

# **U-Stick**

## Users Manual

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# 1 Copyright

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## 3 Safety

The hardware described here is an electrostatic sensitive device. This means it can be damaged by common static charges which build up on people, tools and other non-conductors or semiconductors. To avoid such a damage, it has to be handled with care and including all relevant procedures (like proper grounding of people handling the devices, shielding/covering to not to let a person touch the device unwanted, proper packaging in ESD-bags, ...). For more information please refer to related regulations and standards regarding handling of ESD devices.

The hardware described here is a component which is intended to be used as part of a larger device.

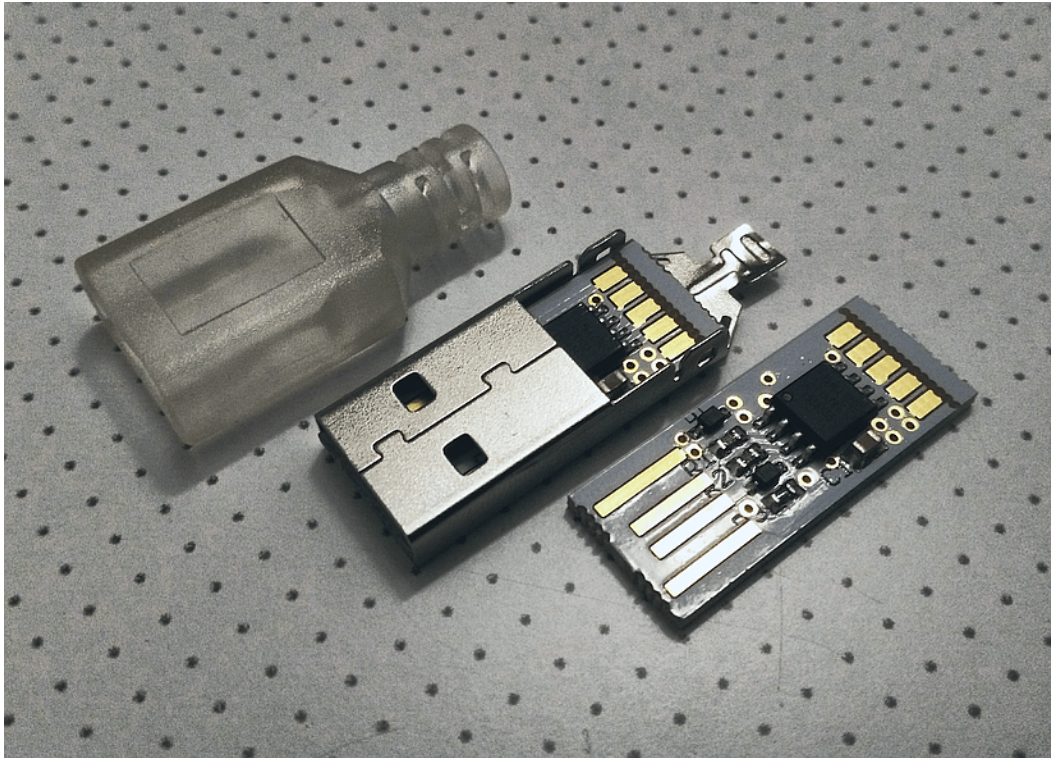
This document describes the U-Stick-hardware but may contain errors or may be changed without further notice.

## 4 Overview

This document describes the U-Stick module, its electrical characteristics and usage. It is designed for various IoT applications and can be used in different environments and scenarios. It is not a ready-to-use device but a component which is intended to be integrated in larger devices or specifically directly into a USB-A-plug and which has to be equipped with an own firmware. Development and integration of this firmware is up to the user.

### 4.1 Features

The U-Stick consists of a tiny board which has a size that lets it fit into a standard USB-A plug:



It is directly powered by the USB port it is connected to and provides four outputs which are freely programmable and can be used for different purposes. It can be programmed using V-USB: <https://www.obdev.at/products/vusb/index.html>

## 5 Boards And Connectors

The U-Stick board provides the following connectors and ports:



The U-Stick board bases on an ATTiny85 which can be operated with a clock of up to 16,5 MHz.

