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RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-R8C-A016A/E	Rev.	1.00
Title	Notes on R8C Family (2)		Information Category	Technical Notification		
Applicable Product	R8C/1x Series R8C/2x Series R8C/3x Series R8C/Lx Series	Lot No.	Reference Document			
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The following notes have been added to the hardware user's manual. The functions described below do not exist in some MCUs. Refer to the hardware user's manual for applicable products.

1. Note when inputting an externally generated clock from the XCIN pin

   This note applies to the R8C/3x Series.

   When inputting an externally generated clock from the XCIN pin, set the CM03 bit in the CM0 register to 1 (XCIN clock stops) and the CM12 bit in the CM1 register to 1 (on-chip feedback resistor disabled).

2. Note on timer X and timer RA

   The timer X note applies to the R8C/1x Series.

   The timer RA note applies to the R8C/2x Series, R8C/3x Series, and R8C/Lx Series.

   Do not set 00h to the TX register or TRA register in pulse width measurement mode and pulse period measurement mode.

3. Note on synchronous serial communication unit (SSU) and I^{2}C bus interface

   This note applies to the R8C/1x Series, R8C/2x Series, R8C/3x Series, and R8C/Lx Series.

   When using the SSU, a maximum of three cycles are required between writing to the SSTDR register and setting the TEND bit or TDRE bit in the SSSR register to 0. When reading the TEND bit or TDRE bit in the SSSR register immediately after writing to the SSTDR register, insert more than three NOP instructions between the write and read instructions.
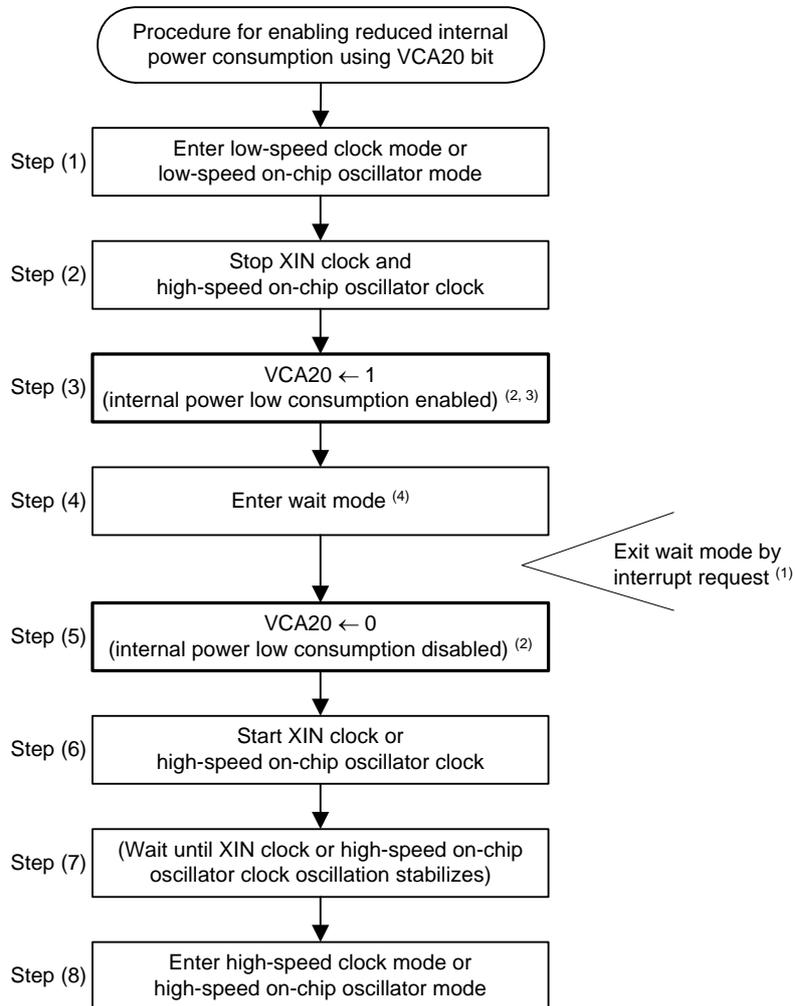
   While using the I^{2}C bus interface, when reading the TEND bit or TDRE bit in the ICSR register immediately after writing to the ICDRT register, insert more than three NOP instructions between write and read instructions.

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4. Procedure for enabling reduced internal power consumption using VCA20 bit in the VCA2 register

    This note applies to the R8C/3x Series and R8C/Lx Series.

    The procedure when the MCU enters wait mode by setting the CM30 bit in the CM3 register to 1 is shown below.

    Note: The procedure described in the hardware user's manual assumes the MCU enters wait mode by executing the WAIT instruction.

```
                    ╭─────────────────────────────╮
                    │  Procedure for enabling      │
                    │  reduced internal            │
                    │  power consumption using     │
                    │  VCA20 bit                   │
                    ╰─────────────────────────────╯
                                 │
                                 ▼
         Step (1)  ┌─────────────────────────────┐
                   │  Enter low-speed clock mode or │
                   │  low-speed on-chip oscillator mode │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (2)  ┌─────────────────────────────┐
                   │  Stop XIN clock and          │
                   │  high-speed on-chip oscillator clock │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (3)  ┌─────────────────────────────┐
                   │  VCA20 ← 1                   │
                   │  (internal power low consumption enabled) (2, 3) │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (4)  ┌─────────────────────────────┐
                   │  Enter wait mode (4)         │
                   └─────────────────────────────┘
                                 │         Exit wait mode by
                                 │         interrupt request (1)
                                 ▼
         Step (5)  ┌─────────────────────────────┐
                   │  VCA20 ← 0                   │
                   │  (internal power low consumption disabled) (2) │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (6)  ┌─────────────────────────────┐
                   │  Start XIN clock or          │
                   │  high-speed on-chip oscillator clock │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (7)  ┌─────────────────────────────┐
                   │  (Wait until XIN clock or high-speed on-chip │
                   │  oscillator clock oscillation stabilizes) │
                   └─────────────────────────────┘
                                 │
                                 ▼
         Step (8)  ┌─────────────────────────────┐
                   │  Enter high-speed clock mode or │
                   │  high-speed on-chip oscillator mode │
                   └─────────────────────────────┘
```

Notes:
1. After entering wait mode by the CM30 bit, when an interrupt request is generated, without performing interrupt handling, start the execution from the instruction immediately following the instruction to set the CM30 bit to 1.
2. Do not set the VCA20 bit to 0 with the instruction immediately after setting the VCA20 bit to 1. Also, do not do the opposite.
3. When the VCA20 bit is set to 1, do not set the CM10 bit to 1 (stop mode).
4. When the MCU enters wait mode, comply with the information in the **Wait Mode** chapter in the hardware user's manual.