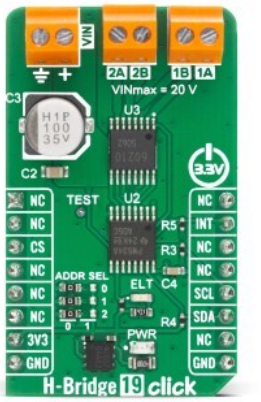
MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

H-Bridge 19 Click





PID: MIKROE-7004

H-Bridge 19 Click is an I2C-controlled dual H-bridge motor driver for operating brushed DC motors, bipolar stepper motors, and solenoid loads in embedded systems. It features the BD60210FV-E2 from ROHM Semiconductor, supporting two brushed DC motors, one bipolar stepper motor, or four solenoids with output currents up to 1A per phase. I2C control enables drive-mode configuration, direction control, braking, power-save operation, and fault monitoring, while onboard address jumpers provide selectable device addressing. Separate VIN and motor-output terminals simplify power and load connections. It is suitable for refrigerators, air conditioners, printers, office automation equipment, and embedded motor and actuator control applications.

For more information about **H-Bridge 19 Click** visit the official product page.

How does it work?

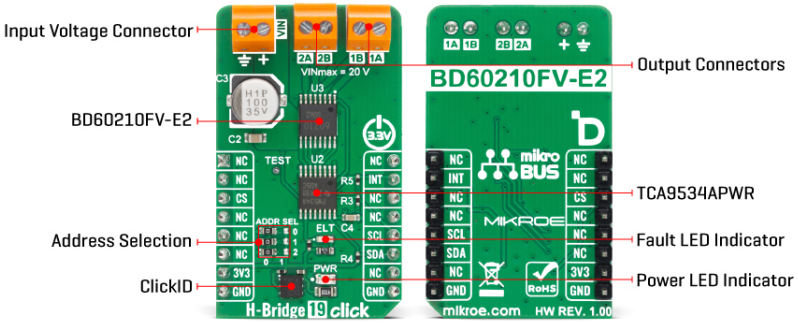
H-Bridge 19 Click is a compact add-on board designed for bidirectional control of brushed DC motors, bipolar stepper motors, and solenoid loads. It is based on the BD60210FV-E2, a dual H-bridge motor driver from ROHM Semiconductor that integrates two DMOS bridge output stages and can drive two brushed DC motors, one bipolar stepper motor, or up to four solenoids. The driver is rated for a continuous output current of 1A per phase and a peak current of 4A per phase under the short-pulse conditions specified in the datasheet, while the recommended operating conditions specify up to 0.7A per phase continuously. Its typical total high-side and low-side ON resistance of 0.95Ω helps reduce conduction losses. The control inputs support direct PWM operation at frequencies up to 250kHz, making the device suitable for motor and actuator control in refrigerators, air conditioners, printers, office equipment, and similar applications.

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The BD60210FV supports four-pin, two-pin, parallel-bridge, and half-bridge interface modes, selected through the MODE and IN2A control inputs. Depending on the selected configuration, the outputs can provide forward rotation, reverse rotation, braking, or a high-impedance stop state. In four-pin mode, the two bridges can be controlled independently, while parallel-bridge mode operates both bridges together. The device can also drive a bipolar stepper motor using full-step or half-step sequences and supports slow-decay and fast-decay current recirculation during direct PWM operation. Pulling the PS input LOW activates the power-save state and places all motor outputs in a high-impedance condition, reducing the driver current consumption to a maximum of 1µA. Integrated protection features include cross-conduction prevention, overcurrent protection, thermal shutdown, undervoltage lockout, ghost-supply prevention, and adjacent-pin short protection. The open-drain FAULT output becomes active LOW when overcurrent or thermal protection is triggered, allowing the connected system to respond to an abnormal operating condition.

Since the BD60210FV does not include a serial communication interface, H-Bridge 19 Click uses the TCA9534APWR, an 8-bit I2C GPIO expander from Texas Instruments, to control and monitor the motor driver. The host MCU communicates with the expander through the standard two-wire I2C interface using the SCL and SDA pins. The expander ports P0, P1, P2, and P3 control the IN1A, IN1B, IN2B, and IN2A inputs, respectively, while P4 controls the MODE input and P6 controls the PS power-save input. Port P5 monitors the FLT signal from the motor driver. The expander’s active-LOW, open-drain interrupt output is routed to the INT pin, allowing the host MCU to detect a change in the monitored fault state without continuously polling the input register. Although the BD60210FV supports direct hardware PWM control, the mikroBUS™ PWM pin is not connected on this board, as the driver control inputs are managed through the I2C GPIO expander. The CS pin is used exclusively for communication with the onboard DS28E36BQ ClickID device.

