

RX231 Group

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Target Board for RX231 LED Blink Control Program

Introduction

The LED lighting control program runs on Target Board for RX231. The function of this program performs either the user switch interrupt or the timer interrupt according to the mode selection at startup and controls the lighting of the LED by using the corresponding interrupt.

Target Device

RX231 Group

Target Device

IDE: e2studio v6.0.0

Compiler: CC-RX v2.07.00

Code Generator2: v1.01.00.05

Hardware: Target Board for RX231

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1. Function list

The functions of the LED lighting control program are shown below.

- (1) Start-up mode selection
- (2) Timer interrupt function
- (3) User switch interrupt function

1.1 Mode selection of start-up

After resetting with the power-on reset or RES # pin, it detects whether the user switch is pressed and switches the start mode. If you reset while pressing down the user switch, it transits to manual mode, and if you reset without pressing the user switch it will transition to automatic mode.

1.2 Timer interrupt function (Auto-mode)

After switching to the automatic mode, set the timer interrupt and control the LED by timer interrupt. The setting list of the timer interrupt function and the processing contents are shown below

Timer: CMT0

Counter clock: PCLKB / 512

Interrupt interval: 500 ms

Interrupt level: Level 15

Interrupt class: CMI 0

Interrupt processing content: LED 0 (Port: D6), LED 1 (Port: D7) are alternately turned on and off

1.3 User switch interrupt function (Manual-mode)

After manual mode transition, this function is enabled. The setting list and processing contents of the user switch interrupt function are shown below.

Interrupt: IRQ 4 (Port: B1)

Detection type: Falling edge (corresponding to user switch press)

Interrupt level: Level 15

Digital filter: Enable (PCLKB / 64)

Interrupt processing content: LED 0 (Port: D6), LED 1 (Port: D7) are alternately turned on and off

2. LED lighting control program operation flow

Figure 2-1 shows the power-on reset operation flow of the LED lighting control program.

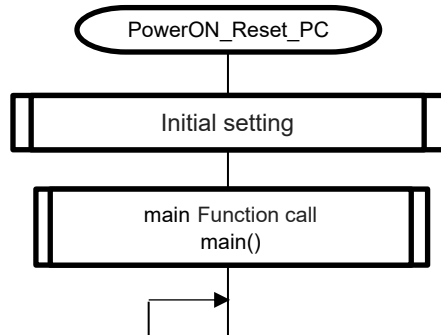


Figure 2-1: Power-on reset operation flow

Figure 2-2 shows the operation flow of the main function of the LED lighting control program.

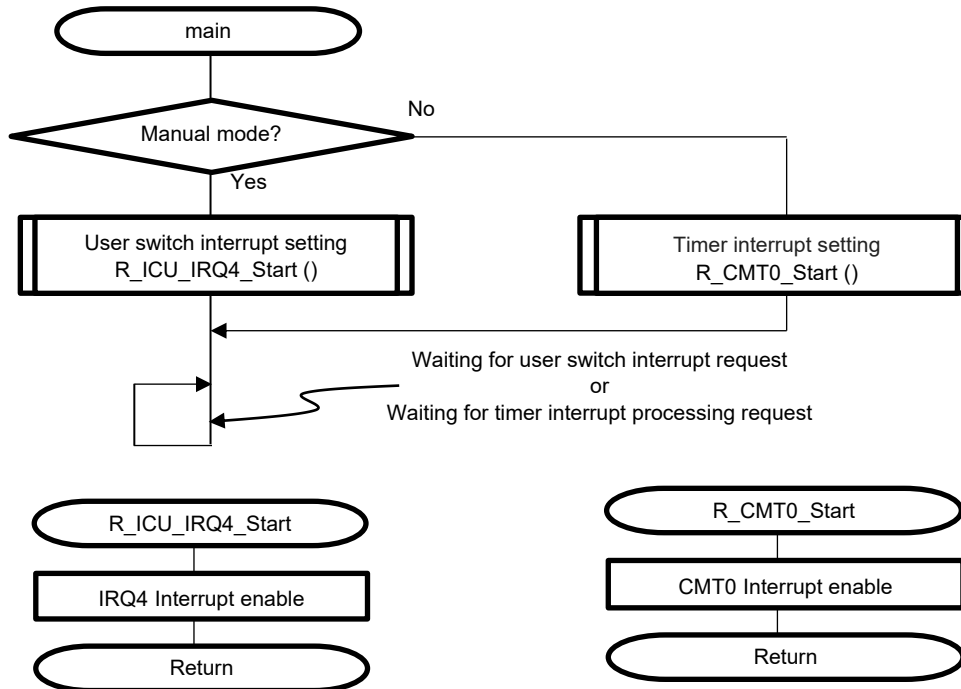


Figure 2-2: LED lighting control program operation flow

Figure 2-3 shows the user switch interrupt operation flow of the LED lighting control program, and Figure 2-4 shows the timer interrupt operation flow.

