# TMC7300-EVAL Evaluation Board

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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</li>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



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# **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/.
- 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.

👗 TMCL-IDE 3.0	
<u>F</u> ile <u>T</u> ools <u>O</u> ptions Views <u>H</u> elp	
1	
Connected devices ×	
Device	
✓ 🐳 USB	
🗸 🏹 COM6: USB port	
👻 🎂 ID1: Landungsbruecke [V 3.01]	
Uirect 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. 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			×	🛥 Land	lungsbruecke	: VC1-ld 1					
oard Assignment	Settings				Board	Assignment	Settings					
Automated board o	letection			-11	Rese	t						
Push scan for auto keep the evaluatio	mated detectio n board firmwa	n of connected b re up to date.	oards. Please	•	You Trir	i can reset the amic chips it	e board setti s a matter of	ngs to firmw	o defa ware	aults he to resto	re. Form ore defau	most llts.
	Sca	n	_		Ple	ase note th cessarily th	at the defa le chip rese	ult se et set	ettir tting	ngs are s. The	not default	
scanning				_	0		ller board or	nly 🗍				·
Manual board assig	nment					ower driver b	oard only		-			efaults
									R	eset bo	ards to d	croores
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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.

Connected devices X
Device
Y 🗐 Serial
🍇 COM1: Serial port
Virtual
YC1: USB port
ID1: Landungsbruecke [virtual]
🕛 Direct mode
✓ DC power driver
TMC7300-EVAL
Register browser (TMC7300)
V 💽 Motor 1
Ƴ Info graph
🞢 Empty graph
Chip Click
Standby
₽₩M

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.



🔎 Register browser (TN	MC7300) @TMC7300-6	EVAL [Aa	] <1st motor of 1> (l	Landungs	sbruecke)	: VC1-ld 11.0.2	5.0002 - tools_re	gister_browser_xm	I		
e.g. vel match all na	ames contains	-	£ £ 🗸							E1 ? Ø	
Address Name	Name		ADR	ACS	Size/Mask	Read value	To write value	Function	Description(s)		
<ul> <li>Group select: Ger</li> <li>Group select: Cho</li> </ul>	neral Registers opper Co Registers	<ul> <li>Act</li> <li>Act</li></ul>	<ul> <li>ver registers</li> <li>GCONF</li> <li>PVM_direct</li> <li>extcap</li> <li>par_mode</li> <li>test_mode</li> <li>(3) GSTAT</li> <li>(3) IFCNT</li> <li>(3) IFCNT</li> <li>(3) IFCNT</li> <li>(3) ISLAVECONF</li> <li>(4) CURRENT_LIMIT</li> <li>(5) PVM_AB</li> <li>(6) CHOPCONF</li> <li>(3) DRV_STATUS</li> <li>(4) PVMCONF</li> </ul>	0x00 0x01 0x02 0x03 0x06 0x10 0x22 0x6C 0x6F 0x70	RW RW RW RWC R W RW RW RW RW	32 0000 0001 0000 0002 0000 0004 0000 0080 32 32 32 32 32 32 32 32 32 32 32 32 32	0x00000000  0x0000000 0x0000000 0x000000	0x00000000 Set bit 0 Set bit 1 Set bit 2 Set bit 7 0x00000000 0x00000000 0x00000000 0x000000	0 OpeCP. Opeors Norion	GCONF – Global configuration flags This value has to bre enabling drivers External capacitor Parallel mode test_mode GSTAT – Global str respective flags) INPUT (Reads theput pins available) CURRENT_LIMIT –er current control PWM_DIRECT - Driver current control CHOPCONF - Chopper configuration PWMCONF - Volt PWM StealthChop	
		XML-Version:1.0									
Main description The TMC7300 (Minion) is an ultra-silent motor driver IC for two DC motors.											
Expand all Project: default								heck a group which pools 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



# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management IC Development Tools category:

Click to view products by Analog Devices manufacturer:

Other Similar products are found below :

EVB-EP5348UI MIC23451-AAAYFL EV MIC5281YMME EV 124352-HMC860LP3E DA9063-EVAL ADP122-3.3-EVALZ ADP130-0.8-EVALZ ADP130-1.8-EVALZ ADP1740-1.5-EVALZ ADP1870-0.3-EVALZ ADP1874-0.3-EVALZ ADP199CB-EVALZ ADP2102-1.25-EVALZ ADP2102-1.875EVALZ ADP2102-1.8-EVALZ ADP2102-2-EVALZ ADP2102-3-EVALZ ADP2102-4-EVALZ AS3606-DB BQ25010EVM BQ3055EVM ISLUSBI2CKIT1Z LP38512TS-1.8EV EVAL-ADM1186-1MBZ EVAL-ADM1186-2MBZ ADP122UJZ-REDYKIT ADP166Z-REDYKIT ADP170-1.8-EVALZ ADP171-EVALZ ADP1853-EVALZ ADP1873-0.3-EVALZ ADP198CP-EVALZ ADP2102-1.0-EVALZ ADP2102-1-EVALZ ADP2107-1.8-EVALZ ADP5020CP-EVALZ CC-ACC-DBMX-51 ATPL230A-EK MIC23250-S4YMT EV MIC26603YJL EV MIC33050-SYHL EV TPS60100EVM-131 TPS65010EVM-230 TPS71933-28EVM-213 TPS72728YFFEVM-407 TPS79318YEQEVM UCC28810EVM-002 XILINXPWR-083 LMR22007YMINI-EVM LP38501ATJ-EV