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April 1st, 2010
Renesas Electronics Corporation

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M16C/62A Group Operation of Timer A (one-shot timer mode)

1.0 Abstract

In one-shot 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	○ Internal count source ($f_1 / f_8 / f_{32} / f_{c32}$)
Pulse output function	No pulses output
	○ Pulses output
Count start condition	External trigger input (falling edge of input signal to the TAIin pin)
	External trigger input (rising edge of input signal to the TAIin pin)
	Timer overflow (TB2/TAj/TAK overflow)
	○ Writing "1" to the one-shot start flag

Note: $j = i - 1$, but $j = 4$ when $i = 0$; $k = i + 1$, but $k = 0$ when $i = 4$.

2.0 Introduction

- Operation
- (1) Setting the one-shot start flag to "1" with the count start flag set to "1" causes the counter to perform a down count on the count source. At this time, the TAI_{OUT} pin outputs an "H" level.
 - (2) The instant the value of the counter becomes "0000₁₆", the TAI_{OUT} pin outputs an "L" level, and the counter reloads the content of the reload register and stops counting. At this time, the timer Ai interrupt request bit goes to "1".
 - (3) If a trigger occurs while a count is in progress, the counter reloads the value in the reload register again and continues counting. The reload timing is in step with the next count source input after the trigger.
 - (4) Setting the count start flag to "0" causes the counter to stop and to reload the content of the reload register. Also, the TAI_{OUT} pin outputs an "L" level. At this time, the timer Ai interrupt request bit goes to "1".

Note

- When the timer Ai register is set to "0000₁₆", the counter does not operate and the timer Ai interrupt request is not generated. When the pulse is set to output, the pulse does not output from the TAI_{OUT} pin.

