MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

RTC 13 Click

PID: MIKROE-4794

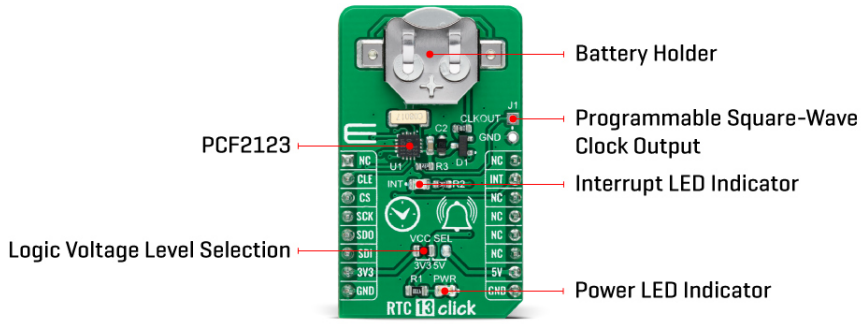
RTC 13 Click is a compact add-on board that accurately keeps the time of a day. This board features the PCF2123, an SPI configurable real-time clock/calendar optimized for low power operations from NXP Semiconductors. The PCF2123 provides year, month, day, weekday, hours, minutes, and seconds based on a 32.768kHz quartz crystal. Data is transferred serially via an SPI interface with a maximum data rate of 6.25 Mbit/s. An alarm and timer function is also available, providing the possibility to generate a wake-up signal on an interrupt line, in addition to a programmable square-wave clock output. This Click board™ is suitable for various time-keeping applications, including high-duration timers, metering, daily alarms, low standby power applications, and many more.

RTC 13 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 13 Click as its foundation uses the PCF2123, an SPI configurable real-time clock/calendar optimized for low power operations from NXP Semiconductors. It contains sixteen 8-bit registers with an auto-incrementing address counter, an on-chip 32.768kHz oscillator with two integrated load capacitors, a frequency divider that provides the source clock for the RTC, and a programmable clock output. The integrated oscillator ensures year, month, day, weekday, hours, minutes, and seconds, making this Click board™ suitable for various time-keeping applications such as high-duration timers, daily alarms, and many more.

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com



The PCF2123 communicates with MCU using the standard SPI serial interface with a maximum frequency of 8MHz, where data transfers serially with a maximum data rate of 6.25 Mbit/s. An alarm and timer function is also available, providing the possibility to generate a wake-up signal on an interrupt line, available on the INT pin of the mikroBUS™ socket, and indicated by a red LED marked as INT.

Besides, this Click board™ also has an onboard header labeled CLKOUT, which provides a programmable square-wave output clock signal controlled by one GPIO pin, a CLE pin routed to the RTS pin the mikroBUS™ socket. Frequencies of 32.768kHz, representing a default value down to 1Hz, can be generated and used as a system and MCU clock, input to a charge pump, or calibration of the oscillator.

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 PCF2123, the RTC 13 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 SPI communication lines properly. However, the 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.

Specifications

Type	RTC
Applications	Can be used for various time-keeping applications, including high-duration timers, metering, daily alarms, low standby power applications, and many more
On-board modules	PCF2123 - SPI configurable real-time clock/calendar optimized for low power operations from NXP Semiconductors
Key Features	Low power consumption, clock/calendar feature, freely programmable timer and alarm with interrupt capability, battery back-up,

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

	programmable square wave clock output, and more
Interface	SPI
Feature	No ClickID
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 13 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	
Clock Output Enable	**CLE**	2	RST	INT	15	**INT**	Interrupt
SPI Chip Select	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	6	MOSI	SDA	11	NC	
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	INT	-	Interrupt LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1	CLKOUT	Unpopulated	Programmable Square Wave Clock Output Header

RTC 13 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Square Wave Output CLKOUT	-	32.768	-	kHz
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the RTC 13 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

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 RTC 13 Click driver.

Key functions:

- rtc13_get_time - RTC 13 get time function.
- rtc13_set_time - RTC 13 set time function.
- rtc13_get_date - RTC 13 get date function.

Examples description

This is an example that demonstrates the use of the RTC 13 click board™.

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.RTC13

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

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™

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Downloads

RTC 13 click example on Libstock

RTC 13 click schematic

RTC 13 click 2D and 3D files

PCF2123 datasheet