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April 1st, 2010
Renesas Electronics Corporation

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3858 Group

Serial I/O 1 (Asynchronous Serial I/O (UART) Mode)

1. Abstract

This document describes how to set up and use serial I/O 1 (asynchronous serial I/O(UART) mode) on the 3858 Group device.

2. Introduction

The application example described in this document is applied to the following:

MCU: 3858 Group

Oscillation frequency: 4.9152 MHz

This sample program may include operations of unused bit functions for the convenience of the SFR bit layout. Set the values according to the operating conditions of the user system.

3. Contents

3.1 Communication Using Asynchronous Serial I/O (UART) (Transmission / Reception)

Outline:

- 2-byte data is transmitted and received using the UART.
- Port P23 is used for communication control.

Specifications:

- Serial I/O 1(UART mode) is used.
- Bit rate: 9600 bps ($f(XIN) = 4.9152 \text{ MHz}$ divided by 512).
- Communication is controlled by port P23.
(The output level of port P23 is controlled by a program.)
- 2-byte data is transferred from the transmitting side to the receiving side at 10 ms intervals (generated by the timer).

Figure 3.1 shows the Connection Diagram and Figure 3.2 shows the Timing Chart.

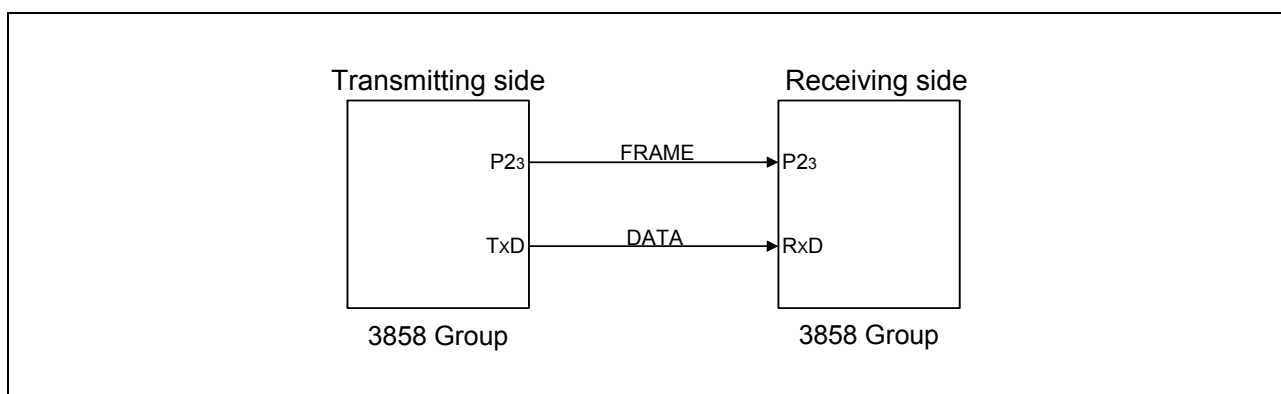


Figure 3.1 Connection Diagram

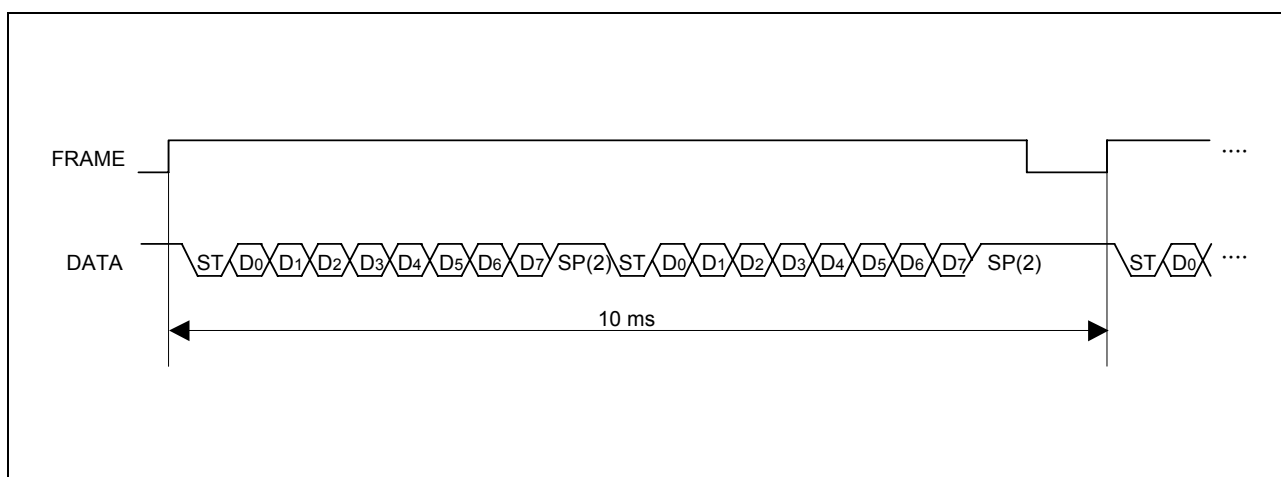


Figure 3.2 Timing Chart

Table 3.1 lists an Example of Baud Rate Generator Set Value and Bit Rate Selection, Figure 3.3 shows the Register Settings Relevant to Transmitting Side, Figure 3.4 shows the Register Settings Relevant to Receiving side, Figure 3.5 shows the Control Procedure of Transmitting Side, and Figure 3.6 shows the Control Procedure of Receiving Side.

