PCAN-USB (ISO)

Adapter PC USB Port to High-speed CAN

User Manual

PEAK System

Products taken into account

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

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

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

www.peak-system.com
info@peak-system.com

Release date: May 3, 2006

Contents

1 Introduction

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.

PCAN-USB allows the connection of a CAN bus to an USB interface of an IBM compatible PC. It is especially suitable for use with notebook computers since these usually don't have an ISA or PCI slot. With the help of this adapter any PC can be linked to a High-speed CAN (HS-CAN).

With the so-called ISO version of the PCAN-USB adapter an isolation of up to 500 V between the PC and the CAN parts of the adapter is achieved by use of a DC/DC converter and an optocoupler.

Note: This manual refers to both **PCAN-USB** standard version and **PCAN-USB ISO** with galvanic isolation. Differences at use and at the technical specifications are mentioned accordingly in this manual.

1.1 Properties at a Glance

- Connection of a High-speed CAN (CAN specifications 2.0A and 2.0B) to a PC
- Use of any USB port at the PC (USB 1.1, compatible with USB 2.0)
- Power supply via USB connection
- Equipped with the CAN controller SJA1000T by Philips
- CAN transfer rate up to 1 MBit/s

- CAN connection 9-pin Sub-D male, pin assignment according to CiA recommendation DS102
- Galvanic isolation at CAN connection up to 500 V (PCAN-USB ISO only)
- Support for operating systems Windows (98 SE, ME, 2000 SP4, XP) and Linux

Note: This manual describes the use of PCAN-USB-Adapters with Windows. You can find device drivers for Linux and the corresponding information on PEAK-System's website under 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 free USB port (USB 1.1 or USB 2.0) at the PC or at an USB hub connected to the PC
- Operating system Windows (98 SE, ME, 2000 SP4, XP) or Linux

1.3 Scope of Supply

The scope of supply normally consists of the following parts:

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

2 Installation

2.1 Software Setup / Connection to the PC

We recommend that you setup the driver before connecting the PCAN-USB adapter to the PC for the first time.

Note: The following instructions are valid only for Windows 2000 and Windows XP. If you use the operating systems Windows 98 SE or Windows ME, please contact the customer support (address: see page 2).

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

1. Please 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-ROM into the PC. Usually a navigation program appears a few moments later. If not, start the file `Intro.exe` from the root directory of the CD-ROM.
3. Navigate through the menus to the driver installation for the PCAN-USB adapter (**English** > **Drivers** > **PCAN-USB**). Click on **Install now** afterwards. The setup program for the driver is executed.
4. Follow the instructions of the setup program.

Tip: During this procedure you may additionally install the CAN monitor PCAN-View for Windows (see also section 4.1).

Do the following to connect the PCAN-USB adapter and complete the initialization:

1. Connect the PCAN-USB adpater to an USB port at your PC. The PC can remain powered on.

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

2.1.1 Safely Removing the Adapter

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

Windows 2000/Windows XP

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):

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 PC.

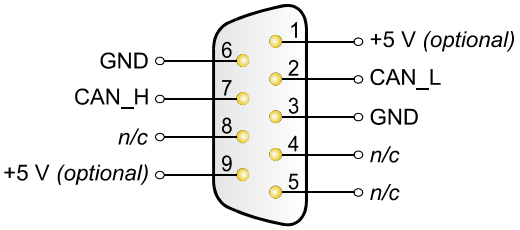
Windows 98 SE/Windows ME

Remove the PCAN-USB adapter from the USB port only, when the red LED on the adapter doesn't blink, e.g. is on continuously. Else system crashes may occur.

You can find detailed information about the red status LED in section 3.1.

2.2 Connecting a HS-CAN

A CAN is connected to the 9-pin Sub-D port on the PCAN-Dongle. The pin assignment corresponds to the CiA recommendation DS 102-1.



n/c = not connected

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

2.3 5-Volt Supply at the CAN Connector

A 5-Volt supply can optionally be routed to pin 1 and/or pin 9 of the CAN connector (PCAN-USB ISO: pin 1 only) by setting solder bridges on the PCAN-USB PCB (PCAN-USB case opened). Thus devices with low power consumption (external transceivers or optocouplers, for example) can be directly supplied via the CAN connector.

When using this option, the 5-Volt supply is directly connected to the power supply of the PCAN-USB adapter (coming from the PC) and is not fused separately. The ISO version of the adapter contains an interconnected DC/DC converter. Therefore the current output is limited to about 50 mA.

⚠ **Attention!** At this procedure a special care is indispensable since there is a short circuit danger. The PCAN-USB-Adapter could be destroyed and/or the power supply or electronics of the PC or other components connected could be damaged.

