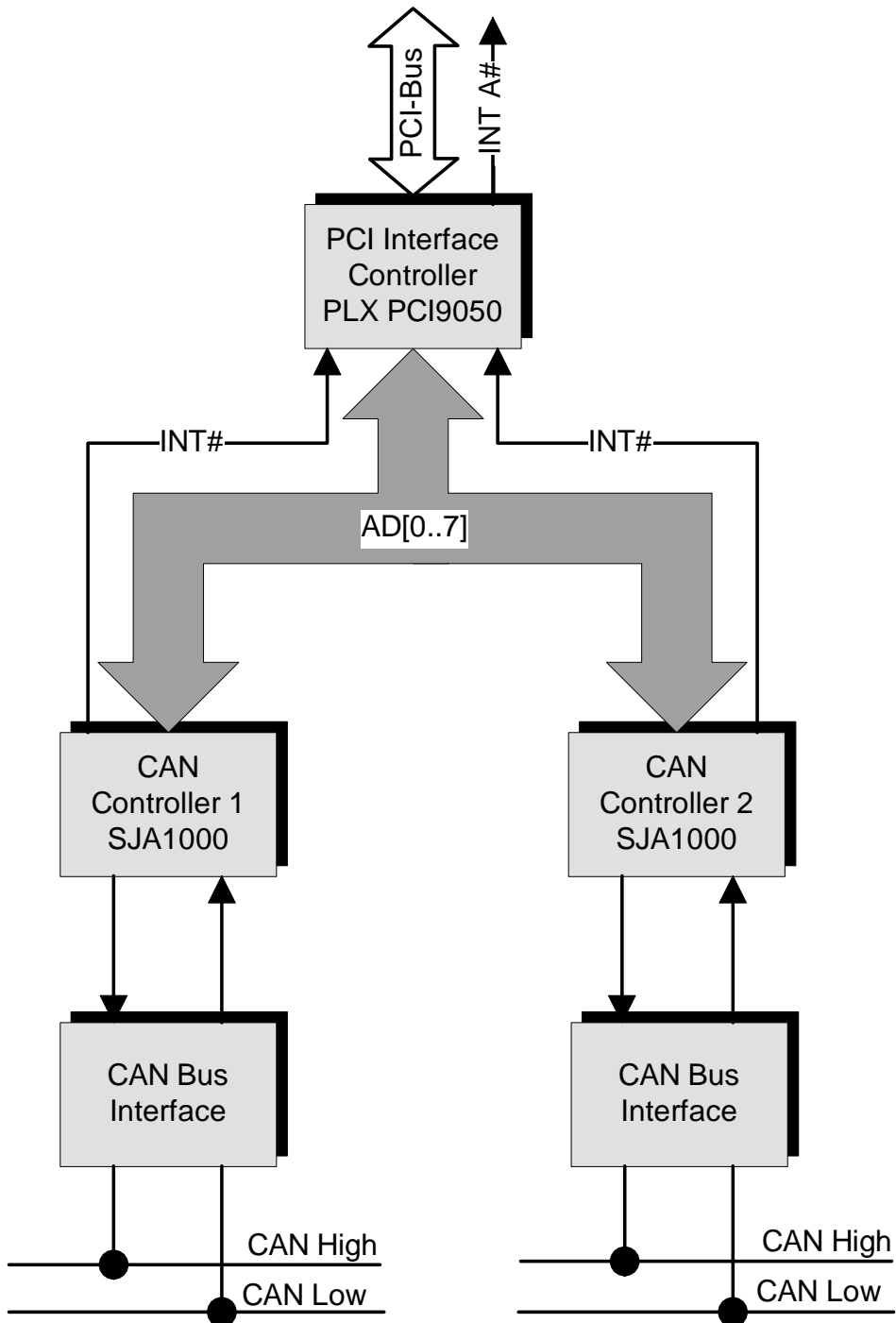


Fig. 1-1: Block diagram PC-I 04/PCI interface

## 2 Installation

### 2.1 Hardware installation

For all work on the PC and interface, you must be statically discharged. Work must be carried out on an earthed, anti-static work mat.

