

H-Bridge 7 Click



PID: MIKROE-4143

H-Bridge 7 Click features flexible motor driver IC for a wide variety of applications, labeled as the DRV8876N. This Click board™ integrates an N-channel H-bridge, charge pump regulator, and protection circuitry. The charge pump improves efficiency by allowing for both high-side and low-side N-channels MOSFETs and 100% duty cycle support. This IC allows the H-Bridge 7 Click to achieve ultra-low quiescent current draw by shutting down most of the internal circuitry with his low-power sleep mode. Internal protection features are provided for supply undervoltage lockout (UVLO), charge pump undervoltage (CPUV), output overcurrent (OCP), and device overtemperature (TSD). Fault conditions are indicated on the nFAULT pin (nFT pin on mikroBUS™). H-Bridge 7 Click can be used for DC Brush motor drive, servo motors, actuators, and more.

The H-Bridge 7 Click 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?

H-Bridge 7 Click uses the [DRV8876N](#) IC, N-channel H-bridge motor driver from [Texas Instruments](#), that operates from a supply voltage of 4.5V to 37V supporting a wide range of output load currents for various types of motors and loads. This device integrates an H-bridge output power stage that can be operated in control modes that is set by the PMODE pin setting. The device also integrates a charge pump regulator to support more efficient high-side N-channel MOSFETs and 100% duty cycle operation. The device operate from a single power supply input (VM) which can be directly connected to a battery or DC voltage supply. The nSLEEP pin (nSL pin on the mikroBUS™) provides an ultra-low power mode to minimize current

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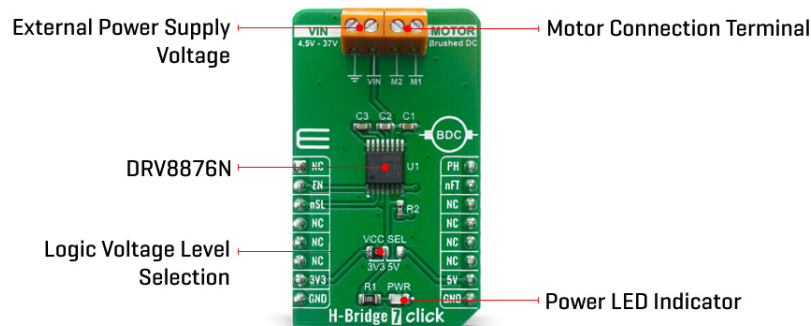


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draw during system inactivity. Also, this device is fully protected against supply undervoltage, charge pump undervoltage, output overcurrent, and device overtemperature events.



H-Bridge 7 Click support different control schemes with the EN/IN1 and PH/IN2 pins. The control mode is selected through the PMODE pin with either logic low, logic high, or setting the pin Hi-Z (in this case PMODE is on the logic low level which means that device is latched into PH/EN mode). PH/EN mode allows for the H-bridge to be controlled with a speed and direction type of interface.

In this configuration Click board™ drives a bidirectional current through an external load (such as a brushed DC motor), and the H-bridge polarity and duty cycle are controlled with a PWM and IO resource from the external controller to the EN/IN1 and PH/IN2 pins. The device is then configured for the PH/EN control mode by tying the PMODE pin to GND. Some applications of DRV8876N includes brushed DC motors, solenoids, and actuators, but also can be utilized to drive many common passive loads such as LEDs, resistive elements, relays, etc.

An onboard SMD jumper, labeled as VCC SEL is used to set the voltage levels for the EN/IN1, PH/IN2, nFAULT, and nSLEEP pins of the DRV8876N. It allows for both 3.3V and 5V MCUs to be interfaced with the H-Bridge 7 Click. More information about the DRV8876N can be found in the attached datasheet. However, this Click board™ comes equipped with a library that contains easy to use functions and a usage example that may be used as a reference for the development.

Specifications

Type	Brushed
Applications	Can be used for DC Brush motor drive, servo motors, actuators, and more.
On-board modules	H-Bridge 7 Click uses the DRV8876N IC, N-channel H-bridge motor driver from Texas Instruments, that operates from a supply voltage of 4.5V to 37V supporting a wide range of output load currents for various types of motors and loads.
Key Features	N-channel H-bridge, charge pump regulator, protection circuitry, undervoltage lockout,

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	charge pump undervoltage, output overcurrent, device overtemperature protection
Interface	GPIO
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on H-Bridge 7 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	PH	H-bridge control 2
H-bridge control 1	EN	2	RST	INT	15	nFT	Fault indicator
Sleep mode	nSL	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
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
JP1	VCC SEL	Left	Logic Voltage Level Selection 3V3/5: Left position 3V3, Right position 5V
TB1	POWER	-	4.5V to 37V Power Supply Input
TB2	MOTOR	-	H-bridge Output

Maximum Ratings (Limiting Conditions)

Description	Min	Typ	Max	Unit
Supply Voltage (VM)	4.5	-	37	V
Logic Pin Voltage (GPIO)	-0.3	-	5.75	V
Maximum Output Current	0	-	3.5	A
Operating Temperature Range	-40	-	+125	°C

Software Support

We provide a library for the H-Bridge 7 Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all

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the main MikroElektronika [development boards](#).

Library Description

The library contains basic functions for working with the H-Bridge 7 click.

Key functions:

- void hbridge7_motor_state (uint8_t state) - Set motor state
- void hbridge7_motor_control (uint8_t ctrl) - Set motor control
- uint8_t hbridge7_get_fault_state (void) - Get Fault pin state

Examples description

The application is composed of three sections :

- System Initialization - Initializes all necessary gpio pins for motor control.
- Application Initialization - Initializes driver init and activates the motor.
- Application Task - Changes the direction of the motor.

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

Other mikroE Libraries used in the example:

- GPIO

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™](#)

Downloads

[DRV8876N datasheet](#)

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[H-Bridge 7 click 2D and 3D files](#)

[H-Bridge 7 click example on Libstock](#)

[H-Bridge 7 click schematic](#)

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