To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 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.

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RENESAS TECHNICAL UPDATE

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Product Category	MPU & MCU			Document No.	TN-16C-A175A/E	Rev.	1.00
Title	M16C/65, M16C/64A Groups Notes on Using EW1 Mode			Information Category	Technical Notification		
Applicable Products	M16C/65, M16C/64A Groups		Lot No. 	Reference Documents			

1. Notes

The MCU may malfunction when using EW1 mode, which is one of the internal flash memory rewrite function, under any of the following conditions:

1.1 A software command is executed in EW1 mode when the CPU clock is lower than 1 MHz.

1.2 A block blank check command is executed when the CPU clock is lower than 3 MHz (when the command is executed in EW1 mode, or executed in EW0 mode before entering EW1 mode).

1.3 The read lock bit status command is executed, or the program command or block erase command is executed to the block although write/erase operations to the block are disabled by the lock bit command (when the command is executed in EW1 mode, or executed in EW0 mode before entering EW1 mode).

1.4 EW1 mode is used in the user program in which the MCU enters wait mode or stop mode.

2 Countermeasures

2.1 Frequency limitation of EW1 mode

Set the CPU clock to 1 MHz or higher when using EW1 mode.

2.2 Frequency limitation of block blank check command

Set the CPU clock to 3 MHz or higher when using the block blank check command.

2.3 Disabling the lock bit

Set the FMR02 bit in the FMR0 register to 1 (lock bit disabled).

Do not execute the read lock bit status command or lock bit program command.

2.4 Entering EW1 mode in the user program using wait or stop mode

When using EW1 mode in the user program in which the MCU enters wait mode or stop mode, follow steps (1) to (13) in the procedure below. Make sure interrupts are disabled in this procedure.

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(1)   Set registers CM0, CM1, and PM1 to use the CPU clock within 1 MHz to 10 MHz with one wait.

(2)   Transfer the programs in steps (6) to (10) to RAM.

(3)   Set the FMR01 bit in the FMR0 register to 0 and then set it to 1 (CPU rewrite mode enabled, EW0 mode).

(4)   Set the FMR02 bit in the FMR0 register to 0 and then set it to 1 (lock bit disabled).

(5)   Jump to the first address of the transferred program (on RAM).

(6)   Set the FMSTP bit in the FMR0 register to 1 (flash memory operation stopped).

(7)   Wait until the flash memory stabilizes (tps).

(8)   Set the FMSTP bit in the FMR0 register to 0 (flash memory operation enabled).

(9)   Wait until the flash memory stabilizes (tps).

(10) Jump to the program on internal flash memory.

(11) Set the FMR11 bit in the FMR1 register to 1 (write to FMR6 register enabled).

(12) Set bits FMR61 and FMR60 in the FMR6 register to 1 (EW1 mode).

(13) Set the FMR11 bit in the FMR1 register to 0 (write to FMR6 register disabled).

3   Relation between EW1/EW0 Modes and Countermeasures

   The table below lists the relation between "2. Countermeasures" and each mode.

Table 1. EW1/EW0 Modes and Countermeasures

Item	EW1 Mode Used	Both EW1 and EW0 Modes Used	EW0 Mode Used
CPU clock	Set as follows: · 1 MHz ≤ f(BCLK) ≤ 10 MHz · PM17 bit in the PM1 register to 1 (one wait)		Set as follows: · f(BCLK) ≤ 10 MHz · PM17 bit in the PM1 register to 1 (wait state)
Block blank check command	Set as follows: · 3 MHz ≤ f(BCLK) ≤ 10 MHz · PM17 bit in the PM1 register to 1 (one wait)		Set as follows: · f(BCLK) ≤ 10 MHz · PM17 bit in the PM1 register to 1 (wait state)
Lock bit	Do not use. Set the FMR02 bit in the FMR0 register to 1 (lock bit disabled).		Applicable Enabled/disabled can be selected.
Lock bit program command	Do not use.		Applicable
Read lock bit status command	Do not use.		Applicable
Entering EW1 mode in the user program using wait or stop mode	Follow the procedure stated in 2.4 to enter EW1 mode.		—