

[Notification]

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Automatic Insertion of Synchronization Processing

to Reduce Man-hours for Development of RH850 Family!

Synchronization Features in the Updating of Control Registers of Renesas Compiler Professional Edition

Outline

This document introduces one of the features of the Renesas Compiler professional edition: Synchronization Features in the Updating of Control Register. (Supported compiler: CC-RH V1.06.00 or later)

This feature enables you to automatically insert synchronization processing as required when updating multiple control registers successively, and make the order of control registers match to the source file.

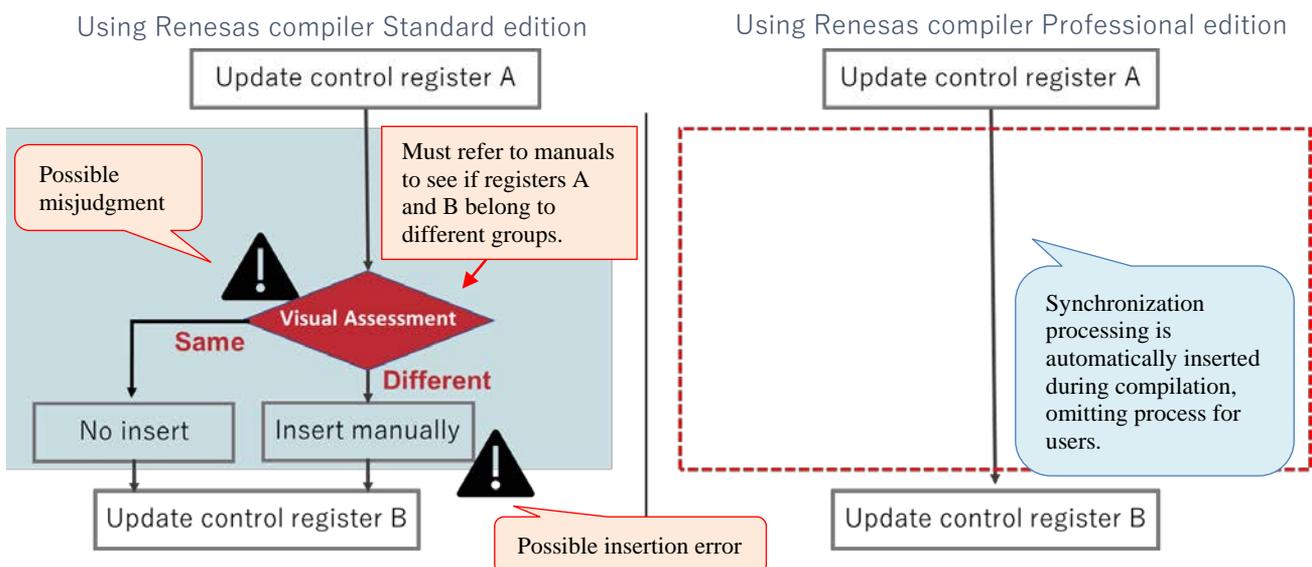
1. Features

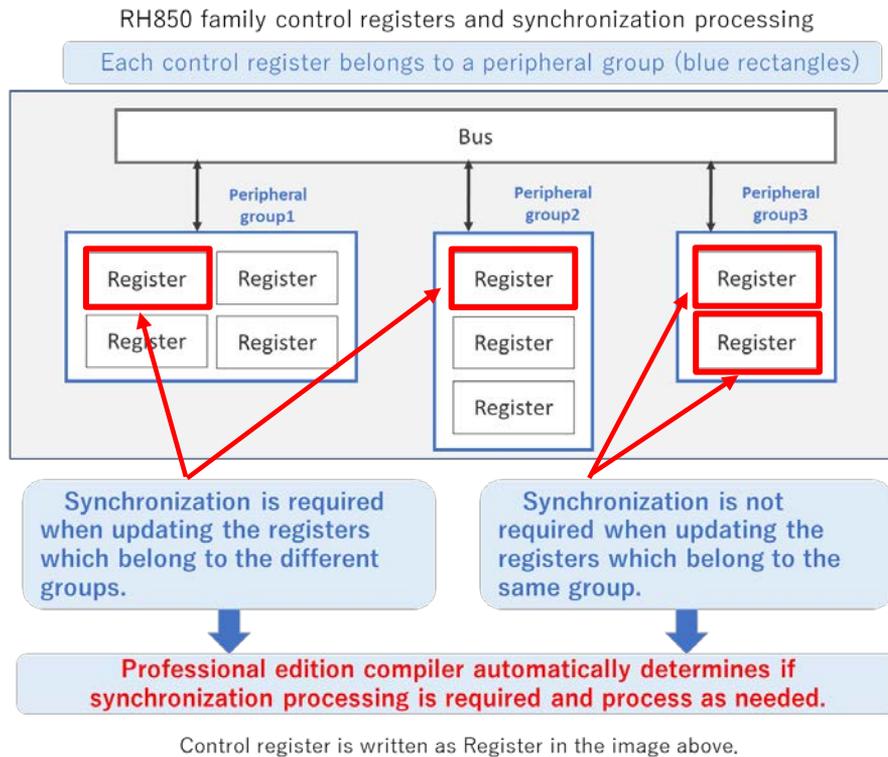
1.1 Reduces Man-Hours for Program Development and Improves Quality of Program

