

7544 Group

I/O Port (Key-on Wake-up)

1. Abstract

The following article introduces and shows an application example of key-on wake up of I/O port (key input interrupt).

2. Introduction

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

3. Contents

3.1 Application Example of Key-on Wake Up (1)

Outline: The built-in pull-up resistor is used.

Specifications: System is returned from the wait mode when the key-on wakeup interrupt occurs

by input of the falling edge to port P0i.

Note: Only the falling edge is active for the key-on wakeup interrupt.

Figure 1 shows an example of application circuit, and Figure 2 shows an example of control procedure.

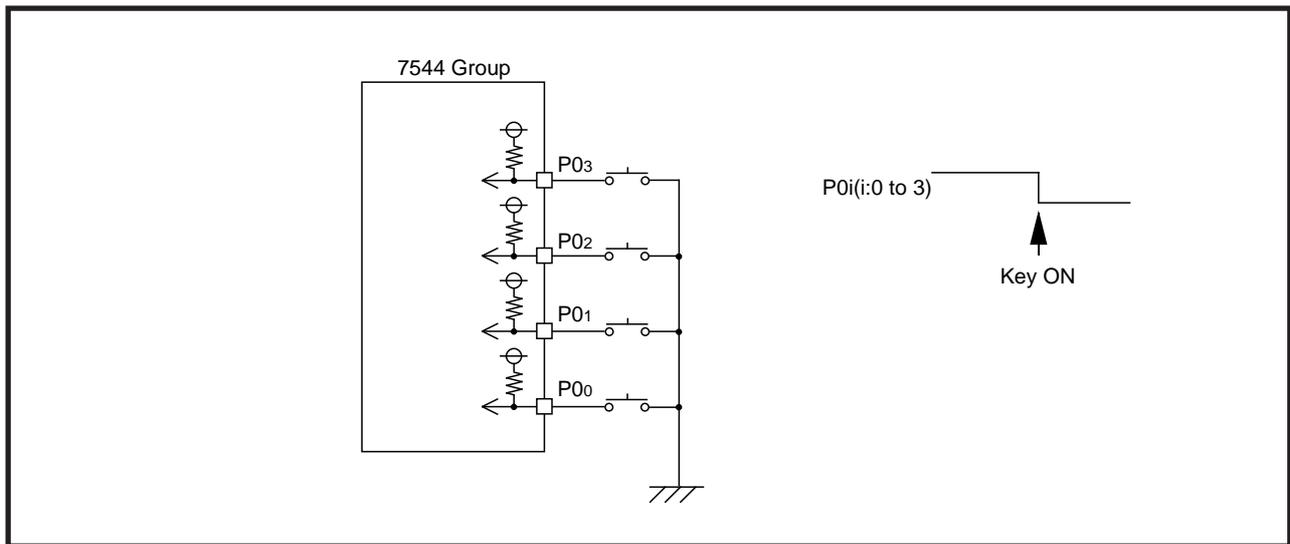


Figure 1 Example of application circuit

3.2 Application Example of Key-on Wake Up (2)

Outline: The key-on wakeup interrupt is used as the normal external interrupt.

Specifications: The key-on wakeup interrupt occurs by input of the falling edge to port P0i.

If necessary, the built-in pull-up resistor is used.

Note: Only the falling edge is active for the key-on wakeup interrupt.

Figure 3 shows an example of control procedure.

