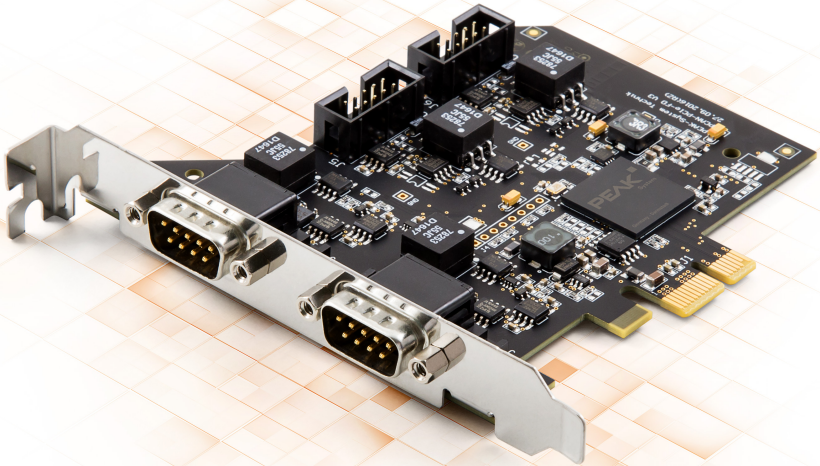


PCAN-PCI Express FD

User Manual



Relevant Products

Product name	Model	Part number
PCAN-PCI Express FD Single Channel	1 CAN channel	IPEH-004026
PCAN-PCI Express FD Double Channel	2 CAN channels	IPEH-004027
PCAN-PCI Express FD Quad Channel	4 CAN channels	IPEH-004040

The cover picture shows the product PCAN-PCI Express FDQuad Channel. Other product models have an identical form factor but vary in equipment.

Imprint

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1 Introduction

The plug-in card PCAN-PCI Express FD enables the connection of a PC with PCI Express slots to CAN FD and CAN networks. There is galvanic isolation of up to 500 V between the computer and CAN sides. The card is available as a single, double, or quad channel version.

The CAN FD standard (CAN with Flexible Data rate) is primarily characterized by higher bandwidth for data transfer. The maximum of 64 data bytes per CAN FD frame (instead of 8 so far) can be transmitted with bit rates up to 12 Mbit/s. CAN FD is downward compatible to the CAN 2.0 standard, CAN FD nodes can be inserted into already existing CAN networks without CAN FD extensions.

The monitor software PCAN-View and the programming interface PCAN-Basic for the development of applications with CAN connection are included in the scope of supply and support CAN FD.

Device drivers exist for different operating systems, so programs can easily access a connected CAN bus.



This manual describes the use of the CAN interface with **Windows**.
Device drivers and application information for **Linux**:
www.peak-system.com/quick/DL-Driver-E



At the end of this manual you can find a Quick Reference with brief information about the installation and operation of the CAN interface.

1.1 Properties at a Glance

- PC plug-in card (PCIe x1) for PCI Express slots
- 1, 2, or 4 High-speed CAN channels (ISO 11898-2)
- Complies with CAN specifications 2.0 and FD
- CAN FD support for ISO and Non-ISO standards switchable
- CAN FD bit rates for the data field (64 bytes max.) from 25 kbit/s up to 12 Mbit/s
- CAN nominal bit rates from 25 kbit/s up to 1 Mbit/s
- CAN bus connection via D-Sub, 9-pin (in accordance with CiA® 303-1)
- FPGA implementation of the CAN FD controller
- NXP TJA1044GT CAN transceiver
- Galvanic isolation up to 500 V per CAN connection
- CAN termination can be activated through a solder jumper, separately for each CAN channel
- PCIe data transfer via bus master DMA
- DMA memory access operations with 32- and 64-bit addresses
- Measurement of bus load including error frames and overload frames on the physical bus
- Induced error generation for incoming and outgoing CAN messages
- Power supply for external devices via CAN connection can be connected through a solder jumper
- Extended operating temperature range from -40 to +85 °C (-40 to +185 °F)

1.2 System Requirements

Computer with

- operating system Windows® 11 (64 bit), 10 (32/64 bit) or Linux (32/64-bit)
- a vacant PCI Express slot (spezifikation 2.x)
- a vacant slot for the slot bracket (only quad channel)

1.3 Scope of Supply

- Plug-in card PCAN-PCI Express FD
- Slot bracket with D-Sub connectors for the CAN bus (only quad channel)

Downloads

- Device drivers for Windows® 11 (64 bit), 10 (32/64 bit) and Linux (32/64-bit)
- CAN monitor PCAN-View for Windows
- Programming interface PCAN-Basic for developing applications with CAN connection
- Programming interfaces for standardized protocols from the automotive sector

2 Settings

The following describes the settings for the power supply of external devices, the internal termination, and the activation of the daisy chain. If you do not need any of these settings, skip this chapter.



Daisy chain and power supply of external devices cannot be used simultaneously.

2.1 Voltage Supply of External Devices

Optionally, an external power supply can be connected separately for each CAN channel via solder bridges at pin 1 on the D-Sub connector. This allows external devices to be supplied with a voltage of 5 V DC, such as the PCAN-TJA1054 bus converter for Low-speed CAN. Pin 1 is not assigned at delivery. The current output is limited to 50 mA.

