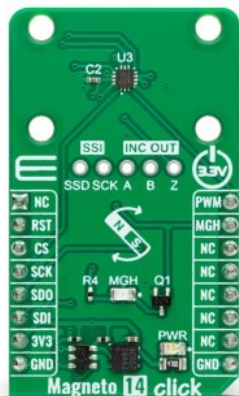


# Magneto 14 Click



PID: MIKROE-5751

**Magneto 14 Click** is a compact add-on board with an accurate and reliable magnetic device. This board features the [MA735](#), a contactless angle sensor with ABZ, and PWM output from [Monolithic Power Systems](#). The MA735 sensor has a 9-bit to 13-bit resolution of the absolute angle encoder. With its fast data acquisition and processing, it provides accurate angle measurements at speeds from 0rpm to 60.000rpm. The sensor can be used in both end-to-shaft and off-axis (side-shaft mounting) configurations. This Click board™ makes the perfect solution for the development of applications for automotive angle sensing, robotics, high-resolution angle encoders, and general-purpose angle measurements.

Magneto 14 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.

**NOTE:** Rotary Magnetic Holder does not come in the same package as this Click board™, but you can find it in our [shop](#).

## How does it work?

Magneto 14 Click is based on the MA735, a contactless angle sensor with ABZ and PWM output from Monolithic Power Systems. It can detect an absolute angular position of a permanent magnet, typically a diametrically magnetized cylinder on a rotating shaft. The adjustable digital filtering can optimize control loop performance when used in servo applications. In addition, the sensor features magnetic field strength detection with a programmable threshold and on-chip non-volatile memory. This memory can store configuration parameters, including magnetic field detection thresholds, ABZ encoder settings, and reference zero-angle positions.

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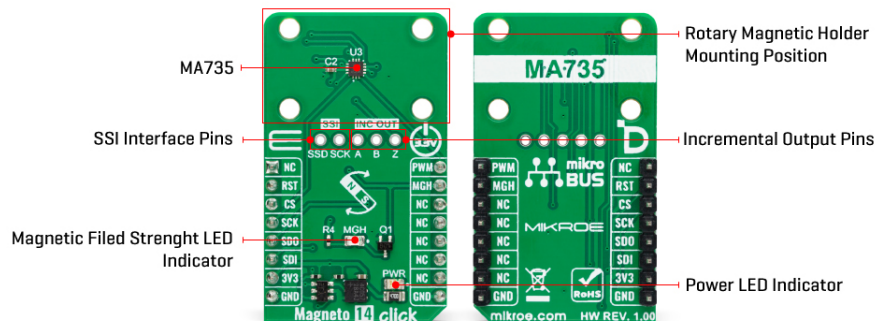


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The frequency of the PWM output of the sensor is up to 1090Hz with a 14-bit resolution.



The MA735 uses integrated Hall devices to detect the magnetic field, while the angle is measured using MPS's proprietary Spinaxis™ method. This method is based on phase detection and digitizes the direction of the field directly, generating a sinusoidal signal with a phase that represents the angle of the field. The angle is obtained from a signal by a time-to-digital converter, and the digital number proportional to the magnetic field is delivered at a rate of 1MHz.

Two headers on this Click board™ allow additional functionalities. The SSI header with SSD and SCK pins is a 2-Wire synchronous serial interface for data reading only and can be used for angle reading operation. The INC OUT header is an incremental output encoder with A, B, and Z pins. The ABZ encoder emulates a 12-bit incremental encoder (like an optical encoder), providing logic pulses per turn from 1 to 1024 in quadrature.

A unique addition to this board is a position for a [Rotary Magnet Holder](#) designed to be used alongside a magnetic contactless angle sensor allowing fast prototyping and quick measurements during development. Rotary Magnetic Holder does not come in the same package as this Click board™, but you can find it in our shop.

The Magneto 14 Click uses a standard 4-Wire SPI serial interface with a maximum supported clock rate of 25MHz. The PWM absolute output provides a logic signal with a duty cycle proportional to the angle of the magnetic field on the pin PWM of the mikroBUS™ socket. This sensor has two thresholds, MGL and MGH, for low and high magnetic fields. The magnetic field high threshold (MFHT) is indicated over the MGH interrupt pin, together with an additional MGH red LED.

This Click board™ can only be operated with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using 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 the development of applications for automotive angle sensing,

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	robotics, high-resolution angle encoders, and general-purpose angle measurements
On-board modules	MA735 - contactless angle sensor with ABZ, and PWM output from Monolithic Power Systems
Key Features	Low power consumption, highest reliability and durability, high-resolution output, operates with wide magnetic range, programmable thresholds, non-volatile memory, SSI and ABZ encoder functionalities, PWM output, and more
Interface	PWM,SPI
ClickID	Yes
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 Magneto 14 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	<b>PWM</b>	PWM Output
	NC	2	RST	INT	15	<b>MGH</b>	Magnetic Field High Threshold
SPI Chip Select	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
SPI Data OUT	<b>SDO</b>	5	MISO	SCL	12	NC	
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	NC	
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	MGH	-	Magnetic Field High Threshold LED Indicator

## Magneto 14 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Rotation Speed Measurement	0	-	60.000	RPM
Applied Magnetic Field	-	60	-	mT

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Absolute Output Resolution	9	-	13	bit
PWM Resolution	13	13.8	14	bit

## Software Support

We provide a library for the Magneto 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 Magneto 14 Click driver.

Key functions

- magneto14\_get\_angle Magneto 14 gets the angular position function.
- magneto14\_get\_field\_strength Magneto 14 gets the magnetic field strength function.
- magneto14\_get\_mgh Magneto 14 gets the MGH function.

## Example Description

This library contains API for the Magneto 14 Click driver. The demo application reads and displays the magnet's angular position in degrees.

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.Magneto14

## 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](#).

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## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[Magneto 14 click example on Libstock](#)

[Magneto 14 click 2D and 3D files](#)

[MA735GGU datasheet](#)

[Magneto 14 click schematic](#)

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