

RTC Module Wakeup timer function

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Wakeup timer function

Epson's 3.2 mm x 2.5 mm RTC module has a wake-up timer function.

A wide range of period settings are possible, from less than 1 second to long periods.

The video with commentary



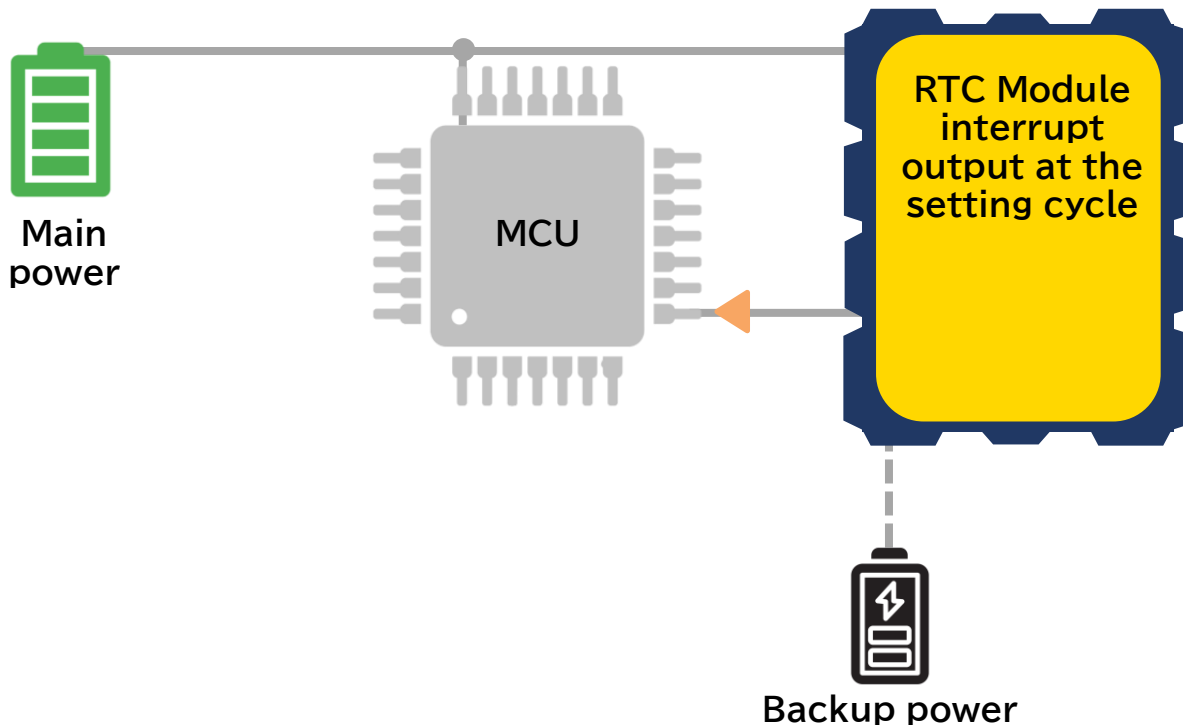
Features	RX8901CE	RX4901CE	RA8000CE	RA4000CE	RX8804CE RA8804CE	RX8900CE RA8900CE	RX8111CE	RX4111CE	RX8130CE
Wakeup timer interrupt period Min.	976 μ s	976 μ s	976 μ s	976 μ s	244.14 μ s	244.14 μ s	244.14 μ s	244.14 μ s	244.14 μ s
Wakeup timer interrupt period Max.	32 years	32 years	32 years	32 years	32 years	4095 min. 2.8 days	32 years	32 years	7.5 years
Backup mode current Typ. / 3 V	240 nA	240 nA	350 nA	350 nA	350 nA	700 nA	100 nA	100 nA	300 nA

An interrupt can be output to an MCU in sleep mode at set intervals, which can be used to wake-up MCU.

The current consumption during backup mode is the typical value when the power supply voltage is 3V, time keeping can be continued, and current consumption is the lowest.

