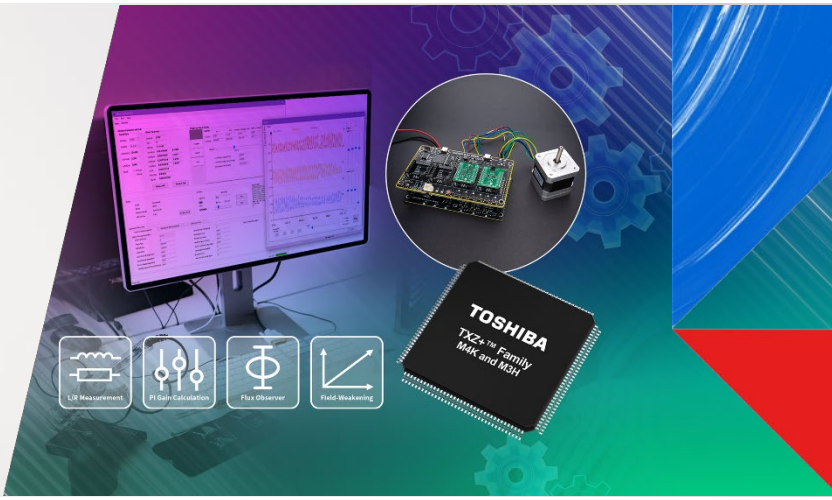
Motor Tuning Studio 1.0

PC Tool & Firmware



Automatic BLDC & PMSM Parameter Measurement and Vector Control Optimization

Motor Tuning Studio is an easy-to-use, all-in-one profiling and parameter optimization solution featuring firmware and a PC-based tool. It allows for automatic motor parameter measurement such as phase resistance, phase inductance, moment of inertia, as well as automatic tuning and optimization of the proportional-integral regulator gains for speed, current, and position.

Applications

- Sensorless BLDC and PMSM motors
- Variable Speed Drives (VSD)
- Robotic / AGV
- HVAC, Fan, Pumps
- Power tools
- Home Appliances

Features

- Automatic resistance, inductance (d-axis & q-axis), flux and inertia moment measurement
- Automatic speed, current and position PI control gain parameter optimization & configuration
- Flux observer based position estimation
- Configurable field weakening
- Parameter export to C header file and XML, compatible with MCU Motor Studio 3.0

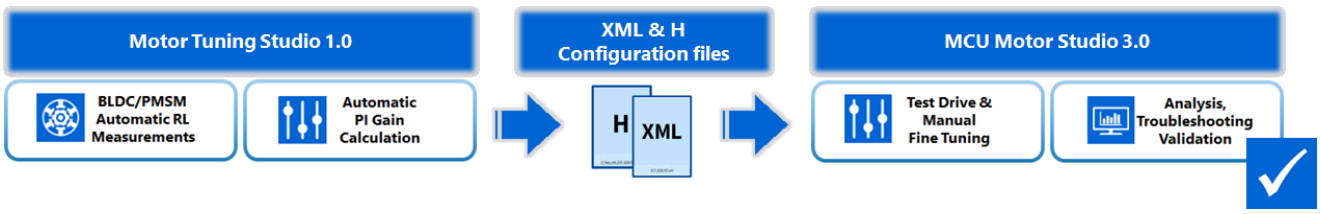
Advantages

- Motor parameter specification or manual multimeter measurement not required
- Eliminate the complexity of the drive control configuration
- Improve stability, responsiveness, torque output and dynamic performance
- Allows sensor-less high accuracy position and speed estimation
- Enables an electric motor to operate at speeds above its rated speed at constant power

Benefits

- Ease the initial motor parameter configuration
- Minimize the time and effort for initially configuring and optimizing the parameters of PI regulators
- Sensor-less systems save cost, are smaller, require less maintenance
- Field weakening is useful for applications that require occasional power bursts, making investment into a higher power rated motor avoidable

Motor Tuning Studio 1.0 complements MCU Motor Studio 3.0 to offer a complete development flow and meet the challenges of any BLDC/PMSM drive system design.

