

Stepper 8 Click



PID: MIKROE-4157

Stepper 8 Click is a motor control add on board based on [TC78H670FTG](#) from [Toshiba](#), a clock-in and serial controlled Bipolar Stepping Motor Driver which can drive a 128 micro-stepping motor with a power supply ranging from 2.5V to 16V for wide range of applications includes USB-powered, battery-powered, and standard 9-12V system devices. A perfect solution for driving stepper motors in security cameras, portable printers, handheld scanners, pico-projectors, smartphones and many more.

Stepper 8 Click board™ is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

Stepper 8 Click can be used with bipolar step motor, coils should be connected to the onboard screw terminals. There are two terminals, used to connect each of the step motor coils. The third connector is used to connect an external voltage, ranging from 2.5V to 16V, depending on the used motor voltage requirements and current of 2A. The maximum output current may be further limited in view of thermal considerations, depending on ambient temperature and board conditions. It should be noted that without a valid external voltage connected to this terminal, the motor will not work.

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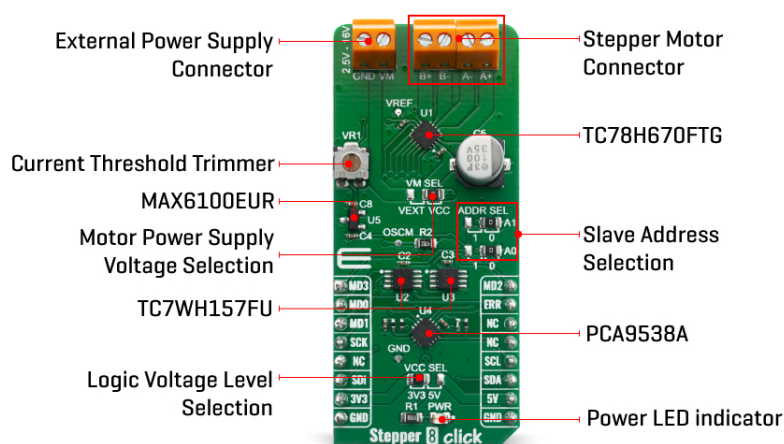
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Stepper 8 Click can operate a bipolar stepper motor in full, half, quarter, 1/8, 1/16, 1/32, 1/64, 1/128 step operation. Thanks to internal safety features, such as thermal shutdown (TSD), over current (ISD), motor load open (OPD) and under voltage lockout(UVLO), this Click board™ is perfectly suited for rapid development of various stepper motor applications.

This TC78H670FTG integrated driver offers a simple interface, featuring a set of pins used to control the functions of the step motor. Since the number of pins exceeds the available mikroBUS™ general purpose pins, an additional port expander IC is used, exposing a 2-wire I2C interface for the communication with the host MCU. The port expander IC is the PCA9538, an 8-bit port expander with the I2C interface.

The MODE0-3 pins can be selected Serial mode or CLK-IN mode. The control mode is set up by the input state of the MODE0-3 pins after releasing standby mode. Under the serial mode, it performs setting and motor control in the following 32 bit format using SPI on mikroBUS™. For the motor control, each current value is set in the serial setting, and the output is updated to the set current value at the timing of the LATCH signal. More information about using Serial mode or CLK-IN mode can be find in TC78H670FTG datasheet.

To allow both Serial mode or CLK-IN mode on mikroBUS™ a [TC7WH157](#) two channel multiplexer from Toshiba is used. Selection is done using I2C communication with [PCA9538](#) port expander and changing state of SELECT pins on multiplexers.

Specifications

Type	Stepper
Applications	Security cameras, portable printers, handheld scanners, pico-projectors, smartphones and many more
On-board modules	TC78H670FTG
Key Features	Advanced Current Detection System, Built-in Dual H Bridges, Low on-resistance, Multi error detect functions
Interface	GPIO,I2C,SPI
ClickID	No
Compatibility	mikroBUS™

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Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Stepper 8 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS				Pin	Notes
MODE3	MD3	1	AN	PWM	16	MD2	MODE2
MODE0	MD0	2	RST	INT	15	ERR	Enable/Error
MODE1	MD1	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
SPI Data IN	SDI	6	MOSI	SDA	11	SDA	I2C Data
Power Supply	3.3V	7	3.3V	5V	10	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP2	VCC SEL	Left	Logic level voltage selection: left position 3V3, right position 5V
JP1	VM	Right	Power supply selection: left position - External supply, right position - On-board supply
JP3, JP4	ADDR SEL	Right	Slave address selection: left position 1, right position 0
VR1	VR1	-	Current threshold reference adjustment trimmer

Stepper 8 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	2.5	-	16	V
Output Current	0	-	2	A
fOSCM	656	1266	3290	kHz
fchop	41	79	206	kHz

Software Support

We provide a library for the Stepper 8 Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

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Library Description

The library covers all the necessary functions that enables the usage of the Stepper 10 Click board. It initializes and defines the I2C driver and drivers that allow full control of the device to the user.

Key functions:

- void stepper8_motor_start(void) - Start Movement
- void stepper8_motor_stop (void) - Stop Movement
- void stepper8_process (void) - Stepper State Machine

Examples description

The application is composed of three sections :

- System Initialization - Initializes all GPIO pins found on Stepper 8 Click.
- Application Initialization - Initializes driver, stepper control, maximum and minimum speed, acceleration ratio and motor work mode.
- Application Task - Starting motor according to a predefined configuration.

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- UART library
- I2C library

Additional notes and informations

Depending on the development board you are using, you may need [USB UART click](#), [USB UART 2 click](#) or [RS232 click](#) to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the [LibStock](#) and installed for the compiler you are using.

For more information about mikroSDK, visit the [official page](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

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Downloads

[TC78H670FTG datasheet](#)

[PCA9538 datasheet](#)

[TC7WH157 datasheet](#)

[Stepper 8 click 2D and 3D files](#)

[Stepper 8 click example on Libstock](#)

[Stepper 8 click schematic](#)

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