


E.E.P.D.
...just embedded!

## Manufacturer

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## General Notes

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## FCC and CE Disclaimer

E.E.P.D. GmbH gives no warranty at all that their products will meet the FCC and CE standards when used in combination with other third party products or when used in any other way than specified.

## Warranty

The warranty and/or guarantee conditions according to the current terms and conditions of E.E.P.D. GmbH apply.

## Reshipment

If you return the IMADC to E.E.P.D. GmbH please remove all connections and peripheral equipment.

Protect the unit with a suitable packaging, preferably use the original packaging.

## Packaging

The IMADC is in a protective package to avoid damage during transport.

This protective package should be recycled in an environmentally friendly way after use.

## Disposal of Device

At the end of the lifetime please dispose and/or recycle the components of the device accordingly.

## Technical Support

For technical information about hardware and software please contact: **support@eepd.de**

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## Symbols


The red danger sign warns you if incorrect operation puts your life or health at great risk. Both the components and the peripherals could be destroyed.


The orange warning sign warns you that an incorrect or missing operation could seriously endanger your health or destroy the used components**.**


The yellow caution sign indicates that an incorrect or missing action could damage the components.


The yellow ESD symbol indicates that electrostatic sensitive components could be destroyed. Unpack shielded components only with ESD protection such as an ESD wristband or on an ESD protected area.

The information sign gives you further information and advice for optimal use of this product. For example, it draws your attention to necessary or optional accessories.

# Ordering Information

## Available Modules

| Ordering Number | Function | Connection | Color | Pinout (see Tab.2) |
|---|---|---|---|---|
| IMCANAA0 | CAN | Direct connection | gray | CAN connector |
| IMCANAA30 | CAN | Direct connection | magenta | CAN connector |
| IMCANAB0 | CAN | Direct connection | gray | CAN connector |
| IMCANAB30 | CAN | Direct connection | magenta | CAN connector |
| IMCANAC0 | CAN | Cable connection | gray | CAN connector |
| IMCANBC0 | CAN | Cable connection | gray | CAN connector |

Tab. 1: Available Modules

# Installation and Operation

## System Information

### Required tools

No tools are required for a standard connection or DIN rail mounting. However, a module protection is recommended for standard connections.
For a secure mounting on the optional module holder from E.E.P.D. we recommend following tools:
Module holder: cross-headed screwdriver
Further required tools depend on mounting type and place.

### External documents

Please note also external mounting and user manuals.

### Technical support

For technical information about hardware or software please contact **sales@eepd.de**.

### Installation and connection regulations


Please follow all safety instructions at the place of installation.
Please ensure that during installation no voltage is applied.
Please ensure that during mechanical installation no cables are connected.

### Scope of supply

Please check before installation that all required parts are complete:
1x IMCAN USB module
1x cross-headed screw M2.5x11
Hardware Reference Manual
Driver online available

### System characteristics – usage

The IMCAN USB module allows a system extension to two CAN bus ports at a D-SUB-9-connector via USB port.
It can be connected to your system by Plug & Play, power supply via USB port. Two LEDs show the actual operating state. If it's necessary to galvanic isolate the CAN-network from the computer, you can order a version with integrated isolated transceiver.
The IMCAN USB module is an easy option to establish CAN-bus connections to your computer.
Due to the compact design with integrated DIN rail mount, the CAN bus module is perfect suitable for CAN bus based developments as well as service-, configurations- and maintenance duties.
This standardized serial interface is widely used in industrial environments.

# Mounting solutions

## USB port installation

If the installation site permits, the USB adapter module can be plugged into any standard USB 3.0/2.0/1.1 Type A socket.


To avoid mechanical stress on interfaces,
we recommend a safe module holder.

The full range of functions depends on the respective USB port.
There is a cable option available

## DIN rail mounting

The USB adapter module is designed for mounting on a TS35 mounting rail (DIN rail). The following procedure is recommended for insertion and removal.

