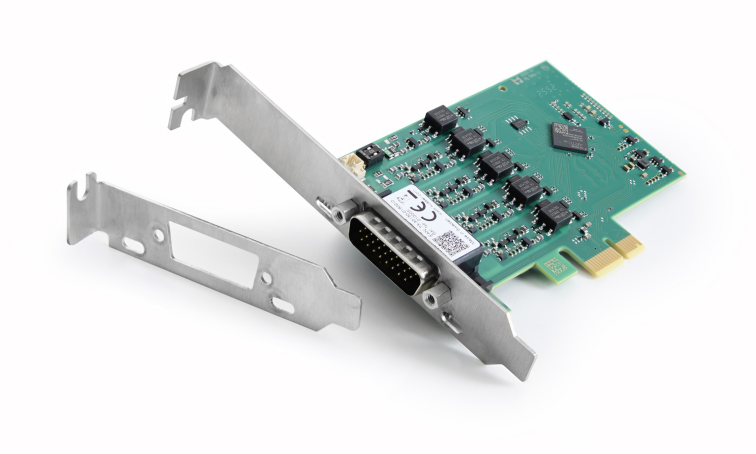
Kvaser PCIe 4xLIN User's Guide



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https://www.kvaser.com

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1 About this manual

This manual is intended for Kvaser PCIe 4xLIN 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 PCIe 4xLIN.

2.1 Welcome to Kvaser PCIe 4xLIN

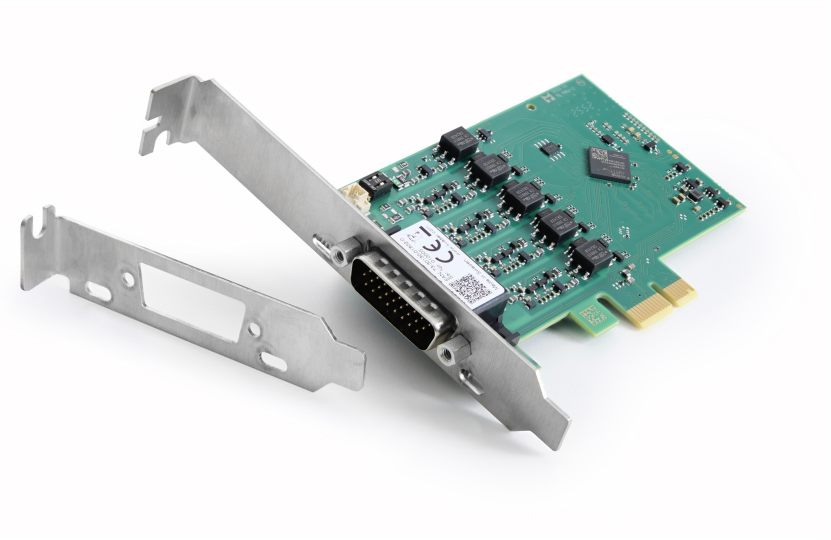

Figure 1: Kvaser PCIe 4xLIN

Kvaser PCIe 4xLIN is a small, yet advanced, LIN multi channel real time LIN interface that handles transmission and reception of LIN messages on the bus with a high time stamp precision. It is compatible with applications that use Kvaser's LINlib.

This guide applies to Kvaser PCIe 4xLIN devices using at least firmware and driver versions listed in Table 1. For minimum compatible firmware and driver versions of Kvaser PCIe 4xLIN see Table 4 on Page 9.

Device	Product Number	Firmware	Driver (Windows/Linux)
Kvaser PCIe 4xLIN	73-30130-01802-0	v1.0	v5.52 (kcanf/kvpciefd)

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

2.2 Major features

- PCI Express LIN interface.
- Supports LIN, up to 20 kbaud.
- Four fully featured, time-synchronized, individually galvanically isolated LIN channels utilizing Kvaser LIN-IP implemented in FPGA.
- Quick and easy plug-and-play installation.
- 100 % compatible with applications written for other Kvaser LIN hardware with Kvaser LINlib.
- Supports simultaneous usage of multiple Kvaser interfaces.
- Kvaser software-based TimeSync – time synchronization with a host-referenced clock source (see Section 3.8, Software-based TimeSync, on Page 11 for more details).
- Low-profile PCI Express card.
- A longer and shorter bracket are included to fit different computer cases.

2.3 Interface

Kvaser PCIe 4xLIN provides a LIN 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 PCIe 4xLIN hardware

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

3.1 Hardware installation

The Kvaser PCIe 4xLIN may be inserted in any free PCI Express slot on the host computer. Ensure the computer is powered off before inserting or removing the device.

3.2 LIN channels

The Kvaser PCIe 4xLIN has four LIN channels in total. These are distributed over a 26-pin HD D-SUB LIN connector (see Figure 2). See Section 3.7, LIN connectors, on Page 10 for pinout information.



