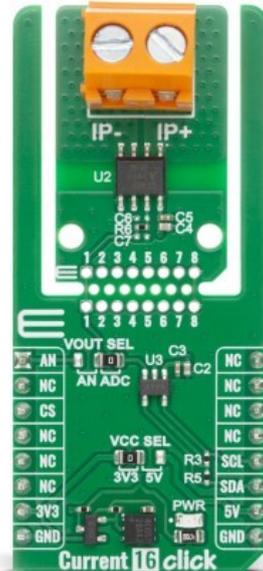


Current 16 Click



PID: MIKROE-6790

Current 16 Click is a compact add-on board that provides precise, isolated current measurement for industrial, automotive, and energy-conversion applications. It is based on the [CT4022](#), a high-performance 500kHz TMR current sensor from [Allegro Microsystems](#), offering ultra-low noise and exceptional accuracy. The sensor supports a $\pm 12A$ measurement range, features 3500Vrms isolation voltage with a 560Vrms working isolation, and achieves up to fifteen times lower noise levels compared to conventional Hall-effect sensors. Its differential TMR architecture effectively rejects common-mode stray magnetic fields, while the 1m Ω primary conductor ensures minimal power loss and excellent handling of high inrush currents. The board supports both analog and digital output selection and includes the MIKROE Click Snap format, allowing the sensing module to be detached and used independently. Current 16 Click is ideal for datacenter power supplies, personal mobility motor drives, renewable energy inverters, and xEV on-board chargers.

For more information about **Current 16 Click** visit the official [product page](#).

DO NOT TOUCH THE BOARD WHILE THE LOAD IS CONNECTED!

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?

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.

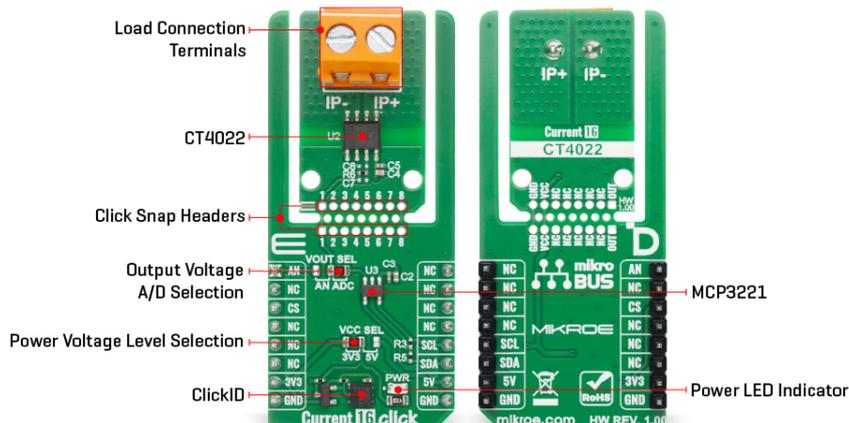


ISO 27001: 2013 certification of informational security management system.
 ISO 14001: 2015 certification of environmental management system.
 OHSAS 18001: 2008 certification of occupational health and safety management system.



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

Current 16 Click is based on the CT4022, an isolated 500kHz Tunneling Magnetoresistance (TMR) current sensor from Allegro Microsystems, which offers ultra-low noise and exceptional signal fidelity. It is designed for precise current measurement in demanding industrial and energy conversion applications. Compared to conventional Hall-effect sensors, the CT4022 achieves up to fifteen times lower integrated noise levels, enabling superior measurement accuracy and stability even in noisy environments. This sensor supports a current measurement range of $\pm 12A$ and provides 3500Vrms isolation voltage with a basic isolation working voltage of 560Vrms, ensuring safe operation in high-voltage systems.



The TMR architecture employs a differential sensing principle that rejects common-mode stray magnetic fields, enhancing measurement reliability and minimizing error sources. The analog output signal from the CT4022 is linearly proportional to the differential magnetic field generated by the measured current, allowing accurate real-time current monitoring with a bandwidth of up to 500kHz. With a primary conductor resistance of just 1m Ω , the sensor minimizes power losses and efficiently handles high inrush currents, making it well-suited for current sensing in datacenter and server power supplies, personal mobility motor drives such as e-bikes and e-scooters, clean energy string and micro inverters, as well as xEV on-board chargers.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the CT4022 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

The CT4022's output 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 sent directly to an analog pin of the mikroBUS™ socket labeled as AN. Selection can be performed via an onboard SMD switch labeled VOUT SEL, placing it in an appropriate position marked as AN or ADC.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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.

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).

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	Current sensor
Applications	Ideal for datacenter power supplies, personal mobility motor drives, renewable energy inverters, and xEV on-board chargers
On-board modules	CT4022 - isolated 500kHz TMR current sensor from Allegro Microsystems
Key Features	TMR current sensor, 500kHz bandwidth, ultra-low noise performance up to fifteen times lower than conventional Hall-effect sensors, differential sensing architecture for common-mode field rejection, 1mΩ primary conductor resistance for minimal power loss and high inrush current handling, analog and digital output proportional to the measured current, onboard MCP3221 12-bit ADC for digital conversion over I2C, Click Snap format, and more
Interface	Analog, I2C
Feature	Click Snap, ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V, 5V

Pinout diagram

This table shows how the pinout on Current 16 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Analog Output	AN	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
ID COMM	CS	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

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).

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	VOUT SEL	Right	Output Voltage A/D Selection AN/ADC: Left position AN, Right position ADC

Current 16 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Current Measurement Range	-12	-	+12	A
Bandwidth	-	500	-	kHz
Galvanic Isolation Voltage	-	-	3500	Vrms
Basic Working Isolation Voltage	-	560	-	Vrms
Primary Conductor Resistance	-	1	-	mΩ

Software Support

[Current 16 Click](#) 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 Current 16 Click board by reading and displaying the input current measurements.

Key Functions

- `current16_cfg_setup` This function initializes Click configuration structure to initial values.
- `current16_init` This function initializes all necessary pins and peripherals used for this Click board.
- `current16_calib_offset` This function calibrates the zero current offset value.
- `current16_calib_resolution` This function calibrates the data resolution at the known load current.
- `current16_read_current` This function reads the input current level [A].

Application Init

Initializes the driver and calibrates the zero current offset and data resolution at 3A load current.

Application Task

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).

Reads the input current measurements and displays the results on the USB UART approximately once per second.

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

[Current 16 click example package](#)

[Current 16 click 2D and 3D files v100](#)

[Current 16 click schematic v100](#)

[CT4022 datasheet](#)

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).