**Insertion:**
Hang the module on the clip lock in the mounting rail, push it in the direction of the USB plug and snap it into the rail.

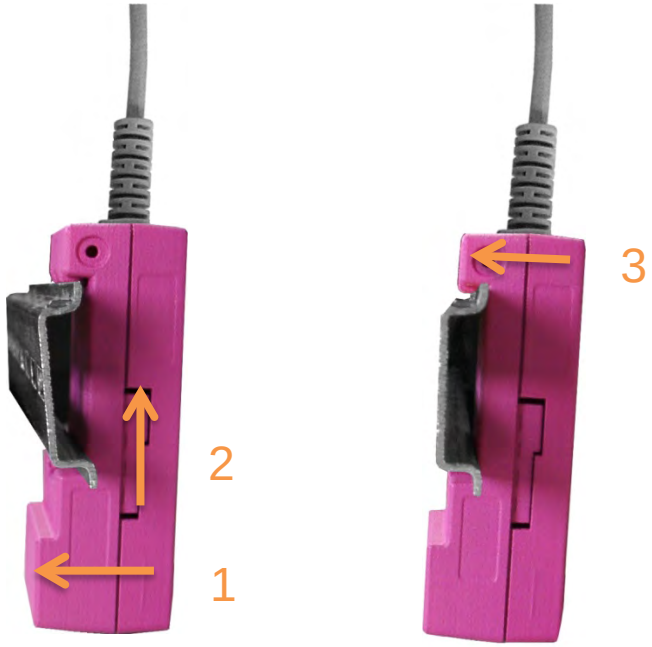



Fig. 1: Module Mounting

**Removal:**
Push the module in the direction of the USB connector, move it away from the rail and remove it.


Fig. 2: Module Disassembly

## Mounting on E.E.P.D. module carrier

The USB module is particularly suitable for connection to a TB-H USB hub, as well as to a TB-M from E.E.P.D..
The mounting profile offers space for seven USB modules, which can be easily and stably mounted here. Insert the USB module into the guide of the respective slot and push it back to the stop. Secure the module with the enclosed screw.

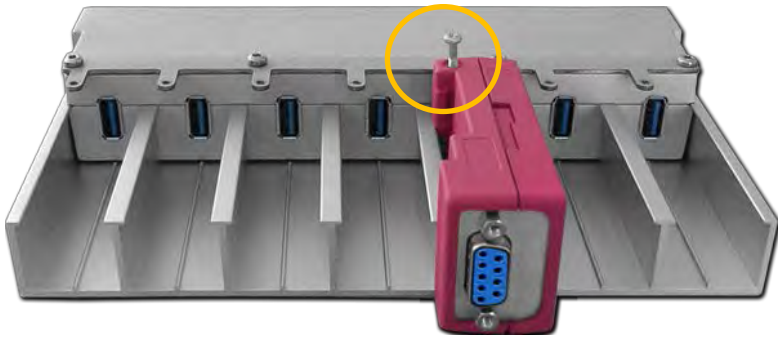


Fig. 3: Module Carrier

Fig. 4: Screw

# Module Versions

## Galvanic isolated

Characteristics:

- Thermal protection
- UL 1577 effective value: 2500 Vrms for 1 minute
- No bus errors by shorted nodes
- DIN EN 60747-5-2 (VDE 0884 part 2): 2003-01
- $V_{IORM}$ = 560 V peak value

## Standard Version

Characteristics:

- Thermal protection
- Bus-dominant, time-out function in standby mode
- Data transmission dominant, time-out function
- Transient protected bus-pins in automotive applications
- ESD protected ports
- ISO 11898-2 / ISO 11898-5 compliant

## Initial Operation

The IMCAN USB module offers the possibility to connect your computer to a CAN network. Thereby CAN outputs from a connected CAN node are transmitted by the D-SUB-9 connector via USB port to your computer.
The initiation is very easy. Once you connect the USB module to your system for the first time, your operation system automatically searches for and installs the required drivers. These can be also installed from the 'Drivers' folder of the provided zip-file.

