A Note on Using C Compiler M3T-NC30WA

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/20, and M16C/10 series MCUs:

- On referencing return values that use register variables after calling inline functions

1. **Versions Concerned**  
   M3T-NC30WA V.5.00 Release 1 and Release 2

2. **Description**  
   Referencing return values that use register variables after calling inline functions results in the correct registers not being accessed.

3. **Conditions**  
   This problem may occur if the following seven conditions are satisfied:
   (1) The -fER option and/or one or more of the optimizing options -O, -O[3-5], -OR, and -OS are used.
   (2) The -ONBSD option is not selected.
   (3) A register variable is used as the argument or return value of an inline function.
   (4) The return value described in (3) above is not rewritten after calling the inline function.
   (5) The return value of the inline function is assigned to a register variable different from the one used as the return value.
   (6) On the register variable into which the return value is assigned in (5) some of the four-rule operations are performed, and the register variable is not accessed thereafter.
   (7) The return value of the inline function is accessed after the assignment in (5).

4. **Example**  

-------------------------------------------------------------------
extern long gl;
inline long func(long vl)
{
    return vl;
}

void smp(void)
{
    register long l,ll;

    l = gl;
    l = func(l);        /* Condition (3) */
    ll = l;             /* Condition (5) */
    ll -= gl;           /* Condition (6) */

    /* Register variable l not accessed correctly */
    gl = l;             /* Condition (7) */
}

5. Workaround

This problem can be circumvented in either of the following ways:
(1) Select the -ONBSD option.
(2) Place a dummy asm function immediately after calling an inline function.

[Example]

extern long gl;
inline long func(long vl)
{
    return vl;
}

void smp(void)
{
    register long l,ll;

    l = gl;
    l = func(l);       /* Condition (3) */
    ll = l;            /* Condition (5) */
    ll -= gl;          /* Condition (6) */

    /* Register variable l not accessed correctly */
    gl = l;            /* Condition (7) */
}

---------------------------------------------
6. **Schedule of Fixing the Problem**

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

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