

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

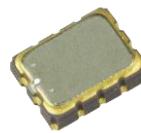
Time stamp function and Low current consumption

## RX8111CE

- Built in frequency adjusted 32.768 kHz crystal unit
- Operating Temperature : -40 °C to +105 °C
- Interface Type : I<sup>2</sup>C -Bus
- 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



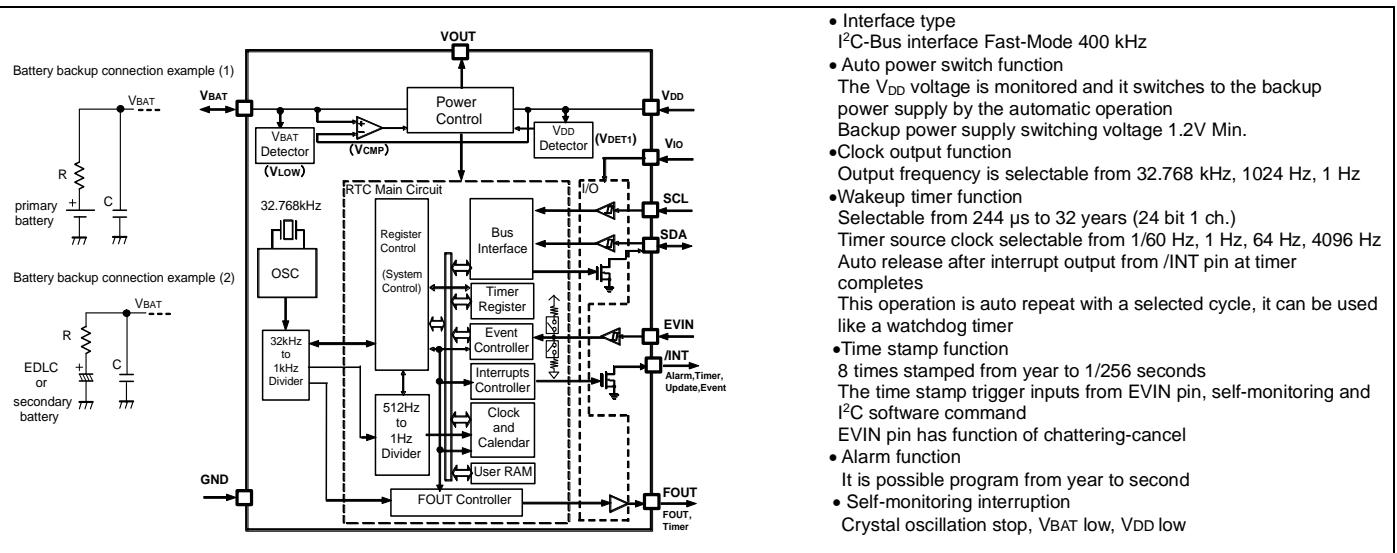
Product Number (2,000 pcs / Reel)  
 RX8111CE (A grade): X1B000421000115  
 RX8111CE (B grade): X1B000421000215



RX8111CE

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

## Block diagram



## Overview

- Interface type  
I<sup>2</sup>C-Bus interface Fast-Mode 400 kHz
- 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
- Wakeup timer function  
Selectable from 244 µs to 32 years (24 bit 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 EVIN pin, self-monitoring and I<sup>2</sup>C software command  
EVIN pin has function of chattering-cancel
- 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 Function

Signal Name	I / O	Function
EVIN	Input	External event input pin (Pull up/down and polarity are selectable by software)
SCL	Input	Serial clock input pin
SDA	Input / Output	Data input and output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/INT	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>out</sub>	-	Internal voltage output pin Connect bypass capacitor of 1.0 µF surely
V <sub>BAT</sub>	-	This is a 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	VDD
2	VOUT
3	VBAT
4	FOUT
5	SCL
6	EVIN
7	SDA
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>CCLK</sub>	-	1.1	3.0	5.5	V
Operating temperature	T <sub>a</sub>	-	-40	+25	+105	°C
V <sub>DD</sub> detect voltage	-V <sub>DET1</sub>	V <sub>DD</sub> , Fall	1.20	1.40	1.60	V

## Current consumption characteristics

Ta = -40 °C to +105 °C

Symbol	Conditions	T <sub>a</sub> (°C)	Typ.	Max.	Unit
I <sub>DD</sub>	Input pins = "L", FOUT = OFF, /INT = OFF, V <sub>DD</sub> = V <sub>io</sub> = 3.0 V, CHGEN = 0b, INIEN = 0b,	-40 ~ +85	100	450	nA
		-40 ~ +105	100	1000	
I <sub>32k</sub>	Input pins = "L", FOUT = 32.768 kHz, /INT = OFF, V <sub>DD</sub> = V <sub>io</sub> = 3.0 V, FOUT pin CL = 15 pF, CHGEN = 0b, INIEN = 1b	-40 ~ +85	2.0	3.0	µA
		-40 ~ +105	2.0	3.5	

## ■ Frequency characteristics

Item	Grade	Symbol	Conditions	Min.	Typ.	Max.	Unit
Frequency tolerance	A	Δ f / f	Ta = +25 °C V <sub>DD</sub> = 3.0 V	-11.5	-	+11.5	× 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

# 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.

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.

