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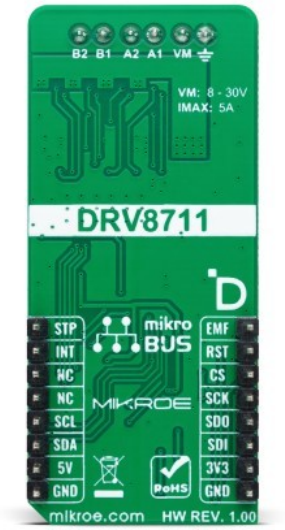
Stepper 22 Click



PID: MIKROE-6206

Stepper 22 Click is a compact add-on board designed for precise motion control of bipolar stepper motors and brushed DC motors. This board features the DRV8711, a bipolar stepper motor gate driver from Texas Instruments, which uses external N-channel MOSFETs to drive motors with up to 5A of output current. The board features a wide range of microstepping options from full-step to 1/256-step, adaptive blanking time, and various current decay modes, ensuring smooth and accurate motor operation. Control is achieved via a standard SPI interface and STEP/DIR inputs, with additional management through an onboard I2C-configurable GPIO expander. This Click board™ is ideal for applications in office automation, factory automation, robotics, and many others.

How does it work?

Stepper 22 Click is based on the DRV8711, a bipolar stepper motor gate driver from Texas Instruments designed for precise motion control. It uses external N-channel MOSFETs (specifically, four dual N-channel power MOSFETs, the CSD87502Q2, also from Texas Instruments) to drive a bipolar stepper motor efficiently or two brushed DC motors connected to the A-B terminals, supporting a maximum output current of up to 5A. The board requires an external power supply from 8V to 30V, delivered through the INPUT connector. The DRV8711's integrated microstepping indexer supports a wide range of step modes, from full to 1/256-step, ensuring smooth and precise motor control. Additionally, the adaptive blanking time and various current decay modes, including an auto-mixed decay mode, enable ultra-smooth motion profiles. This Click board™ is ideal for applications in office automation machines, factory automation, robotics, and more.

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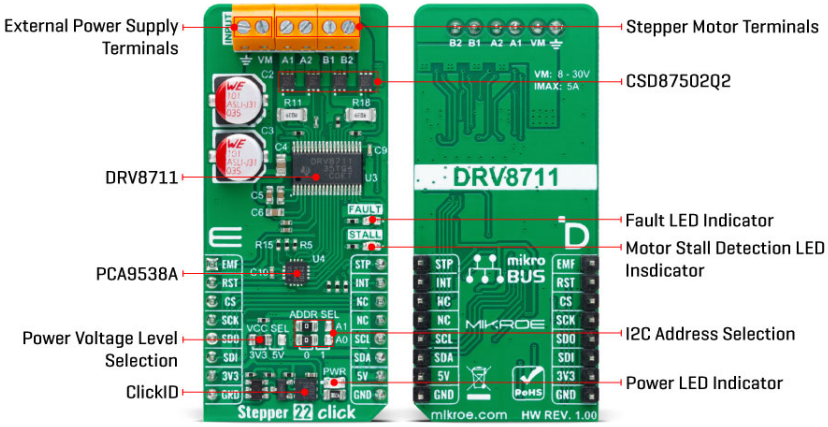

Stepper 22 Click uses a standard 4-wire SPI serial interface to program the device operation and communicate with the host MCU. A simple STEP/DIR interface achieves control over the stepper motor, allowing an external controller to dictate the motor's stepping direction and rate. The microstepping resolution ranges from full-step to 1/256-step and is selectable through the STP pin on the mikroBUS™ socket. All other functions of the DRV8711 can be managed via the onboard I2C-configurable GPIO expander, the PCA9538A.

The PCA9538A enables control over features such as B bridge control, motor stepping direction, low-power Sleep mode, and the reset function for the stepper driver IC. Additionally, output current (torque), step mode, decay mode, and stall detection can all be programmed through the SPI serial interface. The PCA9538A also allows the selection of the least significant bit (LSB) of its I2C address by adjusting the SMD jumpers labeled as ADDR SEL to the appropriate position, marked as 0 or 1.

The RST pin on the mikroBUS™ socket allows the expander to be reset, while the INT pin can be used to route various status signals, such as motor stall, reported via the back-EMF output on the EMF pin of the mikroBUS™ socket and fault conditions, including overcurrent, short-circuit, under-voltage lockout, and overtemperature. Additionally, two red LEDs labeled FAULT and STALL can visually indicate motor stall and fault statuses.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	Stepper
Applications	Ideal for office automation, factory automation, robotics, and more
On-board modules	DRV8711 - bipolar stepper motor gate driver from Texas Instruments
Key Features	PWM microstepping motor driver, flexible decay modes, motor stall detection with optional BEMF output, SPI interface, scalable output current, protection and diagnostic

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	features, and more
Interface	I2C,SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on Stepper 22 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Back-EMF Output	**EMF**	1	AN	PWM	16	**STP**	Step Control
Reset / ID SEL	**RST**	2	RST	INT	15	**INT**	Interrupt
SPI Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	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
STALL	STALL	-	Motor Stall Detection LED Indicator
FLT	FAULT	-	Fault LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Stepper 22 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	8	-	30	V
Output Current	-	-	5	A

Software Support

We provide a library for the Stepper 22 Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development

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boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on MIKROE github account.

Library Description

This library contains API for Stepper 22 Click driver.

Key functions

- stepper22_set_direction This function sets the motor direction by setting the DIR pin logic state.
- stepper22_set_step_mode This function sets the step mode resolution settings.
- stepper22_drive_motor This function drives the motor for the specific number of steps at the selected speed.

Example Description

This example demonstrates the use of the Stepper 22 Click by driving the motor in both directions for a desired number of steps.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on MIKROE github account.

Other MIKROE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Stepper22

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. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE 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™

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