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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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M16C/62A Group

Operation of Timer A (timer mode, gate function)

1.0 Abstract

In timer mode, choose functions from those listed in Table 1. Operations of the circled items are described below.

Table 1. Chosed functions

Item	Set-up	
Count source	<input type="radio"/>	Internal count source($f_1 / f_8 / f_{32} / f_{c32}$)
Pulse output function	<input type="radio"/>	No pulses output
	<input type="radio"/>	Pulses output
Gate function	<input type="radio"/>	No gate function
	<input type="radio"/>	Performs count only for the period in which the TAI _{IN} pin is at "L" level
	<input type="radio"/>	Performs count only for the period in which the TAI _{IN} pin is at "H" level

2.0 Introduction

Operation (1) When the count start flag is set to "1" and the TAI_{IN} pin inputs at "H" level, the counter performs a down count on the count source.

(2) When the TAI_{IN} pin inputs at "L" level, the counter holds its value and stops.

(3) If an underflow occurs, the content of the reload register is reloaded and the count continues. At this time, the timer Ai interrupt request bit goes to "1".

(4) Setting the count start flag to "0" causes the counter to hold its value and to stop.

Note • Make the pulse width of the signal input to the TAI_{IN} pin not less than two cycles of the count source.

Figure 1 shows the operation timing

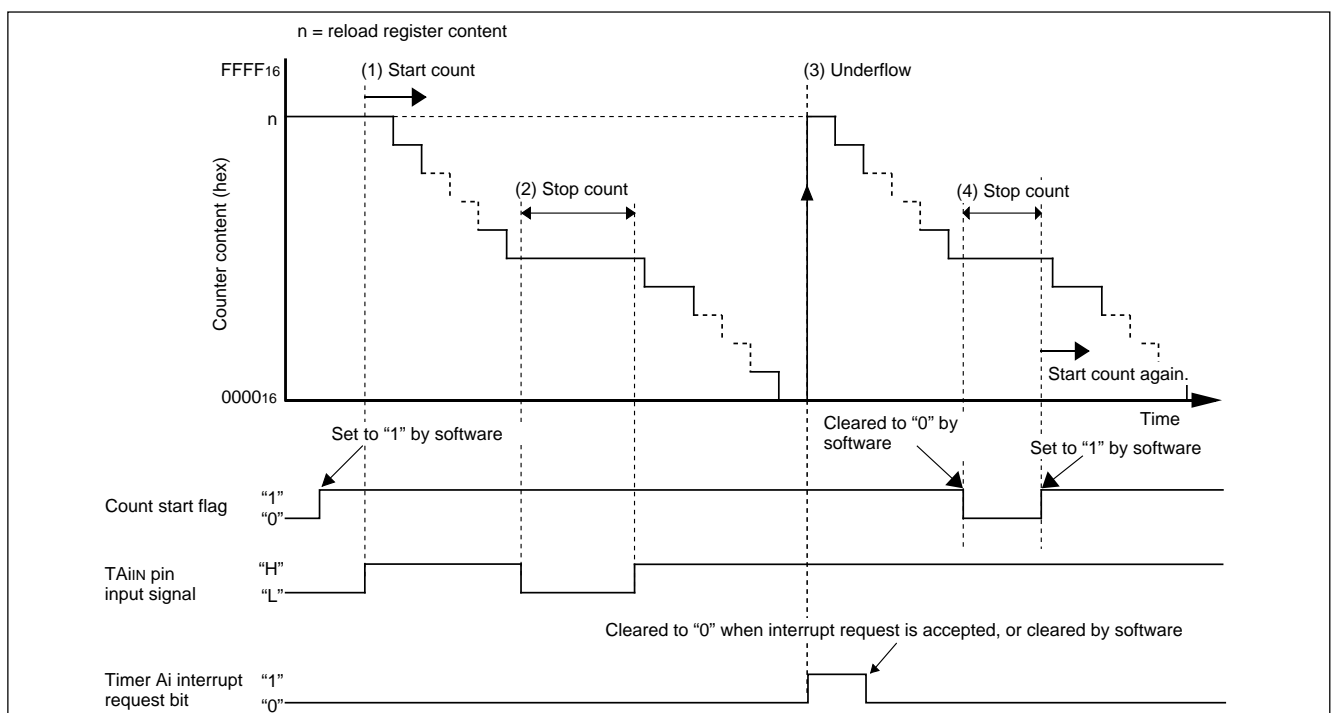
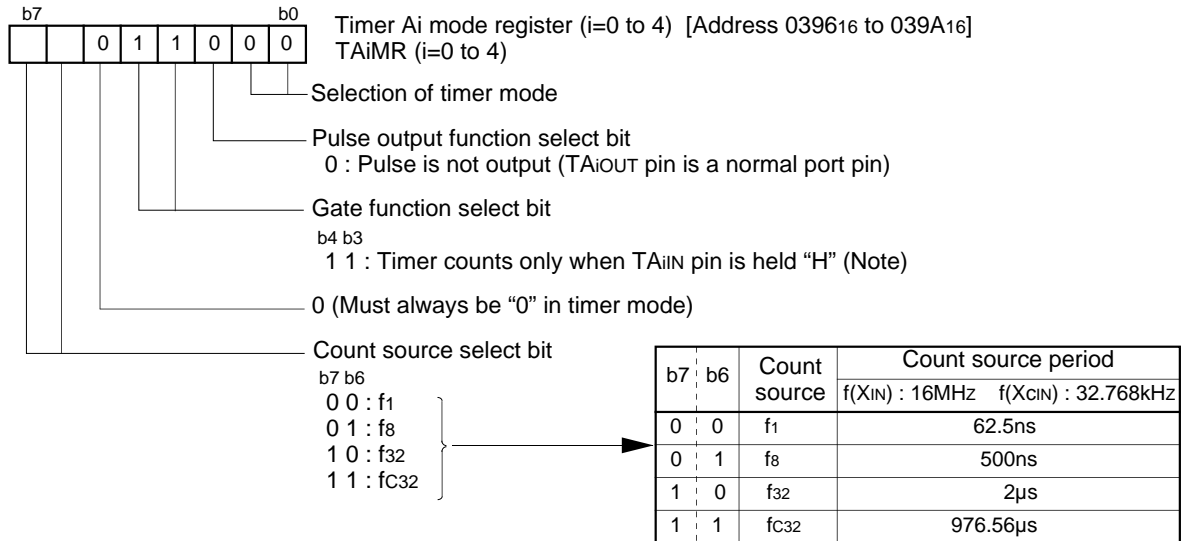


