

**MCU Motor Studio
Release Notes
TOSHIBA TMPM4KN**

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1. Product overview

The TOSHIBA 3-Phase Motor's Vector Control Solution has two main components:

- A highly scalable and fully configurable Motor Control Firmware designed for TMPM4K series MCUs, featuring Field Oriented Control (FOC).
- The "MCU Motor Studio" GUI Tool for Microsoft Windows, utilized for parameter configuration, drive control and real-time logging of various motor parameters in a Digital Storage Oscilloscope fashion.

"TOSHIBA MCU Motor Studio" Feature List	
Motor Drive Control	Speed / Torque / Position (per channel)
Sequencer	Sequential Command List Execution / Wait Stage Support GUI Layout Control Sequence Save / Recall / Clear
Board Information	Base & Power Board Configuration / Versioning Information / Supported Features
Parameter Configuration	Run-time Motor / Encoder / Board / PI Regulator / System (limitations apply)
Statistics	Up to 4 fixed parameters (Speed, Torque, Current) Up to 3 channels individually with optional CSV logging of the selected parameters Scalable Timeline / Manual Zoom Status Information / DC Voltage / Temperature / Errors
Layout Configuration	Save Current View / Restore Default View
Motor Parameter Configuration	Configuration Save / Recall from XML Export to C Header file for Firmware inclusion. NVM (EEPROM/Flash) Save/ Recall (in future releases)
Sensor-less Position Control	Advanced Software Positioning / Advanced Turn Control
Sensor Position Control	Linear Motion Control
Application Control	Demo Control
DSO / HS-DSO	Logging of up to 8 parameters with scalable spread factor
Built-in Calculators	Current Sensitivity / Voltage Sensitivity / Pole Pairs / Single Phase Impedance
Supported MCU Devices	M4Kx
Supported OS	Microsoft Windows 10 32/64-bit OS
Supported Languages	English / German / Japanese
Version	4.1.0
"MCU Motor Studio" Firmware Feature List	
Motor Drive Method	Field Oriented Control (Vector Control) using highly optimized mathematical co-processor, the "TOSHIBA Vector Engine"
Control Scheme	Speed / Torque / Position
Current Detection (configurable)	1-Shunt / 3-Shunt / 2-Sensor (in future releases)
Number of motor channels	1 channel, Up to 3 channels (in future releases)
PWM Frequency	Variable, 8kHz to 24kHz
Protection	Over Current Field Stall Detection Over Voltage Under Voltage Motor Disconnection Detection

Advanced & Convenience Functions	Zero Current Point Detection & Initial Motor Positioning Turn Control / Advanced Turn Control Linear Motion Control Stop Control Stall Recovery Load Dependent Speed Reduction
Encoder	Sensor based: Linear (Optical) / Magnetic (Hall) / Resolver Sensor-less: Advanced Software Positioning
MCU Devices	TMPM4K
Supported Tool-chains	IAR Embedded Workbench(version 8.50.9)
Version	3.10
Hardware Requirement	
MCU	Clicker 4 for TMPM4K
Inverter	Clicker 4 Inverter Board
Power supply	24V 2.7A AC adapter (Model ATS065-P240)
BLDC Motor	MOTOR - HETAI -42BLF01 (ACT-42BLF01), POLEPAIR – 4, RATED - 4000rpm, 24V 1.90A.

2. Resolved Limitations

This section describes the resolved limitations from the previous release (Rev 1.0.0).

2.1. Parameter Export

The motor header (.h) file exported from MCU Motor Studio PC tool is compatible with the Firmware.

2.2. PC tool timeout

In case communication is lost between PC tool and firmware, the PC tool will give a popup message indicating that the communication is lost and the PC tool application will be closed.

2.3. Dead time from PC tool

User can set DeadTime from PC tool in the current release.

2.4. Turn control in counter clockwise direction

Turn control in Counter clockwise direction is supported.

2.5. Error Notifications

The below error notifications are supported in the current release,

1. No Motor notification.
2. SW Undervoltage notification.
3. SW Overvoltage notification.
4. Speed reduction notification.

2.6. Language menu – “Japanese localization”

Japanese Language menu is available.

3. Known Limitations

3.1. Torque control testing using external hardware

Torque control is not tested.

3.2. Encoder usage - Speed control

The following features are not tested:

- (1) Hall sensor(UVW), (2) Hall sensor(UV), (3) Incremental Encoder(ABZ), (4) Incremental Encoder (AB)

3.3. Over Voltage detection using OVV interrupt

Over voltage detection using OVV interrupt is not supported due to limitation of Clicker 4 Inverter Board.

3.4. Compiler optimization level

“Optimization level = high” is highly recommended.

3.5. MAX14890 Re-Initialization

Re-initialization of MAX14890 IC is not supported.

4. Important Notes

4.1. Precautions during installation

Please take the following precautions when installing MCU Motor Studio,

1. Please ensure full install privileges (**Admin rights**) when installing the MCU Motor Studio PC tool.
2. Do not attempt to install from a network drive or removable media. The installation package has to be copied to a local drive.
3. Please ensure that the installer has valid Code Signing Certificate.
4. It is recommended to use small path names during installation, please avoid the use of special characters as directory names.
5. Multiple instances or various versions are not supported.
6. Please un-install any previous versions of "MCU Motor Studio", if already installed.
7. When executing the installer, make sure that no suspicious files exist in the same directory.
8. When executing the installer, copy the files to a newly created temporary directory before executing it.
9. It is recommended that you do not leave files downloaded from external sites in the download directory. For example, if you download a crafted DLL file without knowing it, and then download the installer and run it, you will run the installer with the crafted DLL file in the same directory, which is dangerous.

4.2. Evaluation Kit to be used

Note:

Sanity Testing has been performed using evaluation kit "Clicker 4 for TPM4K + Clicker 4 Inverter shield + ACT motor (42BLF01)".

It is advisable to use ACT motor for evaluating all features of "MCU Motor Studio".

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