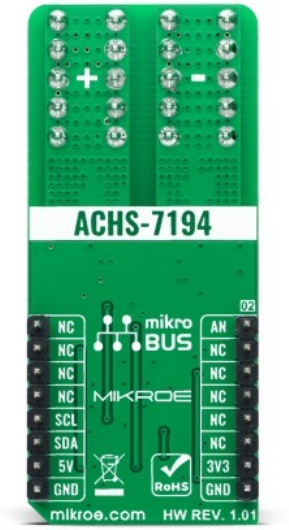
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Hall Current 10 Click





PID: MIKROE-4587

Hall Current 10 Click is a compact add-on board that provides economical and precise AC or DC current sensing solutions. This board features the ACHS-7194, a fully integrated Hall-effect-based isolated linear current sensor designed for the current range of ±40A from Broadcom Limited. Inside ACHS-7194 is a precise, low-offset, linear Hall circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper conduction path generates a magnetic field that the differential Hall sensors convert into a proportional voltage, where after that, the user is given the option to process the output voltage as an analog or digital value. This Click board™ is suitable for AC or DC current-sensing in industrial, commercial, and communications systems.

Hall Current 10 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.

.DO NOT TOUCH THE BOARD WHILE THE EXTERNAL POWER SUPPLY IS ON!

Note: This Click board™ needs to be used by trained personnel only while applying high voltages. Special care should be taken when working with hazardous voltage levels.

How does it work?

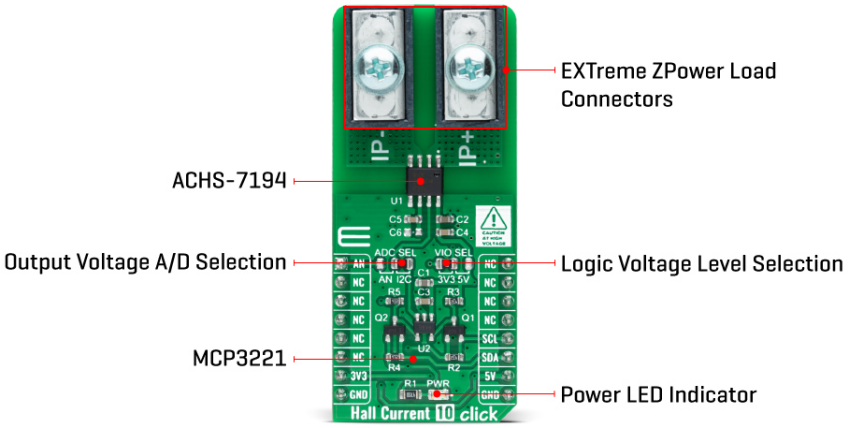
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Hall Current 10 Click as its foundation uses the ACHS-7194, a Hall-effect current sensor that sends an analog voltage proportional to the magnetic field intensity caused by the current flowing through the primary input conductor from Broadcom Limited. Without a magnetic field, the output voltage is half of the supply voltage. The ACHS-7194 can detect both DC and AC designed for the current range of ±40A. Device accuracy is optimized across the operating ambient temperature through the close proximity of the magnetic signal to the Hall sensors.



The thickness of the copper conductor allows the survival of the device at high overcurrent conditions. The terminals of the conductive path are electrically isolated from the signal leads. This feature enables the ACHS-7194 to be used in applications requiring electrical isolation without optoisolators or other costly isolation techniques.

The ACHS-7194 also has a ratiometric output that means it changes proportionally to the supply voltage. Just like that, the output voltage, analog signal, can be converted to a digital value using MCP3221, a successive approximation A/D converter with a 12-bit resolution from Microchip, using a 2-wire I2C compatible interface, or can be sent directly to an analog pin of the mikroBUS™ socket labeled as AN. Selection can be performed by onboard SMD jumper labeled as ADC SEL to an appropriate position marked as AN and I2C.

With the MCP3221, data transfers at rates of up to 100kbit/s in the Standard and up to 400kbit/s in the Fast Mode. Also, maximum sample rates of 22.3kSPS with the MCP3221 are possible in a Continuous-Conversion Mode with a clock rate of 400kHz.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VIO 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	Current sensor,Measurements
Applications	Can be used for AC or DC current-sensing in industrial, commercial, and communications systems
On-board modules	ACHS-7194 - fully integrated Hall-effect-based isolated linear current sensor designed for the

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	current range of ±40A from Broadcom Limited
Key Features	Output voltage proportional to AC or DC currents, ratiometric output from supply voltage, high reliability, factory-trimmed for accuracy, stable output offset voltage, isolation voltage (3kVrms / 1 minute), and more
Interface	Analog,I2C
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 Current 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Signal	**AN**	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
	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	**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	VIO SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADC SEL	Right	Output Voltage A/D Selection AN/ADC: Left position AN, Right position ADC

Hall Current 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Input Current Range	-40	-	+40	A
Sensitivity	-	50	-	mV/A
Operating Temperature Range	-40	+25	+110	°C

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Software Support

We provide a library for the Hall Current 10 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

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 Current 10 Click driver.

Key functions:

- hallcurrent10_cfg_setup - Config Object Initialization function.
- hallcurrent10_init - Initialization function.
- hallcurrent10_default_cfg - Click Default Configuration function.

Examples description

This library contains API for Hall Current 10 Click driver. The demo application reads ADC value, ADC voltage and current value.

The demo application is composed of two sections :

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.HallCurrent10

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

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Downloads

Hall Current 10 click example on Libstock

ACHS-7194 datasheet

Hall Current 10 click 2D and 3D files

Hall Current 10 click schematic

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