

# PCAN-USB

USB to CAN Interface

User Manual



## Products taken into account

Product Name	Model	Item Number
PCAN-USB		IPEH-002021
PCAN-USB opto-decoupled	Galvanic isolation for CAN interface	IPEH-002022

The cover picture shows the product PCAN-USB. The case of the opto-decoupled version has a similar profile, but is longer.

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PEAK-System Technik GmbH  
Otto-Roehm-Strasse 69  
64293 Darmstadt  
Germany

Phone: +49 (0)6151 8173-20  
Fax: +49 (0)6151 8173-29

[www.peak-system.com](http://www.peak-system.com)  
[info@peak-system.com](mailto:info@peak-system.com)

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# 1 Introduction


The PCAN-USB adapter provides one CAN channel at computers with USB ports. Software interfaces exist for different operating systems, so programs can easily access a connected CAN bus.



**Tip:** At the end of this manual (Appendix B) you can find a [Quick Reference](#) with brief information about the installation and operation of the PCAN-USB adapter.

## 1.1 Properties at a Glance

- Adapter for USB port (USB 1.1, compatible to USB 2.0)
- Power supply via USB connection
- 1 High-speed CAN channel (ISO 11898-2)
- CAN transfer rates up to 1 Mbit/s
- CAN specifications 2.0A and 2.0B
- CAN connection 9-pin D-Sub male, pin assignment according to specification CiA 102
- Galvanic isolation up to 500 V for the CAN interface (only PCAN-USB opto-decoupled)
- 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 (from 2000 onwards) and Linux, for older versions and other operating systems on request

 **Note:** This manual describes the use of PCAN-USB adapter with Windows. You can find device drivers for Linux and the corresponding application information on the provided CD in the directory branch `Develop` and on our website under [www.peak-system.com/linux](http://www.peak-system.com/linux).

## 1.2 System Requirements

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

- A vacant USB port (USB 1.1 or USB 2.0) at the computer or at a USB hub connected to 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 consists of the following parts:

- Adapter PCAN-USB (plastic case with CAN connector and a cable for USB connection)
- CD with software (drivers, utilities), programming examples, and documentation

## 2 Installation

This chapter deals with the software setup for the PCAN-USB adapter under Windows, the connection of the adapter to the computer, and the connection of a CAN bus.

### 2.1 Installing the Software and the PCAN-USB Adapter

Setup the driver before connecting the PCAN-USB adapter to the computer for the first time.

▶ 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-USB adapter 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-USB**.
4. Click on **Install now**. The setup program for the driver is executed.
5. 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 connect the PCAN-USB adapter and complete the initialization:
1. Connect the PCAN-USB adapter to an USB port of the computer or of a connected USB hub. The computer can remain powered on.

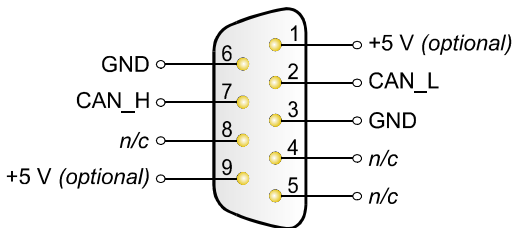
Windows notifies that new hardware has been detected.

2. Windows XP only: A Wizard dialog box appears. Follow its instructions and select the automatic software installation.
3. Afterwards you can work as user with restricted rights again.

After the initialization process is finished successfully the red LED on the PCAN-USB adapter is illuminated.

## 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 specification CiA 102.



*n/c* = not connected

Figure 1: Pin assignment High-speed CAN  
(view onto connector of the PCAN-USB adapter)

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

On the PCAN-USB PCB (PCAN-USB case opened) a 5-Volt supply can optionally be routed to pin 1 and/or pin 9 of the D-Sub CAN connector (PCAN-USB opto-decoupled: pin 1 only). Thus devices with low power consumption (e.g. external 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 model of the adapter 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. external bus converters) to or from the PCAN-USB adapter while it is de-energized (the adapter is not connected to the computer). Consider that some computers still supply the USB ports with power even when they are turned off (standby operation).