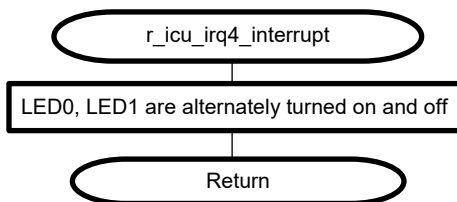


Figure 2-3: User switch interrupt operation flow

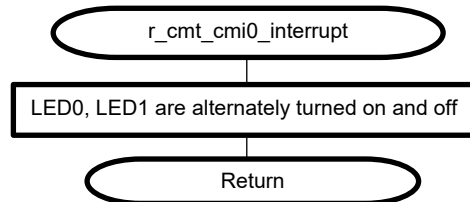


Figure 2-4: Timer interrupt operation flow

3. RX231 Internal block diagram

Figure 3-1 shows the internal block diagram of the RX231 and the used blocks of the LED lighting control program.

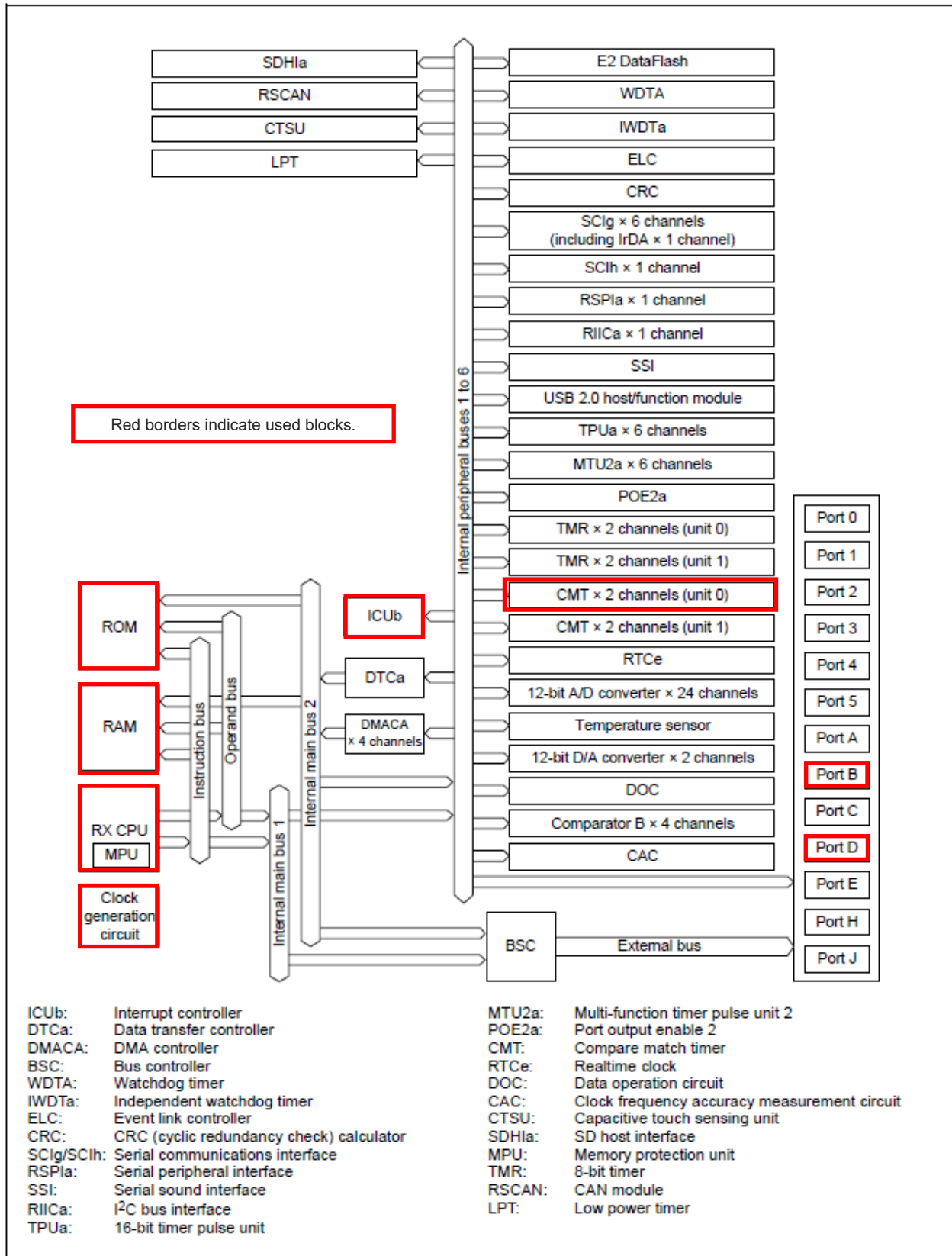


Figure 3-1: RX231 Internal block diagram

4. RX231 Memory map

This MCU has a 4-Gbyte address space, consisting of the range of addresses from 0000 0000h to FFFF