PCAN-PCI Express

PCI Express to CAN Interface

User Manual

PEAK System

Products taken into account

Product Name	Model	Item Number	Ser. no.
PCAN-PCI Express Single Channel	One CAN channel	IPEH-003024	starting at 00100
PCAN-PCI Express Dual Channel	Two CAN channels	IPEH-003025	
PCAN-PCI Express Single Channel opto-decoupled	One CAN channel, galvanic isolation for CAN connection	IPEH-003026	
PCAN-PCI Express Dual Channel opto-decoupled	Two CAN channels, galvanic isolation for CAN connections	IPEH-003027	

The cover picture shows the product PCAN-PCI Express Dual Channel opto-decoupled. Other product versions have an identical form factor but vary in equipment.

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1 Introduction

The PCAN-PCI Express card provides one or two CAN channels in computers with PCI Express slots. Software interfaces exist for different operating systems, so programs can easily access a connected CAN bus.

Tip: At the end of this manual (Appendix C) you can find a Quick Reference with brief information about the installation and operation of the PCAN-PCI Express card.

1.1 Properties at a Glance

- Extension card for PCI Express, 1 Lane (1x)
- 1 or 2 High-speed CAN channels (ISO 11898-2)
- CAN transfer rates up to 1 Mbit/s
- CAN specifications 2.0A and 2.0B applicable
- CAN connection 9-pin D-Sub male, pin assignment according to CiA recommendation 102 DS
- Galvanic isolation up to 500 V for the CAN interface (only opto-decoupled versions), separate for each CAN connector
- 5-Volt power supply at the CAN connector connectible by solder bridges, e.g. for external bus converter
- Device drivers and programming interfaces for operating systems Windows (starting with 2000) and Linux

Note: This manual describes the use of the PCAN-PCI Express card with Windows. You can find device drivers for Linux and the corresponding application information on the provided CD in the directory branch `/Develop/Linux` and on PEAK-System's website under www.peak-system.com/linux.

1.2 System Requirements

The following prerequisites must be given, so that you can use the PCAN-PCI Express card properly:

- A vacant PCI Express slot in the computer
- Operating system Windows (Vista 32-bit, XP SP2, 2000 SP4) or Linux (incl. 64-bit versions)

1.3 Scope of Supply

The scope of supply normally consists of the following parts:

- PCAN-PCI Express card
- CD with software (drivers, utilities), programming examples, and documentation

2 Installation

This chapter deals with the software setup for the PCAN-PCI Express card (short: PCIe card) under Windows, the installation of the card in the computer, and the connection of a High-speed CAN bus.

2.1 Installing Software and the PCIe Card

We recommend that you setup the driver before installing the PCIe card into the computer.

- Do the following to setup the driver and, if applicable, additional software:

  1. Make sure that you are logged in as user with administrator privileges (not needed for normal use of the PCIe card later on).
  2. Insert the supplied CD into the appropriate drive of the computer. Usually a navigation program appears a few moments later. If not, start the file `Intro.exe` from the root directory of the CD.
  3. Navigate through the menus to the driver installation for the PCIe card (**English** > **Drivers** > **PCAN-PCI Express**). Click on **Install now** afterwards. The setup program for the driver is executed.
  4. Follow the instructions of the setup program.

Tip: If you don't want to install the CAN monitor PCAN-View for Windows onto hard disk together with the driver, you have the option to start the program later directly from CD without prior installation.

- Do the following to install the PCIe card into the computer:

  1. Shut down the computer and switch it off.
  2. Disconnect the computer from the mains supply either by using the switch on the computer's power supply unit or by unplugging the mains plug.
  3. Open the computer's casing.
  4. Insert the PCIe card into a vacant PCI Express slot. For details refer to the documentation of the computer.
  5. Close the computer's casing.
  6. If applicable, re-connect the mains cable of the computer and switch on the power supply unit.

- Do the following to complete the initialization:

  1. Turn on the computer and start Windows. Make sure again that you are logged in as user with administrator privileges.
  2. Windows reports that new hardware has been detected and possibly starts an installation wizard. This depends on the used Windows version. If applicable, confirm the steps for driver initialization.
  3. Afterwards you can work as user with restricted rights again, if applicable.

After the driver has been successfully set up you can find the entry “PEAKCAN PCI-card” in the branch “CAN-Hardware” of the Windows Device Manager. Concerning the software part the PCI Express standard is fully compatible to the PCI standard, thus the driver for the PCAN-PCI card is used in the end.

