

[Notes]

R20TS0528EJ0100

Rev.1.00

Jan. 16, 2020

C Compiler Package for RH850 Family

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\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)
    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 -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

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

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