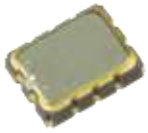
REAL TIME CLOCK MODULE (SPI-Bus)

Time stamp function and Low current consumption

RX4111CE

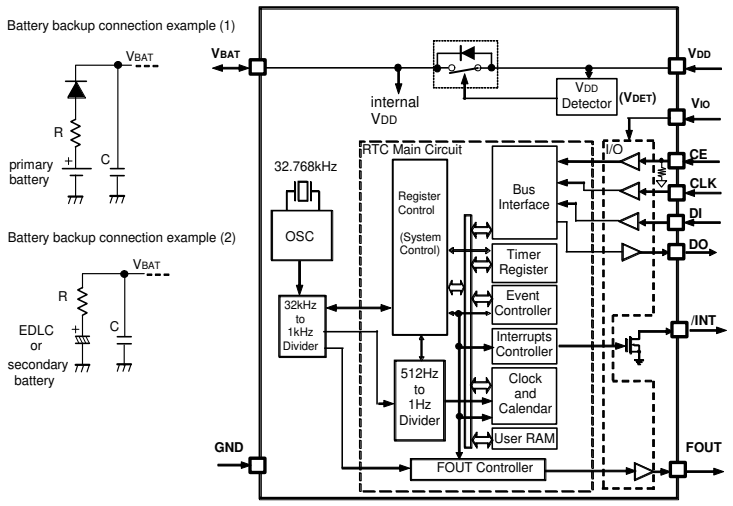
Product Number (2,000 pcs / Reel)
RX4111CE (A grade): X1B000431000115
RX4111CE (B grade): X1B000431000215

- Built in frequency adjusted 32.768 kHz crystal unit
- Operating Temperature : -40 °C to +105 °C
- 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 VDD 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_{BAT} low, V_{DD} low



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

Block diagram



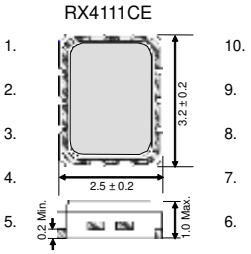
Overview

- Interface type
  SPI-Bus interface (4 wire, 1 MHz)
- Auto power switch function
  The V_{DD} 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 self-monitoring and SPI command
- Alarm function
  It is possible program from year to second
- Self-monitoring interruption
  Crystal oscillation stop, VBAT low, VDD low

Pin Functin

Signal Name	I / O	Function
CE	Input	Chip enables input pin
CLK	Input	Serial clock input pin
DI	Input	Data input pin
DO	Output	Data output pin
FOUT	Output	Frequency output (CMOS) (frequency selection: 32.768 kHz, 1024 Hz, 1 Hz)
/INT	Open-Drain Output	Interrupts output by Alarm and Timer events. (N-ch. open drain)
VDD	–	Power supply pin Possible to supply different voltage from VIO
VIO	–	Interface power supply pin Input to supply the voltage same as a host
VBAT	–	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	VBAT
3	DI
4	FOUT
5	CLK
6	DO
7	CE
8	VIO
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	VDD	-	1.6	3.0	5.5	V
Clock supply voltage	VCLK	-	1.1	3.0	5.5	V
Operating temperature	Ta	-	-40	+25	+105	°C
VDD detect voltage	-VDET1	VDD, Fall	1.20	1.40	1.60	V

■ Frequency characteristics

Item	Grade	Symbol	Conditions	Min.	Typ.	Max.	Unit
Frequency tolerance	A	Δ f / f	Ta = +25 °C VDD = 3.0 V	-11.5	-	+11.5	× 10⁻⁶
	B			-23	-	+23	
Oscillation start-up time		tSTA	VDD = 2.75 V to 5.5 V	-	0.3	1.0	s

Current consumption characteristics Ta = -40 °C to +105 °C

Symbol	Conditions	Ta (°C)	Typ.	Max.	Unit
IDD	Input pins = "L", FOUT = OFF, /INT = OFF, VDD = VIO = 3.0 V, CHGEN = 0b, INIEN = 0b,	-40 ~ +85	100	450	nA
		-40 ~ +105	100	1000	
I32k	Input pins = "L", FOUT = 32.768 kHz, /INT = OFF, VDD = VIO = 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	

Downloaded from Arrow.com.

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 provide high quality and reliable products and services than 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.

Downloaded from Arrow.com.