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RTC 17 Click





PID: MIKROE-5129

RTC 17 Click is a compact add-on board that accurately keeps the time of a day. This board features the RV5C387A, a CMOS real-time clock with a built-in interrupt generation function from Nisshinbo Micro Devices Inc, to perform serial transmission of time and calendar data to the MCU. The BU9873 provides information like year, month, day, weekday, hours, minutes, and seconds based on a 32.768kHz quartz crystal through an I2C serial interface to transmit time and calendar data to the MCU. 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 17 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 17 Click as its foundation uses the RV5C387A, an I2C configurable real-time clock/calendar optimized for low power operations from Nisshinbo Micro Devices Inc. The RV5C387A is configured to transmit calendar and time data to the MCU and comes with an integrated interrupt generation function. It reads and writes time data from and to the MCU in units ranging from seconds to the last two digits of the calendar year. The calendar year will automatically be identified as a leap year when its last two digits are a multiple of 4. Consequently, leap years up to the year 2099 can automatically be recognized.

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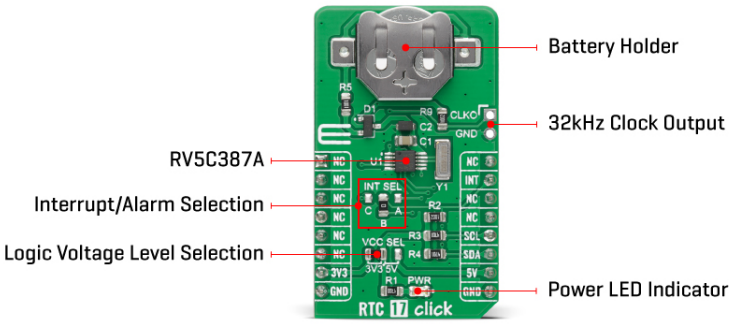

This Click board™ communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting a Fast Mode operation up to 400kHz. It also incorporates an alarm circuit configured to generate an interrupt signal to the INT pin of the mikroBUS™ socket from its A, B, or C interrupt pin at preset times. The alarm circuit allows two types of alarm settings specified by the Alarm_W registers and the Alarm_D registers.

The Alarm_W registers (interrupt B) allow a week, hour, and minute alarm settings, including combinations of multiple day-of-week settings such as Monday, Wednesday, while the Alarm_D registers (interrupt C) allow an hour and minute alarm settings. Besides, the RV5C387A can generate periodic interrupt signals aside from interrupt signals generated by the alarm circuit from interrupt A pin. The RTC 17 Click also has an onboard header labeled CLKO, 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 17 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	RV5C387A - I2C configurable real-time clock/calendar optimized for low power operations from Nisshinbo Micro Devices Inc
Key Features	Low power consumption, programmable periodic and alarm with interrupt capability,

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	clock/calendar feature, battery back-up, 32kHz clock output, automatic leap year recognition up to the year 2099, 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 RTC 17 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
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
R8	A	Unpopulated	Interrupt A Signal Jumper
R7	B	Populated	Interrupt B Signal Jumper
R6	C	Unpopulated	Interrupt C Signal Jumper
J1	CLKO	Unpopulated	32kHz Clock Output Header

RTC 17 Click electrical specifications

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

Software Support

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We provide a library for the RTC 17 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 RTC 17 Click driver.

Key functions

- rtc17_set_time This function sets the starting time values - second, minute and hour.
- rtc17_read_time This function reads the current time values - second, minute and hour.
- rtc17_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 17 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.RTC17

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

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Downloads

RTC 17 click example on Libstock

RV5C387A datasheet

RTC 17 click 2D and 3D files

RTC 17 click schematic

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