Figure 1. Operation timing of timer mode, gate function selected

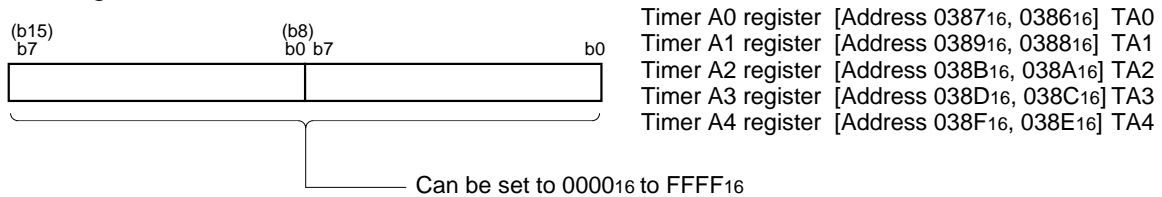
3.0 Set-up procedure

Selecting timer mode and functions



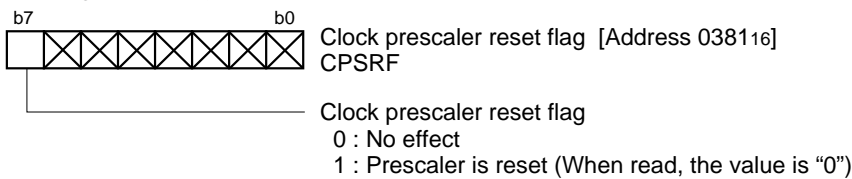
Note: Set the corresponding port direction register to "0".

