



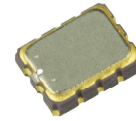
Product Number (2,000 pcs / Reel)  
 RX8901CE XS A0 : X1B000481000115  
 RX8901CE XB A0 : X1B000481000215  
 RX8901CE XS B0 : X1B000481000315  
 RX8901CE XB B0 : X1B000481000415

## REAL TIME CLOCK MODULE (I<sup>2</sup>C-Bus)

Built-in 32.768 kHz-DTCXO, +105°C operating temperature,  
 Low current consumption, Built-in power supply switching circuit and  
 Time stamp function up to 32 records

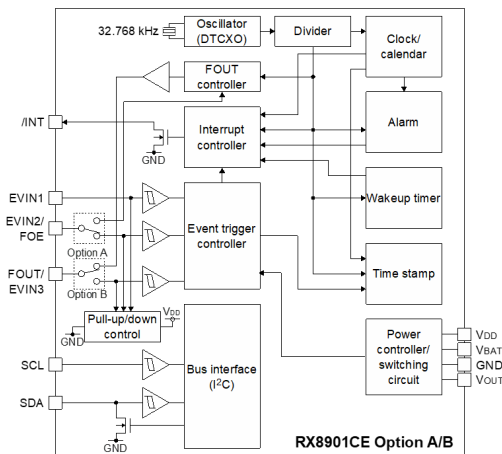
# RX8901CE

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : I<sup>2</sup>C-Bus
- Current consumption : 240 nA / 3 V (Typ.)
- Auto power switching function : Automatically switches to backup power supply by monitoring the V<sub>DD</sub> / V<sub>BAT</sub> voltage
- Time stamp function : Maximum 32 time stamps
- Interrupt output : Wake up every hour or 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



RX8901CE  
 (3.2 × 2.5 mm, t = 1.0 mm Max.)

### Block diagram



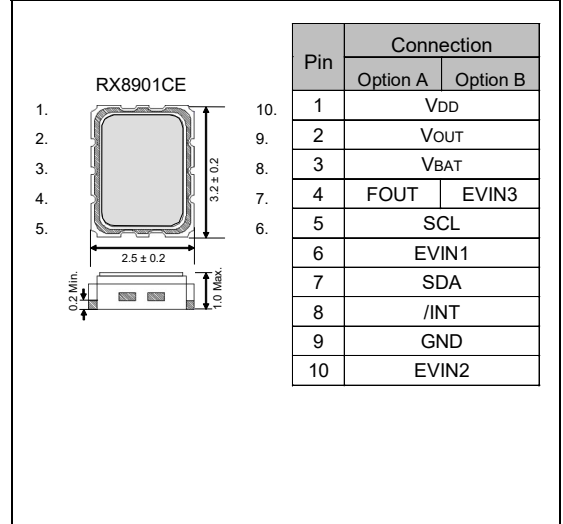
### Overview

- Interface type  
I<sup>2</sup>C-Bus interface Fast-Mode 400 kHz
- High stability  
 XS : ±3.0 × 10<sup>-6</sup> / -40 °C to +85 °C (Monthly rate: ±8 seconds)  
       ±5.0 × 10<sup>-6</sup> / +85 °C to +105 °C (Monthly rate: ±13.2 seconds)  
 XB : ±5.0 × 10<sup>-6</sup> / -40 °C to +85 °C (Monthly rate: ±13.2 seconds)  
       ±8.0 × 10<sup>-6</sup> / +85 °C to +105 °C (Monthly rate: ±21 seconds)
- Time stamp function  
 Trigger source: External event (EVIN) input, voltage drop/oscillation stop status detected, command input from the host  
 Record data: 1/1024 seconds to 1 second, seconds, minutes, hours, days, months, years  
 Number of recordable events: Maximum 32 events
- Backup power supply switching function  
 The V<sub>DD</sub> and V<sub>BAT</sub> voltages are monitored to switch between Normal mode (V<sub>DD</sub> operation) and Backup mode (V<sub>BAT</sub> operation).
- Clock output (FOUT)  
 Selectable from 32.768 kHz, 1024 Hz and 1 Hz outputs  
 Output can be controlled by a register or FOE input (selectable with a register).