Take the following steps in sequence:

- (1) Switch the PC off and remove the mains plug.
- (2) Open the PC according to the instructions of the PC manufacturer and find a suitable place to plug in.  
The interface is designed according to the PC-standard and can easily be built into the computer. Do not use force when plugging in.
- (3) Make sure the interface sits tightly in the PC.
- (4) If your interface is equipped with 2 isolated CAN-circuits, you must fix the additional slot plate, and plug in the header on the interface (see Section 3.2).
- (5) Close the PC; the hardware installation is now complete.

### 2.2 Software installation

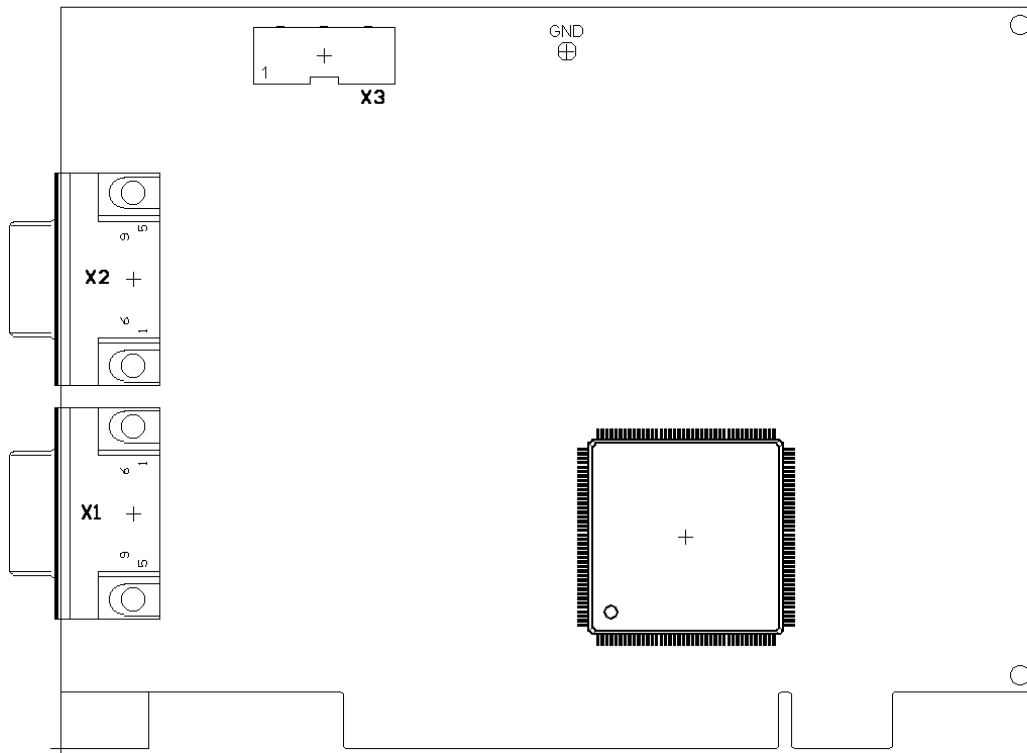
A driver is required in order to operate the interface.

For the installation of the CAN driver VCI, please read the VCI-installation handbook.

