

Compass 3 Click



PID: MIKROE-4063

Compass 3 Click is an expansion board that can measure the three-axis magnetic field which is perfect for implementation in applications such as electric compasses. This board features [MMC5883MA](#), a complete 3-axis magnetic sensor with signal processing from [MEMSIC](#). For obtaining the sensor measurement data of the magnetic field and temperature, an I2C protocol is used. Main feature of the sensor is the capability to measure magnetic fields within the full scale range of 8Gauss (G), with 0.25mG per LSB resolution at 16bits operation mode and 0.4mG total RMS noise level, enabling heading accuracy of 1° in electronic compass applications. Compass 3 Click is suitable for applications such as electrical compass, position sensing, general magnetic field measurement and more.

Compass 3 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?

Compass 3 Click uses the MMC5883MA, a complete 3-axis magnetic sensor with on-chip signal processing and integrated I2C bus suitable for use in various applications, from MEMSIC. The device eliminates the need for A/D converters or timing resources by being directly connected to a microprocessor. It can measure magnetic fields within the full scale range of ±8Gauss (G), with 0.25mG per LSB resolution at 16bits operation mode and 0.4mG total RMS noise level, enabling heading accuracy of ±1° in electronic compass applications.

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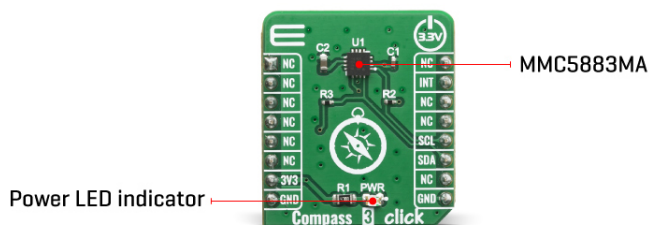
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An integrated SET/RESET function provides for the elimination of error due to Null Field output change with temperature. Temperature information from the integrated temperature sensor is available over the I2C Interface.

The SET/RESET function can be performed for each measurement, periodically, or when the temperature changes by a predetermined amount as the specific application requires. In addition, the SET/RESET function clears the sensors of any residual magnetic polarization resulting from exposure to strong external magnets. The MMC5883MA is packaged in a low profile LGA package (3.0 x 3.0 x 1.0 mm) and an operating temperature range from -40°C to +85°C. The MMC5883MA provides an I2C digital output with 400 kHz, fast mode operation.

This Click Board™ is designed to be operated only with a 3.3V logic level. A proper logic voltage level conversion should be performed before the Click board™ is used with MCUs with different logic levels.

Specifications

Type	Compass,Magnetic
Applications	Can be used in electronic compass and navigation, position sensing or general purpose magnetic field measurements.
On-board modules	Compass 3 Click uses the MMC5883MA IC, a complete 3-axis magnetic sensor with on-chip signal processing, from Memsic Inc.
Key Features	Measuring of magnetic field within the full scale range of ± 8 Gauss (G), 16bits resolution, 0.25mG per LSB sensitivity, heading accuracy of $\pm 1^\circ$
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

This table shows how the pinout on Compass 3 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	NC	
	NC	2	RST	INT	15	INT	Interrupt
	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	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Compass 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Field Range (Each Axis)	-	±8	-	G
Supply Voltage	2.16	3.3	3.6	V
Operating Temperature Range	-40	-	85	°C

Software Support

We provide a library for the Compass 3 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

This library holds functions that can be used to read, write and measure magnetic field and temperature.

Key functions:

- void compass3_write_byte (uint8_t reg_adr, uint8_t data_in); - Writes 8-bit data into register defined by 8-bit register address.
- void compass3_full_measurement (float *x_val, float *y_val, float *z_val); - Measures magnetic field surrounding the device.
- float compass3_read_temp (); - Function is used to measure temperature.

Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module, LOG and GPIO structures, sets INT pin as

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input.

- Application Initialization - Initializes I2C driver, applies default setup and writes an initial log.
- Application Task - (code snippet) This example demonstrates the use of Compass 3 Click board by measuring the magnetic field surrounding the device.

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

Other mikroE Libraries used in the example:

- I2C
- UART
- Conversions

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

[MMC5883MA datasheet](#)

[Compass 3 click 2D and 3D files](#)

[Compass 3 click schematic](#)

[Compass 3 click example on Libstock](#)

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