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April 1st, 2010
Renesas Electronics Corporation

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38D2 Group

Timer X Operation (PWM Mode: Electric Volume Control)

1. Abstract

The following article introduces and shows an example of how to use the Timer X Operation (PWM Mode: Electric Volume Control) on the 38D2 Group device.

2. Introduction

The application explained in this document applies to the following MCU and parameter(s):

Applicable MCU: 38D2 Group

Oscillation frequency: 8 MHz

This sample program may include operations of unused bit functions for the convenience of the SFR bit layout.
Set the values according to the operational conditions of the user system.

3. Contents

3.1 Electric Volume Control

Outline: PWM signal of "H" interval, fixed period is output.

Specifications:

- A signal of 5 μsec "H" width, 20 μsec period is output from P35/TXOUT1 pin.

Example: When $f(X_{IN}) = 8 \text{ MHz}$, the count source is 125 nsec.

Figure 3.1 shows the Connection Diagram and Division Ratio of Timer, Figure 3.2 shows the Relevant Register Settings, Figure 3.3 shows the Control Procedure, Figure 3.4 shows the PWM (TXOUT1) Output Waveform.

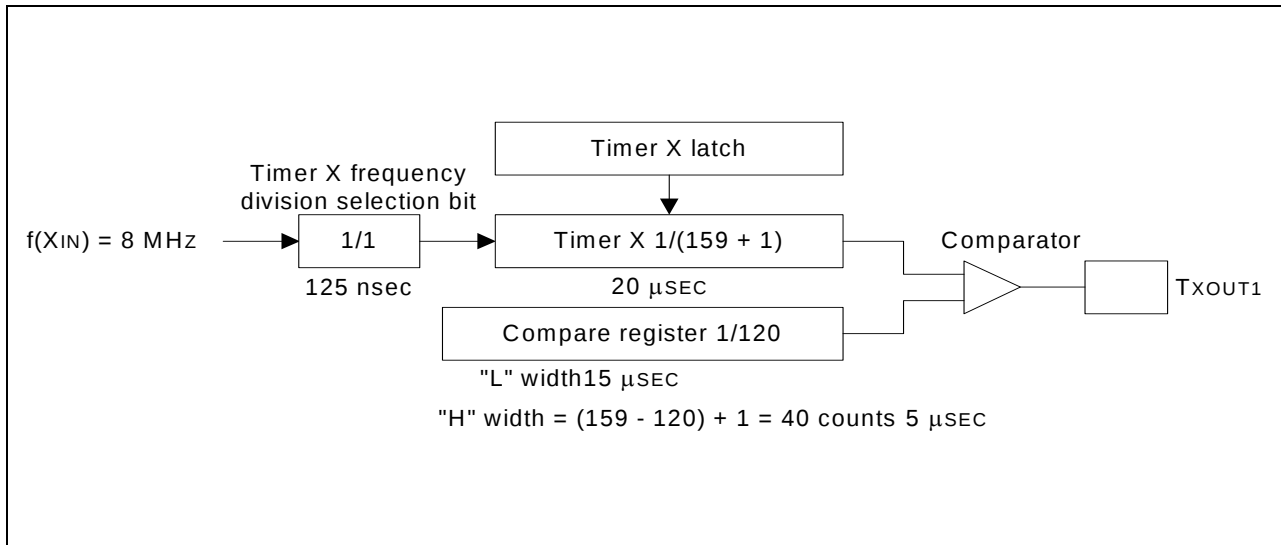
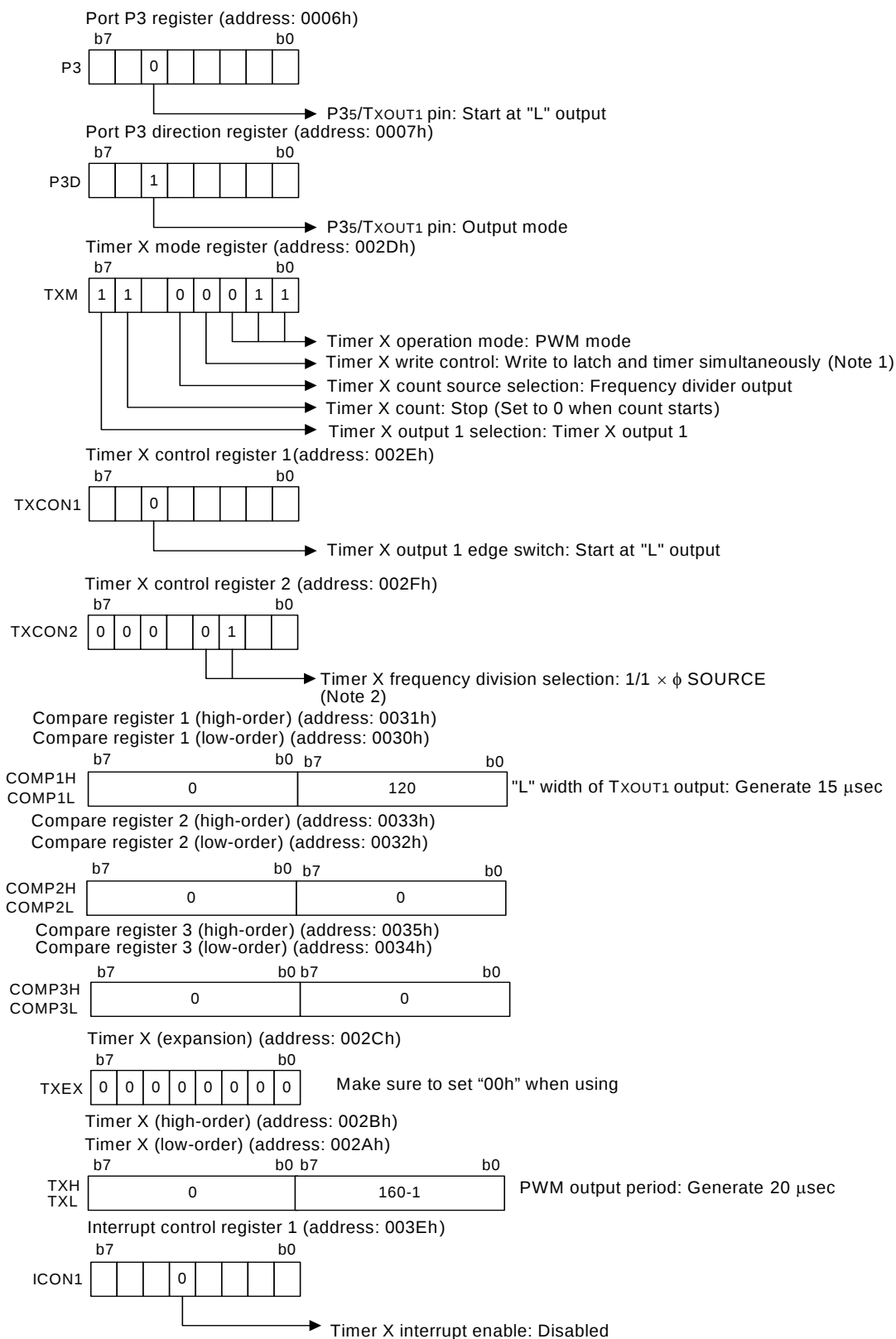


