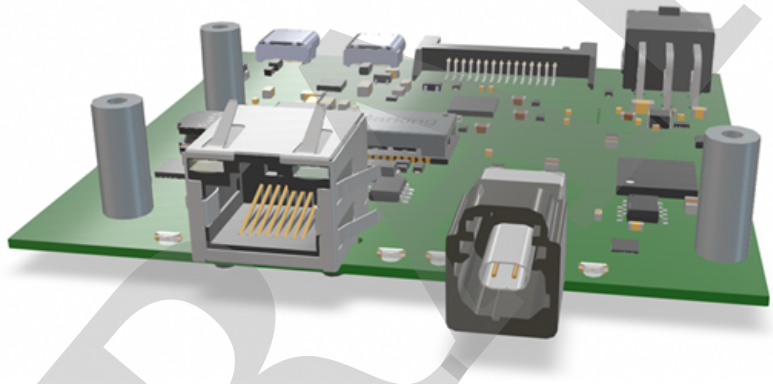
Kvaser Arcus 100/1000BASE-T1 H-MTD User's Guide



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Contents

1 About this manual

This manual is intended for Kvaser Arcus 100/1000BASE-T1 H-MTD 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 Arcus 100/1000BASE-T1 H-MTD.

2.1 Welcome to Kvaser Arcus 100/1000BASE-T1 H-MTD

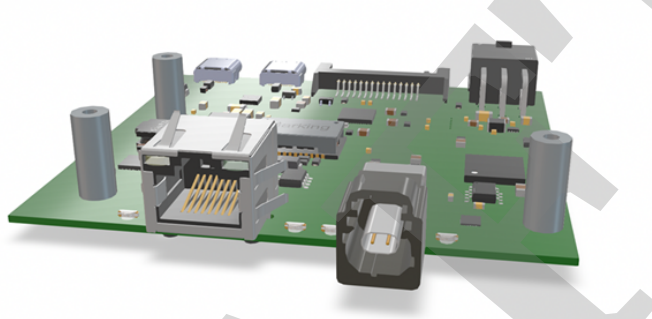

Figure 1: Kvaser Arcus 100/1000BASE-T1 H-MTD

Kvaser Arcus 100/1000BASE-T1 H-MTD is a small, yet advanced, Automotive Ethernet media converter. It converts in full duplex mode an Ethernet communication link established between two physical layers, Automotive Ethernet 100/1000 BASE-T1 and Standard Ethernet 100/1000 BASE-T.

Device	Product Number	Firmware Version
Kvaser Arcus 100/1000BASE-T1 H-MTD	73-30130-01810-5	0.1.0

Table 1: Firmware version needed to support all functionality present in this guide.

2.2 Major features

- Flash ECUs over Automotive Ethernet (DoIP or IP/Ethernet stacks), bridging the vehicle's Ethernet bus to a developer laptop or server.
- Evaluate how an ECU behaves under specific link conditions by injecting packets to test reliability and compliance.
- Use during development of Ethernet-enabled ECUs or gateways as a media bridge for debugging and logging traffic.
- Serves as an Ethernet connection point during cybersecurity testing to inspect secure traffic or test resistance to MAC-level injection attacks.
- Simulates unavailable ECUs in a partial network using applications.
- Connects to a data logger or test PC to monitor Automotive Ethernet traffic from a running development vehicle.
- Enables test of early-boot communication between ECUs and bootloaders over Automotive Ethernet.
- Complies with the requirements of R155/ISO 21434 and CRA/IEC 62443.
- Support of Secure Boot.

2.3 Additional software and documentation

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

3 Kvaser Arcus 100/1000BASE-T1 H-MTD hardware

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

3.1 Hardware Installation

The Kvaser Arcus 100/1000BASE-T1 H-MTD is primarily intended to be mounted in an embedded computer.

To facilitate installation in a PC the Kvaser ATX Bracket Arcus 100/1000BASE-T1 H-MTD can be used, product number 73-30130-01811-2.

