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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## 38C2 Group

### Timer X Operation (PWM Mode : Control Electronic Volume)

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#### 1. Abstract

The following document describes examples how to set the Timer X Operation (PWM Mode : Control Electronic Volume) and application examples in the 38C2 group.

#### 2. Introduction

The application example described in this document is applied to the following conditions:

Applicable MCU: 38C2 Group

Oscillation frequency: 8MHz

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

3. Contents

3.1 Control Electronic Volume

Outline:

- PWM signal of certain period is output during “H” duration

Specifications:

- Signal of “H” width 5μs and period 20μs is output from the P35/TXOUT pin

Example:

- Period of the count source is 125ns when  $f(XIN)=8MHz$

Figure 3.1 shows the Timer Connection and Setting of Division Ratio; Figure 3.2 and 3.3 show the Relevant Registers Setting and Control Procedure; Figure 3.4 shows the PWM (TXOUT) Output Waveform.

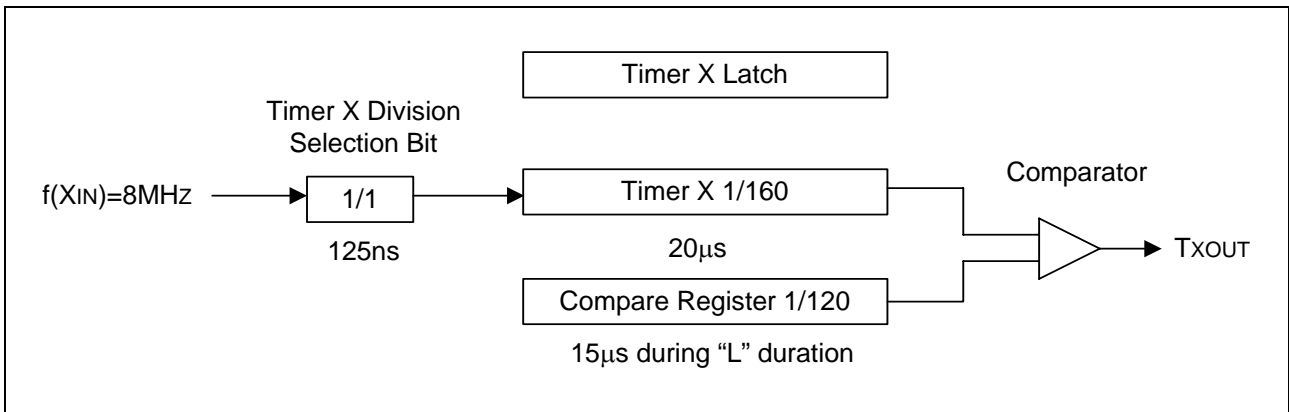


Figure 3.1 Timer Connection and Setting of Division Ratio

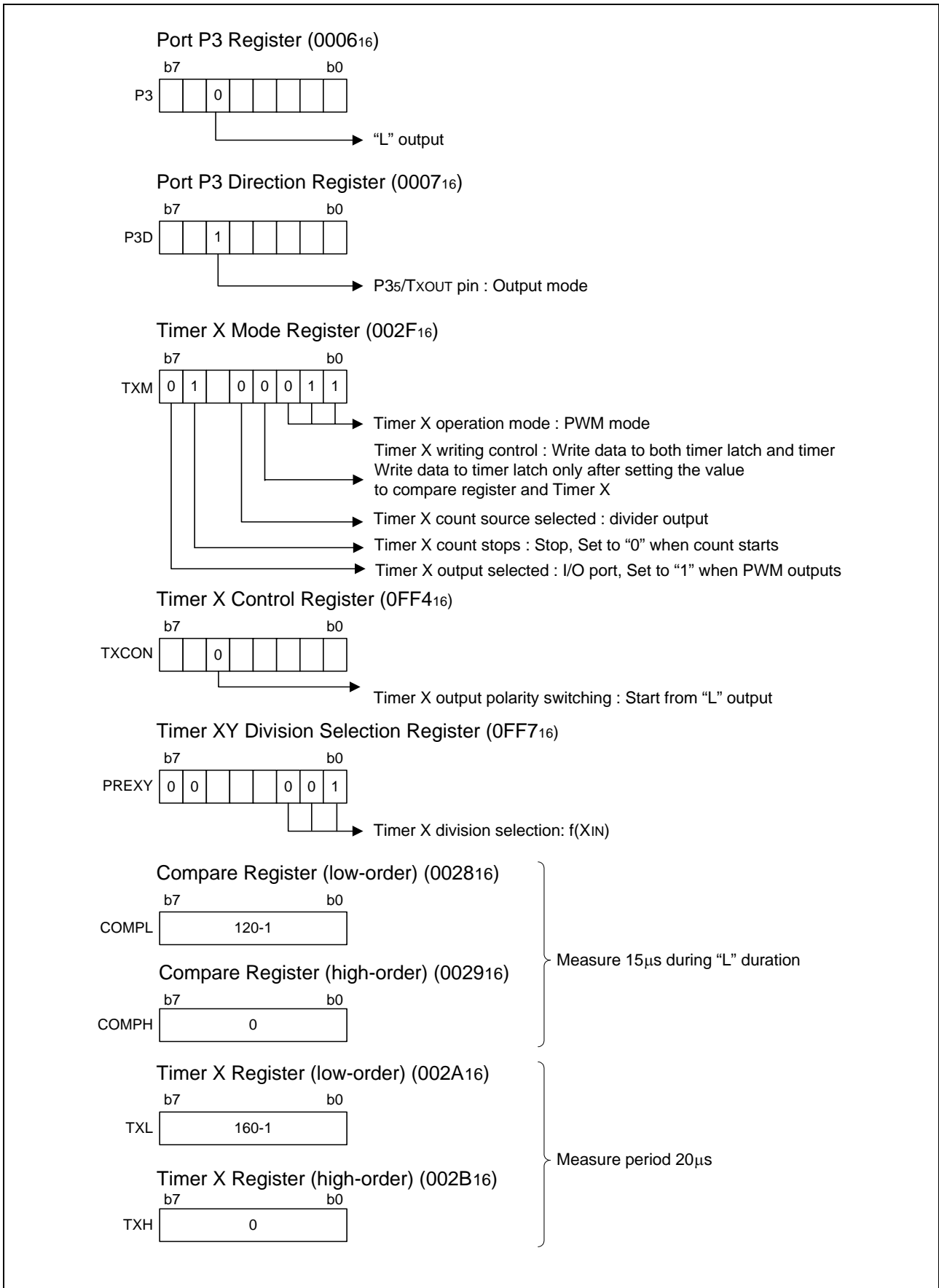


Figure 3.2 Relevant Registers Setting

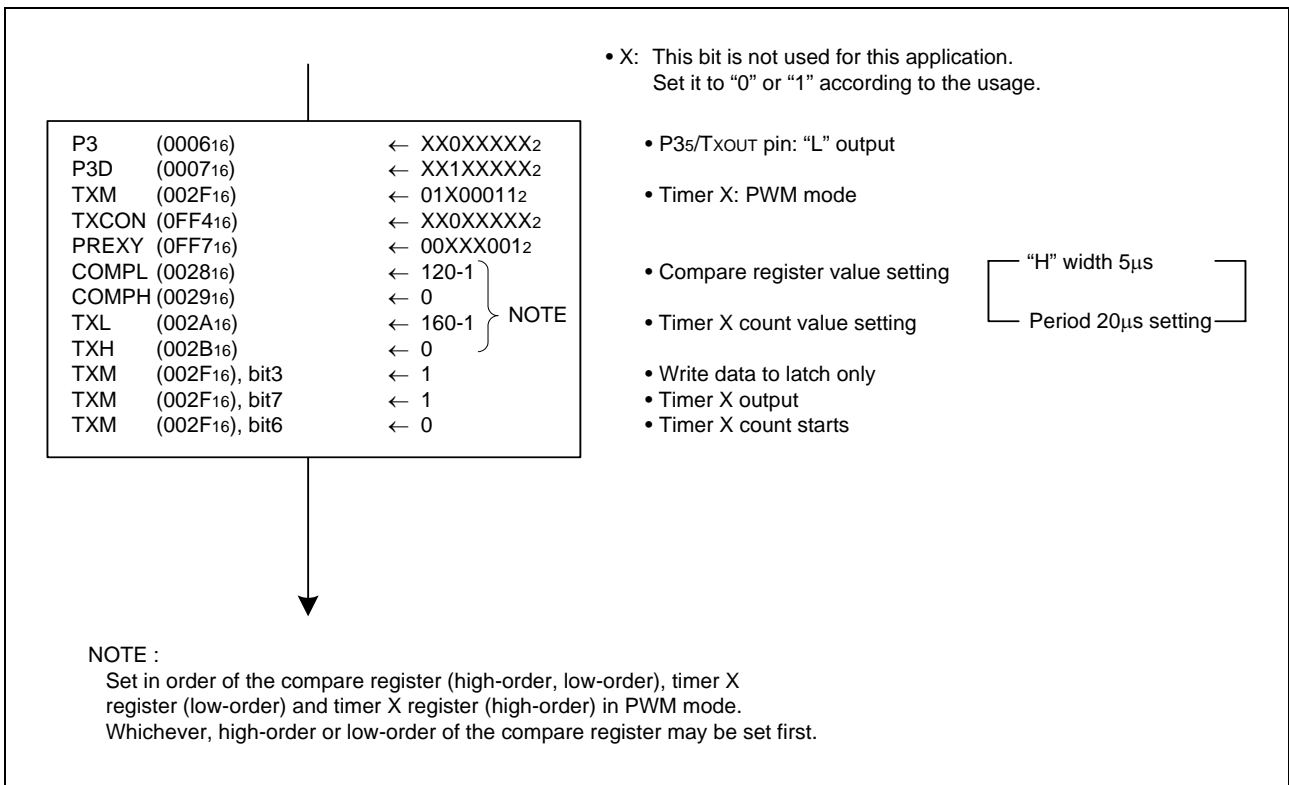


Figure 3.3 Control Procedure

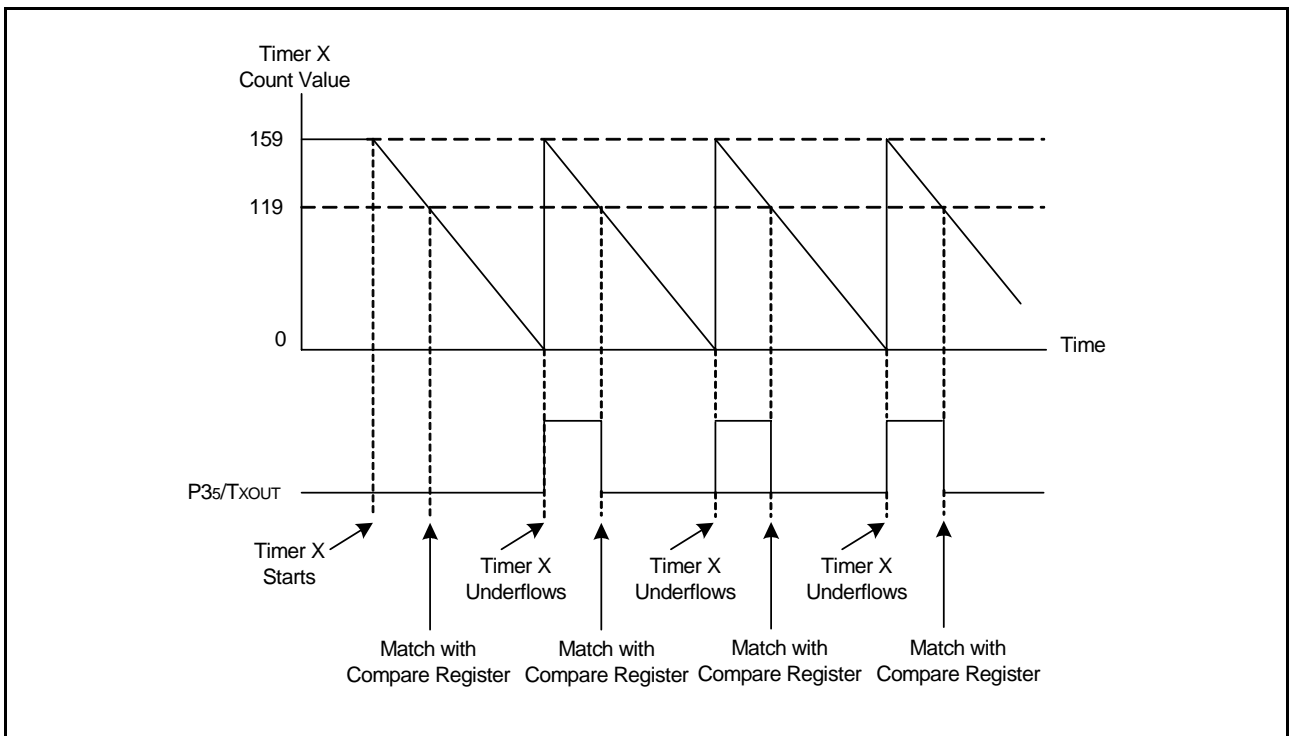


Figure 3.4 PWM (TxOUT) Output Waveform

#### 4. Sample Programming Code

[Setting of Control Register]

```

LDM #00000000,P3      ;Set Port P3 register
LDM #00100000,P3D     ;Set Port P3 direction register
;
LDM #01000011,TXM     ;Set Timer X mode register
LDA #00000000         ;Set Timer X control register
STA TXCON
;
LDA #00000001         ;Set Timer XY frequency division selection
STA PREXY
;
LDM #120-1,COMPL      ;Set Compare register (low)
LDM #0,COMPH          ;Set Compare register (high)
;
LDM #160-1,TXL        ;Set Timer X (low)
LDM #0,TXH            ;Set Timer X (high)
;
SEB 3,TXM
;
SEB 7,TXM              ;Timer X output
;
CLB 6,TXM              ;Timer X start
;

```

## 5. Reference

Data Sheet  
38C2 Group (A version) Data sheet

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REVISION HISTORY	38C2 Group Timer X Operation (PWM Mode : Control Electronic Volume)
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Rev.	Date	Description	
		Page	Summary
1.00	Oct 20, 2004	-	First Edition issued

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