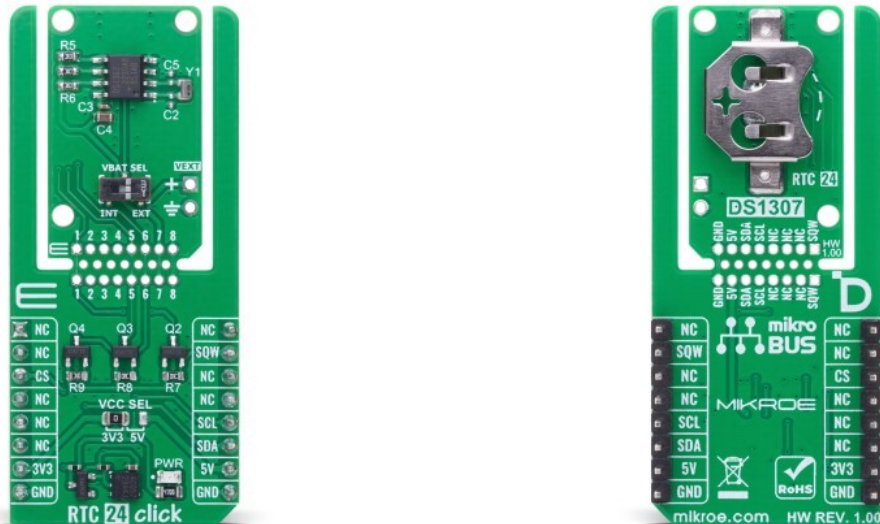


RTC 24 Click



PID: MIKROE-6635

RTC 24 Click is a compact add-on board that provides highly accurate real-time clock and calendar functions for embedded applications, even during power interruptions. It is based on the [DS1307](#) real-time clock module from [Analog Devices](#), which integrates a 64x8-bit battery-backed NV SRAM and full BCD clock/calendar functionality. The board features a standard I2C interface for communication, a selectable square-wave output on the SQW pin with four frequencies, and a VBAT SEL switch to choose between the onboard lithium cell or external 3V backup supply. Additionally, the Click Snap design allows the sensor part to be separated and mounted independently for greater flexibility. The RTC 24 Click is an ideal solution for applications such as data loggers, metering systems, industrial automation, and any embedded system that requires dependable and continuous real-time tracking.

For more information about **RTC 24 Click** visit the official [product page](#).

How does it work?

RTC 24 Click is based on the DS1307, a serial real-time clock (RTC) module from Analog Devices, which features a 64x8 bit battery-backed NV SRAM alongside its full binary-coded decimal (BCD) clock/calendar functionality. This board provides highly accurate real-time clock and calendar functions for embedded applications, enabling precise timekeeping even during power interruptions. The clock/calendar maintains complete time data, including seconds, minutes, hours, day, date, month, and year, with built-in logic to automatically adjust the date at the end of each month, accounting for months with fewer than 31 days and incorporating leap-year compensation valid up to the year 2100. The device supports both 24-hour and 12-hour formats with an AM/PM indicator, making it flexible for various regional and application-specific requirements.

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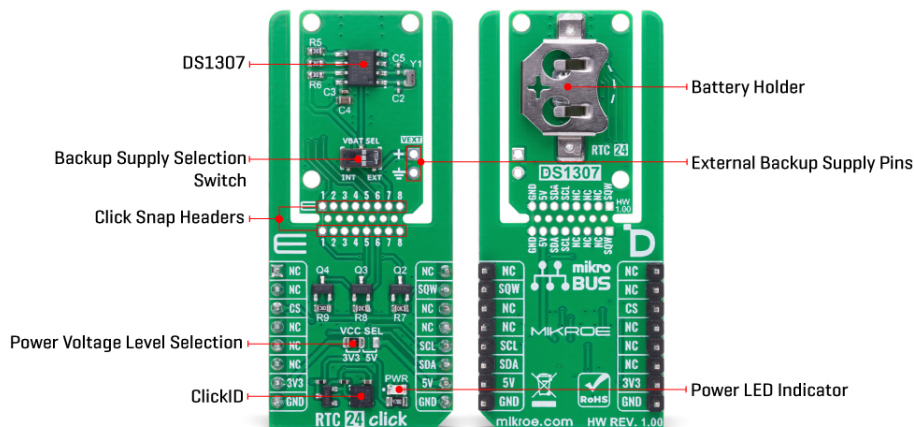
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ISO 9001: 2015 certification of quality management system (QMS).



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 area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the DS1307 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.

Communication with the host MCU is established through a standard I2C interface, allowing for straightforward integration and reliable data transfer. In addition to the standard I2C pins, RTC 24 Click uses the SOW pin, which can output one of four selectable square-wave frequencies: 1Hz, 4kHz, 8kHz, or 32kHz, allowing the board to provide an accurate clock signal or act as an output driver for synchronization purposes in complex systems. The board also integrates a VBAT SEL switch that allows users to select the backup power source for the RTC module. This switch enables the selection between the onboard lithium cell battery or an external 3V backup supply provided via the VEXT pin, located directly next to the switch, ensuring uninterrupted operation and flexible power management depending on system design requirements.

A built-in power-sense circuit within the DS1307 automatically detects power failures and switches to the selected backup supply, preserving timekeeping data at all times. This combination of features makes RTC 24 Click an ideal solution for applications such as data loggers, metering systems, industrial automation, and any embedded system that requires dependable and continuous real-time tracking.

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.

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.

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Specifications

Type	RTC
Applications	Ideal solution for applications such as data loggers, metering systems, industrial automation, and any embedded system that requires dependable and continuous real-time tracking
On-board modules	DS1307 - serial real-time clock (RTC) module from Analog Devices
Key Features	Real-time clock with 64x8 NV SRAM, full BCD clock/calendar, automatic end-of-month and leap-year correction, selectable 12-hour or 24-hour formats with AM/PM indicator, I2C interface, SQW output with selectable 1Hz, 4kHz, 8kHz, or 32kHz square-wave frequencies, VBAT SEL switch for onboard lithium or external 3V backup supply, 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, External

Pinout diagram

This table shows how the pinout on RTC 24 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	NC	
	NC	2	RST	INT	15	SQW	Square-Wave Output
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
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

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SW1	VBAT SEL	Left	Backup Supply Selection INT/EXT: Left position INT, Right position EXT
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RTC 24 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Backup Supply Voltage	-	3	-	V
NV SRAM	64x8			bits
Square-Wave Frequency	1/4/8/32			kHz

Software Support

[RTC 24 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 RTC 24 Click board by initializing the device and setting up the current time and date. It continuously reads and displays the updated time and date every second using the square wave pin.

Key Functions

- `rtc24_cfg_setup` This function initializes Click configuration structure to initial values.
- `rtc24_init` This function initializes all necessary pins and peripherals used for this Click board.
- `rtc24_default_cfg` This function executes a default configuration of RTC 24 Click board.
- `rtc24_set_time` This function sets the current time (hours, minutes, seconds) in the RTC.
- `rtc24_read_time` This function reads the current time (hours, minutes, seconds) from the RTC.
- `rtc24_read_date` This function reads the current date (day, day of week, month, year) from the RTC.

Application Init

Initializes the logger and the RTC 24 Click driver, applies the default configuration, and sets the starting time and date.

Application Task

Waits for a 1 Hz square wave signal and then reads and displays the current time and date.

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](#).

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- 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

[RTC 24 click example package](#)

[RTC 24 click 2D and 3D files v100](#)

[RTC 24 click schematic v100](#)

[DS1307 datasheet](#)

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