Figure 3.1 Connection Diagram and Division Ratio of Timer



Note: 1. Write value to latch only after setting value to compare registers and timer X registers.
2. ϕ SOURCE = XIN input in frequency/2, 4, 8 mode, on-chip oscillator divided by 4 in on-chip oscillator mode, and oscillation frequency of sub-clock in low-speed mode

Figure 3.2 Relevant Register Settings

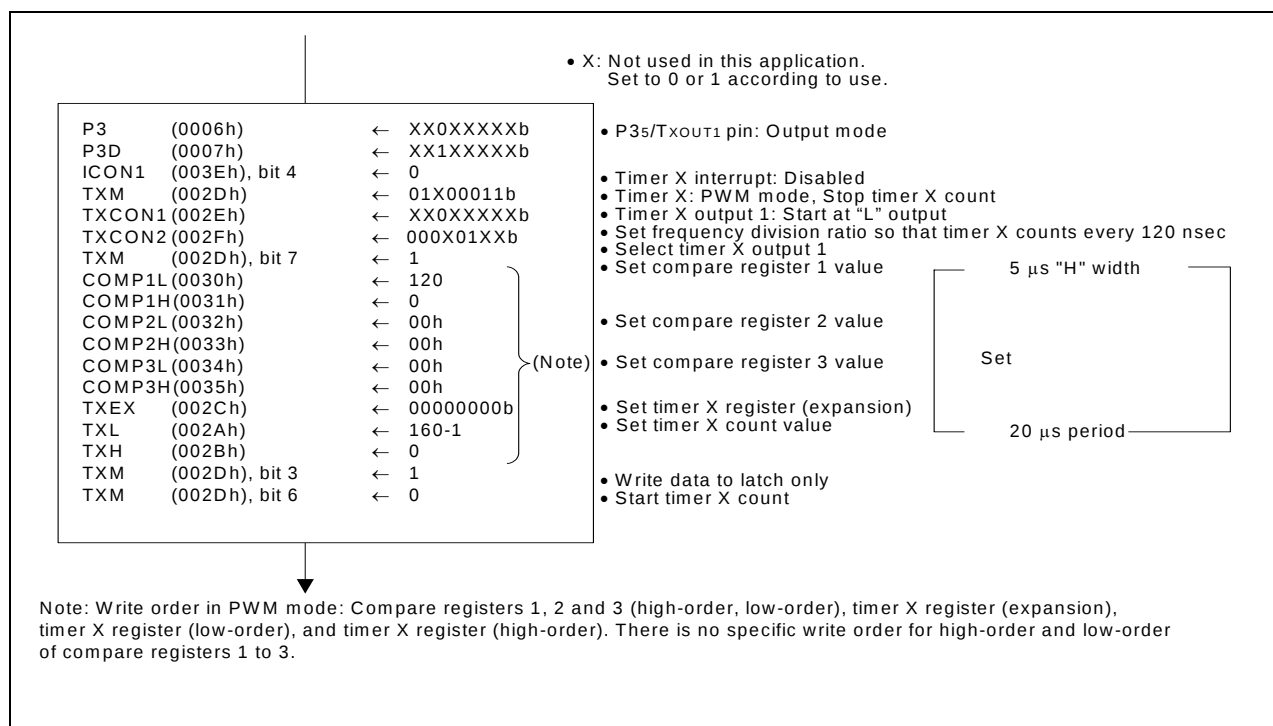


Figure 3.3 Control Procedure

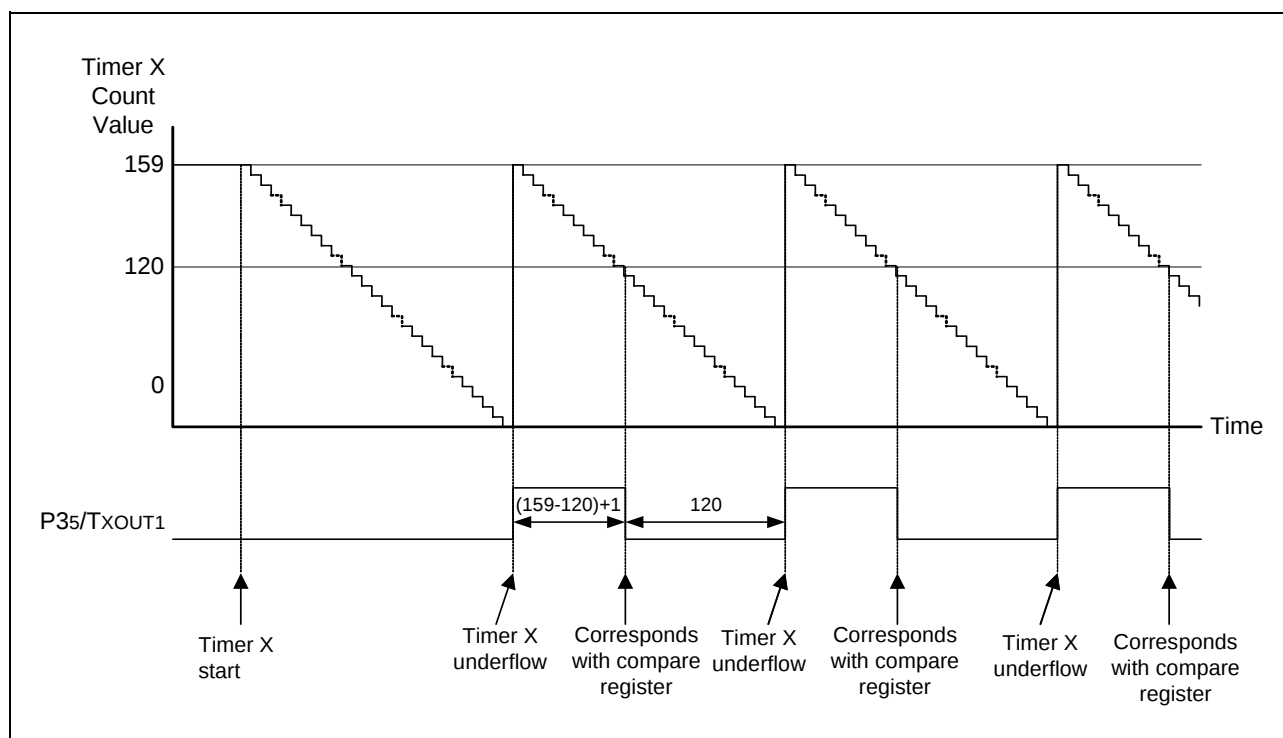


Figure 3.4 PWM (TXOUT1) Output Waveform

4. Sample Programming Code

Download a sample program from the Renesas Technology website.
To download, click "Application Notes" in the left side menu on the page of the 38D2 Group.

5. Reference Document

Datasheet
38D2 Group Datasheet
Download the latest version from the Renesas Technology website.

Technical News/Technical Update
Download the latest information from the Renesas Technology website.

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REVISION HISTORY	38D2 Group Timer X Operation (PWM Mode: Electric Volume Control)
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Rev.	Date	Description	
		Page	Summary
1.00	Feb 9, 2007	–	First Edition issued

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