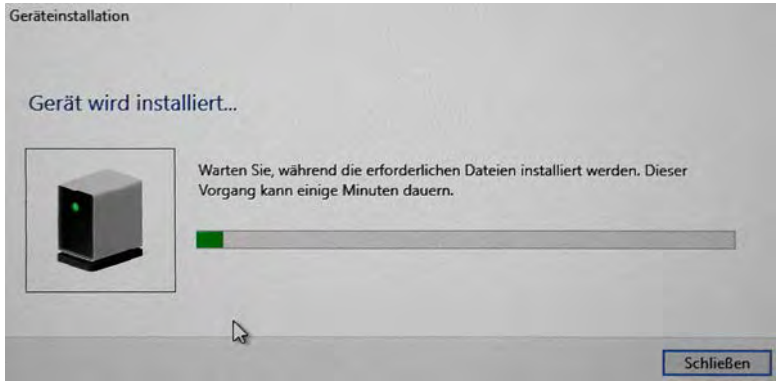


Fig. 5: Driver Installation

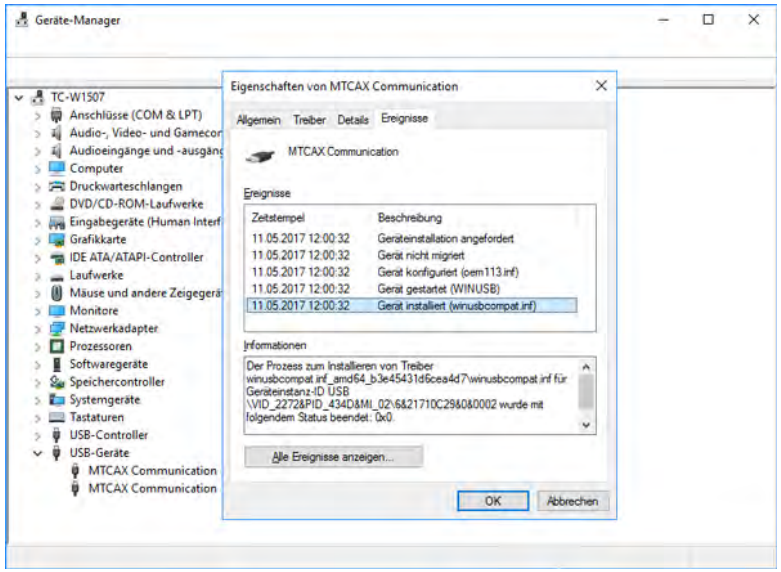
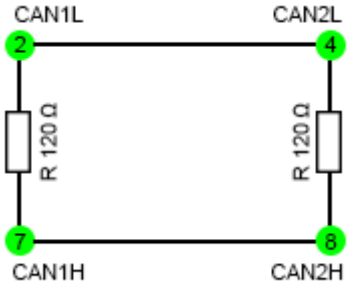


Fig. 6: CAN properties

Furthermore there is the installation file (setup.exe) for the CAN-viewer from E.E.P.D. in the 'CAN-Viewer' folder.
You can use this with Windows® 10 for test purposes.
The transmissions between CAN-1 and CAN-2 can be realized by a loop plug.




The cable length of the terminating resistors should be approx. 20cm each.

Fig. 7: Loop Plug

By starting the CAN-viewer or by clicking on ‘connect’ within the program a window opens to choose the CAN nodes. After clicking on ‘Identify’ the CAN module LEDs show the respectively selected CAN node. The blinking sequence is (2x – break – 2x - …). The LEDs are blinking green. LED-1 for CAN-1, LED-2 for CAN-2.

