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April 1st, 2010
Renesas Electronics Corporation

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# 3823 Group

## Timer X Operation (Real Time Port Control: Stepping Motor Control)

## 1. Abstract

The following article introduces and shows an example of Timer X Operation (Real Time Port Control: Stepping Motor Control) 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

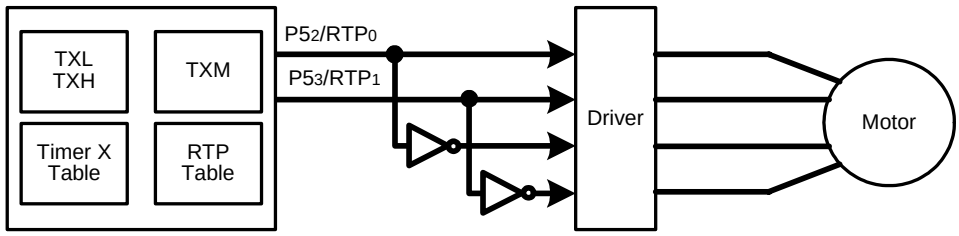
## 3.1 Stepping Motor Control

Outline: The rotation of the stepping motor is controlled by using real time ports.

Specifications:

- Motor is controlled by using real time ports RTP0 and RTP1.
- The count source is f(XIN) = 8 MHz divided by 16.
- Timer X set value (RTP output time) and the output value of a real time port are updated within the timer X interrupt routine. Each value is set from each table.

Figure 3.1 shows the Connection Diagram, Examples of Timer X Set Value Table and RTP Output Value Table, Figure 3.2 shows the RTP Output Example, Figure 3.3 shows the Relevant Register Settings, and Figure 3.4 shows the Control Procedure.




Timer X set value table example

| RTP output time | Timer X set value |
|---|---|
| T0 (8 ms) | 0F9F16 |
| T1 (7 ms) | 0DAB16 |
| T2 (6 ms) | 0BB716 |
| T3 (5 ms) | 09C316 |
| T4 (4 ms) | 07CF16 |
| T5 (3 ms) | 05DB16 |
| T6 (2 ms) | 03E716 |
| T7 (1 ms) | 01F316 |

RTP output value table example

| RTP output pattern | RTP output value | |
|---|---|---|
| | RTP1 | RTP0 |
| (0) | 0 | 1 |
| (1) | 1 | 1 |
| (2) | 1 | 0 |
| (3) | 0 | 0 |

