PCAN-cPCI

CompactPCI to CAN Interface

User Manual

.PEAK
System
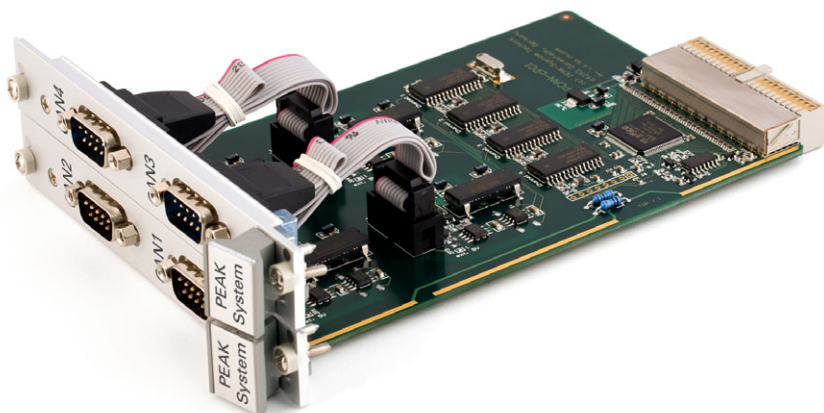
Products taken into account

Product Name	Model	Item Number
PCAN-cPCI Dual Channel opto-decoupled	2 CAN channels, galvanic isolation for CAN connections	IPEH-003021
PCAN-cPCI Quad Channel opto-decoupled	4 CAN channels, galvanic isolation for CAN connections	IPEH-003022

The cover picture shows the product PCAN-cPCI Quad Channel opto-decoupled. The product version Dual Channel opto-decoupled has an identical form factor but differs in equipment (no additional front blind with CAN connectors) and in the board's components.

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Contents

1 Introduction

The PCAN-cPCI card provides two or four CAN channels in computers with CompactPCI 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-cPCI card.

1.1 Properties at a Glance

- Extension card with euroboard form factor (3U) for a CompactPCI system

- According to the product version 2 or 4 High-speed CAN channels (ISO 11898-2), CAN specifications 2.0A and 2.0B

- Equipped with the CAN controller NXP SJA1000

- CAN transfer rate up to 1 MBit/s

- 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, separate for each connector

- Optional 5-Volt power supply at the CAN connector for external devices with low power consumption (e.g. bus converters)

- Support for operating systems Windows and Linux

> **Note:** This manual describes the use of the PCAN-cPCI card with Windows. You can find device drivers for Linux and the corresponding application information on PEAK-System's website under www.peak-system.com/linux.

1.2 Prerequisites for the Operation

The following prerequisites must be given, so that the PCAN-cPCI card can be used properly:

- One empty slot in the CompactPCI system, 3U form factor, CompactPCI connector J1

- With the Quad Channel version a place for an additional front blind with CAN connectors

- 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 includes the following:

- PCAN-cPCI card

- Front blind with D-Sub connectors for 2 CAN busses (only at Quad Channel version IPEH-003022)

- CD with software (drivers, utilities), programming examples, and documentation

2   Installation

This chapter deals with the software setup for the PCAN-cPCI card under Windows, the installation of the card in the computer, and the connection of a CAN bus.

2.1   Installing the Software and the PCAN-cPCI Card

We recommend that you setup the driver <u>before</u> installing the PCAN-cPCI card into the computer.

▶ Do the following to install the driver:

1. Make sure that you are logged in as user with administrator privileges (not needed for normal use of the PCAN-cPCI 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. On the page **English** > **Drivers** activate the entry **PCAN-cPCI**.

4. Click on **Install now**. The setup program for the driver is executed.

5. Follow the instructions of the 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.

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▶ Do the following to install the PCAN-cPCI card in the computer:

1. At the Quad Channel version of the PCAN-cPCI card (IPEH-003022) connect the cables of the additional front blind to the 10-pin ports J1 (CAN 3) and J2 (CAN 4).
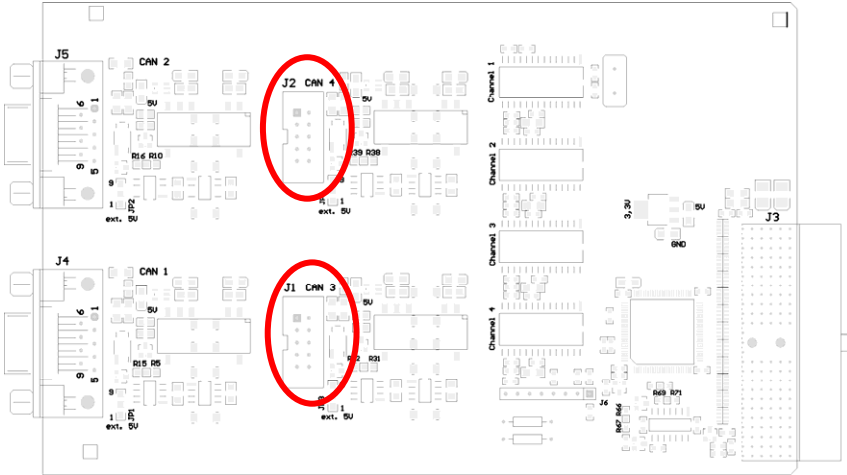

