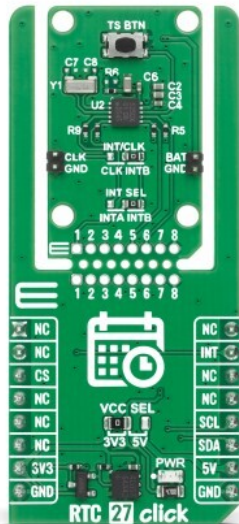


RTC 27 Click



PID: MIKROE-6964

RTC 27 Click is a compact add-on board designed for low-power real-time clock and calendar functionality, time tracking, alarm event generation, watchdog timing, and timestamp capture. This board is based on the [PCF8525](#), a nano-power CMOS real-time clock and calendar with an I2C interface from [NXP](#). A key advantage of the PCF8525 is its integrated temperature compensation engine, which uses an onboard temperature sensor to correct the frequency deviation of an external 32.768kHz crystal and, together with aging offset adjustment, can achieve typical accuracy of $\pm 30\text{ppm}$ across temperature. The compensation supports selectable crystal models of $-0.035\text{ppm}/^\circ\text{C}^2$ or $-0.04\text{ppm}/^\circ\text{C}^2$, helping deliver up to 5x better timekeeping accuracy than a standard RTC IC with an uncompensated crystal. It also provides year, month, day, weekday, hours, minutes, seconds, and 1/100-second data, programmable alarm and watchdog timer functions, timestamp capture, battery backup with automatic switch-over circuitry, and two configurable interrupt outputs with selectable routing through onboard jumpers. Its ultra-low-power operation, with only 64nA typical current consumption in timekeeping mode at $V_{DD} = 3.3\text{V}$, makes it especially suitable for battery-powered and always-on designs. RTC 27 Click is suitable for portable instruments, wearable devices, industrial systems, and IoT applications requiring reliable, low-power, and accurate timekeeping.

For more information about **RTC 27 Click** visit the official [product page](#).

How does it work?

RTC 27 Click is based on the PCF8525, a nano-power CMOS real-time clock IC with integrated temperature compensation for highly accurate timekeeping from NXP, optimized for low power consumption and supporting I2C communication at speeds up to 400kHz. As the first RTC IC requiring an external crystal to feature a default temperature compensation engine, it supports

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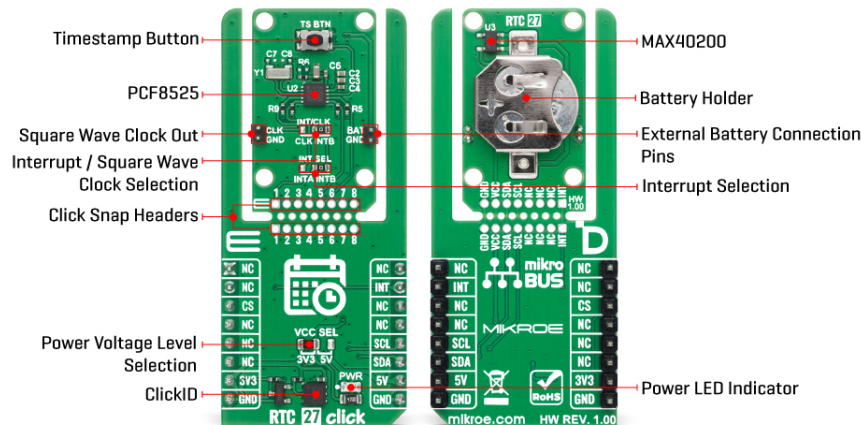


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ISO 9001: 2015 certification of quality management system (QMS).

selectable crystal compensation models and, together with its aging offset feature, can achieve up to five times better timekeeping accuracy than a standard RTC with an uncompensated crystal. The PCF8525 provides time and calendar information including year, month, day, weekday, hours, minutes, seconds, and 1/100 seconds, making it suitable for applications that require precise time tracking with fine resolution like portable instruments, wearable devices, industrial systems, and IoT applications.



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 PCF8525 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.

RTC 27 Click also supports a programmable alarm function, a programmable watchdog timer, and a timestamp function activated through the onboard TS BTN button, each capable of generating interrupt events for responsive system operation. For uninterrupted timekeeping, the board includes a battery backup input pin and automatic switch-over circuitry, allowing the PCF8525 to operate either from the onboard lithium cell battery or from an external backup supply connected through the BAT pin located in the upper-right area of the Snap section, providing flexible power management according to system requirements.

Additional features include power-on reset and software reset functionality, as well as two available interrupt outputs. The INTB output is multiplexed with the CLK pin used for square-wave clock output, with its function selected through the INT/CLK jumper, while the interrupt source routed to the host MCU through the INT pin can be selected between INTA and INTB using the INT SEL jumper.

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

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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	RTC
Applications	Ideal for portable instruments, wearable devices, industrial systems, and IoT applications requiring reliable, low-power, and accurate timekeeping
On-board modules	PCF8525 - nano-power RTC with I2C interface from NXP
Key Features	Default temperature compensation engine for improved timekeeping accuracy, typical ± 30 ppm accuracy across temperature, selectable crystal compensation models, aging offset correction, nano-power CMOS real-time clock and calendar, I2C communication interface, year, month, day, weekday, hours, minutes, seconds, and 1/100-second timekeeping, programmable alarm function and watchdog timer, timestamp function, 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 RTC 27 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	INT	Interrupt
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

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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	INT/CLK	Right	Interrupt / Square Wave Clock Selection CLK/INTB: Left position CLK, Right position INTB
JP3	INT SEL	Right	Interrupt Selection INTA/INTB: Left position INTA, Right position INTB
T1	TS BTN	-	Timestamp Button

RTC 27 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Backup Supply Voltage	1.2	-	5.5	V

Software Support

[RTC 27 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 27 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 timer countdown interrupt pin.

Key Functions

- `rtc27_cfg_setup` This function initializes Click configuration structure to initial values.
- `rtc27_init` This function initializes all necessary pins and peripherals used for this Click board.
- `rtc27_default_cfg` This function executes a default configuration of RTC 27 Click board.
- `rtc27_get_int_pin` This function returns the logical state of the INT pin.
- `rtc27_set_time_date` This function sets both time and date registers in a single operation.
- `rtc27_read_time_date` This function reads both time and date registers in a single operation.

Application Init

Initializes the logger and the RTC 27 Click driver, applies the default configuration, and sets the starting time and date.

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Application Task

Waits for a 1 Hz interrupt 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](#).
- 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 27 Click example package](#)

[RTC 27 Click 2D and 3D files v100](#)

[PCF8525 datasheet](#)

[RTC 27 Click schematic v100](#)

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