Figure 1 shows the operation timing

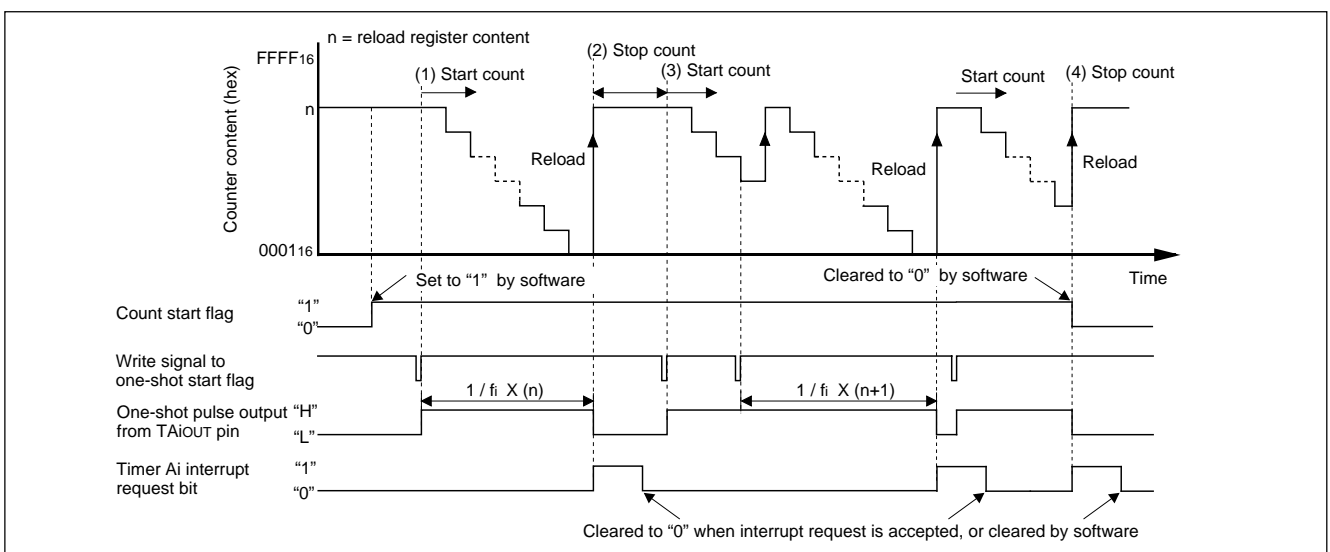
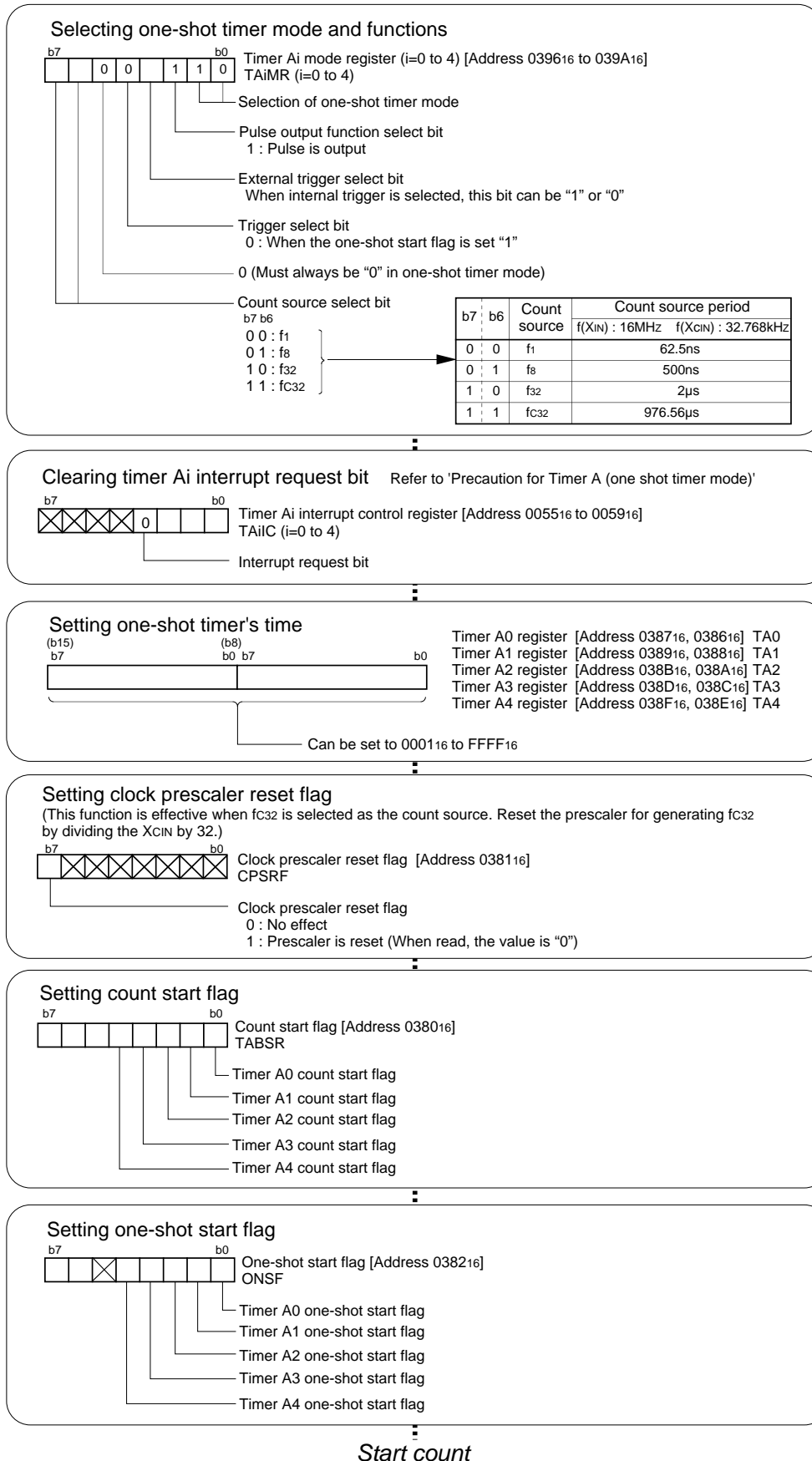


Figure 1. Operation timing of one-shot

3.0 Set-up procedure



4.0 Programming Code

```
*****
;
; M16C/62A Program Collection
;
; FILE NAME : rjj05b0037_src.a30
; CPU       : M16C/62A Group
; FUNCTION  : Operation of Timer A
;           : (one-shot timer mode)
; HISTORY   : 2003.05.16 Ver 1.00
;
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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 (one-shot timer mode)
;=====
MOV.B   #01000110B, talmr ;Selecting one-shot timer mode and functions
;
;       |||||++-----;Selection of one-shot timer mode
;       |||||+-----;Pulse output function select bit (1:Pulse is output)
;       ||||+-----;When internal trigger is selected,this bit can be
;       ||||                                     "1" or " 0"
;       |||+-----;Trigger select bit
;       |||                                     (0:When the one-shot start flag is set "1")
;       |+-----;Must always be "0" in one-shot timer mode
;       ++-----;Count source (01:f8)
MOV.B   #00000000B, talic ;Clearing timerA1 interrupt request bit
;
;       +-----;Interrupt request bit
MOV.W   #2000, tal       ;Setting one-shot timer's time (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
MOV.B   #00000010B, onsf  ;Setting one-shot start flag
;
;       +-----;TimerA1 one-shot 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
<http://www.renesas.com/>

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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