RTP: Real time port

**Figure 3.1 Connection Diagram, Examples of Timer X Set Value Table and RTP Output Value Table**

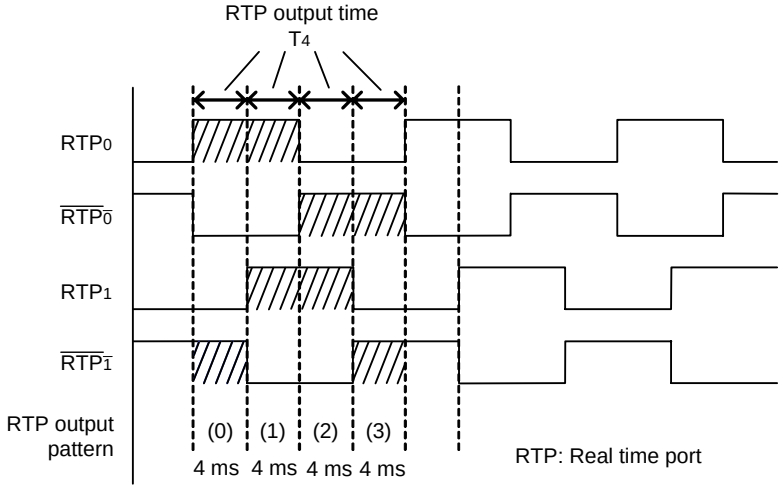



**Figure 3.2 RTP Output Example**

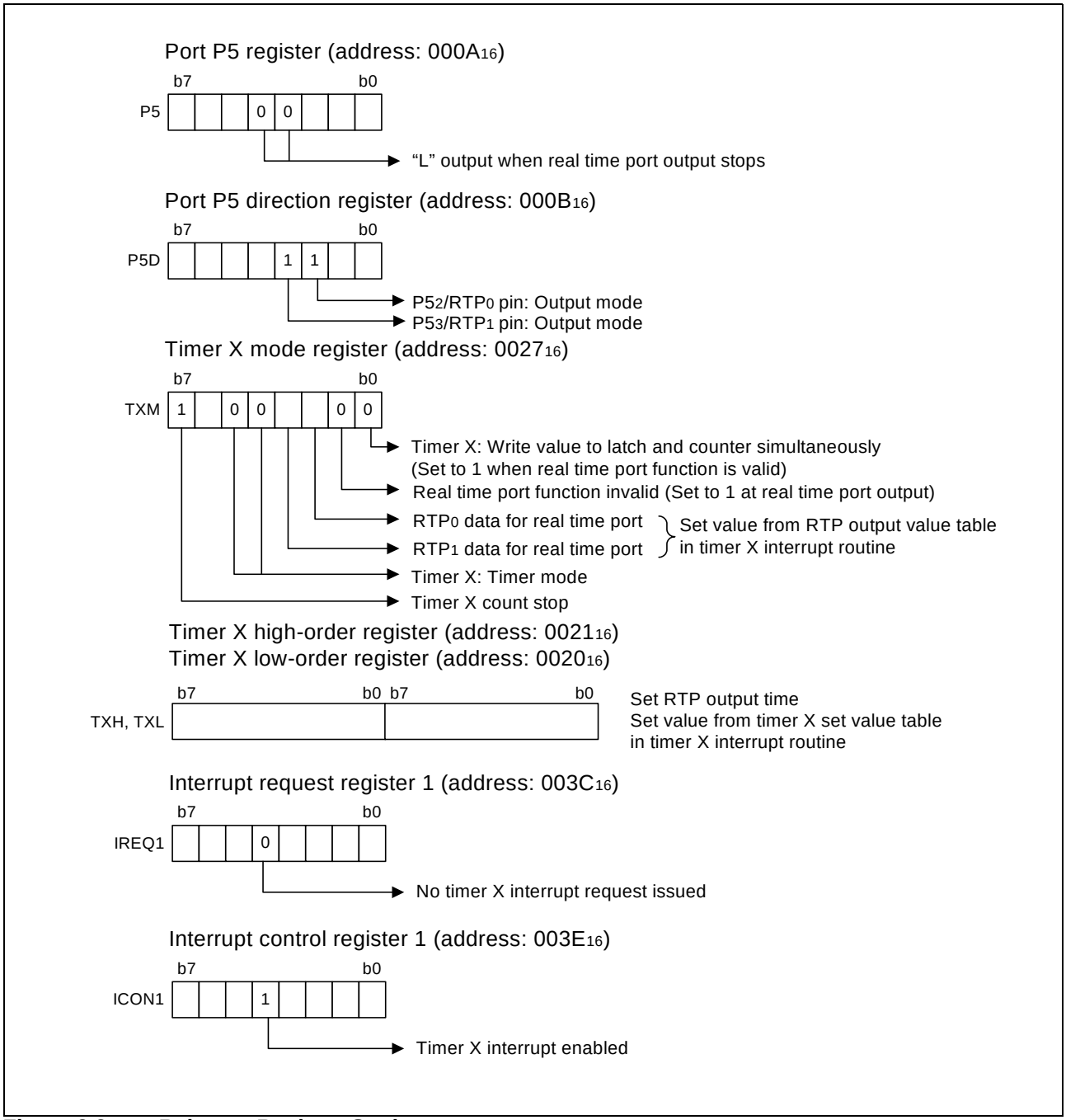



**Figure 3.3 Relevant Register Settings**

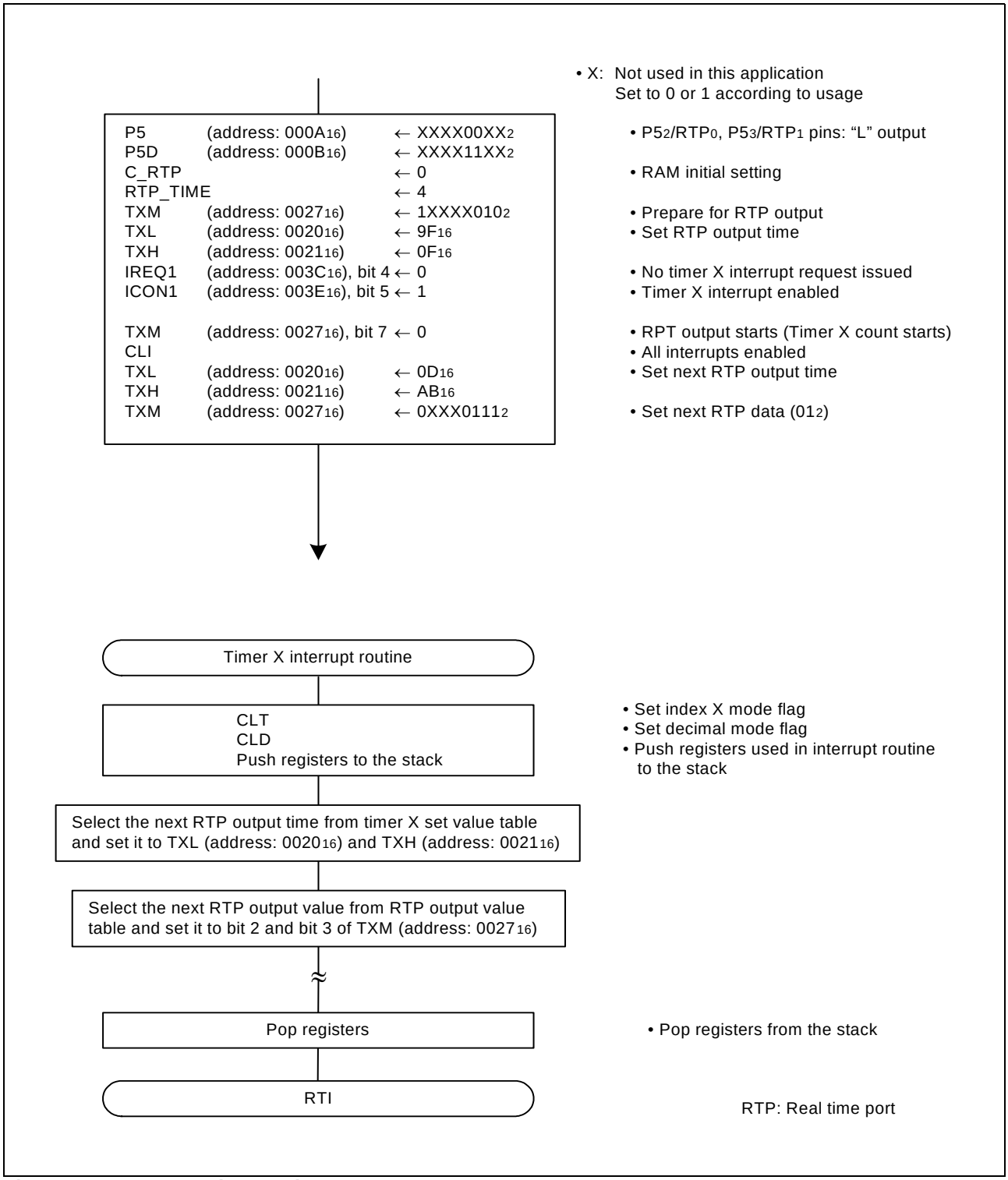



**Figure 3.4 Control Procedure**

## 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 (Real Time Port Control: Stepping Motor Control) |
|---|---|

| Rev. | Date | Description | |
|---|---|---|---|
| | | Page | Summary |
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| | | | |

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