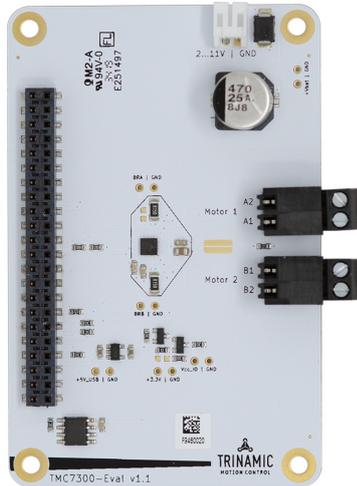# TMC7300-EVAL Evaluation Board

Document Revision V1.0 • 2019-NOV-28

The TMC7300-EVAL allows evaluation of the TMC7300-LA low voltage DC motor driver in combination with the TRINAMIC evaluation board system, or as stand-alone-board. It uses the standard schematic and offers several options in order to test different modes of operation.
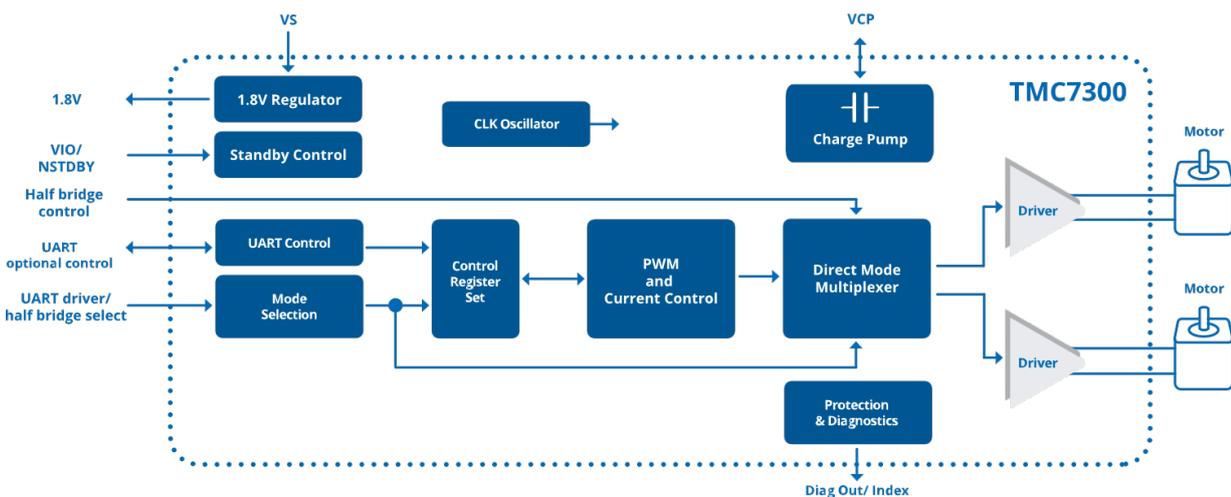
Features

- **2 DC motors** with up to 2A current
- **Single DC motor** with up to 2.4A current
- **Supply Voltage** 2V (1.8V)...11V DC
- **Standby** < 50nA typical current draw
- **UART** for advanced configuration and control
- Parallel operation for single DC motor
- Motor load feedback
- Full protection and diagnostics

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

Read entire documentation.

TRINAMIC
MOTION CONTROL

Contents

1 Getting Started

You need

- TMC7300-EVAL
- Landungsbruecke with latest firmware. (The Startrampe does not support the UART interface.)
- Eselsbruecke bridge board
- 1 or 2 DC motors
- USB interface
- Power Supply
- Latest TMCL-IDE V3.0 and PC
- Cables for interface, motors and power

