# TMC4670-EVAL Evaluation Kit

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The TMC4670-EVAL is designed for evaluating all features of the TMC4670-BI. The evaluation board is part of TRINAMICs user-friendly plug-in system for chip evaluation. Just connect the TMC4670-EVAL with Landungsbruecke, the associated base board and a separate Power Stage (e.g. TMC-UPS-10A/70V) for easy configuration of PI controllers and feedback systems as well as driving a motor in standard modes like position, velocity or torque mode.
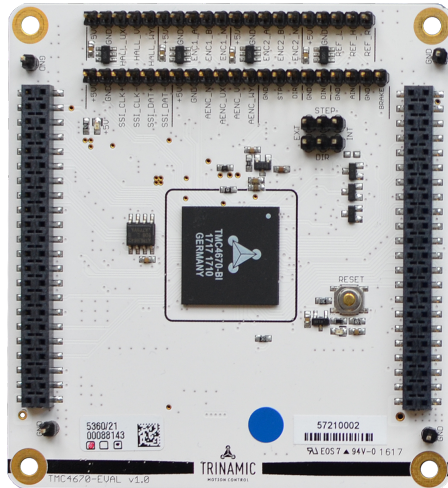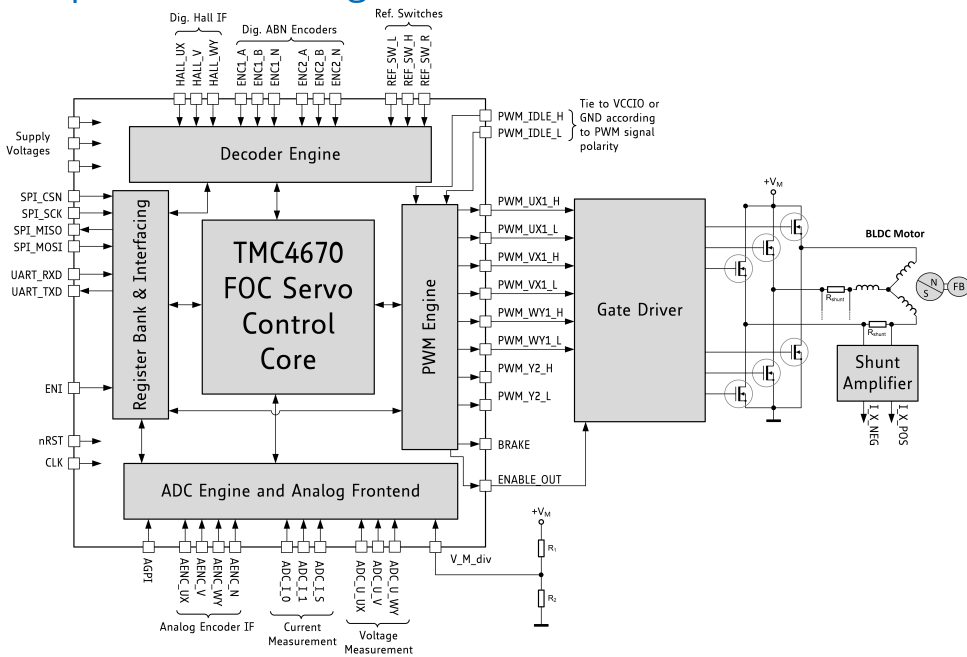
Features

- Servo Controller for BLDC and stepper motors
- Control of torque (FOC), velocity and position by cascade control
- Integrated 12 bit ADCs
- Supply Voltages (1.2V, 2.5V, and 3.3V) are generated from 5V Supply
- SPI for communication with microcontroller
- ABN Encoder Interface, Digital Hall Interface, Analog Hall Interface, Sine/-Cosine Encoder and Ref.-Switch Input

Applications

- Laboratory Automation
- Manufacturing
- Semiconductor Handling
- Robotics
- Factory Automation
- Test & Measurement
- Life Science
- Biotechnology
- Liquid Handling

Simplified Block Diagram

Read entire documentation.

