UDT1FR-I

HARDWARE DATASHEET

USB interface with CAN Fd and RS485

Description

UDT1FR-I product is a high end debugger for UniSwarm products or others brands. Can act as master in RS485 or CAN communication.

Features

- Monitor bus activity and view frames contents
- Send frames on RS485 and CAN bus
- Set parameters on external boards

Interfaces

- 480Mb/s High Speed USB 2.0
- optional Ethernet 100BASE-T (H versions)
- CAN Fd bus up to 8 Mbps compatible with CANOpen and CANOpen Fd
- RS485 / RS422 interface (up to 16 Mbds) for protocols like Modbus, Profibus or DMX512...
- 500 V isolation between USB-side and interface-side

Compatibility

- Linux module to work as a standard SocketCAN interface
- Future windows driver

Reference	Package	Ethernet	USB	RS485	CAN	Isolated
UDT1FR-IP	Aluminium	-	Yes	1	1	500V
UDT1FR-I	PCB only					
UDT1HFR-IP	Aluminium	Yes				
UDT1HFR-I	PCB only					

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Chapter 1

Specifications

1.1 Technical data

Power supply	
Nominal power supply voltage (Vin)	7 - 48 V
Automatic power switch between USB and DC	Yes
ESD protection	30 kV
Interfaces	
USB	480 Mbit/s
Ethernet	100M BASE-T
CAN Fd	max 8 Mbit/s
RS-485	max 16 Mbit/s
Isolation	500V
ESD protection	30 kV
Physical	
Operating temperature	0°C...+85°C
Dimensions (L x W)	80 x 50.5 mm
Mounting	4 mounting holes for M3 screws

1.2 Connectors

UDT1FR-I have 4 connectors.

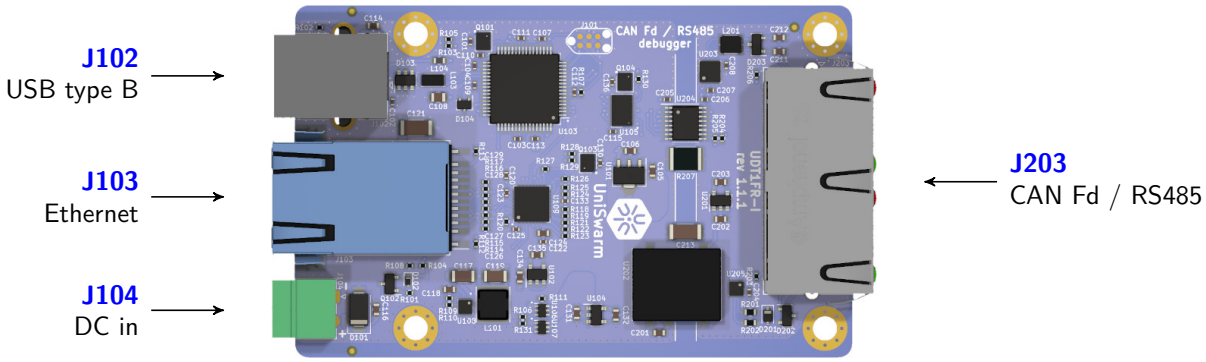


Figure 1.1: UDT1FR-I connectors

1.3 Electrical

1.3.1 Power input

The board is powered through the USB connector or by the DC input connector.

Connector J104, DC input

1.3.2 USB

This port is used to power the board and communicate to a computer with a maximal speed of 480 Mbit/s.

Connector J102, USB

Pins	Name	Description
1	Vbus	5V 500mA power
2	DATA-N	USB data+
3	DATA-P	USB data-
4	GND	Ground
5	Shield	Shield ground connected

Figure 1.2: J102 pins

Recommended connector references

Standard USB type B cable

1.3.3 Ethernet

100M BASE-T Ethernet.

Connector J103, DC Ethernet

1.3.4 Buses

Both buses (RS485 and CAN Fd) have 30 kV Electrostatic Discharge (ESD) protection and high quality filters for noisy environment.

A full 500V isolation is present between bus-side and power-side to prevent damage and avoid noise to propagate through the bus.

The bus use a dual RJ45 socket (J203 connector). Both ports are connected together, to daisy chain the bus without external Y cable or adapter.

Thanks to it's two ports the UDT1FR-I can be used in line or in termination of the bus. If the board is at the end of the network, it is necessary to add a 120 Ohm line plug on the unused port.

The speed of both buses can be set by software. The CAN Bus can reach 8 Mbps and the RS-485 can reach 16 Mbps.

Connector J203, CAN Fd / RS485

Pins	Name	Description
1	CAN H	CAN Fd dominant
2	CAN L	CAN Fd recessive
3	GND	Ground, connected to 7
4	RS485 B	RS485 B side
5	RS485 A	RS485 A side
6	-	Unused, but pins 6 of two connectors are connected together
7	GND	Ground, connected to 3
8	-	Unused, but pins 8 of two connectors are connected together

Figure 1.3: J203 pins

Recommended connector references

Standard straight RJ45 cable.

