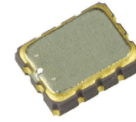




Product Number (2,000 pcs / Reel)  
**RX4901CE XS A0 : X1B000471000115**  
**RX4901CE XB A0 : X1B000471000215**  
**RX4901CE XS B0 : X1B000471000315**  
**RX4901CE XB B0 : X1B000471000415**  
**RX4901CE XS C0 : X1B000471000515**  
**RX4901CE XB C0 : X1B000471000615**  
**RX4901CE XS D0 : X1B000471000715**  
**RX4901CE XB D0 : X1B000471000815**



**RX4901CE**  
 ( 3.2 × 2.5 mm, t = 1.0 mm Max. )

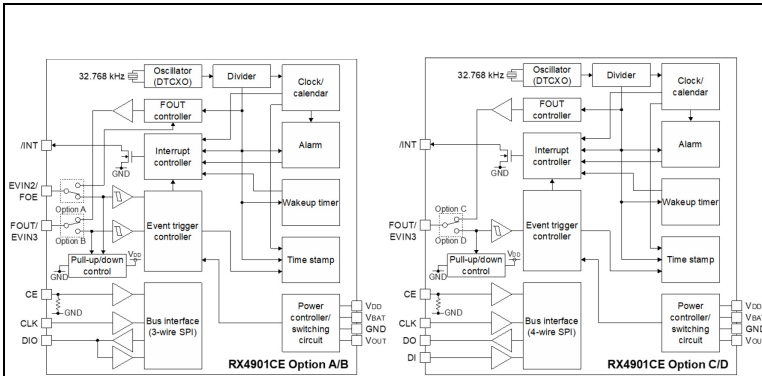
# REAL TIME CLOCK MODULE (SPI-Bus)

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

## RX4901CE

- Built in frequency adjusted 32.768 kHz crystal unit and DTCXO
- Interface Type : 3 wire / 4 wire SPI-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

### Block diagram



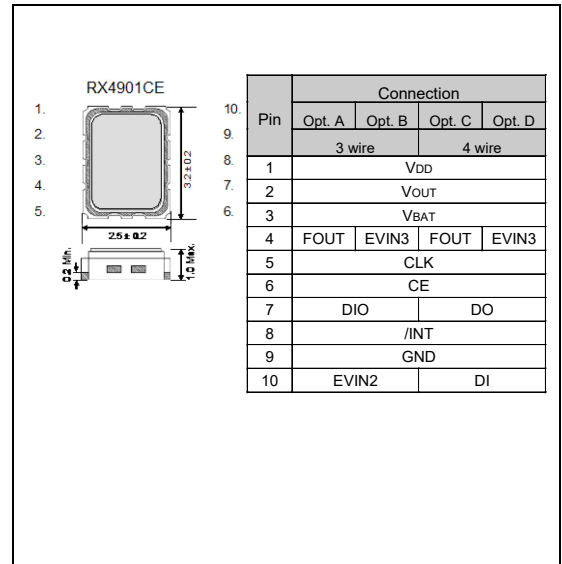
### Overview

- Interface type : 3 wire / 4 wire SPI-Bus
- 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 registers
CE	Input	Slave select input pin A pull-down resistor (Typ. 300 kΩ) is included
CLK	Input	Serial clock input pin
DI	Input	Serial data input pin (4 wire)
DO	Output	Serial data Output pin (4 wire)
DIO	Input / Output	Serial data input/output pin (3 wire)
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.
V <sub>DD</sub>	-	Power-supply pin
V <sub>OUT</sub>	-	Internal operating voltage output pin Connect a 1.0 μF bypass capacitor to this pin.
V <sub>BAT</sub>	-	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
V <sub>DD</sub> detection voltage	-VDET1	V <sub>DD</sub> , 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> = +85 to +105 °C	-5	-	+5	
		XB	T <sub>a</sub> = -40 to +85 °C	-5	-	+5	
			T <sub>a</sub> = +85 to +105 °C	-8	-	+8	
start-up time	t <sub>STA</sub>	T <sub>a</sub> = +25 °C, V <sub>DD</sub> = 1.6 V ~ 5.5 V	-	0.5	1.0	s	

#### Current consumption

T<sub>a</sub> = -40 °C to +105 °C

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

#### Option

I/F	Option	EVIN pin Number	/INT pin Number	FOUT	Number of time stamps recorded by EVIN terminal trigger	
					FIFO Mode	Direct Mode
SPI 3 wire	A	1	1	Yes	32 times	12 times
	B	2	1	-	32 times	22 times
SPI 4 wire	C	0	1	Yes	0 time	0 time
	D	1	1	-	32 times	10 times



Product name

RX4901CE   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
  - C: Option C
  - D: Option D

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.

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IATF 16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

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	► Pb free.
	► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
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