

VCP Monitor Click



PID: MIKROE-4039

The **VCP Monitor Click** is add-on board power monitor system. This Click board™ is based on [INA260AIPWR](#) - precision digital current and power monitor with low-drift, integrated precision shunt resistor, from [Texas Instruments](#). Therefore, using VCP Monitor Click, current, voltage and power can be monitored. The integrated current-sensing resistor ensures measurement stability over temperature as well as simplifying printed-circuit board layout difficulties common in high precision current sensing measurements.

VCP Monitor 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.

How does it work?

The VCP Monitor click is power monitor system, which includes precision measurement of current, voltage and power with low-drift. The main IC on the VCP Monitor click is INA260AIPWR. The current-sensing resistor is designed as a 4 wire connected resistor that enables accurate measurements through a force-sense connection. The INA260AIPWR is internally calibrated to ensure that the current-sensing resistor and current-sensing amplifier are both precisely matched to one another.

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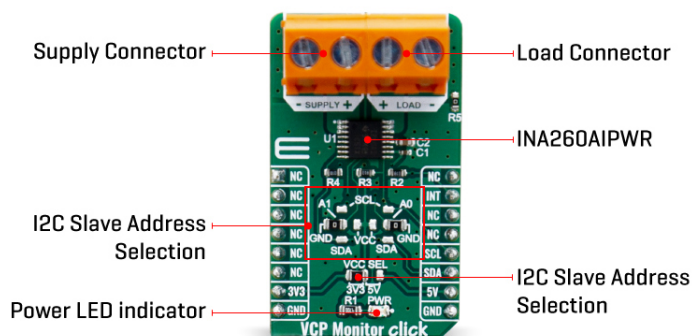
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The INA260AIPWR device performs two measurements on power supply bus. The current measurement on LOAD connector, is internally calculated by measuring the voltage developed across a known internal shunt resistor. The features is a physical shunt resistance that is able to withstand current levels higher than the continuous handling limit of 15 A without sustaining damage to the current-sensing resistor or the current-sensing amplifier if the excursions are very brief. The voltage measurement on SUPPLY connector witch is calculated by measuring the voltage from the external VBUS pin to ground. The voltage monitored range from 0V to 36V

The INA260AIPWR device performs two measurements on power supply bus. The current measurement on LOAD connector, is internally calculated by measuring the voltage developed across a known internal shunt resistor, and voltage measurement on SUPPLY connector wich is calculated by measuring the voltage from the external VBUS pin to ground.

The VCP Monitor click is compatibility with I2C communication protocol. The INA260AIPWR has two slave address selection pins, A0 and A1. For I2C slave address selection, VCP Monitor click has two cross-shape jumpers, first for set pin A0 and second for set A1 pin. One cross-shape jumper has four position for select address pin which can be selected with a SMD 0 ohm resistor, address pin can be connected to GND, VS, SCL or SDA pins. The VCP Monitor click with the two separate jumper on Click board™ user can to set the desired address. The INA260AIPWR provides the opportunity of the 16 possible different I2C addresses.

I2C Slave address selection

A1	A0	Slave address
GND	GND	1000000
GND	VS	1000001
GND	SDA	1000010
GND	SCL	1000011
VS	GND	1000100
VS	VS	1000101
VS	SDA	1000110
VS	SCL	1000111
SDA	GND	1001000
SDA	VS	1001001
SDA	SDA	1001010
SDA	SCL	1001011
SCL	GND	1001100

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SCL	VS	1001101
SCL	SDA	1001110
SCL	SCL	1001111

The INA260AIPWR is supported with ALERT pin, which is connected to the INT pin on mikroBUS™, in order to interrupt the ongoing MCU routine in case of the alert condition. INT pin can be programmed to respond to a user-defined event or to a conversion ready notification.


The voltage level of the logic section can be selected via VCC SEL jumper, between 3.3V and 5V. This allows for both 3.3V and 5V capable MCUs to use the I2C communication lines properly.

Specifications

Type	Current sensor, Measurements
Applications	VCP Monitor click click is a perfect solution for the development of the Power Management system, Battery Chargers and Power Supplies.
On-board modules	NA260AIPWR, a digital-output, current, power, and voltage monitor with an I2C and SMBus™-compatible interface from Texas Instruments
Key Features	Current Sense Resistance: 2 mΩ, Tolerance Equivalent to 0.1%, 15-A Continuous From -40°C to +85°C, 16 Programmable Addresses.
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on VCP Monitor click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	INT	Interrupt OUT
	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

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Onboard settings and indicators

Label	Name	Default	Description
PWR	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power supply voltage selection 3v3/5v: left position 3v3, right position 5v
JP2,JP3	ADD A0	Left	4-position I2C address Selection toward host mcu: left - GND; Right - VCC; Up - SCL; Down - SDA
JP4,JP5	ADD A1	Right	4-position I2C address Selection toward host mcu: left - GND; Right - VCC; Up - SCL; Down - SDA

VCP Monitor Click electrical specifications

Description	Min	Typ	Max	Unit
Input voltage (SUPPLY terminal)	0		36	V
Out voltage (LOAD terminal)	0		36	V
OUT Current (LOAD terminal)	-15		15	A

Software Support

We provide a library for the VCP Monitor Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Library Description

The library contains basic communication with the module and allows the user to read and write data to the module. The user can read the current data of current, voltage and power measured by the sensor.

Key functions:

- float vcpmonitor_get_voltage (void) - Reads voltage data in mV
- float vcpmonitor_get_current (void) - Reads current data in mA
- float vcpmonitor_get_power (void) - Reads power data in mW

Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module and INT pin on INPUT
- Application Initialization - Initializes driver init, check device ID and manufacture ID, start default configuration.
- Application Task - Reads Current, Voltage and Power data. This data logs to USB UART every 1500ms.

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The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- I2C Library
- Conversions library

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

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[VCP Monitor click example on Libstock](#)

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

[INA260 datasheet](#)

[VCP Monitor click schematic](#)

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