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April 1st, 2010
Renesas Electronics Corporation

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38C2 Group

Timer 2 Operation (Timer Mode: Piezoelectric Buzzer Output)

1. Abstract

The following article introduces and shows an example of how to use the Timer 2 (timer mode: piezoelectric buzzer output) on the 38C2 group device.

2. Introduction

The explanation of this issue is applied to the following condition:
Applicable MCU: 38C2 Group
Oscillation frequency: 8 MHz

In this sample program, the bit of the function which is not used may be operated on account of bit arrangement of SFR. Please set these setting values according to the use situation of a user system.

3. Contents

3.1 Piezoelectric Buzzer Output

Outline: The timer mode of timer 2 is used for a piezoelectric buzzer output.

Specifications: The rectangular waveform which is clock f(XIN) = 8MHz divided up to 2 kHz is output from the P36/T2OUT pin.
The level of the P36/T2OUT pin is fixed to “H” while a piezoelectric buzzer output is stopped.

Figure 3.1 shows an output waveform and peripheral circuit example, and Figure 3.2 shows the timers connection and setting of division ratios. Figure 3.3 shows the relevant registers setting, and Figure 3.4 shows the control procedure.

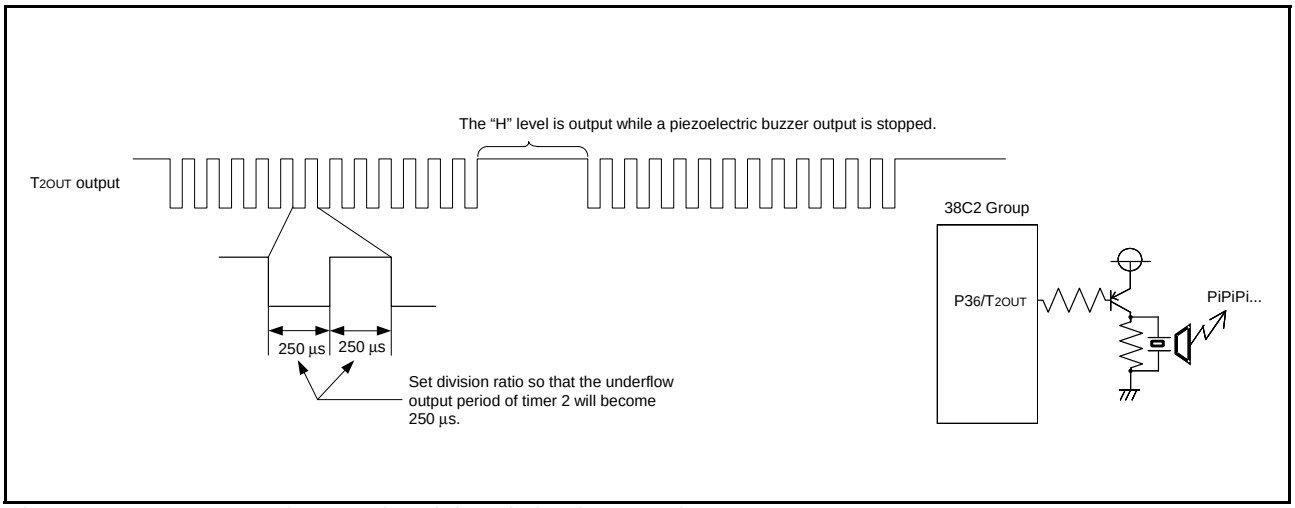

Figure 3.1 Output waveform and peripheral circuit example

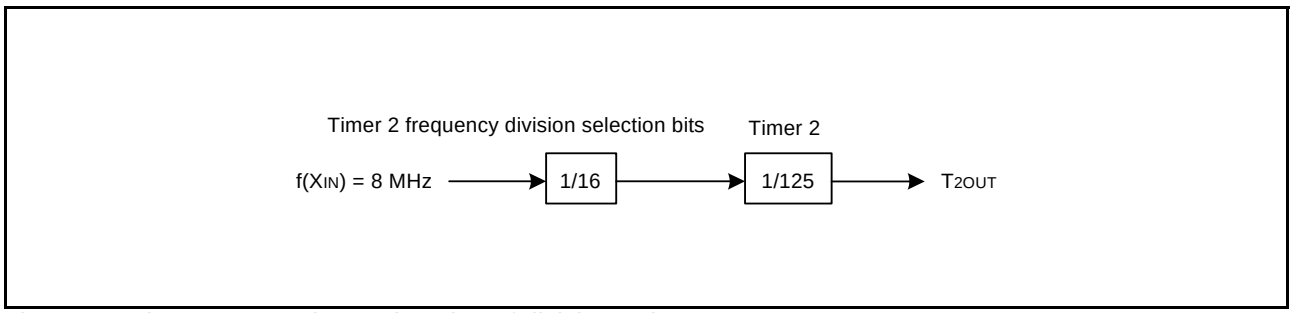

Figure 3.2 Timers connection and setting of division ratios

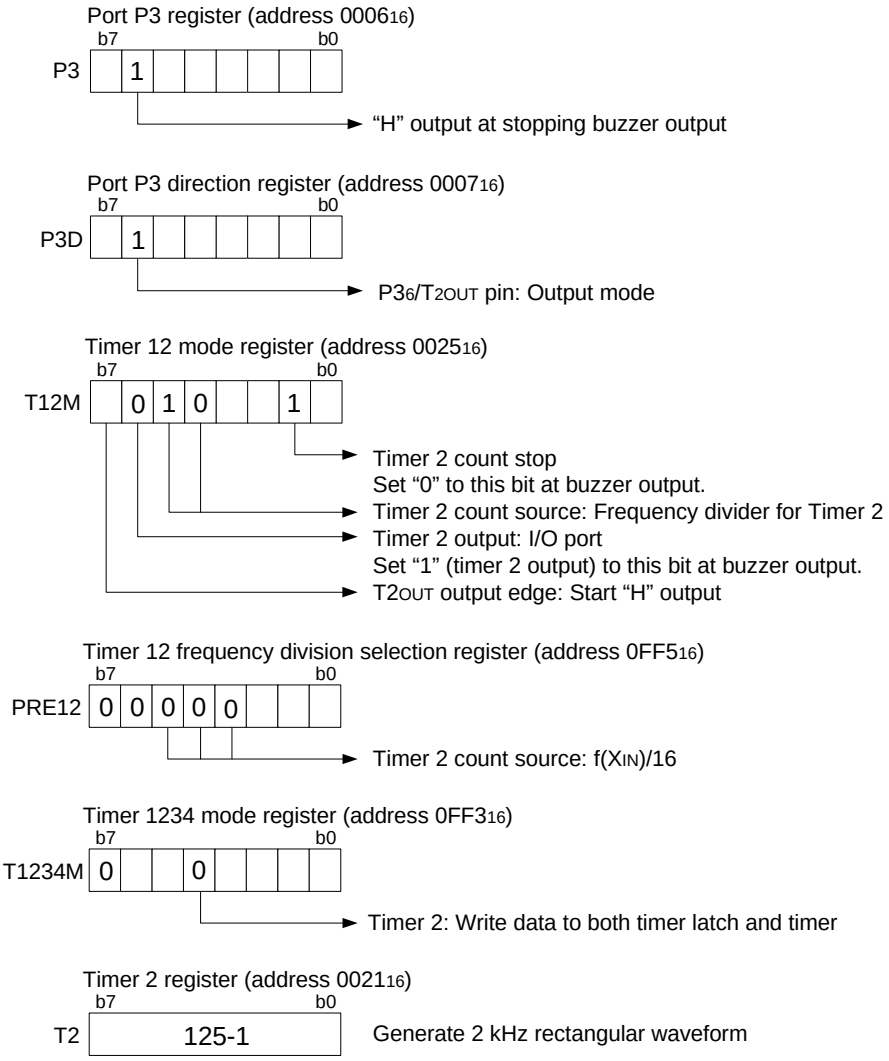

Figure 3.3 Relevant registers setting

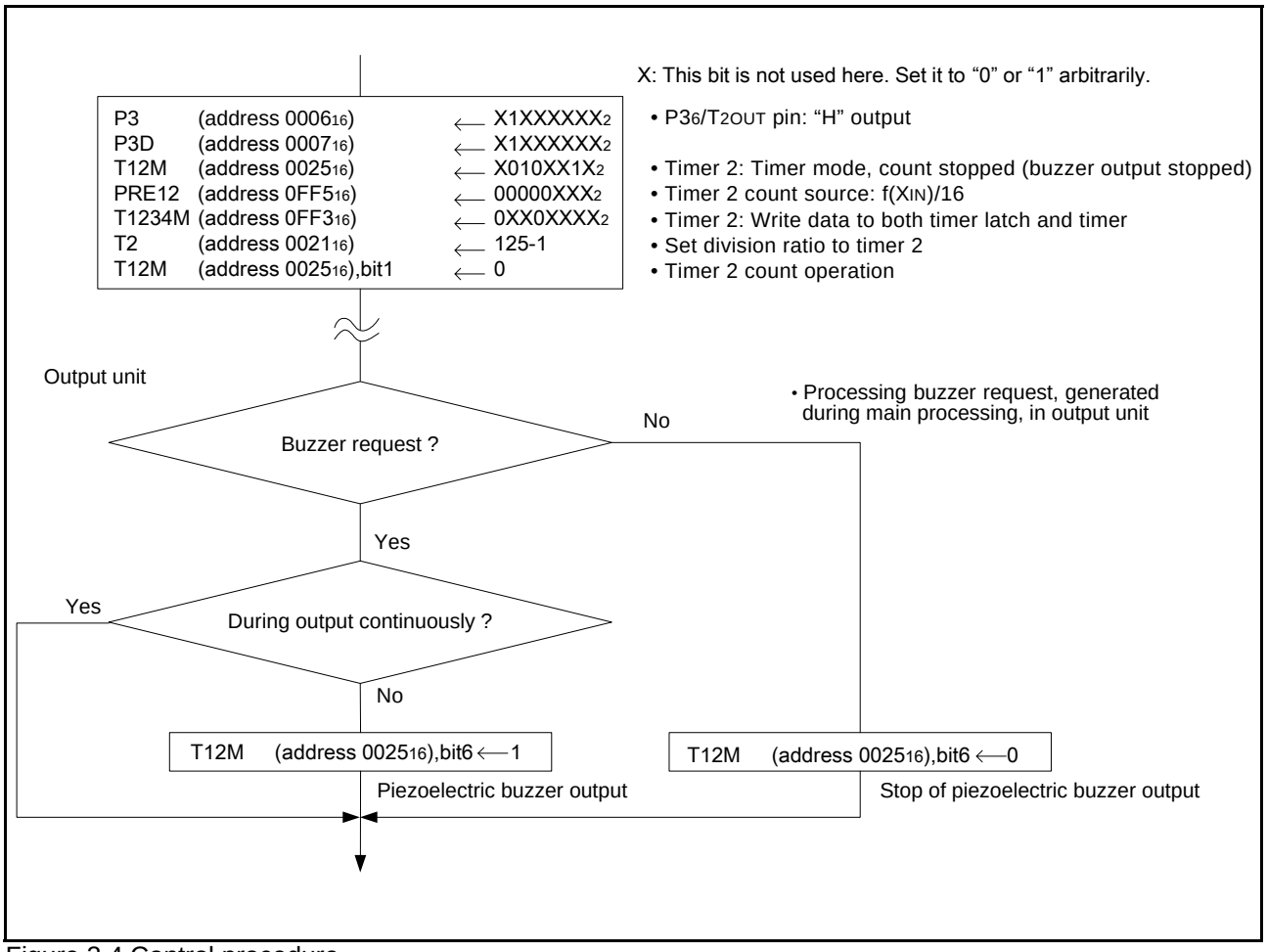

Figure 3.4 Control procedure

4. Sample Programming Code

```
[Setting of control register]
     LDM  #%01000000,P3     ;Set Port P3 register
     LDM  #%01000000,P3D    ;Set Port P3 direction register
  ;
     LDM  #%00100010,T12M   ;Set Timer 12 mode register
     LDA  #%00000000
     STA  PRE12             ;Set Timer 12 frequency division selection
     LDA  #%00000000
     STA  T1234M            ;Set Timer 1234 mode register
     LDM  #125-1,T2         ;Set Timer 2
     CLB  R_BUZZER          ;Clear Buzzer request flag
     CLB  F_BUZZER          ;Clear continuous Buzzer flag
  ;
     CLB 1,T12M             ;Timer 2 start




[Main routine]
  _MAIN:
     BBC  R_BUZZER,STOP_buzzer
     BBS  F_BUZZER,_MAIN
  ;
     SEB  6,T12M            ;Set Timer 2 mode register
     SEB  F_BUZZER
     BRA  _MAIN
  ;
  STOP_buzzer:
     CLB  6,T12M            ;Set Timer 2 mode register
     CLB  F_BUZZER
     BRA  _MAIN
```

5. Reference

Renesas Technology Corporation Semiconductor Home Page
http://www.renesas.com

E-mail Support
E-mail: support_apl@renesas.com

Data Sheet
38C2 Group (A version) Data sheet
38C2 Group Data sheet
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DEVISION HISTORY	38C2 Group Timer 2 (Timer Mode: Piezoelectric Buzzer Output) Application Note

Rev.	Date	Description	
		Page	Summary
1.00	Feb 06, 2004	-	First edition issued
2.00	Sep 08, 2004	5	Sample programming code revised

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