Kvaser Ethercan Light User's Guide

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Contents

1   About this manual

This manual is intended for Kvaser Ethercan Light users. This manual contains a description of the hardware properties and general instructions for connecting the device to a computer.

2 Introduction

This section will describe the functions and features of the Kvaser Ethercan Light.

2.1 Welcome to Kvaser Ethercan Light

Figure 1: Kvaser Ethercan Light

The Kvaser Ethercan Light is a powerful real time Ethernet to CAN interface. With a time stamp precision of 100 microseconds, the Kvaser Ethercan Light handles transmission and reception of standard and extended CAN messages on the bus. The Kvaser Ethercan Light is compatible with applications that use Kvaser's CANlib.

This guide is applicable to the Kvaser Ethercan Light devices listed in Table 1.

Device	Product Number
Kvaser Ethercan Light HS	73-30130-00713-0

Table 1: Kvaser Ethercan Light device and its EAN number.

Throughout this document, we use the name Kvaser Ethercan Light to mean any one of the different Kvaser Ethercan Light products listed in Table 1, unless otherwise noted.

2.2 Major features

- Quick and easy plug-and-play installation.

- Supports ISO 11898-1 with both 11-bit and 29-bit CAN identifiers.

- Large on-board RAM buffer for CAN messages.

- 100 % compatible with applications written for Kvaser hardware such as LAPcan, PCIcan, and USBcan with Kvaser CANlib.

- One high-speed CAN connection (compliant with ISO 11898-2), 40 kbit/s up to 1 Mbit/s.

- Fully compatible with J1939, CANopen, NMEA 2000 and DeviceNet.

- Ethernet connection with auto-MDIX using a standard shielded RJ45 socket.

- Built-in Power over Ethernet (PoE), allows the device to receive both data and power over a single Ethernet cable.

- Small, lightweight plastic housing — easy to tuck away (e.g. in a vehicle during a test drive)

- Supports extreme data throughput, quick reaction times and precise time stamping — removing any bottlenecks.

2.3 Additional software and documentation

The Kvaser CANlib SDK includes everything you need in order to develop software for the Kvaser CAN hardware. It contains full documentation and many sample programs, written in C, C++, C#, Delphi, Python and Visual Basic. All Kvaser CAN interface hardware share a common software API. Programs written for 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 http://www.kvaser.com/download/.

3 Kvaser Ethercan Light hardware

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

3.1 Hardware installation

The Kvaser Ethercan Light may be inserted in any free Ethernet socket. If the Ethernet socket does not support Power over Ethernet, power must be supplied on the CAN connector. For the Kvaser Ethercan Light 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 Ethercan Light and the driver is installed on the computer.

The delivery package Kvaser Ethercan Light contains:

- Kvaser Ethercan Light.

- Software and Driver CD, containing: drivers for Windows, Kvaser CANKing - an easy to use CAN bus monitor, RP1210A support, LabView support, DIAdem driver, and Kvaser CANlib Software Development Kit.

- Kvaser Ethercan Light User's Guide (on the CD).

- Ethercan Factory Reset Device.

3.2 Network connector

The Kvaser Ethercan Light has a standard shielded RJ45 socket (STP) ethernet connector, see Figure 2 on Page 8. Connect the Kvaser Ethercan Light to your network or directly to your PC for first time configuration. For more information on how to configure the Kvaser Ethercan Light see Section 4, How to use the Kvaser Ethercan Light, on Page 11.
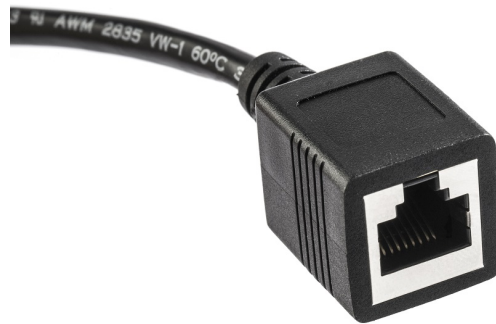
Figure 2: Network connector on the Kvaser Ethercan Light.