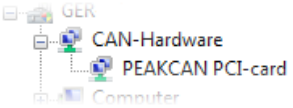

Figure 1: Representation of the PCAN-PCI Express card
in the Windows Device Manager

2.2 Connecting the CAN Bus

A High-speed CAN bus (ISO 11898-2) is connected to the 9-pin D-Sub connector. The pin assignment corresponds to the CiA recommendation 102 DS.

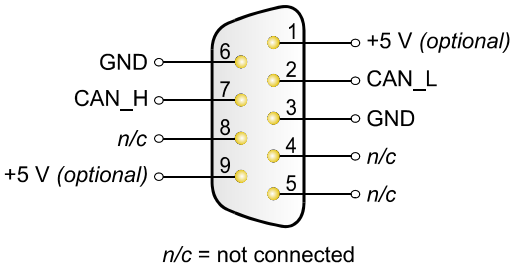

Figure 2: Pin assignment of High-speed CAN connection
(view onto a male connector on the PCAN-PCI Express card)

With the pins 1 and 9 devices with low power consumption (e.g. bus converters) can be directly supplied via the CAN connector. At delivery these pins are not assigned. You can find a detailed description in the following section 2.3.

Tip: You can connect a can bus with a different transmission standard via a bus converter. PEAK-System offers different bus converter modules (e.g. PCAN-TJA1054 for a Low-speed CAN bus according to ISO 11898-3).

2.3 Supplying External Devices via the CAN Connector

A 5-Volt supply can optionally be routed to pin 1 and/or pin 9 of the CAN connector (independently for each D-Sub CAN connector on the Dual Channel version) by setting solder bridges on the PCAN-PCI Express card. Thus devices with low power consumption (e.g. bus converters) can be directly supplied via the CAN connector.

When using this option the 5-Volt supply is connected to the power supply of the computer and is not fused separately. The opto-decoupled versions of the PCAN-PCI Express card contain an interconnected DC/DC converter. Therefore the current output is limited to about 50 mA.

Attention! Risk of short circuit! If the option described in this section is activated, you may only connect or disconnect CAN cables or peripheral systems (e.g. bus converters) to or from the PCIe card while the computer is de-energized.

Set the solder bridge(s) on the PCIe card according to the desired settings. During this procedure take especially care not to produce unwanted short circuits on the card.

The following Figure 3 shows the positions of the solder fields on the PCIe card; the table below contains the possible settings.

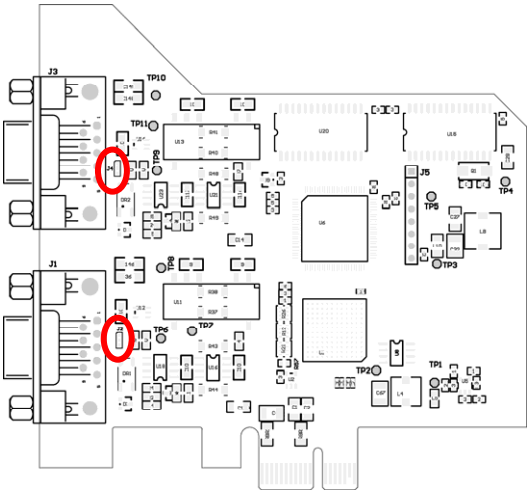

Figure 3: Position of the soldering fields on the PCAN-PCI Express card,
J2 for CAN channel 1 (lower marker) and J4 for CAN channel 2 (upper marker)

5-Volt supply →	None	Pin 1	Pin 9	Pin 1 + Pin 9
J2 (CAN channel 1) / J4 (CAN channel 2)				

3 Software

This chapter deals with the provided software and the software interface to the PCAN-PCI Express card.

3.1 CAN Monitor PCAN-View for Windows

PCAN-View for Windows is a simple CAN monitor for viewing and transmitting CAN messages.

