1. Relational Operators in the Control Expressions of switch Statements
   (CCRL#015)

1.1 Applicable Products
CC-RL V1.00.00 to V1.05.00

1.2 Details
An invalid code may be generated if the control expression of a switch statement is a relational operation or an equality operation.

1.3 Condition
An invalid code may be generated when all of conditions (1) to (5), described below, are met:

(1) The optimization level other than -Onothing is specified, or the optimization level is not specified.
(2) The C source code contains a loop statement and the loop statement contains a switch statement.
(3) The switch statement of (2) is a true/false judgment using >, >=, <, <=, ==, or != (Note 1).
(4) The members of the relational operator or the equality operator of (3) is a loop control variable and a constant that do not have a volatile qualifier (Note 2).
(5) The switch statement of (2) has two case labels with case values 0 and 1 (Note 3).

   Note 1: This condition is true if the statement contains a relational operator or an equality operator.
   For example, the condition is true for switch(i != 0) but not true for switch(i).

   Note 2: The right and left members of the operator are interchangeable for the condition to be true; for example, “i > 1” and “1 < i” are applicable.
   Even if a constant is not contained, the condition may be true if the compiler optimization regards a variable as a static constant.

   Note 3: The condition is true even if the branch destinations of case 0: and case 1: are the same.
   The presence or absence of a default label does not matter.
1.4 Example
The following is an example of the problem.

When the -Onot option is not designated: Condition (1)

```c
unsigned char a;
int main( void )
{
    int i = 0;  /* Condition (4) */
    while(1) {  /* Condition (2) */
        switch( i < 1 ){ /* Condition (2) (3) (4) */
            case 1 : /* Condition (5) */
             a = 20;
             break ;
            case 0 : /* Condition (5) */
             goto end_l ;
             break ;
        } ;
        i++ ;
    }
    end_l:
    return( 0 ) ;
}
```

In the above example, case 1 of the switch statement is executed when i equals 0, but the output code does not set a to 20.

1.5 Workaround
To avoid this problem, take any of the following steps:

1. Specify the optimization level option as -Onot.
2. Replace the switch statement of condition (2) with an if statement.
3. Modify the loop control variable in Condition (4) by adding the volatile qualifier.

1.6 Schedule for Fixing the Problem
The problem had been fixed in CC-RL V1.06.00.
Revision History

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