2.1.1 Activate Voltage Supply



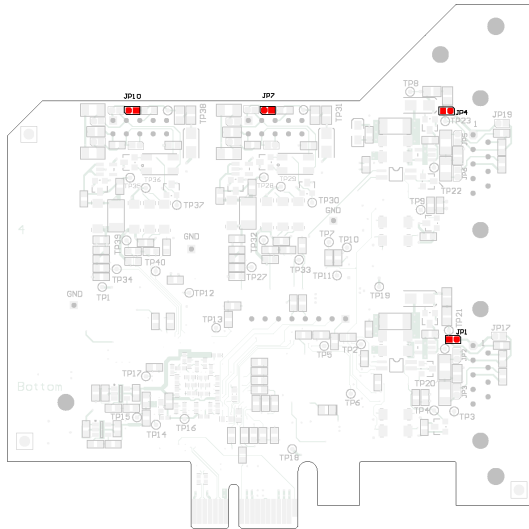
Risk of short circuit! Soldering on the CAN interface may only be performed by qualified electrical engineering personnel.











Attention! Electrostatic discharge (ESD) can damage or destroy components on the card. Take precautions to avoid ESD.

Set the solder bridge(s) corresponding to the desired settings.

The following figure shows the solder field positions on the quad channel card. The table below contains the possible settings.



Position of the solder fields on the bottom side of the card for a 5 V supply

D-Sub connector	Solder field	5 V supply	
		Without (default)	Active (Pin 1)
CAN 1	JP1		
CAN 2	JP4		
CAN 3	JP7		
CAN 4	JP10		



Attention! The voltage supply for external devices is not protected separately. Therefore, turn off the computer before you connect and disconnect CAN cables or peripheral systems.

2.2 Internal Termination

The termination can be activated by solder jumpers on the circuit board, to terminate one end of the CAN bus.



Tip: We recommend to do termination at the CAN cabling, for example with the terminating resistors PCAN-Term (IPEK-003002) or PCAN-MiniTerm (IPEK-003002-Mini). Thus, CAN nodes can be flexibly connected to the bus.

2.2.1 Activate Internal Termination



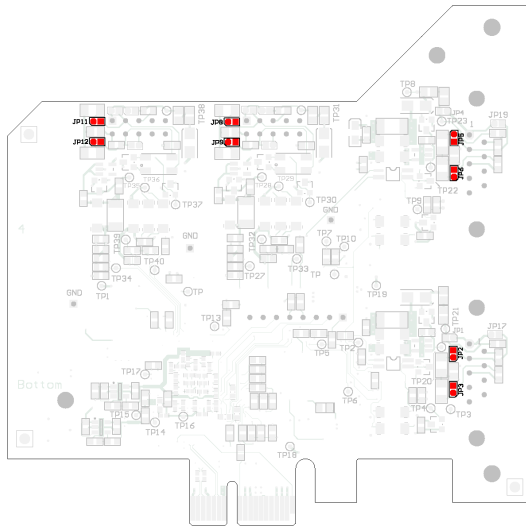
Risk of short circuit! Soldering on the CAN interface may only be performed by qualified electrical engineering personnel.



Attention! Electrostatic discharge (ESD) can damage or destroy components on the card. Take precautions to avoid ESD.

Set the solder bridges corresponding to the desired settings.

Following figure on the next page shows the positions of the solder fields of the quad channel card. The solder fields for the single and double channel card are located in the same positions and can therefore also be taken from the figure. The table below contains the possible settings.



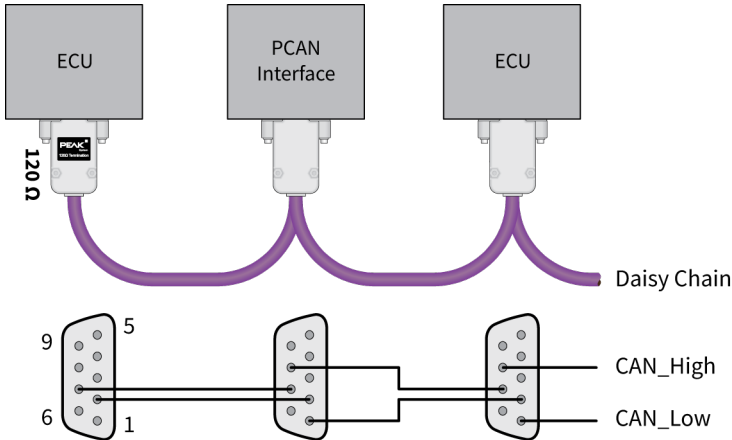
Position of the solder fields on the bottom side of the quad channel card for the internal termination

D-Sub connector	Solder fields	Internal termination	
		Without (default)	Active
CAN 1	JP2 and JP3		
CAN 2	JP5 and JP6		
CAN 3	JP8 and JP9		
CAN 4	JP11 and JP12		

2.3 Daisy Chain

Only quad channel card: The daisy chain can be activated via solder jumpers on the board to connect a CAN-FD-optimized connection to an existing CAN bus. This makes interference-free operation possible at higher CAN FD bit rates, because stubs and Y distributions are avoided as far as possible.

2.3.1 Connection example and assignment

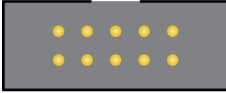
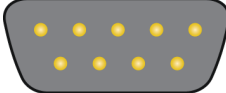


For cabling, the cables and connectors must be assembled accordingly.



The optional voltage supply for external devices can not be operated simultaneously with the daisy chain.

When daisy chain is activated, the pin assignment is as follows:

10-pin connector on plug-in card		9-pin D-Sub plug on slot bracket		
9 7 5 3 1		1 2 3 4 5		
				
10 8 6 4 2		6 7 8 9		Assignment
1		1		CAN_Low Daisy Chain
2		6		CAN_GND
3		2		CAN_Low
4		7		CAN_High
5		3		CAN_GND
6		8		CAN_High Daisy Chain
7, 8, 9, 10		4, 5, 9		None

2.3.2 Activate Daisy Chain



Risk of short circuit! Soldering on the CAN interface may only be performed by qualified electrical engineering personnel.



