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## 7544 Group

### Timer A Operation (Period Measurement Mode)

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#### 1. Abstract

The following article introduces and shows an application example of period measurement mode of timer A.

#### 2. Introduction

The explanation of this issue is applied to the following condition:  
Applicable MCU: 7544 Group

### 3. Contents

**Outline:** The phase control signal is adjusted by using the period measurement mode.

**Specifications:**

- The phase control signal is output to a load, and that controls the phase of a load.
- The period of the pulse input to the P0<sub>0</sub>/CNTR<sub>1</sub> pin from the load as a feedback signal is measured. The correct of the phase control signal to the load is executed using this result. The input pulse period is set to be less than the period of timer A. When timer A underflows, the period is recognized as not corrected, and error processing is executed in the timer A interrupt processing routine.
- Operation clock:  $f(X_{IN}) = 8 \text{ MHz}$ , high-speed mode

#### 3.1 Example of Peripheral Circuit

Figure 1 shows an example of a peripheral circuit.

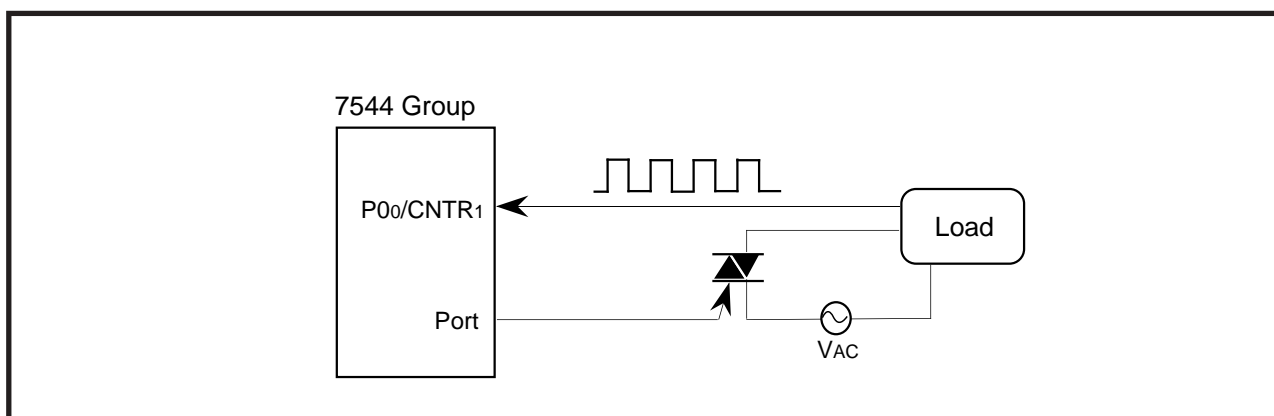
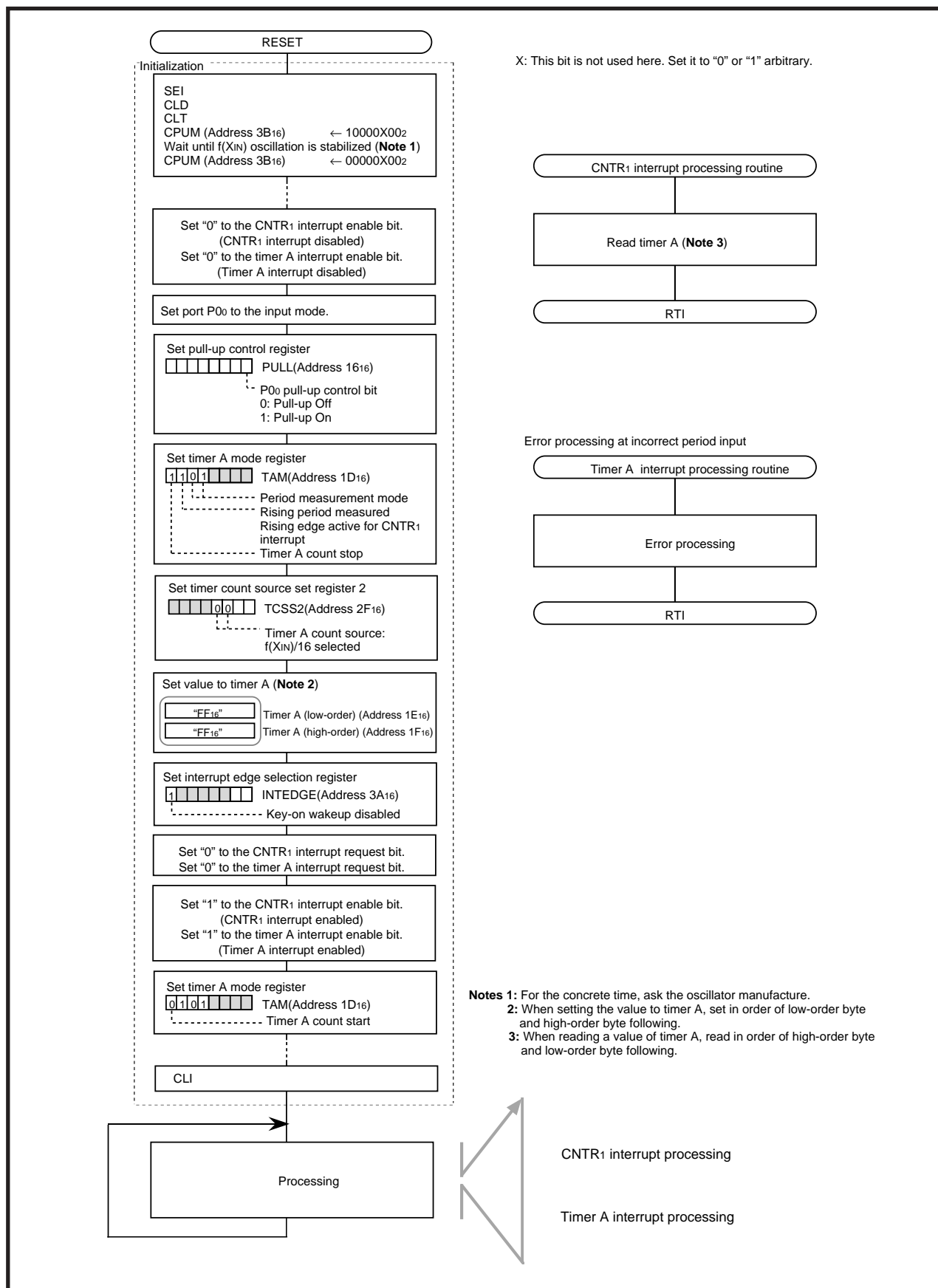


