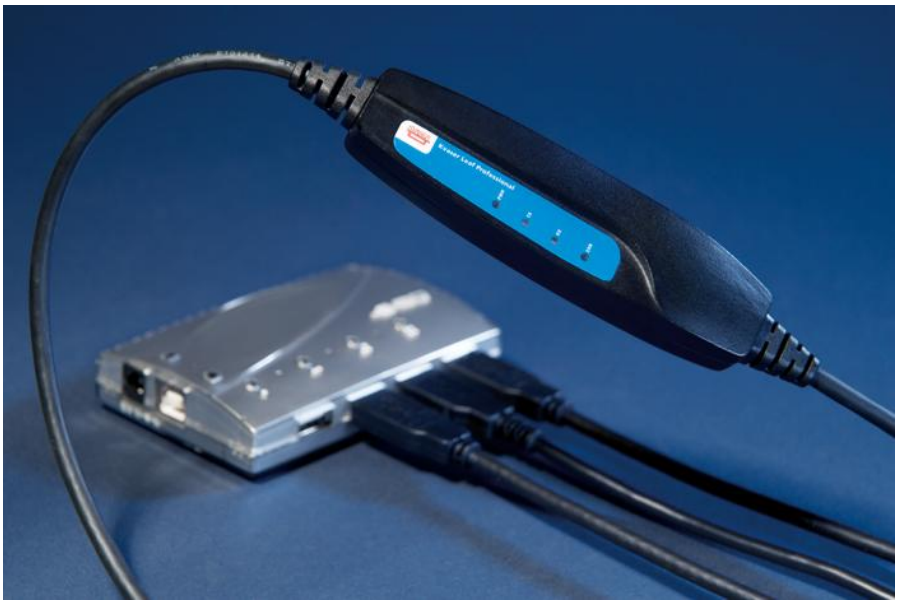
Kvaser Leaf User Guide



Last updated Thursday, 22 April 2010

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1 Table of Contents

2 Introduction

The Kvaser Leaf family currently consists of three basic products: Kvaser Leaf Light, Kvaser Leaf SemiPro and Kvaser Leaf Professional. Kvaser Leaf SemiPro and Kvaser Leaf Professional use the patented Kvaser MagiSync™ that you can read more about in chapter 2.1. All Kvaser Leaf devices use USB to communicate with the computer. Chapter 2.2 describes the basic differences between the various USB standards.

2.1 Kvaser MagiSync™

Kvaser MagiSync™ is a new innovative way of synchronizing several different channels. All units are synchronized, achieving a high precision virtual clock accurate to the microsecond. No external cables are necessary; you get instant synchronization as soon as you connect. For this to work the units must reside on the same USB root hub. If they do not they will *not* be synchronized, see Figure 1 and Figure 2 nedan.

Usually, a computer has a USB controller with one root hub in a computer. If you use that one, you do not need an external USB hub to get your Kvaser Leafs synchronized. The easiest way to verify the setup is to look under the Synchronization tab in “Kvaser Hardware” in your computer’s control panel. If all your hardware is placed in one Kvaser MagiSync™ Group, then you are ready to go. In the first Windows 98 edition, you are not able to see which Kvaser Leaf belongs to a certain Kvaser MagiSync™ Group. However it works properly in Windows 98 Second Edition.

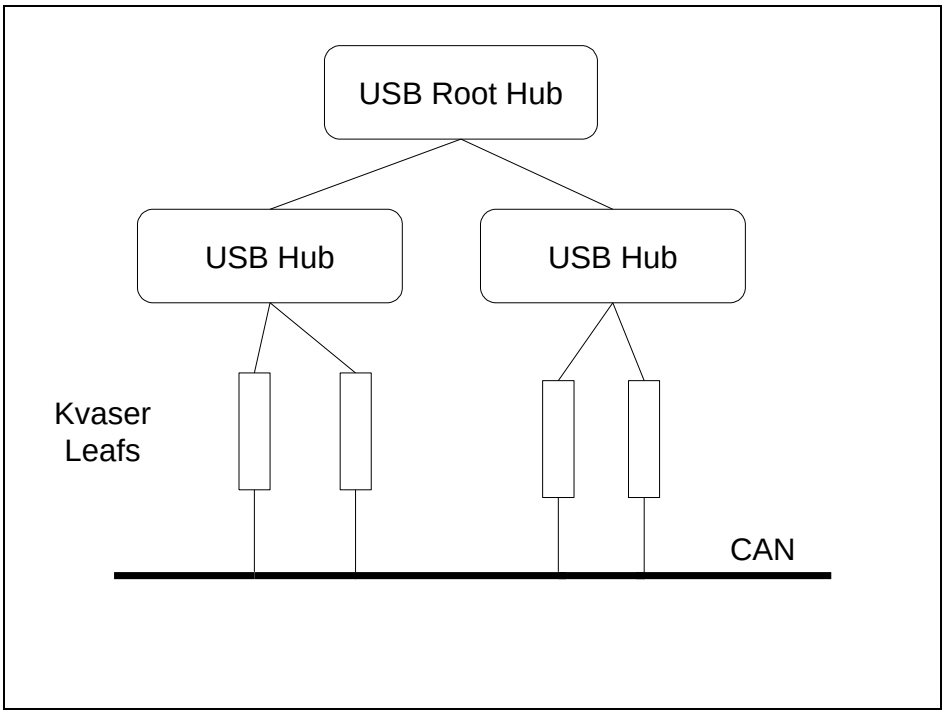

Figure 1: Kvaser Leaf synchronization. All devices are synchronized in this setup.

