

Magneto 12 Click



PID: MIKROE-4991

Magneto 12 Click is a compact add-on board that contains an accurate and reliable magnetic sensing device. This board features the A31315, a magnetic position sensor designed for on- and off-axis rotary and linear stroke position measurement from Allegro Microsystems. This sensor integrates vertical and planar Hall-effect elements with precision temperature-compensating circuitry to detect two out of three magnetic field components (X and Y). Using configurable signal processing (the user is allowed to process the output signal in analog or digital form), linearization and angle calculation allows the A31315 to accurately resolve the absolute rotary (full 360° and short-stroke <360°) or linear position of a moving magnetic target. This Click board™ is suitable for position sensing applications in automotive, industrial, and consumer applications.

Magneto 12 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 12 Click as its foundation uses the A31315, a magnetic position sensor from Allegro Microsystems. This sensor integrates vertical and planar Hall-effect elements with precision temperature-compensating circuitry to detect two out of three magnetic field components (X and Y). Using configurable signal processing, linearization, and angle calculation allows the A31315 to accurately resolve the absolute rotary (full 360° and short-stroke <360°) or linear position of a moving magnetic target.

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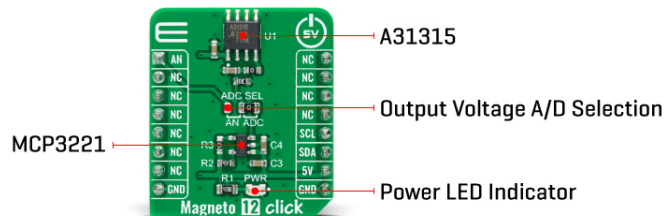
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The A31315 features a ratiometric analog interface to output the angle between the two factory-selected axes (X and Y). When using the analog mode of the A31315, the capacitance is provided for the stability of the output. A load resistor R4 also provides a known diagnostic state in a line break or device tri-state event. A series resistor R5 can be placed (default resistor value is 0Ω) before the capacitance C2 to create a low-pass filter for additional filtering and lower noise. However, caution should be taken, as this could also reduce the operating output voltage based on the ratio of the filter resistor and the load resistance.

This Click board™ possesses two ways to communicate with the MCU. The analog output signal of the A31315 can be converted to a digital value using [MCP3221](#), a successive approximation A/D converter with a 12-bit resolution from Microchip using a 2-wire I2C compatible interface, or can be sent directly to an analog pin of the mikroBUS™ socket labeled as AN. The MCP3221 provides one single-ended input with low power consumption, a low maximum conversion current, and a Standby current of 250μA and 1μA, respectively. Data can be transferred at rates of up to 100kbit/s in the Standard and 400kbit/s in the Fast Mode. Selection can be performed by onboard SMD jumper labeled as ADC SEL, setting it to an appropriate position marked as AN and ADC.

This Click board™ can be operated only with a 5V 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 position sensing applications in automotive, industrial, and consumer applications
On-board modules	A31315 - magnetic position sensor from Allegro Microsystems
Key Features	Highly accurate 360° and short stroke (360°) rotary applications, detects two out of three magnetic field components, ratiometric analog output, high reliability, possibility of signal processing in analog and digital form, and

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Interface	Analog,I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	5V

Pinout diagram

This table shows how the pinout on Magneto 12 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Analog Signal	AN	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
	NC	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	ADC SEL	Right	Output Voltage A/D Selection AN/ADC: Left position AN, Right position ADC

Magneto 12 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	5	-	V
Maximum Magnetic Flux Density	-	-	1000	G
Rotation Angle Range	0	-	360	deg
Resolution	-	12	-	bit
Operating Temperature Range	-40	+25	+120	°C

Software Support

We provide a library for the Magneto 12 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](#).

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Library Description

This library contains API for Magneto 12 Click driver.

Key functions

- `magneto12_read_voltage` This function reads raw ADC value and converts it to proportional voltage level.
- `magneto12_set_vref` This function sets the voltage reference for Magneto 12 click driver.
- `magneto12_read_angle` This function reads the sensor output voltage and converts it to angular position in degrees.

Example Description

This example demonstrates the use of Magneto 12 Click board™ by reading and displaying 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 way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Magneto12

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 12 click example on Libstock](#)

[MCP3221 datasheet](#)

[A31315 datasheet](#)

[Magneto 12 Click schematic](#)

[Magneto 12 click 2D and 3D files](#)

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