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Renesas Electronics Corporation

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1. Abstract

This document describes the procedure for rewriting the real-time clock time data registers.

2. Introduction

The application example described in this document applies to the following microcomputer (MCU):

- MCU: M16C/63 Group

This application note can be used with other M16C Family MCUs which have the same special function registers (SFRs) as the above group. Check the hardware manual for any modifications to functions. Careful evaluation is recommended before using the program described in this application note.
3. Procedure for Rewriting the Time Data Registers for the Real-Time Clock

When rewriting the real-time clock data registers, make sure that the RSTADJ bit in the TRHIFR register is set to 1 (TRHSEC register becomes 00 and the internal counter is initialized).

Steps (1) to (7) describe how to rewrite the real-time clock time data registers.

1. Confirm that the BSY bit in the TRHSEC register is 0 (not while data is updated).
2. Set the RUN bit in the TRHCR register to 0 (count stopped).
3. Wait at least three cycles of the sub clock.
4. Read the BSY bit in the TRHSEC register.
   - When the bit is 0 (not while data is updated), move on to step (5).
   - When the bit is 1 (while data is updated), set the RUN bit in the TRHCR register to 1 (count started), and return to step (1).
5. Set the RSTADJ bit in the TRHIFR register to 1 to reset the second counter.
6. Wait at least four cycles of the sub clock.
7. Rewrite the time data.

Figure 3.1 shows the flowchart of Procedure for Rewriting the Time Data Registers for the Real-Time Clock.
**Figure 3.1 Procedure for Rewriting the Time Data Registers for the Real-Time Clock**

1. **BSY bit in TRHSEC register** = 0
   - 1 (updating data)
   - 0 (not updating data)

2. **RUN bit in TRHCR register** ← 0
   - Stop real-time clock operation
   - (not necessary when count is stopped).

3. **Wait three cycles of the sub clock**

4. **BSY bit in TRHSEC register** = 0
   - 1 (updating data)
   - 0 (not updating data)
   - **RUN bit in TRHCR register** ← 1
   - Start real-time clock operation.

5. **RSTADJ bit in TRHIFR register** ← 1
   - Reset second counter.

6. **Wait four cycles of the sub clock**

   - **RTCTIC register** ← 00h
   - **RTCCIC register** ← 00h

   - **Disable real-time clock periodic interrupt.**
   - **Disable real-time clock alarm interrupt.**

   - **Setting of TRHCSR register**
     - Select clock source.

   - **Setting of HR24 bit in TRHCR register**
     - Set 12-hour/24-hour operating mode.

   - **PROTECT bit in TRHPRC register** ← 1
     - Enable time and day change.

   - **Setting of registers TRHSEC, TRHMIN, TRHHR, TRHWK, TRHDY, TRHMON and TRHYR**
     - Set second, minute, hour, day of the week, date, month, and year.

7. **Setting of PM bit in TRHCR register**
   - Set a.m./p.m.

   - **PROTECT bit in TRHPRC register** ← 0
     - Disable time and day change.

   - **Setting of TRHIER register**
     - Select interrupt source.

   - **Setting of registers RTCTIC and RTCCIC**
     - (IR bit ← 0, select interrupt priority level)

   - **RUN bit in TRHCR register** ← 1
     - Start real-time clock operation.

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**M16C/63 Group**

**Procedure for Rewriting Time Data Registers for the Real-Time**

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4. Reference Documents

Hardware Manual
M16C/63 Group Hardware Manual Rev.1.00.
The latest version can be downloaded from the Renesas Technology website.

Technical Update/Technical News
The latest information can be downloaded from the Renesas Technology website.

C Compiler Manual
C compiler package V.5.45 for M16C Series and R8C Family.
C compiler user’s Manual Rev.1.00.
The latest information can be downloaded from the Renesas Technology website.
Procedure for Rewriting Time Data Registers for the Real-Time Clock

**Revision History**

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