

Kvaser USBcan R User's Guide



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2 About this manual

This manual is intended for Kvaser USBcan R users. This manual contains a description of the hardware's properties and general instructions for connecting the device to a computer.

3 Introduction

This section will describe the functions and features of the Kvaser USBcan R.

3.1 Welcome to Kvaser USBcan R



Figure 1. Kvaser USBcan R.

The Kvaser USBcan R is a powerful two channel, real time, CAN to USB interface.

With quick reaction times and high data throughput, the Kvaser USBcan R is perfect for rapid ECU programming, advanced bus analyzers, and efficient development work.

3.2 Major features of Kvaser USBcan R

- Quick and easy plug-and-play installation.
- Supports both 11-bit (CAN 2.0A) and 29-bit (CAN 2.0B active) identifiers.
- CAN messages are time-stamped with 100 microsecond accuracy.
- Supports data and remote frames.
- Detects error frames.
- Large on-board RAM buffer for CAN messages.
- Handles up to 8000 messages per second.
- 100% compatible with applications written with Kvaser CANLIB for Kvaser hardware such as LAPcan, PClcan, and USBcan.
- Two high-speed CAN connections (compliant with ISO 11898-2), 5 kbit/s up to 1 Mbit/s.
- Fully compatible with all higher layer protocols including J1939, CANopen, NMEA 2000® and DeviceNet.
- One USB 2.0 HiSpeed connection with data rates up to 480 Mbit/s. The device can also be used in USB 1.1 slots (with data rates up to 12 Mbit/s).
- IP67 rated lightweight aluminum housing with dimensions 160 x 20 x 30 mm (6.3 x 0.8 x 1.2 inch) – easy to tuck away (e.g. in a vehicle during a test drive).
- Simultaneous operation of multiple devices.
- Polyurethane cabling for extreme environments.
- Low power-consumption.

3.3 Additional software and documentation

- Kvaser CANLIB SDK, which includes everything you need to develop software for Kvaser CAN hardware. The SDK includes full documentation and many sample programs, written in C, C++, C#, Delphi, and Visual Basic. All Kvaser CAN interface hardware shares a common software API. Programs written for one board type will run without modifications on the other board types!
- On-line documentation in Windows® HTML Help and Adobe Acrobat format.

4 Kvaser USBcan R hardware

In this section you can read more about the CAN bus channels, USB connector, and LED indicators.

4.1 Hardware installation

The Kvaser USBcan R may be inserted in any unused USB socket on the host computer. You do not need to switch the power off before inserting or removing the device. For the Kvaser USBcan R to communicate with the host computer, the correct version of the Kvaser driver and firmware must be installed. The firmware is downloaded and installed directly on the Kvaser USBcan R and the driver is installed on the host computer.

The delivery package of Kvaser USBcan R contains:

- Kvaser USBcan R

4.2 USB connector

The Kvaser USBcan R has a standard USB type "A" plug. If you need a longer cable, you can use USB hubs or USB extension cables with a built-in hub. By chaining up to 5 hubs, you can achieve a cable length of up to 25 meters (approx. 83 ft.).

4.3 CAN channels

The standard Kvaser USBcan R has two independent CAN channels with a common ground. The connectors for these channels are shown in Figure 2.

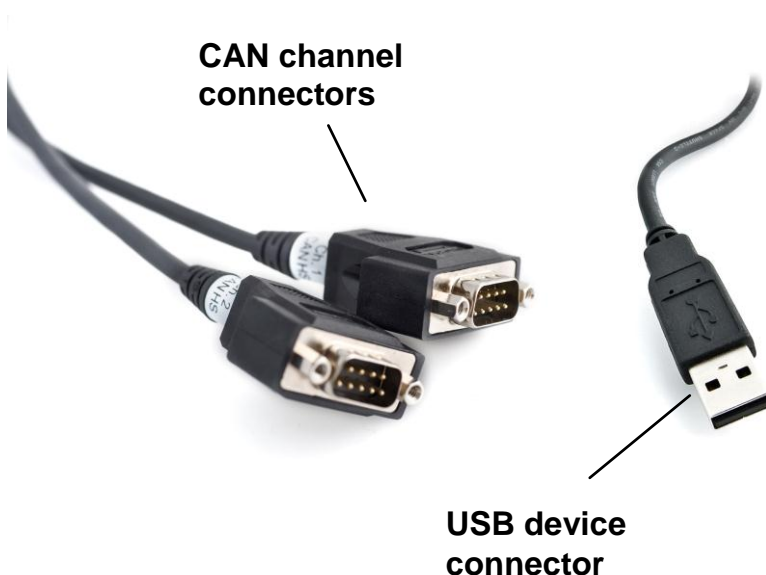


Figure 2: Connections on the Kvaser USBcan R. The two CAN channels are to the left and the USB device connector is to the right.

4.4 LED indicators

Table 1: LED indicators overview.

LED	General meaning
PWR (Green)	Power and general status.
CAN 1 (Yellow)	Status for CAN channel 1.
CAN 2 (Yellow)	Status for CAN channel 2.



Figure 3. LEDs on the Kvaser USBcan R.

Table 2: LED indicators, detailed meaning.

