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April 1st, 2010
Renesas Electronics Corporation

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R32C/100 Series

Timer B Operation in Event Counter Mode

1. Abstract

This document describes counting external signals (input signals from the TBiIN pin ($i = 0$ to 5)), and counting timer overflow/underflow.

2. Introduction

The application described in this document applies to the following MCU:

- MCU: R32C/118 Group

This program can be used with other R32C/100 Series MCUs which have the same special function registers (SFRs) as the R32C/118 Group. Check the manual for any additions or modifications to functions. Careful evaluation is recommended before using this application note.

3. Application Example

This section describes how to generate an interrupt request every thousandth count by counting the falling edges of the TBiIN pin ($i = 0$ to 5).

3.1 Explanation

- (1) After setting the TBiS bit in the TABSR or TBSR register to 1 (count started), the counter decrements the count source.
- (2) When the counter underflows, the value from the reload register is reloaded, and the count continues. At the same time, the IR bit in the TBiC register becomes 1 (interrupt requested).
- (3) After setting the TBiS bit to 0 (counter stopped), the counter holds the count value and stops.

The diagram below shows operation timing.

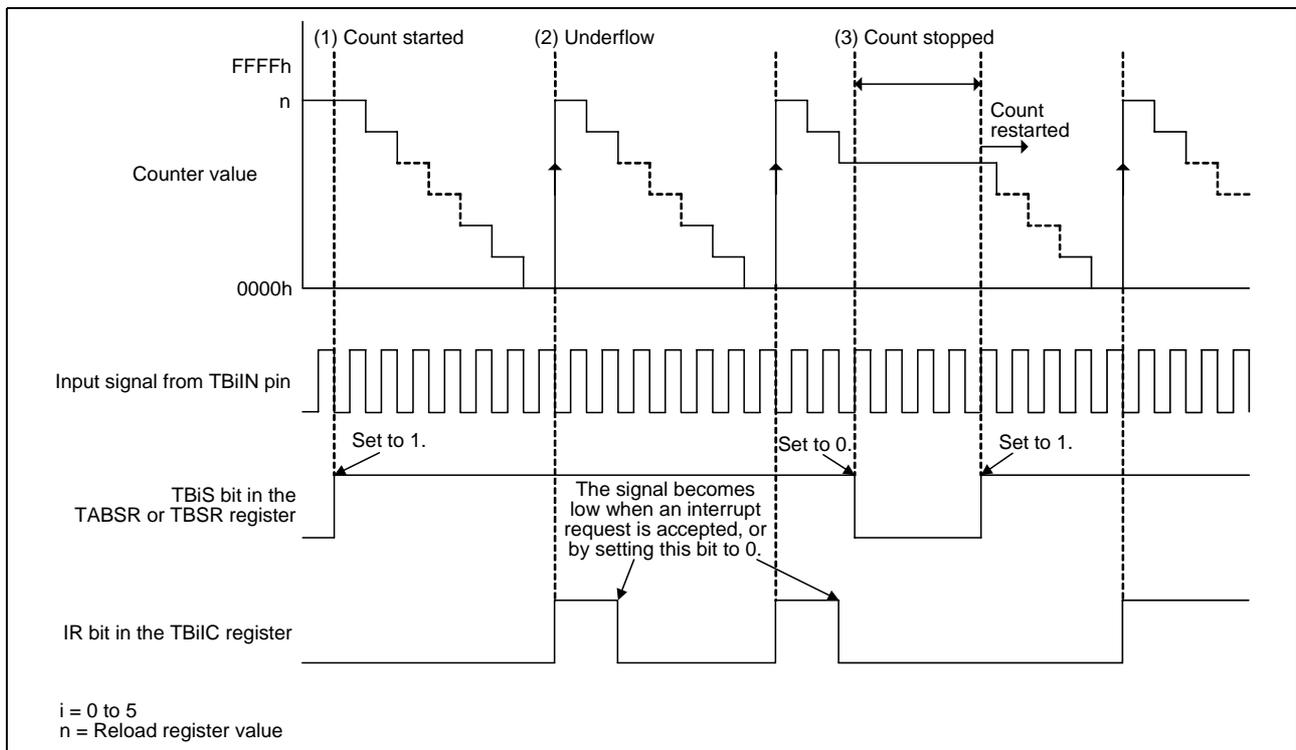


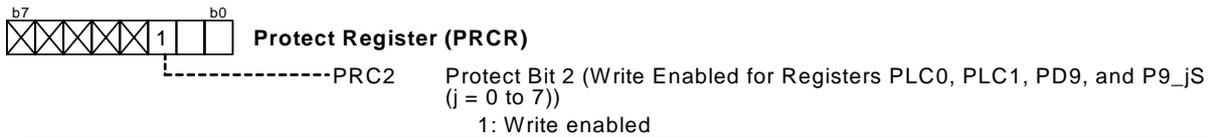
Figure 3.1 Operation in Event Counter Mode