## 3 Configuration

### 3.1 Settings on the interface

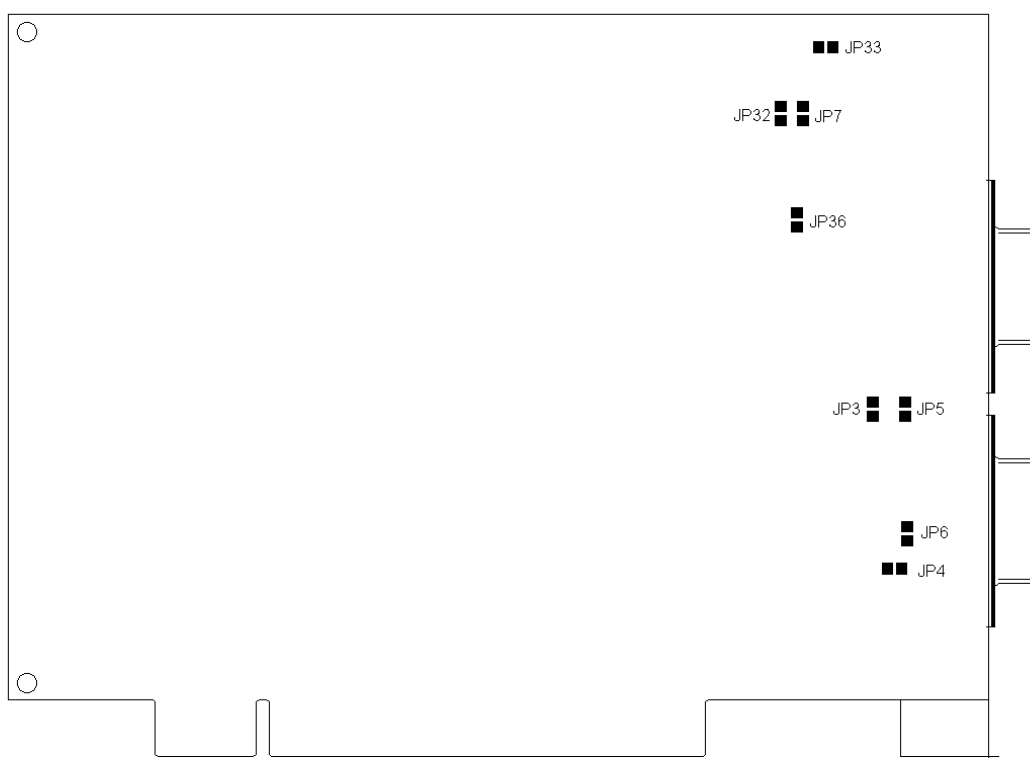
Figure 3-1 shows the position of the plugs, figure 3-2 the jumpers on the interface.



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Fig. 3-1: PC-I 04/PCI interface – components side





**Fig. 3-2: PC-I 04/PCI interface – solder side**

### 3.1.1 Supplying voltage via CAN-plug

With the solder jumpers JP3, JP4, JP5, JP32, JP33 and JP36, VCC (5 V) or GND can be connected to the CAN-plugs of the two CAN-circuits. For this, the jumpers given in the following table are to be connected. The solder jumpers are on the solder side of the PC-I04/PCI.

Plug(X1 / X3) Pin – Signal	Default set- ting	CAN- circuit 1	CAN- circuit 2
3 / 5 - GND	closed	JP3	JP32
6 / 2 - GND	open	JP5	JP33
9 / 8 - VCC	open	JP4	JP36

**Caution:** This voltage may be loaded with maximum 100 mA.

If the bus interface is galvanically isolated, GND and VCC are also galvanically isolated from the power supply of the PC.

### 3.1.2 Connection to ground for measuring purposes

There is a connection on the PC-I 04/PCI for a ground pin. The abbreviation GND is marked on the board next to the drill hole.

## 3.2 Design of the CAN-plugs

Two isolated high-speed bus attachments according to ISO 11898-2 can be mounted on the interface.

The signals of the first bus connection are connected to the 9-pin Sub-D-plug/-socket X1/X2.

If the second bus connection is printed, the signals for the CAN-bus of the second bus connection are connected to the header X3 and a separate slot plate with two sub-D9-plugs are supplied with the interface for the bus connection of the second CAN-controller. This slot plate is connected to the header of the interface via a 9-pin ribbon cable.

## 3.3 Pin assignment

The following plugs are present on the interface:

Pin	Designation
CAN1	X1, X2
CAN2	X3

### 3.3.1 Connecting the bus

Signals of the **first bus connection** to the 9-pin plug X1 and the 9-pin bush X2.

Pin no. X1/X2	Signal name
1	
2	CAN Low
3	GND (JP3)
4	
5	
6	GND (JP5)
7	CAN High
8	
9	VCC (JP4)
-	

With galvanically isolated bus connections, GND and VCC are also galvanically isolated from the power supply of the PC.

Signals of the **second bus connection** on the 10-pin header X3.

Pin no. X3	Signal name
1	
3	CAN Low
5	GND (JP32)
7	
9	
2	GND (via JP33)
4	CAN High
6	
8	VCC (via JP36)
10	

With galvanically isolated bus connections, GND and VCC are also galvanically isolated from the power supply of the PC.

