

Outline

When using the CC-RL C compiler package for the RL78 family, note the following point.

1. Loop statements with loop-control variables in which constants are used as the condition for ending the loop (CCRL#018)

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 (CCRL#018)

1.1 Applicable Products

CC-RL V1.00.00 to V1.05.00

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 -Onothing option is not 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.

[C source]

```
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) Specify the -Onothing option.
- (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

The problem will be fixed in CC-RL V1.06.00.

This revision will be available from January 22.

Revision History

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

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