



Kvaser PCIEcan 4xCAN v2 User's Guide



Copyright 2023-2024 Kvaser AB, Mölndal, Sweden
<https://www.kvaser.com>

Printed Wednesday 18th September, 2024

We believe that the information contained herein was accurate in all respects at the time of printing. Kvaser AB cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by Kvaser AB.

(This page is intentionally left blank.)

Contents

| | | |
|----------|---|-----------|
| 1 | About this manual | 4 |
| 2 | Introduction | 5 |
| 2.1 | Welcome to Kvaser PCIEcan 4xCAN v2 | 5 |
| 2.2 | Major features | 6 |
| 2.3 | Interface | 6 |
| 2.4 | Additional software and documentation | 6 |
| 3 | Kvaser PCIEcan 4xCAN v2 hardware | 7 |
| 3.1 | Hardware installation | 7 |
| 3.2 | CAN channels | 7 |
| 3.3 | Power supply | 7 |
| 3.4 | LED Indicators | 7 |
| 3.5 | Troubleshooting | 8 |
| 4 | Appendices | 9 |
| 4.1 | Technical data | 9 |
| 4.2 | CAN connectors | 9 |
| 4.3 | CAN bus termination | 11 |
| 4.4 | Updating the firmware | 11 |
| 5 | Safety Instructions | 13 |
| 5.1 | Intended Use | 13 |
| 5.2 | Usage Warning | 13 |
| 6 | Disposal and Recycling Information | 14 |
| 7 | Legal acknowledgements | 16 |
| 7.1 | EU Regulatory Compliance | 16 |
| 7.2 | FCC Regulatory Compliance | 17 |
| 7.3 | Patents, Copyrights and Trademarks | 18 |
| 8 | Document Revision History | 19 |

1 About this manual

This manual is intended for Kvaser PCIEcan 4xCAN v2 users. This document contains a description of the hardware's properties and general instructions for connecting the device to a computer.

2 Introduction

This section will describe the functions and features of the Kvaser PCIEcan 4xCAN v2.

2.1 Welcome to Kvaser PCIEcan 4xCAN v2

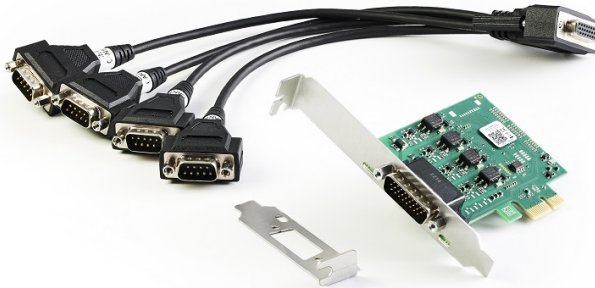


Figure 1: Kvaser PCIEcan 4xCAN v2

Kvaser PCIEcan 4xCAN v2 is a small, yet advanced, CAN multi channel real time CAN interface that handles transmission and reception of standard and extended CAN messages on the bus with a high time stamp precision. It is compatible with applications that use Kvaser's CANlib.

This guide applies to Kvaser PCIEcan 4xCAN v2 devices using at least firmware and driver versions listed in Table 1. For minimum compatible firmware and driver versions of Kvaser PCIEcan 4xCAN v2 see Table 4 on Page 12.

| Device | Product Number | Firmware | Driver (Windows/Linux) |
|-------------------------|------------------|----------|------------------------|
| Kvaser PCIEcan 4xCAN v2 | 73-30130-01414-5 | v1.0 | v5.43 (kcanf/kvpciefd) |

Table 1: Firmware and driver versions needed to support all functionality present in this guide.

2.2 Major features

- PCI Express CAN interface.
- Supports CAN FD, up to 8 Mbit/s.
- Quick and easy plug-and-play installation.
- Supports both 11-bit (CAN 2.0A) and 29-bit (CAN 2.0B active) identifiers.
- 100 % compatible with applications written for other Kvaser CAN hardware with Kvaser CANlib.
- High-speed CAN connection (compliant with ISO 11898-2), up to 1 Mbit /s.
- Fully compatible with J1939, CANopen, NMEA 2000® and DeviceNet.
- Supports silent mode for analysis tools – listen to the bus without interfering.
- Supports simultaneous usage of multiple Kvaser interfaces.
- Low profile board, includes low and high profile brackets.
- Support for SocketCAN.
- Includes 4 channel breakout cable.

