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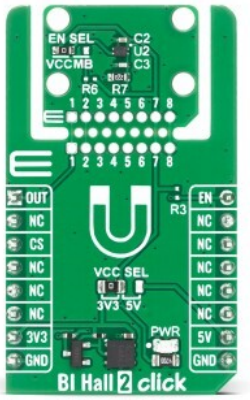
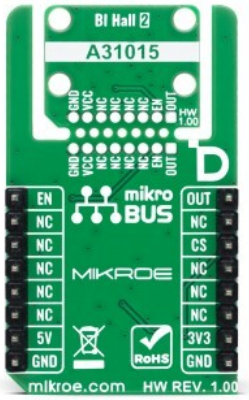
BI Hall 2 Click - 4.7mV/G





PID: MIKROE-7053

BI Hall 2 Click - 4.7mV/G is a nanopower bipolar linear Hall-effect sensor for detecting magnetic-field strength, polarity, position, and travel in battery-powered systems. It features the A31015KEWALT-47BN Hall sensor from Allegro MicroSystems, measuring fields from -30.9mT to +30.9mT with 4.7mV/G sensitivity at 3.3V and a ratiometric analog output. An active-high enable input supports duty-cycled operation and sub-nanoamp sleep current, while the AN and PWM pins provide output reading and power control. Selectable 3.3V or 5V operation, ClickID, and a detachable Click Snap sensor section simplify integration. It is suitable for gaming controls, smart-home devices, industrial and utility meters, and personal-care equipment.

For more information about **BI Hall 2 Click - 4.7mV/G** visit the official product page.

How does it work?

BI Hall 2 Click - 4.7mV/G is based on the A31015KEWALT-47BN, a nanopower, ratiometric 1D linear Hall-effect sensor from Allegro MicroSystems. The sensor measures the magnetic field component perpendicular to the top surface of its package and generates a continuous analog voltage proportional to both the strength and polarity of the applied field. In its bipolar configuration, it supports a typical operating range from -309G to +309G, equivalent to -30.9mT to +30.9mT, with a typical sensitivity of 4.7mV/G at 3.3V. With no magnetic field present, the output remains at approximately half the supply voltage, while north and south magnetic fields move the output voltage in opposite directions. This enables accurate magnetic-field measurement, linear or rotary position detection, travel sensing, and software-defined contactless switching.

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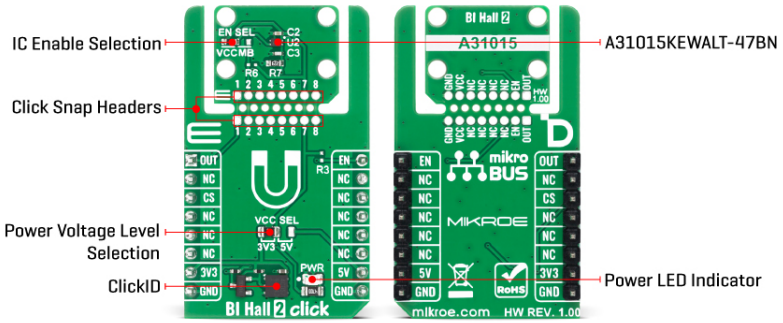

The A31015 integrates a Hall plate, dynamic offset cancellation, amplification, filtering, timing, and output circuitry to maintain stable measurement performance across its -40°C to +125°C operating range. Its typical 15kHz output bandwidth supports responsive detection of rapidly changing magnetic fields, while its low-noise architecture provides a typical signal-to-noise ratio of 58dB and a maximum linearity error of 0.15%. Both the quiescent output voltage and magnetic sensitivity scale with the supply voltage, allowing supply-related measurement errors to be reduced when the host MCU uses the same rail as its ADC reference. The selected device variant also includes a 0.12%/°C sensitivity temperature coefficient intended to compensate for the temperature behavior of neodymium magnets. A dedicated active-high enable input allows the sensor to wake in typically 10µs and enter a high-impedance, sub-nanoamp sleep state when disabled, supporting average power consumption below 1µW with 10Hz duty cycling. These characteristics make it suitable for gaming controls, IoT and smart-home devices, industrial and utility meters, and medical and personal-care equipment.