Wakeup timer function

Targeted products
RTC modules in a 3.2 x 2.5 mm package size



The RTC module outputs an interrupt to the MCU at setting cycle

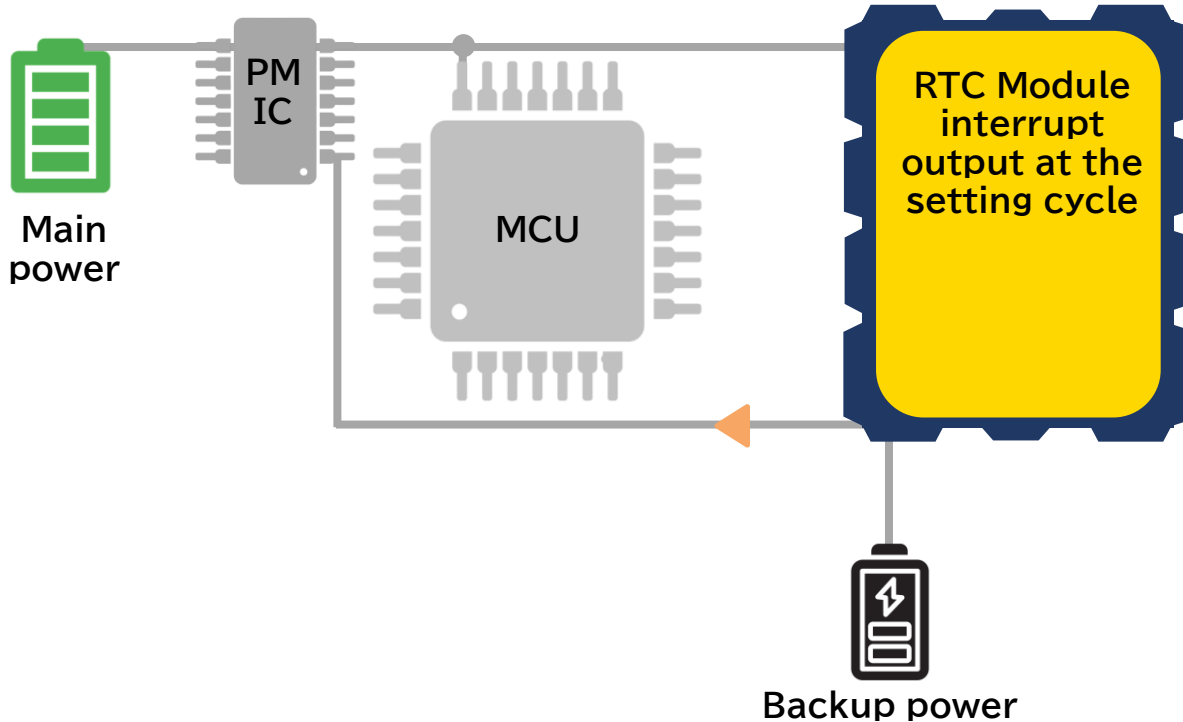
When the system does not need to operate, the MCU is in sleep mode

When the system needs to operate, the RTC can send an interrupt output signal to wake-up the MCU from a low-power sleep mode.

Periodic intermittent operation is possible

Wakeup timer function

Targeted products with Power switching function
RX8901CE / RX8111CE / RX8130CE / RX8900CE
RX4901CE / RX4111CE / RA8900CE



When the system is not required to operate, the main power from the PMIC to the MCU and RTC module is turned off, and RTC module operate with low power consumption using the backup power