Figure 2: LIN connectors on Kvaser PCIe 4xLIN

3.3 Power supply

The Kvaser PCIe 4xLIN is powered from the PCI Express connector.

3.4 LED Indicators

The Kvaser PCIe 4xLIN has five LED indicators, four yellow LEDs at the front of the card and one green LED at the rear of the card. For details on the LED indications, see Figure 3 on Page 8 and Table 2 on Page 8, and Figure 4 on Page 8 and Table 3 on Page 9.

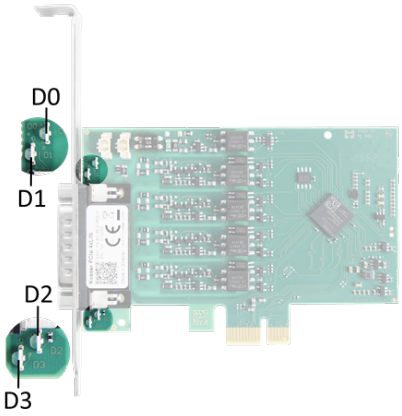

Figure 3: Yellow LEDs on the Kvaser PCIe 4xLIN, labeled as D0-D3.

State	Description	Affected LEDs	LED Pattern	Color
Bus on	The bus is on for the corresponding channel	At least one of D0-D3	Solid	Yellow
Bus off	The bus is off for the corresponding channel	At least one of D0-D3	No light	-
Recovery mode	The device is in recovery mode after a severe error. Please contact Kvaser support.	D0-D3	Blinking at 3 Hz	Yellow

Table 2: States for the yellow LED indicators on the Kvaser PCIe 4xLIN.

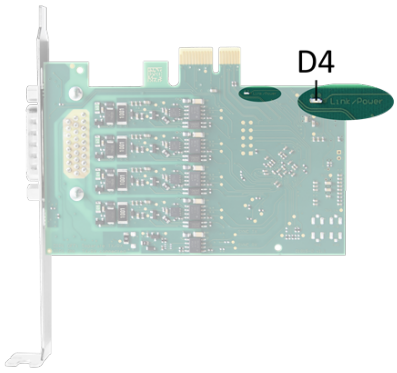

Figure 4: Green LED on the Kvaser PCIe 4xLIN, labeled as D4.

State	Description	Affected LEDs	LED Pattern	Color
Power on	Device power status	D4	Solid	Green
PCI Express communication established	PCI Express communication with the host system is established	D4	Blinking at 1 Hz	Green

Table 3: States for the green LED indicator on the Kvaser PCIe 4xLIN.

3.5 Updating the firmware

For the Kvaser PCIe 4xLIN 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 PCIe 4xLIN 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 PCIe 4xLIN" 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 PCIe 4xLIN are listed in Table 4.

Device	Min. Firmware Version	Min. Driver Version
Kvaser PCIe 4xLIN	v1.0	v5.52

Table 4: Minimum compatible driver and firmware versions of Kvaser PCIe 4xLIN.

3.6 Technical data

In Table 5 on Page 10 below you will find the technical specifications of Kvaser PCIe 4xLIN.

LIN Channels	4
LIN Connector	26-pin HD D-SUB
LIN Transceivers	TLIN2027-Q1
LIN Controller	Kvaser LIN IP in FPGA
Galvanic isolation	Yes
LIN Bit Rate	Up to 20 kbaud
Time stamp resolution	1 µs
Error Frame Detection	No
Error Frame Generation	No
Silent mode	No
Kvaser t programming	No
Kvaser CANtegrity	No
Power consumption	Typically 3 W.
Host interface	PCI Express
Host OS	Windows (10 or later), Linux.
Hardware configuration	Done by software.
Dimensions	68 x 100 mm
Weight with long bracket	56 g
Weight with short bracket	50 g
Operating temperature	−40 °C to +85 °C
Storage temperature	−40 °C to +85 °C
Relative humidity	0 % to 85 % (non-condensing.)

Table 5: Technical Specifications.

3.7 LIN connectors

Kvaser PCIe 4xLIN devices have one 26-pin HD D-SUB connector with four channels. A Kvaser Cable Sync HD26-5xDB9, 73-30130-01817-4, can be used to connect to five separate 9-pin D-SUB connectors, four connectors with one channel each and one connector for the hardware sync port. The pin configuration of the 26-pin HD D-SUB connector is shown in Table 6 on Page 11.