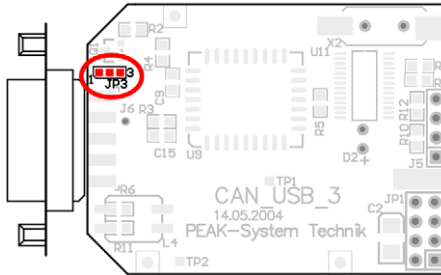


➤ Proceed as follows to activate the 5-Volt supply:

In order to access the PCB, open the case of the PCAN-USB adapter by cautiously pushing in the latches on both sides, e.g. with a flat tip screwdriver.

Set the solder bridge(s) on the PCB of the PCAN-USB adapter according to the desired function. During this procedure take especially care not to produce unwanted short circuits on the card.

The following Figure 2 and Figure 3 show the positions of the solder fields on each PCAN-USB PCB; the tables below contain the possible settings.



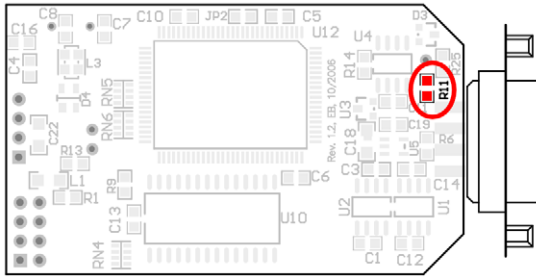




Figure 3: Bottom side of the PCAN-USB opto-decoupled PCB, solder field R11

5-Volt supply →	None	Pin 1
PCAN-USB opto-decoupled, solder field R11		

For reassembly place the PCB overhead onto the top part of the case. Ensure that the cable is lying with the strain relief in the cut-out of the case, and that the LED is placed in the corresponding hole.

Push the bottom part of the case onto the top part (the latches click in).

## 3 operation

### 3.1 Status LED

The PCAN-USB adapter has a red status LED which may be in one of the following conditions:

- **Off:** A connection to a driver of the operating system is not established.
- **On:** The adapter is initialized. There's a connection to a driver of the operating system.
- **Slowly flashing:** A software application is connected to the adapter.
- **Quickly flashing:** Data is transmitted via the connected CAN bus.

### 3.2 Removing the Adapter Safely

If you want to unplug the PCAN-USB adapter from the computer during a Windows session, pay attention to the following notes.

When the PCAN-USB adapter is connected and the driver is active, you can find the icon for safely removing hardware in the notification area of the Taskbar (on the lower right of the desktop):



Figure 4: Icon for removing hardware safely

After clicking on the icon select the command **Remove PCAN-USB Device**. After the red LED on the PCAN-USB adapter has gone out you can remove it from the USB port of the computer.

## 4 software

This chapter deals with the provided software and the software interface to the PCAN-USB adapter.

### 4.1 CAN Monitor PCAN-View for Windows

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

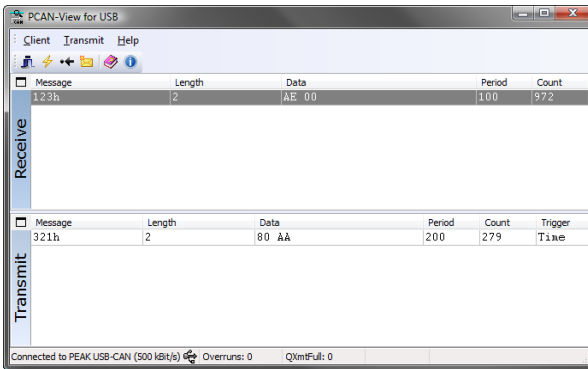


Figure 5: The main window of PCAN-View for Windows

▶ Do the following to start and initialize PCAN-View:

1. 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 USB**.

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 USB** click on **Start**.

The dialog box for selecting the CAN hardware and for setting the CAN parameters appears.

