

Power Monitor 2 Click



PID: MIKROE-6202

Power Monitor 2 Click is a compact add-on board for precise power monitoring of connected load devices. This board features two INA219 12-bit I2C-output digital power monitors from Texas Instruments. This Click board™ monitors current and voltage on two separate power rails - 3.3V and 5V - of an onboard mikroBUS™ socket, providing real-time digital readings of the power consumption of added Click boards™. It supports high-speed I2C communication with configurable I2C addresses and operates at 3.3V and 5V logic levels, which makes it ideal for applications in power management, system diagnostics, and energy optimization in embedded systems.

How does it work?

Power Monitor 2 Click is based on two INA219s, a 12-bit I2C-output digital power monitor from Texas Instruments for precise power monitoring. These ICs are specifically designed to monitor the power consumption of connected load devices by measuring the current and voltage on two separate power rails - 3.3V and 5V - of an additional mikroBUS™ socket. This configuration allows for monitoring these two power lines, ideal for evaluating the power usage of any Click board™ inserted into the onboard mikroBUS™ socket. Thanks to its flexibility, the INA219 allows power monitoring without any special power-supply sequencing, making it capable of monitoring power even when the supply or bus voltage is independently present or absent.

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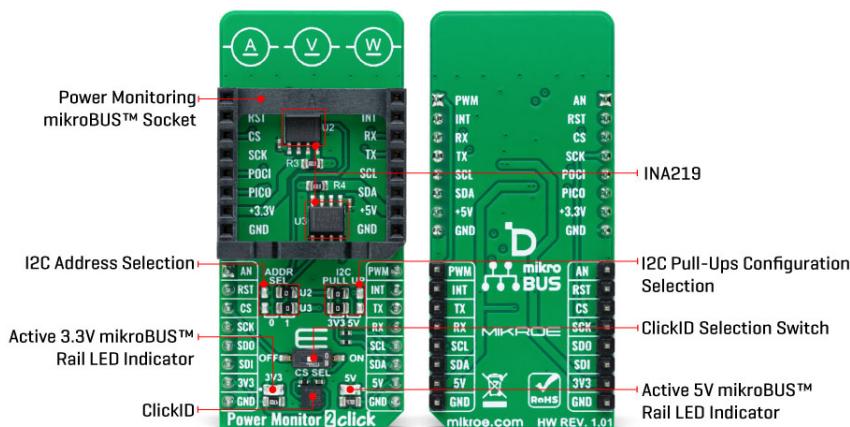
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The INA219s provide real-time digital readings of current, voltage, and power. It achieves this by sensing the voltage drop across shunt resistors (R3 and R4) connected to the bus of interest, and it can handle bus voltages ranging from 0 to 26V. The device's programmable conversion times and filtering options ensure accurate measurements under various operating conditions. Additionally, the INA219 offers a programmable calibration value that, when combined with an internal multiplier, enables direct readouts of current in amperes and calculates power in watts through a multiplying register.

As mentioned, the INA219 communicates with the host MCU using a standard 2-wire I2C interface, supporting High-Speed mode with clock frequencies up to 1MHz. Each INA219 IC on the Power Monitoring 2 Click has a configurable I2C address, which can be set using the ADDR SEL jumpers. These jumpers (U2 or U3, corresponding to each INA219) allow the selection of the desired I2C address by positioning them to either 0 or 1. Additionally, considering that this Click board™ can operate with both 3.3V and 5V logic levels, the voltage to which the pull-up resistors for the I2C lines are connected can also be selected. This is achieved using the I2C PULL-UP jumpers, where the appropriate voltage level (3.3V or 5V) is selected by adjusting the jumpers accordingly.

This board also features an onboard switch labeled CS SEL, which enables the CS line from the mikroBUS™ socket to communicate with the ClickID feature on the board. The CS line is redirected by setting the switch to the ON position, allowing the ClickID feature to function properly for identifying the connected Click board™.

This Click board™ can operate with either 3.3V or 5V logic voltage levels. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. As an added feature, it includes two green LED indicators that show which power rail is active, either 3.3V or 5V. 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.

Specifications

Type	Current sensor
Applications	Ideal for applications in power management, system diagnostics, and energy optimization in embedded systems
On-board modules	INA219 - 12-bit I2C-output digital power

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	monitor from Texas Instruments
Key Features	Current/Voltage/Power monitoring, I2C interface with configurable addresses, 3.3V/5V logic level compatibility, real-time power data, high accuracy, filtering options, calibration registers, and more
Interface	I2C
Feature	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 Power Monitor 2 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	PWM	PWM Signal
Reset	RST	2	RST	INT	15	INT	Interrupt
SPI Select / ID COMM	CS	3	CS	RX	14	TX	UART TX
SPI Clock	SCK	4	SCK	TX	13	RX	UART RX
SPI Data OUT	SDO	5	MISO	SCL	12	SCL	I2C Clock
SPI Data IN	SDI	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	3V3	-	Active 3.3V mikroBUS™ Rail LED Indicator
LD2	5V	-	Active 5V mikroBUS™ Rail LED Indicator
JP1-JP2	ADDR SEL	Right	I2C Address Selection 0/1: Left position 0, Right position 1
JP3-JP4	I2C PULL UP	Left	I2C Pull-Ups Configuration Selection 3V3/5V: Left position 3V3, Right position 5V
SW1	CS SEL	Left	ClickID Selection Switch

Power Monitor 2 Click electrical specifications

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Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

Software Support

We provide a library for the Power Monitor 2 Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

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

Library Description

This library contains API for Power Monitor 2 Click driver.

Key functions

- `powermonitor2_set_address` This function sets the device slave address.
- `powermonitor2_read_data` This function reads the shunt voltage, bus voltage, current, and power data measurements.
- `powermonitor2_read_data_avg` This function reads the shunt voltage, bus voltage, current, and power data measurements averaged from `num_conv` samples.

Example Description

This example demonstrates the use of Power Monitor 2 Click by reading and displaying the power consumption at 3V3 and 5V of the connected click board.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our [LibStock™](#) or found on [MIKROE github account](#).

Other MIKROE Libraries used in the example:

- `MikroSDK.Board`
- `MikroSDK.Log`
- `Click.PowerMonitor2`

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. UART terminal is available in all MIKROE [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MIKROE Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be

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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™](#)

[ClickID](#)

Downloads

[Power Monitor 2 click example on Libstock](#)

[Power Monitor 2 click 2D and 3D files v100](#)

[Power Monitor 2 click schematic v100](#)

[INA219 datasheet](#)

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