FFFFh. That is, linear access to an address space of up to 4-Gbytes is possible, and this contains both program and data areas. **Figure 4-1** shows the memory maps in the respective operating modes. Accessible areas will differ according to the operating mode and states of control bits.

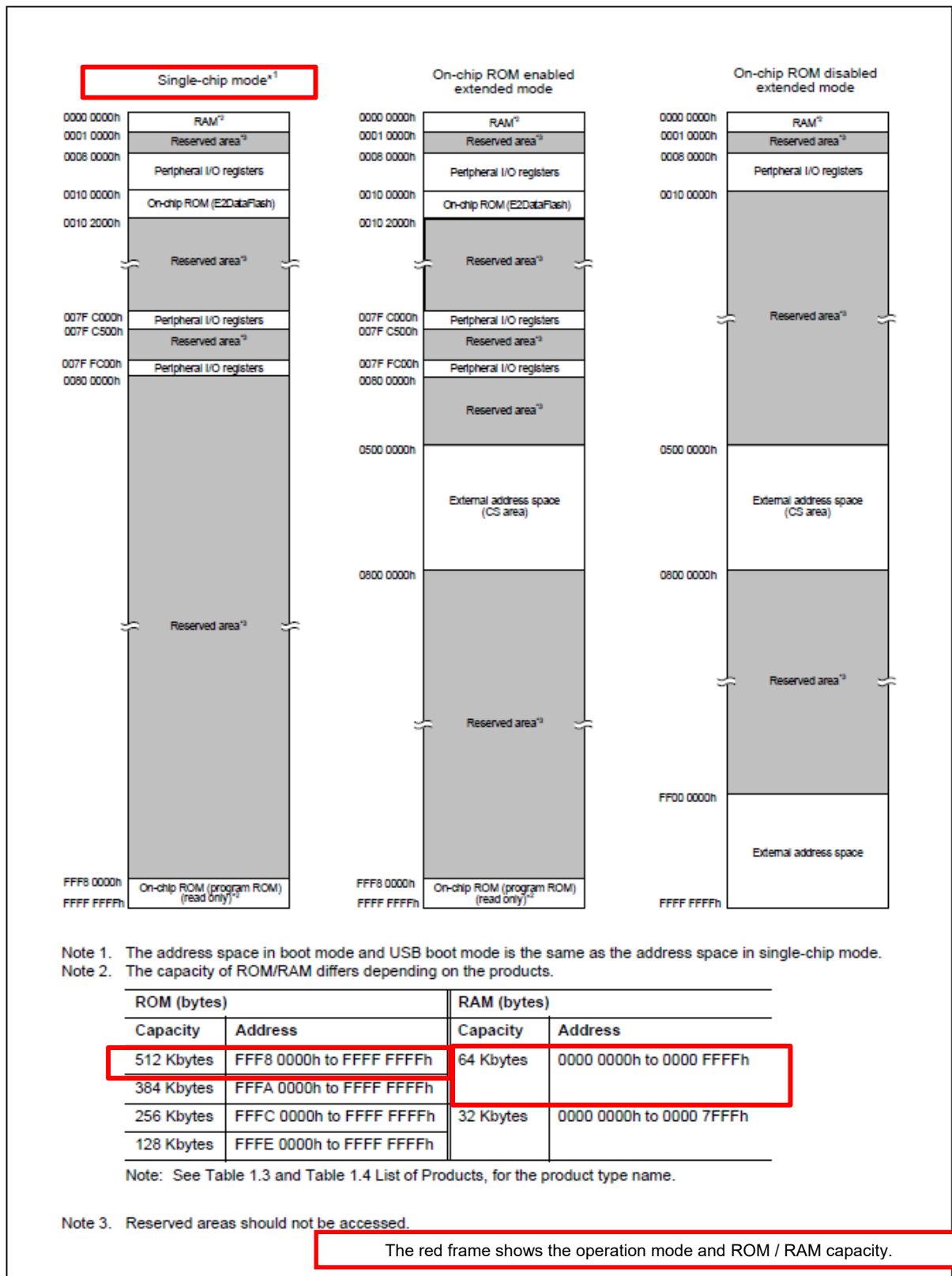


Figure 4-1: RX231 Memory map

5. RX231 Clock generation block diagram

Figure 5-1 shows the clock generation route of the RX231 clock generation block diagram and the LED lighting control program.