Even in backup mode, interrupts can be output at set intervals

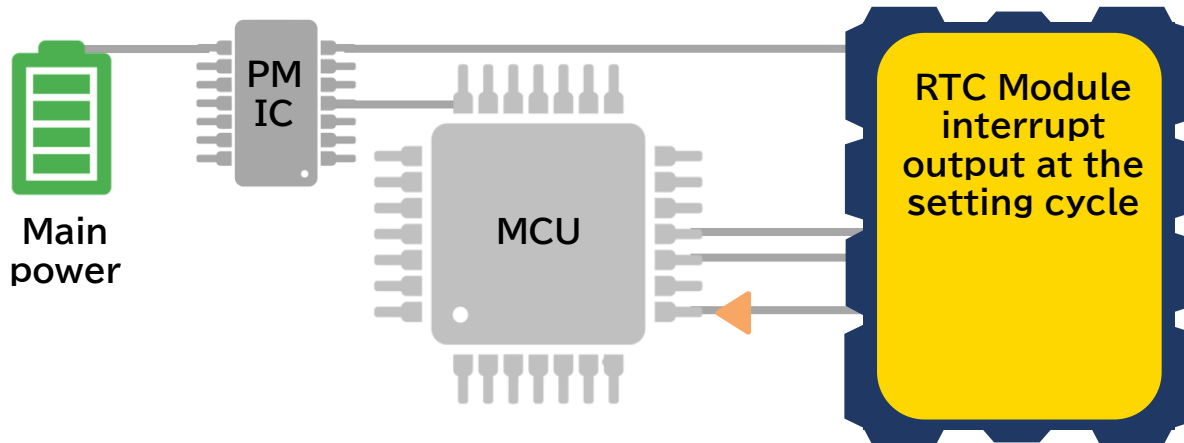
Periodic intermittent operation is possible