3.3   Ethercan Factory Reset Device

The Ethercan Factory Reset Device, see Figure 3, is used to reset the Kvaser Ethercan Light configuration. To perform a factory reset see Section 4.3, Reset device to factory settings, on Page 15.

Figure 3: Ethercan Factory Reset Device

3.4   CAN channels

The Kvaser Ethercan Light has one CAN Hi-Speed channel with a 9-pin DSUB connector. See Section 5.2, CAN connector, on Page 17 for details about the connector.

3.5 Power supply

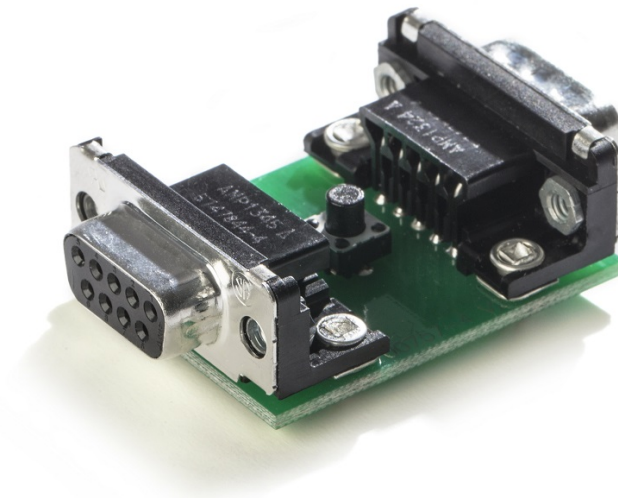The Kvaser Ethercan Light is powered either from the Ethernet connector using PoE or from the CAN connector. The Kvaser Ethercan Light is compliant with PoE IEEE 802.3af supporting both Mode A (endspan) and Mode B (midspan).

3.6 LED indicators

The Kvaser Ethercan Light has four LEDs as shown in Figure 4.

Figure 4: LEDs on the Kvaser Ethercan Light.

LED	General meaning
PWR (Green)	Steady light when unit is powered and working.
CAN (Yellow)	CAN channel status.
ERR (Red)	Indicates different types of errors.
LAN (Yellow)	LAN connection status.
	Fast flashing when waiting for DHCP lease.
	Slow flashing when ready for connection as remote device.
	Steady light when device is connected as a remote device.

Table 2: LEDs on the Kvaser Ethercan Light.

The ERROR LED indicator can give more information about the cause of failure, see Table 3 on Page 10.

ERROR LED Signal	Auxiliary Signal	General Meaning
Blink	CAN LED blinks	CAN channel is in error passive mode
Slower blink	CAN LED blinks	CAN channel is bus off
Short flash	-	Error frame detected

Table 3: ERROR LED Indicator Signals

4 How to use the Kvaser Ethercan Light

4.1 Initial setup on network with DHCP

Connect the Kvaser Ethercan Light to the network and start Kvaser Network Device Selector found in Kvaser Hardware, see Figure 5.
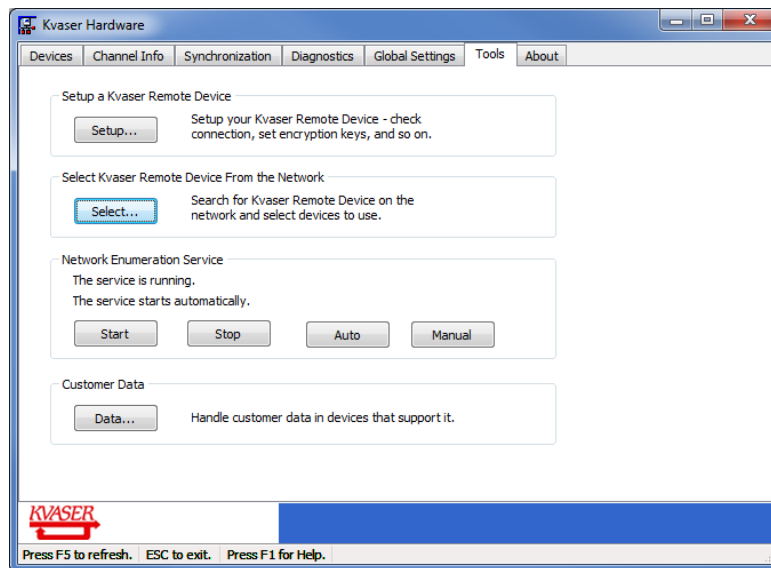

