

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
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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

```
-----  
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:

```
-----  
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.

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