Figure 1: Positions of the pr the ports
J1 (CAN 3, lower marker) and J2 (CAN 4, upper marker)

2. Shut down the computer.

3. Disconnect the computer from the power supply.

4. If applicable, remove the front blind of the CompactPCI slot to be used in the system. The additional front blind with connectors used by the Quad Channel version needs a further place.

5. Install the PCAN-cPCI card in the appropriate 3U slot (cPCI connection J1). For details refer to the documentation of the CompactPCI system.

6. Place the additional connection blind beside the inserted PCAN-cPCI card, if applicable.

7. Reconnect the power supply of the computer.

▶ 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.

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 CompactPCI standard is fully compatible to the PCI standard, thus the driver for the PCAN-PCI card is used in the end.
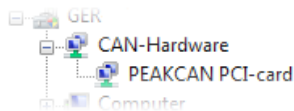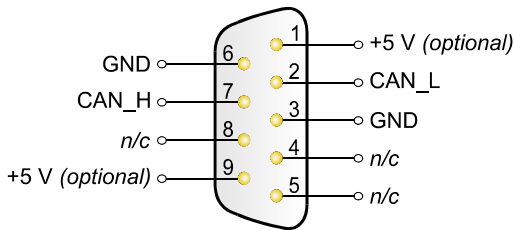

Figure 2: Representation of the PCAN-cPCI card
in the Windows Device Manager

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.

n/c = not connected

Figure 3: Pin assignment High-speed CAN
(view onto a male D-Sub connector on the PCAN-cPCI 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 a D-Sub connector (independently for each connector) by setting solder bridges on the PCAN-cPCI 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. For galvanic isolation the measuring unit contains an interconnected DC/DC converter. Therefore the current output is limited to 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 PCAN-cPCI card while the computer is de-energized.

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

The following Figure 4 shows the positions of the solder fields on the PCAN-cPCI card; the table below contains the possible settings.
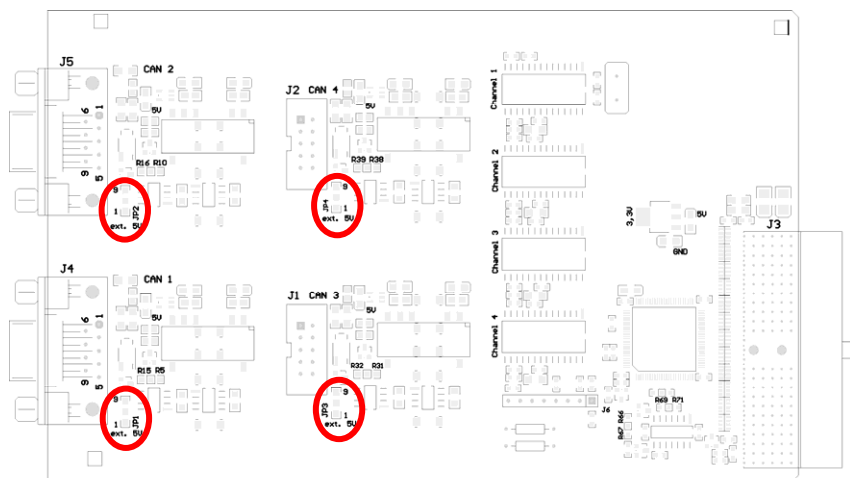
Figure 4: Positions of the solder fields on the PCAN-cPCI card
for a 5-Volt supply,
JP1 to JP4 for CAN channels 1 to 4

5-Volt supply →	None	Pin 1	Pin 9	Pin 1 + Pin 9
JP1, JP2, JP3, JP4	9 ▢ ▢ 1 ▢	9 ▢ 1 ●	9 ● 1 ▢	9 ● 1 ●