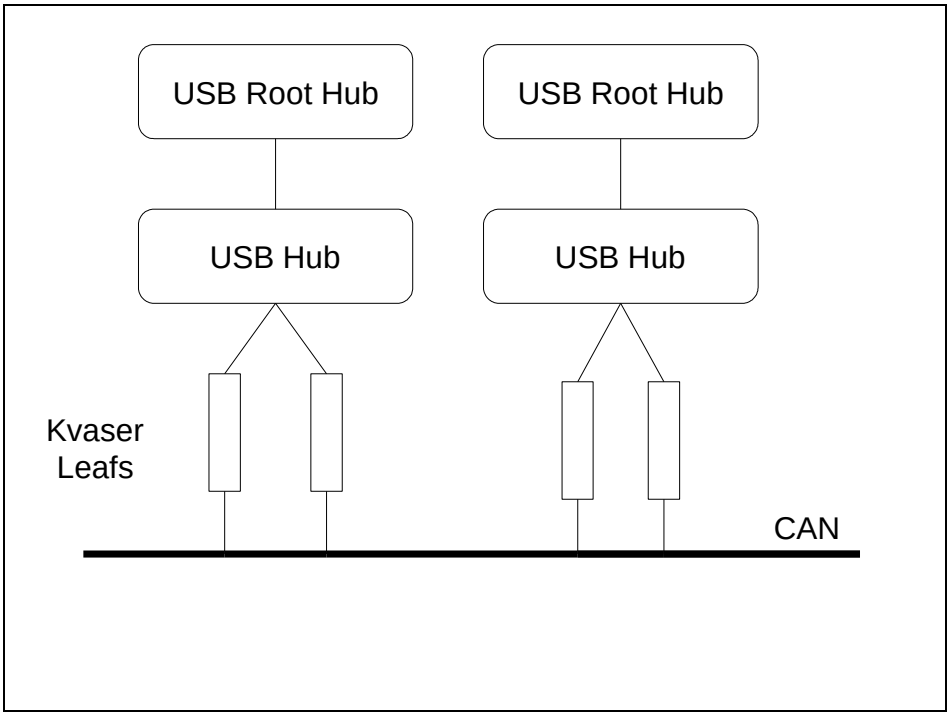

Figure 2: Kvaser Leaf synchronization. The devices are not synchronized in this setup.

2.2 Difference between USB standards

There are three different USB standards: USB 1.0, USB 1.1 and USB 2.0. The major difference between USB 1.X and USB 2.0 is the speed. USB 1.X provides **low-speed** at 1.5 Mbit/s and **full-speed** at 12 Mbit/s. On systems with USB 2.0 support, USB provides **full-speed** at 12 Mbit/s and **high-speed** at 480 Mbit/s. USB 2.0 is backwards compatible with 1.X.

Kvaser Leafs will work on your computer with all standards, but if you do not have USB 2.0, the Kvaser Leafs will use full-speed at max. 12 Mbit/s. Windows 98 and unupdated versions of Windows 2000 and Windows XP do not support USB high-speed. In these versions, the Leafs will therefore use full-speed at max. 12 Mbit/s.

3 General for all Kvaser Leaf products

3.1 Introduction

The Kvaser Leaf family currently consists of three one-channel high-speed versions, two one-channel low-speed versions, two one-channel Single-Wire CAN (SWC) versions and one LIN version; see Table 1.

	High-speed	Low-speed	SWC	LIN
Kvaser Leaf Professional	X	X	X	X
Kvaser Leaf SemiPro	X	X	X	
Kvaser Leaf Light	X			
Kvaser Leaf Professional Rugged	X			
Kvaser Leaf SemiPro Rugged	X			
Kvaser Leaf Light Rugged	X			

Table 1: The Kvaser Leaf family

All Kvaser CAN Leafs use USB 2.0 and handle messages with 11-bit (CAN 2.0A) and 29-bit (CAN 2.0B) identifiers. All Kvaser CAN Leafs can transmit and receive remote frames and also detect error frames.

The Kvaser Leaf family also has the following features:

- Small plastic housing (Kvaser Leaf Light Rugged has an aluminium housing)
- Minimal power consumption (approx. 70 mA)
- 100% compatible with applications that use Kvaser's CANlib (i.e. applications written for LAPcan, LAPcan II, PCIcan, PCIcan II, PCcan, USBcan, USBcan II, etc.)

3.2 Identification

When a Kvaser Leaf is inserted, its index is written to the registry. The next time a Kvaser Leaf of the same type is plugged into the same port, the index is reused if possible, or else the first available "slot" is used. This means that the device numbering will be the same every time, if you plug the devices into the same ports in the computer. If you use different ports, the numbering might be different.

