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Renesas Electronics Corporation

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M16C/64 Group

Operation of Timer A (2-phase pulse signal process in event counter mode, normal processing operation)

1. Abstract

In processing 2-phase pulse signals in event counter mode, choose functions from those listed in Table 1. Operations of the circled items are described below. Figure 1 shows the operation timing. A reference program is an example when using the Timer A2 interrupt based on the setting procedure in this application note.

2. Introduction

This application note is applied to the M16C/64 group microcomputers.

This program can be operated under the condition of M16C family products with the same SFR (Special Function Register) as M16C/64 Group products. Because some functions may be modified of the M16C family products, see the user's manual. When using the functions shown in this application note, evaluate them carefully for an operation

3. Chosen functions

Table 1. Chosen functions

Item	Set-up	
Count operation type		Reload type
	○	Free-run type
2-phase pulses process (Note)	○	Normal processing
		Multiply-by-4 processing
Output polar control	○	Output waveform "H" active
		Output waveform "L" active (output reversed)

Note: Timer A3 alone can be selected. Timer A2 is solely used for normal processing, and timer A4 is solely used for 4 multiplication processing.

4. Operation

- (1) Setting the count start flag to "1" causes the counter to count the effective edges of the count source.
- (2) Even if an underflow occurs, the content of the reload register is not reloaded to the counter, but the count continues. At this time, the timer Ai interrupt request bit goes to "1".
- (3) Even if an overflow occurs, the content of the reload register is not reloaded to the counter, but the count continues. At this time, the timer Ai interrupt request bit goes to "1".

Note:

- When the TAIOUT pin is held "H", the edge applied to the TAIIN pin will be the effective edge.
- The up count or down count conditions are as follows:

If a rising edge is present at the TAIIN pin when the input signal level to the TAIOUT pin is "H", an up count is performed.

If a falling edge is present at the TAIIN pin when the input signal level to the TAIOUT pin is "H", a down count is performed.

Figure 1 shows the operation timing.

