[Notes]
C/C++ Compiler Package for M16C and R8C Families

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Rev.1.00
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Outline

When using the C/C++ compiler package for M16C and R8C families, note the following point:

1. Caution regarding division when the dividend is negative

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1.1 Applicable Product

C/C++ compiler package for M16C and R8C families V.1.00 Release 1 to V.6.00 Release 00

1.2 Details

When the dividend is negative, division may result in incorrect operation.

1.3 Conditions

Division may result in incorrect operation when both of the following conditions (1) and (2) are met.

(1) One of the following conditions (1-1) to (1-3) applies:

(1-1) The quotient is truncated to a 1-byte integer value when the dividend is a 2-byte signed integer-type variable and the divisor is a constant value of 256.

(1-2) The quotient is truncated to a 1-byte integer value when the dividend is a 4-byte signed integer-type variable and the divisor is a constant value of 65536.

(1-3) The quotient is truncated to a 2-byte integer value when the dividend is a 4-byte signed integer-type variable and the divisor is a constant value of 65536.

(2) In the condition that applies in (1), the dividend is set to a negative value.

1.4 Examples

Examples of the problem are shown below. The parts corresponding to the error conditions are shown in red.

[C source]

```
1:  #include<stdio.h>
2:  signed short temp = -1;     // Condition (2)
3:  signed long temp2 = -1;   // Condition (2)
4:  void main(void) {
5:      unsigned char x = (unsigned char)(temp / 256);            // Condition (1-1)
6:      unsigned char x2 = (unsigned char)(temp2 / 65536);      // Condition (1-2)
7:      unsigned short x3 = (unsigned short)(temp2 / 65536);   // Condition (1-3)
8:      printf("%x¥n", x);   /* NG ff (Should be 0) */
9:      printf("%x¥n", x2); /* NG ff (Should be 0) */
10:     printf("%x¥n", x3); /* NG ffff (Should be 0) */
11: }
```

Lines 2 and 3:

Condition (2) is met because the dividend in the division is set to a negative value.

Line 5:

Condition (1-1) is met because the quotient is cast to an unsigned char type and is truncated when the dividend in the division is of signed short type and the divisor is a constant value of 256.

Line 6:

Condition (1-2) is met because the quotient is cast to an unsigned char type and is truncated when the dividend in the division is of signed long type and the divisor is a constant value of 65536.

Line 7:

Condition (1-3) is met because the quotient is cast to an unsigned short type and is truncated when the dividend in the division is of signed long type and the divisor is a constant value of 65536.

1.5 Workaround

Modify the divisor to an external variable that has been initialized to 256 or 65536.

Example:

[C source]

```
1:  #include<stdio.h>
2:  signed short constant256 = 256;
3:  signed long constant65536 = 65536;
4:  signed short temp = -1;
5:  signed long temp2 = -1;
6:  void main(void) {
7:      unsigned char x = (unsigned char)(temp / constant256);
8:      unsigned char x2 = (unsigned char)(temp2 / constant65536);
9:      unsigned short x3 = (unsigned short)(temp2 / constant65536);
10:   }
```

1.6 Schedule for Fixing the Problem

We do not plan to make modifications.

Revision History

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

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Corporate Headquarters

TOYOSU FORESIA, 3- 2- 24 Toyosu,
Koto-ku, Tokyo 135- 0061, Japan
www.renesas.com

Contact information

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