Outline

When using the C/C++ compiler package for RX family CC-RX, note the following point.

1. Using the -alias=ansi option (No.54)
   * The number after the note is the note’s identification number.

1. Using the -alias=ansi Option (No.54)

1.1 Applicable Products
   CC-RX V2.07.00, V2.08.00, V3.00.00, V3.01.00

1.2 Details
   When the -alias=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) Options to enable -alias=ansi are specified. (One of the following.)
       (1-1) -optimize=max is specified and -alias=noansi is not.
       (1-2) -optimize=2 and -alias=ansi are specified.
       (1-3) -alias=ansi is specified without the -optimize option being specified.
   (2) Either of the following variables, (2-1) or (2-2), is used.
   (2-1) Structure-type variable that satisfies all of the following conditions:
       (2-1-a) The structure-type variable has an array-type member.
       (2-1-b) One of the elements of (2-1-a) is referenced three or more times in the function.
       (2-1-c) Both reference methods (reference by the [] operator and reference by the * operator) are used in (2-1-b).
       (2-1-d) The reference in (2-1-b) involves both a value read and assignment.
   (2-2) Union-type variable that satisfies all of the following conditions:
       (2-2-a) The union-type variable has array-type members of different element types.
       (2-2-b) An area-overlapping element of (2-2-a) is referenced three or more times in the function.
       (2-2-c) There are two or more references by the [] operator in (2-2-b).
       (2-2-d) The reference in (2-2-b) involves both a value read and assignment.
       (2-2-e) References in (2-2-b) contains a reference to a different member.
   (3) A structure- or union-type variable that is no qualified with volatile is used.
   (4) 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
ccrx tp1.c -isa=rxv2 -optimize=2 -alias=ansi // Condition (1-2)

// tp1.c
#include<stdio.h>
struct { //Structure-type global variable  
    //not qualified with volatile Condition(3)(4)  
    int ary[10]; //Has an array-type member (2-1-a)  
}data = {0};

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

The printf execution resulted in "1" although it should be "2."
Example 2: When a union-type is used.
ccrx tp2.c -isa=rxv2 -optimize=2 -alias=ansi  // Condition (1-2)

```c
#include<stdio.h>
union{
  int i[2]; //int-type array member (2-2-a)
  short s[4]; //short-type array member (2-2-a)
} un;
int g;

void main (void) {
  un.s[0] = 1; //First reference (2-2-b)
  g = un.i[0]; //Second reference (2-2-b)
  un.s[0] = 2; //Third reference (2-2-b)
  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 -alias=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-RX V2.08.01 and V3.02.00. (Scheduled to be released on January 20.)
Revision History

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