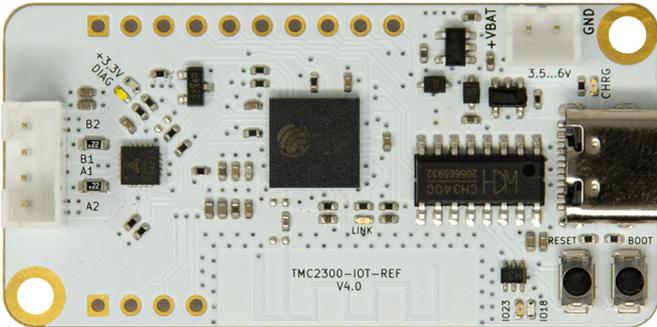


# TMC2300-IOT-REF Hardware Manual

Document Revision V1.2 • 2021-JAN-13

**The TMC2300-IOT-REF allows evaluation of the TMC2300-LA stepper motor driver for usage in battery-powered IoT applications.**



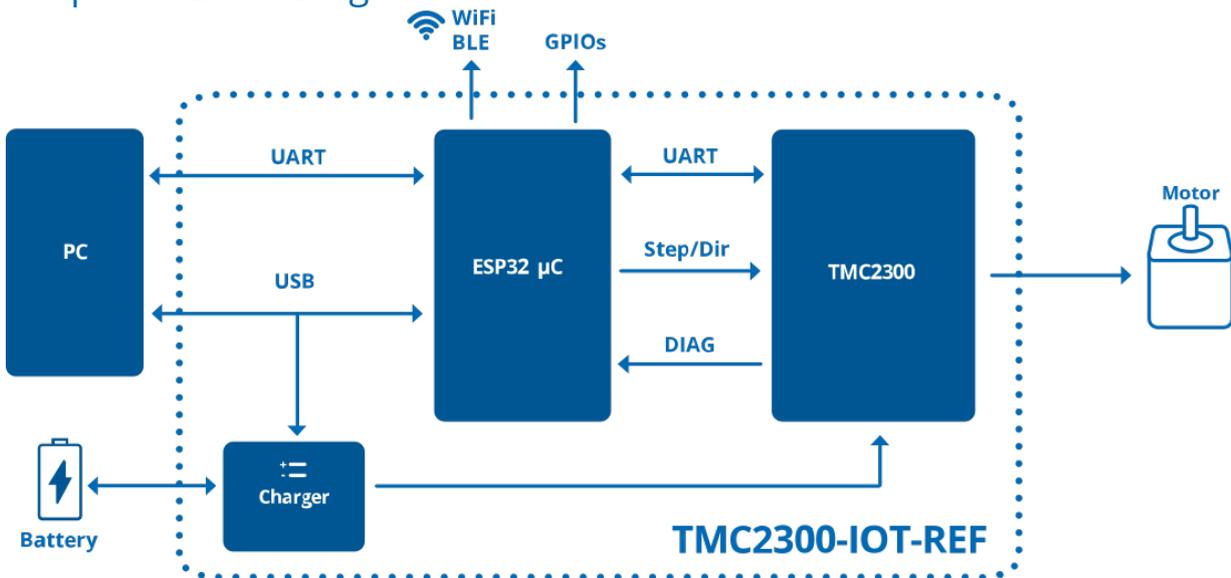
## Features

- **2-phase** stepper motor up to 1.0A coil current
- 3.5V - 6V battery powered operation range
- Li-Ion cell charger via USB-C
- ESP32-PICO-D4 processor with integrated WiFi and BLE capabilities
- **UART** and USB-C for serial communication and programming
- **StealthChop2™** silent motor operation
- **Stall detection** StallGuard4™ in Stealth-Chop mode
- **CoolStep™** smart current control

## Applications

- IoT & Handheld devices
- Battery operated equipment
- Printers, POS
- Miniature 3D Printers
- Toys
- Office and home automation
- CCTV, Security
- HVAC
- Mobile medical devices

## Simplified Block Diagram



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# 1 Getting Started

## You need

- Your TMC2300-IOT-REF.
- Own stepper motor with 4-pin JST-PH connector
- USB-C cable
- (opt.) USB-2-UART cable (3.3V TTL) to connect to onboard UART (RX/TX) header

## Precautions

- Do not mix up connections or short-circuit pins.
- Avoid bundling I/O wires with motor wires.
- Do not exceed the maximum rated supply voltage!
- **Do not use other battery types than Li-Ion with the board!**
- **Do only use Li-Ion batteries with integrated protection!**
- The Li-Ion cell should be properly charged.
- Do not connect or disconnect the motor while powered!
- START WITH POWER SUPPLY OFF!