3.2 Ethernet connection

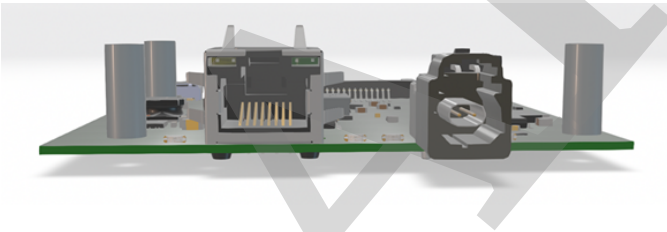

Figure 2: Ethernet connectors on Kvaser Arcus 100/1000BASE-T1 H-MTD

For the Standard Ethernet 100/1000 BASE-T port a RJ45 8p8 connector is used, located to the left in Figure 2. In the current implementation the BASE-T port is configured to operate at the speed of the Base-T1 port, i.e if the Base-T1 port is connected at 100 Mbps the Base-T port will also operate at 100 Mbps. The BASE-T port only supports Full Duplex mode and Auto-Negotiation according to IEEE.

For the Automotive Ethernet 100/1000 BASE-T1 port a H-MTD connector with Z-key is used, located to the right in Figure 2.

3.3 USB Type-C sockets

To be able to configure and monitor the product, connect a USB cable from the host system to the connector marked USBIN as can be seen in Figure 3 on Page 8. If multiple products are used it is possible to chain them by connecting the next interface to USBOUT (see Figure 3 on Page 8) instead of occupying more USB ports from the host.

The number of devices that can be chained is limited by the USB standard, which caps you at 5 hubs in a chain, plus the root hub (inside your computer) as Tier 0.

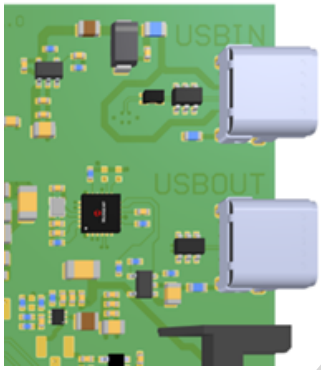

Figure 3: USB Type-C sockets on the rear side

3.4 Power supply

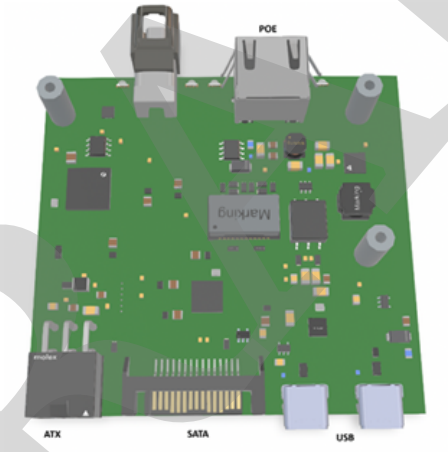

Figure 4: Connectors that supply the Kvaser Arcus 100/1000BASE-T1 H-MTD

Power to the product can be supplied in four different ways.

- USBIN
- SATA
- ATX
- Power over Ethernet (PoE)

PoE has the highest priority. SATA and ATX is next in priority and if no other source exist power is taken from USB. All different power sources can safely be connected at the same time, the connectors can be seen in Figure 4.

3.5 LEDs

There are four LEDs on the front side of the Kvaser Arcus 100/1000BASE-T1 H-MTD as shown in Figure 5 on Page 9.

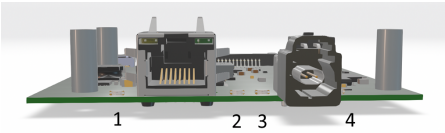

Figure 5: LED indicators on the front side of Kvaser Arcus 100/1000BASE-T1 H-MTD

The LEDs indicate the status of power and the two Ethernet channels according to the list below shown in Table 2. The meaning of each individual LED is described in further detail in the **Device status** list as well as Tables 3, 4 and 5.