BI Hall 2 Click - 4.7mV/G interfaces with the host MCU through an analog output and a GPIO control signal. The sensor's OUT signal is routed to the AN pin of the mikroBUS™ socket, where it can be sampled by the host MCU's analog-to-digital converter. Its EN input can be routed to the PWM pin through the EN SEL jumper, allowing the host MCU to switch the sensor between active and sleep modes. A logic-high state enables measurement, while a logic-low state places the device in sleep mode and changes its output to a high-impedance state. When the EN SEL jumper is placed in its default VCC position, the sensor remains continuously enabled. The CS pin is reserved for ClickID communication, enabling automatic identification of the board by compatible host systems.

This Click board™ supports the Click Snap feature, allowing the sensor section to be detached along the predefined PCB lines and positioned closer to the monitored magnet or moving mechanism. After detachment, the sensor section can operate through the directly accessible connections marked 1-8 and can be secured using the provided mounting holes. The board also includes a green PWR LED for visual power indication, a VCC SEL jumper for selecting the operating voltage, and the EN SEL jumper for choosing between continuous operation and host-controlled enable functionality. An onboard output network follows the sensor manufacturer's recommended loading arrangement to support stable analog signal acquisition.

BI Hall 2 Click - 4.7mV/G can operate from either the 3.3V or 5V mikroBUS™ power rail, selected through the VCC SEL jumper, which is set to 3.3V by default. The sensor supply, quiescent output level, and sensitivity follow the selected voltage, allowing the board to work with both 3.3V and 5V host systems. The board comes with a mikroSDK-compliant library

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containing functions for reading the analog output and controlling the enable input, together with a ready-to-use code example.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	Magnetic
Applications	Ideal for applications such as gaming controls, IoT and smart-home devices, factory automation systems, industrial and utility metering, magnetic position and travel sensing, and medical and personal-care equipment
On-board modules	A31015KEWALT-47BN - nanopower, ratiometric 1D linear Hall-effect sensor with an enable pin from Allegro MicroSystems
Key Features	Nanopower ratiometric 1D linear Hall-effect sensing, bipolar ±30.9mT operating range, 4.7mV/G sensitivity at 3.3V, 15kHz bandwidth, continuous analog output, neodymium magnet temperature compensation, fast enable control, sub-nanoamp sleep current, selectable 3.3V or 5V operation, detachable Click Snap sensor section, ClickID, and more
Interface	Analog
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	1.8V,3.3V,5V

Pinout diagram

This table shows how the pinout on BI Hall 2 Click - 4.7mV/G corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
IC Analog Output	**OUT**	1	AN	PWM	16	**EN**	Enable
	NC	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	

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	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
JP1	VCC SEL	Left	Power/logic voltage level selection 3.3V/5V: Left position 3.3V, Right position 5V
JP2	EN SEL	Left	IC Enable Selection VCC/MB: Left position VCC, Right position mikroBUS™

BI Hall 2 Click - 4.7mV/G electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Temperature	-40	-	125	°C
Polarity	-	Bipolar	-	-
Sensing Range	-30.9	-	30.9	mT
Bandwidth	-	15	-	kHz

Software Support

BI Hall 2 Click - 4.7mV/G demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the BI Hall 2 Click - 4.7mV/G Click board for magnetic field detection. The application reads the sensor output and converts it to magnetic field strength expressed in Gauss units.

Key Functions

- bihall2_cfg_setup This function initializes Click configuration structure to initial values.
- bihall2_init This function initializes all necessary pins and peripherals used for this Click board.
- bihall2_default_cfg This function executes a default configuration of BI Hall 2 Click - 4.7mV/G Click board.
- bihall2_get_output This function reads the OUT pin voltage level and calculates magnetic field strength in Gauss.

Application Init

Initializes the logger and BI Hall 2 Click - 4.7mV/G driver.

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Application Task

Reads the magnetic field measurement and logs the calculated magnetic field strength in Gauss.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

BI Hall 2 Click - 4.7mV/G example package

BI Hall 2 Click - 4.7mV/G 2D and 3D files v100

BI Hall 2 Click - 4.7mV/G schematic v100

A31015KEWALT-47BN datasheet