

Kvaser PClean II User's Guide



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<http://www.kvaser.com>

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2 Introduction

Since 1985, Kvaser has turned its full attention towards Controller Area Network and associated technologies. Based in Sweden, Kvaser develops and manufactures innovative and high performance PC interfaces for the global market.

2.1 Scope of this document

This manual is applicable to the Kvaser products found in Table 1. Since the hardware is essentially the same this guide will refer to all these devices as just PC1can II.

Table 1. The PC1can II devices and their product numbers.

Device	Product Number	Description
Kvaser PC1can II HS/HS	00235-7	Two channel CAN interface
Kvaser PC1can II HS/HS (old version, 5V only) This board is no longer manufactured and is replaced by p/n 00235-7.	00157-2	Two channel CAN interface
Kvaser PC1can II HS	00226-5	One channel CAN interface
Kvaser PC1can II LP HS	00228-9	One channel CAN interface with low profile bracket.

The complete line of PC1can II products are discontinued, due the release of the new PC1canx II boards, see Table 2 . PC1canx II is fully software compatible with PC1can II for easy integration in existing systems.

Table 2. The replacement products for PC1can II.

Device	Product Number	Replacement Product
Kvaser PC1can II HS/HS (3.3V and 5V version)	00235-7	Kvaser PC1canx II HS/HS
Kvaser PC1can II HS/HS (old 5V version)	00157-2	Kvaser PC1canx II HS/HS
Kvaser PC1can II HS	00226-5	Kvaser PC1canx II HS with full height PCI bracket
Kvaser PC1can II LP HS	00228-9	Kvaser PC1canx II HS with low profile bracket

2.2 General description

Kvaser PC1can II is an interface board that connects up to two CAN networks to a PC using the PCI bus. You can with benefit use several Kvaser PC1can II boards on the same PC.

It contains the powerful M16C micro-controller from Renesas with two built-in CAN controllers. It handles CAN messages with 11 bit (CAN 2.0A) as well as 29 bit (CAN 2.0B) identifiers. Remote frames can be sent and received without restrictions. PC1can II can detect and generate error frames on the CAN bus. PC1can II provides one or two completely independent CAN channels with separate connectors. The CAN bus transceivers are integrated into the device. The Kvaser PC1can II is an improved version of the Kvaser PC1can family of boards. It is fully compatible with the Kvaser PC1can boards but features:

- Improved performance
- High performance on-board microcontroller
- Large on-board RAM buffer for CAN messages

Kvaser offers excellent software support. All Kvaser products utilize the common and user friendly Application Programming Interface, Kvaser CANlib API. It enables you to run any applications using Kvaser CANlib API on any Kvaser products, without the need of editing the code and recompile it.

Example of supported PCI, PC/104-Plus, USB and PCMCIA interfaces:

- Kvaser PC1canx II
- Kvaser PC1canx
- Kvaser PC104+
- Kvaser PC1can II
- Kvaser PC1can
- Kvaser PCcan
- Kvaser Leaf Professional / SemiPro / Light
- Kvaser Memorator II
- Kvaser Memorator
- Kvaser LAPcan II
- Kvaser LAPcan

2.3 PC1can II features

- Compliant with PCI revision 2.2
- High performance on-board microcontroller
- Communicates with the PC through a fast DPRAM
- Large on-board RAM buffer to off load the PC
- Supports CAN 2.0 A and 2.0 B (active)
- Supports "Silent Mode"
- ISO 11898-2 compliant High Speed CAN transceivers
- Supports bit rates from 20 kbit/s up to 1 Mbit/s
- CAN oscillator frequency: 16MHz
- DC/DC power supply to galvanically isolated bus drivers – no need for extra external power supply
- High-speed isolator circuits between CAN circuits and CAN drivers
- Quick and easy plug and play installation
- Interfaces the CAN bus with industry standard DSUB connector(s)

3 Kvaser PCICan II Hardware

This chapter describes the hardware properties for Kvaser PCICan II.

3.1 Technical Specifications

Technical specifications for the Kvaser PCICan II boards:

Table 3. Technical specifications for two-channel devices manufactured before June 2004; part number 00157-2.

PCI Slot Type	32-bit, 33 MHz, 5V signaling
Required PCI voltages	5V and 3.3V (If a PCI slot has 5V, it also has 3.3V if the computer is compliant to the PCI standard.)

