

To our customers,

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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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## 3823 Group

### Timer X Operation (Event Counter Mode: Frequency Measurement)

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#### 1. Abstract

The following article introduces and shows an example of Timer X Operation (Event Counter Mode: Frequency Measurement) on the 3823 group device.

#### 2. Introduction

The explanation of this issue is applied to the following conditions:

Applicable MCU: 3823 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 Frequency Measurement

Outline:

- Pulses input from the P54/CNTR0 pin are counted in timer X event counter mode.
- Calculate the frequency from the number of pulses in 2 ms.
- A valid input pulse is in the 10 to 20 kHz (20 to 40 pulses) frequency range.

Specifications:

- Clock  $f(XIN) = 8\text{ MHz}$  is divided with timers 1 and 2, and the timer X count value is read with the timer 2 interrupt which generates 2 ms intervals.
- Timer X is counted down from the initial value of 255 and is initialized at every timer 1 interrupt.
- The valid frequencies for the timer X count are 235 to 215.

Figure 3.1 shows the Judgment Method of Valid/Invalid of Input Pulses, Figure 3.2 shows the Relevant Register Settings, and Figure 3.3 shows the Control Procedure.

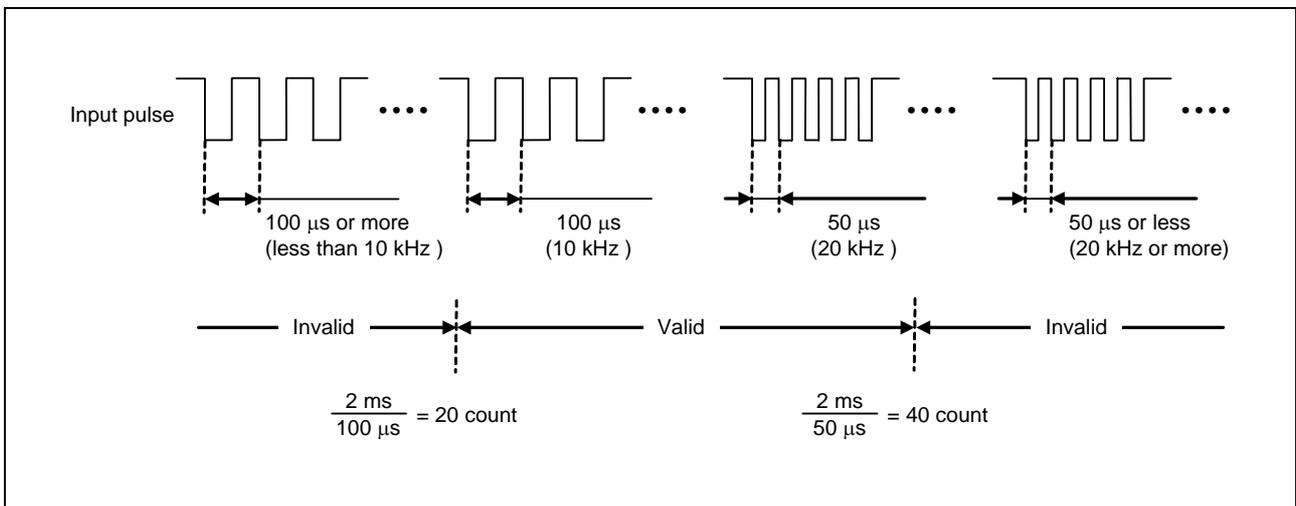


Figure 3.1 Judgment Method of Valid/Invalid of Input Pulses



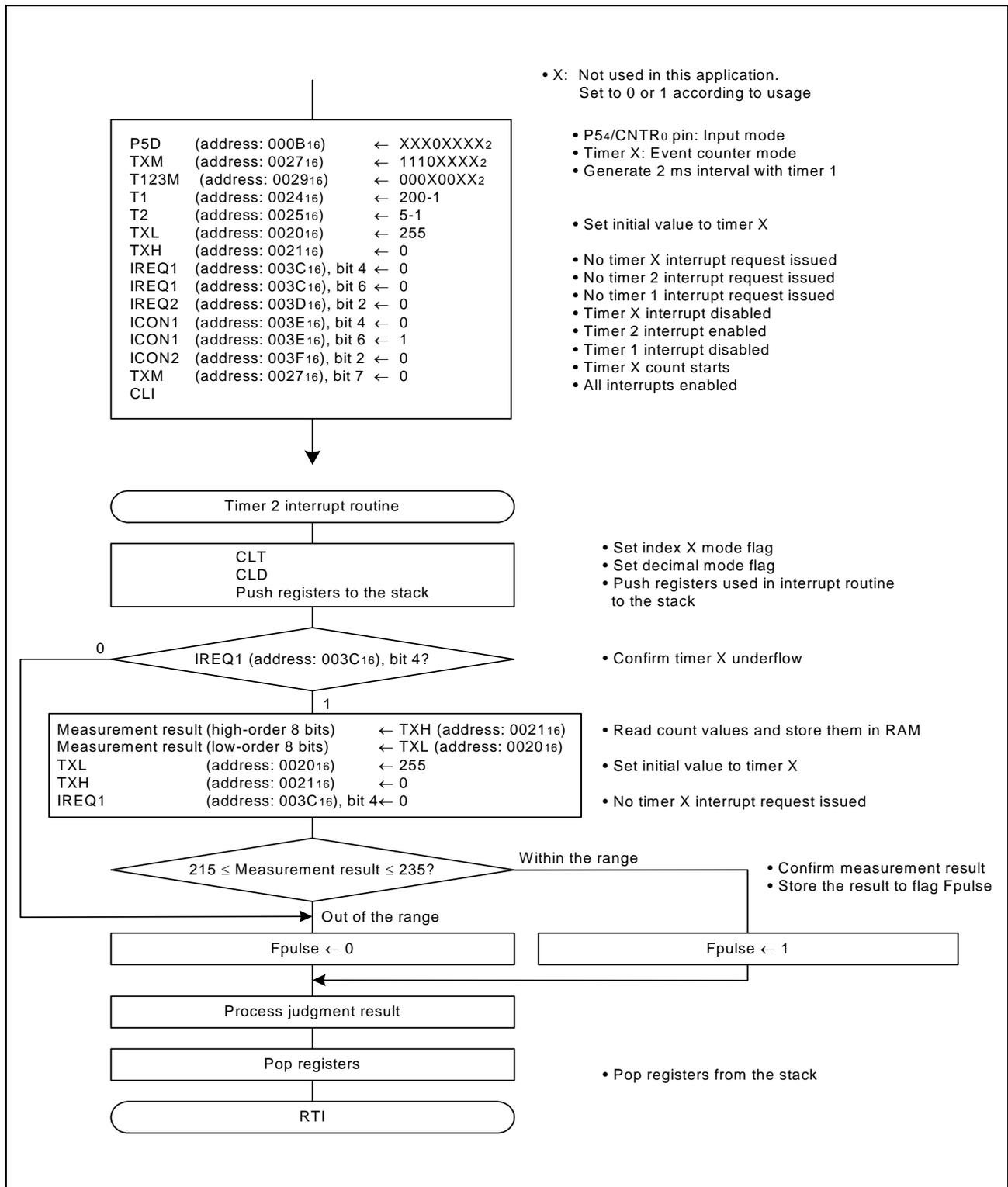


Figure 3.3 Control Procedure

#### 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 3823 Group.

#### 5. Reference Document

Datasheet  
3823 Group Data sheet  
Download the latest version from the Renesas Technology website.

Technical News/Technical Update  
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REVISION HISTORY	3823 Group Timer X Operation (Event Counter Mode: Frequency Measurement)
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		Page	Summary
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