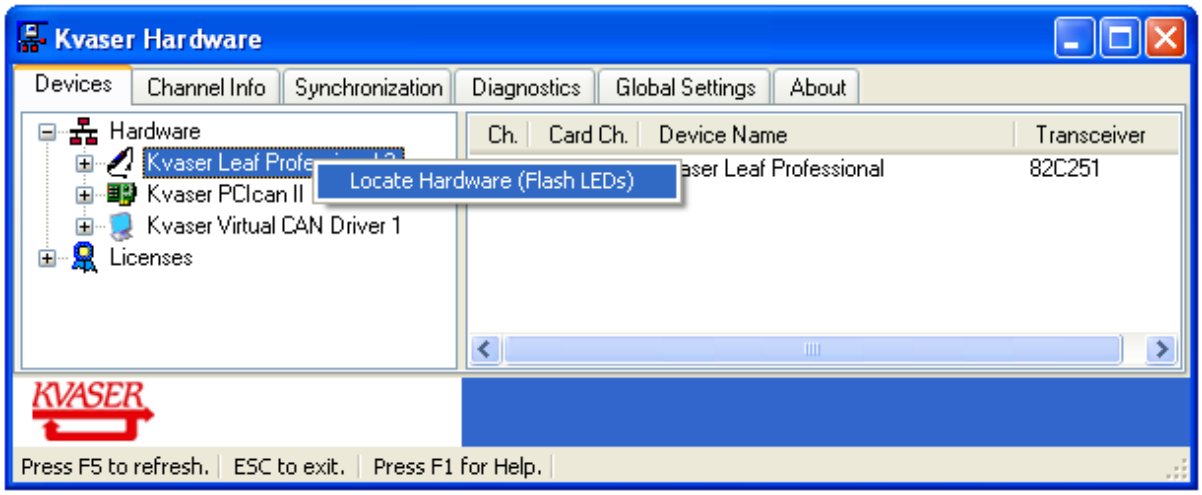

Figure 3: Locate Hardware

You can use Kvaser Hardware to locate the Kvaser Leaf by flashing the LEDs. You will find Kvaser Hardware in your Control Panel. Press the right-hand mouse button in the hardware tree in Kvaser Hardware and choose "Locate Hardware (Flash LEDs)" – see Figure 3 ovan. It is also possible to flash an entire Kvaser MagiSync™ group using the same method on the Synchronization tab. The serial number could be found on the back of the Kvaser Leaf and in Kvaser Hardware, see figure 5.

Clicking on a device channel opens up a panel with more detailed information, for example serial number, firmware revision, EAN number etc; see Figure 4 nedan.

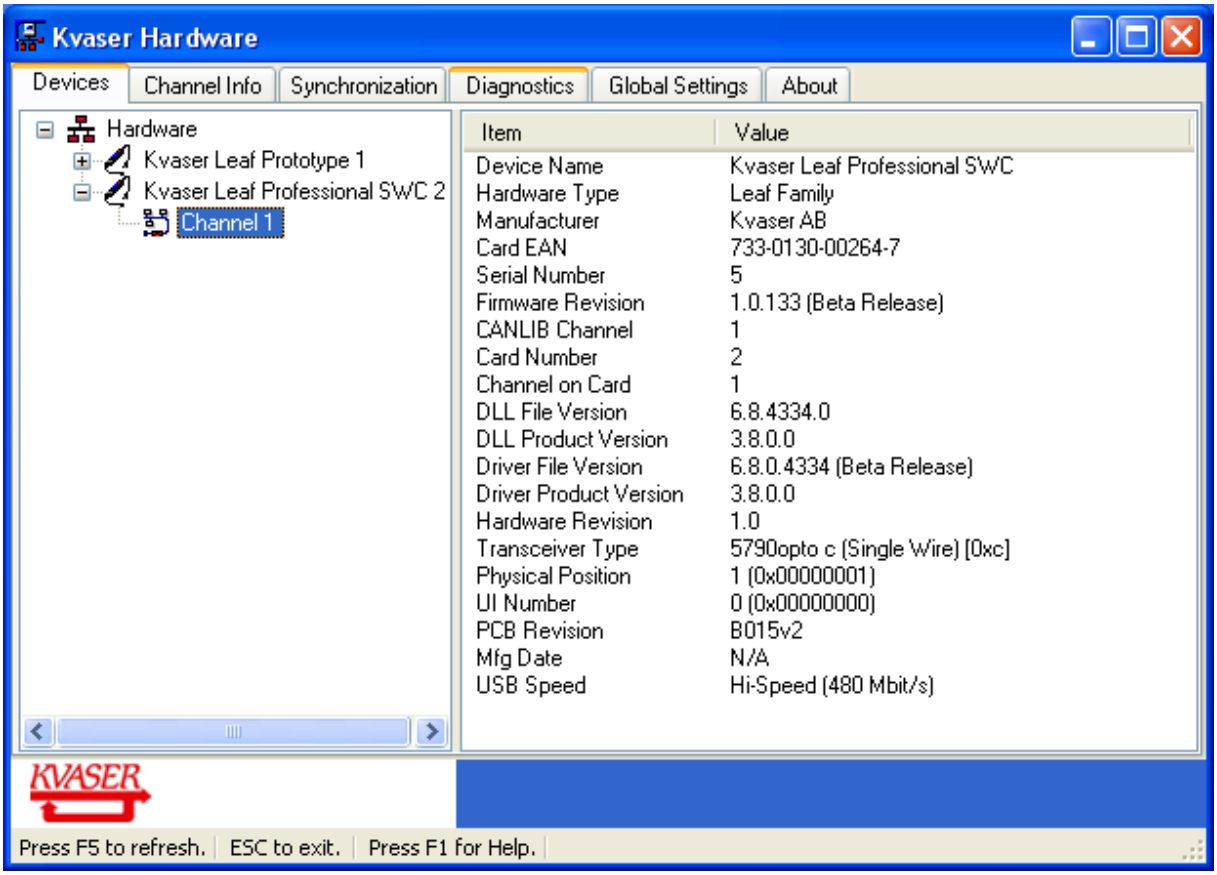

Figure 4: Channel information

For more information and help on using Kvaser Hardware, press F1 from within the program.

3.3 Power

All Kvaser Leaf devices are powered through the USB connector. The host must supply 5 V DC, as per the USB specification. Some device types also need a reference voltage on the CAN or LIN connector. This is described in detail in chapter 3.6.2.

3.4 LEDs

If there is something wrong with the Kvaser Leafs, they will indicate this by flashing the green (power) LED in different ways. See Table 2 nedan.

Power LED (Green)	Description
Steady light	Everything is functioning correctly.
One flash every third second.	Something is wrong with the USB connection.
2 Hz flash	Something is wrong with the firmware or configuration.

