

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 Electronics Corporation

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RENESAS TECHNICAL UPDATE

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Product Category	MPU&MCU	Document No.	TN-16C-A173A/E	Rev.	1st
Title	M16C/6N Group Usage Precaution for the WAIT Instruction		Information Category	Technical Notification	
Applicable Product	M306N4FGFP,M306N4FGGP, M306N4FCFP,M306N4FCGP, M306N5FCFP,M306N5FCGP, M306NKFHGP,M306NKFJGP, M306NLFHGP,M306NLFJGP, M306NMFHGP,M306NMFJGP, M306NNFHGP,M306NNFJGP	Lot No.	Reference Document	See below	
		-			

1. Precaution

When entering wait mode from low-power dissipation mode⁽¹⁾ at low voltage⁽²⁾, if an interrupt request, which is used to exit wait mode, is acknowledged while the WAIT instruction is being executed, then the MCU may run out of control.

NOTE:

1. When the CPU is in low-power dissipation mode, the main clock and the on-chip oscillator clock stop, and the sub clock is used as the source for the CPU clock.
2. VCC=3.5V or less.

2. Countermeasures

Enter wait mode from other than low-power dissipation mode (i.e. high-speed mode, medium-speed mode, low-speed mode, on-chip oscillator mode, or on-chip oscillator low-power dissipation mode), when MCU is used at low voltage (refer to Figure 1).

To reduce power dissipation, execute the WAIT instruction in on-chip oscillator low-power dissipation mode and enter wait mode.

Table 1 shows the typical value of power current of on-chip oscillator low-power dissipation mode (on-chip oscillator divided by 16 is used as the CPU clock) and low-power dissipation mode.

3. Reference Document

• Hardware Manual

M16C/6N Group (M16C/6N4) Hardware Manual Oct.24.05 Rev.2.30 REJ09B0009-0230

M16C/6N Group (M16C/6N5) Hardware Manual Oct.24.05 Rev.2.30 REJ09B0011-0230

M16C/6N Group (M16C/6NK, M16C/6NM) Hardware Manual Nov.28.05 Rev.2.00 REJ09B0124-0200

M16C/6N Group (M16C/6NL, M16C/6NN) Hardware Manual Nov.28.05 Rev.2.00 REJ09B0126-0200

