

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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# RENESAS TECHNICAL UPDATE

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Renesas Technology Corp.

Product Category	MPU&MCU		Document No.	TN-380-A065B/E	Rev.	2.00
Title	Collected and revised edition of technical updates for 3803H/3804H groups flash memory version		Information Category	Technical Notification		
Applicable Product	3803 group (Spec. H) flash memory version M38039FFHSP/FP/HP/KP/WG 3804 group (Spec. H) flash memory version M38049FFHSP/FP/HP/KP 3803 group (Spec. L) flash memory version M38039FFLSP/HP/KP/WG 3804 group (Spec. L) flash memory version M38049FFLSP/HP/KP/WG	Lot No.	Reference Document	(Deleted in revision 2.00. No change in contents of technical update itself).		

This document combines the following two technical updates for 3803H/3804H groups flash memory version and shows applicable products including 3803L/3804L groups. In addition, errors in the technical update (2) TN-380-035A/EA are corrected in this document.

•Technical updates included in this document

- (1) TN-380-33A/EA Usage notes and purchase notes on M38039FFH (Spec. H) flash memory version. Refer to page 3/7 to 4/7.
- (2) TN-380-035A/EA Usage notes on wait mode and stop mode operations for the 3803, 3804 groups (Spec.H) flash memory version. Refer to page 2/7 and 5/7 to 7/7.

Applicable products for each technical update

Contents of TU		3803H group (*1) 3804H group (*1)	3803H group (revised) (*2) 3804H group (revised) (*2)	3803L group 3804L group
(1) TN-380-33A/EA	1.	Applicable	Not applicable	Not applicable
	2.	Applicable	Not applicable	Not applicable
	3. (*3)	Applicable	Applicable	Applicable
	4.	Applicable	Applicable	Applicable
(2) TN-380-035A/EA		Applicable	Applicable	No countermeasure required

(\*1) Renesas lot number (8-digit): Other than "xxxxxWxx", "xxxxxXxx", "xxxxxYxx", and "xxxxxAxx" (Note the alphabet in the 3<sup>rd</sup> position to the last digit of the lot number).

(\*2) Renesas lot number (8-digit): "xxxxxWxx", "xxxxxXxx", "xxxxxYxx", and "xxxxxAxx" (Note the alphabet in the 3<sup>rd</sup> position to the last digit of the lot number).

(\*3) Usage notes saying "port output becomes undefined regardless of reset input conditions" have been revised in the above (\*2) devices and 3803L/3804L groups devices.

•Correction of errors in the technical update TN-380-035A/EA

In the explanation of countermeasures in the technical update TN-380-035A/EA, “#” signs are missed in operands for LDA instructions. Differences before correction and after correction are shown below.

**Before correction**

```

(1)      SEI          ; Disable interrupt
         LDA  %00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  %00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)

(3)      SEI          ; Disable interrupt
         LDA  %00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  %00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)

And
         SEI          ; Disable interrupt
         LDA  %00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  %00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)
    
```



**After correction**

```

(1)      SEI          ; Disable interrupt
         LDA  #%00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  #%00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)

(3)      SEI          ; Disable interrupt
         LDA  #%00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  #%00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)

And
         SEI          ; Disable interrupt
         LDA  #%00010000
         STA  $0FE5   ; Set 0FE516 (Note) to "000100002"
         LDA  #%00000001
         STA  $0FE7   ; Set 0FE716 (Note) to "000000012"
         CLI          ; Enable interrupt (When using interrupt)
    
```

Date: Apr.1.2004  
 Product category: MPU&MCU  
 Document No.: TN-380-33A/EA  
 Rev.: 1.00  
 Title: M38039FFH (Spec. H: Flash) Usage Notes and Purchase Notes  
 Information Category: Usage Limitation  
 Applicable Product: M38039FFHSP/FP/HP/KP/WG  
 Page: 3/7 to 4/7

<<Usage Notes>>

1. Noise immunity

Noise immunity of M38039FFH (Spec.H-Flash) is lower than that of M38039FF (Std-Flash) and M38037M8H(Spec.H-Mask ROM ). Since M38039FFH (Spec.H-Flash) uses finer process compared to M38039FF (Std-Flash) and M38037M8H (Spec.H-Mask ROM), it is more sensitive to noises, while the response speed of transistors are faster. Noise immunity of each MCU is as follows.

[AC Line Transient Immunity]

- M38039FFH (Spec.H-Flash) ..... 1.0 kV
- M38039FF (Std-Flash) ..... 3.6 kV
- M38037M8H (Spec.H-Mask ROM)..... 3.8 kV

\*M38039FF (Std-Flash) and M38037M8H (Spec.H-Mask ROM) have quite high noise immunity compared to MCUs of other companies. As a result of compared to M38039FF (Std-Flash) and M38037M8H (Spec.H-Mask ROM), the noise immunity of M38039FFH (Spec.H-Flash) seems relatively low.

