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Magneto 10 Click

PID: MIKROE-4866

Magneto 10 Click is a compact add-on board that contains a 3D magnetometer. This board features the MLX90392, a +/-5mT range magnetometer for low-noise applications from Melexis Technologies. The MLX90392, specially designed for micropower applications, measures magnetic fields along the three axes (X, Y being in a plane parallel to the surface of the die, and Z being perpendicular to the surface). Those measurements and the MLX90392's temperature are converted into 16-bit words, transferred upon request over I2C communication. This Click board™ is suitable for position sensing requiring a small magnetic range and precise position measurement where noise is a critical design parameter.

Magneto 10 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?

Magneto 10 Click as its foundation uses the MLX90392, a three-axis micropower magnetic field sensor for low-noise applications based on a proprietary Triaxis technology from Melexis Technologies. The MLX90392 comes in a version of a ±5mT full-scale range for leveraging Melexis' patented Triaxis Hall technology to deliver low noise and best-in-class accuracy. It offers a 16-bit output proportional to the magnetic flux density sensed along the XYZ axes and temperature output signal. It also features a Power-Down mode that helps save energy and maximize run-time in battery-powered applications.
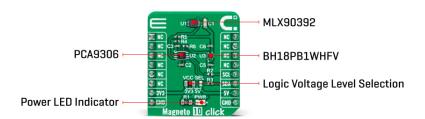
Whereas the ±5mT, the MLX90392 includes several operational modes, the sensitivity of 0.15μT/LSB and typical RMS noise down to 0.3μT. By selecting which axes are to be measured, the raw data can be used as input for further post-processing by an external MCU, making the device suitable for position sensing that requires a small magnetic range and precise position measurement where noise is a critical design parameter.

The MLX90392 also requires a supply voltage of 1.8V to work regularly. Therefore, a small LDO regulator, BH18PB1WHFV from Rohm Semiconductor, provides 1.8V out of mikroBUS™ power rails. This LDO cut power consumption by lowering its current consumption to approximately 2μA when the application is operating in the Standby state.

Magneto 10 Click communicates with MCU using a standard I2C 2-Wire interface that supports Standard and Fast Mode Plus operation. Since the sensor for operation requires a 1.8V logic voltage level only, this Click board™ also features the PCA9306 voltage-level translator from Texas Instruments. The I2C interface bus lines are routed to the dual bidirectional voltage-level translator, allowing this Click board™ to work with both 3.3V and 5V MCUs properly.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the I2C communication lines properly. However, the Click board™ comes equipped with a library that contains 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 position sensing requiring a small magnetic range and precise position measurement where noise is a critical design parameter
On-board modules	MLX90392 - three-axis micropower magnetic field sensor for low-noise applications based on a proprietary Triaxis technology from Melexis Technologies
Key Features	Low power consumption, high precission, Triaxis Hall technology for best-in-class in

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	noise, integrated temperature sensor, 16-bit digital magnetic and temperature output, selectable operational modes, and more
Interface	I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Magneto 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro BUS			Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
	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	**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	-	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Magneto 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Magnetic Flux Density	-5	-	5	mT
Sensitivity	-	0.15	-	µT/LSB
Resolution	-	16	-	bit
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the Magneto 10 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

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 Magneto 10 Click driver.

Key functions

- magneto10_get_magnetic_flux This function reads the raw values of X, Y, and Z axis and converts them to magnetic flux data in microTesla.

- magneto10_get_temperature This function reads the raw temperature value and converts it to Celsius.

- magneto10_set_operating_mode This function sets the device operating mode.

Example Description

This example demonstrates the use of Magneto 10 Click board™.

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.Magneto10

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 MikroElektronika compilers.

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

Magneto 10 click schematic

MLX90392 datasheet

Magneto 10 click 2D and 3D files

Magneto 10 click example on Libstock

BH18PB1WHFV datasheet

PCA9306 datasheet