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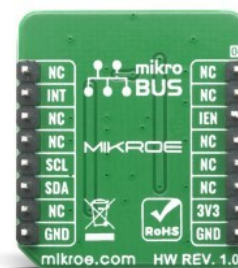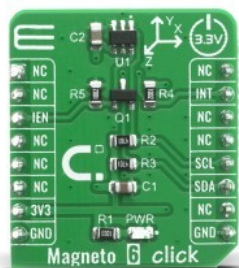www.mikroe.com

Magneto 6 Click

PID: MIKROE-4139

Magneto 6 Click features low power three dimensional Hall effect sensor, TLI493D-A2B6, designed for magnetic sensing applications. It measures the magnetic field in X, Y, and Z direction. Each X, Y and Z Hall probe is connected sequentially to a multiplexer, which is then connected to an Analog to Digital Converter (ADC). Optional, the temperature can be determined as well after the three Hall channels. The data measurement is provided in digital format to the microcontroller over the standard I2C interface. Some of the benefits of this Click board™ are wide application range addressable due to high flexibility and component reduction due to the 3D magnetic measurement principle. Magneto 6 Click is ideal for use in various applications, such as robotics, stick position sensing, control elements for navigation systems, anti-tampering in smart meters, and more.

Magneto 6 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 6 Click uses the TLI493D-A2B6 IC, low power three dimensional Hall effect sensor with I2C interface, from Infineon. Within its small 6-pin package the sensor provides direct measurement of the X, Y, and Z components of a magnetic field. This sensor offers accurate three dimensional sensing with extremely low power consumption and consists of three main functional units:

- The power mode control system, containing a low-power oscillator, basic biasing, accurate restart, undervoltage detection, and a fast oscillator.

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- The sensing unit, which contains the HALL biasing, HALL probes with multiplexers, and successive tracking ADC, as well as a temperature sensor.
- The I2C interface, containing the register files.
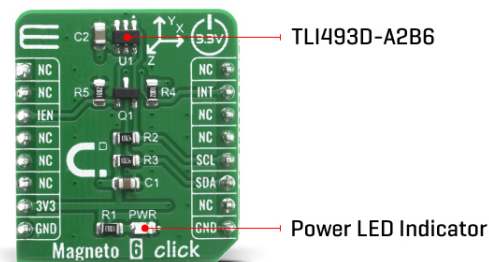
Some of the main characteristics of this sensor IC are 3D magnetic flux density sensing of ±160 mT, 12-bit data resolution for each measurement direction plus 10-bit temperature sensor, programmable flux resolution down to 65 µT, and interrupt signal to indicate a valid measurement to the microcontroller. For a good adaptation, this sensor is equipped with different modes and a digital communication interface. I2C interface can be accessed in any power mode. The interrupt function is multiplexed with the I2C SCL pin, and can be used to indicate measurement completion. The use of an interrupt line is optional but highly recommended to ensure proper and efficient readout of the sensor data. Magneto 6 Click is ideally suited for the measurement of 3 dimensional movement within a magnetic field, linear slide movement, or 360° angle rotation. The magnetic measurement values are provided in the two's complement with 12-bit or 8-bit resolution in the registers with the symbols Bx, By, and Bz. By default, the temperature measurement is activated. The temperature measurement can be disabled if it is not needed and to increase the speed of the repetition of the magnetic values.

This Click Board™ uses I2C communication interface, and it's designed to be operated only with 3.3V logic level. A proper logic voltage level conversion should be performed before the Click board™ is used with MCUs with logic levels of 5V. More information about the TLI493D-A2B6 can be found in the attached datasheet. The Click board™ comes equipped with a library that contains easy to use functions and a usage example that may be used as a reference for the development.

Specifications

Type	Magnetic
Applications	The TLI493D-A2B6 is designed for all kinds of sensing applications, it can be used for multi function knobs, joystick and gimbals, robotics position sensing.
On-board modules	Magneto 6 Click uses the TLI493DA2B6 IC, a high accuracy magnetic sensor, from Infineon Technologies.

Key Features	Low-power oscillator, basic biasing, accurate restart, undervoltage detection, fast oscillator, HALL biasing, HALL probes with multiplexers, successive tracking ADC, temperature sensor, I2C interface
Interface	GPIO,I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Magneto 6 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	**INT**	Interrupt
Interrupt Enable	**IEN**	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

Software Support

We provide a library for the Magneto 6 Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

Library provides functions for reading and writing data via I2C module. There are additial functions for reading device ID, device type and hardware version of the device. Library has functions for reading data from sensor data values, temperature data and magnetic data.

Key functions:

- void magneto6_generic_write (uint8_t reg_adr, uint8_t trigger, uint8_t tx_data) - Function for writing byte data to device.
- int16_t magneto6_get_temp_value (void) - Function for reading temperature value from device and converting it to degrees Celsius.

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- void magneto6_get_axes_value (magneto6_axes_t *axes) - Function for reading magnetic data from device for all three axes.

Examples description

The application is composed of three sections :

- sys_init - Initialization of i2c and log modules, and additional pins
- app_cfg - Reading device information and configuring device
- app_task - Reading values from device

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- Conversion
- UART
- I2C

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. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

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](#)

[Click Boards™](#)

Downloads

[Magneto 6 click example on Libstock](#)

[TLI493D-A2B6 datasheet](#)

[Magneto 6 click 2D and 3D files](#)

[Magneto 6 click schematic](#)