Kvaser Memorator Light HS 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 Memorator Light HS 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 Memorator Light HS v2.

You must charge the battery before using your Kvaser Memorator Light HS v2 for the first time. See Section 3.4, Power supply, on Page 8 for more information.

2.1 Welcome to Kvaser Memorator Light HS v2

Figure 1: Kvaser Memorator Light HS v2

The Kvaser Memorator Light HS v2 is an advanced portable CAN data logger. The device features two CAN message buffers that are used as ring (FIFO) buffers. One buffer logs all messages on the bus. The other buffer logs approximately 1000 messages before and 1000 messages after any error frame.

When a ring buffer is full, it is automatically overwritten from the beginning. An external LED indicates when either of the ring buffers is being overwritten.

The Kvaser Memorator Light HS v2 automatically determines the correct CAN bus bit rate, removing the need for configuration – just plug and play.

Also, the Kvaser Memorator Light HS v2 has a built-in flash disk that cannot be accidentally lost, misplaced, or mixed up with other disks.

This guide applies to Kvaser Memorator Light HS v2 devices listed in Table 1 on Page 6.

Device	Product Number (EAN)	Firmware
Kvaser Memorator Light HS v2	73-30130-01058-1	v3.14

Table 1: Kvaser Memorator Light HS v2 devices and their product numbers.

2.2 Major features

- Data logger
- Quick and easy plug-and-play installation.
- Pre-configured data logging.
- Runs in silent mode – logs bus traffic without interference.
- Automatically adjusts to the CAN bus signaling rate (autobaud feature).
- Logger status is indicated with externally visible LEDs.
- Fixed 1 GB internal disk.
- Data logger with two fixed-size ring buffers – one for all messages, and one for error frames with pre- and post-trigger buffers.
- Built-in real time clock (calendar) with battery backup.
- Supports both 11-bit (CAN 2.0A) and 29-bit (CAN 2.0B active) identifiers.
- Fully compatible with J1939, CANopen, NMEA 2000® and DeviceNet.

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 Memorator Light HS 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 Memorator Light HS 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 Memorator Light HS 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 Memorator Light HS 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 4.5, Updating the firmware, on Page 14.

3.2 USB connector

The Kvaser Memorator Light HS v2 has a standard USB type "B" female connector.

Connect the device to your computer using any high quality USB 2.0 certified cable. The maximum total USB cable length is 5 m (~ 16 ft).

As USB cables become longer they are more sensitive to EMI, because they make a longer antenna that can pick up more noise. These issues can be mitigated by using higher quality cables with better shielding. Thicker cables tend to be better than thin ones, and braided shielding tends to be more reliable than only foil. Furthermore, longer cables may introduce signal degradation and timing issues that, if necessary, can be mitigated using shorter cable segments combined with hubs that amplify the signal and handle delays on a per-cable basis.

3.3 CAN channels

The Kvaser Memorator Light HS v2 has one CAN Hi-Speed channel with a 9-pin D-SUB CAN connector (see Figure 2 on Page 8). See Section 4.2, CAN connectors, on Page 12 for pinout information.

Figure 2: CAN connector on Kvaser Memorator Light HS v2

3.4 Power supply

The device does not have internal galvanic isolation, therefore supplying power on both USB and CAN side at the same time may damage the device unless both power sources have the same electric ground potential.

The Kvaser Memorator Light HS v2 can be powered through the CAN connector or through the USB connector.

To operate the Kvaser Memorator Light HS v2 in logger mode, you **must** supply power through the CAN connector. To configure the device, power the device via USB.

The Kvaser Memorator Light HS v2 contains a battery that needs to be fully charged before using the device for the first time. Connect the Kvaser Memorator Light HS v2 to either a powered USB port or supply power through the CAN connector and let the battery charge overnight.

The battery inside the Kvaser Memorator Light HS v2 is used for powering the real time clock and ensuring a safe shutdown of the device when disconnected.

To maintain a healthy battery you need to:

- Always connect the Kvaser Memorator Light HS v2 to a properly powered USB hub, using the supplied cable, when connected to a computer.
- If the Kvaser Memorator Light HS v2 is not used regularly, ensure the device is recharged at least twice a year overnight at room temperature.

All charging times are given at temperatures between −10 °C to +40 °C. In warmer and colder temperatures the charging time will increase.

See Section 4.2, CAN connectors, on Page 12 for information on how to connect power to the connector. The supply power should be in the range specified in Section 4.1, Technical data, on Page 12.

3.5 Flash disk

The disk in the Kvaser Memorator Light HS v2 is permanently installed inside the device and cannot be replaced by the user.

3.6 LED Indicators

The Kvaser Memorator Light HS v2 is equipped with four LED indicators. The following tables describe the status functions of the LEDs.

Figure 3: LEDs on the Kvaser Memorator Light HS v2.

LED	General meaning
PWR (Green)	Power and general status
CAN (Yellow)	Status for CAN channel
ERR FR (Yellow)	Error frames, and FIFO status
ERR (Red)	Indicates temporary or permanent errors

Table 2: LED indicators overview

PWR (Green)	CAN (Yellow)	ERR FR (Yellow)	ERR (Red)	Meaning
	short flash			Receiving CAN messages on the CAN channel
	blink		blink	The CAN channel is error passive
	slow flash		slow flash	The CAN channel is bus off
		short flash		Receiving Error frames on the CAN channel
steady				Autobaud successfully completed. The device is logging to disk.
slow blink (1 Hz)				Autobaud in progress
flash			steady	Error. Using the device as a CAN interface is not supported by the hardware.

