C Compiler Package for RL78 Family

Outline

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

1. Using the -Oalias=ansi option (CCRL #025)
   * The number after the note is the note’s identification number.

1. Using the -Oalias=ansi option (CCRL #025)

1.1 Applicable Products

   CC-RL V1.05.00, V1.06.00, V1.07.00, V1.08.00

1.2 Details

   When the -Oalias=ansi optional function is used, access to a structure- or union-type variable may be deleted improperly.

1.3 Conditions

   This problem arises if the following conditions are all met:
   (1) -Oalias=ansi is specified.
   (2) -Onothing is not specified.
   (3) Either of the following variables, (3-1) or (3-2), is used.
      (3-1) Structure-type variable that satisfies all of the following conditions:
         (3-1-a) The structure-type variable has an array-type member.
         (3-1-b) One of the elements of (3-1-a) is referenced three or more times in the function.
         (3-1-c) Both reference methods (reference by the [ ] operator and reference by the * operator) are used in (3-1-b).
         (3-1-d) The reference in (3-1-b) involves both a value read and assignment.
      (3-2) Union-type variable that satisfies all of the following conditions:
         (3-2-a) The union-type variable has array-type members of different element types.
         (3-2-b) An area-overlapping element of (3-2-a) is referenced three or more times in the function.
         (3-2-c) There are two or more references by the [ ] operator in (3-2-b).
         (3-2-d) The reference in (3-2-b) involves both a value read and assignment.
         (3-2-e) References in (3-2-b) contains a reference to a different member.
   (4) A structure- or union-type variable that is not qualified with volatile is used.
   (5) A structure- or union-type variable is a static variable.
1.4 Examples

Below is an example of the problem. The parts corresponding to the conditions are shown in red.

- Example 1: When a structure-type is used.

```c
ccrl tp.c -cpu=S1 -Oalias=ansi  // Condition (1)(2)

#include<stdio.h>
struct { //Structure-type global variable
    //not qualified with volatile Condition(4)(5)
    int ary[10]; //Has an array-type member (3-1-a)
}data = {0};

void main (void) {
    data.ary[0] = 1; //First reference (3-1-b)
    //Use of the [] operator (3-1-c)
    //and assignment (3-1-d)
    data.ary[1] = 2;
    *(data.ary + 0) = 2; //Second reference (3-1-b)
    //Use of the * operator (3-1-c)
    //and assignment (3-1-d)
    *(data.ary + 1) = 3;
    printf("%d\n",data.ary[0]); //Third reference (3-1-b)
    //Use of the [] operator (3-1-c)
    //and value read (3-1-d)
}
```

The printf execution resulted in "1" although it should be "2".
Example 2: When a union-type is used.

crl tp.c -cpu=S1 -Oalias=ansi   // Condition (1)(2)

```
#include<stdio.h>

union{
    //Union-type global variable not qualified with volatile
    //Condition(4)(5)
    int i[2];  //int-type array member (3-2-a)
    short s[4];  //short-type array member (3-2-a)
} un;

int g;

void main (void) {
    un.s[0] = 1;  //First reference (3-2-b)
    //Use of the [] operator (3-2-c) and assignment (3-2-d)
    g = un.i[0];  //Second reference (3-2-b)
    //Use of the [] operator (3-2-c), value read (3-2-d)
    //and reference to a different member (3-2-e)
    un.s[0] = 2;  //Third reference (3-2-b)
    //Use of the [] operator (3-2-c) and assignment (3-2-d)
    printf("%d\n",g);
}
```

The printf execution resulted in an undefined value although it should be "1".
1.5 Workaround

You can avoid this problem by one of the following methods.

(1) Specify -Oalias=noansi.
(2) In the case of a structure-type variable (select one of the following):
    ∙ Add the volatile qualifier to the structure-type variable.
    ∙ Add the volatile qualifier to the array members.
    ∙ Only use references by the [] operator.
(3) In the case of a union-type variable (select one of the following):
    ∙ Add the volatile qualifier to the union-type variable.
    ∙ Add the volatile qualifier to all array members that refer to an overlapping area.
    ∙ Use references by the * operator.
    ∙ Limit the number of uses of the [] operator to one.

1.6 Schedule for Fixing the Problem

This problem will be fixed in CC-RL V1.09.00. (Scheduled to be released on January 20.)
Revision History

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