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Hall Switch 2 Click

PID: MIKROE-4788

Hall Switch 2 Click is a compact add-on board that represents a magnetic field-activated dual-relay Click board™. This board features the MHA100KN, a high-performance, low-power Hall-Effect sensor from MEMSIC. This Hall switch is a fully integrated CMOS IC that outputs a high-low signal following magnetic field changing. It works with a magnet and detects the magnet's close/away position. Two high-quality compact relays allow switching of high voltages and can cut or establish a connection on the main side of the circuit. This Click board™ is suitable for various applications activated by the magnetic field, such as contactless switches, lids or tray position detecting switches, or other similar applications that require contactless switching of the relay contacts.

Hall Switch 2 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?

Hall Switch 2 Click as its foundation uses the MHA100KN, a high-performance, low-power Hall-Effect sensor from MEMSIC. This Click board™ detects the presence and magnitude of a magnetic field using the Hall effect. It consists of two high-quality relays, which the MHA100KN activates. When the north pole magnetic field is introduced to the sensor, one of the relays will be activated; otherwise, the other relay will be activated.

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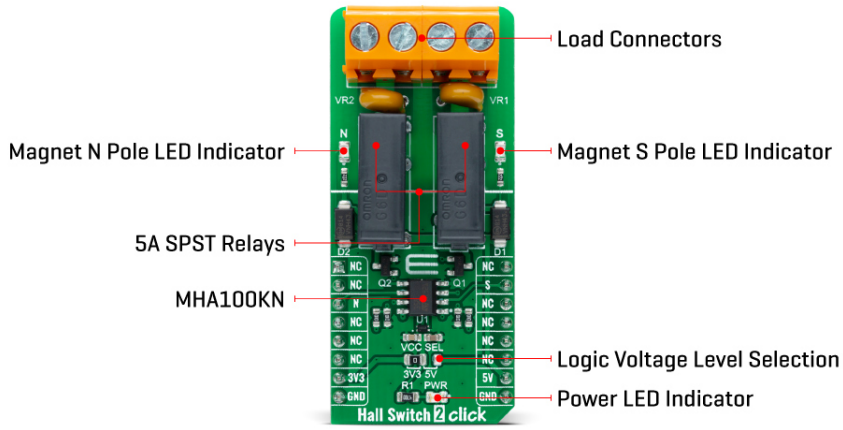

The outputs of the MHA100KN are routed to the LM358 operational amplifier, which works as the inverting comparators. When the output of the MHA100KN is activated, pulled to a low logic level, the output from the comparator will be set to 5V, which will cause biasing of the BJTs, allowing current flow through the relay coil and thus forming a magnetic field necessary for closing the relay contacts. A Schottky diode across the relay coils prevents the reverse kickback voltage, which forms due to the inert nature of the coils.

Hall Switch 2 Click communicates with MCU using two GPIO pins labeled S and N. The north pole output is routed to the CS pin, while the south pole output is routed to the INT pin of the mikroBUS™ socket so that the MCU can monitor the status of the MHA100KN. Activation of the relay coils is also visually indicated by the yellow and red LEDs, respectively.

Two varistors VR1 and VR2, are used to prevent voltage peaks when the load is connected or disconnected on the relay output contacts. However, the relays allow up to 5A for 250VAC / 30VDC, so the connected load should not exceed these power r0atings.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it allows both 3.3V and 5V capable MCUs to use the communication lines properly. However, the Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Magnetic
Applications	Can be used for various applications activated by the magnetic field, such as contactless switches, lids or tray position detecting switches, or other similar applications that require contactless switching of the relay contacts
On-board modules	MHA100KN - high-performance, low-power Hall-Effect sensor from MEMSIC
Key Features	Low power consumption, reliable contactless switching by the magnetic field, separate sensors for both south and north pole magnetic fields, high-quality compact relays,

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	and more
Interface	GPIO
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	mikroBUS™				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	**S**	South Pole
North Pole	**N**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	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
LD2	S	-	Magnet South Pole LED Indicator
LD3	N	-	Magnet North Pole LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Hall Switch 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Maximum Output Current	-	-	5	A
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the Hall Switch 2 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

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Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Hall Switch 2 Click driver.

Key functions:

- hallswitch2_cfg_setup - Config Object Initialization function.
- hallswitch2_init - Initialization function.
- - .

Examples description

This example demonstrates the use of Hall Switch 2 Click board.

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.HallSwitch2

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™

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Downloads

MHA100KN datasheet

Hall Switch 2 click 2D and 3D files

Hall Switch 2 click schematic

Hall Switch 2 click example on Libstock