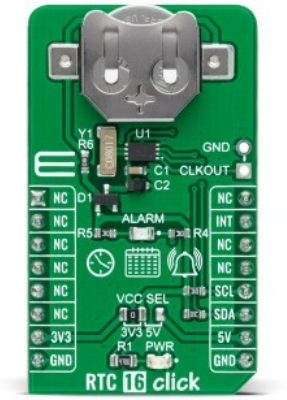
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RTC 16 Click





PID: MIKROE-5083

RTC 16 Click is a compact add-on board that accurately keeps the time of a day. This board features the BU9873, a CMOS real-time clock that has a built-in interrupt generation function from Rohm Semiconductors. The BU9873 provides year, month, day, weekday, hours, minutes, and seconds based on a 32.768kHz quartz crystal. This RTC is connected to the MCU through an I2C interface and configured to serial transmit time and calendar data. It also has an alarm function that outputs an interrupt signal to the MCU when the day of the week, hour, or minute matches with the preset time. This Click board™ is suitable for various time-keeping applications, including daily alarms, metering applications, and others requiring an accurate RTC for their operation.

RTC 16 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?

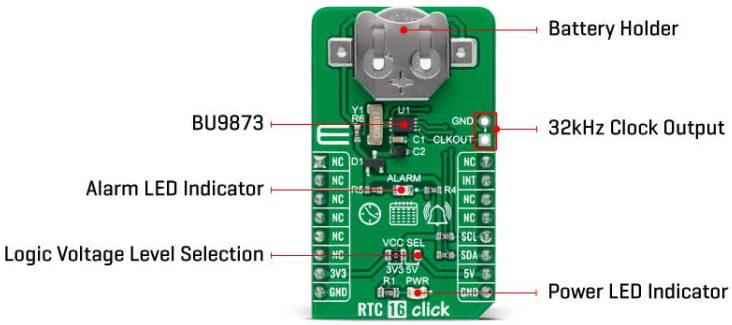
RTC 16 Click as its foundation uses the BU9873, an I2C configurable real-time clock/calendar optimized for low power operations from Rohm Semiconductors. The BU9873 is configured to perform the serial transmission of calendar and time data to the MCU and comes with an integrated interrupt generation function. It also contains a built-in high-precision oscillation adjustment circuit which enables the adjustment of time counts with a digital method and correct deviations in the oscillation frequency of the crystal oscillator. This RTC is also characterized by an automatic leap year recognition until the future 2099 year.

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This Click board™ communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting a Fast Mode operation up to 400kHz. An alarm and interrupt function is also available that outputs an interrupt signal to the INT pin of the mikroBUS™ socket when the day of the week, hour, or minute matches with the preset time. An alarm may be selectable between ON and OFF for each day of the week, allowing outputting warning every day or on a specific day indicated by a red LED marked as ALARM. Besides, the RTC 16 Click also has an onboard header labeled CLKOUT, which provides clock pulses of 32kHz.

The most common RTC configuration, like this one, is a battery-backed up, which maintains time and continues its work without interruption in the event of a power failure. That’s why, in addition to the BU9873, the RTC 16 Click is equipped with a button cell battery holder compatible with the 3000TR battery holder, suitable for 12mm Coin Cell batteries.

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	RTC
Applications	Can be used for various time-keeping applications, including daily alarms, metering applications, and others requiring an accurate RTC for their operation
On-board modules	BU9873 - CMOS real-time clock that has a built-in interrupt generation function from Rohm Semiconductors
Key Features	Low power consumption, clock/calendar feature, programmable periodic and alarm with interrupt capability, battery back-up, 32kHz clock output, automatic leap year recognition up to the year 2099, and more
Interface	I2C

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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 RTC 16 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	**INT**	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	ALARM	-	Alarm LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1	CLKOUT	Unpopulated	32kHz Clock Output Header

RTC 16 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Clock Output CLKOUT	-	32	-	kHz
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the RTC 16 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

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This library contains API for RTC 16 Click driver.

Key functions

- rtc16_set_time This function sets the starting time values - second, minute and hour.
- rtc16_read_time This function reads the current time values - second, minute and hour.
- rtc16_read_date This function reads the current date values - day of week, day, month and year.

Example Description

This example demonstrates the use of RTC 16 Click board™ by reading and displaying the time and date values.

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.RTC16

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.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

RTC 16 click example on Libstock

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RTC 16 click 2D and 3D files

BU9873 datasheet

RTC 16 click schematic

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