Wakeup timer function

Targeted products without Power switching function

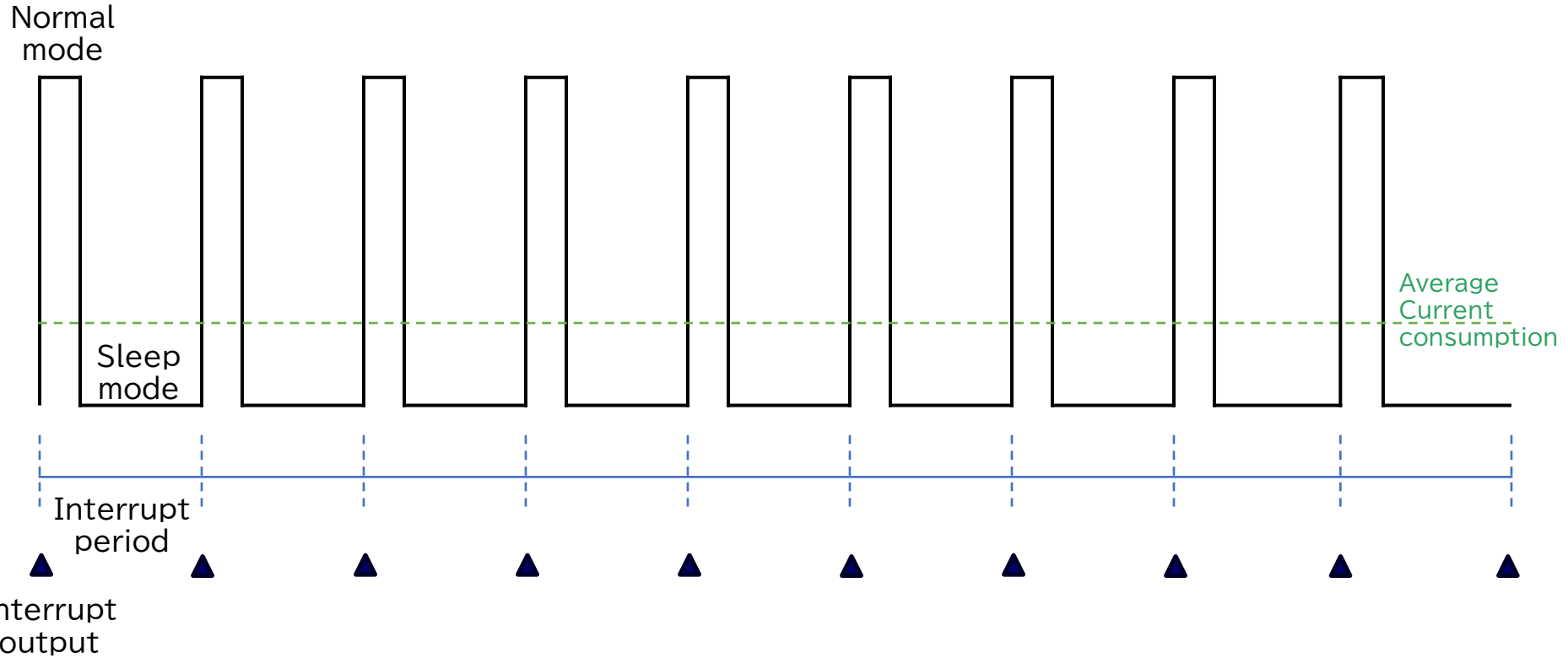
RA8000CE / RX8804CE

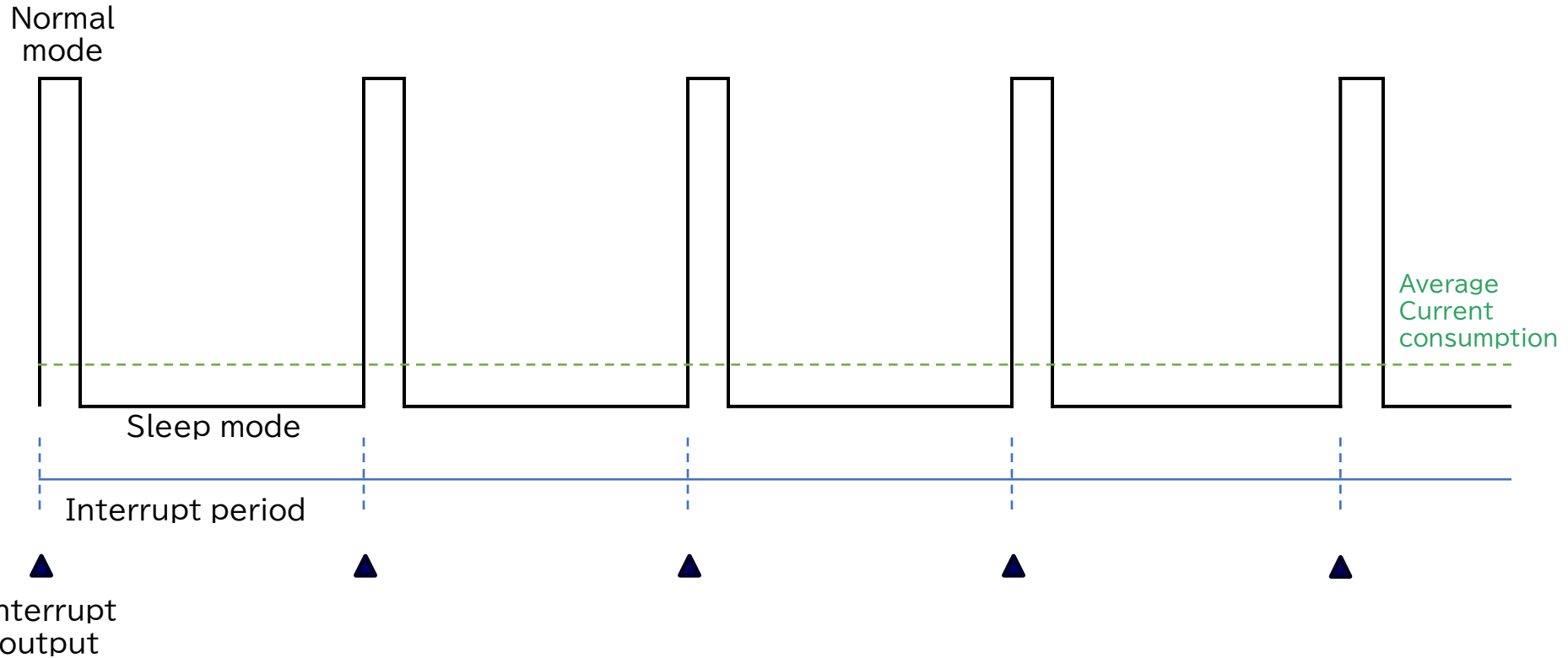
RA4000CE / RA8804CE