Table 2: Error flashing

- If the Leaf indicates that something is wrong with the USB connection, check the cables and connectors, and check the device driver. Is it properly installed? Does the Device Manager (in Windows) indicate any problem? Are there any messages in the system event log?
- If the Leaf indicates something is wrong with the firmware or configuration, try to reprogram the firmware. This error can happen if a firmware not matching the hardware type has been programmed.

3.5 USB connector

The Kvaser Leaf device may be connected to any free USB socket on the host computer. Power does not have to be turned off before inserting or removing the device. It is good practice, though, to exit all applications using the CAN hardware before removing a Kvaser Leaf device.

The USB cable included with the delivery is approx. 110 centimeters long and is permanently attached to the Kvaser Leaf. If a longer cable is desired, use a standard extension cable with a type “A” receptacle (Figure 5) at one end and a type “A” plug (Figure 6) at the other end. Do *not* extend the cable to more than 5 meters without an active extender. With an active extender, the maximum length is 25 meters.

Figure 5: USB Type "A" Receptacle

Figure 6: USB Type "A" Plug

3.6 DSUB connector

The CAN channel has a 9-pin D-SUB plug. The pinning is described in Table 3.

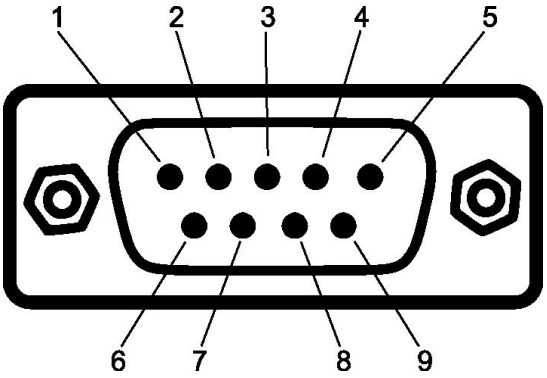

Figure 7: The D-SUB connector pin numbers

D-SUB Pin number	Low Speed	High Speed	SWC	LIN
1	Not connected	Not connected	Not connected	Not connected
2	CAN_L	CAN_L	Not connected	Not connected
3	GND	GND	GND	GND
4	Not connected	Not connected	Pull-down resistor; see chapter 3.6.1.	Not connected
5	Shield	Shield	Shield	Shield
6	Not connected	Not connected	Not connected	Not connected
7	CAN_H	CAN_H	CAN_H	LIN_BUS
8	Not connected	Not connected	Not connected	Not connected
9	Reference power	Not connected	Reference power	Reference power

Table 3: D-SUB pin configuration

3.6.1 Pin 4 (SWC Leafs only)

In high speed mode an external load resistor of 180 Ohm is required. Pin 4 has an 180 Ohm resistance connected through a switch to ground (pin 3). When the Kvaser Leaf is configured to "high speed" mode by software, this switch closes. To acquire the needed pull-down resistor, the user needs only connect pin 4 to pin 7; see Figure 8 nedan. In other modes, the switch is open and pin 4 will not affect the bus.

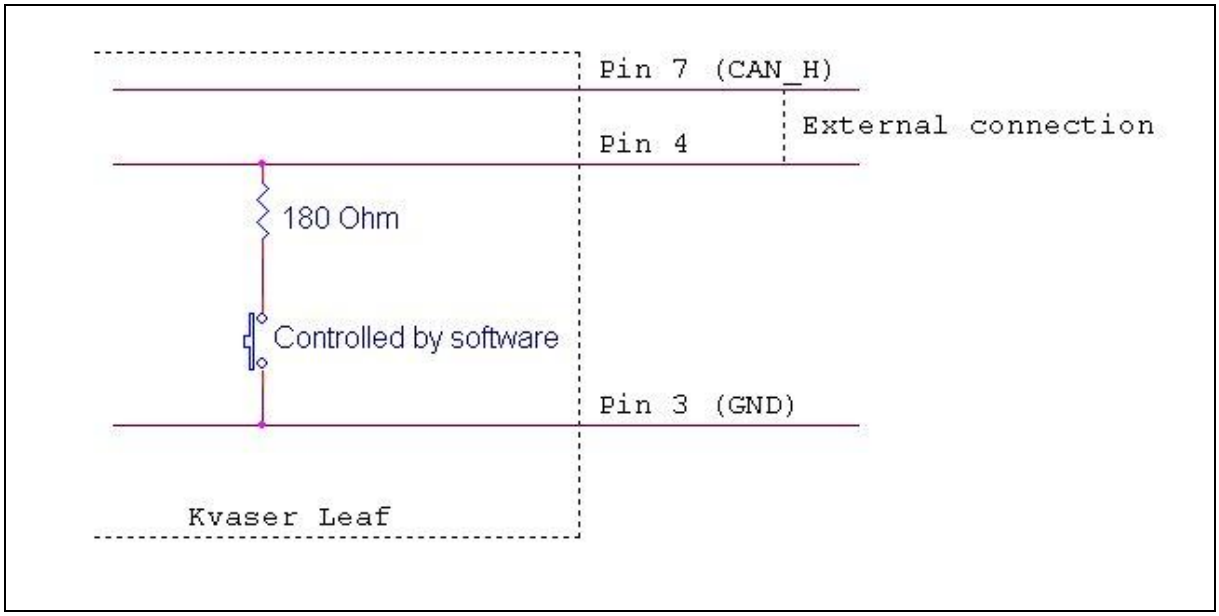

Figure 8: Pin 4 on the SWC Leafs

3.6.2 Pin 9 – Reference Power

This pin is used only to power the transceiver and as voltage reference. The Kvaser Leaf itself is powered trough the USB connector and does not draw any current from this pin.