3 Software

This chapter deals with the provided software and the software interface to the PCAN-cPCI 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 5: 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 card** click on **Start**.
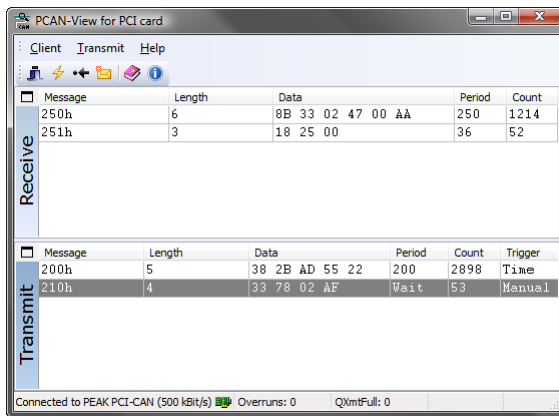
A dialog box for the selection of the CAN hardware as well as the setting of the CAN parameters appears after the program start.
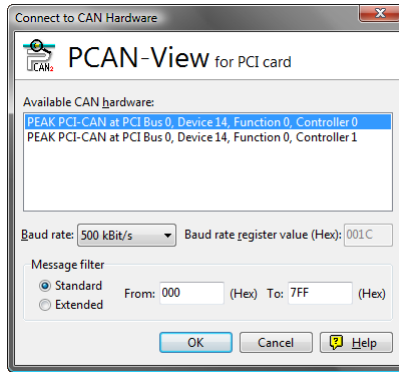
Figure 6: Selection of the CAN specific hardware and parameters

From the list "Available CAN hardware" select the CAN channel to be used. 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. 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 (PEAK-System) 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 Frequently Asked Questions (FAQ)

Question	Answer
Do I need to install the **device driver** for each existing CAN channel under Windows?	No. A single installation procedure is sufficient. In the Windows Device Manager a single device entry appears under CAN-Hardware, however, in PCAN applications all CAN channels are available automatically.
Does each CAN channel use an **interrupt**?	No. All available versions of the PCAN-cPCI card only use a single interrupt in the computer. However, each CAN channel is assigned to a different port address.
Can I use **several PCAN-cPCI cards** in the same computer?	Yes. A one-time installation of the device driver is sufficient in this case, too.
Instead of a High-speed CAN bus I would like to connect another one (e.g. Low-speed CAN). Is this possible?	Yes. You need a bus converter to do so. PEAK-System offers bus converter modules for different transmission standards that are plugged between the PCAN-cPCI card and the CAN bus.

5 Technical Specifications

Connectors	
Computer	CompactPCI connector J1 (110 Pin, 32 Bits)
CAN	D-Sub (m), 9 pins, pin assignment according to CiA recommendation 102 DS Galvanic isolation up to 500 V (separate for each CAN connector)

CAN	
Specification	ISO 11898-2 High-speed CAN (up to 1 MBit/s) 2.0A (standard format) and 2.0B (extended format)
Controller	NXP SJA1000T
Transceiver	NXP PCA82C251T

Supply	
Current consumption	IPEH-003021 (Dual Channel): max. 490 mA (5 V) IPEH-003022 (Quad Channel): max. 980 mA (5 V)
External devices at the CAN connector (Pin 1/9)	5 V, max. 50 mA per CAN connector, activated with solder bridges

Measures	
Form factor	CompactPCI 3U plug-in card
Dimension	Board: 160 x 100 mm (6 5/16 x 3 15/16 inches) Total: 175 x 130 mm (6 7/8 x 5 1/8 inches, without locking lever) (See also dimension drawing in Appendix B on page 19)
Weight	IPEH-003021 (Dual Ch. opto-dec.): 120 g (4.23 oz.) IPEH-003022 (Quad Ch. opto-dec., plus connection blind): 132 g + 56 g (4.66 oz. + 1.98 oz.)

Continued on the next page

Environment	
Operating temperature	-40 – +85 °C (-40 – +185 °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-cPCI IPEH-003021/22 – EC Declaration of Conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the PCAN-cPCI products
IPEH-003021/22

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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Mr. Wilhelm
Otto-Roehm-Strasse 69
64293 Darmstadt
Germany

Phone: +49 (0)6151 8173-20
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E-mail: info@peak-system.com