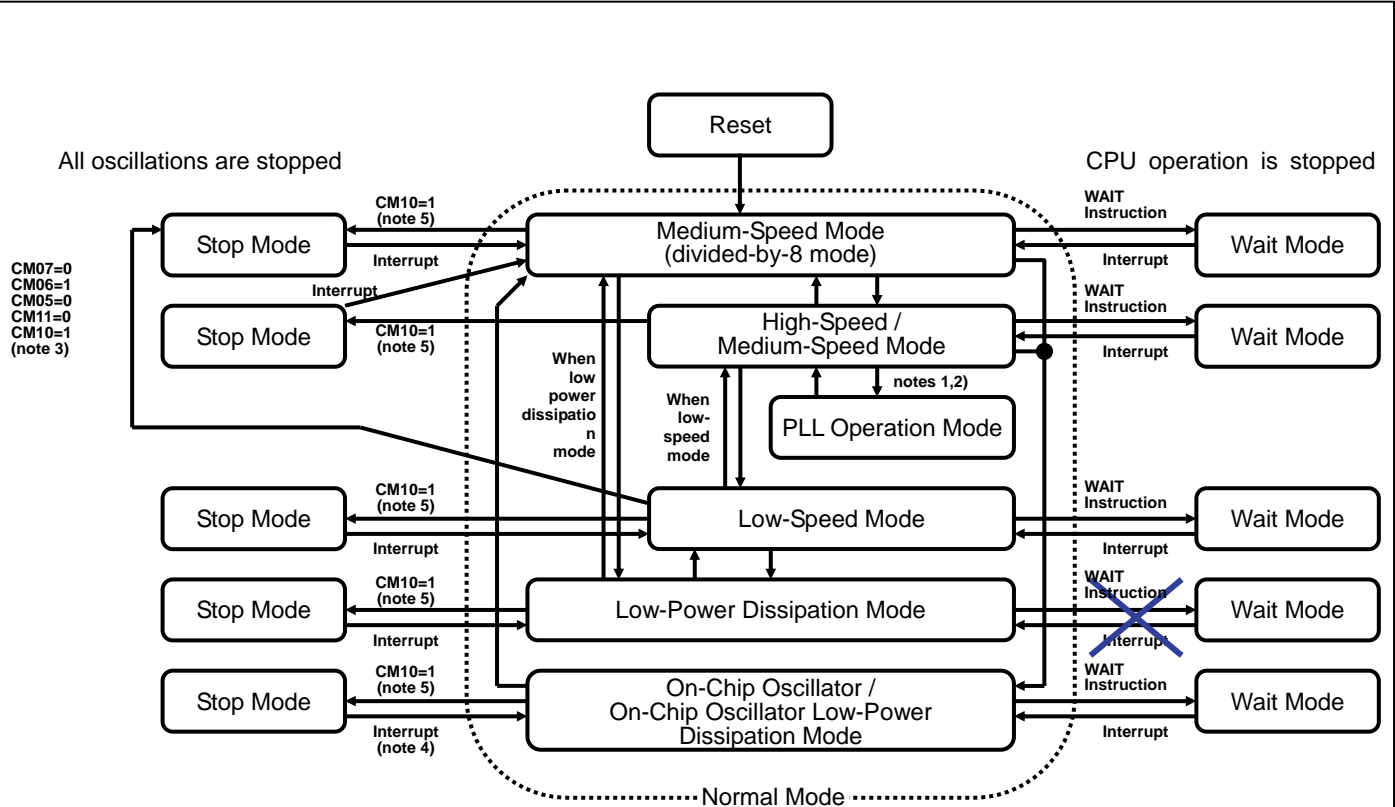
• Datasheet

M16C/6N Group (M16C/6N4) Datasheet Aug.25.06 Rev.2.40 REJ03B0003-0240

M16C/6N Group (M16C/6N5) Datasheet Aug.25.06 Rev.2.40 REJ03B0004-0240

M16C/6N Group (M16C/6NK, M16C/6NM) Datasheet Aug.25.06 Rev.2.10 REJ03B0058-0210

M16C/6N Group (M16C/6NL, M16C/6NN) Datasheet Aug.25.06 Rev.2.10 REJ03B0061-0210



CM05,CM06,CM07 : Bits in CM0 register
 CM10,CM11 : Bits in CM1 register

NOTES:

1. Do not go directly from PLL operation mode to wait or stop mode.
2. PLL operation mode can be entered from high-speed mode. Similarly, PLL operation mode can be changed back to high-speed mode.
3. Write to the CM0 and CM1 registers per 16 bits with the CM21bit in the CM2 register = 0 (on-chip oscillator stops). Since the operation starts from the main clock after exiting stop mode, the time until the CPU operates can be reduced.
4. The on-chip oscillator clock divided by 8 provides the CPU clock.
5. Before entering stop mode, be sure to set the CM20 bit in the CM2 register to "0" (oscillation stop, re-oscillation detection function disabled).
6. Do not enter wait mode from low-power consumption mode

Figure 1. State Transition to Stop Mode and Wait Mode

Table 1. Power Current when using Sub Clock, On-chip oscillator

Mode	Source of CPU Clock	Standard value of Power current [μA]	
		Sub Clock (XCIN=32kHz) Oscillation capacity High	On-Chip Oscillator (divided-by-16 mode)
Low-Power Dissipation Mode (All clocks other than the source of CPU Clock are stopped.)	RAM ⁽²⁾	25	580
	Flash memory ⁽²⁾	420	660
Wait Mode		8.5	100

NOTE

1. Referenced to VCC = 3.0 to 5.5V, VSS = 0V at Topr = -40 to 85°C unless otherwise specified.
2. This indicates the memory in which the program to be executed exists.
3. The value is the example of the characteristic of samples, and cannot be guaranteed.