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 connect or disconnect the motor while powered!
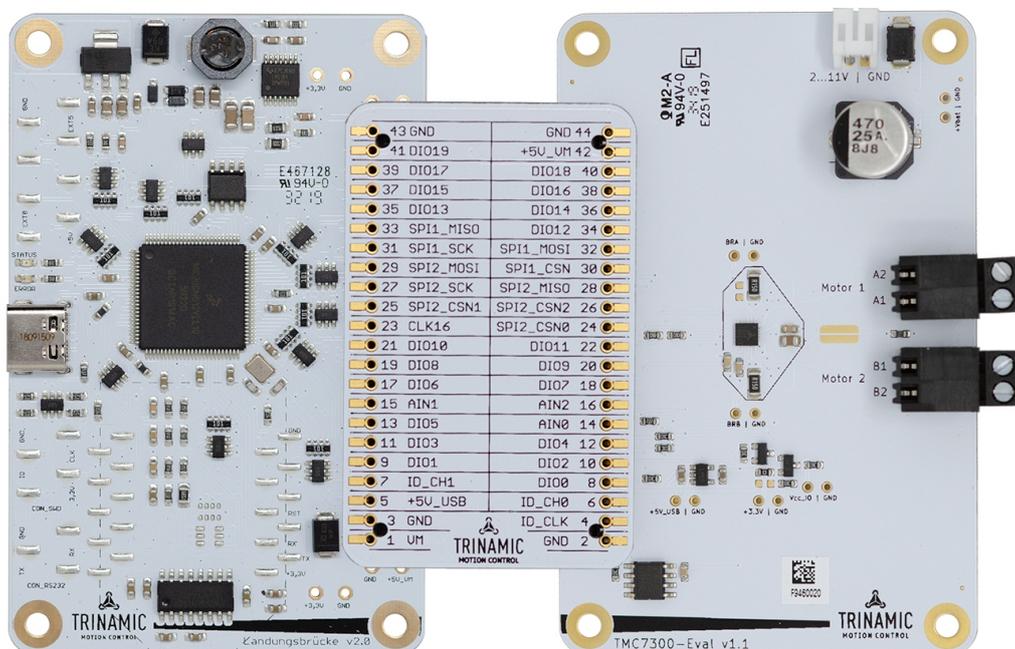- START WITH POWER SUPPLY OFF!

Figure 1: Getting started

1.1   First Start-Up

1. Make sure that the latest version of the TMCL-IDE 3.0 is installed. The TMCL-IDE can be downloaded from www.trinamic.com/support/software/tmcl-ide/.

2. Open the TMCL-IDE and connect the Landungsbruecke via USB to the computer. For Windows 8 and higher is no driver needed, on Windows 7 machines the TMCL-IDE is installing the driver automatically.

3. Verify that the Landungsbruecke is using the latest firmware version. The firmware version is shown in the connected device tree.
    The latest official firmware releases are available from Trinamic's website. Incremental updates (nightly builds) are available from Trinamic's public GitHub repositories.
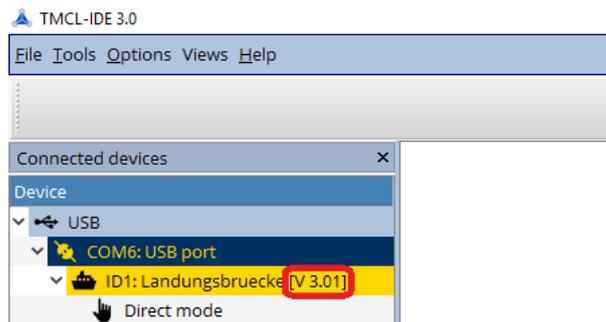

Figure 2: Firmware Version

4. The TMCL-IDE 3.0 needs room to show all important information and to provide a good overview. Therefore, arrange the main window related to your needs. We recommend using full screen. For evaluation boards it is essential to have access to the registers. Therefore open up the Register Browser (left side). For a better view click top right on the normal icon to get a maximized register browser window.

