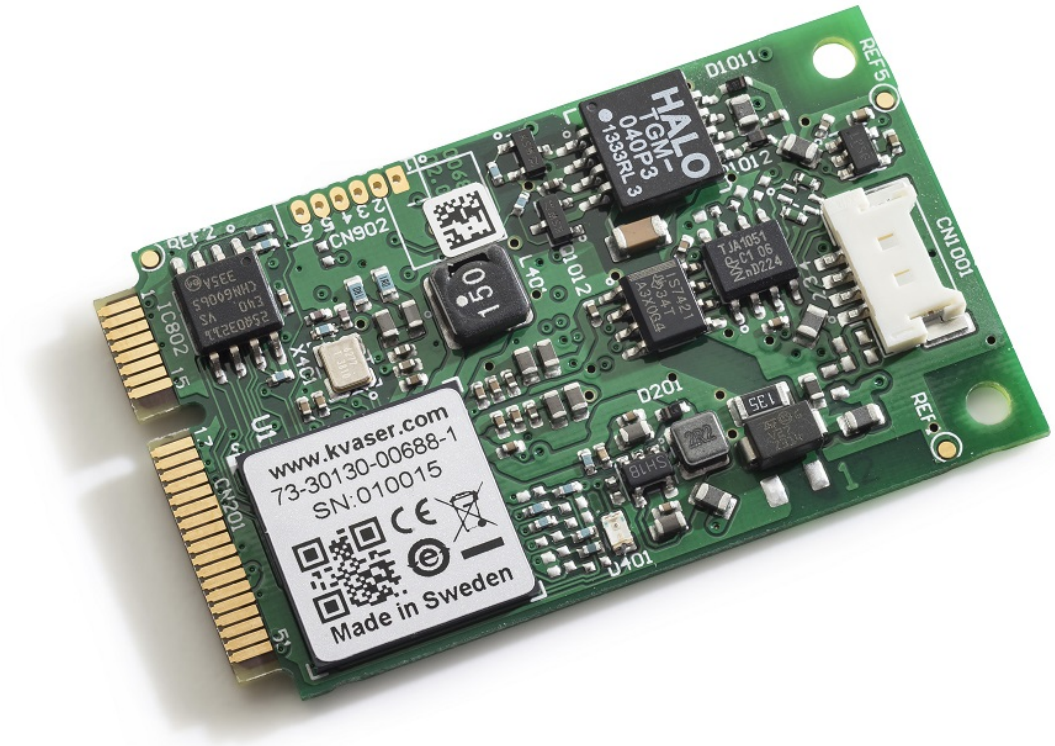
Kvaser Mini PCI Express User's Guide



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https://www.kvaser.com

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1 About this manual

This manual is intended for Kvaser Mini PCI Express users. This manual contains a description of the hardware properties and general instructions for connecting the device to a computer.

2 Introduction

This section will describe the functions and features of the Kvaser Mini PCI Express.

2.1 Welcome to Kvaser Mini PCI Express

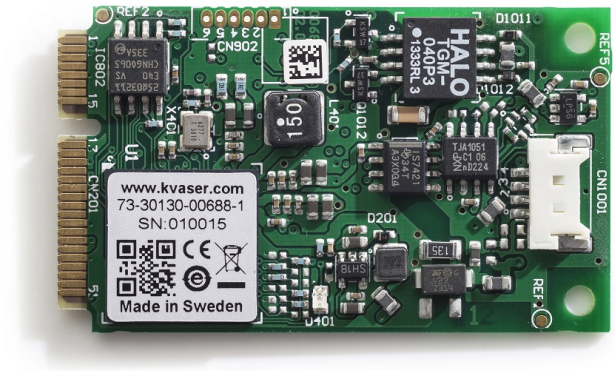

Figure 1: Kvaser Mini PCI Express

The Kvaser Mini PCI Express is a small, yet advanced, CAN interface.

Device	Product Number
Kvaser Mini PCI Express HS	73-30130-00688-1
Kvaser Mini PCI Express 2xHS	73-30130-00743-7

Table 1: Kvaser Mini PCI Express device and EAN number.

Throughout this document, we use the name Kvaser Mini PCI Express to mean any one of the different Kvaser Mini PCI Express products listed in Table 1, unless otherwise noted.

2.2 Major features

- Mini PCI Express CAN interface.
- 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.

2.3 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 Mini PCI Express hardware

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

3.1 Hardware installation

The Kvaser Mini PCI Express may be inserted in any free Mini PCI Express slot on the host computer that supports USB. You do need to switch the power off before inserting or removing the device. For the Kvaser Mini PCI Express to communicate with the host computer, compatible versions of the Kvaser driver and firmware must be used. The firmware is downloaded and installed directly on the Kvaser Mini PCI Express. The driver is installed on the host computer.

The latest version of the drivers, `kvaser_drivers_setup.exe`, and firmware can be downloaded from www.kvaser.com/download.

3.2 Firmware Update

Firmware updates and upgrade instructions can be found at www.kvaser.com/download. Use "Kvaser Device Guide" to see the current firmware version of your Kvaser Mini PCI Express.

