# RENESAS Tool News

# Real-Time OS M3T-MR30/4 Supports an Additional MCU Series

The real-time OS for the M16C/60, M16C/30, M16C/20, M16C/10, and M16C/Tiny MCU series--M3T-MR30/4 V.4.00 Release 00--has added the R8C/Tiny series of MCUs to its support line.

## 1. MCUs Added to the Support Line

The members of the R8C/Tiny series

## 2. Procedures for Supporting the R8C/Tiny Series

### 2.1 Settings of the GUI Configurator and the Configuration Files

(1) In the definition of the system clock, set "timer" to "OTHER".
Example:

```
clock{
. . . . . . . . . . . . .
  timer = OTHER;
. . . . . . . . . . . . .
};
```

(2) In the definitions of the interrupt handlers, define the timer interrupts as those handled by the system-clock interrupt handler, where the name of the system-clock interrupt handler must be "__SYS_STMR_INH".
Example:
This is an example of defining the timer RA interrupt in the R8C/Tiny series as the one handled by the system-clock interrupt handler.

```
interrupt_vector[22]{
  entry_address=__SYS_STMR_INH;
  os_int=YES;
};
```

### 2.2 Modifications Made to the Startup Files (crt0mr.a30, start.a30)

Modify a portion of initializing the system clock in the startup files so that the user can use the timers in the R8C/Tiny series. Example:

This is an example of calling the initializing function of the RA timer written in C.

```
; +-------------------------------------------------------+
; |    System timer interrupt setting             |
; +-------------------------------------------------------+
;      mov.b   #stmr_mod_val,stmr_mod_reg   ;set timer mode
;      mov.b   #stmr_int_IPL,stmr_int_reg   ;set timer IPL
;      mov.w   #stmr_cnt,stmr_ctr_reg       ;set interval count
;      or.b    #stmr_bit+1,stmr_start        ;system timer start
    .glb _timer_ra_init
    JSR.W _timer_ra_init
```

For details of the initializing function of the RA timer, see Application Note of the R8C/Tiny series.

## 2.3 Modifications Made to the Section Definition Files (c_sec.inc, asm_sec.inc)

Modify the address locations of the fixed vector table to meet the R8C/Tiny series.

Example :

This is an example of locating sections in the c_sec.inc file.
In this example, modifications are made to address locations of the variable vector table according to the modifications made to those of the fixed vector table.

```
;------------------------------------------------------------------
;   VECTOR  TABLE
;------------------------------------------------------------------
 .glb       __INT_VECTOR
 .section   INTERRUPT_VECTOR     ;Interrupt vector table
 .org       0fd00H
 __INT_VECTOR:
 .section   FIX_INTERRUPT_VECTOR  ;Fixed Interrupt vector table
 .org       0ffdcH
```

## 3. Notices
### 3.1 On Disabling the Watchdog Timer

If you don't use the watchdog timer, disable it using the assembly directive command ".ofsreg".

Example:
Place the following two lines at the end of the example shown in 2.3:
;WDT disable
.ofsreg 0FFH

## 3.2 On the Cycle of the System Clock

The cycle of the system clock set in the configuration file (the value
to which "tic_nume" has been set in the system definitions) must be
the same as the cycle of interrupts generated by the initialization of
the system clock by the user.

## 3.3 On Debugging Capabilities Supported by M3T-MR30/4

The RTOS debugging capabilities (MR, MR Trace, and MR TaskPause
windows) supported by M3T-MR30/4 and used in the emulator debuggers
and simulator debuggers that have already been released cannot
support the R8C/Tiny series.
We are making these capabilities support the R8C/Tiny series in the
next release of each debuggers.

## 3.4 On Combination with High-performance Embedded Workshop 4

(1) Creating Projects
In the "New Project-2/6-Select RTOS" dialog box, you must select
"All Target" as "Target Type" when creating projects.
(2) Selecting the "-R8C" Option in the Toolchain
"-R8C" option is not selected automatically at creating projects.
You need to specify it as a command option explicitly.