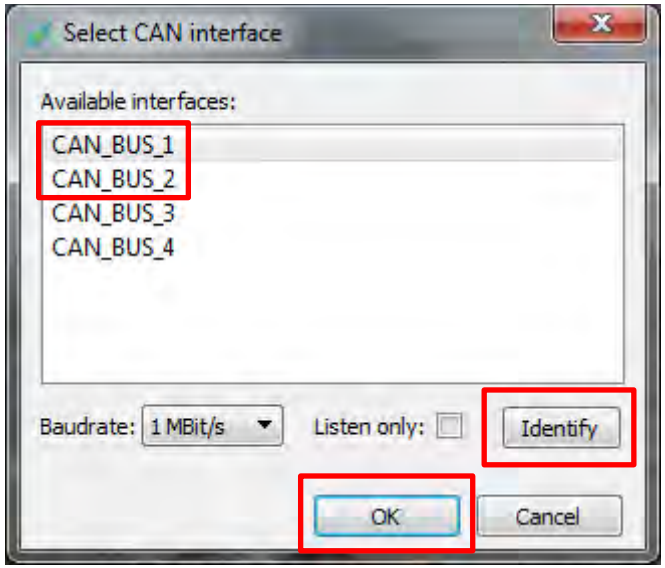



Fig. 8: Select CAN interface

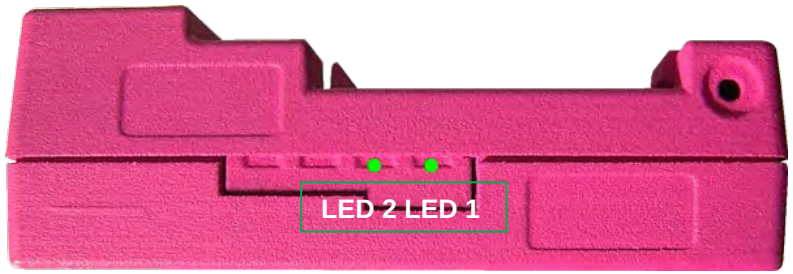



Fig. 9: LEDs

Choose the desired CAN-node with ‘OK’, the LED lights green.
Now you open another CAN-viewer and choose the second node, the correspondent LED lights green.

Click on ‘Transmit’, then on ‘Insert’. Here type a cycle-value > 0 and click on ‘Running’. Confirm with ‘OK’.