3.3 Kvaser Mini PCI Express connection

Figure 2: Kvaser Mini PCI Express

The Kvaser Mini PCI Express is a Card of type F2 (Full-Mini with bottom side keep outs).

3.4 CAN channels

The Kvaser Mini PCI Express HS has one CAN channel and has a 4-pin Molex connector (see Figure 3 on Page 8), the Kvaser Mini PCI Express 2xHS has two CAN channels and a 7-pin Molex connector (see Figure 4 on Page 8). See Section 5.2, CAN connectors, on Page 11 for pinout information.

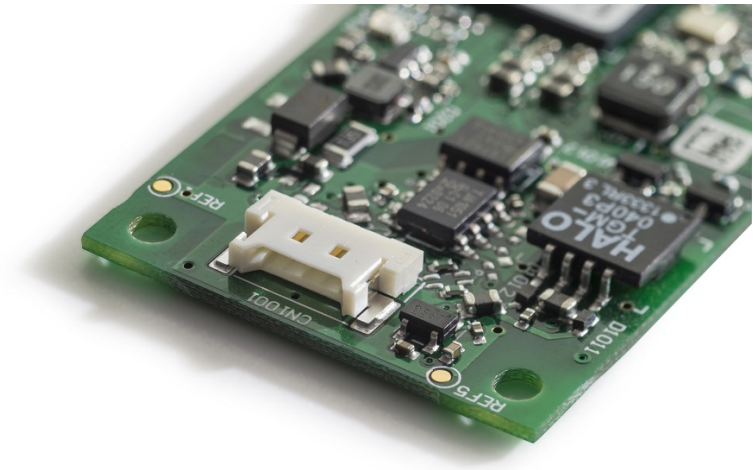

Figure 3: CAN connector on Kvaser Mini PCI Express HS

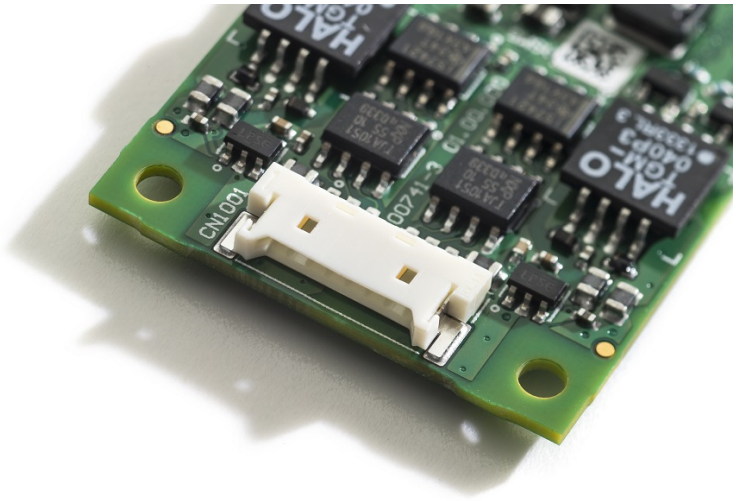

Figure 4: CAN connector on Kvaser Mini PCI Express 2xHS

3.5 Power supply

The Kvaser Mini PCI Express is powered from the Mini PCI Express connector.

3.6 LED indicators

The Kvaser Mini PCI Express has one LED, its functionality is shown in Table 2.

LED	Function	Description
Green	Power	Steady light when unit is powered and working.
	USB configuration	Blinking once every three seconds when something is wrong with the USB connection.
	Firmware	2 Hz flash if something is wrong with the firmware or configuration.

Table 2: LED configuration

4 How to use the Kvaser Mini PCI Express

To use the Kvaser Mini PCI Express as a CAN interface, connect the unit to a free Mini PCI Express slot.

4.1 Troubleshooting

Use "Kvaser Device Guide" in the Control Panel to verify that the computer can communicate with the Kvaser Mini PCI Express. If the firmware version shown is all zeros, there are communication problems. If the LEDs are not flashing or do not light up at all, check the power supply.

5 Appendices

In this section you will find technical information about Kvaser Mini PCI Express and its connectors.

5.1 Technical data

In Table 3 below you will find the Kvaser Mini PCI Express technical specifications.

CAN Channels	1 (Kvaser Mini PCI Express HS), 2 (Kvaser Mini PCI Express 2xHS)
CAN Transceiver	TJA1051T (Compliant with ISO 11898-2)
CAN Controller	Built into the processor
CAN Bit Rate	40 kbit/s up to 1 Mbit/s
Galvanic isolation	Yes
Time stamp resolution	25 µs
Max TX message rate	16000 msg/s per channel
Max RX message rate	20000 msg/s per channel
Error Frame Detection	Yes
Error Frame Generation	No
Silent mode	Yes
Kvaser t programming	No
Kvaser CANtegrity	No
Host interface	Mini PCI Express with USB 2.0.
Host OS	Windows (7 or later), Linux.
Power consumption	Typical values are (@ 3.3 V from Mini PCI Express slot): 180 mA (Kvaser Mini PCI Express HS), 280 mA (Kvaser Mini PCI Express 2xHS)
Hardware configuration	Done by software (Plug & Play).
Weight	6 g excluding cables and connectors.
Operating temperature	−40 °C to +85 °C
Storage temperature	−40 °C to +85 °C
Relative Humidity	0 % to 85 % (non-condensing.)

