A Note on Using C Compiler
M3T-NC30WA
--On an OR Operation Between a Variable and a Constant--

Please take note of the following problem in using C compiler (with an assembler and integrated development environment) M3T-NC30WA for the M16C/60, M16C/30, M16C/Tiny, M16C/20, M16C/10, and R8C/Tiny series MCUs:

- On an OR operation between a variable and a constant

1. **Versions Concerned**
   M3T-NC30WA V.2.00 Release 1 through V.5.20 Release 1

2. **Description**
   Performing an OR operation between a variable of type unsigned or signed long and a constant of powers of 2 may generate incorrect code.

3. **Conditions**
   This problem occurs if the following four conditions are satisfied:
   (1) An OR operation between variable A and a constant of powers of 2 is performed.
   (2) The type of variable A is unsigned or signed long.
   (3) Variable A is declared with the volatile qualifier.
   (4) The result of the operation (1) is assigned to variable B, which satisfies the following conditions:
      a. It is an auto variable.
      b. It is declared without the volatile qualifier.
      c. Its address is either of the following:
         - the address of register FB - 17 or earlier
         - the address of register FB + 16 or later
4. Example

```
volatile long gl;                /* Conditions (2) and (3) */
void func(void)
{
    long bl[6];              /* Condition (4) */

    bl[0] = gl | 0x000001L;  /* Conditions (1) and (4) */
    ...
}
```

5. Workaround

This problem can be circumvented by going through the following steps:

(1) Define temporary variable C of type signed or unsigned long.

(2) Assign to the variable in (1) the constant of powers of 2 between which and variable A an OR operation would be done.

(3) Perform the OR operation between variables A and C.

```
volatile long gl;
void func(void)
{
    long bl[6];              /* Condition (4) */
    long tmp;                /* Constant C */

    tmp = 0x000001L;
    bl[0] = gl | tmp;
    ...
}
```

6. Schedule of Fixing the Problem

We plan to fix this problem in our next release of the product.
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