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A Note on Using the C/C++ Compiler Package for the M32R Family of MCUs --With Using a Control or Iteration Statement Containing a Substatement of 128 KB or More in Code Size--

Please take note of the following problem in using the C/C++ compiler package for the M32R of MCUs:

- With using a control or iteration statement containing a substatement of 128 KB or more in code size

1. Product and Versions Concerned

The C/C++ compiler package--M3T-CC32R--for the M32R family
V.1.00 Release 1 through V.5.01 Release 00

2. Description

If a control statement (an if statement, for example) or an iteration statement (a while statement, for example) contains a substatement to be executed that consumes a large amount of memory, compiling C source code including those statements may cause the following error to arise, and compilation be unsuccessfully terminated:

a132R: "xxx": error: 16-bit displacement overflow in operand 2

NOTICE:

"xxx" is the file name given automatically at compilation by the compiler. It is not the name of the C/C++ source file to be compiled.

2.1 Conditions

This problem may occur if the following conditions are all satisfied:

- (1) In a control or iteration statement exists a substatement of 128 KB or more in code size.
- (2) The substatement in (1) is contained to be executed within any of the following statements:
 - (a) an if statement; valid only when it executes the substatement in (1) if the result of evaluation of the controlling expression is TRUE
 - (b) a switch statement; valid only when the total size of the substatements exceeds 128 KB
 - (c) a while statement
 - (d) a do statement
 - (e) a for statement

2.2 Examples

1. Source file sample1.c

```

-----
int ans1;
void
func1(int a)
{
    if (a) {
        /* Condition (2)-(a) */
        .....
        /* This part reaches 128 KB */ /* Condition (1) */
        .....
    } else {
        ans1 = 1;
    }
}
-----

```

2. Source file sample2.c

```

-----
int ans2;
void
func2(int a)
{
    switch (a) {
        /* Condition (2)-(b) */
        case 0:
            .....
            /* This part reaches 128 KB */ /* Condition (1) */
            .....
            break;
        case 1:
            ans2 = 2;
    }
}
-----

```

```

    break;
}
}

```

3. Source file sample3.c

```

void
func3(int a)
{
    while (--a) {          /* Condition (2)-(c) */
        .....
        /* This part reaches 128 KB */ /* Condition (1) */
        .....
    }
}

```

3. Workarounds

Avoid this problem in either of the following ways:

(1) In the case of an if statement

Because this problem does not occur if the substatement concerned is placed after else, invert the meaning of the controlling expression and change the places between the substatement concerned and the one after else. When the substatement executed if TRUE is empty after the change, this workaround has no effect. So be sure to fill it with any statement.

Modification of Example 1 (source file sample1.c)

```

int ans1;
void
func1(int a)
{
    if (!a) {          /* Meaning of controlling expression inverted */
        ans1 = 1;     /* Substatement changed */
    } else {
        .....
        /* This part reaches 128 KB */ /* Substatement changed */
        .....
    }
}

```

(2) In the case of any control or iteration statement

Convert the whole substatement or a part of the substatement into a newly created function and call it. Be sure not to declare the function to be inline.

Modification of Example 1 (source file sample3.c)

```
-----  
void  
sub_func3(void)      /* Newly created function */  
{  
.....  
    /* This part reaches 128 KB */  
.....  
}  
void  
func3(int a)  
{  
    while (--a) {  
        sub_func3(); /* Newly created function is called */  
    }  
}  
-----
```

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