Setting counter value

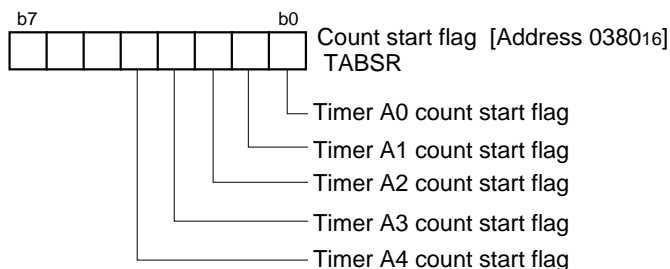


Setting clock prescaler reset flag

(This function is effective when fc₃₂ is selected as the count source. Reset the prescaler for generating fc₃₂ by dividing the XCIN by 32.)



Setting count start flag



Start count

4.0 Programming Code

```

;*****
;
; M16C/62A Program Collection
;
; FILE NAME : rjj05b0031_src.a30
; CPU      : M16C/62A Group
; FUNCTION : Operation of Timer A
;           (timer mode, gate function)
; HISTORY  : 2003.05.16 Ver 1.00
;
; Copyright(C)2003, Renesas Technology Corp.
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;
;*****
;*****
;      Include
;*****
      .LIST      OFF      ;Stops outputting lines to the assembler list file
      .INCLUDE   sfr62a.inc ;Reads the file that defined SFR
      .LIST      ON      ;Starts outputting lines to the assembler list file
;
;*****
;      Symbol definition
;*****
ROM_TOP      .EQU    0F8000H ;Start address of ROM
FIXED_VECT_TOP .EQU    0FFFDCH ;Start address of fixed vector
;
;*****
;      Program area
;*****
;=====
;      Start up
;=====
      .SECTION   PROGRAM, CODE ;Declares section name and section type
      .ORG      ROM_TOP      ;Declares start address
RESET:
      MOV.B     #03H, prcr     ;Removes protect
;                               ;Set processor mode registers 0 and 1
      MOV.B     #00000000B, pm0 ; Single-chip mode
      MOV.B     #00000000B, pm1 ; No expansion, No wait
;                               ;Set system clock control registers 0 and 1
      MOV.B     #00001000B, cm0 ; Xcin-Xcout High
      MOV.B     #00100000B, cm1 ; Xin-Xout High, Main clock is No divison
      MOV.B     #00H, prcr     ;Protects all registers
;
;=====
;      TimerA (timer mode,gate function selected)
;=====
      MOV.B     #01011000B, talmr ;Selecting timer mode and functions
;                               |||||++-----;Selection of timer mode
;                               |||||+-----;Pulse output function select bit (0:Pulse is not output)
;                               |||++-----;Timer counts only when TAIIN pin is held "H" (Note)
;                               ||+-----;Must always be "0" in timer mode
;                               ++-----;Count source (01:f8)
      BCLR     pd7_3          ;(Note)Set the corresponding port direction register to "0"
      MOV.W    #2000-1, ta1   ;Setting counter value (1msec @16MHz, f8)
      MOV.B    #00000000B, cpsrf ;Setting clock prescaler reset flag
;                               +-----;Clock prescaler reset flag (0:No effect)
      MOV.B    #00000010B, tabsr ;Setting count start flag
;                               +-----;TimerA1 count start flag
;
;

```

```

MAIN:
    JMP     MAIN
;
;=====
;    Dummy interrupt processing program
;=====
dummy:
    REIT
;
;*****
;    Setting of fixed vector
;*****
    .SECTION    F_VECT, ROMDATA
    .ORG       FIXED_VECT_TOP
;
    .LWORD     dummy    ;Undefined instruction interrupt vector
    .LWORD     dummy    ;Overflow (INT0 instruction) interrupt vector
    .LWORD     dummy    ;BRK instruction interrupt vector
    .LWORD     dummy    ;Address match interrupt vector
    .LWORD     dummy    ;Single-step interrupt vector
    .LWORD     dummy    ;Watchdog timer interrupt vector
    .LWORD     dummy    ;DBC interrupt vector
    .LWORD     dummy    ;NMI interrupt vector
    .LWORD     RESET    ;Sets reset vector
;
    .END

```

5.0 Reference

Renesas Technology Corporation Semiconductor Home page
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Technical Support

E-mail: support_apl@renesas.com

Data Sheet

M16C/62A group Rev. C.1
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User's Manual

M16C/62A group Rev. 1.0
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