LED	Function
1	Device status
2	100/1000BASE-T link status
3	100/1000BASE-T1 link status
4	100/1000BASE-T1role

Table 2: LED indicators on Kvaser Arcus 100/1000BASE-T1 H-MTD.

Device status:

- Power on: Solid green - indicates the device is powered and initialized without faults.

100/1000BASE-T link status:

State	Description	LED Pattern	Color
No link	No physical connection or link loss	Off	–
Link up - 100 Mbit/s	Active link, 100 Mbit/s negotiated	Solid	Blue
Link up - 1000 Mbit/s	Active link, 1000 Mbit/s negotiated	Solid	Green

Table 3: 100/1000BASE-T link status indication.

100/1000BASE-T1 link status:

State	Description	LED Pattern	Color
No active link	Interface idle or waiting for auto-negotiation	Breathing	Purple
100 Mbit/s (no link)	auto-negotiation complete, link partner not yet active	Breathing	Blue
1000 Mbit/s (no link)	auto-negotiation complete, link partner not yet active	Breathing	Green
Link up - 100 Mbit/s	Active connection	Solid	Blue
Link up - 1000 Mbit/s	Active connection	Solid	Green

Table 4: 100/1000BASE-T1 link status indication.

100/1000BASE-T1 role:

This LED indicates role (Leader / Follower = Master / Slave).

State	Description	LED Pattern	Color
No active link - auto-negotiation	Role detection in progress	Breathing	Purple
No active link - Follower	Role fixed: Follower (Slave)	Breathing	Red
No active link - Leader	Role fixed: Leader (Master)	Breathing	Green
Active link - Follower	Link established	Solid	Red
Active link - Leader	Link established	Solid	Green

Table 5: 100/1000BASE-T1 role indication.

3.6 Technical data

Ethernet Channel 1	100/1000 BASE-T, RJ45 8p8
Ethernet Channel 2	100/1000 BASE-T1, H-MTD Key Z
USB IN	USB 2.0 Type-C
USB OUT	USB 2.0 Type-C
Power input	PoE, USB 2.0, ATX, SATA
Power consumption	t.b.d
TC10 Compliance (T1 PHY)	Yes, tbc
Secure boot	Yes, tbc
Packet Generator	Yes, tbc
Signal Quality Indicator	Yes, tbc
Bit Error Rate Analysis	Yes, tbc
Cable Tester (T1 PHY)	Yes, tbc
Dimensions depth, width, height	80 x 85 x 20 mm
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
Relative Humidity	0% to 85% (non-condensing.)

Table 6: Technical specifications of Kvaser Arcus 100/1000BASE-T1 H-MTD.

4 Troubleshooting

In case of problems using Kvaser Arcus 100/1000BASE-T1 H-MTD, please contact Kvaser Support at support@kvaser.com.

5 Safety Instructions

5.1 Intended Use

The Kvaser Arcus 100/1000BASE-T1 H-MTD is intended for high-speed Ethernet media conversion between automotive and standard ethernet. Enabling reliable point-to-point communication with sensors, ECUs, and other T1-based devices.

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 Arcus 100/1000BASE-T1 H-MTD

Object of the declaration (identification of apparatus allowing traceability):
Product: Kvaser Arcus 100/1000BASE-T1 H-MTD
Type: 73-30130-01810-5

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 61000-6-2 (2019)

EN IEC 63000 (2018)

Signed for and on behalf of:

Mölndal	2025-11-20	
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 Arcus 100/1000BASE-T1 H-MTD
Type: 73-30130-01810-5

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.

The products described in this document are protected by U.S. patent 5,696,911.

8 Document Revision History

Version history for document UG_98434_arcus_100-1000BASE-T1_H-MTD:

Revision	Date	Changes
1.0	2025-11-04	Initial version.