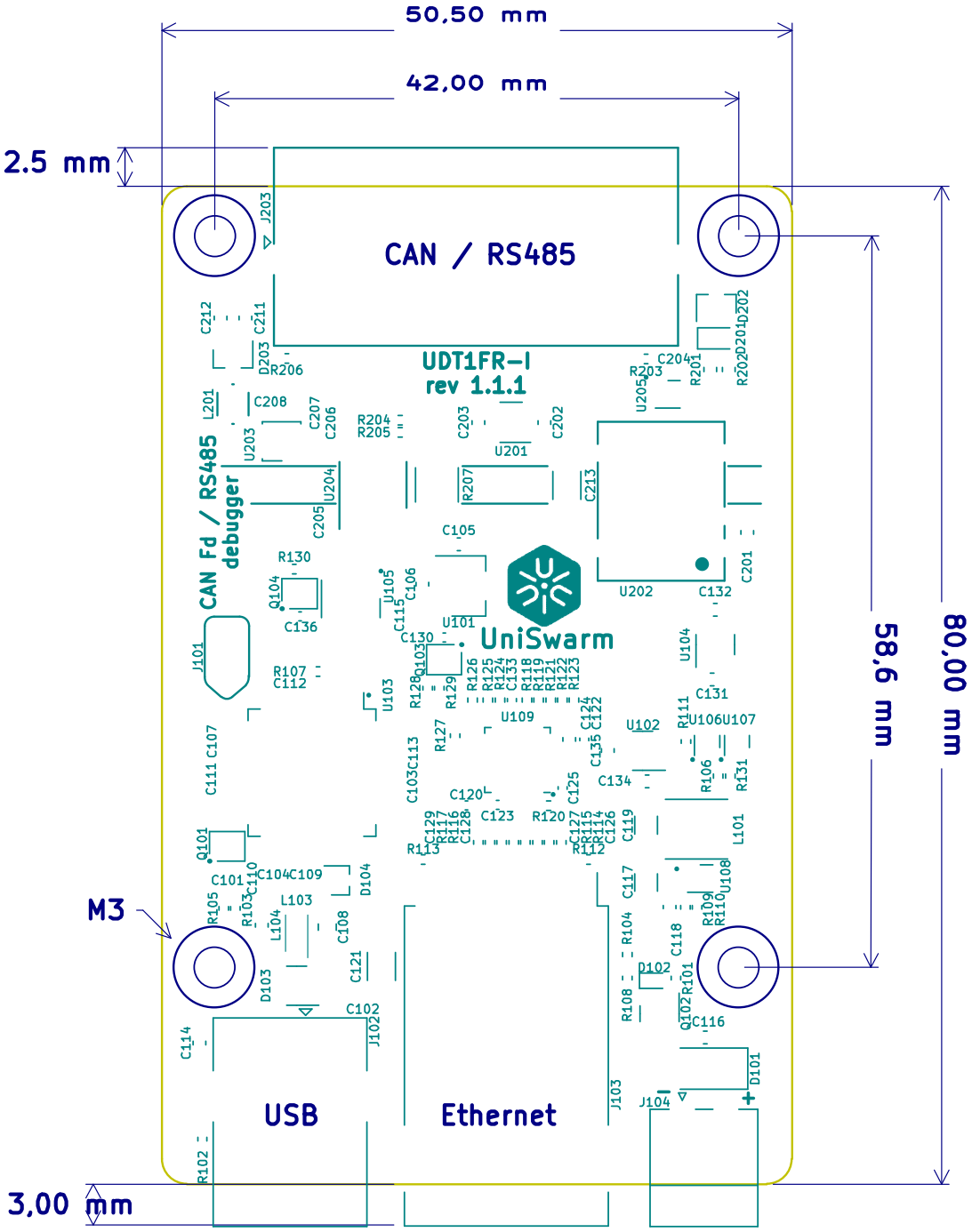
1.4 Option

The UDT can be provided in two versions.

- The first one is just the PCB without any accessory
- The second option is a closed aluminium case that protects the board from environment

In addition it is possible to obtain a 120 Ohm line plugs in order to be sure to perfectly receive CAN and RS-485 communications.

1.5 Drawings



Maximum height : 17.00 mm
Size of package : 57.5 x 86.5 x 28.0 mm

Chapter 2

Driver installation

2.1 Linux

Clone the ‘udt1_linux_driver‘ repository to your local machine:

```
git clone https://github.com/UniSwarm/udt1_linux_driver.git cd udt1_linux_driver
```

2.1.1 DKMS method

```
sudo make dkms
```

if UEFI Secure Boot is active follow instruction:

- Configuring Secure Boot :
  - Ok and enter new password
  - reboot
- Perform MOK management :
  - select "Enroll MOK"
  - select "Continue" → "Ok" → enter password
  - reboot

2.1.2 Installation rules udev

```
sudo make udev_install
```

2.1.3 Automatic installation dkms and rules udev

```
sudo make run_auto
```

2.1.4 To remove all installed files

```
sudo make_remove_all
```

2.1.5 Classic method

```
sudo make modules_install run
```

if there are error :

```
make clean
sudo make modules_install run
```

After that, you can simply connect the debugger to PC with USB B.

2.2 Windows

soon

Chapter 3

Usage

3.1 Linux

3.2 Configuration

As a standard network connection, you need to configure the interface and up it.

```
sudo ip link set can0 type can bitrate 1000000
sudo ip link set can0 up
```

3.3 Tools

You can use some useful standard tools to dump the can bus or send frames. Theses tools are included inside the can-utils package.

```
sudo apt install can-utils
```

To check what is sent on can0 interface :

```
candump can0
```

And to send frame on can0 :

```
candsend can0 123#00010203
```

Appendix A

Hardware revision history

Version	Date	Change
v1.0.1	2018/12/20	Initial internal version
v1.0.2	2019/03/12	Initial public version
v1.0.3	2019/05/31	Fixed package connectors placement
v1.1.0	2021/09/14	Full review, added Ethernet interface Added USB filters and DC-up on USB
v1.1.1	2021/10/29	Improved Ethernet filtering

Appendix B

Datasheet revision history

Revision	Date	Change
A	2020/09/07	Initial public revision
B	2021/10/21	Added hardware revision v1.1.0 and v1.1.1