3.2 Setting

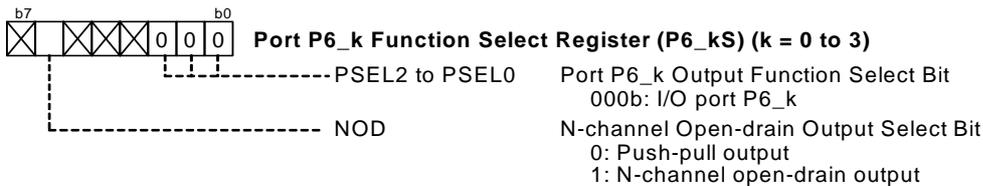
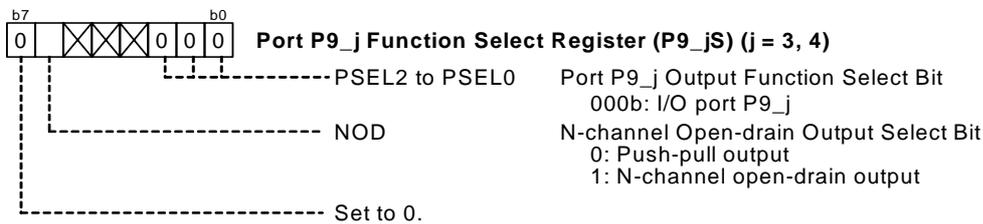
This section shows the procedures and values to set the example in section 3.1 “Explanation”. Refer to individual MCU hardware manuals for details on individual registers.

(1) Set the function select register. Assign the TBiIN pin (i = 0 to 5) to P6_0 (TB0IN), P6_1 (TB1IN), P6_2 (TB2IN), P9_3 (TB3IN), P9_4 (TB4IN), and P6_3 (TB5IN). Set the output function select bit in the function select register to 000b (I/O port).

When Using P9_3 (TB3IN) and P9_4 (TB4IN)

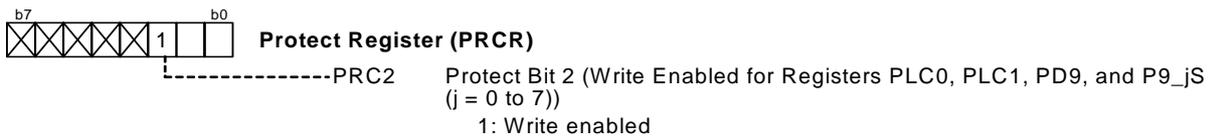


After setting the PRC2 bit to 1 (write enabled), rewrite the P9_{jS} register with the next instruction. Do not generate an interrupt or perform DMA transfer in-between setting the PRC2 bit to 1 and rewriting the P9_{jS} register.

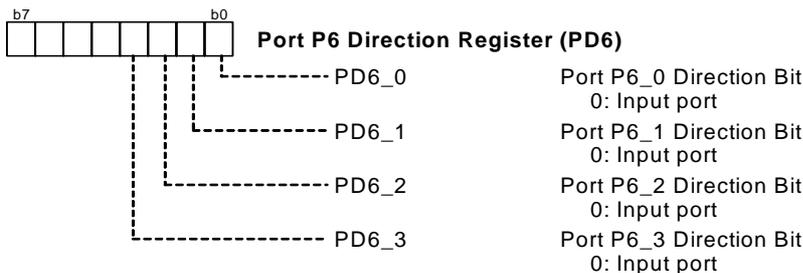
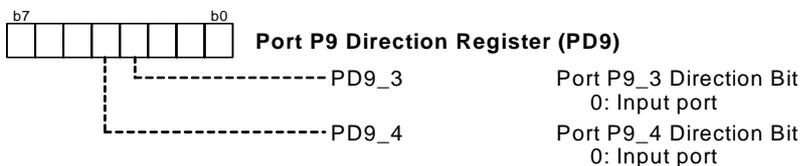


(2) Set the port P6 and P9 direction registers. Set the pins to be used as TBiIN pins as input ports.