Table 3: LED indicators: CAN bus status

ERR FR (Yellow)	Meaning
steady	One or both of the FIFOs (ring buffers) are full and are being overwritten

Table 4: LED Indicators: FIFO status

ERR	Meaning
constant red, one yellow flash	CAN overrun
constant red, two yellow flashes	(this error code is not used)
constant red, three yellow flashes	Configuration file missing or corrupt
constant red, four yellow flashes	Disk error
constant red, five yellow flashes	Internal error; please contact support

Table 5: LED indicators: Error conditions

PWR (Green)	Meaning
steady	Autobaud successfully completed. The device is logging to disk.

Table 6: LED indicators: Logging status

PWR (Green)	CAN (Yellow)	ERR FR (Yellow)	ERR (Red)	Meaning
"Running lights" on all LEDs				The device is communicating with the tool
		blink		Disk activity such as formatting

Table 7: LED indicators: When connected to Kvaser Memorator Tools

PWR (Green)	ERR (Red)	Meaning
flash every few seconds		No USB communication. Check USB cables and communication. Unplug the device and reconnect it after a few seconds. Check that the device driver is installed correctly.
flash	steady	Firmware configuration error. This should not normally happen. Please contact the support.

Table 8: LED indicators: Other light patterns

3.7 Autobaud

The autobaud function is activated when connecting the Kvaser Memorator Light HS v2 to a powered CAN connector. It will always try to connect with the last used bitrate first. Please note that it is necessary to disconnect and re-connect Kvaser Memorator Light HS v2 to the CAN connector in order to change its bitrate.

3.8 Troubleshooting

Use "Kvaser Device Guide" in the Control Panel to verify that the computer can communicate with the Kvaser Memorator Light HS 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. If the battery has been depleted, no LEDs will light up. Connect the Kvaser Memorator Light HS v2 to either a properly powered USB port or supply power through the CAN connector and let the battery charge overnight.

If formatting fails, check that Kvaser Memorator Light HS v2 is connected to a properly powered USB hub and let the battery charge for a few hours before retrying.

4 Appendices

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

4.1 Technical data

In Table 9 below you will find the Kvaser Memorator Light HS v2's technical specifications.

CAN Channels	1
CAN Transceivers	MCP2561FD (Compliant with ISO 11898-2)
CAN Controller	Kvaser CAN IP in FPGA
Galvanic isolation	No
CAN Bit Rate	20 kbit/s to 1 Mbit/s
CAN FD Bit Rate	No
Time stamp resolution	2 µs
Max message rate	20000 msg/s
Error Frame Detection	Yes
Error Frame Generation	No
Autobaud	Yes
Silent mode	Yes - Always on
Kvaser MagiSync	No
Kvaser t programming	No
Kvaser CANtegrity	No
Host interface	USB 2.0
Host OS	Windows (7 or later), Linux.
External power	9–40 V
Power consumption	Up to 3W
Hardware configuration	Done by software (Plug & Play).
Dimensions	46 x 127 x 22 mm for body incl. strain relief
Weight	150 g
Operating temperature	−40 °C to +85 °C
Storage temperature	−40 °C to +85 °C
Relative humidity	0 % to 85 % (non-condensing.)

Table 9: Technical Specifications

4.2 CAN connectors

Kvaser Memorator Light HS v2 devices that use the 9-pin D-SUB connector (see Figure 4 on Page 13) have the pinning described in Table 10 on Page 13.

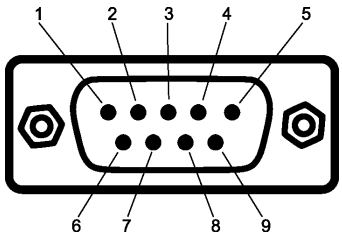

Figure 4: The D-SUB 9 connector pin numbers

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	Power supply to the device

Table 10: 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 Memorator Light HS 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 Kvaser Memorator Config Tool

The Kvaser Memorator Config Tool is required for two tasks:

1. To extract logged data
2. To clear or reinitialize the built-in disk

For further information about the Kvaser Memorator Tools, please refer to the program's online help.

4.5 Updating the firmware

For the Kvaser Memorator Light HS 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 Memorator Light HS v2 to your host computer with the USB cable and start the update.exe application. A window opens showing the Firmware Update Instructions; read and follow those carefully.

To check the current firmware version, open "Kvaser Device Guide" which can be found in the Control Panel. Select "Kvaser Memorator Light HS v2" in the tree view to the left, and click on the channel. The firmware revision information now 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 Memorator Light HS 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.

Dispose of batteries 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 Memorator Light HS v2

Object of the declaration (identification of apparatus allowing traceability):
Product: Kvaser Memorator Light HS v2
Type: 73-30130-01058-1

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 Memorator Light HS v2
Type: 73-30130-01058-1

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.
23881 Via Fabricante, Suite 503
Mission Viejo, CA 92691

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.

8 Document Revision History

Version history for document UG_98214_memo_light:

Revision	Date	Changes
1.0	2019-02-11	Initial version.
2.0	2019-05-08	Added chapter Autobaud.
2.1	2019-08-09	Url protocol updated.
2.2	2019-08-27	Troubleshooting updated.
2.3	2020-01-27	Added sdoc.
2.4	2020-08-19	Updated supported OS.
2.5	2022-04-01	Minor textual changes.
2.6	2023-02-20	Updated the Technical data table. Added section about intended use.
2.7	2024-03-15	Updated Kvaser logo.
2.8	2025-01-10	Updated EU Declaration of Conformity.