

# Microcomputer Technical Information

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<p><math>\mu</math>PD789860, 789861 Subseries</p> <p>Usage Restrictions</p>	Document No.	SBG-DT-03-0195-E	1/2
	Date issued	July 18, 2003	
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Related documents $\mu$ PD789860, 789861 Subseries User's Manual: U14826EJ3V0UM00 $\mu$ PD789860, 789861 Data Sheet: U13917EJ1V1DS00 $\mu$ PD78E9860, 78E9861 Data Sheet: U16524EJ1V0DS00	Notification classification	√	Usage restriction
			Upgrade
		√	Document modification
			Other notification

## 1. Affected products

$\mu$ PD789860, 789861, 78E9860, 78E9861

## 2. Details of modification and added restriction

### (1) Error on starting 8-bit timer

The description in **9.5 Notes on Using 8-Bit Timers 30, 40 (1) Error on starting timer** in the user's manual (U14826EJ3V0UM00) has been corrected as follows.

(Incorrect)

An error of up to 1 clock is included in the time between the timer being started and a match signal being generated.

(Correct)

An error of up to 1.5 clocks is included in the time between the timer being started and a match signal being generated.

### (2) Restriction when an external event is selected for the timer count clock

If an external event (TMI pin input) is selected for the timer count clock when 8-bit timer 40 is used, the count may be incremented after the count operation flag (TCE40) is set, depending on the status of the valid edge and TMI pin.

See attachment 2 for details.

## 3. Correction

Regard the restriction added in this document as a usage restriction. Modification will be reflected in the next revision of the user's manual.

## 4. List of restrictions

The restriction history and detailed information is described in attachment 1.

## 5. Document revision history

**μPD789860, 789861 Subseries Usage Restrictions**

Document Number	Date Issued	Description
SBG-DT-03-0195-E	July 18, 2003	Newly created.

## List of Usage Restrictions in $\mu$ PD789860, 789861 Subseries

### 1. Product History

<Mask ROM version>

Description		$\mu$ PD789860, 789861
Rank		All Ranks
1	Restriction on 8-bit timer	$\Delta$

<EEPROM version>

Description		$\mu$ PD78E9860, 78E9861
Rank		All Ranks
1	Restriction on 8-bit timer	$\Delta$

- Notes 1.** The rank is indicated by the fifth character from the left in the lot number marked on the package.
- 2.** The meaning of each symbol is as follows.
- : Restriction does not apply
  - $\surd$ : Restriction already corrected
  - $\times$ : Restriction applies (correction is planned)
  - $\Delta$ : Restriction applies (correction is not planned)

### 2. Details of Usage Restrictions

No.1: A restriction added this time. Refer to attachment 2 for details.

**No.1 Restriction on 8-bit timer**

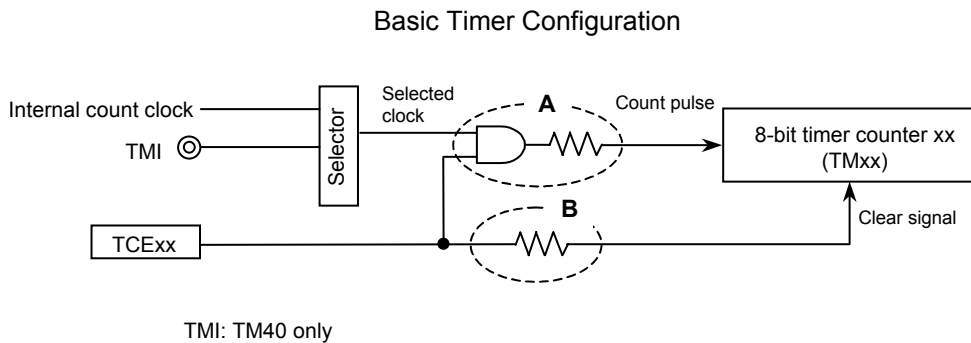
(1) Error upon timer start

When the 8-bit timer/event counter is used, an error of up to 1.5 clocks is generated after the timer has been started until a match signal is generated. This is because a rising edge is detected when the timer is started while the selected clock is high, which results in the count value getting incremented.