## WORKING FOR HIGH QUALITY

In order to provide high quality and reliable products and services that meet customer needs, Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

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

### ► Explanation of the mark that are using it for the catalog

	► 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.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc.).

NOTICE : PLEASE READ CAREFULLY BELOW BEFORE THE USE OF THIS DOCUMENT ©Seiko Epson Corporation 2020

1. The content of this document is subject to change without notice. Before purchasing or using Epson products, please contact with sales representative of Seiko Epson Corporation ("Epson") for the latest information and be always sure to check the latest information published on Epson's official web sites and resources.
2. This document may not be copied, reproduced, or used for any other purposes, in whole or in part, without Epson's prior consent.
3. Information provided in this document including, but not limited to application circuits, programs and usage, is for reference purpose only. Epson makes no guarantees against any infringements or damages to any third parties' intellectual property rights or any other rights resulting from the information. This document does not grant you any licenses, any intellectual property rights or any other rights with respect to Epson products owned by Epson or any third parties.
4. Using Epson products, you shall be responsible for safe design in your products; that is, your hardware, software, and/or systems shall be designed enough to prevent any critical harm or damages to life, health or property, even if any malfunction or failure might be caused by Epson products. In designing your products with Epson products, please be sure to check and comply with the latest information regarding Epson products (including, but not limited to this document, specifications, data sheets, manuals, and Epson's web site). Using technical contents such as product data, graphic and chart, and technical information, including programs, algorithms and application circuit examples under this document, you shall evaluate your products thoroughly both in stand-alone basis and within your overall systems. You shall be solely responsible for deciding whether to adopt/use Epson products with your products.
5. Epson has prepared this document carefully to be accurate and dependable, but Epson does not guarantee that the information is always accurate and complete. Epson assumes no responsibility for any damages you incurred due to any misinformation in this document.
6. No dismantling, analysis, reverse engineering, modification, alteration, adaptation, reproduction, etc., of Epson products is allowed.
7. Epson products have been designed, developed and manufactured to be used in general electronic applications and specifically designated applications ("Anticipated Purpose"). Epson products are NOT intended for any use beyond the Anticipated Purpose that requires particular quality or extremely high reliability in order to refrain from causing any malfunction or failure leading to critical harm to life and health, serious property damage, or severe impact on society, including, but not limited to listed below ("Specific Purpose"). Therefore, you are strongly advised to use Epson products only for the Anticipated Purpose. Should you desire to purchase and use Epson products for Specific Purpose, Epson makes no warranty and disclaims with respect to Epson products, whether express or implied, including without limitation any implied warranty of merchantability or fitness for any Specific Purpose. Please be sure to contact our sales representative in advance, if you desire Epson products for Specific Purpose:  
Space equipment (artificial satellites, rockets, etc.) / Transportation vehicles and their control equipment (automobiles, aircraft, trains, ships, etc.) / Medical equipment/ Relay equipment to be placed on sea floor/ Power station control equipment / Disaster or crime prevention equipment/Traffic control equipment/ Financial equipment  
Other applications requiring similar levels of reliability as the above
8. Epson products listed in this document and our associated technologies shall not be used in any equipment or systems that laws and regulations in Japan or any other countries prohibit to manufacture, use or sell. Furthermore, Epson products and our associated technologies shall not be used for the purposes of military weapons development (e.g. mass destruction weapons), military use, or any other military applications. If exporting Epson products or our associated technologies, please be sure to comply with the Foreign Exchange and Foreign Trade Control Act in Japan, Export Administration Regulations in the U.S.A (EAR) and other export-related laws and regulations in Japan and any other countries and to follow their required procedures.
9. Epson assumes no responsibility for any damages (whether direct or indirect) caused by or in relation with your non-compliance with the terms and conditions in this document or for any damages (whether direct or indirect) incurred by any third party that you give, transfer or assign Epson products.
10. For more details or other concerns about this document, please contact our sales representative.
11. Company names and product names listed in this document are trademarks or registered trademarks of their respective companies.