Figure 5: Kvaser Network Device Selector is found in Kvaser Hardware

The new device will be available in the Kvaser Network Device Selector, see Figure 6 on Page 12.
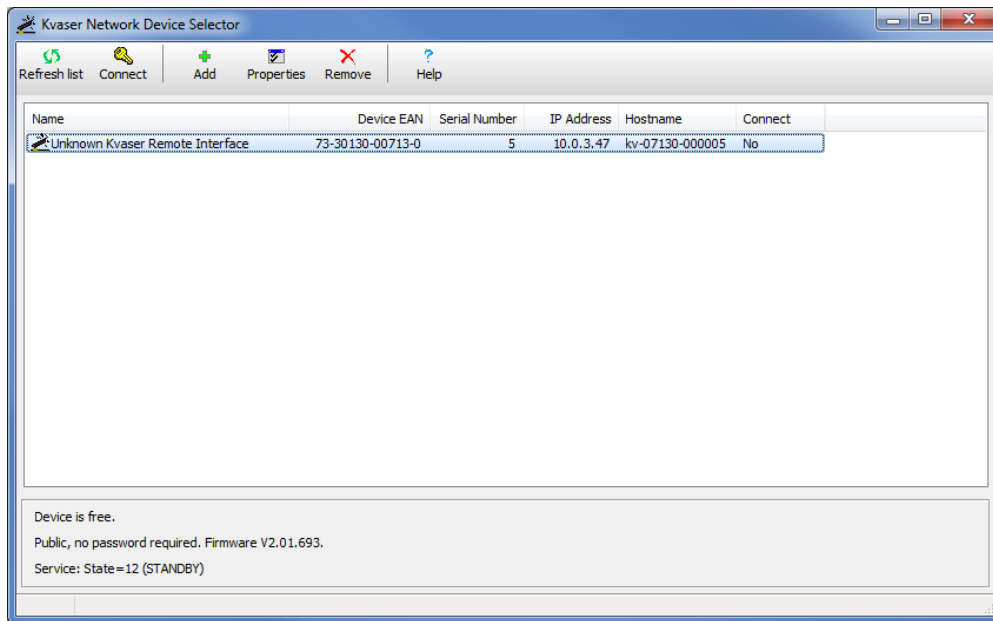
Figure 6: The new device is found in Kvaser Network Device Selector

4.2   Initial setup on network with static IP

The factory setting uses Windows APIPA[1]. To initially configure the Kvaser Ethercan Light for a static IP, connect the device directly to your computer's network connector and the new device will be available in the Kvaser Network Device Selector (using an IP in the range 169.254.0.1 to 169.254.255.254), see Figure 7 on Page 13.

You can now connect to the device by clicking the Connect button, then start Kvaser Remote Device Configuration (found in Kvaser Hardware) and select your device, see Figure 8 on Page 13.

You will be informed that the parameter area is blank, which is a normal condition for new devices, see Figure 9 on Page 14.

Change the Network Settings to the preferred settings and click OK, see Figure 10 on Page 14.

