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	Document: User Instructions Manual		
	Rev: 03	Date: 10-July-2024	Company: AED Vantage


# CruEther 100M USB

## Automotive Ethernet Network Adapter AEC-1MM-100T1-USB

### User Instructions Manual


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Date: 10-July-2024

REVISION HISTORY			
REV	DATE	AUTHOR	DESCRIPTION
01	27-Jun-2024	Danny Meyer	Document creation.
02	03-Jul-2024	Ralf Mayer	Cable products added
03	10-Jul-2024	Danny Meyer	Added section 9.2 Application Note, added section 1.3 Compatible Equipment, minor changes

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## Terms and Acronyms

Term/Acronym	Definition
<b>AEC</b>	Automotive Ethernet Converter
<b>DC</b>	Direct Current
<b>ESD</b>	Electrostatic Discharge
<b>LED</b>	Light-Emitting Diode
<b>STP</b>	Shielded Twisted Pair
<b>USB</b>	Universal Serial Bus
<b>UTP</b>	Unshielded Twisted Pair
<b>WEEE</b>	Waste of Electrical and Electronic Equipment

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## 1 Introduction

### 1.1 General Information

The CruEther 100M (order code: AEC-1MM-100T1-USB) is a network adapter that allows to connect a 100BASE-T1 Automotive Ethernet network to a standard USB port on your laptop/PC.

- Automotive Ethernet standard 100BASE-T1
- Master / Slave mode configurable with a DIP Switch
- Molex Mini50 connector for Automotive Ethernet
- Fits in standard USB port

100BASE-T1 is a standard for automotive applications, using a (unshielded) twisted-pair cable (UTP) up to 15m long, following the 802.3bw standard.




### 1.2 Product List

The CruEther 100M is available in one variant.

Part Number	Description and Protocol
<b>AEC-1MM-100T1-USB/01</b>	Automotive Ethernet Converter, 1 Port UTP, Molex Mini50 connector, up to 100 Mbps, USB

### 1.3 Compatible Equipment

Part Number	Description and Protocol
<b>CBL-030-0001</b>	USB 2.0 Extension Cable, Type A male to Type A female (L=0.15m)
<b>CBL-030-0002</b>	Measurement Cable, Molex Mini50 connector to UTP pigtails (L=5m)

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## 1.4 Pictograms

The following pictograms are used in the following to highlight important information related to the safe operation and handling of the device:




Warning

This pictogram combined with the word “Warning” warns of a potentially imminent danger to the health and lives of people. Ignoring this warning could cause serious personal injury, including death in the worst case.



Caution

This pictogram combined with the word “Caution” warns of a potentially dangerous situation or an unsafe procedure. Ignoring this warning could result in injury of people or property and environmental damage.

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## 2 Safety Notes

### 2.1 General safety instructions

#### Damage due to overvoltage

Application of overvoltage may cause destruction of the device.



Caution

- Only apply the voltage to the device as specified in the data sheet

#### Damage due to mechanical force in USB slot

The device or the host (laptop/PC) may get damaged when applying significant mechanical force



Caution

- Do not put mechanical force to the device when directly plugged into the USB port of your host (laptop/PC)
- To eliminate this risk you may use an USB extension cable in between. The device and the host

#### Damage or malfunction due to unauthorized opening

Unauthorized opening of the device may cause abnormal behavior or destruction of the device.



Caution

- Do not open the housing in any case
- Contact the manufacturer if repair is required

#### Safety and functional defects due to incorrect accessories and spare parts

Accessories or spare parts that are not recommended by AED Vantage GmbH may have adverse effects on the safety and functionality of the device.



Caution

- Do only use and connect original accessories and spare parts that are recommended by AED Vantage GmbH

#### Damage or malfunction due to incorrect connection

Incorrect connection of cables may cause abnormal behavior or destruction of the device.



Caution

- Do only connect cables according to the specification
- Do only apply the signals and voltages to inputs and outputs as specified in section 4 and data sheet

#### Damage or malfunction due to short circuit

Wrong connected or defect cables may cause a short circuit which may cause abnormal behavior or destruction of the device.



