R20TS0225EJ0100
Rev.1.00
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[Notes]
Renesas Starter Kit for RX130, Renesas Starter Kit for RX220, Renesas Starter Kit for RX231, Renesas Starter Kit for RX231B, Renesas Starter Kit for RX630, Renesas Starter Kit+ for RX63N, Renesas Starter Kit+ for RX63N-256K, Renesas Starter Kit+ for RX64M, Renesas Starter Kit+ for RX71M, Renesas Starter Kit+ for RX65N

Outline

When using the products in the title, note the following point.

1. RTC Time Count Acquisition Function of Sample Projects
   (RTC: Real Time Clock)

1. RTC Time Count Acquisition Function of Sample Projects

1.1 List of Applicable Products

Product name	Sample project as attachments to the following application notes posted on the Web	Applicable sample project
Renesas Starter Kit for RX130 (Mounted MCU: R5F51305ADFN)	R01AN3124EJ0100 (CS+) R01AN3123EJ0100 (e^2 studio)	・Low_Power_Mode ・RTC ・System_Input_Capture
Renesas Starter Kit for RX220 (Mounted MCU: R5F52206BDFP)	R20AN0280EJ0100 (CS+) R01AN1792EG0100 (HEW)	・Power_Down ・RTC
Renesas Starter Kit for RX231 (Mounted MCU: R5F52318ADFP) Renesas Starter Kit for RX231B (Mounted MCU: R5F52318BDFP)	R01AN3138EG0200 (CS+) R01AN3137EG0200 (e^2 studio)	・Low_Power_Mode ・RTC ・System_Input_Capture
Renesas Starter Kit for RX630 (Mounted MCU: R5F5630EDDFP)	R20AN0276EJ0100 (CS+) R01AN1243EG0200 (e^2 studio) R01AN1242EG0100 (HEW)	・Power_Down ・RTC
Renesas Starter Kit+ for RX63N (Mounted MCU: R5F563NBDDFC)	R20AN0272EJ0100 (CS+) R01AN1395EG0100 (HEW) R01AN1396EG0100 (e^2 studio)	・Power_Down ・RTC
Renesas Starter Kit+ for RX63N-256K (Mounted MCU: R5F563NFDDFC)	R01AN2508EG0100 (CS+) (Japanese edition only) R01AN2507EG0100 (e^2 studio) (English edition only)	・Power_Down ・RTC
Renesas Starter Kit+ for RX64M (Mounted MCU: R5F564MLCDFC)	R01AN2219EG0100 (CS+) R01AN2218EG0100 (e^2 studio) (English edition only)	・Low_Power_Mode ・RTC ・System_Input_Capture
Renesas Starter Kit+ for RX71M (Mounted MCU: R5F571MLCDFC)	R01AN2515EG0100 (CS+) (English edition only) R01AN2514EG0100 (e^2 studio) (English edition only)	・Low_Power_Mode ・RTC ・System_Input_Capture
Renesas Starter Kit+ for RX65N (Mounted MCU: R5F565N9ADFB)	R01AN3500EJ0100 (CS+) R01AN3499EJ0100 (e^2 studio)	・Low_Power_Mode ・RTC ・System_Input_Capture

1.2 Details

For the RTC time count acquisition function of sample projects (RTC, System_Input_Capture, Low_Power_Mode, and Power_Down), the procedure for reading the RTC time count value differs from the procedure in "User's Manual: Hardware" of the applicable MCU (Figure 1).

For this reason, if you change a sample project so that the RTC time counter read processing is performed outside periodic interrupts, a carry interrupt occurs while the time is being read. This might cause an invalid value to be read. Therefore, the workaround described in section 1.3 must be performed to make the procedure the same as the time read procedure described in "User's Manual: Hardware" of the applicable MCU.

Note that a sample project reads the RTC time counter in synchronization with RTC periodic interrupts. A carry occurs before an RTC periodic interrupt, and does not occur while the time is being read. Therefore, if you use the RTC time counter read processing of a sample project without changes, there is no problem because invalid values will not be read.