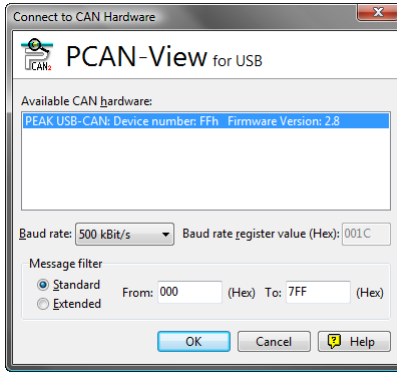


Figure 6: Selection of the CAN specific hardware and parameters

2. From the list **Baud rate** select the transfer rate that is used by all nodes on the CAN bus.
3. Under **Message filter** you can limit the range of CAN IDs to be received, either for standard frames (11-bit IDs) or for extended frames (29-bit IDs).
4. Finally confirm the settings in the dialog box with **OK**. The main window of PCAN-View appears (see Figure 5).

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.

## 4.2 Linking Own Programs with PCAN-Light

On the provided CD you can find files for software development in the directory branch `Develop`. 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 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, consult the software provider. To obtain development support, you need to own a PCAN-Developer or PCAN-Evaluation version.

## 5 Technical specifications

### Supply

Supply voltage	+5 V DC (via USB port)
Current consumption	max. 200 mA

### Connectors

Computer	USB plug type A
CAN	D-Sub (m), 9 pins Pin assignment according to specification CiA 102 PCAN-USB opto-decoupled: galvanic isolation up to 500 V

### USB

Type	USB 1.1, compatible to USB 2.0
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### 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

### Environment

Operating temperature	-40 - +85 °C (-40 - +185 °F)
Temperature for storage and transport	-40 - +100 °C (-40 - +212 °F)
Relative humidity	15 – 90 %, not condensing
EMC	EN 55024:2003-10 EN 55022:2007-04 EC directive 2004/108/EG

Continued on the next page




**Measures**


Size (w/o cable)	PCAN-USB: 75 x 43 x 22 mm (2 15/16 x 1 11/16 x 7/8 inches) (L x W x H) PCAN-USB opto-dec.: 87 x 43 x 22 mm (3 7/16 x 1 11/16 x 7/8 inches) (L x W x H)
Weight (with cable)	PCAN-USB: 78 g (2.8 oz.) PCAN-USB opto-dec.: 83 g (2.9 oz.)

# Appendix A Certificates

## A.1 CE PCAN-USB

PCAN-USB IPEH-002021 – EC Declaration of Conformity  
PEAK-System Technik GmbH



**Notes on the CE Symbol** 

The following applies to the PCAN-USB product  
IPEH-002021

**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:

**PEAK-System Technik GmbH**  
Mr. Wilhelm  
Otto-Roehm-Strasse 69  
64293 Darmstadt  
Germany

Phone: +49 (0)6151 8173-20  
Fax: +49 (0)6151 8173-29  
E-mail: [info@peak-system.com](mailto:info@peak-system.com)



Signed this 5<sup>th</sup> day of February 2009

## A.2 CE PCAN-USB opto-decoupled

PCAN-USB IPEH-002022 – EC Declaration of Conformity  
PEAK-System Technik GmbH



### Notes on the CE Symbol

The following applies to the PCAN-USB product  
IPEH-002022

### 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  
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German version EN 55024:1998 + A1:2001 + A2:2003

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Information technology equipment – Radio disturbance characteristics – Limits and methods  
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### PEAK-System Technik GmbH

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

Phone: +49 (0)6151 8173-20  
Fax: +49 (0)6151 8173-29  
E-mail: [info@peak-system.com](mailto:info@peak-system.com)

A handwritten signature in black ink, appearing to read "Uwe W. M.", written in a cursive style.

Signed this 5<sup>th</sup> day of February 2009

## Appendix B Quick Reference

### Software/Hardware Installation under windows

Before connecting the PCAN-USB adapter to the computer set up the corresponding software package from the supplied CD (with administrator privileges). Afterwards connect the PCAN-USB adapter to an USB port at your computer. The adapter is recognized by Windows and the driver is initialized. After the installation process is finished successfully the red LED on the adapter is illuminated.

### Getting Started under windows

Run the CAN monitor PCAN-View from the Windows Start menu as a sample application for accessing the PCAN-USB adapter. For initialization of the PCAN-USB adapter select the CAN transfer rate (Baud rate).

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