Kvaser Leaf HS:

This pin is not connected.

Kvaser Leaf LS:

Connect the battery voltage to this pin. It is used by the transceiver to detect whether CAN_H and/or CAN_L are shorted to the system voltage. It may be omitted but the transceiver will then not detect a short circuit properly. The operating input voltage range is 6 – 27V (absolute maximum rating is 40 V). The input is protected from load dumps.

Kvaser Leaf SWC:

Connect the battery voltage to this pin. It is used as a reference voltage when transmitting and receiving WAKEUP frames. It **must** be connected to ensure proper behaviour of the transceiver. The operating input voltage range is 6 – 27V (absolute maximum rating is 40 V). The input is protected from load dumps.

Kvaser Leaf LIN:

Connect the battery voltage to this pin. It is used as a reference voltage and to power the transceiver. It **must** be connected to ensure proper behaviour of the transceiver. The operating input voltage range is 6 – 18V (absolute maximum rating is 40 V). The input is protected from load dumps. The Kvaser Leaf will automatically switch the pull-up from 30kΩ to 1kΩ when you go from slave mode to master mode; see Figure 9 nedan

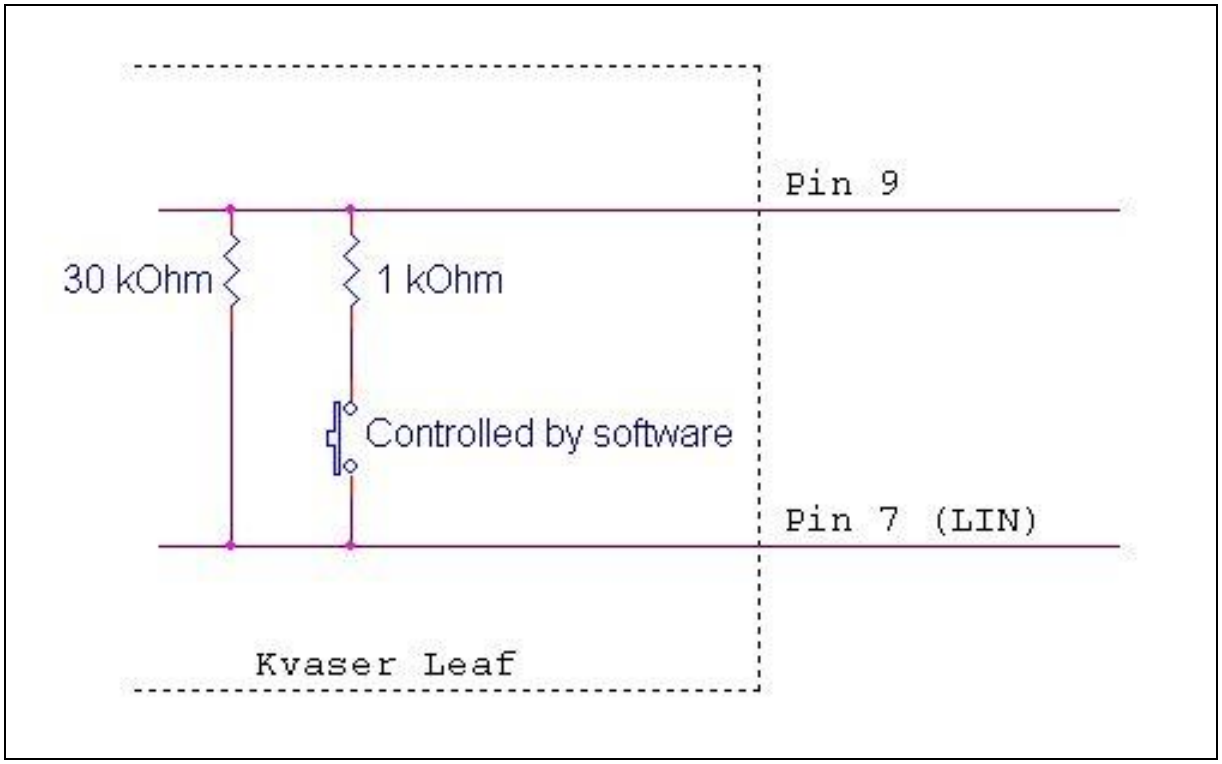

Figure 9: Pull up resistors on the LIN Leaf

3.6.3 CAN Bus Termination

The Kvaser Leaf devices do not have built-in termination.

You must ensure your CAN bus have appropriate termination, or the communication may be unreliable.

3.6.3.1 Terminating a High-Speed CAN bus

A high-speed (ISO 11898-2) CAN bus is terminated by placing a 120 Ohm resistor in each end of the CAN bus. The resistors connect CAN_H to CAN_L.

In a lab environment, with short CAN buses, it might be sufficient with only one terminator.

A high-speed CAN bus without any termination at all **will not work**.

3.6.3.2 Terminating a Low-Speed CAN bus

A low-speed (ISO 11898-3) CAN bus does not have any termination proper. Instead each module on the CAN bus has a pull-up resistor from CAN_L to +5V, and a pull-down resistor from CAN_H to signal ground. The net resistance of all pull-up resistors should be 200 Ohm, and the same holds true for the net resistance of all pull-down resistors in the system.

The low-speed Kvaser Leafs have built-in pull-up and pull-down resistors of 4700 Ohm. This value is chosen as to load the system as little as possible. You will probably need to add extra pull-up and pull-down resistors to the CAN bus unless the system you connect the Kvaser Leaf to already has a proper resistor configuration.

3.6.3.3 Terminating a Single-Wire CAN bus

The single-wire (SAE J2411) CAN bus does not have any termination. When running the SWC bus in its high-speed mode, a load resistance of 180 Ohm from CAN_H to ground is required.