PWR (Green)	CAN 1 (Yellow)	CAN 2 (Yellow)	Meaning
Slow flash			Waiting for USB connection with the PC.
Steady			Power ON (The device is connected to the computer).
	Short flash		CAN traffic on channel 1.
		Short flash	CAN traffic on channel 2.
Fast flash			Firmware configuration error (should not normally happen, so please contact support).

5 How to use the Kvaser USBcan R

To use the Kvaser USBcan R as a CAN interface; connect the unit to a free USB socket on your PC or USB hub.



When used as a CAN interface, the green LED will be illuminated, and the yellow LEDs will emit short flashes when CAN messages are transmitted and received.

5.1 Troubleshooting



- Use “Kvaser Hardware” in the Control Panel to verify that the computer really can talk to the Kvaser USBcan R. Read out the firmware version. If the firmware version is all zeroes, there are communication problems.
- If the LEDs are flashing or glowing, compare the pattern with the specified LED indicators in Table 1 and Table 2.
- If the LEDs are not flashing or glowing at all, check the power supplied through the USB connection.

6 Appendices

In this section you will find technical information about the Kvaser USBcan R and its connectors.

6.1 System requirements

- A USB interface. Use USB 2.0 HiSpeed for optimum results, although the device will also work with a USB 1.1 interface.

6.2 Technical data

In Table 3 below you will find the Kvaser USBcan R's technical specifications.

Table 3: Kvaser USBcan R Technical specifications.

CAN Channels	2 (CAN 2.0A and 2.0B active).
CAN Transceivers	Compliant with ISO 11898-2
CAN Controller	Built into the M32C
Microcontroller	Renesas M32C
CAN Bit Rate	5 kbit/s to 1 Mbit/s
Timestamp resolution	100 μ s
Error Frame Detection	Yes, both channels.
Error Frame Generation	No.
PC interface	USB 2.0. Supports HiSpeed (HS) at 480 Mbit/s. Compatible with USB 1.1 Full Speed (FS) at 12 Mbit/s.
Power consumption	~ 5V and 130mA powered from the USB.
Software requirements	Windows XP or later. (For other operating systems, see Kvaser web or contact Kvaser support.)
Hardware configuration	Done by software (Plug & Play).
Dimensions (W x L x H)	30 x 160 x 20 mm (1.2 x 6.3 x 0.8 inch)
Operating temperature	-40 °C ... +85 °C
Weight	Approx 160 g

Storage temperature	-40 °C ... +85 °C
Relative Humidity	0% ... 95% (non-condensing.)

6.3 CAN connectors

The Kvaser USBcan R has two high-speed CAN channels. Both CAN channels have 9-pin D-SUB connectors (see Figure 4) with the pinning described below (see Table 4 and Table 5).

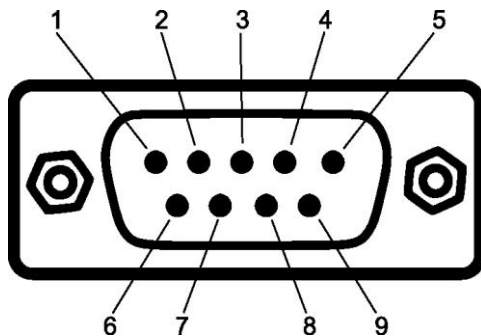


Figure 4: The D-SUB connector pin numbers on a CAN channel.

Table 4: D-SUB pin configuration of the CAN channel 1.

The CAN channel 1 has the following pin configuration.
(Auto-reset fuses protect Pins 2, 3, 4, 7 and 9.)

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

Table 5: D-SUB pin configuration of the CAN channel 2.

The CAN 2 channel has the following pin configuration.
(Auto-reset fuses protect Pins 2, 3, 4, 7 and 9.)

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



Note: Always connect the ground pin on the D-SUB to the ground of your CAN bus.

6.4 Required driver version

You need at least version (CANLIB) 4.3 of the driver to use your Kvaser USBcan R.

6.5 CAN bus termination

Every CAN bus must be terminated with a 120 Ohm resistor at each end of the bus. The Kvaser USBcan R does not contain any CAN bus terminators, 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.

7 Frequently Asked Questions

Q: Could I use several Kvaser USBcan R?

A: Yes, no problem.

Q: If I reboot my computer, will the Kvaser USBcan R and other products have the same channel numbers as before?

A: Yes, they will try to reuse the old channel numbers.

Q: How can I identify which Kvaser USBcan R has a certain channel number?

A: Use "Kvaser Hardware" to flash the LEDs on the Kvaser USBcan R.

8 Legal acknowledgements

8.1 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-LEVEL SYSTEM, WHICH MAY BE DEFECTIVE.

8.2 EMC compliance statement

CE regulation:

This product is in accordance with the directive 2004/108/EC regulating the electromagnetic compatibility.

FCC regulation:

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

8.3 WEEE compliance statement



This product is sold in compliance with the directive 2002/96/EC of the European Parliament on Waste Electrical and Electronic Equipment (WEEE.)

8.4 RoHS compliance statement

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).

8.5 Patents, copyrights and trademarks

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9 Document revision history

Revision	Date	Changes
1	2010-11-22	Original revision
1.2	2010-12-12	Updated regulation text, Operating and storage temperature
1.3	2011-01-14	Updated supported OS list