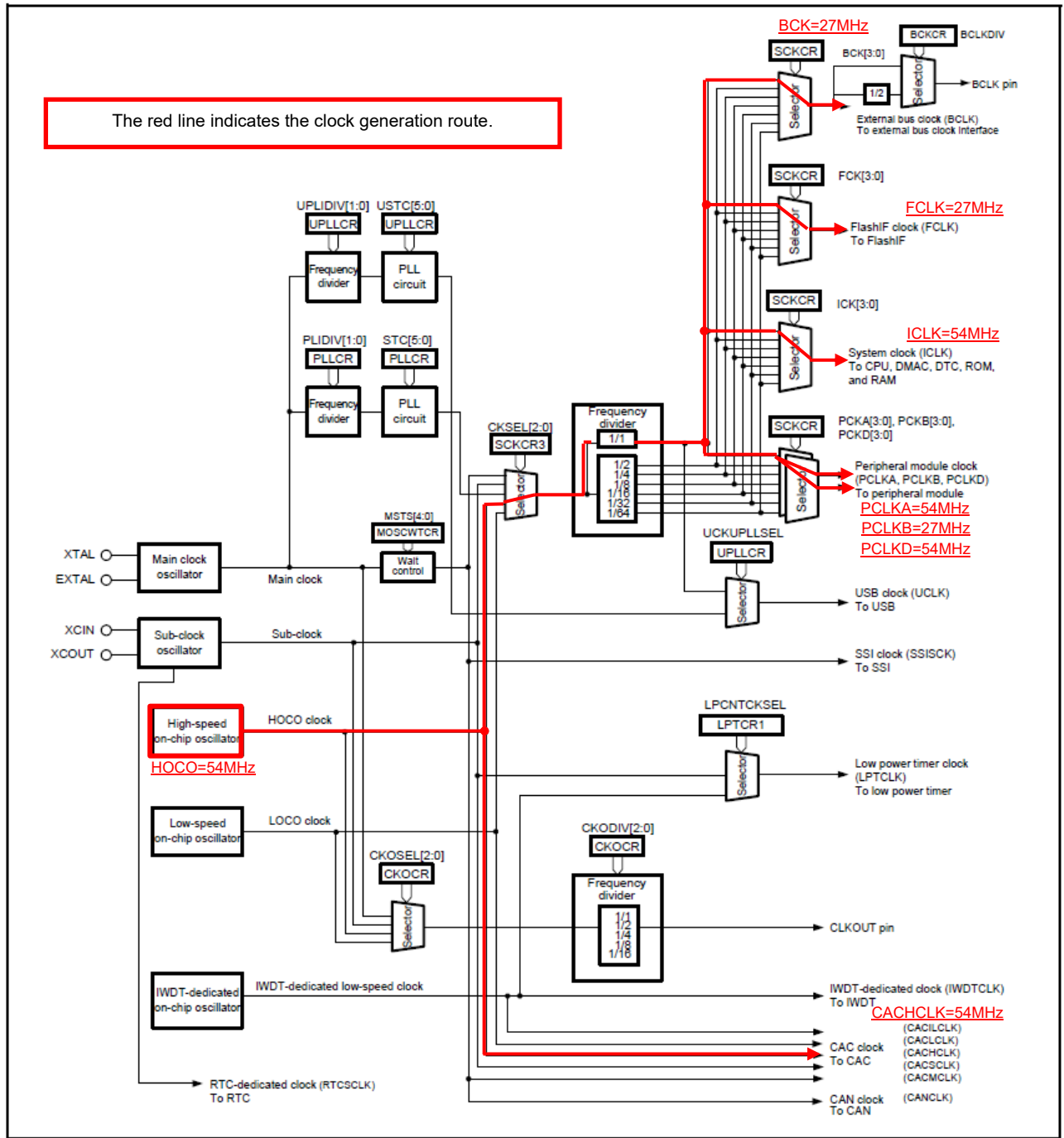


Figure 5-1: RX231 Clock generation block diagram

6. Precautions

Please do not incorporate this program into your product. This program does not guarantee the operation. When using it, please check the operation at your own risk.

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Oct 13, 2017	-	First edition issued

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins

Handle unused pins in accordance with the directions given under Handling of Unused Pins in the manual.

- The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

- When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

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Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

- The characteristics of Microprocessing unit or Microcontroller unit products in the same group but having a different part number may differ in terms of the internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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