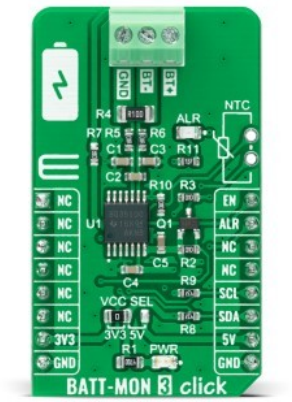
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BATT-MON 3 Click





PID: MIKROE-5098

BATT-MON 3 Click is a compact add-on board representing an advanced battery monitoring solution. This board features the BQ35100, battery fuel gauge, and end-of-service monitor from Texas Instruments. The BQ35100 provides highly configurable fuel gauging for non-rechargeable (primary) lithium batteries without requiring a forced battery discharge. It uses patented TI gauging algorithms to support the option to replace an old battery with a new one seamlessly. It provides accurate results with ultra-low average power consumption, alongside an I2C interface through which the host can read the gathered data. This Click board™ can be used in battery systems suitable for dynamic load and large ambient temperature change applications, for battery status reporting and diagnostics with early failure detection for flow meter systems, or to extend battery run-time with accurate battery gauging in various applications.

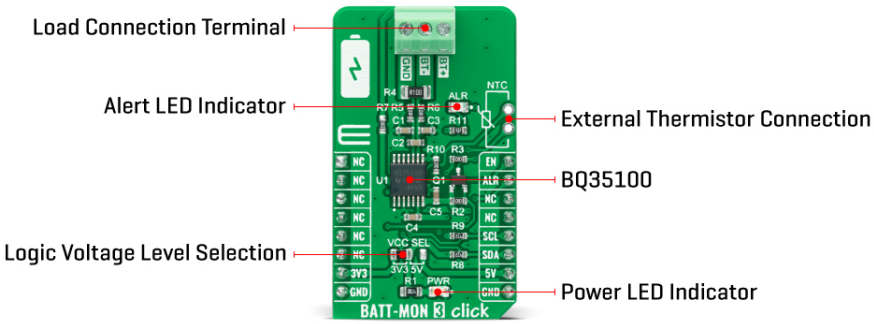
BATT-MON 3 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

BATT-MON 3 Click as its foundation uses the BQ35100, battery fuel gauge, and end-of-service monitor from Texas Instruments that provides gas gauging for lithium thionyl chloride (Li-SOCl2) and lithium manganese dioxide (Li-MnO2) primary batteries without requiring any forced discharge of the battery. The lithium primary gas gauging function uses voltage, current, and temperature data to provide accurate results alongside an ultra-low average power consumption. It also uses patented TI gauging algorithms to support the option to replace an old battery with a new one seamlessly.

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This device measures the BT input using the integrated delta-sigma ADC, scaled by the internal translation network, through the ADC. A calibration process determines the translation gain function. It can also operate in three distinct modes: accumulator (ACC), state-of-health (SOH), and end-of-service (EOS) mode. The device can be configured and used for only one of these modes in the field, as it is not intended to be able to switch between modes when in regular use.

BATT-MON 3 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings with a maximum frequency of 400kHz. The BQ35100 is intended for systems where the battery electronics need to consume a low average current. This board is designed to be fully powered OFF when not required by controlling the enable pin routed to the PWM pin of the mikroBUS™ socket. When this pin is low, the Click board™ is fully powered down with no measurements being made, and no data is retained unless in a flash.

An alarm and interrupt function is also available that outputs an interrupt signal to the ALR pin of the mikroBUS™ socket based on a variety of configurable status and data options. This feature is also indicated by a red LED marked as ALR. Besides, this Click board™ also features battery pack temperature sensing through an integrated temperature sensor or an external NTC thermistor connected to the onboard header labeled as NTC, using the integrated delta-sigma ADC where only one source can be used at a time.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the Click board™ comes equipped with a library that contains easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Battery charger
Applications	Can be used for dynamic load and large ambient temperature change applications, for battery status reporting and diagnostics with early failure detection for flow meter systems, or to extend battery run-time with accurate battery gauging in various applications

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On-board modules	BQ35100 - battery fuel gauge, and end-of-service monitor from Texas Instruments
Key Features	Fuel gauge and battery diagnostics that predicts end-of-service or early battery failure, ultra-low average power consumption to maximize battery run time, I2C interface, programmable alarm with interrupt capability, and more
Interface	I2C
ClickID	No
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 BATT-MON 3 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	**EN**	Enable
	NC	2	RST	INT	15	**ALR**	Interrupt
	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

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	ALR	-	Alarm LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1	NTC	Unpopulated	External Thermistor Connection Header

BATT-MON 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Battery Capacity	100	-	32.000	mAh
Resolution	14	-	15	bits
Operating Temperature Range	-40	+25	+85	°C

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Software Support

We provide a library for the BATT-MON 3 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

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

Library Description

This library contains API for BATT-MON 3 Click driver.

Key functions

- battmon3_read_voltage This function reads the battery voltage in millivolts.
- battmon3_read_current This function reads the battery current load from BATT+ to GND in milliampers.
- battmon3_read_used_capacity This function reads the used battery capacity in mAh.

Example Description

This example demonstrates the use of BATT-MON 3 Click board™ by measuring the battery voltage, current and used capacity, as well as the chip internal temperature.

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

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.BATTMON3

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 MikroElektronika compilers.

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.

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Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

BATT-MON 3 click example on Libstock

BATT-MON 3 click 2D and 3D files

BQ35100 datasheet

BATT-MON 3 click schematic

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