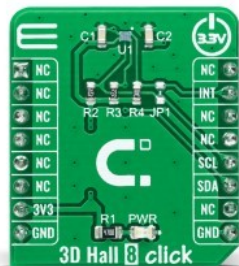


3D Hall 8 Click



PID: MIKROE-4498

3D Hall 8 Click is a compact add-on board containing an ultra-small 3D-magnetic sensor for industrial and consumer applications. This board features the TLI493D-W2BW, a low-power 3D Hall sensor from Infineon. This magnetic sensor combines high-accuracy magnetic field measurements with exceptionally low power consumption (minimum 7nA). It features an I2C interface, enabling it to be easily configured by MCU with the measurement data provided in digital format. It also provides the functionality to Wake-Up a sleeping system. This Click board™ is suitable for a wide range of magnetic sensing, including robotics position sensing, angle measurement at the end of the shaft and out of shaft configurations, and many more.

3D Hall 8 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?

3D Hall 8 Click as its foundation uses the TLI493D-W2BW, a low-power 3D Hall sensor with an I2C interface and Wake-Up feature from Infineon. It consists of three central functional units; containing the power mode control system, a low-power oscillator, basic biasing, undervoltage detection, and a fast oscillator. Besides, it has also implemented the sensing unit, which contains the HALL biasing, HALL probes with multiplexers and successive tracking ADC, and a temperature sensor. This sensor offers several use cases, including innovative human-machine interfaces in the form of industrial and consumer joysticks and precise position control in robotics.

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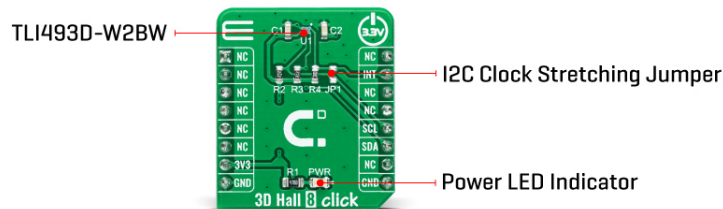
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The power mode control provides the power distribution, which manages the Start-Up behavior in the TL1493D-W2BW, a power-on reset function, and a specialized low-power oscillator, the clock source. The sensing unit measures the magnetic field in the X, Y, and Z direction. Each X-, Y- and Z-Hall probe is connected sequentially to a multiplexer, connected to an analog to digital converter. Optional, the temperature measurement feature, activated in the default state, can be determined after the three Hall channels.

3D Hall 8 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Fast Mode operation with a clock frequency up to 1MHz. For each of the three magnetic channels (X/Y/Z), the Wake-Up function has an upper and lower comparison threshold. Each component of the applied field is compared to the lower and upper threshold. If one of the results is above or below these thresholds, an interrupt is generated called a Wake-Up function. The Wake-Up mode allows the sensor to continue making magnetic field measurements while the MCU is in the power-down state, which means the microcontroller will only consume power and access the sensor if relevant measurement data is available.

An interrupt pin signals a finished measurement cycle but also can be used for I2C clock stretching. In this case, the INT pin must be connected to the SCL pin, which can be done by populating the jumper labeled JP1.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Magnetic
Applications	Can be used for a wide range of magnetic sensing, including robotics position sensing, angle measurement at the end of the shaft and out of shaft configurations, and many more.
On-board modules	TL1493D-W2BW - low-power 3D Hall sensor with an I2C interface and Wake-Up feature

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	from Infineon
Key Features	Low power 3D Hall sensor, Wake-Up function, power down mode with 7nA (typ.) power consumption, 12-bit resolution for each measurement direction plus 10-bit temperature sensor, and more.
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on 3D Hall 8 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	NC	
	NC	2	RST	INT	15	INT	Interrupt
	NC	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

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	-	Unpopulated	I2C clock stretching jumper

3D Hall 8 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Sensing Range	-	±160	-	mT
Resolution	-	12	-	bit
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the 3D Hall 8 Click 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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Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [mikroE github account](#).

Library Description

This library contains API for 3D Hall 8 Click driver.

Key functions:

- c3dhall8_cfg_setup - Config Object Initialization function.
- c3dhall8_init - Initialization function.
- c3dhall8_default_cfg - Click Default Configuration function.

Examples description

This application shows capability of 3D Hall 8 Click board™. It configures device and reads sensor data. Sensor is capable of reading magnetic flux density from 3 axes and temperature.

The application is composed of three sections :

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

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.3DHall8

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](#)

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[Click boards™](#)

Downloads

[TLI493D-W2BW datasheet](#)

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

[3D Hall 8 click schematic](#)

[3D Hall 8 click example on Libstock](#)

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[TS_EK_MB](#) [AS5162-EK-AB](#) [AS5247U-TQ_EK_AB](#) [AS5247U-TQ_EK_SB](#) [AS5262-MF_EK_AB](#) [AS5306-TS_EK_AB](#) [AS5311-](#)
[TS_EK_AB](#) [AS5510-SOIC8-AB](#) [AS5600-SO_EK_AB](#) [AS5600-SO_EK_ST](#) [AS5600-SO_RD_RB](#) [AS5601-SO_EK_AB](#) [AS5601-SO_EK_ST](#)