When control registers of RH850 are successively updated, the order of the control registers may not match the one that is written in the source file. To make the order match, the users determine if insertion of synchronization processing is required, and manually insert code as needed. If the control registers are in the same peripheral group, synchronization processing is not required as the order is guaranteed.

Renesas compiler professional edition can detect writing to control registers and automatically insert the synchronization processing to make the order match the source file, as well as output the information as messages. This reduces the load on the users when updating multiple control registers. It also prevents human errors such as misjudgment and insertion errors. The following flowchart shows performance improvement when control registers are successively updated.

Example of updating control registers A and B successively





## 2. Application Example

Here is an example of processing the updating for three different types of register using synchronization processing.

Example of the source program

```
void main(void)
{
    PORT0.PCR00_0.UINT32 = 0x1;
    SDMAC0.DMA0CHFCR_1.UINT32 = 0x00001C01;
    SDMAC0.DMA0CHFCR_0.UINT32 = 0x0000320F;
}
```

### ① Automatic Insertion! When the option for the insertion of synchronization processing (-store\_reg=sync) is specified

Inserting the synchronization process automatically to the output code as shown in the image below.

Register **PORT0.PCR00\_0.UINT32** belongs to **PGROUP\_6**.

Register **SDMAC0.DMA0CHFCR\_1.UINT32** belongs to **PGROUP\_0**.

Register **SDMAC0.DMA0CHFCR\_0.UINT32** belongs to **PGROUP\_0**.

```
void main(void)
movhi 0xff81, r0, r2
mov 0x1, tp
{
    PORT0.PCR00_0.UINT32 = 0x1;
    st.w tp, 0x2000[r2]
    ld.w 0x2000[r2], r2
    syncp
    SDMAC0.DMA0CHFCR_1.UINT32 = 0x00001C01;
    movhi 0xff9, r0, r2
    movea 0x1c01, r0, tp
    st.w tp, 0x209c[r2]
    movea 0x320f, r0, tp
    SDMAC0.DMA0CHFCR_0.UINT32 = 0x0000320F;
    st.w tp, 0x201c[r2]
    ld.w 0x201c[r2], r2
    syncp
    jmp [lp]
```

When writing from a different group (from PGROUP\_6 to PGROUP\_0) synchronization processing is automatically inserted.

When writing from the same group (PGROUP\_0) synchronization processing is not inserted.

Figure 2-1 Example of when -store\_reg=sync is specified

② **Displays only the required processing! When the option of outputting control registers write instructions list (-store\_reg=list) is specified**

When users insert the synchronization process manually, the groups which each control register belong to are displayed as a message in the output panel, only when updating for the different peripheral groups. The users can use the output message in inserting synchronization processing.

③ **Displays All! When the option of outputting control registers write instructions list (-store\_reg=list\_all) is specified**

When users insert the synchronization process manually, all groups which registers belong to are displayed as a message in the output panel. The users can use the output message in inserting synchronization processing. The message makes it easy for the users to determine if synchronization is required.