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[1]APIPA (Automatic Private IP Addressing) is a DHCP failover mechanism for local networks. When a DHCP server fails, APIPA allocates IP addresses in the private range 169.254.0.1 to 169.254.255.254. APIPA exists in all modern versions of Windows except Windows NT.
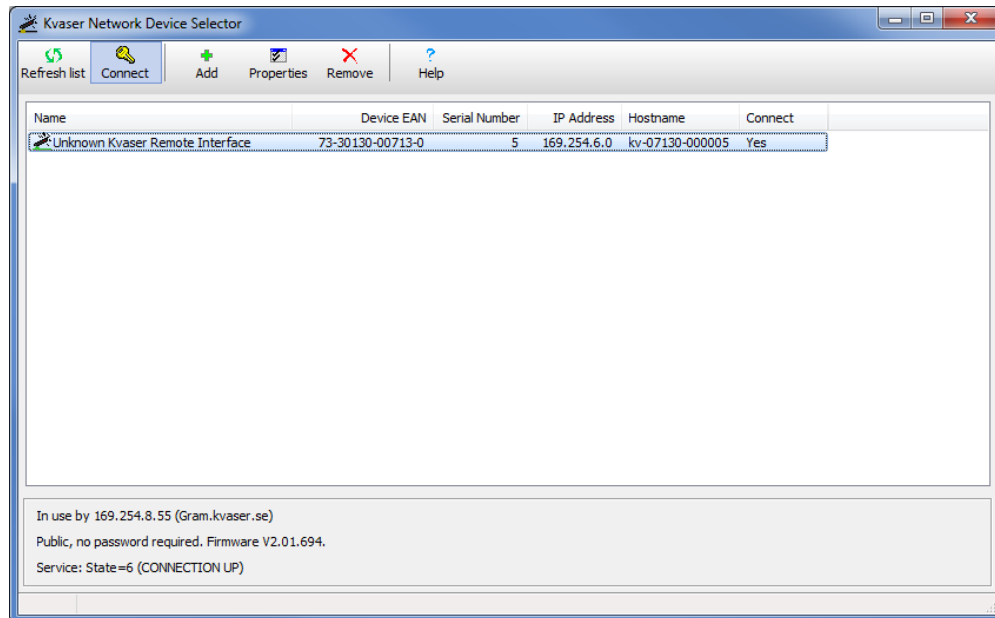
Figure 7: The new device is found in Kvaser Network Device Selector
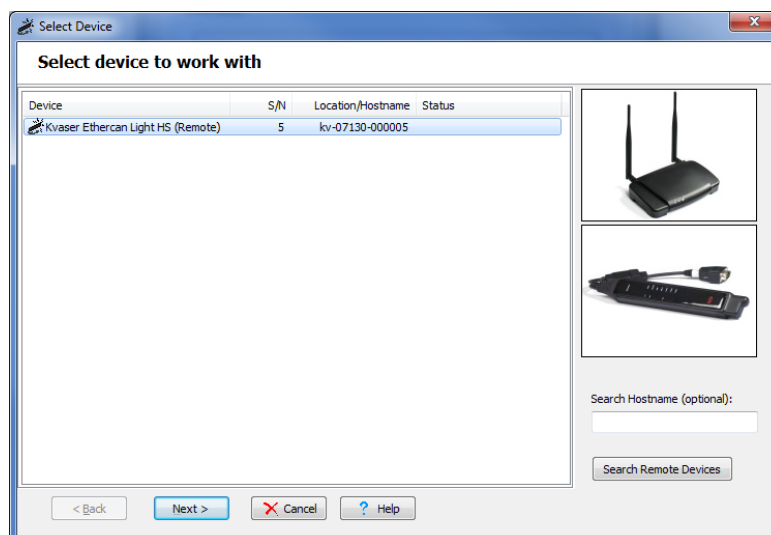

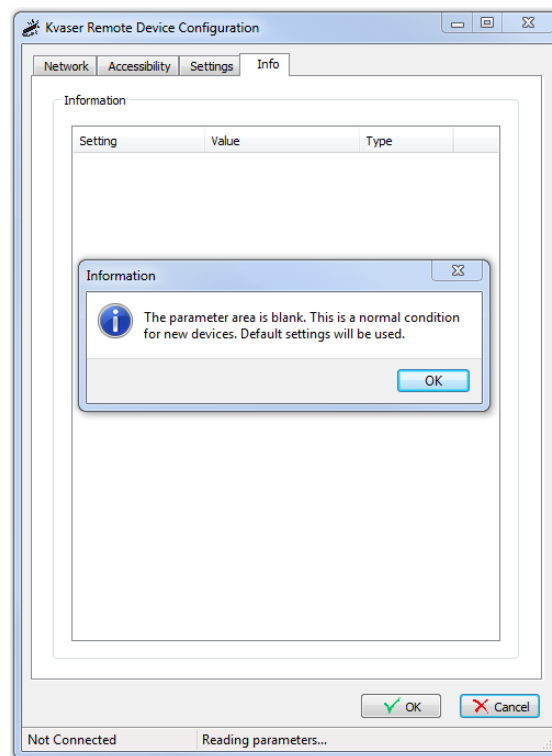Figure 8: Select device in Kvaser Remote Device Configuration

