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# VCP Monitor 5 Click



PID: MIKROE-6091

VCP Monitor 5 Click is a compact add-on board designed for various applications' precise current, voltage, and temperature measurements. This board features the INA700A, a 16-bit digital power monitor from Texas Instruments based on an advanced EZShunt™ technology for high-accuracy sensing. This board handles full-scale current measurements up to ±15.728A, operates within a wide common-mode voltage range of -0.3V to +40V, and offers real-time power, energy, and charge monitoring with ±0.5% accuracy. The onboard temperature sensor is accurate to ±3°C, and adjustable ADC conversion times and sample averaging provide noise reduction and optimized overcurrent detection. VCP Monitor 5 Click is ideal for applications like industrial battery packs, smart network interface cards (NICs), and hardware accelerator cards, where accurate current and energy monitoring are critical.

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?

VCP Monitor 5 Click is based on the INA700A, a 16-bit digital power monitor from Texas Instruments built with advanced EZShunt™ technology. The INA700A integrates a precision shunt resistor and a high-resolution delta-sigma ADC designed specifically for accurate current

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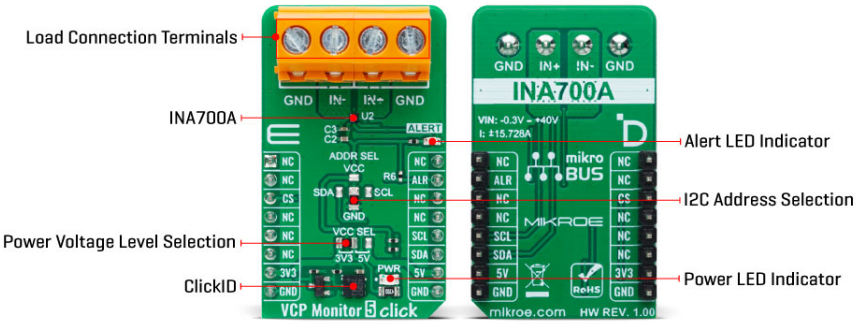
sensing applications. This IC can handle full-scale current measurements of up to ±15.728A and operates within a broad common-mode voltage range from -0.3V to +40V, making it adaptable for various power monitoring needs. It is ideal for high-precision power monitoring applications, including industrial battery packs, smart network interface cards (NICs), and hardware accelerator cards, among other high-performance systems where accurate current and energy monitoring are essential.




This power monitor accurately measures and reports current, bus voltage, internal temperature, power, energy, and charge accumulation. Thanks to the integrated ±0.5% oscillator, it performs real-time calculations seamlessly in the background. The embedded temperature sensor provides an accuracy of ±3°C across the junction temperature range, ensuring reliable thermal monitoring under varying operating conditions. The device allows customization through selectable ADC conversion times ranging from 50µs to 4.12ms and sample averaging options from 1x to 1024x, significantly reducing measurement noise and improving the detection window for overcurrent events.

VCP Monitor 5 Click uses a standard 2-wire I2C communication protocol to enable the host MCU to control the INA700A. The I2C interface supports clock frequencies up to 400kHz, with the I2C address selectable via the ADDR SEL jumpers. The alert interrupt ALR pin can be used to report multiple diagnostics whenever the monitored output value crosses the associated out-of-range threshold or to indicate that the ADC conversion is complete. Detected abnormalities such as current under/over-limit, bus voltage under/over-limit, or power over-limit, besides the ALR pin, can also be visually displayed by a red ALERT LED.

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.

## Specifications

| Type | Measurements |
|---|---|
| Applications | Ideal for applications like industrial battery packs, smart network interface cards (NICs), and hardware accelerator cards |
| On-board modules | INA700A - digital power monitor from Texas |

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| | |
|---|---|
| | Instruments |
| Key Features | High resolution, based on EZShunt™ technology, wide current measurement and common-mode voltage range, high precision, temperature accuracy, sample averaging options, diagnostics and alerts, and more |
| Interface | I2C |
| Feature | 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 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes | Pin | mikroBUS | | | | Pin | Notes |
|---|---|---|---|---|---|---|---|
| | NC | 1 | AN | PWM | 16 | NC | |
| | NC | 2 | RST | INT | 15 | **ALR** | Alarm Interrupt |
| 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 |

## Onboard settings and indicators

| Label | Name | Default | Description |
|---|---|---|---|
| LD1 | PWR | - | Power LED Indicator |
| LD2 | ALR | - | Alert LED Indicator |
| JP1 | VCC SEL | Left | Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V |
| JP2 | ADDR SEL | Lower | I2C Address Selection SDA/VCC/SCL/GND: Left position SDA, Upper position VCC, Right position SCL, Lower position GND |

## VCP Monitor 5 Click electrical specifications

| Description | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | 3.3 | - | 5 | V |
| Common-Mode Voltage Range | -0.3 | - | 40 | V |
| Current Range | -15.728 | - | +15.728 | A |

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| | | | | |
|---|---|---|---|---|
| ADC Resolution | - | 16 | - | bit |

## Software Support

We provide a library for the VCP Monitor 5 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 VCP Monitor 5 Click driver.

Key functions

- vcpmonitor5_get_bus_voltage This function reads the BUS voltage output measurement in volts [V] by using I2C serial interface.
- vcpmonitor5_get_current This function reads the current measurement result in milliamperes [mA] by using the I2C serial interface.
- vcpmonitor5_get_power This function reads the power measurement result in Watts [W] by using the I2C serial interface.

### Example Description

This library contains API for the VCP Monitor 5 Click driver for measurements of the voltage, current, power, energy, charge, and die temperature.

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.VCPMonitor5

### 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

VCP Monitor 5 click example on Libstock

VCP Monitor 5 click 2D and 3D files v100

VCP Monitor 5 click schematic v100

INA700A datasheet