Attention! Electrostatic discharge (ESD) can damage or destroy components on the card. Take precautions to avoid ESD.





Set the solder bridges corresponding to the desired settings.

Figure on the next page shows the solder field **positions on the top** of the quad channel card. The table below contains the possible settings.

Figure on page 14 shows the solder field **positions on the bottom** of the quad channel card. The table below contains the possible settings.

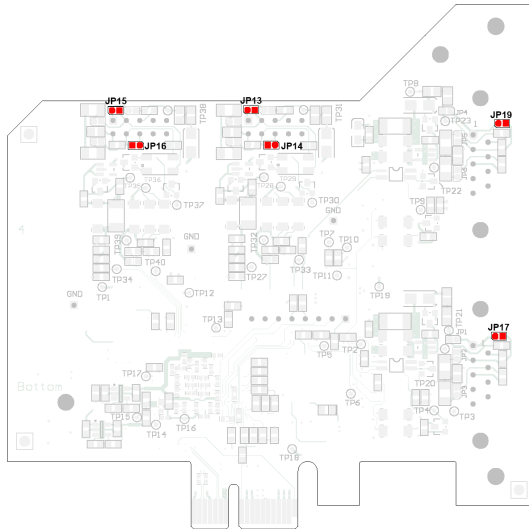


Position of the solder fields on the top side of the card for the activation of the daisy chain

D-Sub connector	Solder field	Daisy chain	
		Without (default)	Active
CAN 1	JP18		
CAN 2	JP20		



For CAN 1 and CAN 2, additional soldering fields on the bottom of the card must be observed. See figure on the next page.



Position of the solder fields on the bottom side of the card for the activation of the daisy chain

D-Sub connector	Solder field	Daisy chain	
		Without (default)	Active
CAN 1	JP17		
CAN 2	JP19		
CAN 3	JP13 and JP14		
CAN 4	JP15 and JP16		



For CAN 1 and CAN 2, additional soldering fields on the top of the card must be observed. See figure on the previous page.

3 Installation

This chapter covers the software setup for the PCAN-PCI Express FD card in Windows and the installation of the card in the computer.

Note: For installation on Linux, see Appendix D *Linux*.

Install the driver before you install the CAN interface.

3.1 Install Device Driver Setup

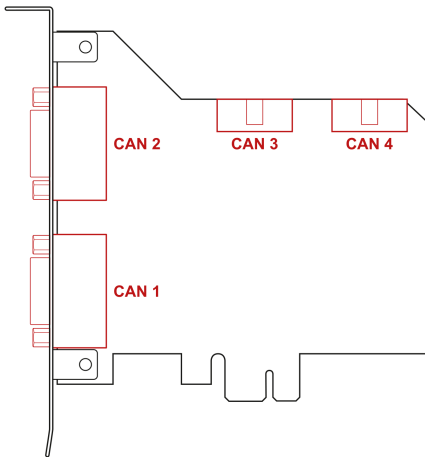
1. Download the device driver setup from our website:
www.peak-system.com/quick/DL-Driver-E
2. Unpack the file `PEAK-System_Driver-Setup.zip`
3. Double-click the file `PeakOemDrv.exe`
The driver setup starts.
4. Follow the program instructions.

3.2 Installing the PCAN-PCI Express FD card



Attention! Electrostatic discharge (ESD) can damage or destroy components on the card. Take precautions to avoid ESD.

1. Shut down the computer.
2. Disconnect the computer's power supply.
3. Open the computer case.
4. Insert the plug-in card into an available PCI Express slot and attach it to the slot.
5. Quad channel: Connect one cable per CAN connection from the slot bracket to a 10-pin male connector on the plug-in card (CAN 3 and CAN 4).



6. Quad channel: Insert the slot bracket and fasten it to the slot.
7. Close the computer case.
8. Reconnect the computer power supply.

9. Turn on the computer and start Windows.
Windows detects the new hardware and completes the driver installation.

3.3 Check Operational Readiness

1. Open the Windows Start menu.
2. Type `Peak Settings` and press `Enter`.
The window *PEAK Settings* appears.
3. Select *CAN Hardware*.
The connected CAN interface is displayed.

3.3.1 Plug-in card is not listed

The PCAN-PCI Express FD card uses the PCIe standard 1.0. It may happen that the card is not detected by the system. This may occur, when the PCIe standard on your system is newer than "1.0" or when the card is in a PEG slot.

You can ensure correct recognition of the card by changing the settings in the computer BIOS.

Make the following settings in the BIOS of your computer mainboard:

1. For the PCIe slot in use, set 1.0 for PCIe support.
Possible terms for the setting: Gen1, Legacy, 1.0
2. To use the card in a PEG slot, enable the "Early PCIe Delay" option.

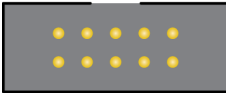



The terms and availability of the above options may differ depending on the mainboard used. Therefore, check the user manual of the mainboard or contact the manufacturer.

