Kvaser Mini PCI Express User's Guide

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Contents

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
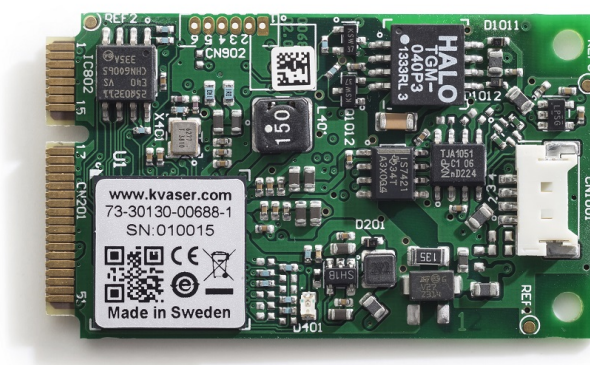
Figure 1: Kvaser Mini PCI Express

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.

- Simultaneous operation of multiple devices.

2.3 Additional software and documentation

The Kvaser CANlib SDK includes everything you need in order to develop software for the Kvaser CAN hardware. It contains full documentation and many sample programs, written in C, C++, C#, Delphi, Python and Visual Basic. All Kvaser CAN interface hardware share a common software API. Programs written for 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 http://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 http://www.kvaser.com/download/.

3.2   Firmware Update

Firmware updates and upgrade instructions can be found at http://www.kvaser.com/download/. Use "Kvaser Hardware" 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).

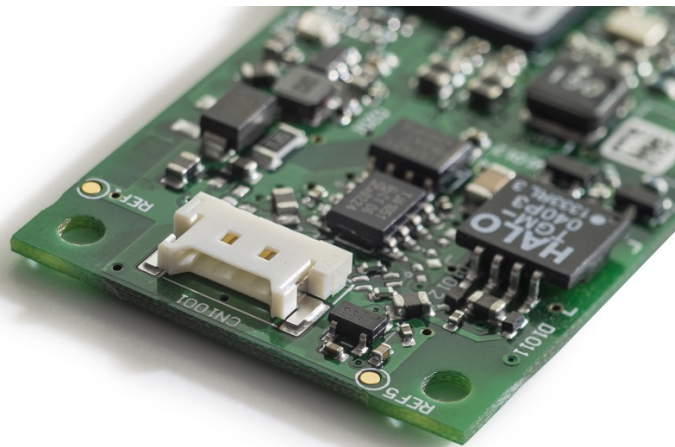Figure 3: CAN connector on Kvaser Mini PCI Express HS
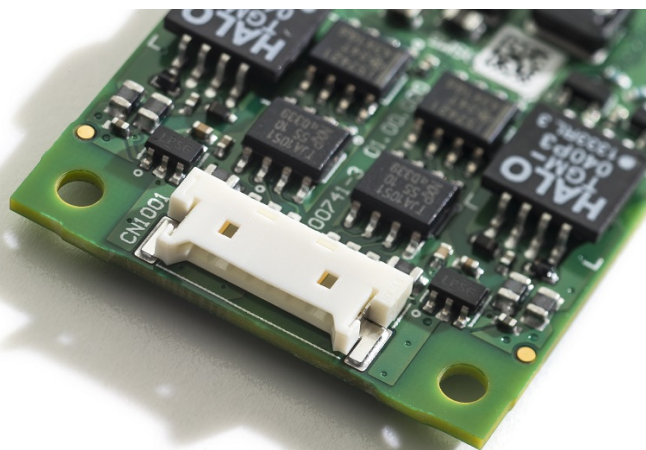
Figure 4: CAN connector on Kvaser Mini PCI Express 2xHS

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 12 for pinout information.

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 Hardware" in the Control Panel to verify that the computer can communicate with the Kvaser Mini PCI Express. If the firmware version shown is all zeroes, there are communication problems.

If the LEDs are not flashing or illuminated at all, check the power supply.

If the LEDs are flashing or illuminated, compare the pattern with the specified led indicators in Section 3.6, LED indicators, on Page 10.

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
Time stamp resolution	25 µs
Error Frame Detection	Yes
Error Frame Generation	No
Silent mode	Yes
PC interface	Mini PCI Express with USB 2.0.
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).
Software requirements	Windows XP or later.[1]
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 uses the 4-pin Molex connector (53780-0470) has the pinning described in Table 4.

Molex pin number	Function
1	GND
2	CAN_H
3	CAN_L
4	Shield

Table 4: Molex pin configuration

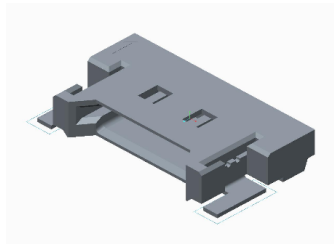[1]For other operating systems, see Kvaser web or contact Kvaser support.

Figure 5: Molex Connector 53780-0470

Kvaser Mini PCI Express devices that uses the 7-pin Molex connector (53780-0770) has the pinning described in Table 5 on Page 13.
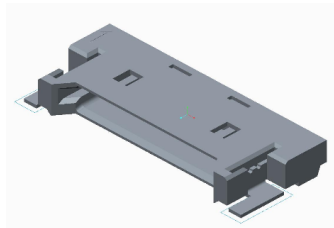

Figure 6: Molex Connector 53780-0770

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 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: http://www.kvaser.com/en/kvaser/recycling-policy.html

7 Legal acknowledgements

7.1 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-LEVER SYSTEM, WHICH MAY BE DEFECTIVE.

7.2 EC Regulatory Compliance

The product(s); 73-30130-00688-1, 73-30130-00743-7, is in conformity with the essential requirements of the following regulations and directives:

- DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 (WEEE)
- REGULATION (EC) No. 1907/2006 (REACH), Annex XIV (the 'Candidate list') and Annex XVII ('Restriction of Substances')

The products listed above also complies with DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 (RoHS) and is in conformity with the following standards and/or other normative documents:

Standard	Description
EN 50 581 (2012)	Assessment with respect to restriction of hazardous substances

Table 6: Standards and normative documents for RoHS 2011

The products listed above also complies with DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 (EMC-directive) and is in conformity with the following standards and/or other normative documents:

Standard	Description
EN 55 022 (2010)	Class B, radiated. IT equipment, commercial emission
EN 55 024 (2010)	IT equipment, commercial immunity
EN 61 000-6-2 (2005)	Generic, industrial immunity

Table 7: Standards and normative documents for EMC 2004

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

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.

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

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

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

8 Version history

Version history for document UG_98150_kvaser_mini_pci_express:

Revision	Date	Changes
1.0	2013-09-17	Initial version
	2013-11-28	Changed layout of references, figures.
2	2014-04-15	Added device 00743-7 2xHS.
3	2015-01-08	Minor update