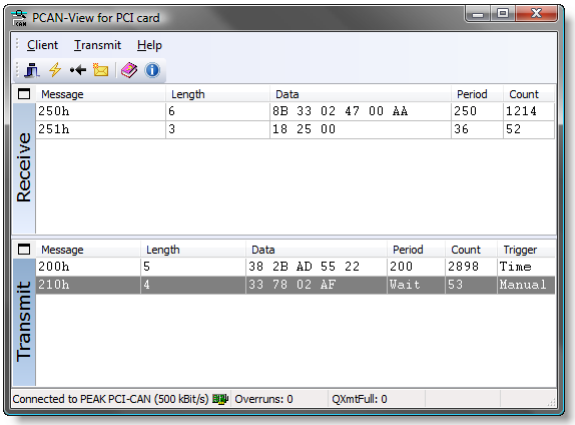

Figure 4: The main window of PCAN-View for Windows

Starting PCAN-View

You can start PCAN-View in two ways:

- If PCAN-View is already installed on the hard disk, open the Windows Start menu, go to **Programs** > **PCAN-Hardware**, and select the entry **PCAN-View PCI**.

- In order to start directly from the supplied CD without prior installation use the navigation program (`Intro.exe`), go to **English** > **Tools**, and in the entry **PCAN-View for PCI** click on **Start**.

A dialog box for the selection of the CAN hardware as well as the setting of the CAN parameters appears after the program start.

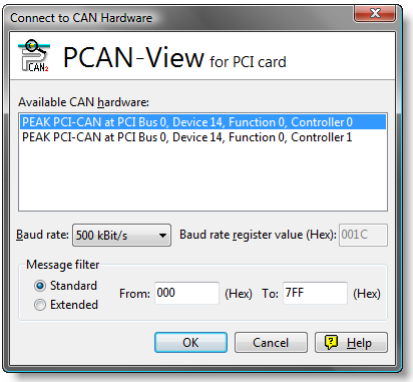

Figure 5: Selection of the CAN specific hardware and parameters

From the list “Available CAN hardware” select the CAN channel to be used (with Dual Channel versions only). Note that the count of the CAN controllers starts at 0, i.e. the CAN controller 0 is assigned to CAN channel 1.

As a rule you can leave the remaining preset values and confirm the dialog box with **OK**.

You can find further information about the use of PCAN-View in the help which you can invoke in the program via the menu **Help** or the F1 key.

3.2 Linking Own Programs with PCAN-Light

On the provided CD you can find files for software development in the directory branch `/Develop/Windows`. They exclusively serve the linking of own programs to hardware by PEAK-System with the help of the installed device driver under Windows.

Further more the CD-ROM contains header files and examples for creating own applications in conjunction with the PCAN-Light drivers. Please read the detailed documentation of the interface (API) in each header file.

You can find further information in the text and help files (file name extensions `.txt` and `.chm`).

Notes about the License

Device drivers, the interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a CAN hardware component of third party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

PEAK-System assumes no liability and no support for the PCAN-Light driver software and the necessary interface files. If third party suppliers develop software based on the PCAN-Light driver and problems occur during use of this software, please, consult the software provider. To obtain development support, you need to own a PCAN-Developer or PCAN-Evaluation license.

4 Technical Specifications

Connectors	
Computer	PCI Express x1 (1 Lane), Specification 1.1
CAN	D-Sub (m), 9 pins Pin assignment according to CiA recommendation 102 DS Opto-decoupled versions: galvanic isolation up to 500 V (separate for each CAN channel)

CAN	
Specification	ISO 11898-2 High-speed CAN (up to 1 Mbit/s) 2.0A (standard format) and 2.0B (extended format)
Controller	NXP (Philips) SJA1000T
Transceiver	NXP (Philips) PCA82C251

Supply			
Current consumption		3.3 V	12 V
	IPEH-003024 (Single Ch.):	250 mA	max. 35 mA
	IPEH-003025 (Dual Ch.):	250 mA	max. 45 mA
	IPEH-003026 (Single Ch. opto-dec.):	250 mA	max. 50 mA
	IPEH-003027 (Dual Ch. opto-dec.):	250 mA	max. 70 mA

Measures	
Size	PCB: 100 x 100 mm (3 15/16 x 3 15/16 inches) (H x W) See also dimension drawing in Appendix B on page 17
Weight	IPEH-003024 (Single Ch.): 54 g (1.90 oz.) IPEH-003025 (Dual Ch.): 61 g (2.15 oz.) IPEH-003026 (Single Ch. opto-dec.): 54 g (1.90 oz.) IPEH-003027 (Dual Ch. opto-dec.): 63 g (2.22 oz.)

