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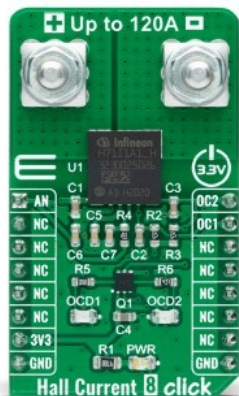www.mikroe.com

Hall Current 8 Click - 120A

PID: MIKROE-4508

Hall Current 8 Click is a compact add-on board that contains a precise solution for AC/DC current sensing. This board features the TLI4971-A120T5, a high-precision coreless current sensor for industrial/consumer applications from Infineon Technologies. The TLI4971-A120T5 has an analog interface and two fast overcurrent detection outputs, which support the protection of the power circuitry. Galvanic isolation is also provided according to the magnetic sensing principle. Infineon's monolithic Hall technology enables accurate and highly linear measurement of currents with a full scale up to 120A. This Click board™ is suitable for AC/DC current measurement applications: electrical drives, general-purpose inverters, chargers, current monitoring, overload, over-current detection, and many more.

Hall Current 8 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: Hall current click has exposed pins/pads. To stay safe take precaution when applying high voltage to the click. The click is to be used by trained personnel only when applying high voltage.

How does it work?

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

ISO 9001: 2015 certification of quality management system (QMS).

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Hall Current 8 Click as its foundation uses the TLI4971-A120T5, a high-precision miniature coreless magnetic current sensor for AC and DC measurements with an analog interface and two fast overcurrent detection outputs from Infineon Technologies. The well-established Hall technology, on which the TLI4971 is based, enables accurate and highly linear measurement of currents with a full scale that depends on the chosen product variant, in this case, up to 120A. Typical applications are electrical drives and general-purpose inverters. It is suitable for fast over-current detection, which allows the control unit to switch off and protect the affected system from damage, independently from the primary measurement path.
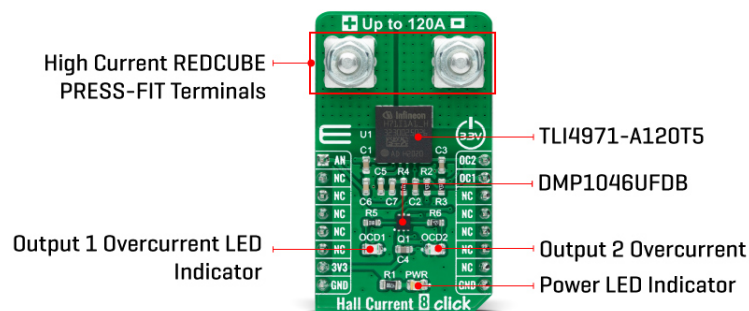
The preconfigured output mode of the TLI4971-A120T5 is set to semi-differential mode. Current flowing through the primary conductors are galvanically isolated, protecting low-voltage parts of the Click board™, as well as the host MCU, and induces a magnetic field that is differentially measured by two Hall probes. A high-performance amplifier combines the signal resulting from the differential field and the internal compensation information provided by the temperature and stress compensation unit. Then the amplifier output signal is fed into a differential output amplifier, which drives the sensor's analog output available on the AN pin of the mikroBUS™ socket.

In addition to the already mentioned characteristics, this Click board™ also has two separate interface pins (OCD), routed to the PWM and INT pins of the mikroBUS socket. They provide fast output signals if a current exceeds a preset threshold in combination with the red and yellow LEDs marked with OCD1 and OCD2. Those pins offer a swift response, thanks to independence from the main signal path. They can be used as a trap functionality to quickly shut down the current source and precisely detect mild overload conditions.

Also, this Click board™ should be connected in series with the load. The current is measured by two onboard terminal connectors, one terminal block for the positive and the other for the negative current input.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Current sensor,Measurements

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Applications	Can be used for AC/DC current measurement applications: electrical drives, general-purpose inverters, chargers, current monitoring, overload, over-current detection, and many more.
On-board modules	TLI4971-A120T5 - high-precision miniature coreless magnetic current sensor for AC and DC measurements up to 120A with an analog interface and two fast overcurrent detection outputs from Infineon Technologies
Key Features	High accurate, scalable, DC & AC current sensing, analog interface and two independent fast Over-Current Detection (OCD) outputs, very low sensitivity error over temperature, and more.
Interface	Analog
ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Hall Current 8 Click - 120A corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
Analog Signal	**AN**	1	AN	PWM	16	**OC2**	Overcurrent Output 2
	NC	2	RST	INT	15	**OC1**	Overcurrent Output 1
	NC	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	OCD1	-	Output 1 Overcurrent LED Indicator
LD3	OCD2	-	Output 2 Overcurrent LED Indicator

Hall Current 8 Click - 120A electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V

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Measurement Range	-	-	120	A
Operating Temperature Range	-40	+25	+105	°C

Software Support

We provide a library for the Hall Current 8 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 8 Click driver.

Key functions:

- hallcurrent8_cfg_setup - Config Object Initialization function.
- hallcurrent8_init - Initialization function.
- hallcurrent8_default_cfg - Click Default Configuration function.

Examples description

This library contains API for Hall Current 8 Click driver. The library initializes and defines the ADC drivers. The library also includes a function for calibration, current measurement and overcurrent detection.

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.HallCurrent8

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

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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

Hall Current 8 Click - 120A 2D and 3D files

TLI4971 datasheet

Hall Current 8 Click - 120A schematic

Hall Current 8 Click - 120A example on Libstock