4 Connecting the CAN Bus

4.1 Connection over D-Sub connector

After installation of the CAN interface a CAN bus can be connected to the D-Sub connector. The pin assignment of the D-Sub connector corresponds to the specification CiA[®] 303-1:

10-pin connector on the plug-in card		D-Sub plug, CAN 1 to 4		
9	7	5	3	1
				
10	8	6	4	2
				Assignment
1			1	+5 V (optional)
2			6	CAN_GND
3			2	CAN_Low
4			7	CAN_High
5			3	CAN_GND
6, 7, 8, 9, 10			4, 5, 8, 9	None

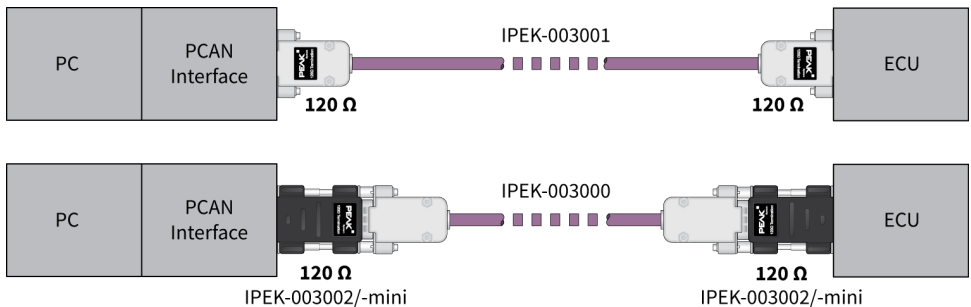
4.2 Cabling

4.2.1 Termination

The High-speed CAN bus (ISO 11898-2) must be terminated with $120\ \Omega$ on both ends. The termination prevents interfering signal reflections and ensures the proper operation of the transceivers of the connected CAN nodes (CAN interfaces, control devices).

The CAN interface PCAN-PCI Express FD does not have an internal termination. Use the CAN interface on a terminated CAN bus.

4.2.2 Example of a Connection



This example shows a connection between the PCAN Interface and a control unit (ECU). The upper example shows a connection with a cable which is terminated with $120\ \Omega$ at both ends. At the lower example the connection is made with termination adapters.

4.2.3 Maximum Bus Length

The maximum bus length depends primarily on the bit rate:

Nominal bit rate	Buslength
1 Mbit/s	40 m
500 kbit/s	110 m
250 kbit/s	240 m
125 kbit/s	500 m
50 kbit/s	1.3 km
25 kbit/s	2.5 km

The listed values have been calculated on the basis of an idealized system and can differ from reality.

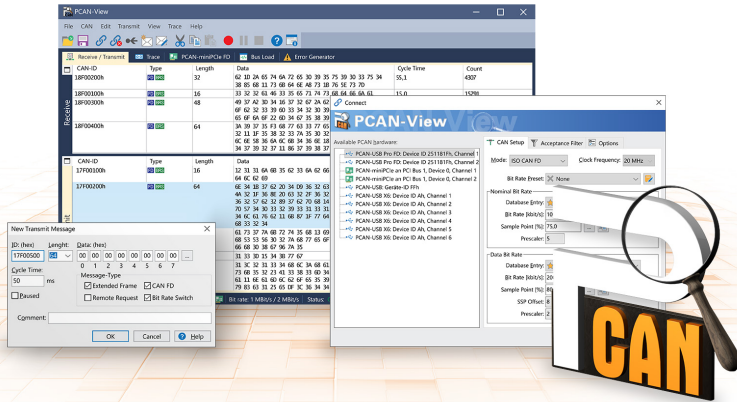


Note: For CAN FD, the same maximum bus lengths apply as for CAN, despite the higher data bit rate of CAN FD. The dependency is based on the bit rate during the arbitration, called nominal bit rate.

4.3 Example Application under Windows

As an example application for accessing the CAN interface, run the CAN monitor PCAN-View from the Windows Start menu.

5 CAN Monitor PCAN-View



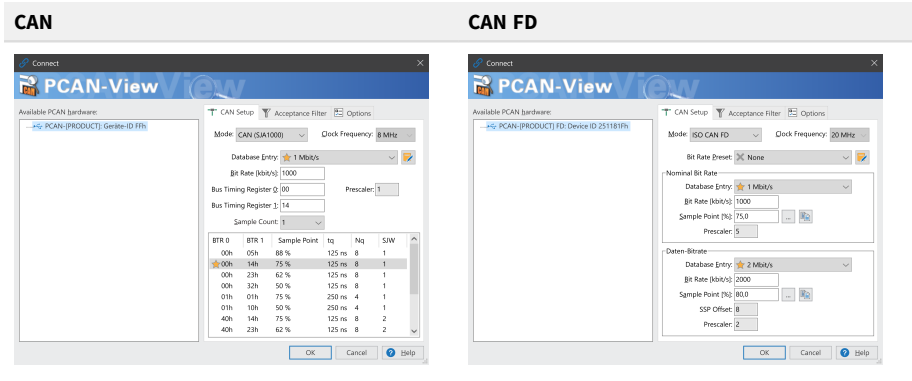
The CAN monitor PCAN-View is a Windows software for viewing, sending, and recording CAN and CAN FD messages. The software is installed with the installation of the device driver package under Windows.

In the following the initialization of a CAN interface is described as an example.

Detailed information about using PCAN-View can be found in the program window under the menu item *Help*.