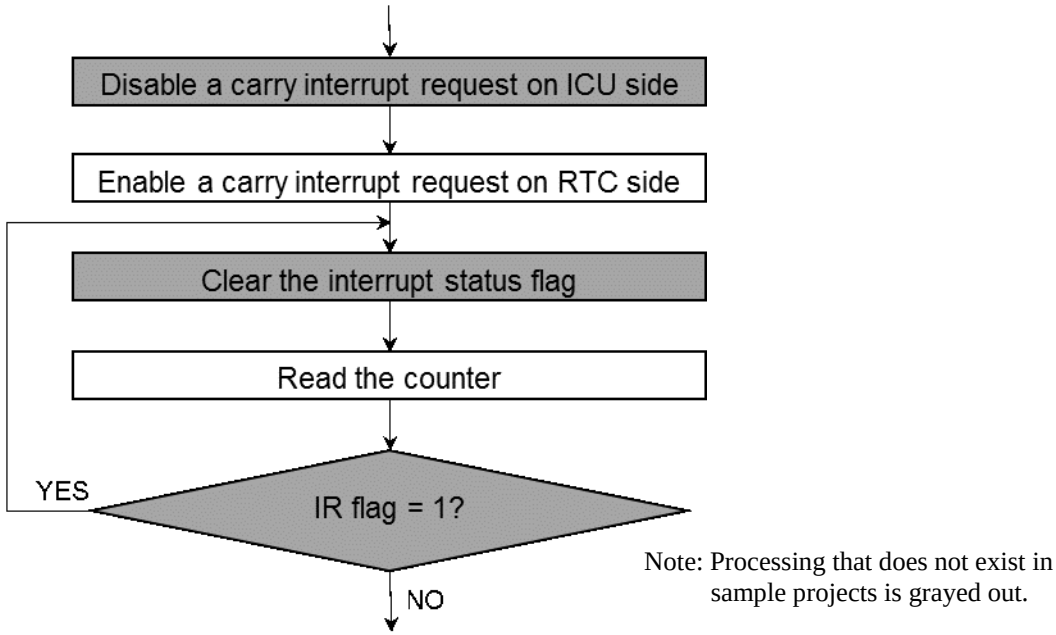

Figure 1: Flowchart of RTC Time Counter Read Processing

1.3 Workaround

1.3.1 For products that support code generation

- Applicable products
  - Renesas Starter Kit for RX130
  - Renesas Starter Kit for RX231
  - Renesas Starter Kit for RX231B
  - Renesas Starter Kit+ for RX64M
  - Renesas Starter Kit+ for RX71M
  - Renesas Starter Kit+ for RX65N

When code generation is performed according to the following procedure, the procedure in question becomes the same as the processing described in the flowchart in Figure 1, including grayed out sections. The following shows an example of how to set the RTC sample project of RX231.

(1) In [Code Generator (Design Tool)], open [Realtime Clock] (Figure 2). Then, select the [Setting] tab from [Peripheral Functions].

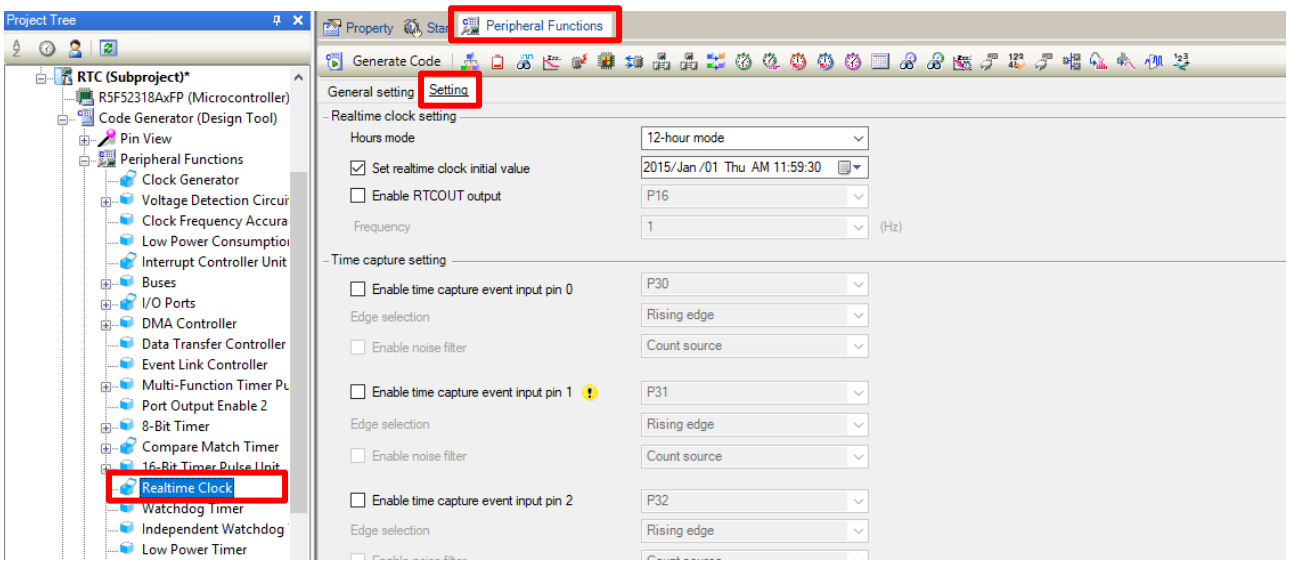

Figure 2: Realtime Clock Setting Window

(2) In [Carry interrupt setting] (Figure 3) at the lower part of the [Setting] tab, select the [Enable carry interrupt (CUP)] check box, and then select [Level 0 (disabled)] for [Priority].