\*Please check whether the above immunity will not cause a problem in your system.

\*Improved version of M38039FFH (Spec.H-Flash) will be in mass-production around Aug, 2004. The target of the noise immunity is about 2.0 kV.

2. Indeterminate value of ports during Power-on

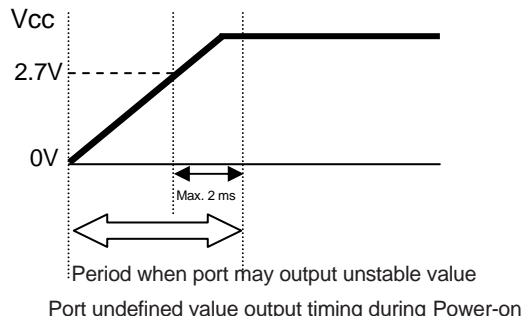
There might be cases that the MCU is not in a reset status until the internal power supply is stabilized (approximately 2ms). It prevents I/O ports from being in the input status, so that the I/O ports might output indeterminate value for a moment.

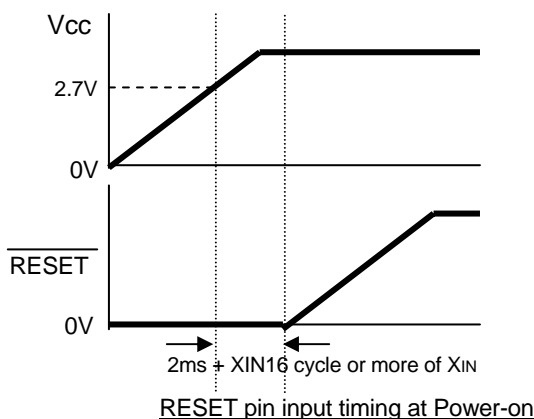
Revised version of M38039FFH (Spec.H-Flash) will be in mass-production around Aug, 2004.

3. Reset input at Power-on

Release RESET after a power supply voltage goes to 2.7 V and waiting for 2 ms (internal power supply stabilizing time) + 16 cycles or more (reset input time) of XIN at power-on.

\*The non-revised products may be in the state of outputting an undefined value regardless of this condition.





4. Stop mode

In the Stop mode, the internal power supply circuit is switched to low power consumption mode for reducing consumption current. Although the internal power supply circuit is automatically switched to the normal operation mode when returning from the Stop mode, a certain time is required until the Flash memory can operate. Therefore, 100 μs or more must be set as the oscillation stabilization time using timer1.

\*Notes3, 4 are applied to the revised version MCU that will be in mass-production around Aug, 2004.

<Supplement for 4>

The oscillation stabilizing time after the STP instruction release can be automatically set by bit 0 of MISRG (address 001016). When this bit is "0", this time is set automatically. When this bit is "1", "automatic set" is disabled. When "automatic set" is selected, the fixed values of Timer 1 and Prescaler 12 (Timer 1 = "0116", Prescaler 12 = "FF16") are automatically reloaded. When "prohibition of automatic set" is selected, set an appropriate value to each register, in accordance with the oscillation stabilizing time, before executing the STP instruction. When "automatic set" is selected, the oscillation stable time is set to 100 μs or more in the following conditions.

- (1) At  $f(XIN) \leq 10$  MHz
- (2) When selecting except  $f(XIN)/2$  (ex.  $f(XIN)/4$ ,  $f(XIN)/8$  etc.) as timer 12 count source

[Purchase Notes for M38039FFH (Spec. H-Flash version before revised) are deleted.]

Date: Aug.23.2004

Product Category: MPU&MCU

Document No.: TN-380-035A/EA

Rev.: 1.00

Title: Usage notes on wait mode and stop mode operations for the 3803, 3804 groups (Spec.H) flash memory version

Information Category: Usage Limitation

Applicable Products: M38039FFHHP/FP/KP/SP/WG

M38049FFHHP/FP/KP/SP/WG

Reference Document: 3803, 3804 groups (Spec. H) datasheet

Page: 5/7 to 7/7

When using wait mode or stop mode in low-speed mode (sub clock (XCIN - XCOUT) operates) for the above applicable products, there are the following usage notes.