Every Single-Wire CAN driver has a small load between the CAN bus line and ground. In the Kvaser Leaf, it is 9100 Ohm. The load current through this resistor will be used to detect a disconnected ground wire. When running the SWC bus in its high-speed mode, a load resistance of 180 Ohm from CAN_H to ground is required. The Kvaser Leaf hardware supports high-speed as a master and has an internal 180 Ohm which is automatically switched in when required, as seen in Figure 8.

3.7 OBDII Connector

The CAN channel has a 16-pin OBDII plug. The pinning is described in Table 3.

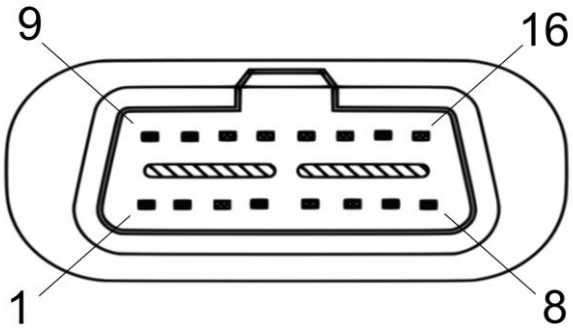

Figure 10: OBDII Connector pin Numbers.

OBDII Pin number	Kvaser Leaf Professional HS with OBDII connector
4	Chassis Ground
5	Shield
6	CAN_H
14	CAN_L
16	Reference power (not used)

Table 4: OBDII pin configuration (showing only connected pins).

4 Technical data common to all Kvaser Leaf products

Property	Description
CAN channels	1 (CAN 2.0A and 2.0B active)
Error frame detection	Yes
Hardware requirements	IBM PC AT or 100% compatible; USB host socket
USB interface	USB 2.0 or USB 1.1
Power consumption	5V and approx. 70mA powered from the USB side
Software requirements[1]	Windows 98, ME, 2000, XP, Server 2003, Vista
Configuration	Done by software (Plug & Play)
Mix 11 / 29 bits messages	Yes
CAN Connector	9-pin male DSUB
USB cable length	110 cm (approx. 3.6 ft.)
USB connector	USB standard type “A” plug
CAN cable length	30 cm (1 ft.)
Load dump protection	Yes
Dimensions (W*L*H) [a]	25 x 100 x 20 (millimetres) ca. 1 x 4 x 0.8 (inches)
Housing [a]	Black plastic
Weight [a]	105 gram
Dimensions (W*L*H) [b]	140 x 18 x 30 (millimetres) ca. 5.5 x 0.7 x 1.2 (inches)
Housing [b]	Black anodized aluminium
Weight [b]	155 gram

Table 5: Technical data for all Kvaser Leafs

[a] All products except for the “Rugged” types
[b] All “Rugged” product types

[1] Please contact us for other operating systems.

5 Kvaser Leaf Light HS

5.1 Introduction

Kvaser Leaf Light is a reliable low cost product. With a time stamp precision of 100 microseconds it handles transmission and reception of standard and extended CAN messages on the bus.

Figure 11: Kvaser Leaf Light

5.2 LEDs

The Kvaser Leaf Light has two LEDs. Their functions are shown in Table 6.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Rx/Tx	Active when messages are being sent or received.

Table 6: Kvaser Leaf Light LED configuration

5.3 Technical data

Technical data exclusive to Kvaser Leaf Light HS are listed in Table 7: Technical data for Kvaser Leaf Light HS. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	Description	Unit
CAN physical layer	High speed (ISO 11898-2)	
CAN transceiver	Texas SN65HVD251	
USB speed	12	Mbit/s
Bit rate	5-1000	Kbit/s
Temperature range	-0 - +70	°Celsius
Clock accuracy	100	µs
Max message rate	8000	Messages/s
Time stamp	32	Bits
OBDII Connector	Optional [a]	
Galvanic isolation	Optional [b]	

Table 7: Technical data for Kvaser Leaf Light HS

[a] With Kvaser Leaf Light OBDII
[b] With Kvaser Leaf Light Galvanic Isolation

6 Kvaser Leaf Light Rugged

6.1 Introduction

Kvaser Leaf Light Rugged is a one channel USB interface for CAN. In hostile environments where dust and water are the norm, the IP67 rated housing assures reliable protection.

Figure 12: Kvaser Leaf Light Rugged

6.2 LEDs

The Kvaser Leaf Light Rugged has two LEDs. Their functions are shown in Table 6.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Rx/Tx	Active when messages are being sent or received.

Table 8: Kvaser Leaf Light Rugged LED configuration

6.3 Technical Data

Technical data exclusive to Kvaser Leaf Light Rugged HS are listed in Table 9: Specifications for Kvaser Leaf Light Rugged. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	Kvaser Leaf Light Rugged HS	Unit
CAN physical layer	High speed (ISO 11898-2)	
CAN transceiver	Texas SN65HVD251	
Bit rate	5-1000	Kbit/s
Temperature range	-40 -+85	°Celsius
Max message rate	8000	Messages/s
USB speed	12	Mbit/s
Clock accuracy	100	µs
Time stamp	32	Bits
Galvanic isolation	Yes	
Polyurethane cabling	Yes	
IP Rating	IP 67	

Table 9: Specifications for Kvaser Leaf Light Rugged

7 Kvaser Leaf SemiPro LS/HS/SWC

7.1 Introduction

Kvaser Leaf SemiPro is a product with high and reliable performance. With the patented Kvaser MagiSync™, all Kvaser Leaf SemiPro and Kvaser Leaf Professional connected to the same USB hub are synchronized to a virtual global clock, common for all time stamps.

