A Note on Using C Compiler M3T-NC30WA

Please take note of the following problem in using the M3T-NC30WA C compilers (with an integrated development environment):

- On multiplying a scalar-type variable by an immediate value

1. Versions Concerned

M3T-NC30WA V.4.00 Release 1 through V.5.10 Release 1
   for the M16C/60, M16C/30, M16C/20, and M16C/10 series MCUs

2. Description

Multiplying a scalar-type variable by an immediate value may result in incorrect code being generated.

3. Conditions

This problem occurs if the following five conditions are satisfied:

(1) Any one or more of these optimizing options, -O, -O1, -O2, -O3, -O4, -O5, -OR, and -OS, is selected.

(2) A multiplication of a scalar-type auto variable, A, by an immediate value is performed, and its result is stored in another variable, B.

(3) A register is allocated to variable A and memory to variable B.

(4) Either or both of variable A and the immediate value in (2) are cast to the type of variable B.

(5) The types of variables A and B are as follows:
   - Variable A: unsigned int, signed int,
                 unsigned short, or signed short
   - Variable B: unsigned long or signed long
4. Example

```c
void func(void)
{
    long l;
    int i;
    :
    l = (long)i * 100;  /* Conditions (2) and (4) */
    l += (long)i;      /* NOTE */
    :
}
```

NOTE:
The code that cannot correctly refer to the value of variable i is generated.

5. Workaround

This problem can be circumvented by performing the following steps:

(1) Define a temporary auto variable and assign the immediate value in Condition (2) to it.
(2) Place a dummy asm function immediately after the assignment expression in (1) above.
(3) Use the temporary auto variable defined in (1) in place of the immediate value in Condition (2).

Example:

```c
void func(void)
{
    int tmp = 100;   /* A tmp auto variable defined and an immediate value assigned to it */
    asm();              /* A dummy asm function placed */
    :
    l = (long)i * tmp;  /* Use tmp in place of 100 */
    :
}
```

6. Schedule of Fixing the Problem

We plan to fix this problem in our next release of the product.
[Disclaimer]
The past news contents have been based on information at the time of publication. Now changed or invalid information may be included. The URLs in the Tool News also may be subject to change or become invalid without prior notice.

© 2010-2016 Renesas Electronics Corporation. All rights reserved.