Table 4. Technical specifications for all one-channel devices, and for the two-channel devices manufactured after June 2004; part number 00235-7.

PCI Slot Type	32-bit, 33 MHz, 5V or 3.3V signaling
Required PCI voltages	5V and 3.3V (If a PCI slot has 5V, it also has 3.3V if the computer is compliant to the PCI standard.)

Table 5. Technical specifications common to all variants of the Kvaser PCICan II

PCI Revision	2.2
CAN channels	2 (CAN 2.0A and 2.0B active)
CAN Transceivers	Philips 82C251 (ISO 11898-2 compliant)
CAN Controller	Built into the M16C; ISO 11898-1 compliant.
Microcontroller	Mitsubishi/Renesas M16C/6N, 256 kB Flash and 10 kB RAM.
Bit rate, CAN bus	20 kbit/s to 1 Mbit/s
Timestamp resolution	10 μ s
Error Frame Detection	Yes
Error Frame Generation	Yes
Hardware requirements	IBM PC AT, or 100% compatible, with a free PCI slot.
Power consumption	Approximately 1 W (200 mA)
Software requirements¹	Windows XP or later. (For other operating systems, see Kvaser web or contact Kvaser support.)
Configuration	Done by software (Plug & Play)
Dimensions (W*L)	120 x 95 mm (approx. 4.5 x 4 in.)
Operating temperature	-25 °C ... +85 °C
Storage temperature	-35 °C ... +85 °C
Relative Humidity	0% ... 85% (non condensing.)

¹ Contact us for other operating systems.

3.2 Schematics

This chapter describes the three product variants of Kvaser PCICan II.

3.2.1 PCICan HS/HS - a two-channel full-height PCI board

This board has been manufactured in two versions:

- A version that can be used in PCI slots with 5V signaling. This version was manufactured until around June 2004. The part number was 00157-2.
- A version that can be used both in PCI slots with 5V signaling and in PCI slots with 3.3V signaling. The part number is 00235-7.

To determine which voltages your board requires, look at the voltage keying on the PCI connector.

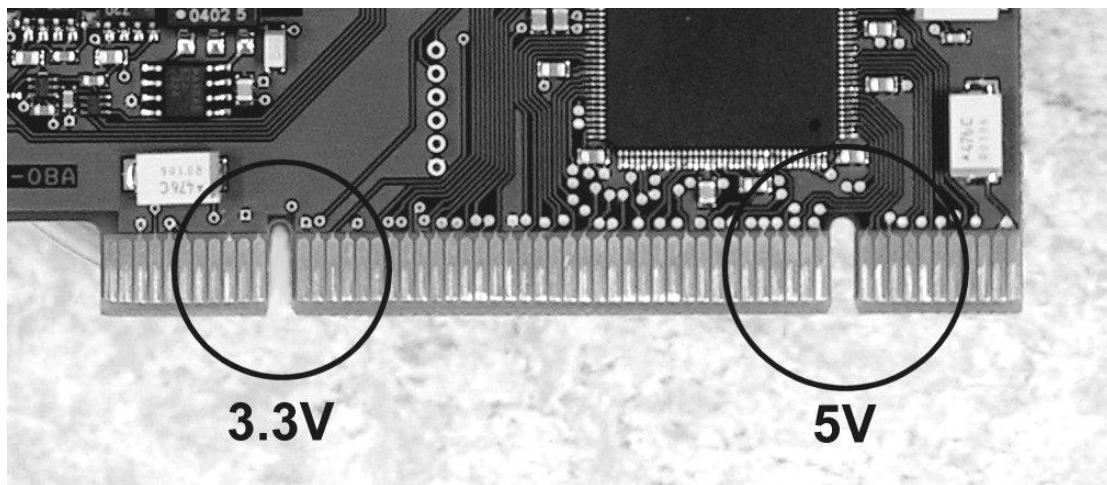


Figure 1: The PCI connector with its voltage keying

- If the board has two keys as seen in Figure 1, then it can be mounted in both 5V PCI slots and 3.3 V PCI slots. The PCI standard refers to this type of card as “Universal cards”.
- If the board has just the 5V key, then it requires a 5V PCI slot.