2.3 Interface

Kvaser PCIEcan 4xCAN v2 provides a CAN bus interface through a standard PCI Express x1 interface.

2.4 Additional software and documentation

The Kvaser CANlib SDK includes everything you need in order to develop software applications interacting with Kvaser CAN and LIN hardware. The SDK contains full documentation and many sample programs, written in C, C++, C#, Delphi, Python and Visual Basic. Kvaser CAN and LIN hardware is built around the same common software API. Applications developed using one device type will run without modification on other device types.

The latest versions of documentation, software and drivers can be downloaded for free at www.kvaser.com/download.

3 Kvaser PCIEcan 4xCAN v2 hardware

In this section you can read more about the CAN channels, power supply and LED indicators.

3.1 Hardware installation

The Kvaser PCIEcan 4xCAN v2 may be inserted in any free PCI Express slot on the host computer. You do need to switch the power off before inserting or removing the device.

3.2 CAN channels

The Kvaser PCIEcan 4xCAN v2 has four CAN channels in a single 26-pin HD D-SUB CAN connector (see Figure 2). See Section 4.2, CAN connectors, on Page 9 for pinout information.



Figure 2: CAN connector on Kvaser PCIEcan 4xCAN v2

3.3 Power supply

The Kvaser PCIEcan 4xCAN v2 is powered from the PCI Express connector.

3.4 LED Indicators

The Kvaser PCIEcan 4xCAN v2 has four yellow LED indicators, one for each channel. The LEDs indicate the bus state (on/off) with a steady light for on and no light for off.

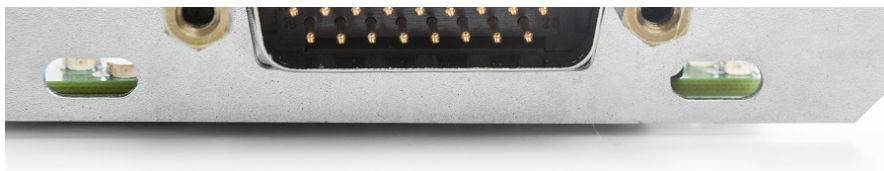


Figure 3: LEDs on the Kvaser PCIEcan 4xCAN v2.

3.5 Troubleshooting

Use “Kvaser Device Guide” in the Control Panel to verify that the computer can communicate with the Kvaser PCIEcan 4xCAN v2. If the firmware version shown is all zeros, there are communication problems.

4 Appendices

In this section you will find technical information about the Kvaser PCIEcan 4xCAN v2 and its connectors.

4.1 Technical data

In Table 2 below you will find the technical specifications of Kvaser PCIEcan 4xCAN v2.

| | |
|------------------------|--|
| CAN Channels | 4 |
| CAN Transceivers | MCP2561FD (Compliant with ISO 11898-2) |
| CAN Controller | Kvaser CAN IP in FPGA |
| Galvanic isolation | Yes |
| CAN Bit Rate | 20 kbit/s to 1 Mbit/s |
| CAN FD Bit Rate | Up to 8 Mbit/s |
| Time stamp resolution | 1 μ s |
| Max message rate | 20000 msg/s per channel |
| Error Frame Detection | Yes |
| Error Frame Generation | Yes |
| Silent mode | Yes |
| Kvaser t programming | No |
| Kvaser CANtegrity | No |
| Power consumption | Typically 700 mW idle plus max 150 mW per channel, i.e. max 1300 mW for a four channel interface. Only uses 3.3 V. |
| Host interface | PCI Express |
| Host OS | Windows (7 or later), Linux. |
| Hardware configuration | Done by software. |
| Dimensions | Low profile, 86 x 69 mm |
| Weight | 50 g (200g including HD26-4DS9 Splitter) |
| Operating temperature | -40 °C to +85 °C |
| Storage temperature | -40 °C to +85 °C |
| Relative humidity | 0 % to 85 % (non-condensing.) |

Table 2: Technical Specifications.