Three ADDR SEL solder jumpers, JP1 through JP3, configure the A0, A1, and A2 address inputs of the TCA9534A, allowing one of eight I2C addresses to be selected. All three jumpers default to the left position, corresponding to logic 0, while moving a jumper to the right position selects logic 1. The external motor supply is connected through the VIN screw terminal, while two additional screw terminals expose the OUT1A/OUT1B and OUT2A/OUT2B bridge outputs for connecting motors, stepper-motor windings, or solenoid loads. A green PWR LED indicates the presence of the 3.3V logic supply, while a red FLT LED illuminates when the active-LOW fault signal is asserted. The board also includes an accessible TEST pad connected to the driver’s factory test pin, which should remain open during normal operation, as well as 100µF bulk and 100nF ceramic capacitors for filtering and stabilizing the external motor supply.

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H-Bridge 19 Click uses the 3.3V and GND rails from the mikroBUS™ socket to power its logic circuitry, while the 5V rail is not used. The BD60210FV output stage is powered separately through the external VIN terminal, with a recommended operating range from 8V to 18V; the marked 20V value represents the maximum supply rating and should not be exceeded. The logic and motor supplies share a common ground. This Click board™ comes equipped with a library containing easy-to-use functions and a ready-to-use code example that can be downloaded and used as a reference for further development.

Specifications

Type	Brushed
Applications	Ideal for applications such as refrigerators, air conditioners, printers, office automation equipment, and embedded motor and actuator control systems
On-board modules	BD60210FV-E2 - dual H-bridge motor driver for brushed DC motors, bipolar stepper motors, and solenoid loads from ROHM Semiconductor
Key Features	Dual H-bridge motor driver, drives two brushed DC motors, one bipolar stepper motor, or four solenoids, 8V to 18V motor supply, up to 1A continuous output per phase, multiple bridge modes, forward/reverse/brake/stop control, full-step and half-step operation, I2C interface with selectable address, power-save mode, fault monitoring, integrated protection features, and more
Interface	GPIO,I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V,External

Pinout diagram

This table shows how the pinout on H-Bridge 19 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	**INT**	IC Interrupt
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

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Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	FLT	-	Fault LED Indicator
JP1	ADDR 0 SEL	Left	Address selection 0/1: Left position 0, Right position 1
JP2	ADDR 1 SEL	Left	Address selection 0/1: Left position 0, Right position 1
JP3	ADDR 2 SEL	Left	Address selection 0/1: Left position 0, Right position 1
TB1	VIN	-	Input Voltage Connector
TB2	TB2	A1, B1	Output Connector
TB3	TB3	A2, B2	Output Connector

H-Bridge 19 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
VIN	-	-	20	V
PWM Frequency	-	-	250	kHz
Operating Temperature	-25	-	85	°C

Software Support

H-Bridge 19 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the H-Bridge 19 Click board by driving the DC motors connected between OUT1A-OUT1B and OUT2A-OUT2B in both directions.

Key Functions

- hbridge19_cfg_setup This function initializes Click configuration structure to initial values.
- hbridge19_init This function initializes all necessary pins and peripherals used for this Click board.
- hbridge19_default_cfg This function executes a default configuration of H-Bridge 19 Click board.
- hbridge19_enable_device This function enables the device by setting the PS pin to high logic state.
- hbridge19_set_motor_state This function sets the operating state for the selected motor.
- hbridge19_get_fault This function checks whether overcurrent protection or thermal

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shutdown circuit is activated.

Application Init

Initializes the driver and performs the Click default configuration.

Application Task

Drives the motors connected between OUT1A-OUT1B and OUT2A-OUT2B in both directions in the span of 12 seconds, and logs data on the USB UART where you can track the program flow.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

H-Bridge 19 Click example package

H-Bridge 19 Click 2D and 3D files v100

H-Bridge 19 Click schematic v100

BD60210FV-E2 datasheet

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