TRINAMIC
MOTION CONTROL

Contents

1 Getting Started

You need

- TMC4670-EVAL
- Landungsbruecke or Startrampe with latest firmware (We recommend the Landungs-bruecke as it offers faster USB communication.)
- 2 x Eselsbruecke
- BLDC or Stepper motor with supported feed-back system
- 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 bounding I/O wires with motor wires.
- Do not exceed the maximum rated supply supply voltage!
- Do not connect or disconnect the motor while powered!
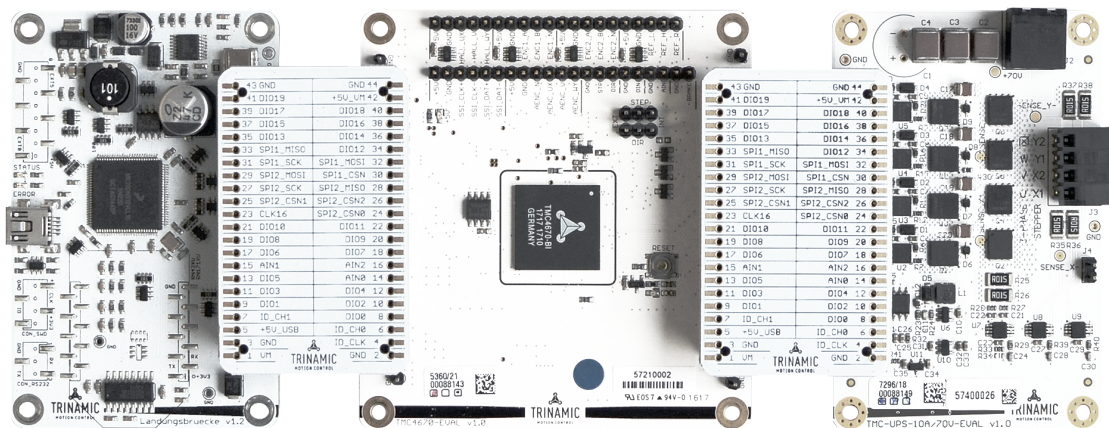- START WITH POWER SUPPLY OFF!

Figure 1: Getting started

| NOTICE | The Landungsbruecke operates on USB Power Supply. All other voltages are generated from V_M. Kit works only, when V_M is applied. |

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 or Startrampe 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 or Startrampe is using the latest firmware version. The firmware version is shown in the connected device tree.
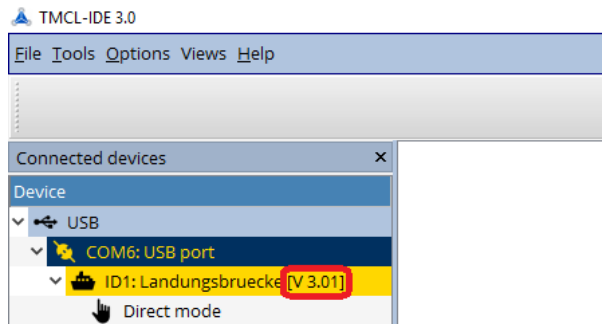
Figure 2: Firmware Version

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. Thus, 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 1defaults.
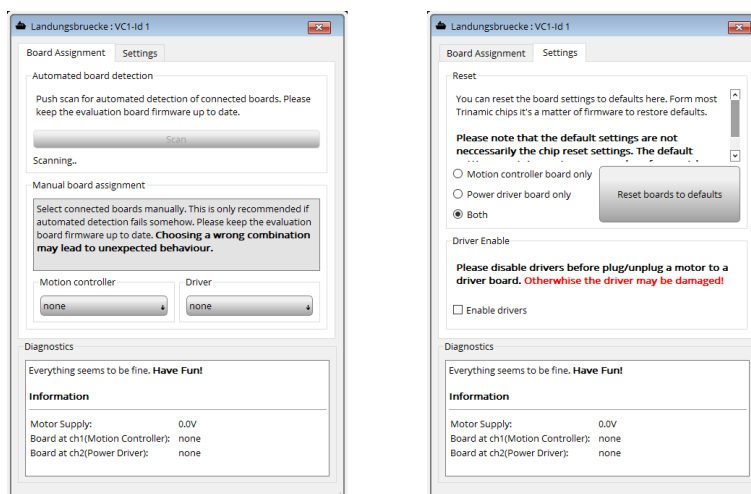
Figure 3: Landungsbruecke Dialogue