4.2 CAN connectors

Kvaser PCIEcan 4xCAN v2 devices that use the 26-pin HD D-SUB connector (see Figure 4 on Page 10) have the pinning described in Table 3 on Page 10. This table also describes how the HD26-4xDS9 splitter (see Figure 6 on Page 11) connects to four separate 9-pin D-SUB connectors, CAN 1 to CAN 4.

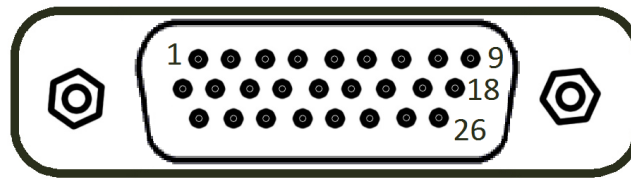


Figure 4: The male 26 pin HD D-SUB connector pin numbers

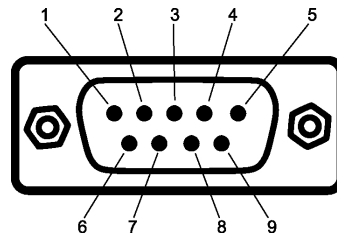


Figure 5: The male D-SUB 9 connector pin numbers

| HD D-SUB | CAN 1 | CAN 2 | CAN 3 | CAN 4 | Function |
|----------|-------|-------|-------|-------|-------------------------------------|
| 1 | 2 | | | | CAN_L channel 1 |
| 2 | | 2 | | | CAN_L channel 2 |
| 3 | | | 2 | | CAN_L channel 3 |
| 4 | | | | 2 | CAN_L channel 4 |
| 5 | | | | | Not connected |
| 6 | | | | | Not connected |
| 7 | | | | | Not connected |
| 8 | 4 | | | | Not used by Kvaser PCIEcan 4xCAN v2 |
| 9 | | | | | Not connected |
| 10 | 9 | | | | Not used |
| 11 | 7 | | | | CAN_H channel 1 |
| 12 | | 7 | | | CAN_H channel 2 |
| 13 | | | 7 | | CAN_H channel 3 |
| 14 | | | | 7 | CAN_H channel 4 |
| 15 | | | | | Not connected |
| 16 | | | | | Not connected |
| 17 | | | | | Not connected |
| 18 | | 4 | | | Not used by Kvaser PCIEcan 4xCAN v2 |
| 19 | 3 | | | | GND channel 1 |
| 20 | | 3 | | | GND channel 2 |
| 21 | | | 3 | | GND channel 3 |
| 22 | | | | 3 | GND channel 4 |
| 23 | | | | | Not connected |
| 24 | | | | | Not connected |
| 25 | | | | | Not connected |
| 26 | | | | | Not connected |

Table 3: Pin configuration of the 26-pin HD D-SUB (and HD26-4xDS9 splitter)



Figure 6: The HD26-4xDS9 Splitter

4.3 CAN bus termination

Every CAN bus must be terminated with a 120 Ohm resistor at each end of the bus. The Kvaser PCIEcan 4xCAN v2 does not contain any CAN bus termination, because their inclusion could cause severe disturbance in a system which is already correctly terminated.

For laboratory or testing use, the exact value of the termination resistors is not always critical. Sometimes a single terminator is sufficient. For production, proper termination is essential. If you see error frames on the bus, you should check the termination.



To save yourself a lot of trouble, always terminate the CAN bus properly.

4.4 Updating the firmware

For the Kvaser PCIEcan 4xCAN v2 to communicate with the host computer, compatible versions of the Kvaser CANlib (including driver) and firmware or SocketCAN Device Drivers must be installed.

The latest versions of firmware and drivers can be downloaded for free at www.kvaser.com/download.

Connect the Kvaser PCIEcan 4xCAN v2 to your host computer.

For Linux based operating systems, instructions for how to update the firmware when using Kvaser CANlib can be found in the README in the kvflash directory. The corresponding instructions for SocketCAN are found in the kvflash-mmap directory. Read and follow the README carefully. Note: when updating PCIEcan, a complete shutdown of the computer is required in order to power cycle the device.