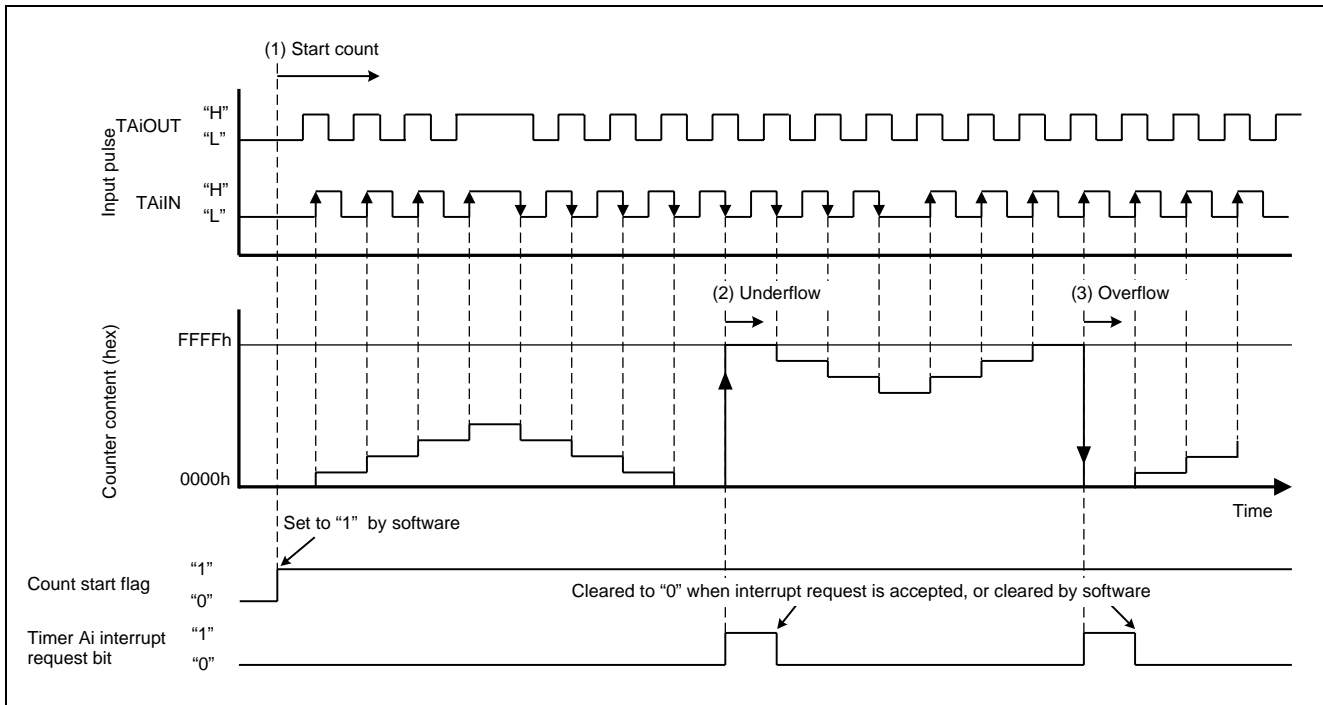
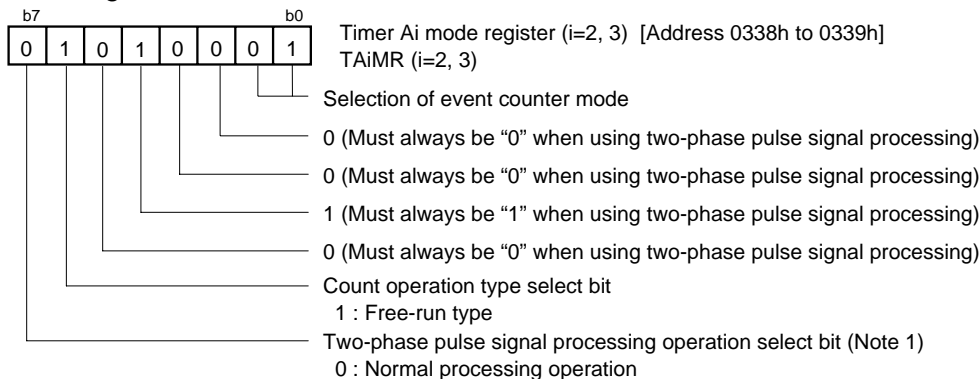


Figure 1. Operation timing of 2-phase pulse signal process in event counter mode, normal processing operation

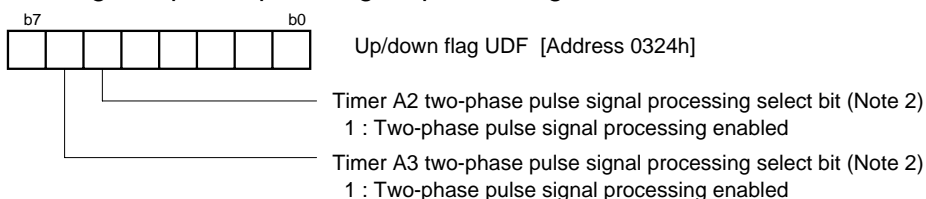
5. Set-up procedure

Selecting event counter mode and functions



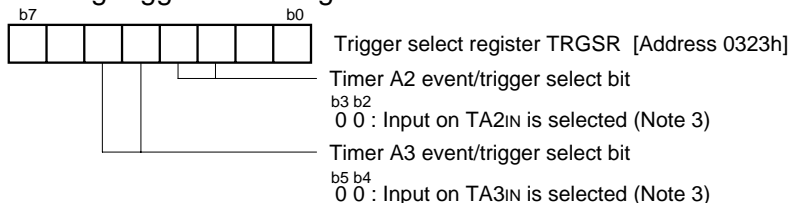
Note 1: This bit is valid for timer A3 mode register. For timer A2 mode register, this bit can be "0" or "1".