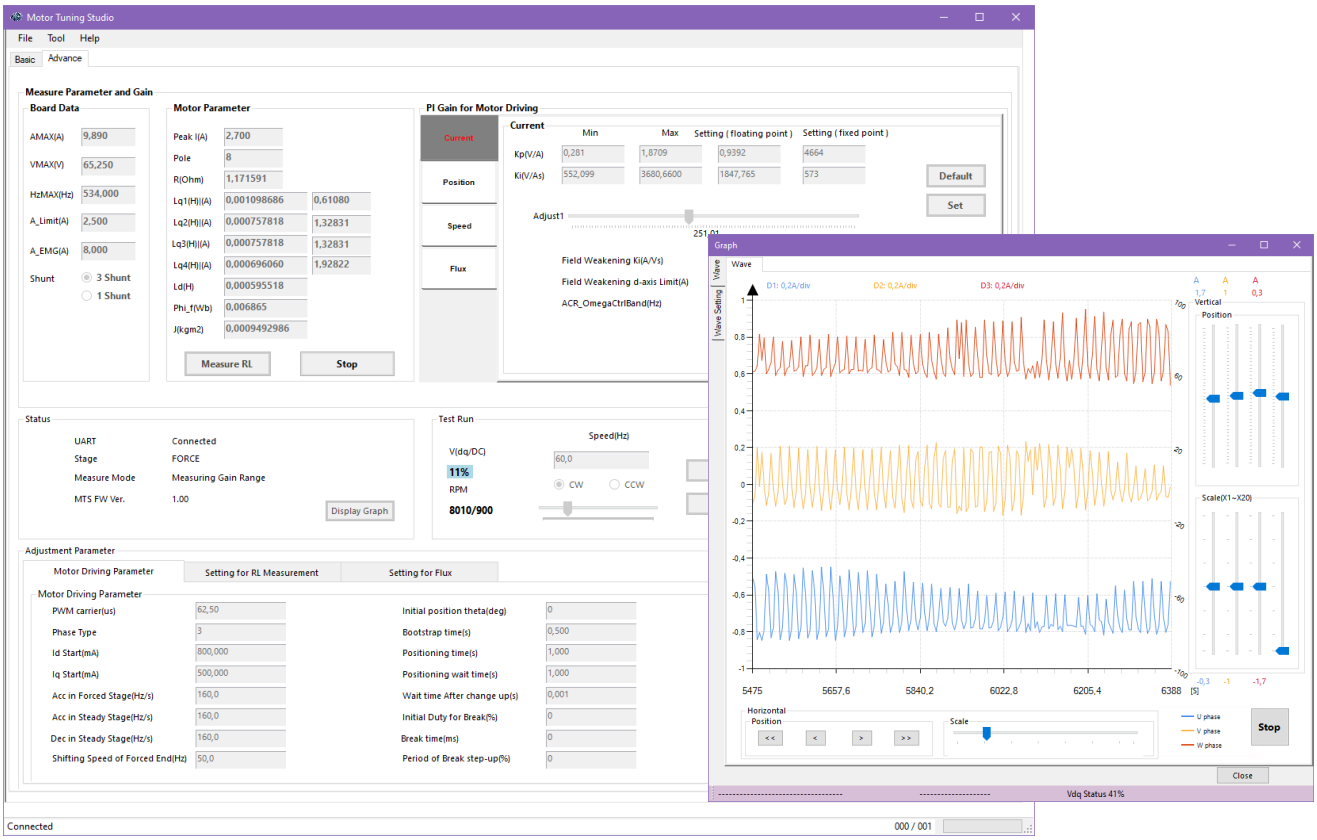


Basic & advanced modes of operation

- Basic mode – single click for fully automatic motor parameter measurement & PI gain control
- Advanced mode - enhanced control over the PI gain control parameters configuration and ratio
- Status display and logging in both modes

PI gain tuning (GUI)

- Measurement and automatic determination of the proportional and integral gains for speed, current and position PI regulators
- Second-Order Generalized Integrator (SOGI) gain measurement and optimization for accurate position estimation with the flux observer



Motor test drive / parameter graph (GUI)

- 3-shunt test drive up to the rated speed (or above with field weakening) for measurement results validation
- Fully configurable and scalable waveform graphical representation for up to 4 signals
- Overcurrent, overvoltage and low voltage detection/protection

Motor parameter measurement (GUI)

- In a test sinewave commutation the phase resistance, phase inductance , moment of inertia and BEMF constant of the motor are dynamically measured
- Minimal input required – rated speed, rated current, number of poles
- Salient and non-salient pole BLDC/PMSM supported as d-axis and q-axis inductance is measured separately

Further information

https://toshiba.semicon-storage.com/eu/semiconductor/product/microcontrollers/motor-studio.html

MIKROE CLICKER 4

for TMPM4K

https://www.mikroe.com/clicker-4-for-tmpm4k

for TMPM3H

https://www.mikroe.com/clicker-4-for-tmpm3h

Inverter shield

https://www.mikroe.com/clicker-4-inverter-shield