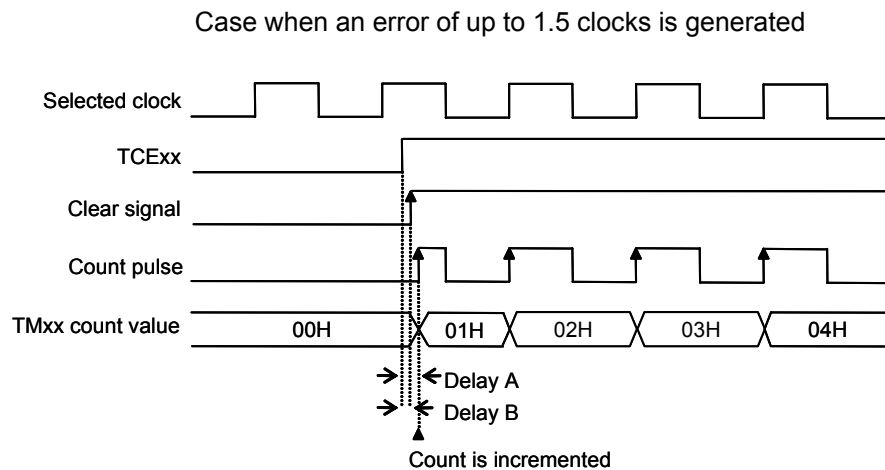
[Details of restriction]

The basic timer configuration applicable to this restriction is shown in the figure below.

- The selected clock and the count operation flag (TCExx) are ANDed, and the result is supplied to the counter
- The TMxx counter value is cleared when the count operation flag (TCExx) is set



If a count pulse is delayed for the clear signal (“delay A > delay B”) as the result of setting the count operation flag (TCExx) while the selected clock is high, the TMxx count value is incremented. An error of up to 1.5 clocks is generated.



**Remark** See Basic Timer Configuration above for details of the selected clock, TCE, clear signal, and count pulse.

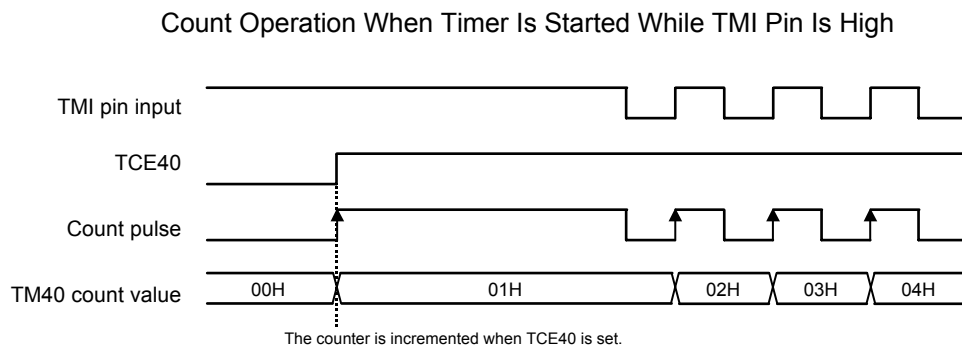
(2) Restriction when an external event is selected for the timer count clock

If an external event (TMI pin input) is selected for the timer count clock when 8-bit timer 40 is used, the count may be incremented after the count operation flag (TCE40) is set, depending on the status of the valid edge and TMI pin.

[Details of restriction]

In the case of “delay A > delay B” as described in (1), the TM40 count value is incremented if the following condition is satisfied.

- The count operation flag (TCE40) is set while the TMI pin is high.



[Workaround]

Make allowances for 1-count error in the counter, or implement one of workarounds (1) and (2) below.

Workaround (1)

- Always start the timer while the TMI pin is low.

Workaround (2)

- Save the count value upon timer start in the control register. When reading the count value, subtract this value from the count value saved in the control register and use the result as a true count value.