5.1 CAN interface initialize

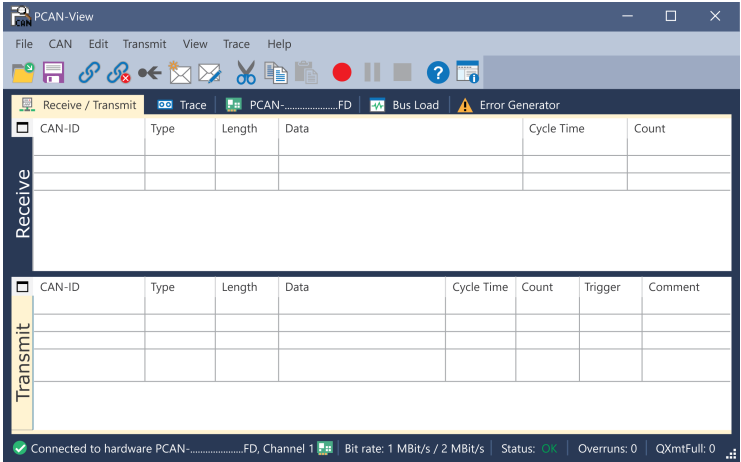
1. Open the program *PCAN-View* via the Windows Start menu.
Depending on the CAN interface the *Connect* dialog is displayed with or without settings for CAN FD.



CAN interface	List entry in Available Hardware
USB Interface, 1-channel	see example above
USB Interface, 2-channel	<ul style="list-style-type: none"> PCAN-USB Pro FD: Device ID 251181Fh, Channel 1 PCAN-USB Pro FD: Device ID 251181Fh, Channel 2
PCIe Interface, 2-channel	<ul style="list-style-type: none"> PCAN-PCI Express at PCI Bus 1, Device 0, Channel 1 PCAN-PCI Express at PCI Bus 1, Device 0, Channel 2

2. If there are several CAN interfaces, select the desired interface. For multiple channels, select the desired channel from the list.
3. Enter the *bit rate(s)* and other settings according to the connected CAN bus.

- Confirm the entries with *OK*. The main window appears and displays the *Receive / Transmit* tab.



- For initializing another channel or CAN interface, open another instance of *PCAN-View*.

5.2 Transmit CAN message

1. Select the menu command *Transmit / New Message*.

Depending on the CAN interface, the dialog box *New Transmit Message* is displayed with or without settings for CAN FD.

CAN CAN FD

New Transmit Message

ID: (hex) Length: Data: (hex)

000 8 00 00 00 00 00 00 00 ...

0 1 2 3 4 5 6 7

Cycle Time: 0 ms

Paused

Message-Type

Extended Frame

Remote Request

Comment:

OK Cancel Help

New Transmit Message

ID: (hex) Length: Data: (hex)

000 8 00 00 00 00 00 00 00 ...

0 1 2 3 4 5 6 7

Cycle Time: 0 ms

Paused

Message-Type

Extended Frame CAN FD

Remote Request Bit Rate Switch

Comment:

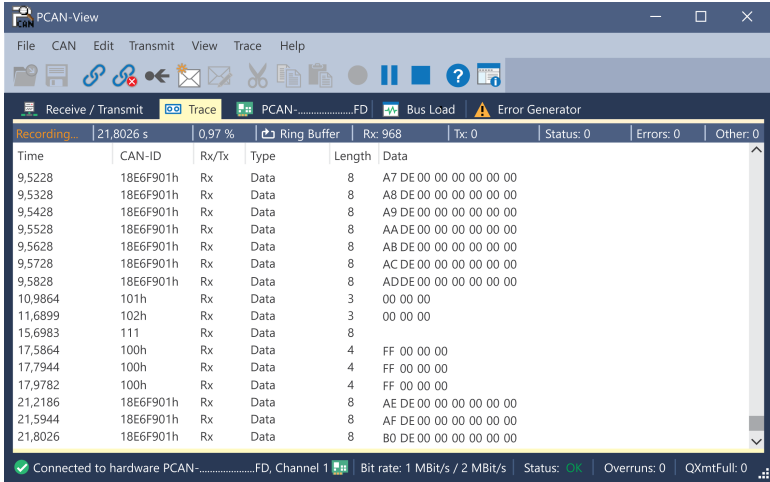
OK Cancel Help

1. Enter the *ID*, *Length* and *Data* of the message. Other settings can be made according to the connected CAN bus.
2. Enter a value into the *Cycle Time* field to choose manually or periodically message transmission.
Enter a value greater than 0 to transmit periodically.
Enter the value 0 to transmit only manually.
3. Confirm the entries with *OK*.
The created transmit message appears on the *Receive / Transmit* tab.
4. To send the message manually, select the menu command *Transmit > Send* or press the `space` bar.
The manual transmission process is performed additionally for periodically transmitted CAN messages.

5.3 Additional Tabs

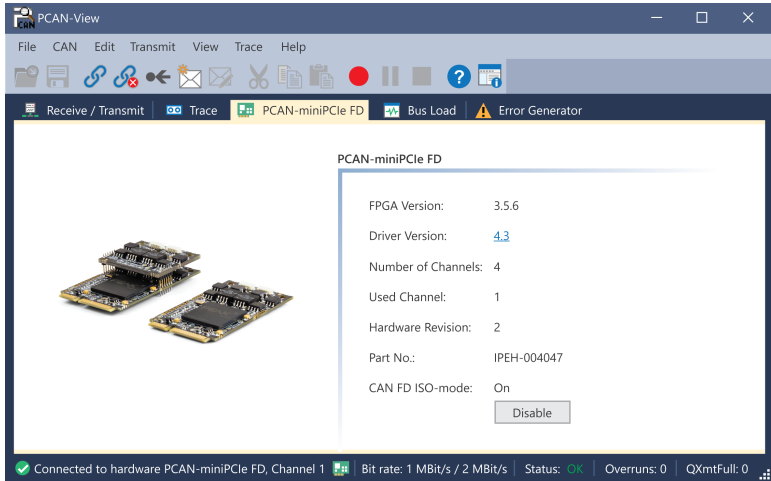
Depending on the CAN interface, additional tabs are available.