Figure 1 Example of peripheral circuit

#### 3.2 Example of Control Procedure

Figure 2 shows an example of control procedure.



**Figure 2 Example of control procedure**

## 4. Sample Programming Code

[Reset Start ••• Main Routine Process]

```

RESET:
    SEI                      ; Interrupt disable
    CLD
    CLT
;
    LDX #$FF                ; Set stack bottom
    TXS
;
    LDM #%100000000,CPUM    ; Set CPU mode register
;
; Wait f(XIN) oscillation stabilizing time
;
    LDM #%000000000,CPUM    ; Set CPU mode register
;
    LDA #0
    LDX #>RAM_top
RAM_clear:
    STA $00,X
    INX
    BNE RAM_clear
;
    CLB 6,ICON1             ; CNTR1 interrupt disable
    CLB 2,ICON2             ; Timer A interrupt disable
;
    LDM #%000000000,P0D     ; Set Port P0 direction register
    LDM #%000000000,PULL    ; Set Pull-up control register
;
    LDM #%11010000,TAM      ; Set Timer A mode register
    LDM #%00000000,TCSS2    ; Set Timer count source set register 2
    LDM #$FF,TAL            ; Set Timer A (low-order)
    LDM #$FF,TAH            ; Set Timer A (high-order)
;
    SEB 7,INTEDGE           ;
;
    CLB 6,IREQ1             ; CNTR1 interrupt request clear
    CLB 2,IREQ2             ; Timer A interrupt request clear
    SEB 6,ICON1             ; CNTR1 interrupt enable
    SEB 2,ICON2             ; Timer A interrupt enable
;
    CLB 7,TAM               ; Timer A start
;
    CLI
;
__MAIN:
    BRA __MAIN
;

```

Figure 3 Sample Programming Code (1)

#### [CNTR1 Interrupt Process]

```

__int_CNTR1:
    CLD
    CLT
    PHA

;
    LDA  TAH
    STA  B_RESULT+1
    LDA  TAL
    STA  B_RESULT+0

;
    LDM  #$FF,TAL           ; Set Timer A (low-order)
    LDM  #$FF,TAH           ; Set Timer A (high-order)

;
__INT_c1_E:
    PLA
    RTI

;

```

#### [Timer A Interrupt Process]

```

__int_TimerA:
    CLD
    CLT
    PHA

;
;Error process
;

__INT_tA_E:
    PLA
    RTI

;

```

Figure 4 Sample Programming Code (2)

## 5. Reference

Data Sheet  
7544 Group Data sheet  
7544 Group Data sheet (QzROM Version)

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|------------------|--------------------------------------------------------|
| REVISION HISTORY | 7544 Group Timer A Operation (Period Measurement Mode) |
|------------------|--------------------------------------------------------|

| Rev. | Date         | Description |                                |
|------|--------------|-------------|--------------------------------|
|      |              | Page        | Summary                        |
| 1.00 | Apr 01, 2003 | -           | First Edition issued           |
| 2.00 | Nov 12, 2004 | 4-5         | Sample Programming Code added. |
|      |              |             |                                |

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