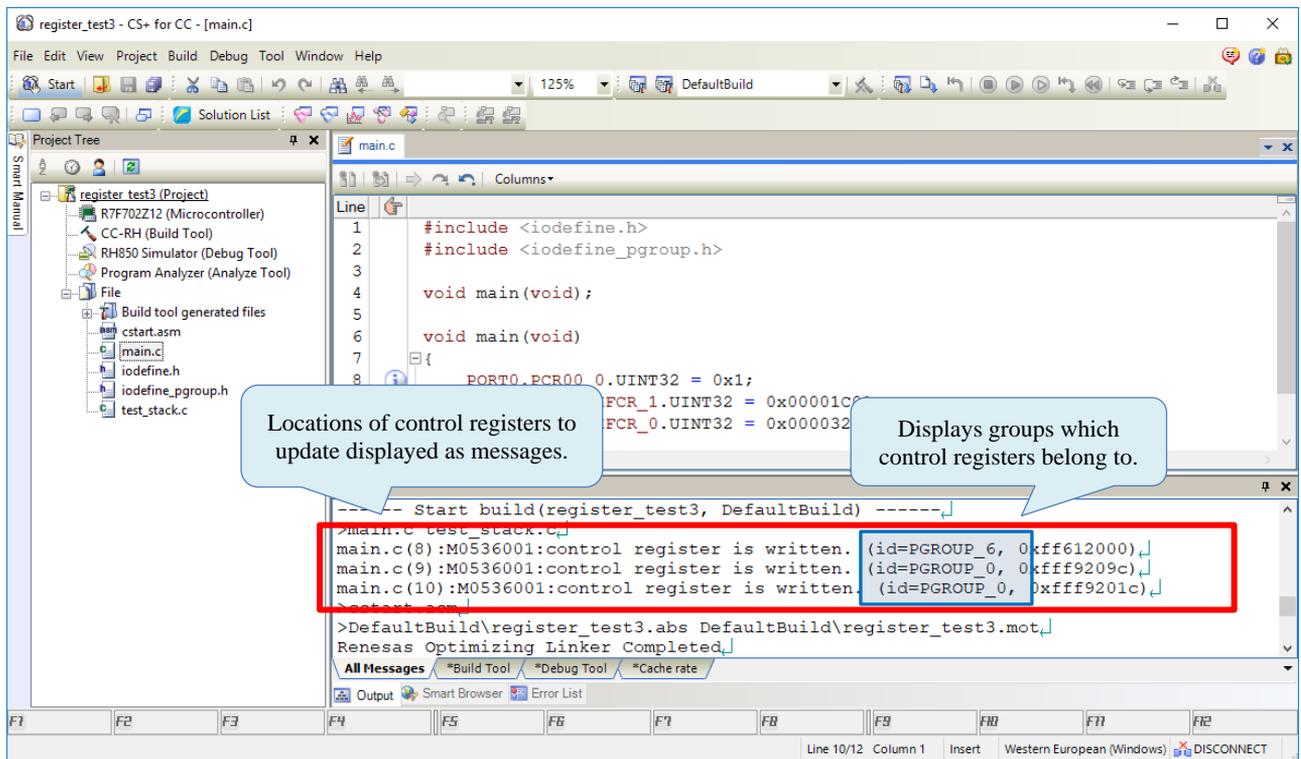


Figure 2-2 Example of when -store\_reg=list\_all is specified

### 3. More Features of Professional Edition

➤ MISRA-C Rule Checking Feature

This function is featured in the Tool News below.  
Learn more about this function in the following URL:

<https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0342>

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Perform MISRA-C Rule Check During Compilation to Reduce Man-hours and Improve Quality of Program Development!

MISRA-C Rule Checking Feature of Renesas Compiler Professional Edition

➤ Other Useful Features

Renesas Compiler professional edition provides additional features such as:

Detection of Stack Smashing, Detection of Illicit Indirect Function Calls

Enhanced Security for Dynamic Memory Management Functions, Half-precision Floating Point

For details, refer to the following leaflet

<https://www.renesas.com/search/keyword-search.html#genre=document&q=r20pf0024>

For details on the features of Renesas Compiler professional edition, refer to the following Application Note:

<https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ut4026>

In addition to Synchronization Features in the updating of control registers, the application note introduces more features which improve the quality of your programs and shorten development period. There is also an example of the C source code that can be copied and pasted to try out instantly.

### 4. How to Purchase the Product

To order products, contact your local Renesas Sales office or distributor.

If you have a node-locked license for a standard edition, you can upgrade your compiler from standard to professional edition by additionally purchasing an upgrade (edition) license. For orderable part number, refer to the following web page for the compiler packages.

CC-RL: [https://www.renesas.com/rl78\\_c](https://www.renesas.com/rl78_c)

CC-RX: [https://www.renesas.com/rx\\_c](https://www.renesas.com/rx_c)

CC-RH: [https://www.renesas.com/rh850\\_c](https://www.renesas.com/rh850_c)

**Revision History**

Rev.	Date	Description	
		Page	Summary
1.00	Oct. 16, 2018	-	First edition issued

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