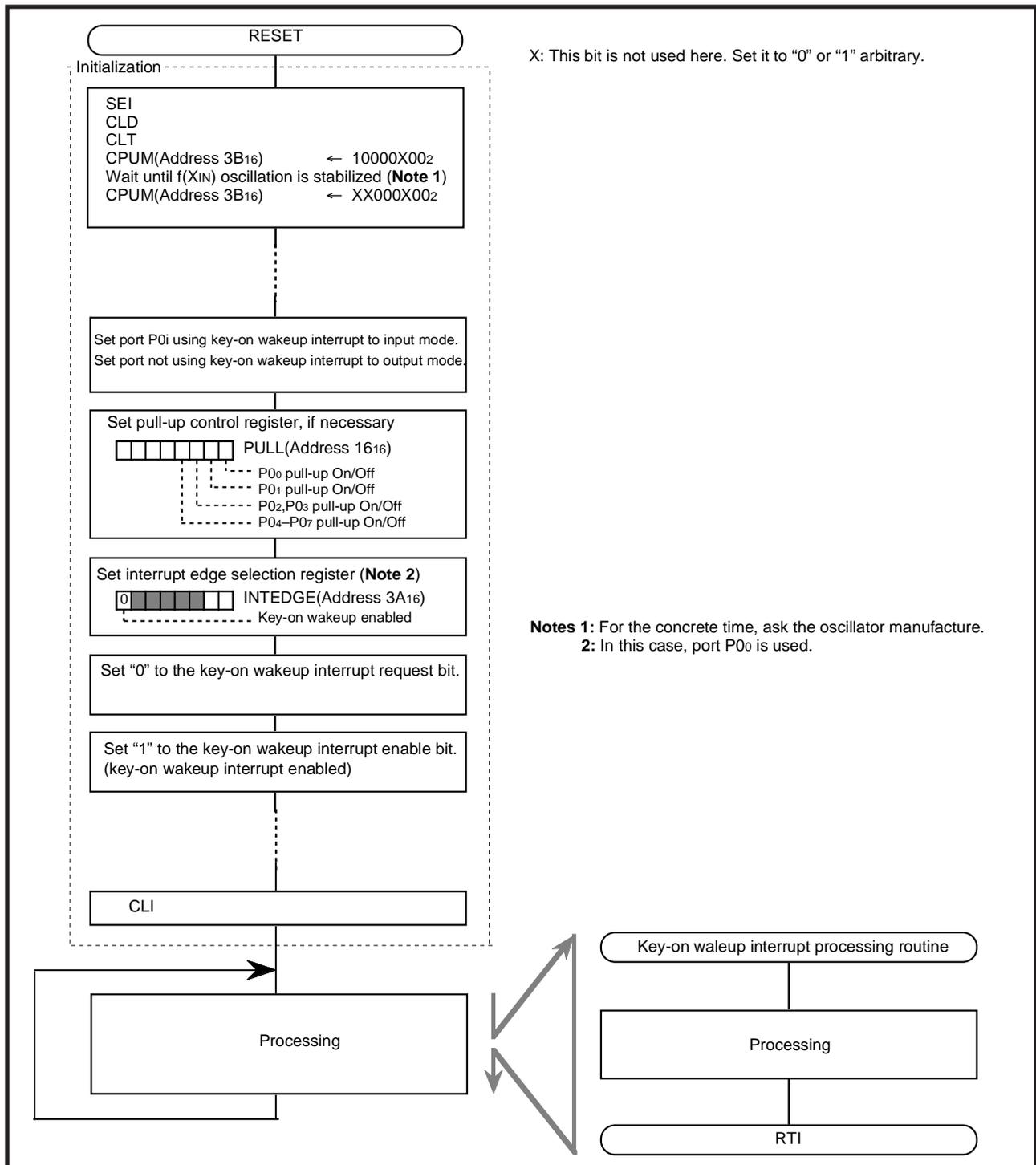


Figure 3 Example of control procedure (2)

4. Sample Programming Code

[Reset Start ••• Main Routine Process]

```

RESET:
    SEI                                ; Interrupt disable
    CLD
    CLT
;
    LDX #$FF                            ; Set stack bottom
    TXS
;
    LDM #10000000,CPUM                  ; Set CPU mode register
;
; Wait f(XIN) oscillation stabilizing time
;
    LDM #00000000,CPUM                  ; Set CPU mode register
;
    LDA #0
    LDX #>RAM_top
RAM_clear: STA $00,X
    INX
    BNE RAM_clear
;
    LDM #00000111,PULL                  ; set P0_0 to P0_3 pins pull-up
;
    CLI                                ; enable interrupt
;
__MAIN:
    CLB 7,INTEDGE                       ; disable key on wake-up interrupt
    CLB 4,IREQ1                          ; clear key on wake-up interrupt request
    SEB 4,ICON1                          ; enable key on wake-up interrupt
    WIT                                  ; enter wait mode

__MAIN_00:
    BBC KEY_ON_FLAG,__MAIN
;
; Key processing
;
    BRA __MAIN
;

```

[KEY Interrupt Process]

```

__KEY:
    CLD
    CLT
    PHA
;
    LDA P0                                ; read Port P0 register
    AND #00001111
    CMP #00001111
    BNE KEY_01                            ; key input? -> yes
    CLB KEY_ON_FLAG                       ; key on flag clear
    BRA __KEY_02
;
__KEY_01:
    STA KEY_CODE
    SEB KEY_ON_FLAG                       ; set Key on flag
;
__KEY_02:
;
    PLA
    RTI
;

```

Figure 4 Sample Programming Code for Application Example of Key-on Wakeup (1)

[Reset Start •• Main Routine Process]

```

RESET:
    SEI                ; Interrupt disable
    CLD
    CLT
;
    LDX #$FF          ; Set stack bottom
    TXS
;
    LDM #10000000,CPUM ; Set CPU mode register
;
; Wait f(XIN) oscillation stabilizing time
;
    LDM #00000000,CPUM ; Set CPU mode register
;
    LDA #0
    LDX #>RAM_top
RAM_clear: STA $00,X
           INX
           BNE RAM_clear
;
    LDM #00000000,P0
    LDM #11110000,P0D ; set P0 direction register
                       ; use P0_0 to P0_3 pins key on wake-up interrupt
    LDM #00000111,PULL ; set P0_0 to P0_3 pins pull-up
                       ; set P0_0 to P0_3 pins pull-up
    CLB 7,INTEDGE     ; enable P0_0 key on wake-up
    CLB 4,IREQ1       ; clear key on wake-up interrupt request
    SEB 4,ICON1       ; enable key on wake-up interrupt

    CLI                ; enable interrupt

```

```

__MAIN:
;
; process
;
    BRA __MAIN
;

```

[KEY Interrupt Process]

```

__KEY:
    CLD
    CLT
    PHA
;
    LDA P0              ; read Port P0 register
    AND #00001111
    CMP #00001111
    BNE __KEY_01       ; key input? -> yes
    CLB KEY_ON_FLAG    ; key on flag clear
    BRA __KEY_02
;
__KEY_01:
    STA KEY_CODE
    SEB KEY_ON_FLAG    ; set Key on flag
;
__KEY_02:
;
    PLA
    RTI
;

```

Figure 5 Sample Programming Code for Application Example of Key-on Wakeup (2)

5. Reference

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

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REVISION HISTORY	7544 Group I/O Port (Key-on Wake-up)
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		Page	Summary
1.00	Apr 01, 2003	-	First Edition issued
2.00	Nov 12, 2004	5-6	Sample Programming Code added.

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