Use the example utility 'listChannels' in Kvaser CANlib to check the current firmware version.

If your computer is running Windows, start the update.exe application. A window opens showing the Firmware Update Instructions; read and follow those carefully.

To check the current firmware version for a computer running Windows, open "Kvaser Device Guide" which can be found in the Control Panel. Select "Kvaser PCIEcan 4xCAN v2" in the tree view to the left, and click on the channel. The firmware revision information now appears in the right half of the window.

The absolute minimum firmware and driver versions needed in order to use Kvaser PCIEcan 4xCAN v2 are listed in Table 4.

| Device | Min. Firmware Version | Min. Driver Version |
|-------------------------|-----------------------|---------------------|
| Kvaser PCIEcan 4xCAN v2 | v1.0 | v5.41 |

Table 4: Minimum compatible driver and firmware versions of Kvaser PCIEcan 4xCAN v2.

5 Safety Instructions

5.1 Intended Use

Kvaser interfaces are used to connect computer systems to CAN buses. The Kvaser PCIEcan 4xCAN v2 is intended for connection to a computer via an available PCI Express slot.

5.2 Usage Warning



WARNING FOR ALL USERS

WARNING! - YOUR USE OF THIS DEVICE MUST BE DONE WITH CAUTION AND A FULL UNDERSTANDING OF THE RISKS!

THIS WARNING IS PRESENTED TO INFORM YOU THAT THE OPERATION OF THIS DEVICE MAY BE DANGEROUS. YOUR ACTIONS CAN INFLUENCE THE BEHAVIOR OF A CAN-BASED DISTRIBUTED EMBEDDED SYSTEM, AND DEPENDING ON THE APPLICATION, THE CONSEQUENCES OF YOUR IMPROPER ACTIONS COULD CAUSE SERIOUS OPERATIONAL MALFUNCTION, LOSS OF INFORMATION, DAMAGE TO EQUIPMENT, AND PHYSICAL INJURY TO YOURSELF AND OTHERS. A POTENTIALLY HAZARDOUS OPERATING CONDITION IS PRESENT WHEN THE FOLLOWING TWO CONDITIONS ARE CONCURRENTLY TRUE: THE PRODUCT IS PHYSICALLY INTERCONNECTED TO A REAL DISTRIBUTED EMBEDDED SYSTEM; AND THE FUNCTIONS AND OPERATIONS OF THE REAL DISTRIBUTED EMBEDDED SYSTEM ARE CONTROLLABLE OR INFLUENCED BY THE USE OF THE CAN NETWORK. A POTENTIALLY HAZARDOUS OPERATING CONDITION MAY RESULT FROM THE ACTIVITY OR NON-ACTIVITY OF SOME DISTRIBUTED EMBEDDED SYSTEM FUNCTIONS AND OPERATIONS, WHICH MAY RESULT IN SERIOUS PHYSICAL HARM OR DEATH OR CAUSE DAMAGE TO EQUIPMENT, DEVICES, OR THE SURROUNDING ENVIRONMENT.

WITH THIS DEVICE, YOU MAY POTENTIALLY:

- CAUSE A CHANGE IN THE OPERATION OF THE SYSTEM, MODULE, DEVICE, CIRCUIT, OR OUTPUT.
- TURN ON OR ACTIVATE A MODULE, DEVICE, CIRCUIT, OUTPUT, OR FUNCTION.
- TURN OFF OR DEACTIVATE A MODULE, DEVICE, CIRCUIT, OUTPUT, OR FUNCTION.
- INHIBIT, TURN OFF, OR DEACTIVATE NORMAL OPERATION.
- MODIFY THE BEHAVIOR OF A DISTRIBUTED PRODUCT.
- ACTIVATE AN UNINTENDED OPERATION.
- PLACE THE SYSTEM, MODULE, DEVICE, CIRCUIT, OR OUTPUT INTO AN UNINTENDED MODE.