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 transceivers or optocouplers) to or from the PCAN-USB adapter while it is de-energized (the adapter is not connected to the PC). Consider that some PCs still supply the USB ports with power even when they are turned off (standby operation).

Important note: PEAK-System Technik GmbH does not give guarantee on damages which have resulted from application of the option described in this section.

Procedure:

1. In order to access the PCB, open the case of the PCAN-USB-Adapters by cautiously pushing in the latches on both sides (risk of breakage!), e.g. with a flat tip screwdriver.
2. Set the solder bridge on the PCB of the PCAN-USB adapter according to the desired function. Figure 2 and Figure 3 show the position on each PCB; the table below contains the possible settings.

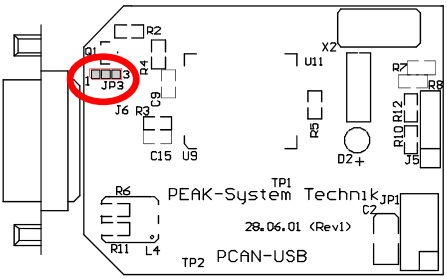


Figure 2: PCB PCAN-USB, JP3

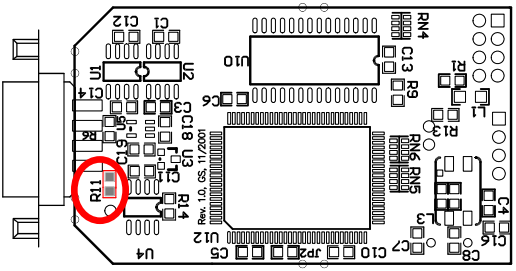


Figure 3: PCB PCAN-USB ISO, R11

5-Volt supply →	**None**	**Pin 1**	**Pin 9**	**Pin 1 + Pin 9**
PCAN-USB, JP3	1 ▢▢▢ 3	1 ▢▬▢ 3	1 ▬▢ 3	1 ▬▬ 3
PCAN-USB ISO, R11	▢ ▢	▬ ▢	-/-	-/-

3. For reassembly place the PCB overhead onto the top part of the case. Make sure 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.

4. 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 (assumed that adapter is connected to a turned on PC):

- **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 PCAN-USB.
- **Quickly flashing**: Data is transmitted via the connected CAN bus.

4 Software

4.1 PCAN-View for Windows

PCAN-View for Windows is a simple CAN monitor.

Installation

You can install the application optionally during the driver setup procedure (see also section 2.1 *Software Setup / Connection to the PC*).

Program Start

In the Start menu of the Windows desktop you can find the entry "PCAN Hardware". From there you can execute the program PCAN-View.

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

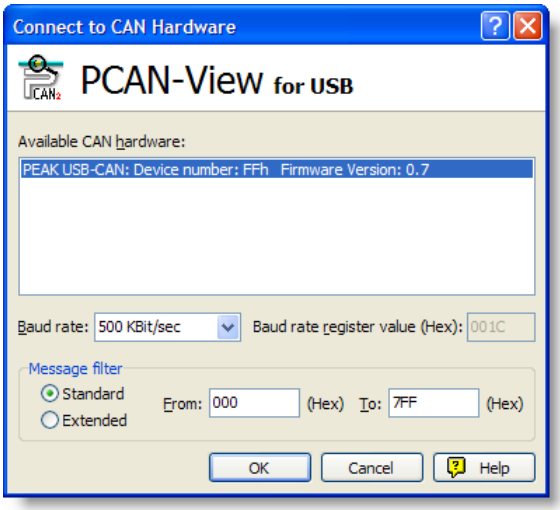


Figure 4: Selection of the CAN specific hardware and parameters

As a rule you can use the preset values and confirm the dialog box directly.

If you need further help after the program start, use the online help provided with the program (key [F1]).

4.2 Linking Own Programs with PCAN-Light

On the supplied CD-ROM you can find files that are provided for software development. You can access them with the navigation program (button **Programming**). The files 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 Light drivers. Please read the detailed documentation of the interface (API) in each header file.

Tip: You can find further information in the file `PCANLight_enu.chm` (Windows Help file) on the CD-ROM.

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 version.