Continued on the next page

Environment	
Operating temperature	-20 - +70 °C (-4 - +158 °F)
Temperature for storage and transport	-40 - +125 °C (-40 - +257 °F)
Relative humidity	15 - 90 %, not condensing
EMC	EN 55024:2003-10 EN 55022:2007-04 EC directive 2004/108/EG

Appendix A CE Certificate

PCAN-PCI-Express IPEH-003024/25/26/27 – EC declaration of conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the PCAN-PCI-Express products IPEH-003024/25/26/27, serial numbers starting at 00100

EC Directive

This product fulfills the requirements of EC directive 2004/108/EG on "Electromagnetic Compatibility" and is designed for the following fields of application as per the CE marking:

Electromagnetic Immunity
DIN EN 55024, Publication date: 2003-10
Information technology equipment, immunity characteristics – Limits and methods of measurement (IEC/CISPR 24:1997, modified + A1:2001 + A2:2003);
German version EN 55024:1998 + A1:2001 + A2:2003

Electromagnetic Emission
DIN EN 55022, Publication date: 2007-4
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (IEC/CISPR 22:2005, modified);
German version EN 55022:2006

Declarations of Conformity

In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities at the address below:

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Signed this 5th day of February 2009

Appendix B Dimension Drawing

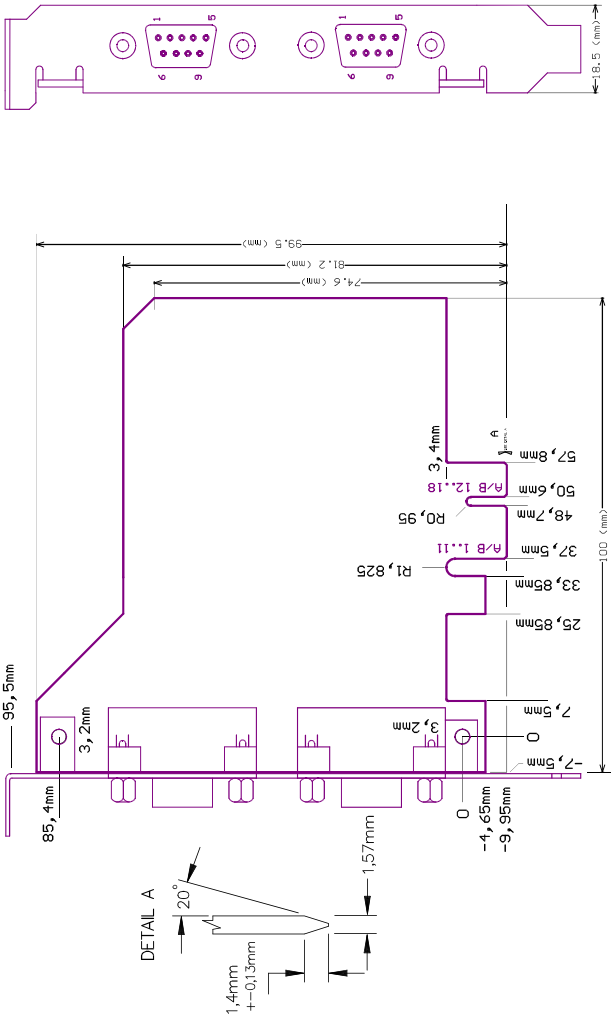


Figure 6: Dimension drawing PCAN-PCI Express
(doesn't represent the actual size of the product)

Appendix C Quick Reference

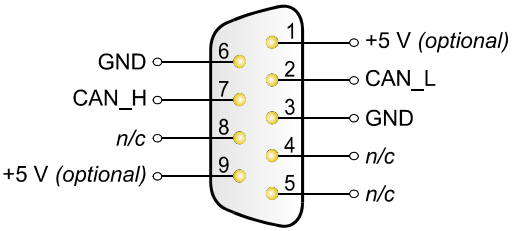
Software/Hardware Installation under Windows

Before installing the PCAN-PCI Express card into the computer please set up the corresponding software package from the supplied CD (with administrator privileges). Afterwards, insert the PCIe card into a vacant PCI Express slot of the switched off (de-energized) computer. At the next start of Windows the PCIe card is recognized by Windows and the driver is initialized. After the driver has been successfully installed you can find the entry "PEAKCAN PCI-card" in the branch "CAN-Hardware" of the Windows Device Manager. Afterwards, you may also work as user with restricted rights.

Getting Started under Windows

Run the CAN monitor PCAN-View from the Windows Start menu as a sample application for accessing the PCAN-PCI Express card. You can use the preset parameters for initialization of the PCIe card without changes (select the desired CAN channel, when using the Dual Channel version).

High-speed CAN connector (D-Sub, 9 pins)



n/c = not connected