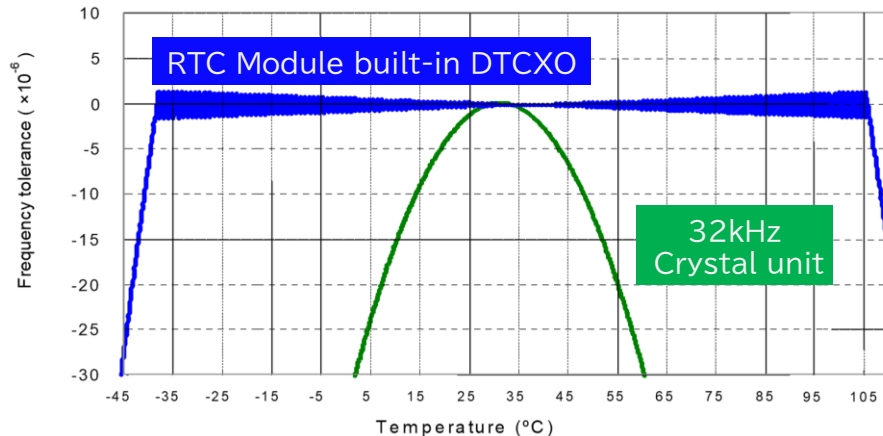
Even without power switching function, RTC module operates with low current consumption

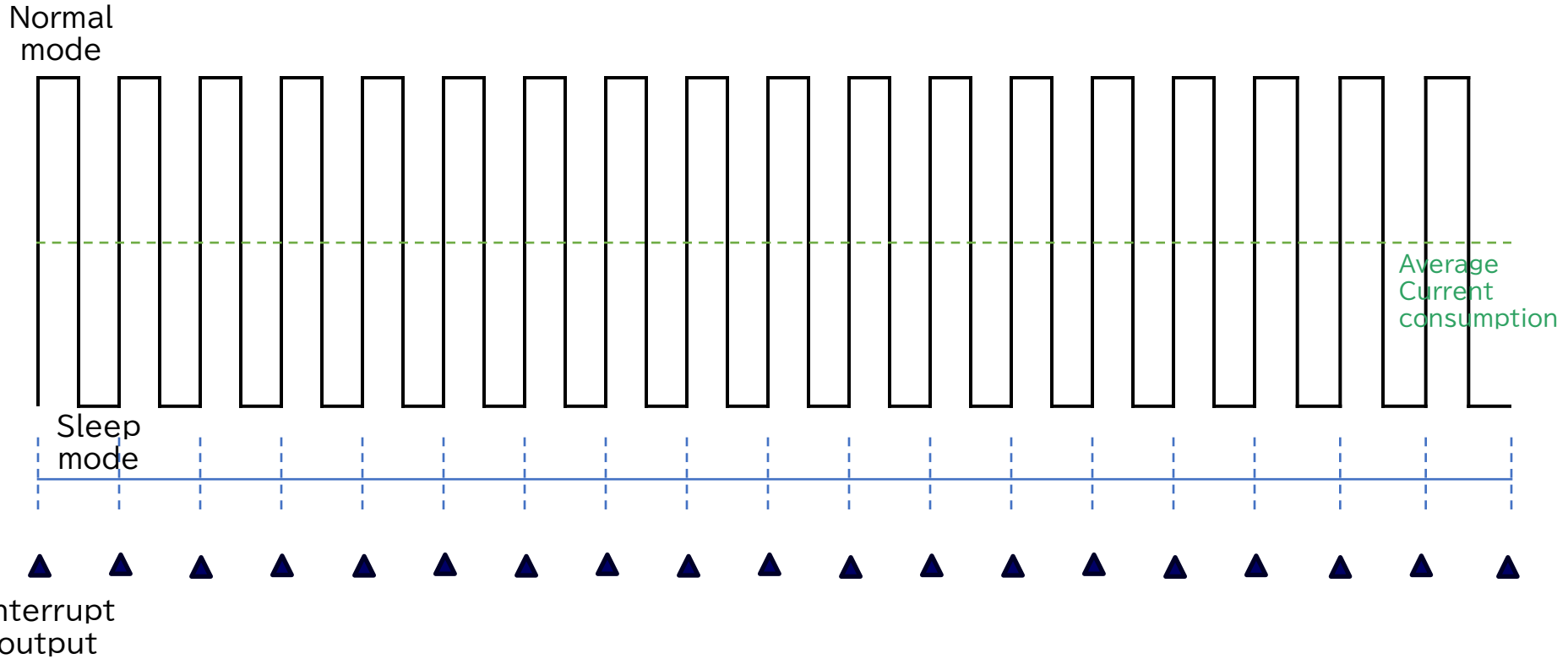
RTC Module can output interrupts at setting cycle





