# Kvaser Leaf Light R v2 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 Leaf Light R v2 users. This document contains a description of the hardware's properties and general instructions for connecting the device to a computer.

# 2 Introduction

This section will describe the functions and features of the Kvaser Leaf Light R v2.

## 2.1 Welcome to Kvaser Leaf Light R v2



Figure 1: Kvaser Leaf Light R v2

Kvaser Leaf Light R v2 is a reliable low cost product. In hostile environments where dust and water are the norm, the IP65 rated housing assures reliable protection. With a time stamp precision of 100 microseconds it handles transmission and reception of standard and extended CAN messages on the bus. It is compatible with applications that use Kvaser's CANlib.

This guide applies to Kvaser Leaf Light R v2 devices listed in Table 1.

| Device | Product Number |
|---|---|
| Kvaser Leaf Light R v2 | 73-30130-00921-9 |

Table 1: Kvaser Leaf Light R v2 devices and their EAN numbers.

## 2.2 Major features

- USB CAN interface.
- IP65 rated lightweight aluminum housing.
- 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 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 Leaf Light R v2 hardware

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

## 3.1 Hardware installation

For the Kvaser Leaf Light R v2 to communicate with the host computer, a compatible version of the Kvaser driver and firmware must be installed.

After the driver has been installed on the host computer, the firmware may then be downloaded and installed on the Kvaser Leaf Light R v2.

The latest version of the driver and firmware can be downloaded from www.kvaser.com/download.

The driver is installed by running the file `kvaser_drivers_setup.exe`.

The Kvaser Leaf Light R v2 may be inserted in any free USB socket on the host computer. You do not need to switch the power off before inserting or removing the device.

For information on how to upgrade the firmware, see Section 4.4, Updating the firmware, on Page 11.

## 3.2 USB connector

The Kvaser Leaf Light R v2 has a standard USB type "A" connector.



Figure 2: A standard USB type "A" connector.

## 3.3 CAN channel

The Kvaser Leaf Light R v2 has one CAN Hi-Speed channel with a 9-pin D-SUB CAN connector. See Section 4.2, CAN connector, on Page 11 for details about the pinout.



Figure 3: 9-pin D-SUB CAN connector

## 3.4 Power supply

The Kvaser Leaf Light R v2 is powered from the USB port.

## 3.5 LED Indicators

The Kvaser Leaf Light R v2 has two LEDs as shown in Figure 4. Their functions are shown in Table 2 on Page 9.




Figure 4: LEDs on the Kvaser Leaf Light R v2.

| LED | Function | Description |
|---|---|---|
| PWR (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. |
| CAN (Yellow) | CAN RxTx | Status for CAN channel. |

Table 2: LEDs on the Kvaser Leaf Light R v2.

## 3.6 Troubleshooting

Use "Kvaser Device Guide" in the Control Panel to verify that the computer can communicate with the Kvaser Leaf Light R v2. 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.

# 4 Appendices

In this section you will find technical information about the Kvaser Leaf Light R v2 and its connectors.

## 4.1 Technical data

In Table 3 below you will find the Kvaser Leaf Light R v2's technical specifications.

| | |
|---|---|
| CAN Channels | 1 |
| CAN Transceivers | TJA1051T (Compliant with ISO 11898-2) |
| CAN Controller | Built into the processor |
| Galvanic isolation | Yes |
| CAN Bit Rate | 50 kbit/s to 1 Mbit/s |
| Time stamp resolution | 100 µs |
| Max message rate | 8000 msg/s |
| Error Frame Detection | Yes |
| Error Frame Generation | No |
| Silent mode | No |
| Kvaser t Script | No |
| Kvaser CANtegrity | No |
| Host interface | USB Hi-Speed |
| Host OS | Windows (7 or later), Linux, Android. |
| Power consumption | Typical 90mA |
| Hardware configuration | Done by software (Plug & Play). |
| Dimensions | 30 x 200 x 17 mm for body incl. strain relief |
| Weight | 148 g |
| Operating temperature | −40 °C to +70 °C |
| Storage temperature | −40 °C to +85 °C |
| Relative humidity | 0 % to 85 % (non-condensing.) |
| IP Rating | IP65 |

Table 3: Technical Specifications.