Figure 13: Kvaser Leaf SemiPro

7.2 LEDs

The Kvaser Leaf SemiPro has three LEDs. The functionality is presented in Table 10.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Rx/Tx	Active when CAN messages are being sent or received.
LED 3 Red	Error	Active when CAN error frames are detected. On the Kvaser Leaf SemiPro LS, it is also active when the NERR signal is active from the transceiver.

Table 10: Kvaser Leaf SemiPro LED configuration

7.3 Technical data

Technical data exclusive to Kvaser Leaf SemiPro LS/HS/SWC are listed in Table 11 nedan. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	Kvaser Leaf SemiPro LS	Kvaser Leaf SemiPro HS	Kvaser Leaf SemiPro SWC	Unit
CAN physical layer	Low speed (ISO 11898-3)	High speed (ISO 11898-2)	SWC (SAE J2411)	
CAN transceiver	Philips TJA1054	Texas SN65HVD251	Philips AU5790D	
Bit rate	5-125	5-1000	5-50/100	Kbit/s
Temperature range	-40 -+85	-40 -+85	-40 -+85	°Celsius
Max message rate	2500	15000	2000	Msg/s
USB speed	12 & 480	12 & 480	12 & 480	Mbit/s
Clock accuracy	25	25	25	µs
Time stamp	32	32	32	Bits
Galvanic isolation	Yes	Yes	Yes	
Clock sync of multiple devices	Yes	Yes	Yes	
Error frame generation	Yes	Yes	Yes	
Silent mode	Yes	Yes	Yes	
Polyurethane cabling	Yes	Yes	Yes	

Table 11: Technical data for Kvaser Leaf SemiPro LS/HS/SWC

8 Kvaser Leaf SemiPro Rugged

8.1 Introduction

Kvaser Leaf SemiPro Rugged is a one channel USB interface for CAN. In hostile environments where dust and water are the norm, the IP67 rated housing assures reliable protection.

Figure 14: Kvaser Leaf Semipro Rugged

8.2 LEDs

The Kvaser Leaf SemiPro Rugged has three LEDs. The functionality is presented in Table 10.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Rx/Tx	Active when CAN messages are being sent or received.
LED 3 Red	Error	Active when CAN error frames are detected.

Table 12: Kvaser Leaf SemiPro Rugged, LED configuration

8.3 Technical Data

Technical data exclusive to Kvaser Leaf SemiPro Rugged HS are listed in Table 13: Specifications for Kvaser Leaf SemiPro Rugged. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	Kvaser Leaf SemiPro Rugged HS	Unit
CAN physical layer	High speed (ISO 11898-2)	
CAN transceiver	Texas SN65HVD251	
Bit rate	5-1000	Kbit/s
Temperature range	-40 -+85	°Celsius
Max message rate	15000	Messages/s
USB speed	12 & 480	Mbit/s
Clock accuracy	25	µs
Time stamp	32	Bits
Galvanic isolation	Yes	
Clock sync of multiple devices	Yes	
Error frame generation	Yes	
Silent mode	Yes	
Polyurethane cabling	Yes	
IP Rating	IP 67	

Table 13: Specifications for Kvaser Leaf SemiPro Rugged

9 Kvaser Leaf Professional LS/HS/SWC/LIN

9.1 Introduction

Kvaser Leaf Professional is designed for high end applications that require high performance, accurate time stamping and Kvaser MagiSync™ synchronisation. It is perfect for advanced CAN bus analysers, data loggers and other applications.

Figure 15: Kvaser Leaf Professional

9.2 LEDs

The Kvaser Leaf Professional has four LEDs. Their functions are shown in Table 14.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Tx	Active when CAN messages are being sent.
LED 3 Yellow	CAN Rx	Active when CAN messages are being received.
LED 4 Red	Error	Active when CAN error frames are being detected. On the Kvaser Leaf Professional LS, it is also active when the NERR signal from the transceiver is active.

Table 14: Kvaser Leaf Professional LEDs

9.3 Technical data

Technical data exclusive to Kvaser Leaf Professional LS/HS/SWC are listed in Table 15 and to Kvaser Leaf Professional LIN in Table 16. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	**Kvaser Leaf Professional LS**	**Kvaser Leaf Professional HS**	**Kvaser Leaf Professional SWC**	Unit
CAN physical layer	Low speed (ISO 11898-3)	High speed (ISO 11898-2)	SWC (SAE J2411)	
CAN transceiver	Philips TJA1054	Texas SN65HVD251	Philips AU5790D	
Bit rate	5-125	5-1000	5-50/100	Kbit/s
Temperature range	-40-+85	-40-+85	-40-+85	°Celsius
Max message rate	2000	20000	2500	Msg/s
USB speed	12 and 480	12 and 480	12 and 480	Mbit/s
Clock accuracy	1	1	1	µs
Time Stamp:	32/64	32/64	32/64	bits
Clock sync of multiple devices	Yes	Yes	Yes	
Galvanic isolation	Yes	Yes	Yes	
Error frame generation	Yes	Yes	Yes	
Error counters reading	Yes	Yes	Yes	
Sound indicator	Yes	Yes	Yes	
Silent mode	Yes	Yes	Yes	
Auto transmit buffers	Yes	Yes	Yes	
Auto receive buffers	Yes	Yes	Yes	
Polyurethane cabling	Yes	Yes	Yes	
OBDII Connector	-	Optional*	-	