Crystal Devices (ambient temperature)	Frequency tolerance [$\times 10^{-6}$]	Time shifts relative to elapsed time [sec.]					
		1 h	2 h	5 h	6 h	12 h	24 h
RX8901CE XS (-40 °C to +85 °C)	± 3.0	-0.01	-0.02	-0.05	-0.06	-0.13	-0.26
RX8901CE XB (-40 °C to +85 °C)	± 5.0	-0.02	-0.04	-0.09	-0.11	-0.22	-0.43
32kHz Crystal Unit (+25°C)	± 36.0	-0.13	-0.26	-0.65	-0.78	-1.56	-3.11
32kHz Crystal Unit (+50°C)	-57.9	-0.21	-0.42	-1.04	-1.25	-2.50	-5.00
32kHz Crystal Uinit (+85°C)	-162.0	-0.58	-1.17	-2.92	-3.50	-7.00	-14.00





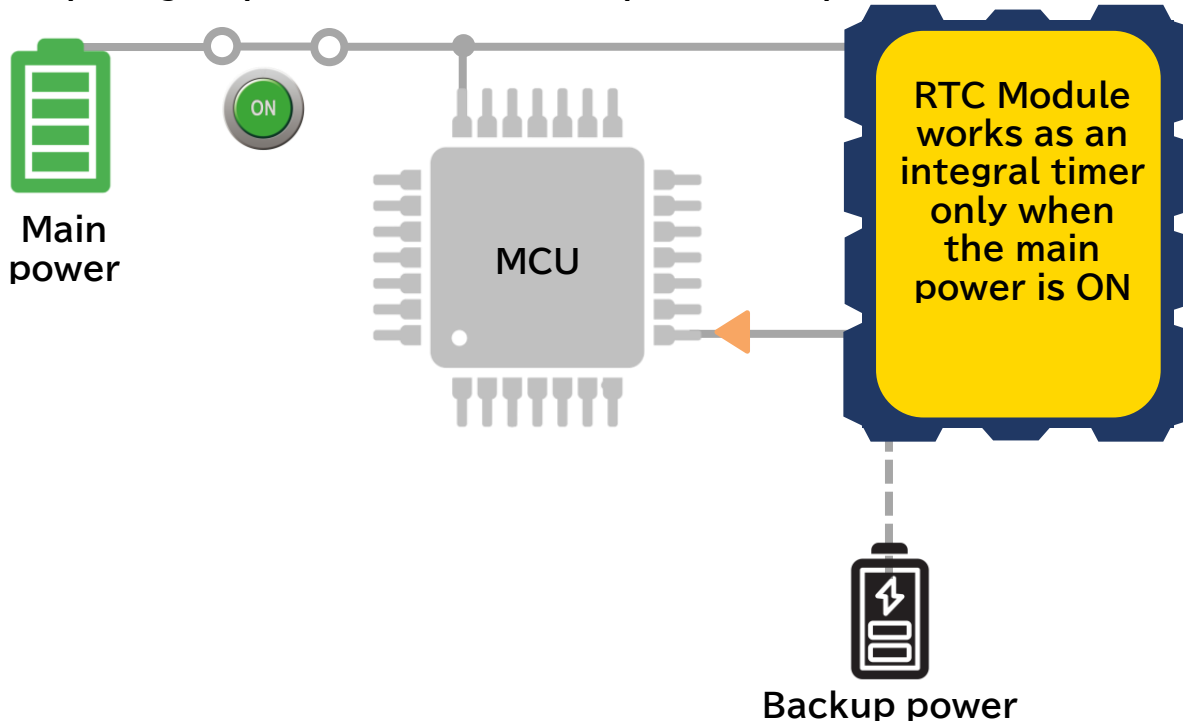
Integrating timer

Targeted products with Power switching function

RX8901CE / RX8111CE / RX8130CE

RX4901CE / RX4111CE

Depending on the equipment or facility, there is a set service life, and there are regulations requiring disposal after a certain period of operation