### 3.4 Bus terminator

On the PC-I04/PCI there are bus terminator resistors for the two bus connections. The bus terminator for the first bus connection is connected via the solder jumper JP6 and for the second bus connection with JP7. Bus termination is with a 120 Ohm resistor between CAN Low and CAN High.

On delivery, the jumpers JP6 and JP7 are not bridged. Therefore no bus terminator resistor is active.

## 4 Architecture

### 4.1 PC-side memory assignment

The CAN-controllers are displayed directly in the memory range of the PC.

Reset CAN2	03FFh
2.CAN-Controller	0300h
Reset CAN1	0200h
1.CAN-Controller	0100h
	0000h (Basisadresse)

---

Fig. 4-1: PC-side memory assignment

#### 4.1.1 Access to CAN-controllers

There can be up to two CAN-controllers of the type Philips SJA1000 on the interface.

The first CAN-controller is displayed in the range from 0000h to 00FFh, the second CAN-controller in the range of 0200h to 02FFh from the basic address of the card. When accessing a memory range, the corresponding CAN-controller is called up automatically. The basic address is allocated by the PCI-plug and play BIOS.

The exact register description of the SJA1000 can be found in the corresponding Philips data sheets (web-addresses in Appendix C).

The Output Control Register of the CAN-controllers must be loaded with the value 5Eh.

#### 4.1.2 Reset of the CAN-Controller from the PC

By writing a random value to an address of the reset range (0100h to 01FFh for the first CAN-controller and 0300h to 03FFh for the second CAN-controller), a hardware reset is carried out on the corresponding CAN-controller.

### 4.2 Triggering an interrupt on the PC

The CAN-controllers can trigger an interrupt on the PC. Both CAN-controllers share one interrupt (INTA# of the PCI-interface).

The PCI-plug and play BIOS allocates an interrupt to the card (IRQ3..IRQ15).

### 4.3 Interrupt handling

The card is transparent, which means that the interrupt signal on the PCI-bus (INTA#) is active when a CAN-controller issues an interrupt signal and it remains active until the signal on the CAN-controller is reset by an interrupt acknowledge by the PC. The PCI-bus interface chip PLX PCI9050-1 does not appear here.

It should be noted that the PCI-bus interrupt in the PCI-specification is defined as level-triggered. With the ISA-bus, the interrupt was transition-triggered.

# 5 Notes for programmers

For more details on programming the CAN-controller and for example programs, visit the support area of our homepage ([www.ixxat.de](http://www.ixxat.de)) or contact us via e-mail ([support@ixxat.de](mailto:support@ixxat.de)).

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# Appendix

## Appendix A

### Technical data

The following data refer to the version of the PC-I04/PCI with two Philips SJA1000 CAN-controllers and two galvanically isolated bus connections.

Dimensions:	107 x 125 mm (without slot plate) 16 mm overall height
Weight:	approx. 100 g
Operating temperature range:	0 - 50°C
Voltage supply:	5V DC $\pm$ 5%
Current consumption:	typically 300 mA max. 600 mA
EMC-test according to:	DIN EN 55022 (VDE 0878 part 22) /05.1999 DIN EN 55024 (VDE 0878 part 24) /05.1999

### Notes on EMC

The PC/CAN-interface PC-I 04/PCI may only be installed in a PC with a CE symbol and with an RF-shielded housing. All cables connected to the interface must have a braiding which lies flat on the plug housing. The plug housing must be RF-shielded and have low inductive contact with the PC-housing. All unused connections of the PC/CAN-interface PC-I 04/PCI must be sealed with HR-shielded covers.

### Appendix B

#### Delivery settings

The settings of the interface on delivery are listed in the following. With special versions of the interface, individual settings may vary.

<b>Jumper</b>	<b>Setting on delivery</b>
JP3	closed
JP4	open
JP5	open
JP6	open
JP7	open
JP32	closed
JP33	open
JP36	open



## Appendix C

### Sources of data sheets

CAN-controller Philips SJA1000:

<http://www.philips-semiconductors.com>

CAN-transceiver Philips PCA82C251:

<http://www.philips-semiconductors.com>

PCI-bus interface chip PLX PCI9050-1:

<http://www.plxtech.com>