

# REAL TIME CLOCK MODULE (SPI-Bus)

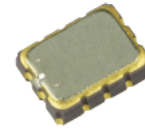
Time stamp function and Low current consumption



Product Number (2,000 pcs / Reel)  
 RX4111CE A : X1B000431000115  
 RX4111CE B : X1B000431000215

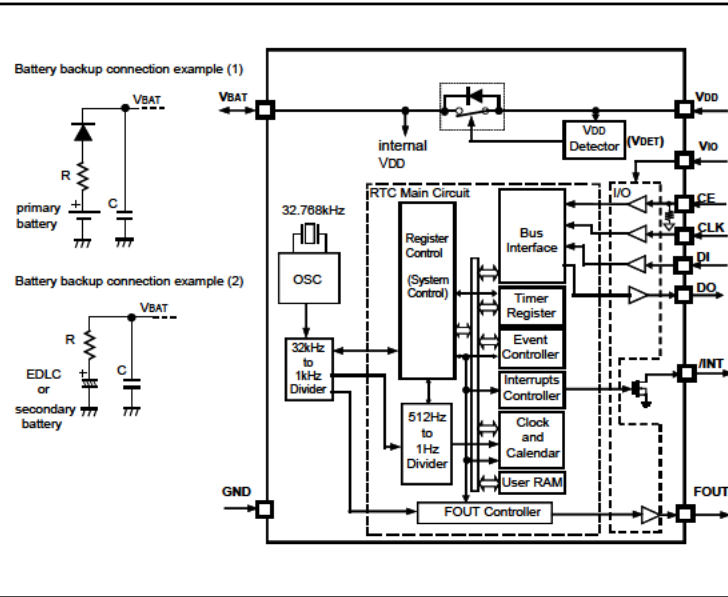
# RX4111CE

- Built in frequency adjusted 32.768 kHz crystal unit
- Interface Type : SPI -Bus 4 wire
- Low backup current : 100 nA Typ. / 3 V
- Auto power switching function : Automatically switches to backup power supply by monitoring the V<sub>DD</sub> voltage.
- Time stamp function : 8 times stamped from year to 1/256 seconds
- Interrupt output : Wake up every minute or every second
- Alarm interruption : Day, date, hour, minute, second
- Auto repeat wakeup timer interruption
- Self-monitoring interruption : Crystal oscillation stop, V<sub>BAT</sub> low, V<sub>DD</sub> low



RX4111CE  
 ( 3.2 x 2.5 mm, t = 1.0 mm Max. )

## Block diagram



## Overview

- Interface type  
 SPI-Bus interface (4 wire, 4 MHz Max.)
- Auto power switch function  
 The V<sub>DD</sub> voltage is monitored and it switches to the backup power supply by the automatic operation  
 Backup power supply switching voltage 1.2V Min.
- Clock output function  
 Output frequency is selectable from 32.768 kHz, 1024 Hz, 1 Hz  
 When the clock output is not used, the FOUT pin can be used as a timer output pin (CMOS)
- Wakeup timer function  
 Selectable from 244 μs to 32 years (24 bit x 1 ch.)  
 Timer source clock selectable from 1/60 Hz, 1 Hz, 64 Hz, 4096 Hz  
 Auto release after interrupt output from /INT pin at timer completes  
 This operation is auto repeat with a selected cycle, it can be used like a watchdog timer
- Time stamp function  
 8 times stamped from year to 1/256 seconds  
 The time stamp trigger inputs from self-monitoring and SPI command
- Alarm function  
 It is possible program from year to second
- Self-monitoring interruption  
 Crystal oscillation stop, V<sub>BAT</sub> low, V<sub>DD</sub> low

## Pin Functin

Signal Name	I / O	Function
CE	Input	Chip enables input pin
CLK	Input	Serial clock input pin
DI	Input	Serial data input pin
DO	Output	Serial data output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/ NT	Output	Interrupts output by Alarm and Timer events (N-ch. open drain)
VDD	-	Power supply pin Possible to supply different voltage from V <sub>IO</sub>
V <sub>IO</sub>	-	Interface power supply pin Input to supply the voltage same as a host
V <sub>BAT</sub>	-	Power supply pin for backup battery Connect an EDLC, a secondary battery, a primary battery In the backup voltage range, supplied to IC, from this pin
GND	-	Ground pin

## Terminal connection / External dimensions (Unit: mm)

Pin	Connection
1	V <sub>DD</sub>
2	V <sub>BAT</sub>
3	DI
4	FOUT
5	CLK
6	DO
7	CE
8	V <sub>IO</sub>
9	GND
10	/INT

## Specifications (characteristics)

\* Refer to application manual for details

### Recommended Operating Conditions

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Operating supply voltage	V <sub>DD</sub>	-	1.6	3.0	5.5	V
Clock supply voltage	V <sub>CLK</sub>	-	1.1	3.0	5.5	V
Operating temperature	T <sub>a</sub>	-	-40	+25	+85	°C
V <sub>DD</sub> detect voltage	-VDET1	V <sub>DD</sub> , Fall	1.20	1.40	1.60	V

### Frequency characteristics

tem	Grade	Symbol	Conditions	Min.	Typ.	Max.	Unit
Frequency tolerance	A	Δf/f	T <sub>a</sub> = +25 °C V <sub>DD</sub> = 3.0 V	-11.5	-	+11.5	x 10 <sup>-6</sup>
	B			-23	-	+23	
Oscillation start-up time		t <sub>STA</sub>	V <sub>DD</sub> = 2.75 V to 5.5 V	-	0.3	1.0	s

### Current consumption characteristics

T<sub>a</sub> = -40 °C to +85 °C

tem	Symbol	Conditions	Min.	Typ.	Max.	Unit
Current consumption	I <sub>BAT</sub>	Input pins = "L", FOUT = OFF, / NT = OFF, V <sub>BAT</sub> = 3.0 V, V <sub>DD</sub> = V <sub>IO</sub> = 0.0 V, CHGEN = 0b, N EN = 0b, SWSEL0 = 1, SWSEL1 = 0	-	100	450	nA
	I <sub>32k</sub>	Input pins = "L", FOUT = 32.768 kHz, / NT = OFF, V <sub>DD</sub> = V <sub>IO</sub> = 3.0 V, FOUT pin CL = 15 pF, CHGEN = 0b, N EN = 1b	-	2.0	3.0	μA

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