## 2 Hardware Information

All design files for our evaluation boards are available for free. We offer the original ECAD files, Gerber data, the BOM, and PDF copies. For the TMC2300-IOT-REF the CAD files are available in KiCAD format. Please check schematics for Jumper settings and input/output connector description.

The files can be downloaded from the evaluation boards' website directly at our homepage: [TRINAMIC Eval Kit homepage](#).

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**Note**

If files are missing on the website or something is wrong please send us a note.

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### 2.1 Onboard Connectors

The following connectors are available on the TMC2300-IOT-REF.

- **USB-C Connector** - used for charging the battery as well as programming the microcontroller.
- **2 Pin battery connector**
- **4 pin and 10 pin headers** - all signals are labeled on the back of the board
- **Stepper motor connector** - a 4-pin JST PH series connector that connects the TMC2300-LA motor driver outputs to the motor phases. **Plug/unplug the motor only when the module is not powered!**

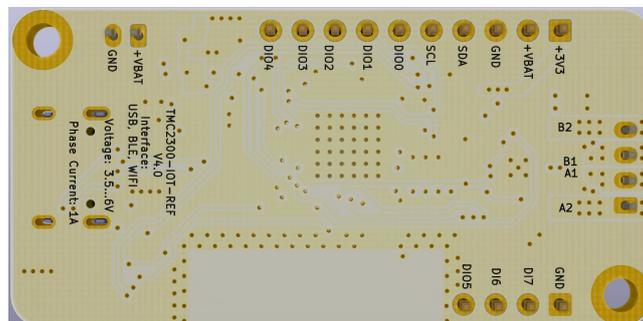


Figure 1: Bottom side of the TMC2300-IOT-REF board



## 2.2 Onboard LEDs

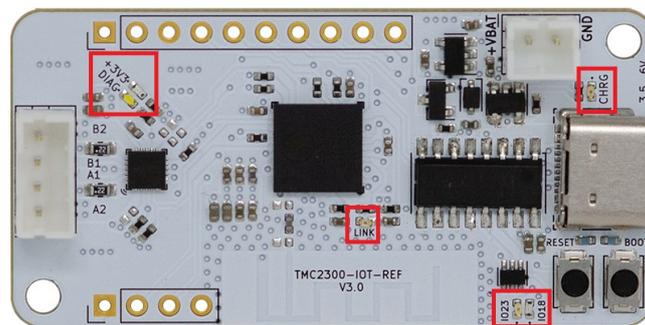


Figure 2: TMC2300-IOT-REF Onboard LEDs (identical on V3.0 and V4.0 boards)

- **3V3 (green)**: This LED indicates the presence of the 3V3 power rail.
- **DIAG (white)**: This LED is connected to the TMC2300 DIAG signal
- **CHRG (yellow)**: This LED indicates that the battery is being charged.
- **LINK (yellow)**: This LED is connected to the ESP32 microcontroller. It is usable by the application code to signal an established connection.
- **IO18 (green)**: This LED is connected to the ESP32 microcontroller. It is usable by the application code to signal a status (e.g. a heartbeat).
- **IO23 (red)**: This LED is connected to the ESP32 microcontroller. It is usable by the application code to signal an error condition.

Note that you are free to use all LEDs connected to the ESP32 microcontroller for any other purpose in your program.



## 3 Revision History

### 3.1 Document Revision

Version	Date	Author	Description
1.0	2020-09-11	LH	Initial release.
1.1	2020-09-30	LH	Updated block diagram
1.2	2021-01-13	SK	Updated images for V4.0 hardware

*Table 1: Document Revision*

