

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-16C-A189A/E	Rev.	1.00
Title	M16C/6C Group Notes on Using Memory Expansion Mode and Microprocessor Mode		Information Category	Technical Notification		
Applicable Product	M16C/6C Group	Lot No.	Reference Document			

Notes on using memory expansion mode and microprocessor mode for the M16C/6C Group are listed in 1. Perform the countermeasures listed in 2.

## 1. Notes

When using memory expansion mode or microprocessor mode, the UVCC level becomes undefined if either of the conditions below is met. When this occurs, problems such as an external device not being read correctly or port P1 outputting an unexpected level may occur.

- When the VDDUSBE bit in the USBMC register is 1 (3.3 V USB internal power source supplied),  $VCC1 < 4.0 \text{ V}$ . <sup>(1)</sup>
- When the VDDUSBE bit is 0 (USB internal power stopped),  $UVCC < 3.0 \text{ V}$ . <sup>(2)</sup>

### Notes:

1. Internal power for the USB device can be used when  $4.0 \text{ V} \leq VCC1 \leq 5.5 \text{ V}$ . To use the internal power, connect a  $0.33 \mu\text{F}$  capacitor between the UVCC pin and VSS with the shortest and thickest possible wiring.
2. 3.0 V is listed in the Recommended Operating Conditions as a minimum value of the UVCC input when using the USB module.

## 2. Countermeasures

### 2.1 Wait Mode or Stop Mode

#### 2.1.1 When the power supply to the USB module does not stop in wait mode or stop mode

The MCU can enter wait mode or stop mode without exiting memory expansion mode or microprocessor mode.

#### 2.1.2 When using the USB module after setting the VDDUSBE bit in the USBMC register to 1, and then the MCU enters wait mode or stop mode by turning off the USB internal power supply

Enter single-chip mode first, then enter wait mode or stop mode

- (1) Set bits PM01 and PM00 in the PM0 register to 00b (single-chip mode).
- (2) Set the VDDUSBE bit in the USBMC register to 0.
- (3) Enter wait mode or stop mode.

Use the following procedure to rewrite bits PM01 and PM00 after exiting wait mode or stop mode:

- (1) Set the CM14 bit in the CM1 register to 0 (125 kHz on-chip oscillator on).
- (2) Set the VDDUSB bit in the USBMC register to 1.
- (3) Wait for 1 ms.
- (4) Rewrite bits PM01 and PM00 in the PM0 register.

## 2.2 Low Supply Voltage

When the supply voltage is low in memory expansion mode or microprocessor mode, and the issue described in "1. Notes" causes a problem, connect a reset IC to prevent the MCU from operating at or under the levels specified in the conditions.

## 3. Others

### 3.1 CNVSS Pin

Connect the CNVSS pin to VSS via a resistor.

The CNVSS pin cannot be used to select a processor mode. Start up the MCU in single-chip mode, and then set bits PM01 and PM00 in the PM0 register to select a processor mode.

### 3.2 UVCC Pin When Not Using USB Module

Connect the UVCC pin to VCC1 and set the PXXCON bit in the USBMC register to 0.