5.3.1 Trace Tab



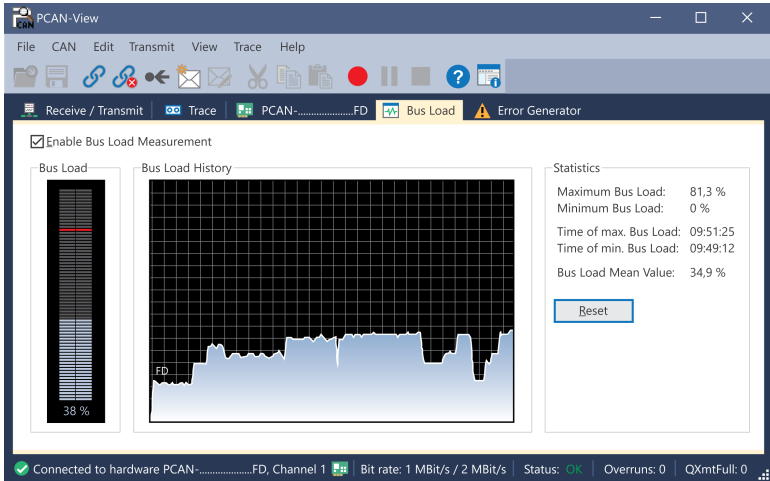
The tracer (data logger) records the communication of the CAN bus in linear or ring buffer mode. The trace data can be saved to a file.

5.3.2 CAN interface Tab



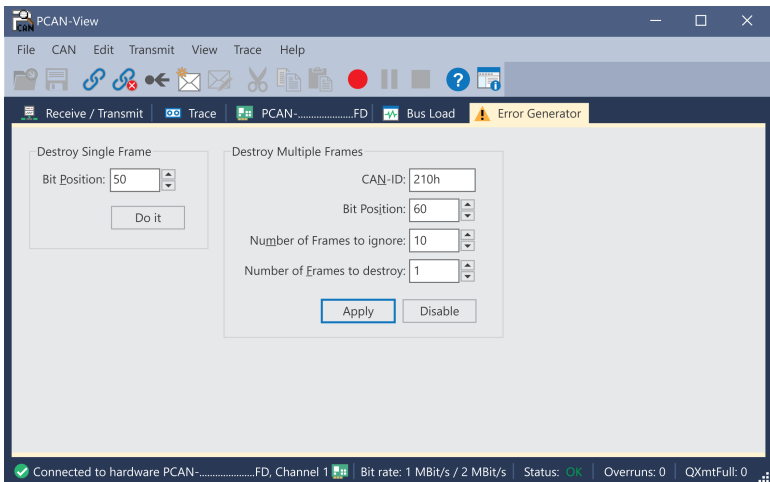
The *CAN interface* tab shows information about the hardware and the used Windows device driver. In this case exemplary for the PCAN-miniPCIe FD. Depending on the CAN interface, a hardware ID can be determined to distinguish several interfaces of the same type. For interfaces with CAN FD a transmission according to "ISO" or "Non-ISO" can be set as default of the hardware.

5.3.3 Bus Load Tab



The *Bus Load* tab displays the current bus load, its time history and statistical information of the connected CAN channel.

5.3.4 Error Generator Tab



Via the *Error Generator* tab the communication on the CAN bus in test environments or during the development of CAN buses can be disturbed in a controlled way by 6 consecutive dominant bits. This is a violation of the CAN protocol on the CAN bus which must be recognized as an error by the connected CAN nodes.



Note: The Error Generator should only be used by experienced users and in the development environment. For further information, please contact our customer support: support@peak-system.com

You can destroy CAN frames with the error generator by one of two methods:

- once after activation
- repeatedly at specific intervals related to a CAN ID

Destroy Single CAN Frame

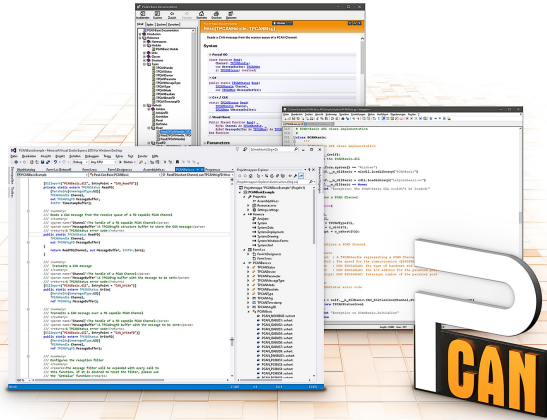
The *Destroy Single Frame* area refers to the next CAN frame that is recognized by the plug-in card after activation.

1. Enter the *Bit Position* where in the CAN frame the error is to be generated. The bit position must start after the identifier. The count includes the stuff bits.
2. Execute the destroy action with *Do it*.
The next received or transmitted CAN frame will be destroyed at the selected bit position.

Destroy Multiple CAN Frames

1. Enter the *CAN ID* of the CAN frame that is intended to be destroyed multiple times. The following specifications refer to this ID.
2. Enter the *Bit Position* where in the CAN frame the error is to be generated. The bit position must start after the identifier. The count includes the stuff bits.
3. If CAN messages are to be sent unharmed before being destroyed, specify the *Number of Frames to ignore*.
4. Determine the *Number of Frames to destroy*.
5. Confirm the entries with *Apply* to activate the error generator.
6. Stop destroying further CAN frames with *Disable*.