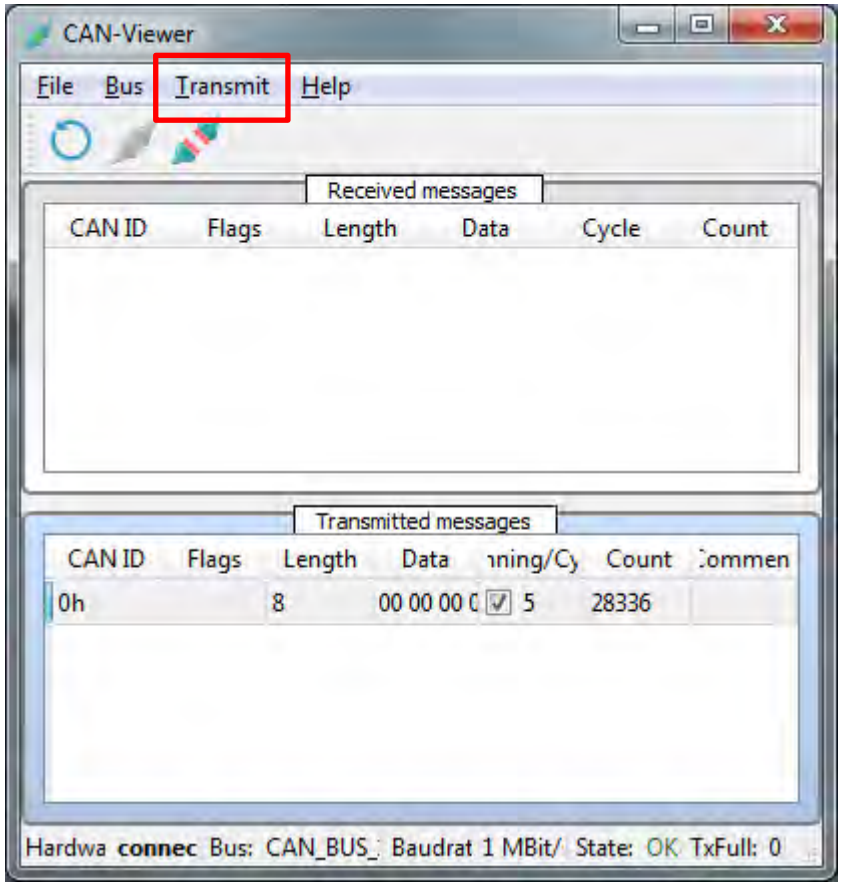



Fig. 10: CAN Viewer

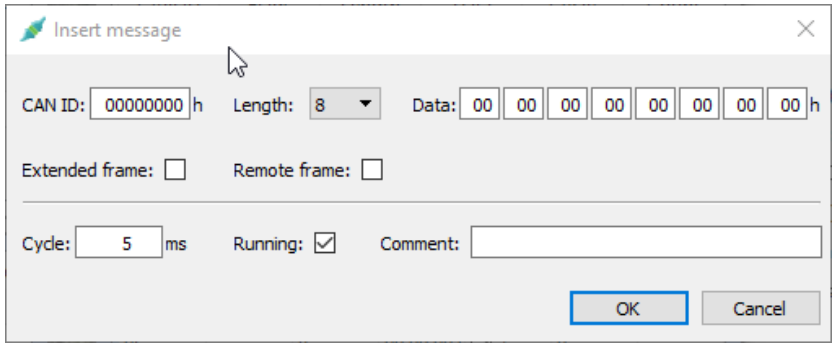



Fig. 11: Insert Message

In the ‘Received Messages’ box the incoming transmissions are counted. In the ‘Transmitted Messages’ box the outgoing transmissions are counted. The corresponding LEDs light green in case of error-free operation.