Caution

- Make sure that the cable insulation and plugs of the cables and the device are intact and the cables are correctly mounted
- Observe section 4

#### Damage or malfunction due to overheating


Overheating may cause abnormal behavior or destruction of the device.



Caution

- Operate the device only within the specified temperature range and ensure proper ventilation
- Observe section 7



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### Damage or malfunction due to shocks

Excessive mechanical shocks and vibration may cause abnormal behavior or destruction of the device.



Caution

- Do not expose the device to excessive mechanical shocks and vibration during transport, operation and storage

### Damage or malfunction due to penetration of dust, moisture or liquids

Dust, moisture or liquids inside the device may cause abnormal behavior or destruction of the device.



Caution

- Transport, store and operate the device in a clean environment
- Only clean the device in de-energized status
- Do not use wet wipes near plugs or openings in the housing
- Observe section 7

### Damage or malfunction due to pollution

Any contamination may affect the functionality of the device



Caution

- Transport, store and operate the device in a clean environment

## 2.2 Product liability

Manufacturer liability for damage caused by using the device is excluded.

If the device is not strictly used in the intended way, then the liability is transferred to the user.

The following cases are examples for not intended usage:

- The device is not used according to the user manual or according to the described scope.
- Modifications are done to the device without permission of AED Vantage GmbH.
- Installation instructions of the device are not fulfilled.

## 2.3 Terms of use

The device is designed to be used for engineering purpose only. Special care must be taken during operation of the device. Installation in series production cars is not scope of this product.


All safety requirements must be fulfilled by the overall system excluding the device. Users of the device must be instructed about possible risks (for example communication interruption).

## 2.4 Warranty

Warranty period is limited to 12 months.

Excluded are damages due to improper installation, improper handling, modification of the product or usage of the product not according to the described scope or not according to the manual.

Manufacturers' liability for damage caused by using the device is excluded.


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### 3 Intended use and integration into a system

The device is used as a network adapter in order to connect a Laptop/PC with a 100BASE-T1 Automotive Ethernet network.

#### Important notes:

- Users must be qualified in electronic or electrical engineering.
- The device is for industrial environments only. No use in private or domestic areas.
- The device is for test environments only.
- No liability for any failures caused by the product.
- Do not use in hazardous areas.
- Do not use in wet locations or in areas where moisture or condensation can be expected.
- Always use the device according to its technical specifications.
- Do not open, modify or repair the device. Otherwise, operational safety cannot be guaranteed.
- Repairs are only carried out by AED Vantage GmbH.

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## 4 Installation and Operation

### 4.1 Identification


A laser engraved nameplate on the top of the device contains the following information:



Figure 4.1-1 Nameplate top

Acronym	Description	Example
P/N:	Device type	AEC-1MM-100T1-USB/01
Rev.	Revision	A
dd/mm/yyyy	Date of production	06/05/2024
S/N:	Serial number	0502-000004


By contacting our support always provide device type, revision and serial number.

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4.2 Connections and controls

This section provides an overview of the physical interfaces of the device.

Ports and Connectors




USB Port	USB3.1 Gen1 (Universal Serial Bus) port, which fits in any standard USB Type-A port of your laptop/PC.
Molex Mini50 connector	Connection for a UTP (unshielded twisted-pair) cable to the 100BASE-T1 Automotive Ethernet network.
Status LEDs	A green and a red LED are used to communicate the device status (detailed description below).
User switch	To configure the device.

Figure 4.2-1 Ports and Connectors

USB Port

The USB (Universal Serial Bus) port can be connected to any standard USB Type-A port of your laptop/PC. As soon as the device is plugged in, the operating system (Win/Linux) recognizes the device as a network participant. The USB type used is USB3.1 Gen1.

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### Molex Mini50 Connector

The Molex Mini50 Connector (34912-8020) enables to connect various UTP cables (unshielded twisted-pair) of different length. The maximum cable length is 15 meters. The 100BASE-T1 Automotive Ethernet network is connected to this connector.