ONLY THOSE PERSONS WHO:

- (A) ARE PROPERLY TRAINED AND QUALIFIED WITH RESPECT TO THE USE OF THE DEVICE,
- (B) UNDERSTAND THE WARNINGS ABOVE, AND
- (C) UNDERSTAND HOW THIS DEVICE INTERACTS WITH AND IMPACTS THE FUNCTION AND SAFETY OF OTHER PRODUCTS IN A DISTRIBUTED SYSTEM AND THE APPLICATION FOR WHICH THIS DEVICE WILL BE APPLIED, MAY USE THE DEVICE.

PLEASE NOTE THAT YOU CAN INTEGRATE THIS PRODUCT AS A SUBSYSTEM INTO HIGHER-LEVEL SYSTEMS. IN CASE YOU DO SO, KVASER AB HEREBY DECLARES THAT KVASER AB'S WARRANTY SHALL BE LIMITED TO THE CORRECTION OF DEFECTS, AND KVASER AB HEREBY EXPRESSLY DISCLAIMS ANY LIABILITY OVER AND ABOVE THE REFUNDING OF THE PRICE PAID FOR THIS DEVICE, SINCE KVASER AB DOES NOT HAVE ANY INFLUENCE ON THE IMPLEMENTATIONS OF THE HIGHER-LEVEL SYSTEM, WHICH MAY BE DEFECTIVE.

6 Disposal and Recycling Information



When this product reaches its end of life, please dispose of it according to your local environmental laws and guidelines.

For information about Kvaser's recycling programs, visit:
<https://www.kvaser.com/en/kvaser/recycling-policy.html>

7 Legal acknowledgements

7.1 EU Regulatory Compliance



EU Declaration of Conformity (DoC)

We

| | | | |
|-----------------|---------------|-------------------|------------------|
| Company Name: | Kvaser AB | City: | Mölndal |
| Postal address: | Aminogatan 25 | Telephone number: | +46 31 886344 |
| Postcode: | 431 53 | E-mail address: | sales@kvaser.com |

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Product: Kvaser PCIEcan 4xCAN v2

Object of the declaration (identification of apparatus allowing traceability):

Product: Kvaser PCIEcan 4xCAN v2

Type: 73-30130-01414-5

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Electromagnetic Compatibility (EMC) Directive 2014/30/EU (Art. 6)

RoHS recast Directive 2011/65/EU (Art. 4.1)

The following harmonised standards and technical specifications have been applied

(title, date of standard/specification):

EN 55032 (2015 + A11:2020)

EN 55035 (2017 + A11:2020)

EN 61000-6-2 (2019)

EN 61000-6-3 (2007 + A1:2011)

EN IEC 63000 (2018)


Signed for and on behalf of:

Mölndal

2022-11-17

Place of issue

Date of issue


Kent Lennartsson, Research Manager

7.2 FCC Regulatory Compliance



Federal Communications Commission (FCC) Compliance Information Statement

IDENTIFICATION OBJECT:

Product: Kvaser PCIEcan 4xCAN v2

Type: 73-30130-01414-5

APPLICABLE COMPLIANCE STATEMENTS:

CFR Title 47 Part 15 §15.107, §15.109

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

RESPONSIBLE PARTY (IN USA) NAME:

Kvaser Inc.

23881 Via Fabricante, Suite 503

Mission Viejo, CA 92691

Internet contact: support@kvaser.com

7.3 Patents, Copyrights and Trademarks

All trademarks are the property of their respective owner. Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

Adobe, the Adobe logo, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

MagiSync is a trademark of Kvaser AB.

DeviceNet is a trademark of Open DeviceNet Vendor Association, Inc.

NMEA 2000 is the registered trademark of the National Marine Electronics Association, Inc.

For information about Kvaser related CAN patents, see www.kvaser.com/patent.

8 Document Revision History

Version history for document UG_98253_pciecan_4xcan_v2:

| Revision | Date | Changes |
|----------|------------|---|
| 1.0 | 2023-02-06 | Initial version. |
| 1.1 | 2023-08-30 | Updated corresponding driver version in the Introduction section. |
| 1.2 | 2024-01-23 | Added firmware update instructions for Linux based operating systems. |
| 1.3 | 2024-03-15 | Updated Kvaser logo. |