5 Frequently Asked Questions (FAQ)

Question	Answer
Why doesn't PCAN-USB have an integrated interface for **USB 2.0**?	The transfer rates defined by the USB 1.1 standard are sufficient for handling the upcoming data from the CAN traffic and additional management information. USB 1.1 devices also work on USB 2.0 interfaces.
The **data transfer** always **stops** after a short period of time, when a CAN application has been started (status LED shines continuously instead of blinking).	It may be that you use an older PCAN-USB adapter being connected to a PC with USB 2.0 interface. PEAK-System has a solution for this problem. Please contact us on this matter.
Does PCAN-USB also work with **DOS**?	No. DOS does not support the USB standard, and on the other hand PEAK-System doesn't provide a special driver. In order to have a CAN connection with DOS you may alternatively use the PCAN-Dongle for connection to the parallel interface, for example.

6 Technical Specifications

Supply	
Supply voltage	+5 V DC (via USB port)
Current consumption	max. 200 mA
Connectors	
PC	USB plug type A
CAN	Sub-D (m), 9 pins Pin assignment according to CiA recommendation DS 102-1 PCAN-USB ISO: galvanic isolation up to 500 V
USB	
Type	USB 1.1
I/O address, IRQ	Automatically assigned by the PC
CAN	
Specification	ISO 11898 High-speed CAN (up to 1 MBit/s) 2.0A (standard format) and 2.0B (extended format)
Controller	Philips SJA1000T
Transceiver	Philips PCA82C251
Environment	
Operating temperature	-40 – +85 °C -40 – +185 °F
Storage temperature	-40 – +100 °C -40 – +212 °F
Relative humidity	15 – 90 %, not condensing
EMC	EN 50081-1:1992 (PCAN-USB only) EN 50082-1:1997 (PCAN-USB only) EN 50081-2:1993 (PCAN-USB only) EN 61000-6-2:1999 (PCAN-USB only) EN 61000-6-1:2001 (PCAN-USB ISO only) EN 61000-6-2:2001 (PCAN-USB ISO only) EN 61000-6-3:2001 (PCAN-USB ISO only) EN 61000-6-4:2001 (PCAN-USB ISO only) EC directive 89/336/EEC

Continued on next page

Measures	
Dimension (w/o cable)	PCAN-USB: about 75 x 43 x 22 mm (2 15/16 x 1 11/16 x 7/8 inches) PCAN-USB ISO: about 87 x 43 x 22 mm (3 7/16 x 1 11/16 x 7/8 inches)
Weight	max. 70 g (2.5 oz.)

Design and specifications are subject to change without notice.

Appendix A Certificates

A.1 CE

PCAN-USB IPEH-002021
PEAK-System Technik GmbH

EC declaration of conformity

Notes on the CE Symbol CE

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

EC Directive

This product fulfills the requirements of EC directive 89/336/EEC on "Electromagnetic Compatibility," and is designed for the following fields of application as per the CE marking:

Field of Application	Requirement for Emitted Interference	Requirement for Noise Immunity
Residential, commercial and small businesses	EN 61000-6-3: 2001	EN 61000-6-1: 2001
Industrial	EN 61000-6-4: 2001	EN 61000-6-2: 2001

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-Röhm-Str. 69
D-64293 Darmstadt
Germany

phone: +49 6151 81 73-20
fax.: +49 6151 81 73-29
info@peak-system.com

Signed this 14th day of July 2004

PCAN-USB IPEH-002022
PEAK-System Technik GmbH

EC declaration of conformity

Notes on the CE Symbol CE

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

EC Directive

This product fulfills the requirements of EC directive 89/336/EEC on "Electromagnetic Compatibility," and is designed for the following fields of application as per the CE marking:

Field of Application	Requirement for Emitted Interference	Requirement for Noise Immunity
Residential, commercial and small businesses	EN 61000-6-3: 2001	EN 61000-6-1: 2001
Industrial	EN 61000-6-4: 2001	EN 61000-6-2: 2001

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-Röhm-Str. 69
D-64293 Darmstadt
Germany

phone: +49 6151 81 73-20
fax.: +49 6151 81 73-29
info@peak-system.com

Signed this 14th day of July 2004

Appendix B Quick Reference

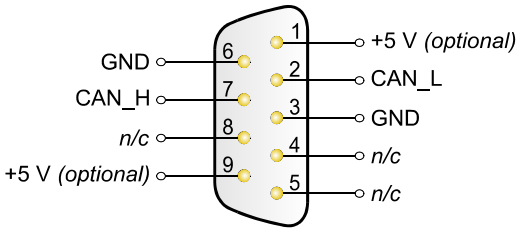
Software/Hardware Installation under Windows

Before connecting the PCAN-USB adapter to the PC please set up the corresponding software package from the supplied CD-ROM (under 2000 and XP with administrator priviliges). Afterwards connect the PCAN-USB adpater to an USB port at your PC. 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. The preset parameters for initialization of adapter can be used without changes.

HS-CAN connector (Sub-D, 9 pins)



n/c = not connected