When Using P9_3 (TB3IN) and P9_4 (TB4IN)



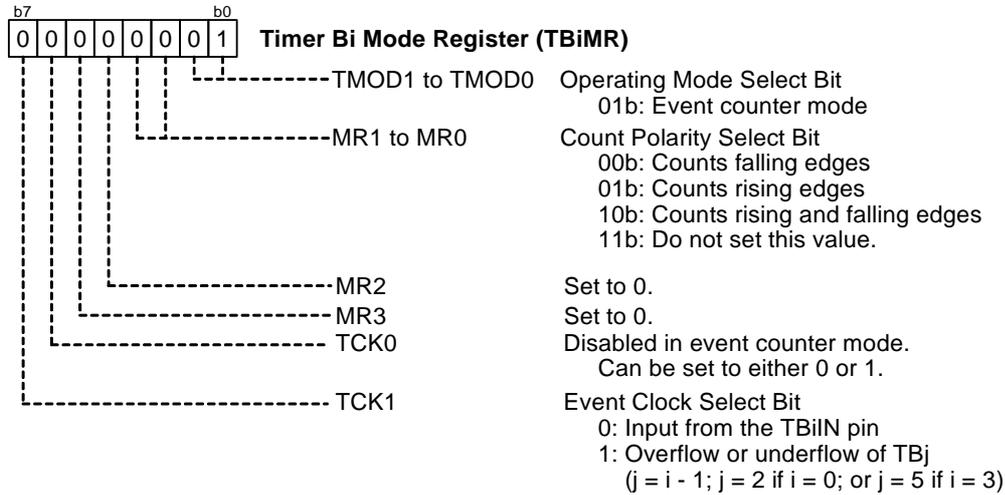
After setting the PRC2 bit to 1 (write enabled), rewrite the PD9 register with the next instruction. Do not generate an interrupt or perform DMA transfer in-between setting the PRC2 bit to 1 and rewriting the PD9 register.



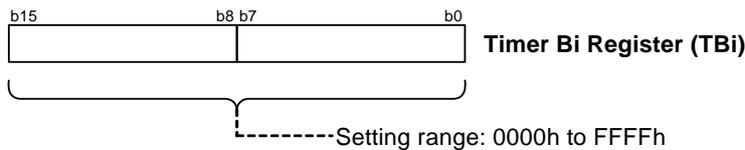
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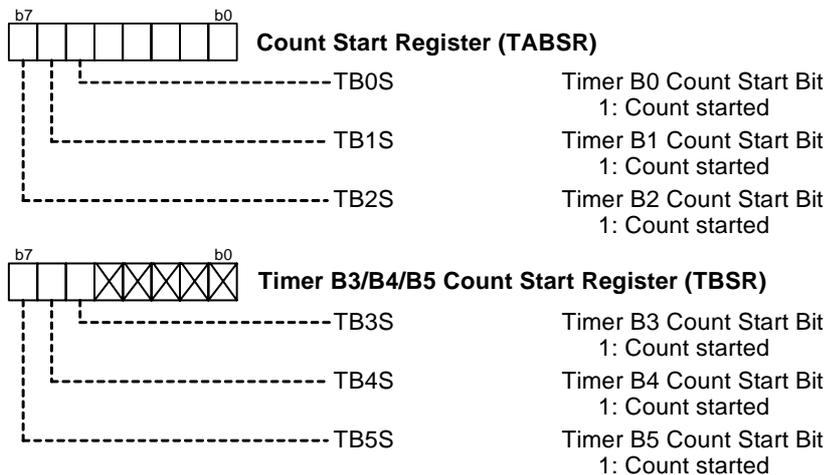
(3) Set the timer Bi mode register (i = 0 to 5).



(4) Set the timer Bi register.



(5) Set the count start registers.



4. Sample Program

A sample program can be downloaded from the Renesas Technology website.

5. Reference Documents

Hardware Manual

R32C/118 Group Hardware Manual Rev.1.00

The latest version can be downloaded from the Renesas Technology website.

Technical Update/Technical News

The latest information can be downloaded from the Renesas Technology website.

C Compiler Manual

R32C/100 Series C Compiler Package Ver. 1.02 Compiler User's Manual Rev. 1.00

The latest version can be downloaded from the Renesas Technology website.

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REVISION HISTORY	Timer B Operation in Event Counter Mode
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Rev.	Date	Description	
		Page	Summary
1.00	Mar. 5, 2010	—	Initial release

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