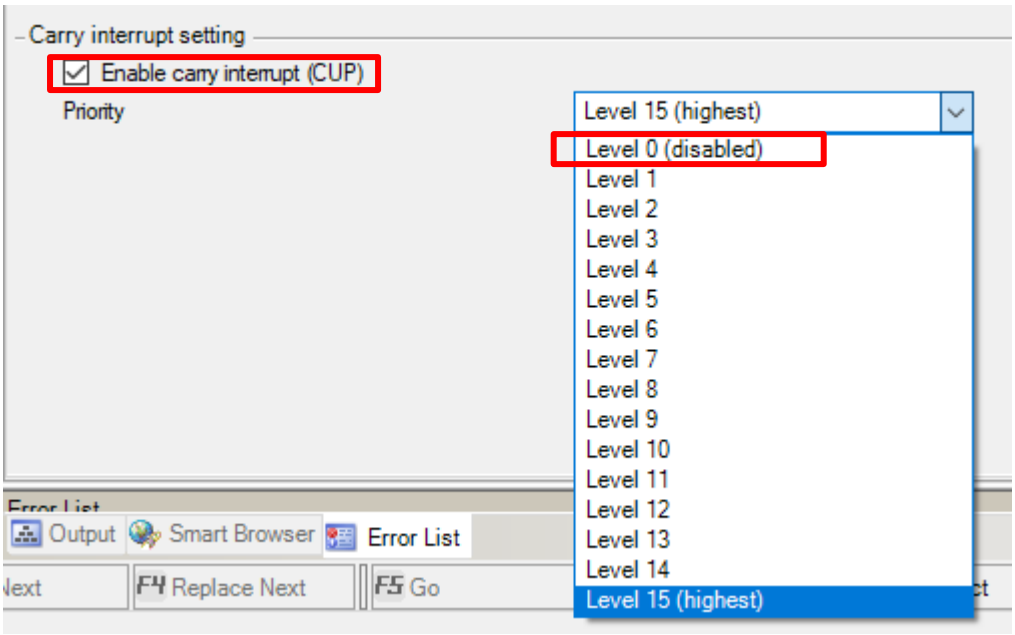

Figure 3: Carry Interrupt Setting

(3) After the settings are changed in steps (1) and (2), click the [Generate Code] button to generate code.

1.3.2 For products that do not support code generation

- Applicable products
  - Renesas Starter Kit for RX220

Add the text in red to the file shown in "Source file to add processing" in Table 1.

Table 1: Sample Projects and Source File to Add Processing

Sample project	Source file to add processing
· RTC · Power_Down	rtc.c

■ Changes in Excep_RTC_SLEEP_isr

```
void Excep_RTC_SLEEP_isr (void)
{
     /* Turn on LED0 to indicate CPU activity */
     LED0 = LED_ON;
     RTC.RCR1.BYTE |= 0x02;
     do
     {
           IR(RTC,CUP) = 0U;
           /* Read the time and status flags */
           /* Read the seconds count register */
           time_data  = (uint32_t)(RTC.RSECCNT.BYTE & 0x0000007Fu);

           /* Read the minutes count register */
           time_data |= (RTC.RMINCNT.BYTE & 0x0000007Fu) << 8u;

           /* Read the hours count register */
           time_data |= (RTC.RHRCNT.BYTE  & 0x0000003Fu) << 16u;
     } while(IR(RTC,CUP) == 1U);
     RTC.RCR1.BYTE &= 0xFD;

    /* Convert the data to string & display on the LCD */
    uint32_to_bcd_string(lcd_buffer, 0, time_data);
.......The rest is omitted.............
```

➢ Applicable products
- Renesas Starter Kit for RX630
- Renesas Starter Kit+ for RX63N
- Renesas Starter Kit+ for RX63N-256K

Add the text in red to the file shown in "Source file to add processing" in Table 2.

Table 2: Sample Projects and Source File to Add Processing

Sample project	Source file to add processing
· RTC · Power_Down	rtc.c

■ Changes in Excep_RTC_SLEEP

```
 void Excep_RTC_SLEEP(void)
 {
      /* Turn on LED0 to indicate CPU activity */
      LED0 = LED_ON;
      RTC.RCR1.BYTE |= 0x02;
      do
      {
            IR(RTC,CUP) = 0U;
            /* Read the time and status flags */
            time_data  = (RTC.RSECCNT.BYTE & 0x0000007F);
            time_data |= (RTC.RMINCNT.BYTE & 0x0000007F) << 8;
            time_data |= (RTC.RHRCNT.BYTE  & 0x0000003F) << 16;
      } while(IR(RTC,CUP) == 1U);
      RTC.RCR1.BYTE &= 0xFD;

      /* Skip processing the day of the week */
      time_data &= 0x00FFFFFF;
.....The rest is omitted.............
```

1.4 Schedule for Fixing the Problem

We do not plan to update the sample projects.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Nov. 16, 2017	-	First edition issued

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