A Note on Using C Compilers
M3T-NC308WA and M3T-NC30WA
--On Testing Equality/Inequality Between a Variable and a Constant--

Please take note of the following problem in using C compilers (with an assembler and integrated development environment) M3T-NC308WA and M3T-NC30WA

- On testing equality/inequality between a variable of type signed or unsigned char and a constant

1. **Products and Versions Concerned**
   M3T-NC308WA V.5.00 Release 1 and V.5.10 Release 1
   for the M32C/80 and M16C/80 series MCUs
   M3T-NC30WA V.5.00 Release 1 through V.5.10 Release 1
   for the M16C/60, M16C/30, M16C/Tiny, M16C/20, M16C/10, and R8C/Tiny series MCUs

2. **Description**
   Testing equality/inequality between a variable of type signed or unsigned char and a constant may generate incorrect code.

2.1 **Conditions**
   This problem occurs if the following five conditions are satisfied:
   
   (1) In an if statement exist two or more controlling expressions testing equality/inequality between a variable of type signed or unsigned char and a constant.

   (2) The variables in (1) are such as arrays or aggregates (whose elements are arranged continuously in memory space).

   (3) Operators used in the controlling expressions in (1) are all "==" or "!=".

   (4) The controlling expressions in (1) are associated with each other by a logical OR operator.
The following compile options are used:
  a. Any of those, -O1, -O2, -O3, -OR, and -OS, and -Ocompare_byte_to_word (-OCBTW), or
  b. O4 only, or
  c. O5 only

2.2 Example

```
char c[2];                         /* Condition (2) */

int func( void )
{
    if( c[0] == 1 || c[1] == 1 )  /* Conditions (1), (2), (3),
                                   and (4) */
        return 0;
    else
        return 1;
}
```

3. Workaround
This problem can be circumvented in any of the following ways:

(1) Split the if statement.
```
char    c[2];                         

int     func( void )
{
    if( c[0] == 1 )        /* One of split if statement */
        return 0;
    else if( c[1] == 1 )   /* The other of split if statement */
        return 0;
    else
        return 1;
}
```

(2) Don't use -Ocompare_byte_to_word (-OCBTW) together with any of the options -O1, -O2, -O3, -OR, and -OS.

(3) Use -O3 instead of -O4 or -O5.
4. **Schedule of Fixing the Problem**
   In the M3T-NC308WA, we plan to fix this problem in its next release.
   In the M3T-NC30WA, this problem has been resolved in its V.5.20 Release 1, so please upgrade your product to it.

---

[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.