

[Notes]

R20TS0698EJ0100

Rev.1.00

C/C++ Compiler Package for RX Family (No.59)

Jun. 01, 2021

Overview

When using the C/C++ Compiler Package for RX Family, note the following point.

1. Initializing a union in a C++ source code (No.59)

Note: The number following the note is an identification number for the note.

1. Initializing a union in a C++ source code (No.59)**1.1 Applicable Products**

CC-RX V2.00.00 to V3.03.00

1.2 Description

The memory area assigned to a union-type variable, union member of a structure-type variable, or element of a union-type array becomes smaller than the size that is supposed to be allocated. As a result, a range outside the area assigned to these variables might be read or written.

1.3 Conditions

This problem may arise if all of the conditions from (1) to (4) are met.

- (1) The compilation option or source file satisfies either of the following conditions:
 - (1-1) Either `-lang=cpp` or `-lang=ecpp` is specified as a compilation option.
 - (1-2) A source file with `cpp`, `cc`, or `cp` extension is compiled without using a `-lang` compilation option.
- (2) There is a global or static variable of one of the following types:
 - (2-1) Union type
 - (2-2) Structure type with a union member
 - (2-3) Array type with a union element
- (3) The size of the first member of a union type in condition (2) is greater than 1 byte.
- (4) A union-type variable, union member, or element covered by condition (2) is initialized by an empty initializer list (`{}`).

1.4 Example

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

ccrx -isa=rxv2 -lang=cpp tp.c (1-1)

```

/* tp.c */
typedef union {
    unsigned long a[2]; // (3)
    unsigned char b[8];
} U;
U x = {}; // (2) (4)

```

When this example is compiled, the following assembly source is generated.

```

.glob _x
.section D,ROMDATA,ALIGN=4
_x:
    .byte 00H,00H,00H,00H
    .END

```

While an 8-byte area must be allocated, an area is allocated only for 4 bytes.

1.5 Workarounds

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

- (1) Avoid initializing variables covered by condition (2).
- (2) Change the first member of the union type in condition (2) to a one-byte member or a bit field of 1 to 8 bits.
- (3) Avoid initializing a union-type variable, union member, or element covered by condition (2) by an empty initializer list.
(For example, by initializing it by {0}.)

1.6 Permanent Measure

The problem will be fixed in CC-RX V3.04.00. The release date has not yet been decided.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jun.01.21	-	First edition issued

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