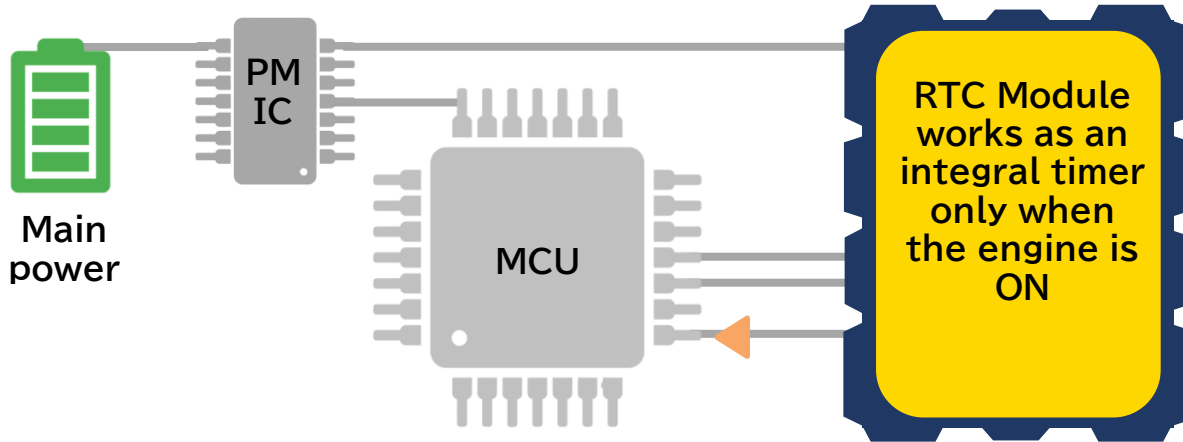


RTC module can count time only when the main power is on, i.e., when the device is operating in normal mode

An interrupt output is possible when the accumulated operating time exceeds the limit, for example, when it reaches 20,000 hours

Integrating timer

RTC Module with Reset output function
RA8000CE
RA4000CE



RTC module:RA8000CE and RA4000CE, if the reset function is included, it can switch from normal mode to safe mode when the power supply voltage drops below a set voltage

By setting the RTC module's power supply voltage to be lower than a set voltage when the engine is off, it can operate as an integrator only with the engine on or only with the engine off

RTC Module comparison table

Package size 3.2 x 2.5 mm

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Item	RX8901CE	RX4901CE	RA8000CE	RA4000CE	RX8804CE RA8804CE	RX8900CE RA8900CE	RX8111CE	RX4111CE	RX8130CE
DTCXO	✓	✓	✓	✓	✓	✓	-	-	-
Interface	I ² C	SPI	I ² C	SPI	I ² C	I ² C	I ² C	SPI	I ² C
Operating Temperature Max.	+105 °C	+105 °C	+125 °C	+125 °C	+105 °C	+85 °C	+105 °C	+105 °C	+85 °C
Backup current Typ. / 3 V	240 nA	240 nA	350 nA	350 nA	350 nA	700 nA	100 nA	100 nA	300 nA
Time stamp	32 times (Max.)	32 times (Max.)	2 times	2 times	1 time	-	8 times	8 times	-
EVIN pin	2 or 3 pin	0 or 1 or 2 pin	0 or 1 or 2 pin	0 or 1 or 2 pin	1 pin	-	1 pin	-	-
Power switching	✓	✓	-	-	-	✓ *Need external Diode for VBAT	✓	✓ *Need external Diode for VBAT	✓ Built-in backup battery charge control function
Reset output	-	-	✓ (optional)	✓ (optional)	-	-	-	-	✓
Automotive grade	-	-	Available	Available	Available RA8804CE	Available RA8900CE	-	-	-

Learn more about Epson's RTCs / Learn the basics of RTC modules, understand their main functions, and see application examples.

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