5. The TMCL-IDE includes a dialogue for diagnostic tasks. Further, the dialogue provides an overview of the connected motion controller and driver chips. A window pops up immediately after connecting the evaluation kit the first time. The window shows the actual status of the connections. The second tab of the dialogue offers the possibility to choose basic settings or to reset the module to factory defaults.
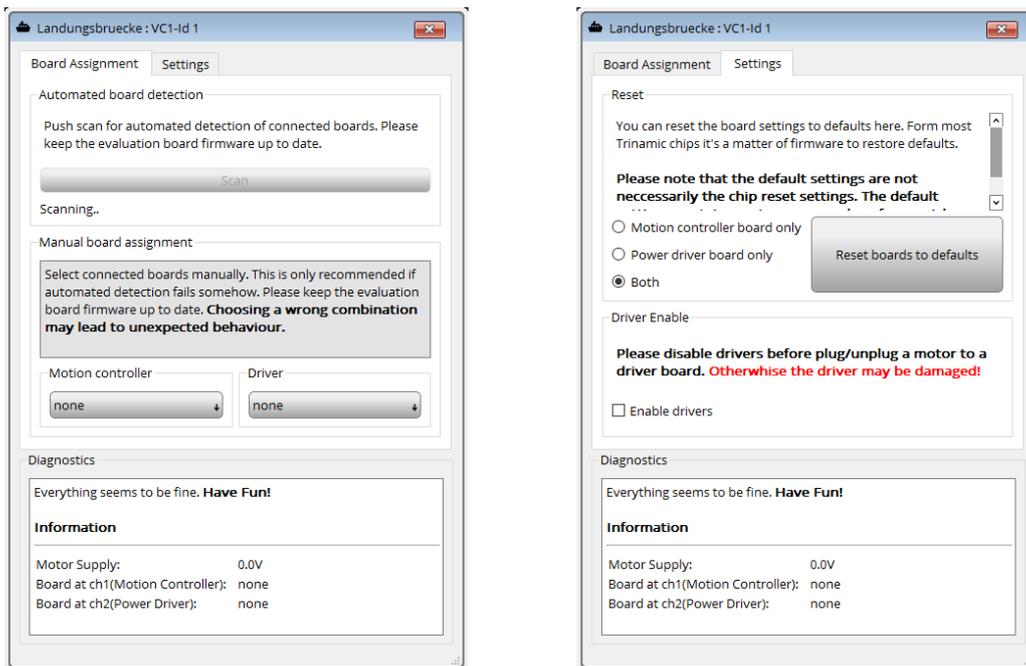
Figure 3: Landungsbruecke Dialogue

2   Hardware Information

All design files for our evaluation boards are available for free. We offer the original ECAD files (Eagle, Altium, or PADS), Gerber data, the BOM, and PDF copies. Please check schematics for Jumper settings and input/output connector description.

The files can be downloaded from the evaluation boards' website directly at out homepage: TRINAMIC Eval Kit homepage.

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

3   Evaluation Features in the TMCL-IDE

This chapter gives some hints and tips on using the functionality of the TMCL-IDE, e.g., how to use the velocity mode or using the wizards.

Note   In order to achieve good settings please refer to descriptions and flowcharts in the TMC7300-LA data sheet. The register browser of the TMCL-IDE provides helpful information about any currently selected parameter. Beyond that, the data sheet explains concepts and ideas which are essential for understanding how the registers are linked together and which setting will fit for which kind of application. For getting more familiar with the evaluation kit in the beginning of your examinations, drive the motor using velocity mode and/or positioning mode first. Beyond this, the direct mode function can be used. This way, TMCL commands can be sent to the evaluation board system.