3.2.2 PCICan II HS – a one-channel full-height PCI board

This is simply a one-channel version of the above board, with the exception that there is only one version, which can handle both 5V and 3.3V PCI slots.

3.2.3 PCICan II LP HS – a one-channel low-profile PCI board

This is low-profile (about half the height) version of the above card. Note that it requires a low-profile PCI slot! It can accept both 5V and 3.3V PCI slots.



Figure 2. A low-profile PCICan II LP HS board.

3.3 *The Isolated CAN Drivers*

Each CAN transceiver is isolated from the CAN controller and all other CAN transceivers. The CAN transceiver will get the necessary power from the PCI bus via an isolated DC/DC convert. The isolation between the CAN controller and the CAN transceiver has a delay of maximum 50 ns in each direction. This will reduce the possible cable length with 20 meter compared to having no isolation.

4 Kvaser PCICan II Installation

The Kvaser PCICan II is plug-and-play. There are no switches or jumpers to set. For best results, install the device drivers first. Follow the instructions on the Kvaser CD to do so. Important – you must read this entire chapter before installing your Kvaser PCICan II board.

4.1 *Install hardware*

For driver installation and firmware update, see the driver installation documentation. After installing the Kvaser Drivers that comes with the PCICan II card, follow these steps.

- Power down the computer.
- For your personal safety, unplug the computer from mains.
- Touch the metal chassis of the computer before you remove the PCICan II from its protective antistatic plastic bag.
- Insert the board into an empty PCI slot.
- Power up the computer.

4.2 *Updated drivers and device firmware*

Updated drivers and device firmware is available from our web site, <http://www.kvaser.com>.

4.3 *Adjusting interrupt and I/O space resources*

This is done by the computer's BIOS at startup time. Interrupt assignment and I/O space usage can normally not be adjusted.

Note: It is perfectly normal for PCI devices to share a single interrupt in the PC. Kvaser PCICan II will work without problems when sharing the interrupt with other PCI devices.

4.4 *Motherboard power supply*

The PCI standard mandates that if a PCI connector on the computer motherboard provides 5V, it must also provide 3.3V. However, not all computers follow the standard here. If your PCICan II board is not responding after installation, it could be a good idea to check the computer documentation if the PCI slots really are compliant to the PCI standard.

4.5 The CAN Channels

The standard PClcan II has two independent I/O ports (CAN channels) as seen in Figure 3. The first channel, Channel 1, is the one closest to the PCI connector. See Figure 4.

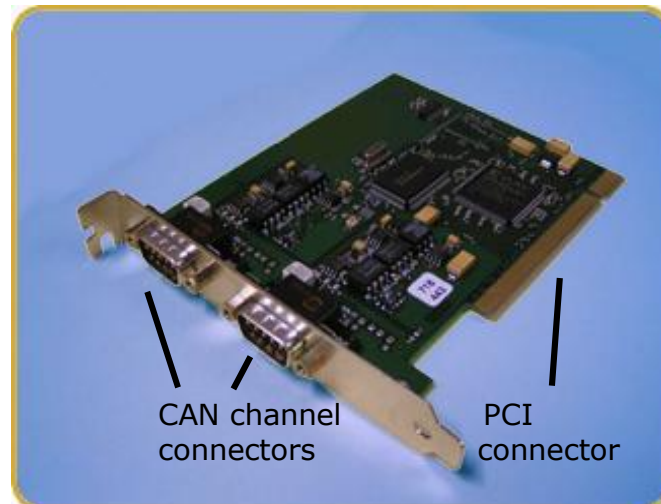


Figure 3. Connectors on the Kvaser PClcan II.

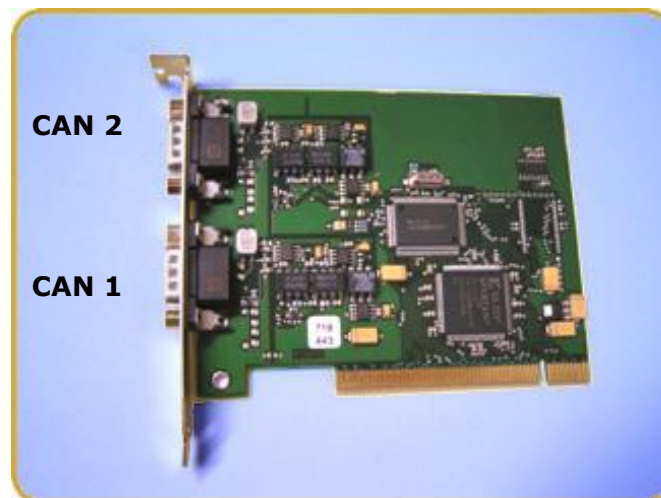


Figure 4. The channels on the Kvaser PClcan II

The pin numbering of the DSUB CAN connector is seen in Figure 5 and the functions of the pins are listed in Table 6.