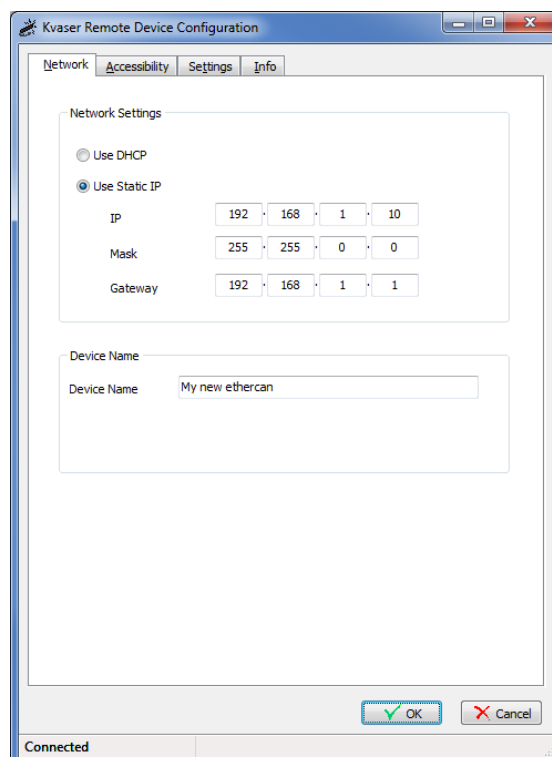Figure 9: Kvaser Remote Device Configuration starting up

Figure 10: Kvaser Remote Device Configuration network settings

4.3   Reset device to factory settings

To reset the Kvaser Ethercan Light to factory settings using the Ethercan Factory Reset Device, connect the Ethercan Factory Reset Device directly to the CAN connector on the Kvaser Ethercan Light and follow the steps in Section 4.3.1 Factory reset procedure.
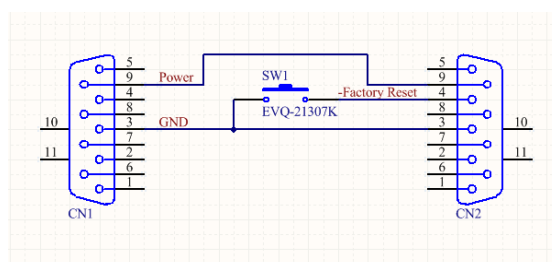
Figure 11: Ethercan Factory Reset Device schematic.

Male D-SUB (CN1)	Function
3	GND
4	Not connected
9	Power supply to the device

Table 4: Ethercan Factory Reset Device pin configuration for Male D-SUB (CN1)

Female D-SUB (CN2)	Function
3	GND
4	Factory Reset. By pushing the button SW1, this pin will be connected to GND.
9	Power supply to the device

Table 5: Ethercan Factory Reset Device pin configuration for Female D-SUB (CN2)

> ⚠️ If the Ethercan Factory Reset Device is connected to the Kvaser Ethercan Light it can not be used for normal CAN traffic since CAN high/low are not forwarded within the Ethercan Factory Reset Device.

4.3.1   Factory reset procedure

1. First connect the Ethercan Factory Reset Device to the Kvaser Ethercan Light CAN connector. If the Kvaser Ethercan Light is powered through the CAN connector the Ethercan Factory Reset Device should be placed in between.