3.1   Tree View and Control Tools

The TMCL-IDE offers a set of tools to control and interact with the TMC7300-EVAL. The tree view as shown below allows access to each of these tools. The enable button brings the TMC7300 into standby mode. The PWM tools allows to control the DC motors.
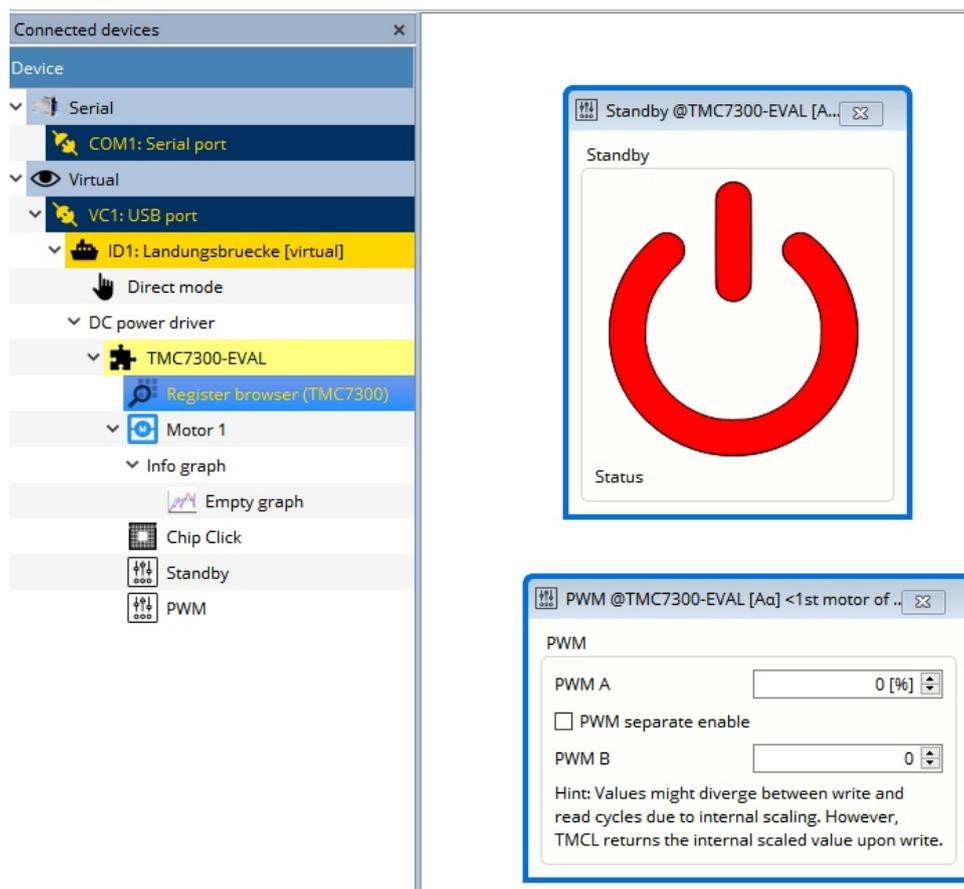

Figure 4: Tree view and tool set of a TMC7300-EVAL (similar for other ICs).

3.2   ChipClick

To configure the control pins for the TMC7300-EVAL, open the ChipClick tool by clicking the appropriate entry in the tool tree. To view a description of a pins possible configurations, hover the mouse over the pin in the graphical view. To change the pins state, click on it.
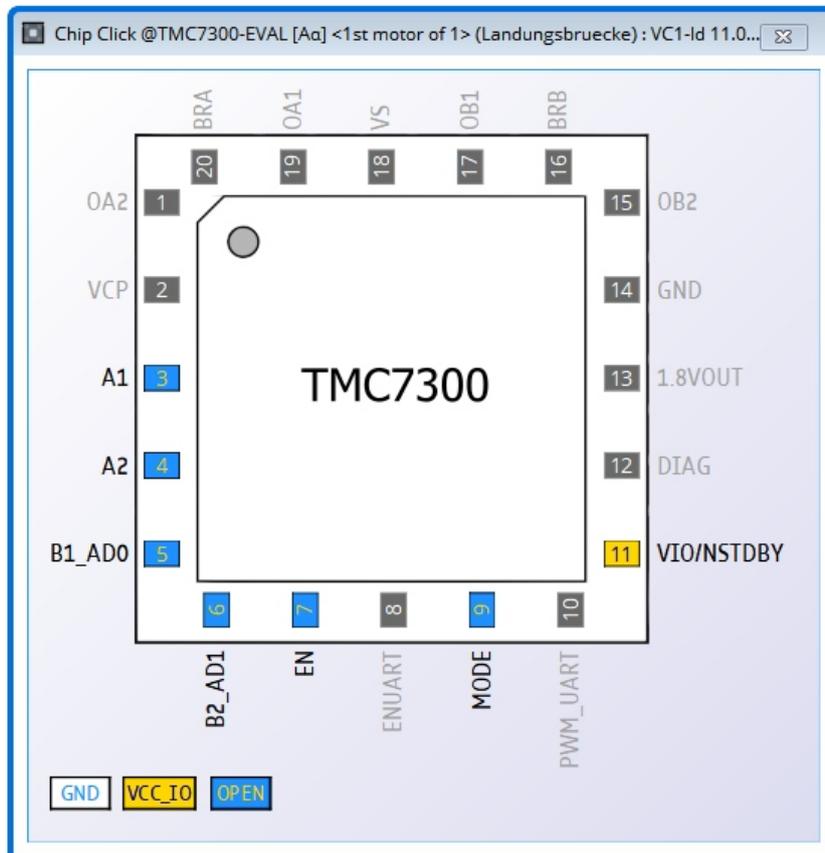