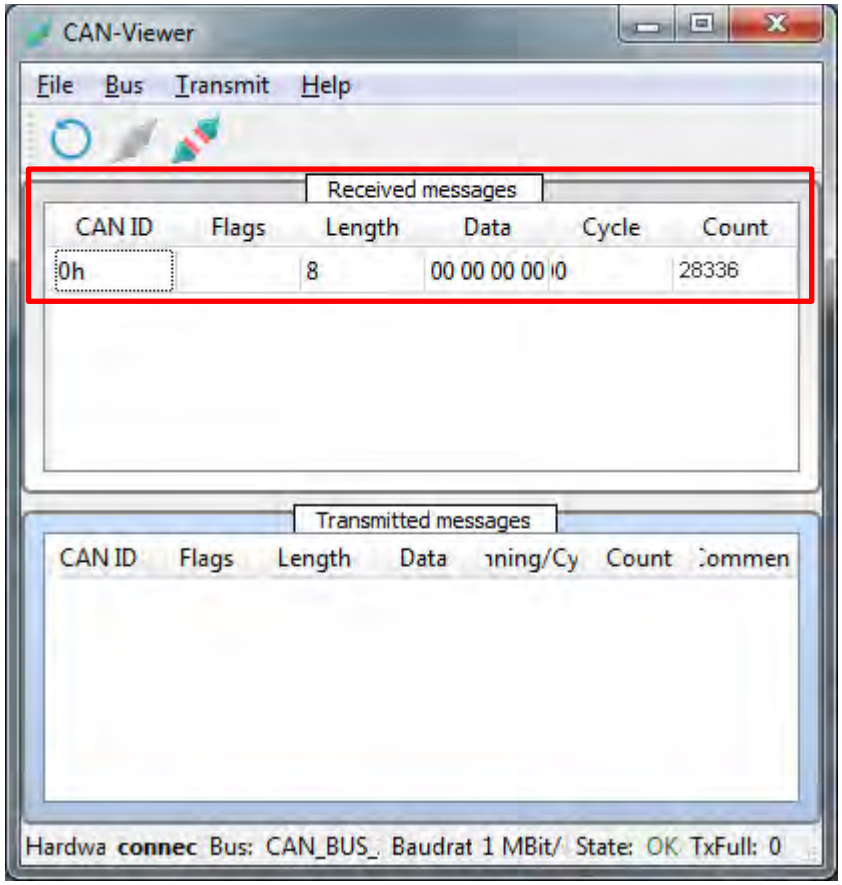



Fig. 12: Received Messages

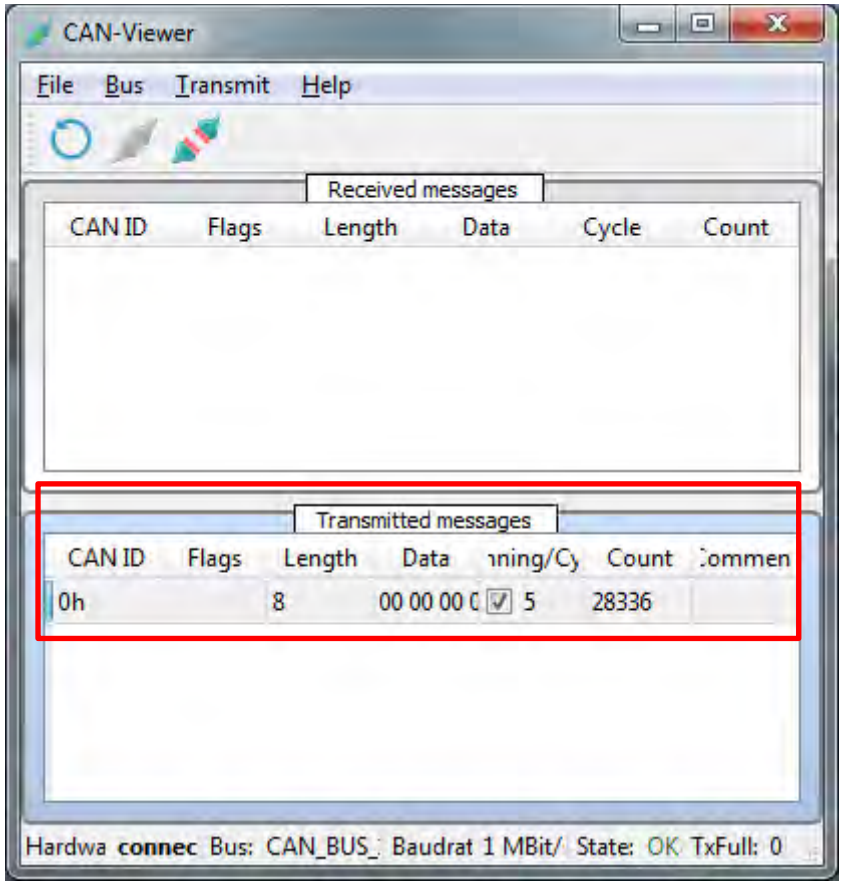



Fig. 13: Transmitted Messages

Transmission interruptions or erroneous transmissions are indicated by the correspondent LED with red flashing light (1x – 1x – 1x - ...) and a notification at the CAN-viewer.

