[Notes]
C Compiler Package for RH850 Family

R20TS0251EJ0100
Rev.1.00
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Outline

When using the CC-RH C compiler package for the RH850 family, note the following point.

1. Loop statements with loop-control variables in which constants are used as the condition for ending the loop (No.18)

Note: The number which follows the description of a precautionary note is an identifying number for the precaution.

1. Loop Statements with Loop-Control Variables in Which Constants are Used as the Condition for Ending the Loop (No.18)

1.1 Applicable Products

CC-RH V1.00.00 to V1.06.00

1.2 Details

If any of the following items exists in a loop with a loop-control variable in which an integer constant is used as the condition for ending the loop, the loop repeat count may be incorrect.

- Multiplication expression with a loop-control variable and integer constant
- Loop induction variable whose incremental value is an integer multiple of the incremental value of a loop-control variable

1.3 Conditions

This problem may arise if all of the conditions from (1) to (5) are met.

(1) The -Osize or -Ospeed option is specified.

(2) A loop with a loop-control variable(Note 1) exists, and the condition for ending the loop is a comparison between the loop-control variable and an integer constant(Note 2).

(3) Either (3-1) or (3-2) exists in the loop of (2).

(3-1) Multiplication expression that contains the loop-control variable and integer constant(Note 2) of (2) as the operands

(3-2) Loop induction variable(Note 1) whose incremental value is an integer multiple(Note 3) of the incremental value of the loop-control variable of (2)

(4) The loop of (2) does not contain a loop induction variable whose incremental value is the same as the incremental value of the loop-control variable of (2).

(5) The loop-control variable of (2) satisfies either (5-1) or (5-2).

(5-1) The type of the loop-control variable is signed long long, unsigned long long, or pointer.

(5-2) The loop-control variable is used in the loop of (2) as an operand of an operation expression that contains 15 or more operands.

Note 1: Loop-control variable: Loop induction variable used in loop end determination

Loop induction variable: Variable that is incremented by a fixed value each time in a loop

Note 2: Includes cases in which such a value is statically known to be a constant.

Note 3: Zero-fold and one-fold are not applicable.

1.4 Example

The following is an example of the problem. Characters in red are the parts that correspond to the conditions.

```
1:   #pragma inline_asm sub
2:   static void sub(long long arg) {}
3:   long long func( void )
4:   {
5:     long long count;                          // Condition (5-1)
6:     long long result = 0;
7:
8:     for ( count = 0; count < 6; count++ ) {   // Condition (2)
9:       result = result * 2 + count * 10;       // Condition (3-1)
10:      sub(result);
11:    }
12:    return result;
13:  }
```

- Line 8: Corresponds to Condition (2) and Condition (5) because this loop uses "count", a loop-control variable in the long long type, and uses comparison with "6", an integer constant, as the condition for ending the loop.
- Line 9: Corresponds to Condition (3) because a multiplication expression with the loop-control variable "count" and integer constant "10" exists.
- Lines 8 to 11: Corresponds to Condition (4) because the loop does not contain a loop induction variable whose incremental value is the same as the incremental value "+1" of the loop-control variable "count".

Supplement: In the above example, although the loop of lines 8 to 11 should be executed 6 times for the correct operation, the loop is actually executed only 4 times.

1.5 Workaround

To avoid this problem, take either of the following steps:

(1) Do not specify the -Osize and -Ospeed options.

(2) Modify the loop-control variable of Condition (2) or the loop induction variable of Condition (3-2) by declaring it as volatile.

1.6 Schedule for Fixing the Problem

This problem will be fixed in CC-RH V1.07.00.
This revision will be available from January 22.

Revision History

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

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061 Japan

Renesas Electronics Corporation

■Inquiry

https://www.renesas.com/contact/