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Renesas Electronics Corporation

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M16C/60 Series and M16C/20 Series

General-purpose Program for Variable Vector Table

1. Abstract

This program shows an example for setting variable vector tables and an example for using software interrupts.

2. Introduction

A variable vector table is a 256-byte interrupt vector table whose start address (IntBase) is indicated by the content of the interrupt table register (INTB). The variable vector table in this program has its start address at FE000H. The variable vector table has individual vector tables each comprised of 4 bytes, and each vector table contains the start address of an interrupt routine.

There are software interrupt numbers (0 to 63) available for each vector table. The INT instruction uses these software interrupt numbers. No labels can be used in place of the software interrupt numbers. Peripheral I/O interrupts are assigned software interrupt numbers 0 to 31. In this program, software interrupt number 21 is used for timer A0 and software interrupt number 22 is used for timer A1. Software interrupt numbers 32 to 63 are used for software interrupts. This type of interrupt is generated by the INT instruction. Therefore, software interrupts are used in the same way as a subroutine by using the INT instruction. The INT instruction is executed even when interrupts are disabled. After interrupts are disabled (FCLR I) in this program, INT#22 and INT#32 are executed regardless of whether or not the interrupt enable flag (I) is set.

3. The example of a reference program

```
;***********************************************************************
; *
; M16C General-purpose Programs *
; CPU : M16C *
; *
;***********************************************************************
VromTOP     .EQU     0F0000H          ; Declares start address of ROM
VIstack     .EQU     002C00H          ; Interrupt stack pointer
Vintbase      .EQU     0FE000H        ; Declares interrupt vector table
                                      ; address
;
;=============================================================
; Title     : Variable vector table
; Outline   : Description example of variable vector table and software interrupt
;=============================================================
            .SECTION    PROGRAM,CODE
            .ORG     VromTOP          ; ROM area
MAIN:
   LDC      #VIstack,ISP             ; Sets interrupt stack pointer
   LDINTB      #Vintbase             ; Sets interrupt table register
;
   MOV.W       #100-1,TA0            ; Sets timer A0 counter
   MOV.B       #00000001B,TA0IC      ; Sets interrupt level 1 for timer A0
   MOV.W       #1000-1,TA1           ; Sets timer A1 counter
   MOV.B       #00000010B,TA1IC      ; Sets interrupt level 2 for timer A1
;
   MOV.B       #00000011B,TABSR      ; Timers A0 and A1 start counting
;
   FSET     I                        ; Enables interrupts
;
   INT      #21                      ; Performs timer A0 interrupt
                                     ; processing
                                     ; (TIMER_A0 is executed)
;
   FCLR     I                        ; Disables interrupts
;
   INT      #22                      ; Performs timer A1 interrupt
                                     ; processing
                                     ; (TIMER_A1 is executed)
;
   INT      #32                      ; Performs SOFTINT label interrupt
                                     ; processing

   ;(Here is your program.)
```

```
TIMER_A0:
   ;(Here is your program.)
   REIT
TIMER_A1:
   ;(Here is your program.)
   REIT
SOFTINT:
   ;(Here is your program.)
   REIT
NOTUSE:
   REIT
;
            .SECTION    SPECIAL,ROMDATA
            .ORG     Vintbase            ; Variable vector table area
;-------------------------------------------
; Peripheral I/O interrupt vector table
;-------------------------------------------
            .LWORD      NOTUSE           ; Software interrupt number 0
            .LWORD      NOTUSE           ; Software interrupt number 1
;
            .ORG     Vintbase+84
            .LWORD      TIMER_A0         ; Software interrupt number 21
            .LWORD      TIMER_A1         ; Software interrupt number 22
;
            .ORG     Vintbase+128        ; Software interrupt area
;-------------------------------------------
; Software interrupt vector table
;-------------------------------------------
            .LWORD      SOFTINT          ; Software interrupt number 32
            .LWORD      NOTUSE           ; Software interrupt number 33
;
            .END                         ;
```

4. Reference

SOFTWARE MANUAL
M16C/60 M16C/20 Series SOFTWARE MANUAL
(Acquire the most current version from Renesas web-site)

5. Web-site and contact for support

Renesas Web-site

http://www.renesas.com

Contact for Renesas technical support

Mail to : support_apl@renesas.com

REVISION HISTORY

Rev.	Date	Description	
		Page	Summary
1.00	Jul 08, 2002	-	First edition issued

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