## 4.2 CAN connector

Kvaser Leaf Light R v2 devices that use the 9-pin D-SUB connector (see Figure 5) have the pinning described in Table 4.

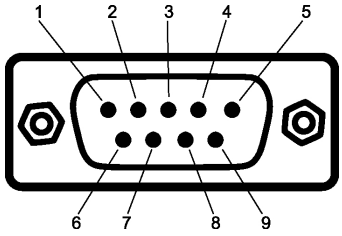


Figure 5: The D-SUB 9 connector pin numbers

| 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 |

Table 4: Configuration of the 9-pin D-SUB

## 4.3 CAN bus termination

Every CAN bus must be terminated with a 120 Ohm resistor at each end of the bus. The Kvaser Leaf Light R v2 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.**

## 4.4 Updating the firmware

For the Kvaser Leaf Light R v2 to communicate with the host computer, compatible versions of the Kvaser CANlib (including driver) and firmware must be installed.

The latest versions of firmware and drivers can be downloaded for free at www.kvaser.com/download.

Connect the Kvaser Leaf Light R v2 to your host computer with the USB cable. Start the update.exe application. A window opens where you should see the device listed if correctly connected to your host computer. Select the device to update and click the Next button. Read the Release Notes carefully.

Click on the Start Upgrade button to start programming. Programming takes approximately 30 s. The progress is displayed on the screen.

If you see any error messages, try to disconnect and reconnect the device, and then perform the operation again.

To verify that the firmware has been updated, open "Kvaser Device Guide" in Control Panel. Select "Kvaser Leaf Light R v2" in the tree view to the left, and click on the channel. The firmware revision information appears in the right half of the window.

# 5 Safety Instructions

## 5.1 Intended Use

Kvaser interfaces are used to connect computer systems to CAN buses. The Kvaser Leaf Light R v2 is intended for connection to a computer via the USB port.

## 5.2 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.

# 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:
https://www.kvaser.com/en/kvaser/recycling-policy.html

# 7 Legal acknowledgements

## 7.1 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 Leaf Light R v2

**Object of the declaration** (identification of apparatus allowing traceability):
Product: Kvaser Leaf Light R v2
Type: 73-30130-00921-9

**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 55032 (2015 + A11:2020)

EN 55035 (2017 + A11:2020)

EN IEC 63000 (2018)

**Signed for and on behalf of:**

| Mölndal | 2025-01-10 | |
|---|---|---|
| Place of issue | Date of issue | Kent Lennartsson, Research Manager |

## 7.2 FCC Regulatory Compliance

KVASER

Federal Communications Commission (FCC) Compliance Information Statement

**IDENTIFICATION OBJECT:**
Product: Kvaser Leaf Light R v2
Type: 73-30130-00921-9

**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.
41650 Gardenbrook Road, Suite 130
Novi, MI 48375

Internet contact: support@kvaser.com

## 7.3 Patents, Copyrights and Trademarks

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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.

# 8 Document Revision History

Version history for document UG_98186_leaf_light_r_v2:

| Revision | Date | Changes |
|---|---|---|
| 1 | 2017-01-18 | Initial version. |
| 2.0 | 2017-08-25 | Updated EU Declaration of Conformity. |
| 2.1 | 2018-01-29 | "Kvaser Device Guide" has replaced "Kvaser Hardware". |
| 2.2 | 2018-05-07 | Minor textual changes. |
| 2.3 | 2018-08-28 | Minor textual changes. |
| 3.0 | 2018-10-15 | Updated EU Regulatory Compliance. |
| 3.1 | 2019-02-11 | Minor textual changes. |
| 3.2 | 2019-08-09 | Url protocol updated. |
| 3.3 | 2020-01-27 | Added sdoc. |
| 3.4 | 2020-05-06 | Updated Technical data table with galvanic isolation. |
| 3.5 | 2020-08-27 | Updated supported OS. |
| 3.6 | 2022-04-01 | Added Android to Technical data table, minor textual changes. |
| 3.7 | 2023-02-13 | Updated the Technical data table. Added section about intended use. Minor textual changes. |
| 3.8 | 2024-03-15 | Updated Kvaser logo. |
| 3.9 | 2025-01-10 | Updated EU Declaration of Conformity. |
| 3.10 | 2026-08-17 | Minor textual changes. |