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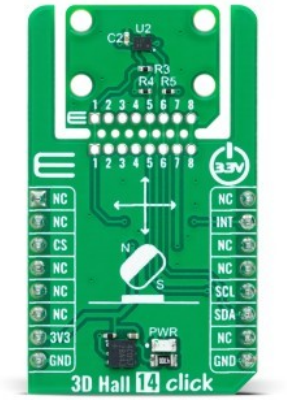
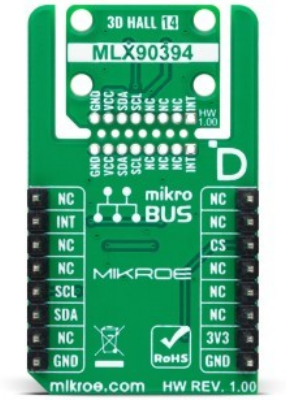
3D Hall 14 Click





PID: MIKROE-6242

3D Hall 14 Click is a compact add-on board designed for high-precision position sensing in various applications. This board features the MLX90394, a 3-axis magnetometer from Melexis based on the Triaxis® Hall technology. The MLX90394 offers low power consumption, excellent noise performance, and flexible measurement modes, including intelligent wake-up functions for efficient power management. It communicates via a standard 2-Wire I2C interface and supports fast-mode frequencies up to 1MHz. The 3D Hall 14 Click also features the innovative Click Snap design, allowing for easy detachment and autonomous operation. This Click board™ is ideal for battery-powered tools, household appliances, industrial machinery, smart home devices, and home security systems.

How does it work?

3D Hall 14 Click is based on the MLX90394, a high-precision 3-axis magnetometer from Melexis, which uses the Triaxis® Hall technology to deliver exceptional performance and enhance position sensing in various applications. The MLX90394 is made for micropower applications, making it an excellent choice for battery-powered solutions. It accurately measures magnetic fields along three axes (X, Y, and Z) and converts these measurements and IC temperature into 16-bit words. These data points are then communicated through an I2C interface. The sensor offers flexibility in operation, allowing for measurements to be taken either on demand or continuously, with user-selectable refresh rates. Despite its compact size, the MLX90394 excels in noise performance and maintains low power consumption across various configurations.

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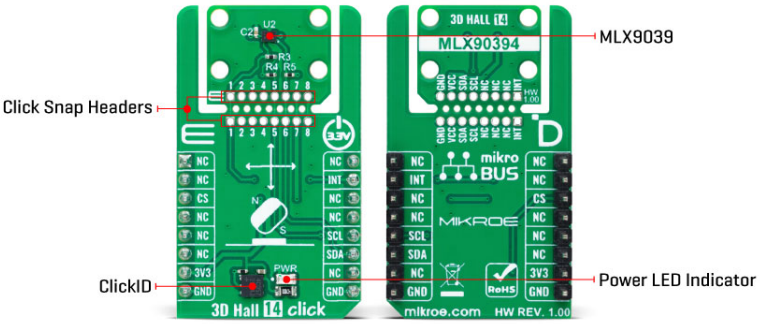

One of the standout features of the MLX90394 is its intelligent wake-up modes, which enable the entire system to enter a deep sleep state until a magnetic field change is detected. This detection can be based on different criteria: a change from an initial measurement (Static Delta), a change from the previous measurement (Dynamic Delta), or surpassing a predefined threshold (Absolute). This functionality ensures efficient power management by toggling the device between active and sleep modes, capturing both busy and slowly changing magnetic fields effectively. As mentioned, the 3D Hall 14 Click is ideal for various applications. It can be used in battery-powered tools, household appliances (white goods), industrial machinery, smart home devices, home security systems, and many other contexts where precise and reliable position sensing is crucial.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the MLX9039 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

3D Hall 14 Click uses a standard 2-Wire I2C interface to communicate with the host MCU with fast-mode support and frequencies up to 1MHz. In addition to I2C pins, this Click board™ also has the interrupt signal on the INT pin of the mikroBUS™ socket to provide a notification that violates programmed thresholds. This interrupt can serve as a wake-up on change (WOC) interrupt output or a synchronization output.

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

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

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Specifications

Type	Magnetic
Applications	Ideal for battery-powered tools, household appliances, industrial machinery, smart home devices, and home security systems
On-board modules	MLX90394 - 3-axis magnetometer from Melexis
Key Features	Based on Triaxis® Hall technology for high-precision position sensing, low power consumption, excellent noise performance, flexible measurement modes, intelligent wake-up modes for efficient power management, standard 2-Wire I2C interface, innovative Click Snap design for easy detachment and autonomous operation of the sensor area, interrupt signal, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on 3D Hall 14 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**	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

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

3D Hall 14 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Magnetic Measurement Range	±5	-	±50	mT

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Magnetic Sensitivity	0.15	-	1.5	µT/LSB

Software Support

We provide a library for the 3D Hall 14 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

This library contains API for 3D Hall 14 Click driver.

Key functions

- c3dhall14_get_magnetic_flux This function reads the raw values of X, Y, and Z axis and converts them to magnetic flux data in microTesla.
- c3dhall14_get_temperature This function reads the raw temperature value and converts it to Celsius.
- c3dhall14_set_range This function sets the magnetic flux measurement range.

Example Description

This example demonstrates the use of 3D Hall 14 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.3DHall14

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.

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For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

3D Hall 14 click example on Libstock

3D Hall 14 click 2D and 3D files v100

3D Hall 14 click schematic v100

MLX9039 datasheet

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