Figure 4.2-2 Molex Mini50 Connector

Connector: 34912-8020, Molex


### Status LED

The device has two status LEDs, green and red:

- Green LED:
  - ON: Automotive Ethernet link established.
  - OFF: No link.
  - Blinking: Data transfer ongoing.
- Red LED:
  - ON: device is running.

### User switch

For configuration purposes a user switch is located on the side of the device. Further details can be found in the chapter “Configuration”.

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## 5 Configuration

### 5.1 User switch

The configuration of the device is done with a user switch which is located on the side of the device. The user switch is a two-state switch to configure the device as master or slave.




Figure 5.1-1 User switch states (top view)

#### 5.1.1 Master/Slave

The following table shows the possible configurations of the user switch:

Switch state	Configuration
1	Master
2	Slave

Figure 5.1-2 master/slave operation mode configuration

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## 6 Compatibility


### 6.1 Operating System (OS)

The device is compatible with Windows and Linux. In the moment you connect the device to your laptop, a standard network driver is used.

If you are using Windows, you can find the device as a new network adapter as follows:

*Start/Search → enter “Settings” → Network and internet → Under “Advanced network settings” check the headline “Network adapters” for the list of all network adapters.*

The device is shown as “LAN7801” ethernet adapter.

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## 7 Installation location


Always prepare the protection of the device against external damage.

### 7.1 General environmental conditions

The following general environmental conditions shall be considered when using the device:

- Indoor use only
- Altitude up to 3000 m
- Operating temperature -40 °C ... +80 °C
- Maximum relative humidity 95 % non-condensing
- No use in wet locations or in areas where moisture or condensation can be expected
- Pollution degree 2: Only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be expected



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## 8 Quick Start Guide

### 8.1 Configure the Device

The device comes with the newest released firmware version installed. Please configure the device based on your needs in terms of master/slave operation mode (see [section 5](#)).

### 8.2 Power up the Device

Plug the device into a standard USB port to power up the device.

### 8.3 Functional description


The startup time depends on the host and it's settings to which the device is connected.

### 8.4 Connect the Device

The device is connected via the Molex Mini50 connector to an automotive ethernet network. For 100BASE-T1 networks normally UTP cables are used. Please don't use cable length > 15m to connect your DUT.



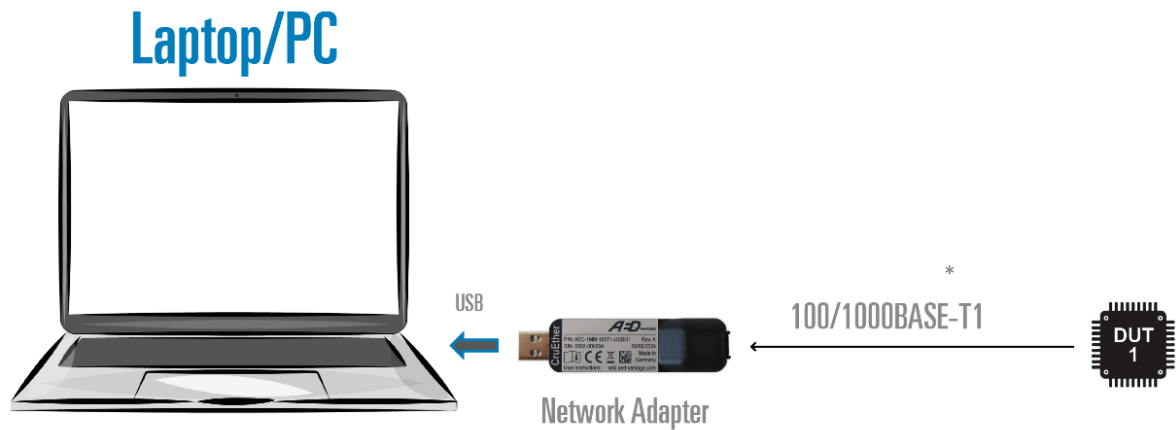
Figure 8.4-1 CruEther 100M connected to a laptop

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## 9 Example use cases

### 9.1 Data collection with a laptop

The following figure shows the CruEther 100M, a 100BASE-T1 Network Adapter, connected via an UTP cable (Length < 15 m) to an Automotive Ethernet network. The aim is to record Automotive Ethernet data packages with a laptop from a DUT.