6 API PCAN-Basic



The intended use of PCAN-Basic requires compliance with the license rights. Read the license agreement for end users at:

<https://www.peak-system.com/quick/eula>

The programming interface (API) PCAN-Basic provides basic functions for the connection of own programs to the CAN interface of PEAK-System. PCAN-Basic is the interface between the program and the device driver. In Windows operating systems this is a DLL (Dynamic Link Library) and in Linux operating systems an SO (Dynamic Shared Object). PCAN-Basic is designed to be cross-operating system compatible. Software projects can be ported between supported systems with little effort.

With the installation of the device driver package under Windows the DLL files of the API PCAN-Basic are placed in the system folder. Examples for all common programming languages as well as libraries and help files are available as download package at: www.peak-system.com/quick/DL-Develop-E

For Linux a download of the API is available under this link. For a use of PCAN-Basic another driver package with chardev driver is needed, because an access under SocketCAN is not possible. The "Driver Package for Proprietary Purposes", the user manual, and further information about the implementation can be found at www.peak-system.com/linux

6.1 Features of PCAN-Basic

- Thread-safe API for developing applications with CAN and CAN FD connections
- Supports CAN specifications ISO 11898-1 for CAN and CAN FD
- Supports the operating systems:
 - Windows® 11 (64 bit), 10 (32/64 bit)
 - Linux (32/64-bit)
- Multiple PEAK-System applications and your own can be operated on a physical channel at the same time
- Single DLL (Win) / SO (Linux) for all supported hardware types
- Use of up to 16 channels for each hardware type
- Simple switching between channels
- Access to the CAN channels of a PCAN-Gateway via the PCAN-LAN device type
- Driver-internal buffering under Windows of up to 32,768 CAN messages per CAN channel
- Precision of time stamps on received messages up to 1 μ s (depending on the PEAK CAN interface used)
- Supports PEAK-System's trace formats v1.1 for CAN and v2.0 for CAN FD applications
- Access to specific hardware parameters, such as Listen-only mode
- Notification of the application through Windows events when a message is received
- Support of CAN error frames
- Confirmation of physical transmission by CAN echo frames
- Extended system for debugging operations

- Multilingual debugging output
- Output language depends on operating systems
- Debugging information can be defined individually

6.2 Principle Description of the API

The sequence of accessing the CAN interface is divided into three phases:

Initialization

A CAN channel must be initialized before using it. This is done by the simple call of the function `CAN_Initialize` for CAN and `CAN_InitializeFD` for CAN FD. Per CAN interface type the API allows the simultaneous use of up to 16 CAN channels. After a successful initialization the CAN channel is ready. No further configuration steps are required.

Interaction

For receiving and transmitting messages the functions `CAN_Read` and `CAN_Write` as well as `CAN_ReadFD` and `CAN_WriteFD` are available depending on the initialization mode. Additional settings can be made, such as setting up message filters to confine to specific CAN IDs or setting the CAN controller to Listen-only mode.

For the receiving CAN messages, events can be configured for automatic notification of an application (client). This offers the following advantages:

- The application no longer needs to check for received messages periodically (no polling).
- The response time at reception is reduced.

Completion

To end the communication the function `CAN_Uninitialize` is called in order to release the reserved resources for the CAN channel, among others. In addition the CAN channel is marked as "Free" and is available to other applications.

7 Technical Specifications

Connectors

Computer	PCI Express x1 (1 Lane); electromechanical specification 2.x
CAN	D-Sub (m), 9 pins, pin assignment according to specification CiA® 303-1

CAN

Protocols on OSI layer 2	CAN FD ISO 11898-1:2015, CAN FD non-ISO, CAN 2.0
Physical transmission, OSI layer 1	ISO 11898-2 (High-speed CAN)
CAN bit rates	25 kbit/s to 1 Mbit/s
CAN FD bit rates	25 kbit/s to 12 Mbit/s
Controller	FPGA implementation
Transceiver	NXP TJA1044GT
Time stamp resolution	1 µs
Galvanic isolation	up to 500 V, separate for each CAN connection
Supplying external devices	D-Sub pin 1; 5 V, max. 50 mA, disabled at delivery
Daisy Chain (only IPEH-004040)	via solder bridges, disabled at delivery
Internal termination	via solder bridges, disabled at delivery

Power supply

Max. current consumption at 3.3 V pin without power supply for external devices	Single Channel	200 mA
	Double Channel	200 mA
	Quad Channel	200 mA
Max. current consumption at 12 V pin without power supply for external devices	Single Channel	50 mA
	Double Channel	70 mA
	Quad Channel	100 mA

Measures

Size (PCB H x W)	99,5 x 100 mm	
Weight	Single Channel	55 g
	Double Channel	66 g
	Quad Channel	73 g
	Quad Channel slot bracket	40 g

Environment

Operating temperature	-40 to +85 °C / -40 to +185 °F
Temperature for storage and transport	-40 to +125 °C / -40 to +257 °F
Relative humidity	15 to 90 %, not condensing

Conformity

RoHS	EU Directive 2011/65/EU (RoHS 2) + 2015/863/EU DIN EN IEC 63000:2019-05; VDE 0042-12:2019-05
EMC	EU Directive 2014/30/EU DIN EN 55024:2016-05; VDE 0878-24:2016-05 DIN EN 55032:2016-02; VDE 0878-32:2016-02

Appendix A CE Certificate

EU Declaration of Conformity



This declaration applies to the following product:

Product name: PCAN-PCI Express FD
Item number(s): IPEH-004026/27/40
Manufacturer: PEAK-System Technik GmbH
Otto-Roehm-Strasse 69
64293 Darmstadt
Germany

CE We declare under our sole responsibility that the mentioned product is in conformity with the following directives and the affiliated harmonized standards:

EU Directive 2011/65/EU (RoHS 2) + 2015/863/EU (amended list of restricted substances)

DIN EN IEC 63000:2019-05;VDE 0042-12:2019-05

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (IEC 63000:2016); German version EN 63000:2018

EU Directive 2014/30/EU (Electromagnetic Compatibility)

DIN EN 55024:2016-05;VDE 0878-24:2016-05

Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010 + Cor.:2011 + A1:2015); German version EN 55024:2010 + A1:2015

DIN EN 55032:2016-02;VDE 0878-32:2016-02

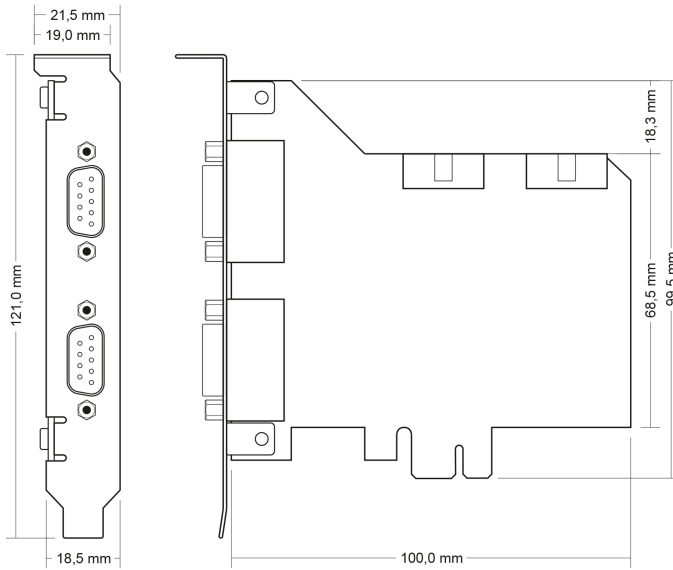
Electromagnetic compatibility of multimedia equipment - Emission Requirements (CISPR 32:2015); German version EN 55032:2015

Darmstadt, 30 August 2021

A handwritten signature in black ink, appearing to read "Uwe Wilhelm".

Uwe Wilhelm, Managing Director

Appendix B Dimension Drawing



PCAN-PCI Express FD Quad Channel

Appendix C Quick Reference

Software/Hardware Installation under Windows

Download the device drivers installation package from our website www.peak-system.com/quick/DL-Driver-E. Install the driver before you install the CAN interface.

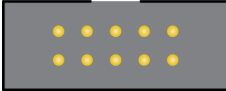
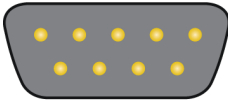
Turn off the computer and insert the card into an available PCI Express slot.

The new hardware is detected at the next Windows start and the driver is initialized. Check the operational readiness. Open the Windows Start menu. Type *Peak Settings* and press . The window *PEAK settings* appears. The connected CAN interface is displayed under *CAN Hardware*.

Getting Started under Windows

Run the CAN monitor PCAN-View from the Windows Start menu as a sample application for accessing the CAN interface. For initialization of the CAN interface select the desired CAN channel and CAN bit rate.

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

10-pin connector on the plug-in card	D-Sub plug, CAN 1 to 4	
9 7 5 3 1	1 2 3 4 5	
		
10 8 6 4 2	6 7 8 9	Assignment
1	1	+5 V (optional)
2	6	CAN_GND
3	2	CAN_Low
4	7	CAN_High
5	3	CAN_GND
6, 7, 8, 9, 10	4, 5, 8, 9	None

Appendix D Linux

Depending on the Kernel version, device drivers for the CAN interfaces from PEAK-System are already included in the operating system. The CAN interfaces are treated as network devices (SocketCAN, netdev). You can find the documentation for SocketCAN under: <https://www.kernel.org/doc/Documentation/networking/can.txt>

The command `grep PEAK_ /boot/config-`uname -r`` lists the available drivers. The following table shows the PCAN-Interfaces and from which kernel version they are supported.

PCAN-Interface			Kernel version
PCAN-PCI	PCAN-PCI Express	PCAN-miniPCI	≥ 3.2
PCAN-PC/104-Plus	PCAN-PCI/104-Express		
PCAN-USB	PCAN-USB Pro	PCAN-ExpressCard	≥ 3.4
PCAN-PCI Express	PCAN-miniPCle		≥ 3.7
PCAN-PCI/104-Express			≥ 3.7
PCAN-USB FD	PCAN-USB Pro FD		≥ 4.0
PCAN-Chip USB			≥ 4.11
PCAN-PCI Express FD			≥ 4.12
PCAN-PCI/104-Express FD	PCAN-miniPCle FD	PCAN-Chip PCle FD	≥ 4.12
PCAN-M.2			
PCAN-Chip PCle			≥ 4.3
PCAN-USB X6			≥ 4.9

Whether the required driver for the PCAN-Interface is present and loaded can be checked with the following command: `lsmod | grep ^peak check`. If the initialization was successful, the response line starts with `peak_usb` or `peak_pci`.

If the required drivers are not listed, install the "Driver Package for Proprietary Purposes". The download, the user manual for the driver, and the corresponding "Implementation Details" can be found under: www.peak-system.com/linux

This driver package is also needed to use the APIs based on the chardev driver, for example PCAN-Basic, libpcan, or libpcanfd.