[Notes]

C Compiler Package for RH850 Family

R20TS0528EJ0100 Rev.1.00 Jan. 16, 2020

Outline

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

- 1. Using the -Xalias=ansi option (No.28)
 - * The number after the note is the note's identification number.
- 1. Using the -Xalias=ansi option (No.28)
- 1.1 Applicable Products

CC-RH V1.06.00, V1.07.00, V1.07.01, V2.00.00, V2.01.00

1.2 Details

When the -Xalias=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) -Xalias=ansi is specified.
- (2) -O, -Osize, or -Ospeed is 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.

ccrh -O -Ounroll=10 tp.c -Xalias=ansi // Conditions (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) {
  int cnt = 0;
  for (cnt = 0; cnt < 10; cnt++) {
   data.ary[cnt] = cnt + 1;
                                //First reference (3-1-b)
                                 //Use of the []operator (3-1-c)
                                 //and assignment (3-1-d)
  for (cnt = 0; cnt < 10; cnt++) {
   *(data.ary+cnt) = cnt + 2;
                                //Second reference (3-1-b)
                                //Use of the * operator (3-1-c)
                                 //and assignment (3-1-d)
  }
printf("%d\forall 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.

ccrh -O tp.c -Xalias=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)
                                                                                     //Second reference (3-2-b)
       g = un.i[0];
                                                                                       //Use of the [] operator (3-2-c), value read (3-2-d)
                                                                                        //and reference to a different member (3-2-e)
      un.s[0] = 2i
                                                                                        //Third reference (3-2-b)
                                                                                          //Use of the [] operator (3-2-c)
                                                                                           //and assignment (3-2-d)
         printf("%d\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formalfont\formal
```

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 -Xalias=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-RH V2.02.00. (Scheduled to be released on January 20.)



Revision History

		Description	
Rev.	Date	Page	Summary
1.00	Jan.16.20	-	First edition issued

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