6. In the upper area of the Evaluation board you find pin headers for connecting Digital Encoders, Digital Hall Signals and Reference Switches. These input pins are 5V tolerant and have extra needed protection and conditioning circuitry. Analog Hall Sensor Signals or Sine/Cosine Encoder can be processed as single ended analog signals at the respective pin headers in the lower row. Power Supply and GND pins allow easy connection. Please check board schematics for proper connection of your feedback system. SSI and Step/Dir Interface are not supported yet.
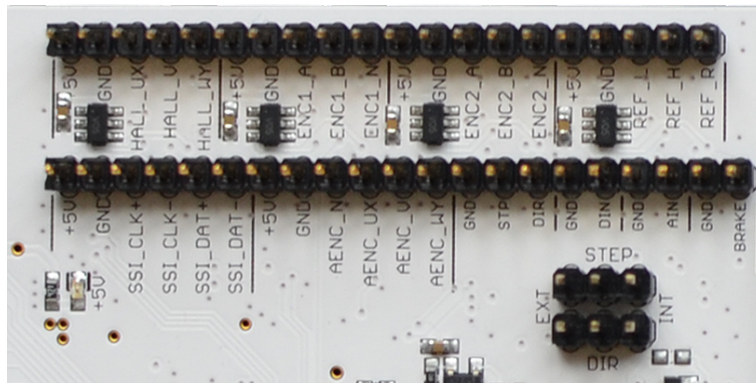

Figure 4: Pin Header on TMC4670-EVAL

2 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.
Start first parametrization of the TMC4670-EVALwith the Wizard, providing guided dialogues to configure and calibrate your setup. Use configuration dialogues to setup PWM, Openloop generator, ADC calibration, and feedback configuration. You can start the Wizard by clicking the marked icon (see fig. 5).

Figure 5: Wizard Icon in TMCL-IDE

The TMCL-IDE also offers special dialogues for selectors, limits and PI controller configuration accessible from the left control pane.
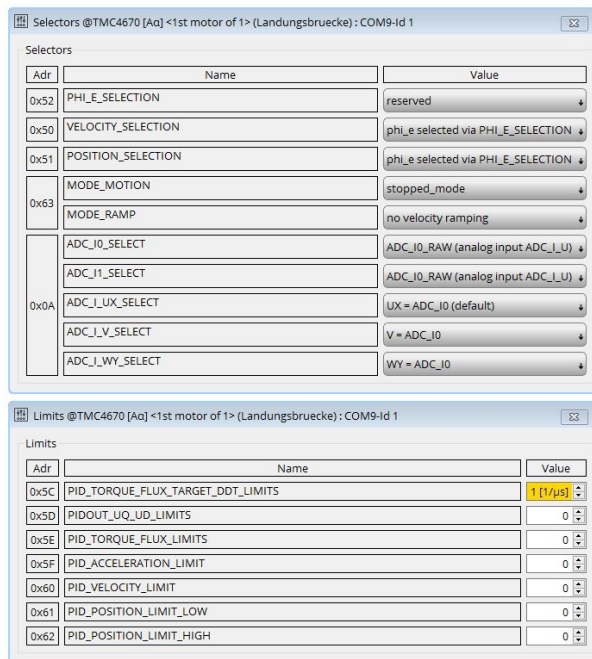
Figure 6: Selectors and Limits dialogues in TMCL-IDE

The TMCL-IDE also provides ease-of-use dialogues for using drive modes (Torque Mode, Velocity Mode and Position Mode, see fig. 7).
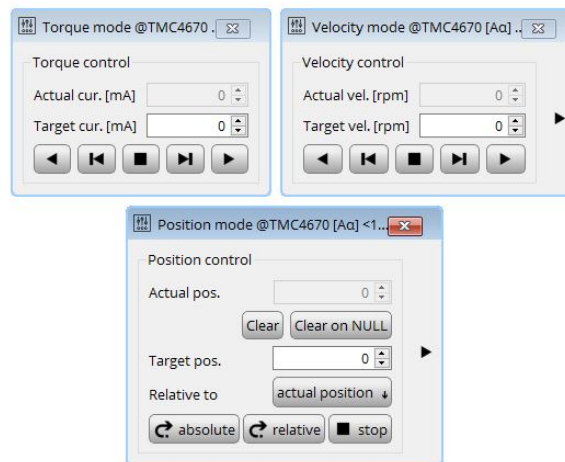

Figure 7: Control Mode Dialogues

3   Revision History

3.1   Document Revision

Version	Date	Author	Description
1.0	2017-OCT-26	OM	Initial creation.

Table 1: Document Revision