\*CruEther 100M supports 100BASE-T1 only

Figure 9.1-1 Automotive Ethernet Data collection with a laptop

### 9.2 Analyzing and testing with CANoe

The product was tested with Vector's CANoe development tool. The following Application Note describes the installation instructions and can be found as public document on the Download Center:

**AN\_AEC\_001-CANoe Device Installation**

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## 10 Technical specification

### 10.1 Technical Data

The following table provides an overview of electrical and technical data of the device.

Property	Value/ Characteristic
Input operating voltage	+5 VDC
Power consumption	~ 1W
Dimensions (W x D x H)	88 x 24 x 15 mm
Weight	20 g
IP grade	IP30

Figure 10.1-2 Technical Data

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## 11 Storage, transport and disposal

### 11.1 Storage

For a longer unused storage of our device, we advise the following conditions:

- Storage temperature: -40 °C ... +85 °C
- Storage humidity: 0 ... 99 % non-condensing
- Protect the device from strong sunlight, heat and shocks
- Do not place any object on the product
- Storage in a dry, dust-free and ESD safe area

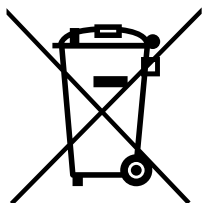
### 11.2 Transport

Transport conditions:

- Transport temperature: -40 °C ... +85 °C
- Transport humidity: 0 ... 99 % non-condensing
- Use only original packaging


### 11.3 Disposal

The user is responsible for the proper disposal of the device. Therefore, industry-specific and local provisions must be observed for the disposal of this device and its packaging.



According to the Waste Electrical and Electronic Equipment Directive (WEEE Directive) 2012/19/EU, electrical and electronic devices may not be disposed of with the normal household waste.



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## 12 Maintenance and Service

### 12.1 Safety measures

#### Damage or malfunction due to short circuit

Wrong connected or defect cables may cause a short circuit which may cause abnormal behavior or destruction of the device.



Caution

- Make sure that the cable insulation and plugs of the cables and the device are intact and the cables are correctly mounted
- Observe section 4

#### Safety and functional defects due to incorrect accessories and spare parts

Accessories or spare parts that are not recommended by AED Vantage GmbH may have adverse effects on the safety and functionality of the device.



Caution

- Do only use and connect original accessories and spare parts that are recommended by AED Vantage GmbH

### 12.2 Cleaning

#### Damage or malfunction due to pollution

Any contamination may affect the functionality of the device



Caution

- Transport, store and operate the device in a clean environment


#### Damage or malfunction due to penetration of dust, moisture or liquids

Dust, moisture or liquids inside the device may cause abnormal behavior or destruction of the device.



Caution

- Transport, store and operate the device in a clean environment
- Only clean the device in de-energized status
- Do not use wet wipes near plugs or openings in the housing
- Observe section 7

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## 12.3 Repair

In case of any malfunction or defect to the device please contact our support (see section 12.4) before sending the device to AED Vantage GmbH. AED will decide if a hardware defect occurs and if the RMA procedure comes to use. Customers will receive an RMA number and will be informed about the next steps.

For more details see *RMA Procedure-Description Handout* provided on our AED wiki see section 12.4.

### Damage or malfunction due to unauthorized opening

Unauthorized opening of the device may cause abnormal behavior or destruction of the device.



Caution

- Do not open the housing in any case
- In case of a defect contact AED Vantage GmbH

## 12.4 Service

AED Vantage GmbH provides a wiki for all products to share software, firmware and documents:

<https://wiki.aed-vantage.com/>

Please contact [sla-support@aed-vantage.com](mailto:sla-support@aed-vantage.com) for further questions.


Contact address:

AED Vantage GmbH

Taunusstraße. 51

80807 München

GERMANY

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