TMC2225-EVAL Evaluation Board

Document Revision V1.1 • 2021-SEP-03

The TMC2225-EVAL allows evaluation of the TMC2225 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-phase stepper motor up to 1.35A coil current (2A peak)
- Supply Voltage 4.75...36V DC
- UART
- 1...256 microsteps
- Step/Dir interface
- StealthChop[™] silent PWM mode
- SpreadCycle[™] smart mixed decay

• ATM, Cash recycler

Applications

- Compatible Design Upgrade

- 3D Printers
- Printers, POS
- Office and home automation
- Textile, Sewing Machines CCTV, Security
- HVAC



©2021 TRINAMIC Motion Control GmbH & Co. KG, Hamburg, Germany Terms of delivery and rights to technical change reserved. Download newest version at: www.trinamic.com



Contents

1	Order Codes	2
2	Getting Started 2.1 First Start-Up	3 4
3	Hardware Information	5
4	Evaluation Features in the TMCL-IDE4.1Velocity Mode4.2Position Mode4.3ChipClick	6 6 7 8
5	Revision History 5.1 Document Revision	9 9

1 Order Codes

Order Code	Description	Size
TMC2225-EVAL	The evaluation board includes: - TMC2225 evaluation board - Eselsbruecke (bridge connector board) - TMC2225 evaluation board - Eselsbruecke (bridge connector board)	55mm x 85mm
TMC2225-EVAL-KIT	The kit includes: - TMC2225 evaluation board - Landungsbruecke (interface board to a PC) - Eselsbruecke (bridge connector board)	140mm x 85mm

Table 1: TMC2225-EVAL Order Codes



2 Getting Started

You need

- TMC2225-EVAL
- Landungsbruecke or Startrampe with latest firmware
- Eselsbruecke
- Stepper motor (e.g. QMot line)
- 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 supply voltage!
- Do not connect or disconnect the motor while powered!
- START WITH POWER SUPPLY OFF!



Figure 1: Getting started





2.1 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/.
- 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.

👗 TMCL-IDE 3.0					
<u>F</u> ile <u>T</u> ools <u>O</u> ptions Views <u>H</u> elp					
Connected devices ×					
Device					
✓ ↔ USB					
🗸 🏹 COM6: USB port					
💙 🌰 ID1: Landungsbruecke [V 3.01]					
🖢 Direct mode					

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 defaults.

Landungsbruecke : VC1-Id 1	Landungsbruecke : VC1-Id 1
Board Assignment Settings	Board Assignment Settings
Automated board detection	Reset
Push scan for automated detection of connected boards. Please keep the evaluation board firmware up to date.	You can reset the board settings to defaults here. Form most Trinamic chips it's a matter of firmware to restore defaults.
Scan	Please note that the default settings are not neccessarily the chip reset settings. The default
Sconningi	O Motion controller board only
Manual board assignment	Power driver board only Reset boards to defaults
Select connected boards manually. This is only recommended if automated detection fails somehow. Please keep the evaluation	 Both
board firmware up to date. Choosing a wrong combination	Driver Enable
Motion controller Driver none • none •	Please disable drivers before plug/unplug a motor to a driver board. Otherwhise the driver may be damaged!
iagnostics	Diagnostics
Everything seems to be fine. Have Fun!	Everything seems to be fine. Have Fun!
Information	Information
Motor Supply: 0.0V	Motor Supply: 0.0V
Board at ch1(Motion Controller): none	Board at ch1(Motion Controller): none
Board at ch2(Power Driver): none	Board at ch2(Power Driver): none

Figure 3: Landungsbruecke Dialogue



3 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. Typically, the ECAD files are in KiCAD format. Some (older) evaluation boards may only be available in Eagle, Altium, or PADS format.

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.



4 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 some feature-based tools.

Note In order to achieve good settings please refer to descriptions and flowcharts in the TMC2225-SA data sheet. The register browser of the TMCL-IDE provides help-ful 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.

4.1 Velocity Mode

To move the motor in velocity mode, open the velocity mode tool by clicking the appropriate entry in the tool tree. In the velocity mode tool you can enter the desired velocity and acceleration and then move the motor using the arrow buttons. The motor can be stopped at any time by clicking the stop button. Open the velocity graph tool to get a graphical view of the actual velocity.

Note

In order to get a more accurate graphical velocity view, close the register browser window when using the velocity graph.



Figure 4: Driving the motor in velocity mode (TMCL-IDE provides similar view for TMC2225-EVAL)



4.2 **Position Mode**

To move the motor in position mode, open the position mode tool by clicking the appropriate entry in the tool tree. In the position mode tool you can enter a target position and then start positioning by clicking the Absolute or Relative Move button. The speed and acceleration used for positioning can also be adjusted here.

Open the position graph tool to get a graphical view of the actual position.

Note In order to get a more accurate graphical position view, close the register browser window when using the position graph.



Figure 5: Driving the motor in position mode (TMCL-IDE provides similar view for TMC2225-EVAL)



4.3 ChipClick

To configure the control pins for the TMC2225-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 6: Configuring the control pins of a TMC2209 (similar for other ICs).



5 Revision History

5.1 Document Revision

Version	Date	Author	Description
1.0	2019-AUG-16	LH	Initial release.
1.1	2021-SEP-03	SK	Order code info updated.

Table 2: Document Revision