### Pin Function

Signal Name	I / O	Function
EVIN1,2,3	Input	External event input pins. Detectable even in Backup mode. Pull-up and pull-down is configurable by the resistors
SCL	Input	Serial clock input pin
SDA	Input / Output	Serial data input and output pin
FOUT	Output	Frequency output pin (CMOS). 32.768 kHz (default), 1024 Hz or 1 Hz clock output is selectable. This pin can be switched to the wakeup timer interrupt output (CMOS)
/INT	Output	Interrupt output pin (N-ch. open drain). The wakeup timer, time update, alarm, and/or event detection interrupt signals can be selected to output from this pin. When two or more signals are selected, they are NORed before being output. This pin is effective even in Backup mode.
VDD	-	Power-supply pin
VOUT	-	Internal operating voltage output pin Connect a 1 μF bypass capacitor to this pin
VBAT	-	Backup power supply pin Connect a backup power supply such as a large-size capacitor, secondary battery, or primary battery. The operating power voltage is supplied from this pin to the internal circuits in Backup mode.
GND	-	Ground pin

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



### Specifications (characteristics)

\* Refer to application manual for details

Recommended Operating Conditions						
Item	Symbol	Condition	Min.	Typ.	Max.	unit
Operating 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	+105	°C
VDD detection voltage	-VDET1	VDD, Fall	1.35	1.45	1.55	V

Frequency Characteristics							
Item	Symbol	Condition	Min.	Typ.	Max.	unit	
Frequency tolerance	Δf/f	XS	T <sub>a</sub> = -40 to +85 °C	-3	-	+3	× 10 <sup>-6</sup>
			T <sub>a</sub> = -40 to +105 °C	-5	-	+5	
		XB	T <sub>a</sub> = -40 to +85 °C	-5	-	+5	
			T <sub>a</sub> = -40 to +105 °C	-8	-	+8	
start-up time	t <sub>STA</sub>	T <sub>a</sub> = +25 °C, VDD = 1.6 V ~ 5.5 V	-	0.5	1.0	s	

Current consumption						
Item	Symbol	Condition	Min.	Typ.	Max.	unit
I <sub>DD</sub>	IBAT	VBAT = 3.0 V, /INT = Hi-Z, FOUT: Output OFF (Hi-Z), Temperature compensation interval: 2 s, FSEL1 = FSEL0 = 1, INIEN = 1, CHGEN = 0, SCL = SDA = L	-	240	1500	nA
	I32k	VDD = 3.0 V, /INT = Hi-Z, FOUT: 32 kHz output, C <sub>L</sub> = 0 pF, Temperature compensation interval: 2 s, FSEL1 = FSEL0 = 1, INIEN = 1, CHGEN = 0, SCL = SDA = H	-	1.0	3.0	μA

Option						
I/F	Option	EVIN pin Number	/INT pin Number	FOUT	Number of time stamps recorded by EVIN pin trigger	
I <sup>2</sup> C	A	2	1	Yes	FIFO Mode	Direct Mode
	B	3	1	-	32 times	22 times
					32 times	32 times



Product name

RX8901CE   XS   A0  
①            ②            ③

- ① Model CE type package 3.2 x 2.5 x 1.0 mm
- ② Frequency tolerance
  - XS:  $\pm 3.0 \times 10^{-6}$  / -40 °C to +85 °C (Monthly rate:  $\pm 8$  seconds)
  - $\pm 5.0 \times 10^{-6}$  / +85 °C to +105 °C (Monthly rate:  $\pm 13.2$  seconds)
  - XB:  $\pm 5.0 \times 10^{-6}$  / -40 °C to +85 °C (Monthly rate:  $\pm 13.2$  seconds)
  - $\pm 8.0 \times 10^{-6}$  / +85 °C to +105 °C (Monthly rate:  $\pm 21$  seconds)
- ③ Pin Option
  - A: Option A
  - B: Option B



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At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.





ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
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