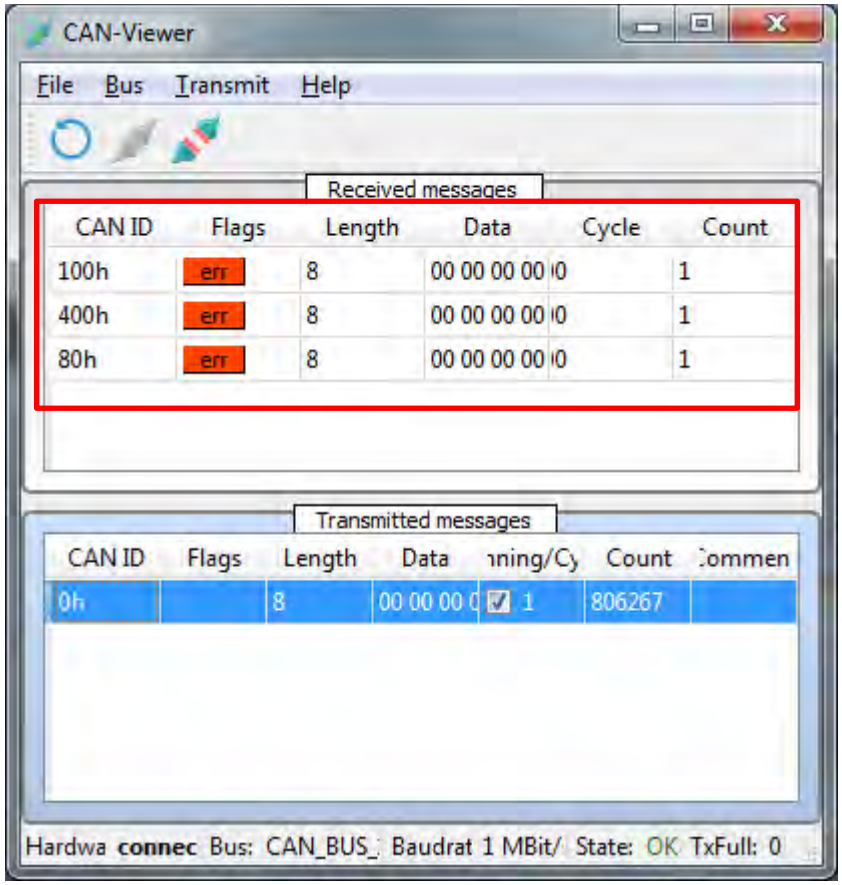



Fig. 14: Error Notification

An application programming interface (API) for CAN interfaces is available on the provided data carrier in the 'CAN-API' folder. Please read the relevant README-file. With the API you can develop programs which need direct access to the CAN-bus in order to execute specific tasks like e.g. analysis and control of CAN based networks. Please read the documentation how to operate the CAN bus programs.

For a programmer example please unpack the zip-file 'example' from the 'CAN-API' folder.

This application shows the usage of API for CAN-interface regulation. For further information please read the relevant README-file.

The API and the example can be started with Windows® 10.

# Product Description

## Features

### Power Supply

USB VCC (+5 V supply, current limited to 500 mA)

### CAN Connector

D-SUB 9pol. female connector
2 CAN ports
Standard CAN (Version 2.0A)
Extended CAN (Version 2.0B)
Bit rate 20 kBit/s up to 1 Mbit/s

### CAN transceiver

Standard version: NXP TJA 1024TK
Isolated version: Analog Devices ADM3053

### USB Client Port

1 USB 2.0 type A
Cable solution optional

### OS Support

Linux Ubuntu 20.04 LTS
Microsoft® Windows® 10
Microsoft® Windows® 10 IoT Enterprise

### Housing

ABS-PC

### Cooling

Designed for fanless operation.

### Conformity

CE, ROHS, REACH

### Dimensions

93 mm x 38.5 mm x 26.6 mm

### Weight

Approximately 40 grams

### Mounting

EMTrust TB-M and TB-H module mounting or
Hat rail mounting
Cable option available

## Environmental Specification

**Max. Operating Temperature**

-40°C to +85°C ambient

Other operating temperature ranges upon request.