2. Press and hold the button on the Ethercan Factory Reset Device (this will connect the Factory reset pin to ground).

3. Apply power to the Kvaser Ethercan Light

4. Let the device boot up and the CAN and ERR LEDs will have a steady light

5. After 5 s the CAN and ERR LEDs start flashing, release the button on the Ethercan Factory Reset Device

6. The Kvaser Ethercan Light will now reboot with factory default settings.

If the button has not been released after 10 s, the device will continue normal operation without reebooting. The CAN and ERR LEDs will now also stop flashing.

4.4 Troubleshooting

Use "Kvaser Hardware" in the Control Panel to verify that the computer can communicate with the Kvaser Ethercan Light. If the firmware version shown is all zeroes, there are communication problems.

5 Appendices

In this section you will find technical information about Kvaser Ethercan Light and the device's connectors.

5.1 Technical data

In Table 6 below you will find the Kvaser Ethercan Light technical specifications.

CAN Channels	1
CAN Transceiver	TJA1051T (Compliant with ISO 11898-2)
CAN Bit Rate	40 kbit/s up to 1 Mbit/s
Time stamp resolution	100 µs
Max message rate	8000
Error Frame Detection	Yes
Error Frame Generation	No
Silent mode	No
PC interface	Ethernet (using Power over Ethernet)
Ethernet interface	Ethernet IEEE 802.3u 100BASE-TX
Ethernet connector	Shielded RJ45 socket STP
Galvanic isolation	Yes
Power Supply	PoE (Power over Ethernet) IEEE 802.3af or CAN +9 V to +35 V DC
Power consumption	Typical 1.2 W
Software requirements	Windows (XP with SP3 or later)[1].
Hardware configuration	Done by software.
Dimensions	35 x 165 x 17 mm for body incl. strain relief
Weight	120 g including cables and connectors.
Operating temperature	−20 °C to +70 °C
Storage temperature	−40 °C to +85 °C
Relative Humidity	0 % to 85 % (non-condensing.)

Table 6: Technical specifications.

5.2 CAN connector

Kvaser Ethercan Light devices that uses the 9-pin D-SUB connector (see Figure 12 on Page 18) has the pinning described in Table 7 on Page 18.

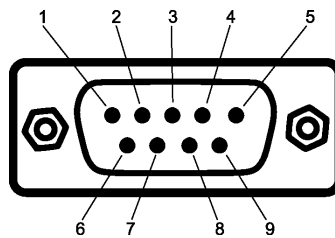[1]For other operating systems, contact Kvaser support.

Figure 12: The D-SUB 9 connector pin numbers

D-SUB pin number	Function
1	Not connected
2	CAN_L
3	GND
4	Factory Reset
5	Shield
6	Not connected.
7	CAN_H
8	Not connected.
9	Power supply to the device

Table 7: Configuration of the 9-pin DSUB

The Factory Reset input is only used to reset the device to factory settings, see Section 4.3, Reset device to factory settings, on Page 15.

5.3   CAN bus termination

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

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:
http://www.kvaser.com/en/kvaser/recycling-policy.html

7 Legal acknowledgements

7.1 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-LEVER SYSTEM, WHICH MAY BE DEFECTIVE.

7.2   EC Regulatory Compliance

The product(s); 73-30130-00713-0, is in conformity with the essential requirements of the following regulations and directives:

- DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 (WEEE)

- REGULATION (EC) No. 1907/2006 (REACH), Annex XIV (the 'Candidate list') and Annex XVII ('Restriction of Substances')

The products listed above also complies with DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 (RoHS) and is in conformity with the following standards and/or other normative documents:

Standard	Description
EN 50 581 (2012)	Assessment with respect to restriction of hazardous substances

Table 8: Standards and normative documents for RoHS 2011

The products listed above also complies with DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 (EMC-directive) and is in conformity with the following standards and/or other normative documents:

Standard	Description
EN 55 022 (2010)	Class B, radiated. IT equipment, commercial emission
EN 55 024 (2010)	IT equipment, commercial immunity

Table 9: Standards and normative documents for EMC 2004

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/her own expense.

7.3   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.

Adobe, the Adobe logo, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or 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.

8 Version history

Version history for document UG_98155_ethercan_light:

Revision	Date	Changes
1.0	2014-04-23	Initial version
1.1	2015-01-08	Minor update