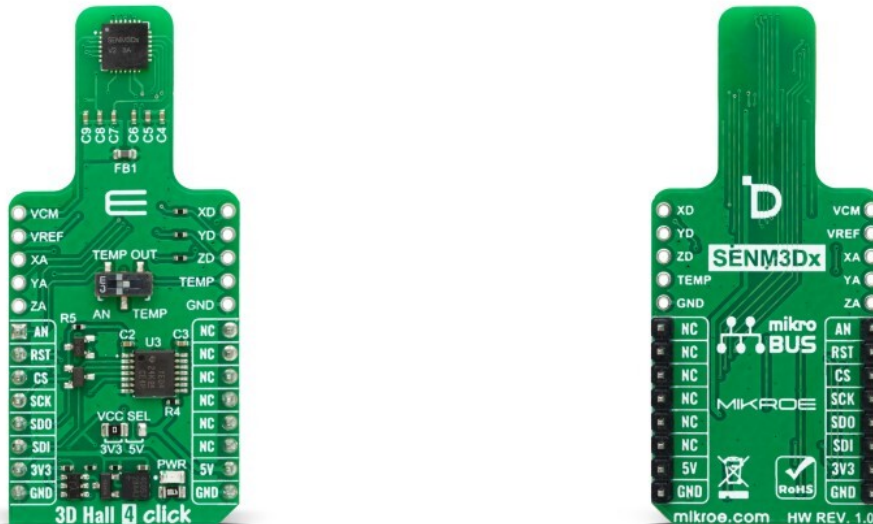


3D Hall 4 Click



PID: MIKROE-5925

3D Hall 4 Click is a compact add-on board that can detect the strength of a magnetic field in all three dimensions. This board features the SENM3Dx, a 3D Hall magnetic sensor from SENIS. It is a CMOS-integrated magnetic field sensor that allows the acquisition of all three magnetic field components at the same time and in the same spot. The sensor is equipped with on-chip EPROM to hold initialization, calibration data, and other settings and definitions. This Click board™ makes the perfect solution for the development of 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 4 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the [mikroBUS™](#) standard. It comes with the [mikroSDK](#) open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking [ClickID](#) feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

3D Hall 4 Click is based on the SENM3Dx, a 3D Hall magnetic sensor from SENIS. The sensor incorporates three groups of mutually orthogonal Hall-effect elements, of which one is horizontal and two are vertical. Each of them has biasing circuits and amplifiers. Those elements are very compact, allowing for the sensor's very high spatial resolution. In addition, by incorporating some other techniques, the sensor features high angular accuracy, significantly suppressing offset, low-frequency noise, and the planar Hall effect.

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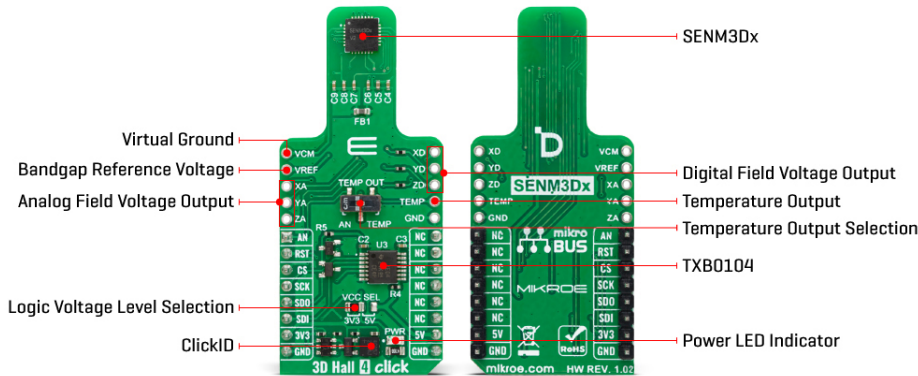
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ISO 9001: 2015 certification of quality management system (QMS).



The sensor provides high analog frequency bandwidth from DC to 220kHz and has a built-in temperature sensor that measures the chip temperature. Over the TEMP OUT switch, you can select the host MCU to read the temperature or connect the sensor temperature output to the TEMP connector for testing. There are also two 3-pin headers for analog and digital output of all three magnetic field dimensions. Finally, there is VCM, a virtual ground, and VREF, a bandgap reference voltage pin.

3D Hall Click uses an SPI serial interface to communicate with the host MCU and is compatible with SPI mode 1. The sensor is a 5V device, and to allow 3.3V MCUs to work with the sensor, the 3D Hall Click is equipped with the [TXB0104](#), a 4-bit bidirectional voltage-level translator from Texas Instruments. The temperature output of the sensor, host MCU, can read over the AN pin if selected over the TEMP OUT switch.

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	Magnetic
Applications	Can be used for the development of 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	SENM3Dx - 3D Hall magnetic sensor from SENIS
Key Features	Real 3D magnetic-field measurement, possibility to select the active sensitivity axis, high magnetic field resolution, high analog frequency bandwidth, built-in temperature sensor, on-chip correction of sensitivity, offset, noise, and more
Interface	Analog, SPI

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Feature	ClickID
Compatibility	mikroBUS™
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 3D Hall 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Temperature Output	AN	1	AN	PWM	16	NC	
ID SEL	RST	2	RST	INT	15	NC	
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	NC	
SPI Data In	SDI	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 Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
SW1	TEMP OUT	-	Temperature Output Selection AN/TEMP: Left position AN, Right position TEMP

3D Hall 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Measurement Range	30	-	4000	mT
Magnetic Field Resolution	-	1	-	μT

Software Support

We provide a library for the 3D Hall 4 Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development 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

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This library contains API for 3D Hall 4 Click driver.

Key functions

- `c3dhall4_read_data` This function reads the measurement status, 3-axes magnetic field data, and the chip internal temperature.
- `c3dhall4_reg_write` This function writes a desired number of data bytes starting from the selected register by using SPI serial interface.
- `c3dhall4_reg_read` This function reads a desired number of data bytes starting from the selected register by using SPI serial interface.

Example Description

This example demonstrates the use of 3D Hall 4 Click board™ by reading the magnetic field strength from 3 axes and the sensor internal temperature.

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.3DHall4

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™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

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[ClickID](#)

Downloads

[3D Hall 4 click example on Libstock](#)

[TXB0104 datasheet](#)

[3D Hall 4 click 2D and 3D files v101](#)

[3D Hall 4 click schematic v101](#)

[SENM3Dx datasheet](#)

[3D Hall 4 click 2D and 3D files v102](#)

[3D Hall 4 click schematic v102](#)

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