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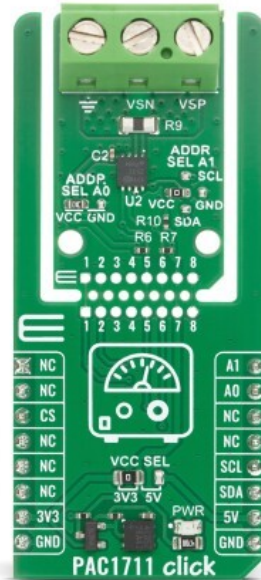www.mikroe.com

PAC1711 Click

PID: MIKROE-6801

PAC1711 Click is a compact add-on board that provides accurate real-time measurement of voltage, current, and power consumption for embedded and industrial systems. It is based on the PAC1711, a single-channel DC power monitor from Microchip that integrates a high-side current sense amplifier and a bus voltage monitor feeding a 12-bit ADC. The device performs automatic power calculations and long-term energy accumulation with programmable sampling rates, integration periods, and one-shot measurement modes accessible via the I2C interface. The Click board supports voltage measurements up to 42V and currents up to 13.5A, includes two configurable alert pins for event notifications or interface address selection. Its built-in real-time calibration and adjustable averaging ensure high-resolution, low-noise performance without external filtering enhances system integration. It is ideal for embedded computing, battery management, automotive, networking, and power optimization applications.

For more information about **PAC1711 Click** visit the official product page.

How does it work?

PAC1711 Click is based on the PAC1711, a single-channel DC power monitor IC from Microchip, which combines a high-side current sense amplifier and a bus voltage monitor feeding a 12-bit resolution analog-to-digital converter (ADC). This board is designed to provide accurate real-time monitoring of voltage, current, and power consumption in a wide range of embedded and industrial applications. The digital processing circuitry within the PAC1711 performs automatic power calculations and integrates energy values over time, supporting accumulation periods that can extend up to one year or even longer, making it particularly suitable for embedded computing systems, power-sensitive devices, cloud servers, portable electronics, and

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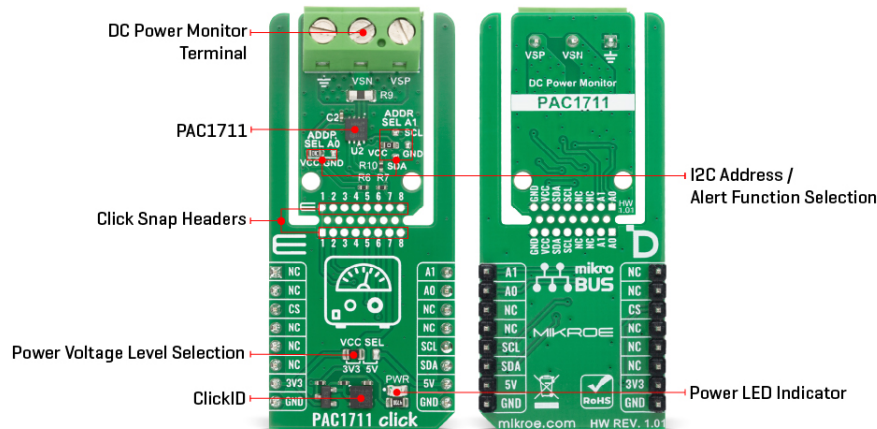
ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

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

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automotive applications where precise DC power measurement, diagnostics, and optimization are critical.

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 many new possibilities for implementation. Thanks to the Snap feature, the PAC1711 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 PAC1711 Click measures voltages from 0V up to 42V and currents up to 13.5A, offering a wide dynamic range suitable for both low-voltage and high-power systems. Bus voltage, sense resistor voltage, and accumulated power values are stored in internal registers, which can be read by the host MCU through a standard 2-wire I2C interface. This interface supports communication speeds of up to 3.4MHz, enabling fast data acquisition and integration into existing embedded architectures. The PAC1711 Click provides flexible I2C address configuration through ADDR SEL jumpers, allowing multiple devices to coexist on the same bus.

The board also includes an intelligent alert system with two dedicated alert pins (A0 and A1), which can, besides address selection, be configured to trigger notifications when measured voltage, current, or power values exceed user-defined thresholds, providing real-time protection and system diagnostics. The sampling rate and energy integration period are fully programmable via I2C, giving developers control over the precision, speed, and responsiveness of measurements. Additionally, one-shot measurement mode and other configuration commands are accessible through the same interface, allowing many operation modes depending on application needs.

The PAC1711 incorporates real-time calibration to minimize offset errors, ensuring stable and reliable measurements without the need for external trimming or compensation. It requires no external input filters due to its integrated low-noise architecture, while its built-in adjustable averaging function further enhances measurement accuracy by filtering transient noise and ensuring consistent readings even under rapidly changing load conditions.

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

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functions and an example code that can be used as a reference for further development.

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	Measurements
Applications	Ideal for embedded computing, battery management, automotive, networking, and power optimization applications
On-board modules	PAC1711 - single channel DC power monitor from Microchip
Key Features	High-side current sense amplifier, 12-bit ADC resolution, wide measurement range, automatic power calculation and long-term energy accumulation, programmable sampling rate and integration period, one-shot measurement mode, real-time calibration for offset error minimization, integrated low-noise architecture without the need for external filters, Click Snap, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on PAC1711 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	**A1**	Address Selection / Alert
	NC	2	RST	INT	15	**A0**	Address Selection / Alert
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

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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	ADDR SEL A0	Left	I2C Address / Alert Selection VCC/GND: Left position VCC, Right position GND
JP3	ADDR SEL A1	Left	I2C Address / Alert Selection VCC/SCL/GND/SDA: Left position VCC, Upper position SCL, Right position GND, Lower position SDA

PAC1711 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Bus Voltage Measurement Range	-	-	42	V
Current Measurement Range	-	-	13.5	A
ADC Resolution	-	12	-	bit

Software Support

PAC1711 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 the PAC1711 Click board for current, voltage, and power monitoring. The application reads and logs bus voltage, sense current, power values, as well as min/max and average measurements.

Key Functions

- pac1711_cfg_setup This function initializes Click configuration structure to initial values.
- pac1711_init This function initializes all necessary pins and peripherals used for this Click board.
- pac1711_default_cfg This function executes a default configuration of PAC1711 Click board.
- pac1711_set_fsr This function configures full-scale ranges (FSR) for V(SENSE) and V(BUS).
- pac1711_refresh This function issues a REFRESH command to update measurement registers.

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- pac1711_read_data This function reads accumulated count, voltage, current, and power data, and converts raw codes into SI units, storing the results to the output structure.

Application Init

Initializes the logger and PAC1711 Click driver, then applies the default configuration.

Application Task

Periodically refreshes the measurements and logs voltage, current, and power data. Updates are provided every 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

PAC1711 click example package

PAC1711 click 2D and 3D files v101

PAC1711 click schematic v101

PAC1711 datasheet