HD D-SUB	Channel	Function
1		Reserved
2		Reserved
3		Reserved
4		Reserved
5		Reserved
6	2	VREF channel 2
7		Sync in
8		Reserved
9		Reserved
10	1	VREF channel 1
11	1	LIN channel 1
12	2	LIN channel 2
13	3	LIN channel 3
14	4	LIN channel 4
15		Reserved
16		Sync out
17	3	VREF channel 3
18		Not connected
19	1	GND channel 1
20	2	GND channel 2
21	3	GND channel 3
22	4	GND channel 4
23		Reserved
24	4	VREF channel 4
25		Reserved
26		GND Sync
Shell		Shield

Table 6: Pin configuration of the 26-pin HD D-SUB

3.8 Software-based TimeSync

Kvaser PCIe 4xLIN supports Kvaser software-based TimeSync. The feature enables the interface onboard clock to be aligned with a host-referenced clock source such that timestamps from events and messages are consistent and comparable across devices referencing the same clock source.

For detailed configuration and usage, see Section 3.8.1 Kvaser Timesync Details.

3.8.1 Kvaser Timesync Details

Software-based TimeSync is supported through Linux PTP. The driver exposes a device PTP Hardware Clock (PHC) as `/dev/ptpX` in Linux. This PHC can be disciplined to a clock source using, e.g., `phc2sys`. Drift correction is handled by `phc2sys`, the default servo update interval can typically be set to 1 second.

The software path is: Clock source -> phc2sys -> PHC (/dev/ptpX) -> Driver -> Disciplined timestamps

The driver does not perform drift compensation on its own. Time alignment requires running LinuxPTP user-space tools.

Following is an example of using `phc2sys` to discipline the device's exposed PHC to the host system clock `CLOCK_REALTIME`.

Load the driver and verify that the PHC device exists:

```
ls /dev/ptp*
```

Debug PHC access:

```
sudo phc_ctl -l7 /dev/ptpN
```

Discipline one PHC to host system clock:

```
sudo phc2sys -mq -O0 -s CLOCK_REALTIME -c /dev/ptpN
```

Discipline multiple PHCs to host system clock:

```
sudo phc2sys -mq -O0 -s CLOCK_REALTIME -c /dev/ptpN -c /dev/ptpM
```

Use external PPS/EXTTS reference instead of `CLOCK_REALTIME`:

```
sudo ts2phc -mq -s /dev/ptp1 -c /dev/ptpM
```

3.8.2 Automatic startup configuration

For automatic start when a Kvaser PHC appears, create the following systemd service file:

/etc/systemd/system/kvaser-timesync@.service

```
[Unit]
Description=Synchronize Kvaser device clock %I to system clock
Documentation=man:phc2sys
BindsTo=dev-%i.device
After=dev-%i.device

[Service]
Type=simple
ExecStart=/usr/sbin/phc2sys -O0 -s CLOCK_REALTIME -c /dev/%I
Restart=on-failure

[Install]
WantedBy=multi-user.target
```

And create the udev rules in */etc/udev/rules.d/99-kvaser-ptp.rules*:

```
ACTION=="add", SUBSYSTEM=="ptp", DRIVERS=="kvpciefd",
TAG+="systemd", ENV{SYSTEMD_WANTS}="kvaser-timesync@$kernel.service"
```

For SocketCAN, replace `kvpciefd` with `kvaser_pciefd`.

3.8.3 CANlib considerations

Disable automatic bus-on time zeroing before synchronization (`canIOCTL_SET_BUSON_TIME_AUTO_RESET`). If using CANlib time domains, apply offsets only after clocks are already synchronized.

3.9 LIN bus pull-up requirement

The LIN commander handles the LIN bus pull-up. The Kvaser PCIe 4xLIN requires an external Vref supply on channels operating in commander mode to provide this pull-up. Without external Vref, LIN communication will not work. Channels in responder mode do not connect Vref to the LIN bus; therefore, there is no drawback to leaving Vref supplied to channels in responder mode.



External Vref is needed for LIN commander operation. Without Vref, communication will not function.

4 Troubleshooting

Use "Kvaser Device Guide" in the Control Panel to verify that the computer can communicate with the Kvaser PCIe 4xLIN. If the firmware version shown is all zeros, there are communication problems.

5 Safety Instructions

5.1 Intended Use

Kvaser interfaces are used to connect computer systems to CAN buses. The Kvaser PCIe 4xLIN 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

KVASER **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 PCIe 4xLIN

Object of the declaration (identification of apparatus allowing traceability):
Product: Kvaser PCIe 4xLIN
Type: 73-30130-01802-0

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 IEC 63000 (2018)

Signed for and on behalf of:

Mölndal	2026-03-19	
Place of issue	Date of issue	Kent Lennartsson, Research Manager

7.2 FCC Regulatory Compliance

KVASER

Federal Communications Commission (FCC) Compliance Information Statement

IDENTIFICATION OBJECT:
Product: Kvaser PCIe 4xLIN
Type: 73-30130-01802-0

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

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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_98450_kvaser_pcie_4xlin:

Revision	Date	Changes
1.0	2026-04-28	Initial version.