

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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## M16C/Tiny Series

### Operation of Timer B (Event Counter Mode)

#### 1. Abstract

In event counter mode, choose functions from those listed in Table 1. Operations of the checked items are described below.

**Table 1. Chosen Functions**

Item	Set-up	
	Yes	
Count source		Input signal to TBi <sub>IN</sub> (counting falling edges)
		Input signal to TBi <sub>IN</sub> (counting rising edges)
		Input signal to TBi <sub>IN</sub> (counting rising and falling edges)
		Timer overflow (TB2 overflow /TBj overflow)

Note:  $j = i - 1$ , but  $j = 2$  when  $i = 0$ .

#### 2. Introduction

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

Applicable MCU: M16C/26, M16C/26A, M16C/28, M16C/29 Group

This program can also be used when operating other microcomputers within the M16C family, provided they have the same SFR (Special Function Registers) as the M16C/26, M16C/26A, M16C/28, M16C/29 microcomputers. However, some functions may have been modified.

Refer to the User's Manual for details. Use functions covered in this Application Note only after careful evaluation.

#### 3. Operation of Timer A

- (1) Setting the count start flag to "1" causes the counter to count the falling edges of the TBi<sub>IN</sub>.
- (2) If an underflow occurs, the content of the reload register is reloaded, and the count continues. At this time, the timer Bi interrupt request bit goes to "1".
- (3) Setting the count start flag to "0" causes the counter to hold its value and to stop.

Figure 1 shows the operation timing of event counter mode.

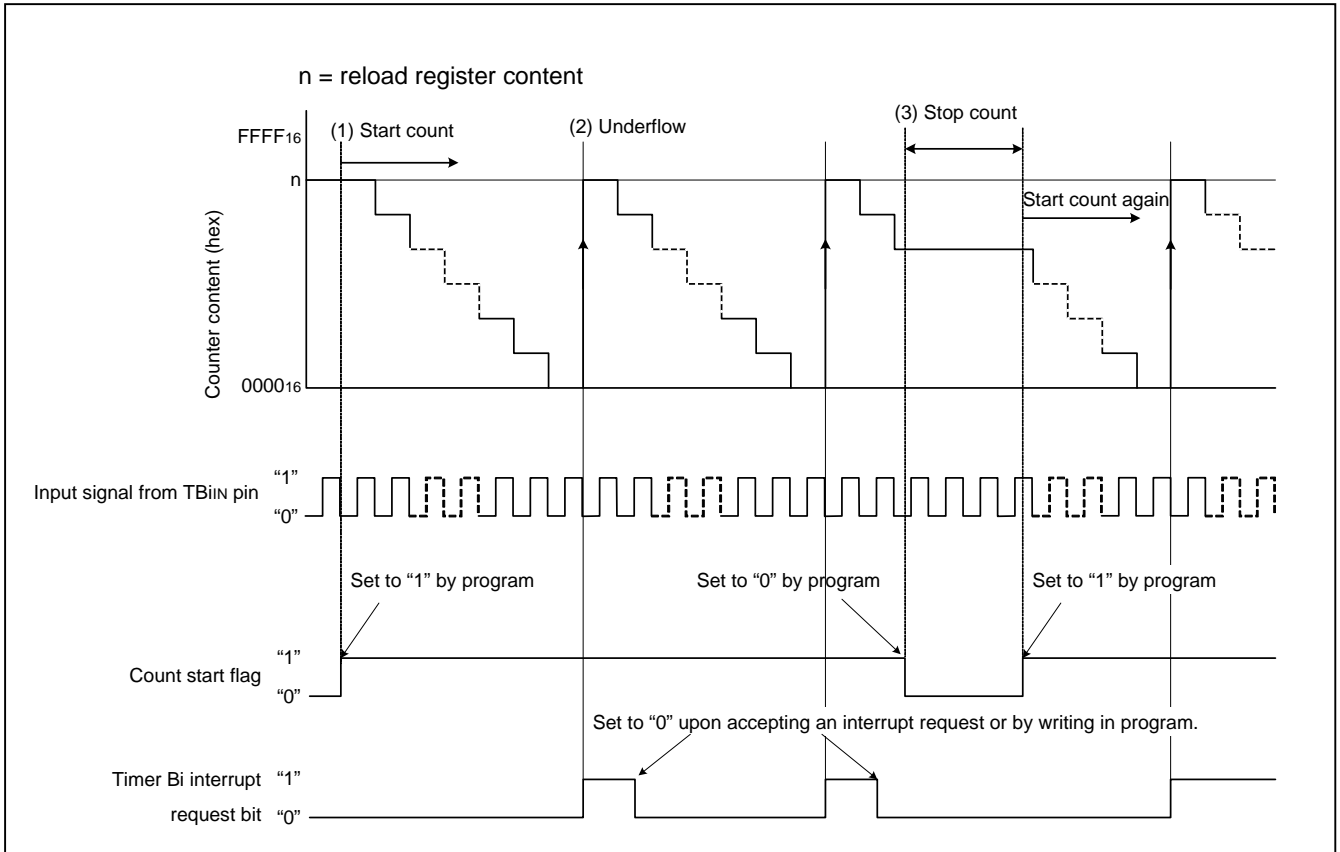
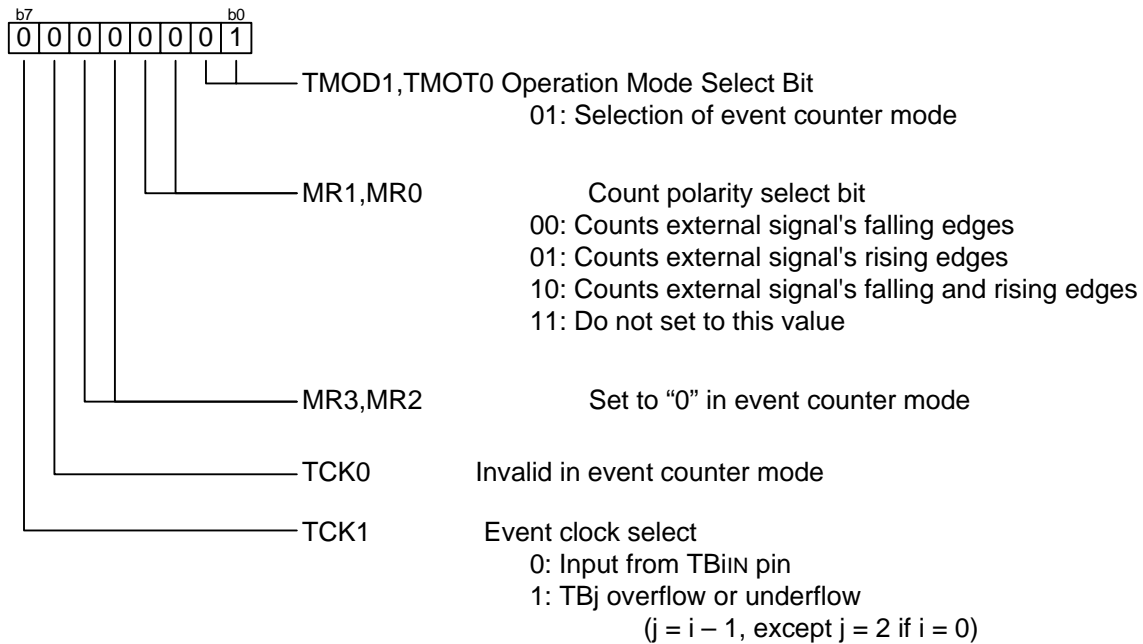