Setting two-phase pulse signal processing select bit



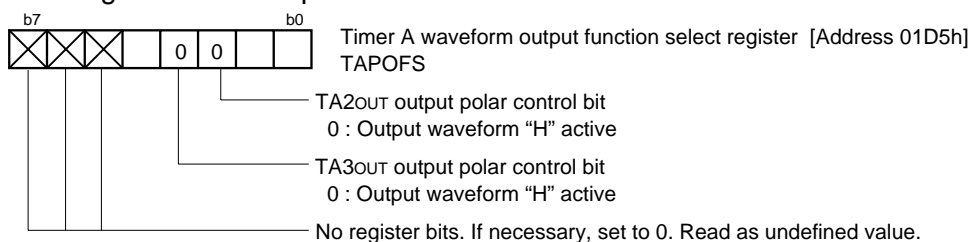
Note 2: Set the TAIiN,TAiOUT corresponding port direction register to "0".

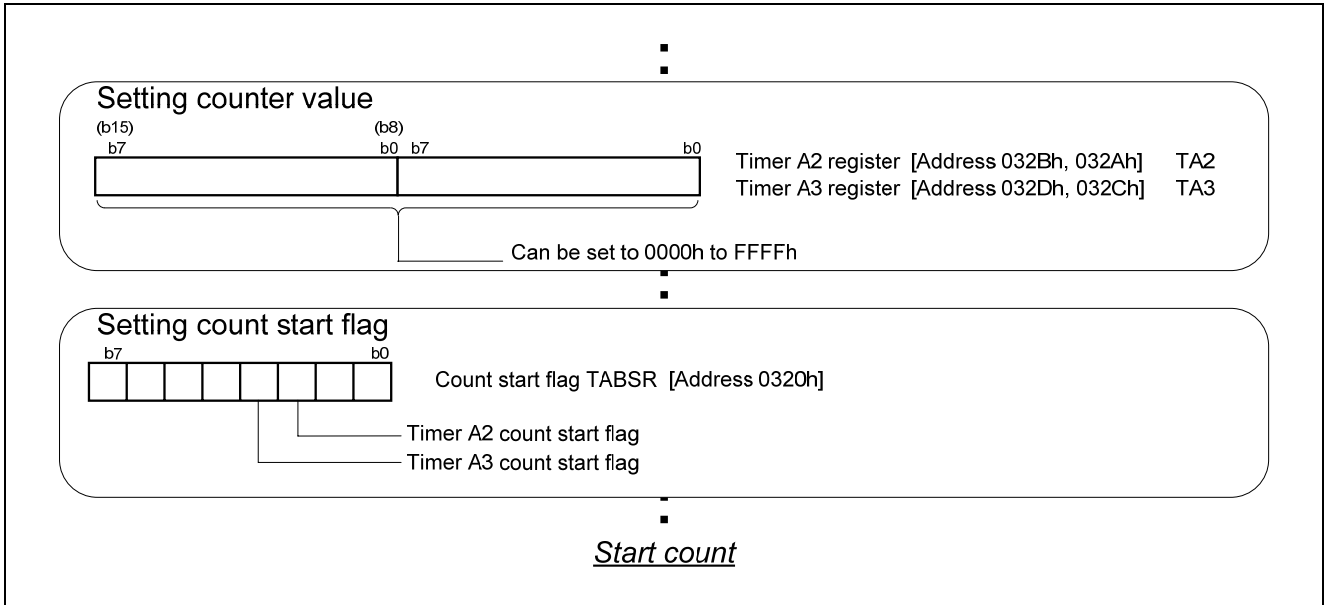
Setting trigger select register



Note 3: Set the corresponding port direction register to "0".

Selecting waveform output function





6. Reference

Hardware manual

M16C/64 Group Hardware Manual

(Use the most recent version of the document on the Renesas Technology Web site.)

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Revision

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		Page	Point
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