On left side the USB-pins can be found which fit into a USB-A port directly. On right side following ports of the ATTiny85 are available and can be accessed out of own application either as a GPIO or by using one of the other functions of these multi-purpose pins:

- PB5 (PCINT5/RESET/ADC0/dW)
- PB2 (SCK/USCK/SCL/ADC1/T0/INT0/PCINT2)
- PB1 (MISO/DO/AIN1/OC0B/OC1A/PCINT1)
- PB0 (MOSI/DI/SDA/AIN0/OC0A/OC1A/AREF/PCINT0)
- GND

## 6 Software

The U-Stick is ready to be used with the V-USB firmware from <https://www.obdev.at/products/vusb/index.html>

It makes the U-Stick available as HID device which then can be controlled from outside via it's identifier. Following defines have to be set V-USB for U-Stick:

```
#define USB_CFG_IOPORTNAME B
#define USB_CFG_DMINUS_BIT 4
#define USB_CFG_DPLUS_BIT 3
```

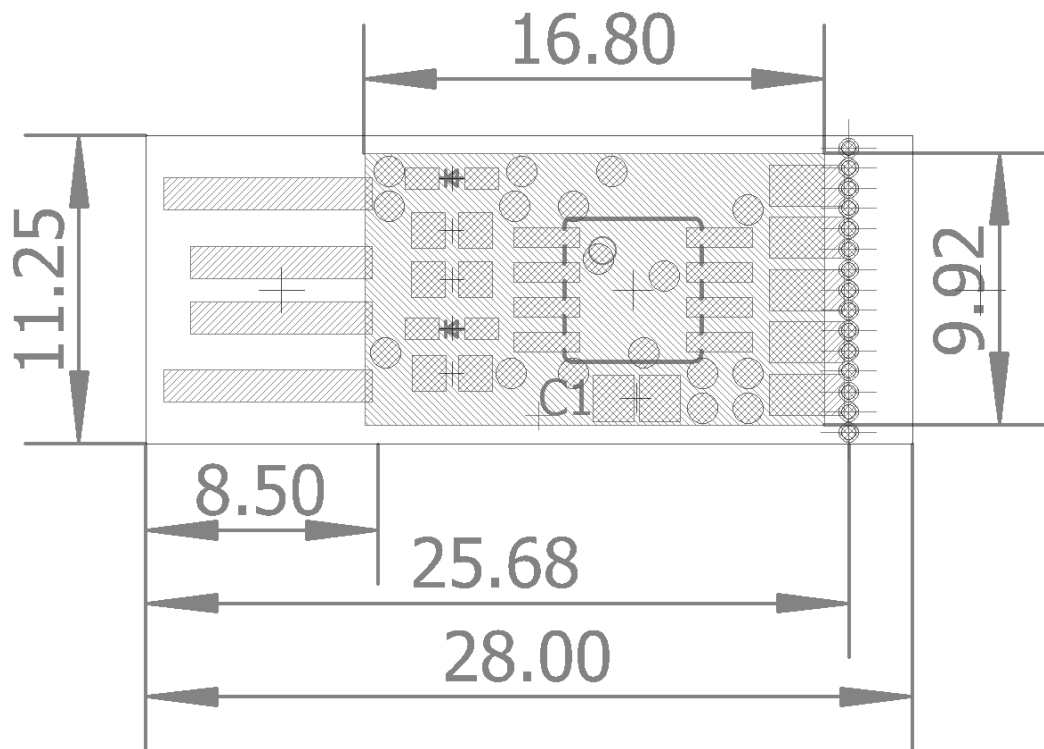
Depending on which version of V-USB you use, these definitions have to be set either in `bootloaderconfig.h` or in `usbconfig.h`. Details about how to use the port for the ATtiny85 MCU can be found at <https://www.microchip.com/wwwproducts/en/ATtiny85>

Usage of V-USB of course is not mandatory, the U-Stick can be used with any other firmware that can be operated on ATtiny85 MCU.



## APPENDIX A – Board dimensions

Board dimension drawings, all values are given in unit mm.



On the left side there is an area of 8,5 x 11,25 mm which contains the USB-pins. It has to be left free from any additional equipment in order to fit into the host device's USB-port properly. The height of 11,25 mm is defined by the USB-standard. With this width the board fits into every standard USB-A connector housing and even in several USB-stick-housings.

On the bottom side there is a ground-pad with a size of 16,8 x 9,92 mm. It is intended to connect the metal housing of the USB-plug and should not be insulated from it. Establishing of an additional solder connection from the housing to these pads via the appropriate holes of the USB-plug-housing is recommended.

The holes at the position of 25,68 mm can be used to shorten the board, here the right side can be broken off to reduce the total size of the board from 28,00 mm to 25,68 mm if desired.

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