Figure 1. Operation Timing of Event Counter Mode

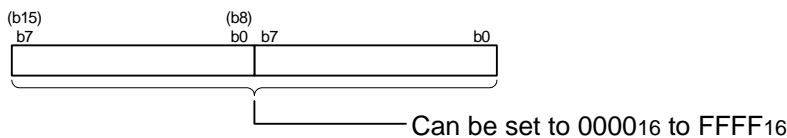
## 3.1 Register Setting

To enable the operation defined in “Section 3. Operation of timer A”, the following register settings must be taken place step by step. For detail configuration of each register, please refer to M16C/26 Group hardware manual, M16C/26A Group hardware manual, M16C/28 Group hardware manual, M16C/29 Group hardware manual.

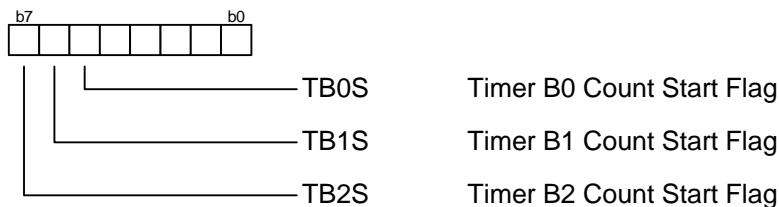
### (1) Setting timer Bi mode register (i=0 to 2)



### (2) Setting timer Bi register (i=0 to 2)



### (3) Setting Count Start Flag



## 4. Sample Program

```

/*****
 *
 * FILE NAME :
 * CPU      : M16C/Tiny series
 * Function  : Operation of Timer B
 *            (Event Counter Mode)
 * Version   : 1.00
 *
 * Copyright (C)2004, Renesas Technology Corp.
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 *
 *****/
/*****
 * include file
 *****/
#include "sfr28.h"

/*****
 * main
 *****/
void main(void) {

    tb0mr = 0x01; /* Selection of event counter mode
                  Counts external signal's falling edge
                  */

    tb0 = 0x7fff; /* Counter value on event counter mode (down count) */

    tb0s = 1; /* TimerB0 count start */

    while (1) {
    }
}

```

5. Reference

Renesas Technology Corporation Home Page

<http://www.renesas.com/>

E-mail Support

E-mail: [csc@renesas.com](mailto:csc@renesas.com)

Hardware Manual

M16C/26, M16C/26A, M16C/28, M16C/29 Group Hardware Manual

(Use the latest version on the home page: <http://www.renesas.com>)

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