Compass 2 click

PID: MIKROE-2264

RS Product Code: 136-0813

Compass 2 click carries the AK8963 3-axis electronic compass. The AK8963 sensor is based on the Hall affect. The click is designed to run on a 3.3V power supply only. It communicates with the target microcontroller through either I2C or SPI interface, with additional functionality provided by the INT pin on the mikroBUS™ line.

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AK8963 features

The built-in ADC converter can be set up at either 14 or 16 bit resolution, for each of the 3 axes. The sensitivity is 0.6µT/LSB typ. at 14-bit, and 0.15µT/LSB at 16-bit.

AK8963 incorporates magnetic sensors for detecting terrestrial magnetism in the X-axis, Y-axis, and Z-axis, a sensor driving circuit, signal amplifier chain, and an arithmetic circuit for processing the signal from each sensor.

Key features

- AK8963 electronic compass
- Built-in ADC converter
- 14-/16-bit selectable resolution
- Sensitivity:
- 0.6 µT/LSB typ. (14-bit)
- 0.15µT/LSB typ. (16-bit)
- I2C or SPI interface
- 3.3V power supply

Specification

Product Type	Magnetometer
Applications	Position detection, navigation and orientation for portable devices
On-board modules	AK8963 3-axis electronic compass
Key Features	Sensitivity: 0.6µT/LSB typ. at 14-bit, and 0.15µT/LSB at 16-bit
Key Benefits	Selectable interface, Configurable ADC resolution
Interface	I2C or SPI
Power Supply	3.3V
Compatibility	mikroBUS
Click board size	S (28.6 x 25.4 mm)
Weight	20g

Pinout diagram

This table shows how the pinout on Compass 2 click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
External trigger pulse input pin	**TRG**	**1**	AN	PWM	**16**	NC	Not connected
Reset pin	**RST**	**2**	RST	INT	**15**	**INT**	Interrupt
Chip Select	**CS**	**3**	CS	TX	**14**	NC	Not connected
Serial Clock input pin	**SCK**	**4**	SCK	RX	**13**	NC	Not connected
SPI Master Input Slave Output	**MISO**	**5**	MISO	SCL	**12**	**SCL**	I2C Clock
SPI Master Output Slave Input	**MOSI**	**6**	MOSI	SDA	**11**	**SDA**	I2C Data
Power supply	**+3.3V**	**7**	3.3V	5V	**10**	NC	Not connected
Ground	**GND**	**8**	GND	GND	**9**	**GND**	Ground

Features and usage notes

The AK8964 has several operating modes which can be configured by setting a specific register (CNTL1) to certain values. The following is a list of available operating modes with partial descriptions (to give you an overview). The configuration details are available on page 13 of the official data sheet, while the complete descriptions

(1) Power-down mode

Power to almost all internal circuits is turned off. All registers are accessible in power-down mode. However, fuse ROM data cannot be read correctly. Data stored in read/write registers are remained. They can be reset by soft reset.

(2) Single measurement mode

When single measurement mode (MODE[3:0]=“0001”) is set, sensor is measured, and after sensor measurement and signal processing is finished, measurement data is stored to measurement data registers (HXL to HZH), then AK8963 transits to power-down mode automatically.

(3) Continuous measurement mode 1 and 2

When continuous measurement mode 1 (MODE[3:0]=“0010”) or 2 (MODE[3:0]=“0110”) is set, sensor is measured periodically at 8Hz or 100Hz respectively. When sensor measurement and signal processing is finished, measurement data is stored to measurement data registers (HXL ~ HZH) and all circuits except for the minimum circuit required for counting cycle length are turned off (PD).

(4) External trigger measurement mode

When external trigger measurement mode (MODE[3:0]=“0100”) is set, AK8963 waits for trigger input. When a pulse is input from TRG pin, sensor measurement is started on the rising edge of TRG pin. When sensor measurement and signal processing is finished, measurement data is stored to measurement data registers (HXL to HZH) and all circuits except for the minimum circuit required for trigger input waiting are turned off (PD state).

(4) External trigger measurement mode

Fuse ROM access mode is used to read Fuse ROM data. Sensitivity adjustments for each axis is stored in fuse ROM.

Compass 2 click has both SPI and I2C interfaces. The active interface is configured with on board jumpers. If you use I2C, an additional jumper will allow you to set the I2C address.

Programming

The linked code snippet Mikroe.com initiates Compass 2 with I2C communication, and reads out the heading value, along with a direction, (N, NE, E, etc) from the module to a UART terminal every 100 ms.

Code examples that demonstrate the usage of Compass 2 click with MikroElektronika hardware, written for mikroC for ARM, AVR, dsPIC, FT90x, PIC and PIC32 are available on Libstock

Downloads

mikroBUS™ Standard specification

LibStock: Compass 2 click library

Compass 2 click Schematic

Learn: Compass 2 click

AK8963 datasheet