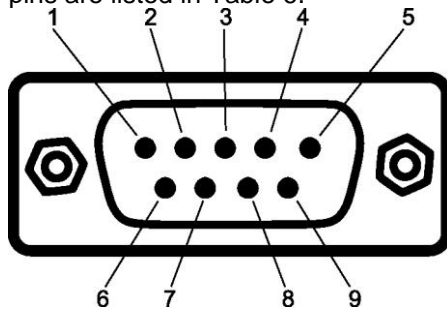


Figure 5. The D-SUB connector pin numbers on a CAN channel.

Table 6. D-SUB Pin configuration of the HS channels.

D-SUB pin number	Function
1	Not connected.
2	CAN_L
3	GND
4	Not connected.
5	Shield
6	Not connected.
7	CAN_H
8	Not connected.
9	Not connected.

4.6 CAN bus termination

There are no on-board CAN bus terminators on the PCICan II board. You must terminate the CAN bus yourself by placing a 120 Ohms resistor between CAN_H and CAN_L at each end of the CAN bus.

Note that without terminators on the CAN bus, the communication may or may not work – it's totally unpredictable. For laboratory use the termination need not be perfect but you will always need some load resistance between CAN_H and CAN_L somewhere on the CAN bus.

4.7 LED Indicators

The on-board LEDs, shown in Figure 6 from the CAN connector side, indicate the status of the card according to Table 7.



Figure 6. Position of the LEDs on a PC1can II board.

Table 7. Meaning of the LED activity on the PC1can II boards.

LED Activity	Meaning of LED Activity
Both LEDs (or the single LED on the one-channel devices) are blinking continuously with a frequency of around 5 Hz	The built-in self-test failed.
Steady light	The card is OK.
Blinking irregularly	The card is OK, and there is activity (transmit or receive) on the CAN bus.

4.8 Do's and Don'ts

Do connect the ground pin on the D-SUB to the ground of your CAN bus.

In case of trouble, **do** verify that you have **at least one terminator on the CAN bus**.

5 Software Support

The Kvaser PC1can II boards are supported by drivers routines and program examples for Windows, Linux, etc². The software and its documentation are available from our web site, and not further documented here.

Kvaser CANKing – a free-of-charge and general-purpose interactive CAN bus monitor can be download from our web site.

Please visit our homepage <http://www.kvaser.com> to find software updates, hints and tips and other helpful information. You are always welcome to contact our Support Team – support@kvaser.com.

² Contact us for other operating systems.

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:
www.kvaser.com/en/kvaser/environment/recycling

7 Legal Information

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CE Marking Directive

This line of products has been CE marked. We will be pleased to inform you on which standards this equipment has been tested for compliance.

RoHS Directive

This product is manufactured in accordance with directive 2002/95/EC on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS.)

Trademarks and patents

All product names mentioned in this manual are registered or unregistered trademarks of their respective owner. Windows® is a registered trademark of Microsoft Corporation in the United States and other countries. Linux® is the registered trademark of Linus Torvalds in the United States and other countries. The products described in this document are protected by U.S. patent 5,696,911.

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 own expense.

8 Document Revision History

Date	Version	Changes
	1	Initial edition
	2	Added data for new board revision (universal cards)
July 2004	3	Corrected data for the universal cards – all cards require that the motherboard provides 5V and 3.3V.
10-DEC-2004	4	Revised part numbers for PC1can II HS/HS
21-APR-2005	5	Minor edits to the pictures
2006-03-27	6	No major changes of contents
2006-11-10	7	New layout, no major changes
2008-12-01	8	Updated legal information
2011-01-14	9	Updated supported OS list
2011-09-12	10	Updated disposal information
2012-08-31	11	Corrected minimum CAN bit rate