1. Usage Notes

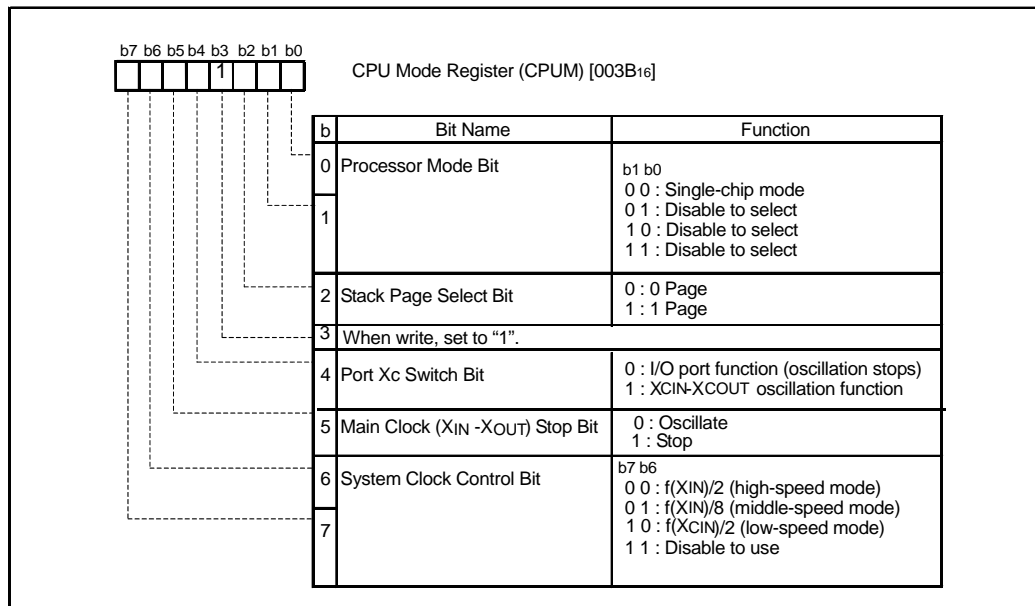
In the following cases, returning by an interrupt may not be performed.

- 1) When the main clock (XIN - XOUT) stops oscillating in low-speed mode and using wait mode.
- 2) When using stop mode in low-speed mode.
- 3) When using both (1) and (2).

However, the above-mentioned cases do not correspond in any status other than (1) to (3).

Refer to the following "CPU Mode Register" for the setting of operation mode.

[Addition]



CPU Mode Register

2. Countermeasures

(1) When the main clock (XIN - XOUT) stops oscillating in low-speed mode and using wait mode.

Execute the following program after reset while the main clock (XIN - XOUT) oscillates (CPUM5=0)

```

SEI                ; Disable interrupt
LDA  #0001000     ;
STA  $0FE5        ; Set 0FE516 (NOTE) to "000100002"
LDA  #0000001     ;
STA  $0FE7        ; Set 0FE716 (NOTE) to "000000012"
CLI                ; Enable interrupt (When using interrupt)
    
```

Execute the above instruction continuously.

Execute the above program one time after reset. Executing it every time before executing the WIT instruction is not necessary.

However, when executing this countermeasure, the power source current (Icc) will increase when executing WIT instruction in low-speed mode (See Table 1.)

Table 1. Power Source Current Value (Icc) when Executing WIT Instruction in Low-Speed Mode

Parameter	Conditions		Min.	Typ.	Max.	Unit
Power Source Current (ICC)	VCC=5V	In countermeasure		24.1		μA
			Ta = 25°C			
			Ta = 90°C		30.4	
		Not in countermeasure		4.5	6.8	μA

(2) When using stop mode in low-speed mode

Execute the STP instruction while the main clock oscillates (CPUM5=0).

Hold the oscillation status (CPUM5=0) before executing the STP instruction when the main clock stops oscillating. At this time, the oscillation stability is not necessary.

(3) When using both (1) and (2)

When using wait mode : Execute the following program while the main clock (XIN-XOUT) oscillates (CPUM5=0)

```
SEI                ; Disable interrupt
LDA  #0001000     ;
STA  $0FE5        ; Set 0FE516 (NOTE) to "000100002"
LDA  #0000001     ;
STA  $0FE7        ; Set 0FE716 (NOTE) to "000000012"
CLI                ; Enable interrupt (When using interrupt)
```

Execute the above instruction continuously.

Execute the above program every time before executing the WIT instruction.

When using stop mode: Execute the following program and STP instruction while the main clock (XIN - XOUT) oscillates (CPUM5=0).

```
SEI                ; Disable interrupt
LDA  #0001000     ;
STA  $0FE5        ; Set 0FE516 (NOTE) to "000100002"
LDA  #0000000     ;
STA  $0FE7        ; Set 0FE716 (NOTE) to "000000002"
CLI                ; Enable interrupt (When using interrupt)
```

Execute the above instruction continuously.

Execute the above program every time before executing the STP instruction.

NOTE: Do not program any data other than these countermeasures because this address is assumed as reserved area.