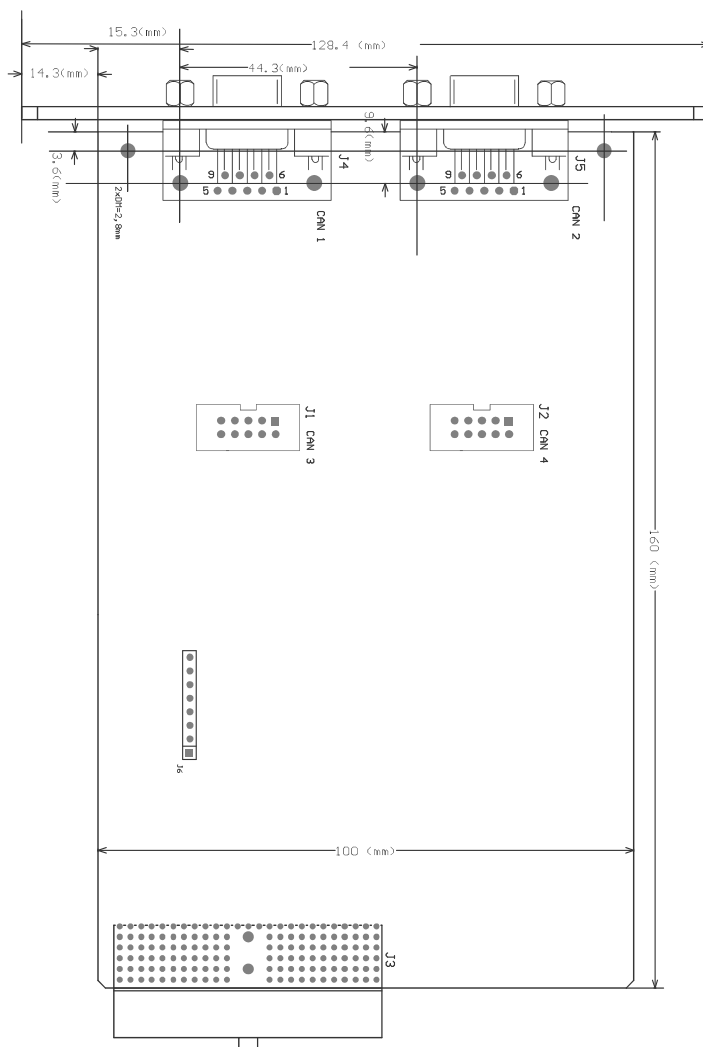Signed this 5th day of February 2009

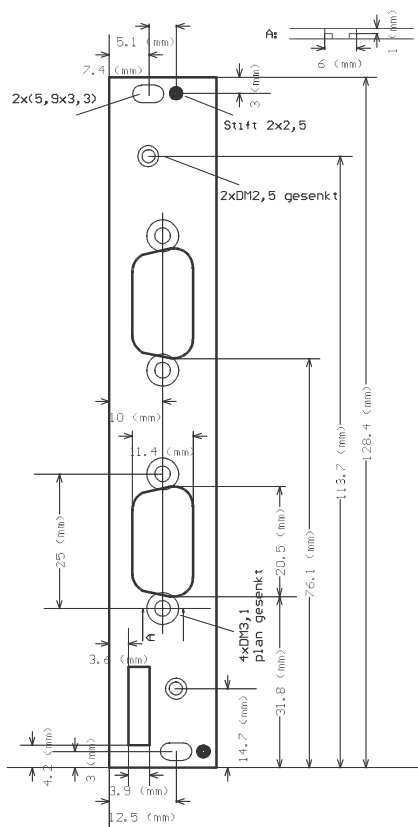# Appendix B Dimension Drawings

Figure 7: Top view PCAN-cPCI card

Figure 8: View of the front blind

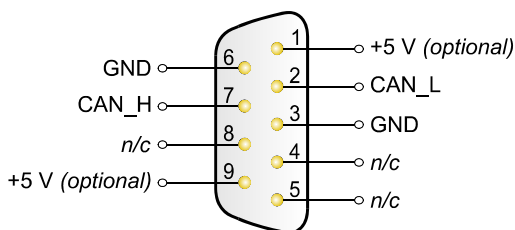The figures don't show the original size.

Appendix C Quick Reference

Software/Hardware Installation under Windows

Before installing the PCAN-cPCI card into the computer please set up the corresponding software package from the supplied CD (with administrator privileges). Afterwards, insert the PCAN-cPCI card into an empty CompactPCI slot of the switched off (de-energized) computer. At the next start of Windows the PCAN-cPCI 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-cPCI card. Select the desired channel. The preset parameters for initialization of the card can be used without changes.

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

GND — 6
CAN_H — 7
n/c — 8
+5 V (optional) — 9

1 — +5 V (optional)
2 — CAN_L
3 — GND
4 — n/c
5 — n/c

n/c = not connected