

PMIC 2 Click



PID: MIKROE-6599

PMIC 2 Click is a compact add-on board designed for energy harvesting in low-power applications, enabling the collection and storage of energy from various sources to power electronic devices autonomously. It is based on the [NEH7100](#), an inductorless power management IC from [Nexperia](#). The NEH7100 supports harvesting from a wide range of light sources and can use kinetic, thermal, and electromagnetic energy sources. It features advanced MPPT with a hill-climbing algorithm, USB charging up to 200mA, an LDO/load switch, and storage element protection, along with configuration via hard-coding jumpers or an I2C interface. The board also supports the Click Snap format for flexible implementation. This Click board is ideal for applications such as smart remotes, wireless peripherals, industrial sensors, tire pressure monitoring systems, and wearable devices.

For more information about **PMIC 2 Click** visit the official [product page](#).

How does it work?

PMIC 2 Click is based on the NEH7100, an inductorless power management IC from Nexperia designed for energy harvesting in low-power applications. Optimized for harvesting energy from a wide range of light sources, including indoor and outdoor photovoltaic cells connected to VIN pins, the device can also use other sources such as kinetic movement, vibrations, thermal variations, and electromagnetic fields with the aid of external auxiliary components. The NEH7100 collects energy from a suitable harvester to charge a storage element (connected on VBAT), such as a rechargeable battery or a supercapacitor, while Nexperia's advanced maximum power point tracking (MPPT) technology, employing an embedded hill-climbing algorithm, ensures maximum power delivery to the storage element.

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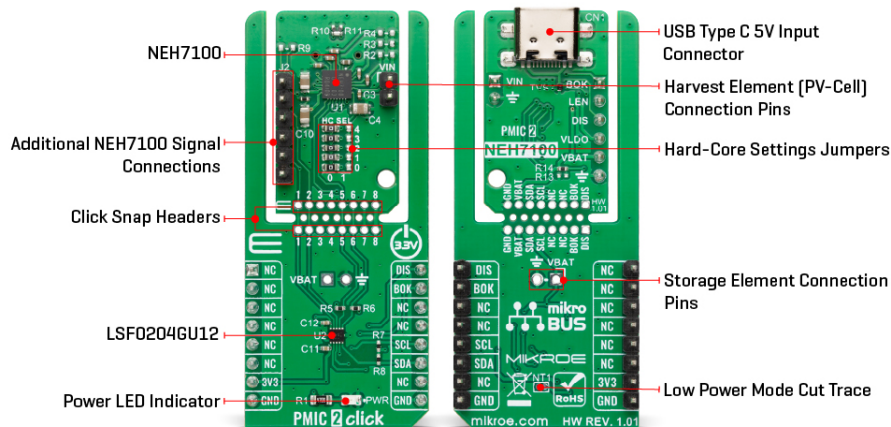
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This MPPT operates with any compatible harvester and can update as frequently as every 0.5 seconds, delivering exceptional performance even under rapidly changing light or environmental conditions. The device integrates multiple auxiliary features, including storage element protection, USB charging capability of up to 200mA, and an LDO/load switch for flexible power distribution. Its ideal for a wide range of applications such as smart remote controls for TVs, gaming, and AV equipment, wireless PC peripherals including keyboards, mice, and headphones, industrial sensors like electronic shelf labels, asset trackers, and beacons, tire pressure monitoring systems, and wearable devices such as watches, body bands, and health monitoring equipment.

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 NEH7100 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.

PMIC 2 Click can be configured either through hard-coding jumpers (HC SEL) or via an I2C interface operating at 100kHz, providing flexibility in setup and integration. In addition to the standard I2C communication pins, the board also features dedicated control and status signals from the NEH7100, such as the DIS pin, which places the device into a low-power consumption mode, and the BOK pin, which serves as an indicator that the battery voltage is above the configured low-voltage detection (LVD) threshold. For extended accessibility to the PMIC's capabilities, PMIC 2 Click incorporates an additional header (J2) that exposes multiple useful signals, including BOK, DIS, LEN for enabling the LDO regulator, VLDO as the regulated LDO output, and VBAT, which outputs the harvested energy and serves as the power supply input for the PMIC.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Hard-code settings

When using the hard-coded jumper selection (HC SEL), the PMIC 2 Click allows users to define

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key battery protection parameters directly on the board. These settings determine how the NEH7100 manages charging thresholds, low-voltage detection, and overall storage-element safety. For choosing the correct configuration for your battery, consult the [NEH7100 datasheet \(Chapter 7.3.7, Table 19\)](#), which provides the detailed battery-protection options and valid HC SEL combinations.

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	Battery charger
Applications	Ideal for applications such as smart remotes, wireless peripherals, industrial sensors, tire pressure monitoring systems, and wearable devices
On-board modules	NEH7100 - inductorless energy harvesting PMIC from Nexperia
Key Features	Advanced maximum power point tracking with hill-climbing algorithm updating every 0.5 seconds, support for harvesting energy from indoor and outdoor photovoltaic cells and other sources, storage element protection, USB charging capability, integrated LDO/load switch, configuration via hard-coding jumpers or I2C interface, Click Snap format for detachable and flexible implementation, and more
Interface	GPIO,I2C
Feature	Click Snap
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on PMIC 2 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	DIS	Device Enable
	NC	2	RST	INT	15	BOK	Battery Status

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	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	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP2-JP6	HC SEL	Left	Hard-Code Settings Selection 0/1: Left position 0, Right position 1 (Default to 00000)
NT1	NT1	Connected	Low Power Mode Cut Trace

PMIC 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Harvesting Power Range	0.015	-	50	mW
USB Charging Current	-	-	200	mA

Software Support

[PMIC 2 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 PMIC 2 Click board. The board is designed to efficiently harvest energy from high-impedance sources such as solar panels. The demo reads and logs status flags and battery health indicators, including over-voltage, under-voltage, output current protection, and chip status. It also measures and logs the battery charging current in microamperes.

Key Functions

- `pmic2_cfg_setup` This function initializes Click configuration structure to initial values.
- `pmic2_init` This function initializes all necessary pins and peripherals used for this Click board.
- `pmic2_default_cfg` This function executes a default configuration of PMIC 2 Click board.
- `pmic2_get_charge_current` This function reads the charge current measurement and calculates the current value in milliamps.
- `pmic2_get_bok_pin` This function reads the logic state of the BOK pin.

Application Init

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Initializes the logger and the PMIC 2 Click driver and applies the default configuration.

Application Task

Periodically checks and logs status flags, battery OK signal, and charging current.

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™](#)

Downloads

[PMIC 2 click example package](#)

[PMIC 2 click 2D and 3D files v101](#)

[NEH7100 datasheet](#)

[LSF0204GU12 datasheet](#)

[PMIC 2 click schematic v101](#)

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