**Max. Storage Temperature**

-40°C to +85°C

**Max. rel. Humidity for all versions**

95% @ 40°C Non-condensing

## Detailed Technical Specification

### CAN Transceiver ADM3053

2.5 kV rms signal and power isolated CAN transceiver
*iso*Power integrated isolated dc-to-dc converter
Complies with ISO 11898 standard
High speed data rates of up to 1 Mbps
Unpowered nodes do not disturb the bus
Connect 110 or more nodes on the bus slope control for reduced EMI
Thermal shutdown protection
High common-mode transient immunity: >25 kV/µs
Safety and regulatory approvals
UL recognition 2500 V rms for 1 minute per UL 1577
CSA component acceptance notice #5A VDE certificate of conformity
DIN EN 60747-5-2 (VDE 0884 part 2): 2003-01
VIORM = 560 V peak

### CAN Transceiver TJA1042

Fully ISO 11898-2 and ISO 11898-5 compliant
Suitable for 12 V and 24 V systems
Low ElectroMagnetic Emission (EME) and high ElectroMagnetic Immunity (EMI)
Dark green product (halogen free and restriction of hazardous substances [RoHS] compliant)

### Two bicolor LEDs

Green and red color integrated in one case
35 mcd luminous intensity of green color
45 mcd luminous intensity of red color

## Pin out description

### CAN Connector


Fig. 15: CAN Connector Detail

| Pin | Signal |
|---|---|
| 1 | CAN_2_LOW (optional) |
| 2 | CAN_1_LOW |
| 3 | CAN_GND |
| 4 | CAN_2_LOW |
| 5 | SHIELD |
| 6 | CAN_GND |
| 7 | CAN_1_HIGH |
| 8 | CAN_2_HIGH |
| 9 | VCC (optional) |
| case | SHIELD |

Tab. 2:CAN Connector

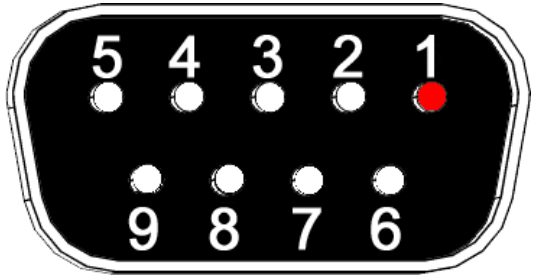



Fig. 16:CAN Connector Schematic

**Single USB**

Fig. 17: Single USB Detail

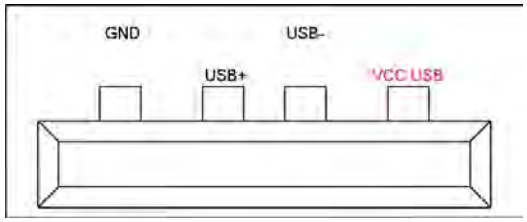



Fig. 18: Single USB Detail Schematic

| Pin | Signal |
|---|---|
| 1 | VCC_USB |
| 2 | USB_N |
| 3 | USB_P |
| 4 | GND |

Tab. 3: Single USB Connector

There is a cable option available for the USB port:

Fig. 19: USB Cable Option

**Internal USB Molex Connector**

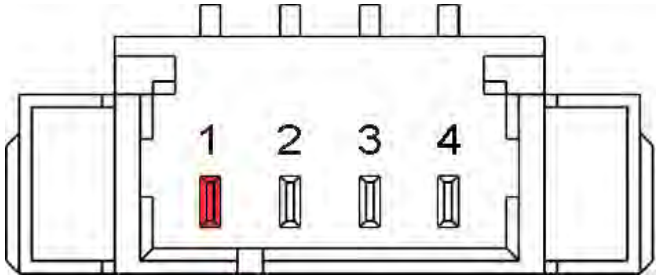



Fig. 20: Internal USB Molex Connector Schematic

Counterpart plug:
MOLEX Pico Blade 0510210400

| Pin | Signal |
|---|---|
| 1 | VCC_USB |
| 2 | USB_N |
| 3 | USB_P |
| 4 | GND |

Tab. 4: internal USB Molex connector

## Appendix

# Revision History

| Date | Version | Changes | Proofed to release |
|---|---|---|---|
| 17.01.2019 | 1.0 | First release | |
| 23.06.2021 | 2.0 | New manual design | |
| | | | |

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