Figure 5: Configuring the control pins of a TMC7300 (similar for other ICs).

3.3   Register Browser

To interact with the internal registers of the TMC7300 you can open the register browser. This tool shows all available registers and their content (flags, parameters) in real-time. It allows for modifying each individual bit, flag or parameter inside the registers.
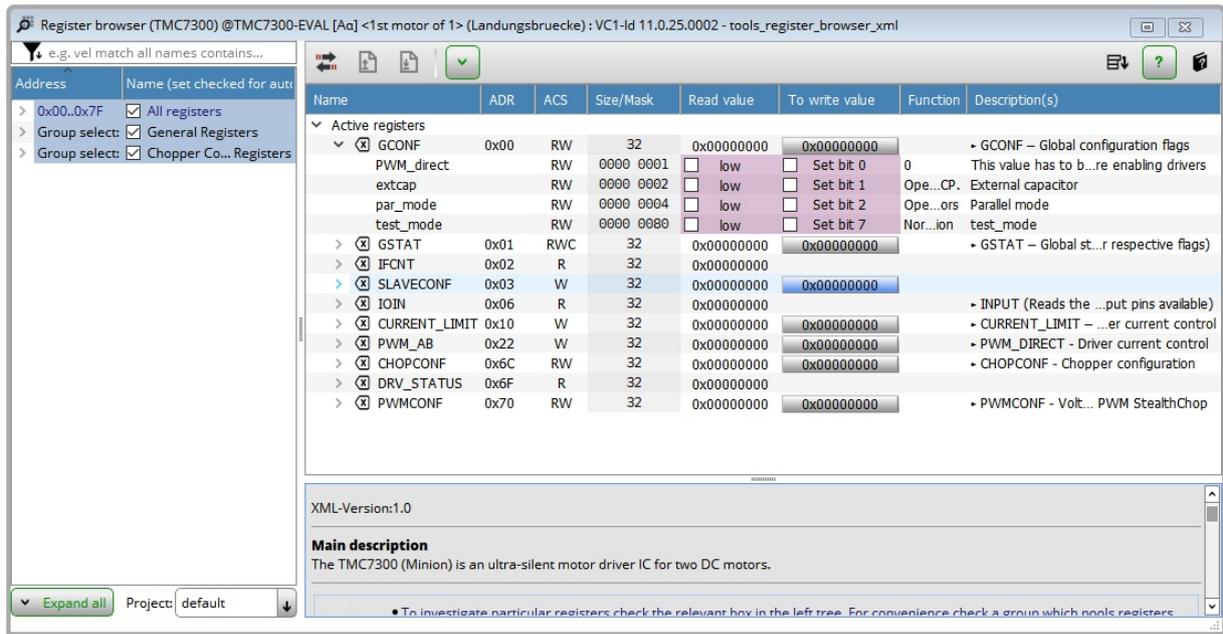
Figure 6: Register browser of a TMC7300 (similar for other ICs).

4 Revision History

4.1 Document Revision

Version	Date	Author	Description
1.0	2019-NOV-28	SK	Initial release.

Table 1: Document Revision