Table 15: Technical data for Kvaser Leaf Professional LS/HS/SWC

* With Kvaser Leaf Professional HS with OBDII connector

Property	**Kvaser Leaf Professional LIN**	Unit
LIN specification	2.0 and 1.X	
LIN transceiver	Freescale MC33399	
Bit rate	1-20	Kbit/s
Temperature range	-40-+85	°Celsius
Max message rate	20000	Msg/s
USB speed	12 and 480	Mbit/s
Clock accuracy	1	µs
Time Stamp:	32/64	bits
Clock sync of multiple devices	Yes - also between Kvaser Leaf Professional LS/HS/SWC	
Galvanic isolation	Yes	
Sound indicator	Yes	
Normal/Sleep Mode	Yes - 20µA Standby Current in Sleep Mode	
Monitor Mode	Yes	
Master/Slave Mode	Yes	
Auto transmit buffers	Yes	
Auto receive buffers	Yes	
Polyurethane cabling	Yes	

Table 16: Technical data for Kvaser Leaf Professional LIN

10 Kvaser Leaf Professional Rugged

10.1 Introduction

Kvaser Leaf Professional Rugged is a one channel USB interface for CAN. In hostile environments where dust and water are the norm, the IP67 rated housing assures reliable protection.

Figure 16: Kvaser Leaf Professional Rugged

10.2 LEDs

The Kvaser Leaf Professional Rugged has four LEDs. Their functions are shown in Table 14.

LED	Function	Description
LED 1 Green	Power	Active when the Kvaser Leaf is powered.
LED 2 Yellow	CAN Tx	Active when CAN messages are being sent.
LED 3 Yellow	CAN Rx	Active when CAN messages are being received.
LED 4 Red	Error	Active when CAN error frames are being detected.

Table 17: Kvaser Leaf Professional Rugged, LEDs

10.3 Technical Data

Technical data exclusive to Kvaser Leaf Professional Rugged HS are listed in Table 18: Specifications for Kvaser Leaf Professional Rugged. For common technical data for all Kvaser Leaf products, see Table 5: Technical data for all Kvaser Leafs.

Property	Kvaser Leaf Professional HS	Unit
CAN physical layer	High speed (ISO 11898-2)	
CAN transceiver	Texas SN65HVD251	
Bit rate	5-1000	Kbit/s
Temperature range	-40-+85	°Celsius
Max message rate	20000	Msg/s
USB speed	12 and 480	Mbit/s
Clock accuracy	1	µs
Time Stamp:	32/64	bits
Clock sync of multiple devices	Yes	
Galvanic isolation	Yes	
Error frame generation	Yes	
Error counters reading	Yes	
Sound indicator	Yes	
Silent mode	Yes	
Auto transmit buffers	Yes	
Auto receive buffers	Yes	
Polyurethane cabling	Yes	
IP Rating	IP 67	

Table 18: Specifications for Kvaser Leaf Professional Rugged

11 Frequently Asked Questions

How many Kvaser Leafs can I connect to my computer?

The theoretical maximum is 127 per USB controller. The present limit, set by the software is 16. If you want to connect more Kvaser Leafs, please contact our support department.

Could I use several hubs?

Yes, but the Kvaser Leafs must be on the same root hub for the Kvaser MagiSync™ to work. For more information, see chapter 2.1, Kvaser MagiSyncTM.

If I reboot my computer, will the Kvaser Leafs and other products have the same channel numbers as before?

Yes, they will try to reuse the old channel numbers. For more information see chapter 3.2, Identification.

How can I identify which Kvaser Leaf has a certain channel number?

Use “Kvaser Hardware” to flash the LEDs on the Kvaser Leaf. For more information see chapter 3.2, Identification.

How do I know which Kvaser Leafs are synchronized?

Use “Kvaser Hardware” to flash the LEDs on an entire MagiSync™ group. For more information see chapter 3.2, Identification.

Do I have to use an external hub to keep the Leafs synchronized?

No, you don’t. See chapter 2.1, Kvaser MagiSyncTM.

As far as I remember pin 7 was not connected on the Kvaser DRVcan LIN so I can connect pin 7 and pin 4 on my LIN bus in order to work with both kinds of cables. Is that correct?

Yes. For more information about LIN, please contact our support department.

12 Support and software updates

Visit our homepage http://www.kvaser.com to find more FAQs and other helpful information.

Support email:

support@kvaser.com

12.1 Driver installation

For driver installation and firmware update see the driver installation documentation.
If you use Windows 2000 or Windows XP, we strongly recommend that you install the latest service pack for that OS before trying to install your Kvaser Leaf.

12.2 Firmware Updates

Firmware updates and upgrade instructions can be found at http://www.kvaser.com/download/. Use “Kvaser Hardware” to see the present firmware version of your Kvaser Leaf.

12.3 Driver Updates

Driver updates and upgrade instructions can be found at http://www.kvaser.com/download/. Use “Kvaser Hardware” to see the present firmware version of your Kvaser Leaf.

13 Legal information

13.1 Electromagnetic compability

All Kvaser Leafs are CE-marked and tested according to the appropriate standards.
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.

13.2 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.)

13.3 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.)

13.4 About this manual

We believe that the information contained herein was accurate in all respects at the time of printing. Kvaser AB cannot, however, assume any responsibility for errors or omissions in this text. Please also note that the information in this document is subject to change without notice and should not be construed as a commitment on the part of Kvaser AB.

13.5 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. Linux® is the registered trademark of Linus Torvalds in the United States and other countries. MagiSync™ is a trademark of Kvaser AB. 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

14 Document revision history

Revision	Date	Changes
1	2006	Older Versions
2	2006-11-13	Reviewed, new layout
3	2008-05-27	Added Kvaser Leaf Light Rugged. Added more information about bus termination. Other minor editorial changes.
4	2008-12-03	Added several new part numbers in Table 1.
5	2009-02-24	Added SemiPro Rugged and Professional Rugged. Added Light with OBDII connector. Removed table 1 with all part numbers – this information is better obtained from our web site.