Table 3: Technical specifications

5.2 CAN connectors

Kvaser Mini PCI Express devices that use the 4-pin Molex connector (53780-0470) have the pinning described in Table 4 on Page 12.

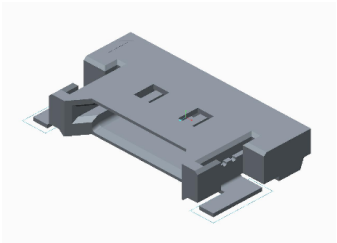

Figure 5: Molex Connector 53780-0470

Molex pin number	D-SUB 9	Function
1	3	GND
2	7	CAN_H
3	2	CAN_L
4	5	Shield

Table 4: Molex pin configuration

Kvaser Mini PCI Express devices that use the 7-pin Molex connector (53780-0770) have the pinning described in Table 5.

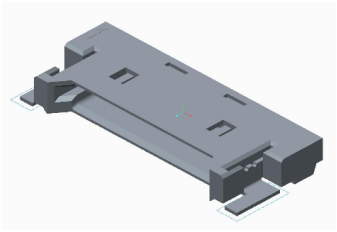

Figure 6: Molex Connector 53780-0770

Molex pin number	Function
1	GND channel 1
2	CAN_L channel 1
3	CAN_H channel 1
4	Shield
5	CAN_L channel 2
6	CAN_H channel 2
7	GND channel 2

Table 5: Molex pin configuration

5.3 CAN bus termination

Every CAN bus must be terminated with a 120 Ohm resistor at each end of the bus. The Kvaser Mini PCI Express 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.

6 Safety Instructions

6.1 Intended Use

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

6.2 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.

7 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

8 Legal acknowledgements

8.1 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 Mini PCI Express HS

Object of the declaration (identification of apparatus allowing traceability):
Product: Kvaser Mini PCI Express HS
Type: 73-30130-00688-1

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 55024 (2010)

EN 55032 (2012)

EN 61000-6-2 (2005)

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

EN 50581 (2012)

Signed for and on behalf of:

Mölndal	2019-12-05	
Place of issue	Date of issue	Claes Haglund, Supply Chain and Quality Director

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 Mini PCI Express 2xHS

Object of the declaration (identification of apparatus allowing traceability):
Product: Kvaser Mini PCI Express 2xHS
Type: 73-30130-00743-7

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

EN 50581 (2012)

Signed for and on behalf of:

Mölndal	2019-12-05	
Place of issue	Date of issue	Claes Haglund, Supply Chain and Quality Director

8.2 FCC Regulatory Compliance

KVASER

Federal Communications Commission (FCC) Compliance Information Statement

IDENTIFICATION OBJECT:
Product: Kvaser Mini PCI Express HS
Type: 73-30130-00688-1

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

KVASER

Federal Communications Commission (FCC) Compliance Information Statement

IDENTIFICATION OBJECT:

Product: Kvaser Mini PCI Express 2xHS
Type: 73-30130-00743-7

APPLICABLE COMPLIANCE STATEMENTS:

CFR Title 47 Part 15 §15.107, §15.109
This device complies with part 15 of the FCC Rules.
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RESPONSIBLE PARTY (IN USA) NAME:

Kvaser Inc.
23881 Via Fabricante, Suite 503
Mission Viejo, CA 92691

Internet contact: support@kvaser.com

8.3 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.

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.

The products described in this document are protected by U.S. patent 5,696,911.

9 Document Revision History

Version history for document UG_98150_kvaser_mini_pci_express:

Revision	Date	Changes
1.0	2013-09-17	Initial version.
2	2014-04-15	Added device 00743-7 2xHS. Changed layout of references, figures.
3	2015-01-08	Minor update.
4	2015-08-11	Minor textual changes.
4.1	2016-02-04	Minor textual changes.
4.2	2017-01-09	Updated compliance text, added link to patents.
5.0	2017-08-25	Updated EU Declaration of Conformity.
5.1	2018-02-02	"Kvaser Device Guide" has replaced "Kvaser Hardware", added DSUB pin numbers to Molex connector.
5.2	2018-08-28	Minor textual changes.
6.0	2018-10-15	Updated EU Regulatory Compliance.
7.0	2019-02-11	Windows Vista or later supported, minor textual changes.
7.1	2019-08-09	Url protocol updated.
7.2	2020-01-27	Added DoC:s and sdoc:s.
7.3	2020-08-19	Updated supported OS.
7.4	2022-04-01	Minor textual changes, added galvanic isolation info to Technical data table.
7.5	2023-02-13	Updated the Technical data table. Added section about intended use. Minor textual changes.
7.6	2024-03-19	Updated Kvaser logo. Updated the Technical data table.