Table 3.1 Example of Baud Rate Generator Set Value and Bit Rate Selection

BRG Count Source ⁽¹⁾	BRG Set Value	Bit Rate (bps) ⁽²⁾	
		f(XIN) = 4.9152 MHz	f(XIN) = 8 MHz
f(XIN)/4	255(FFh)	300	488.2815
f(XIN)/4	127(7Fh)	600	976.5625
f(XIN)/4	63(3Fh)	1200	1953.125
f(XIN)/4	31(1Fh)	2400	3906.25
f(XIN)/4	15(0Fh)	4800	7812.5
f(XIN)/4	7(07h)	9600	15625
f(XIN)/4	3(03h)	19200	31250
f(XIN)/4	1(01h)	38400	62500
f(XIN)	3(03h)	76800	125000
f(XIN)	1(01h)	153600	250000
f(XIN)	0(00h)	307200	500000

NOTES:

1. The BRG count source is selected by bit 0 in the serial I/O1 control register (address 001Ah).
2. Calculation formula for bit rate:

$$\text{Bit rate (bps)} = \frac{f(\text{XIN})}{(\text{BRG set value} + 1) \times 16 \times m}$$

m: When bit 0 in the serial I/O1 control register = 0, m = 1
When bit 0 in the serial I/O1 control register = 1, m = 4

Transmitting side

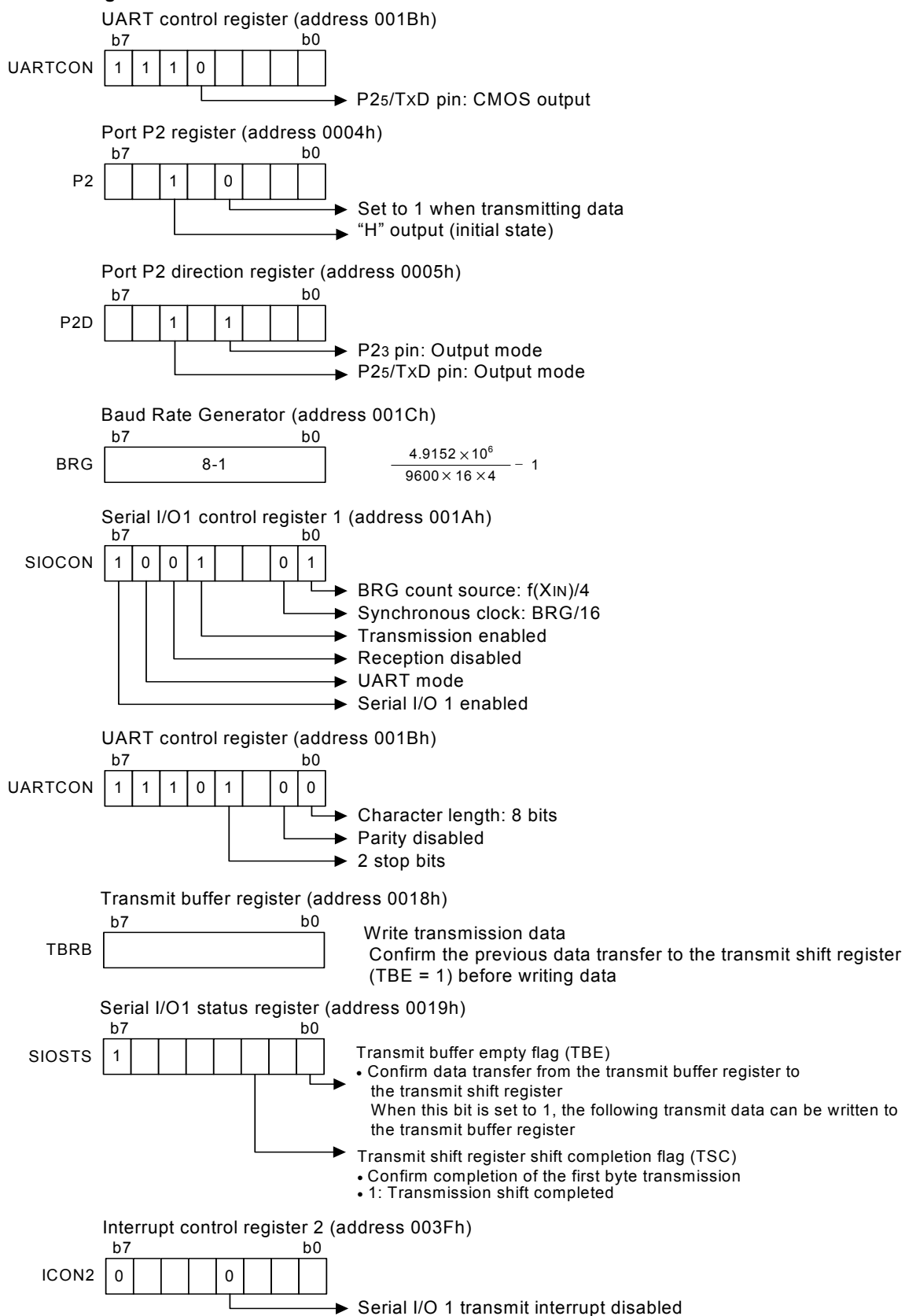


Figure 3.3 Register Settings Relevant to Transmitting Side

Receiving side

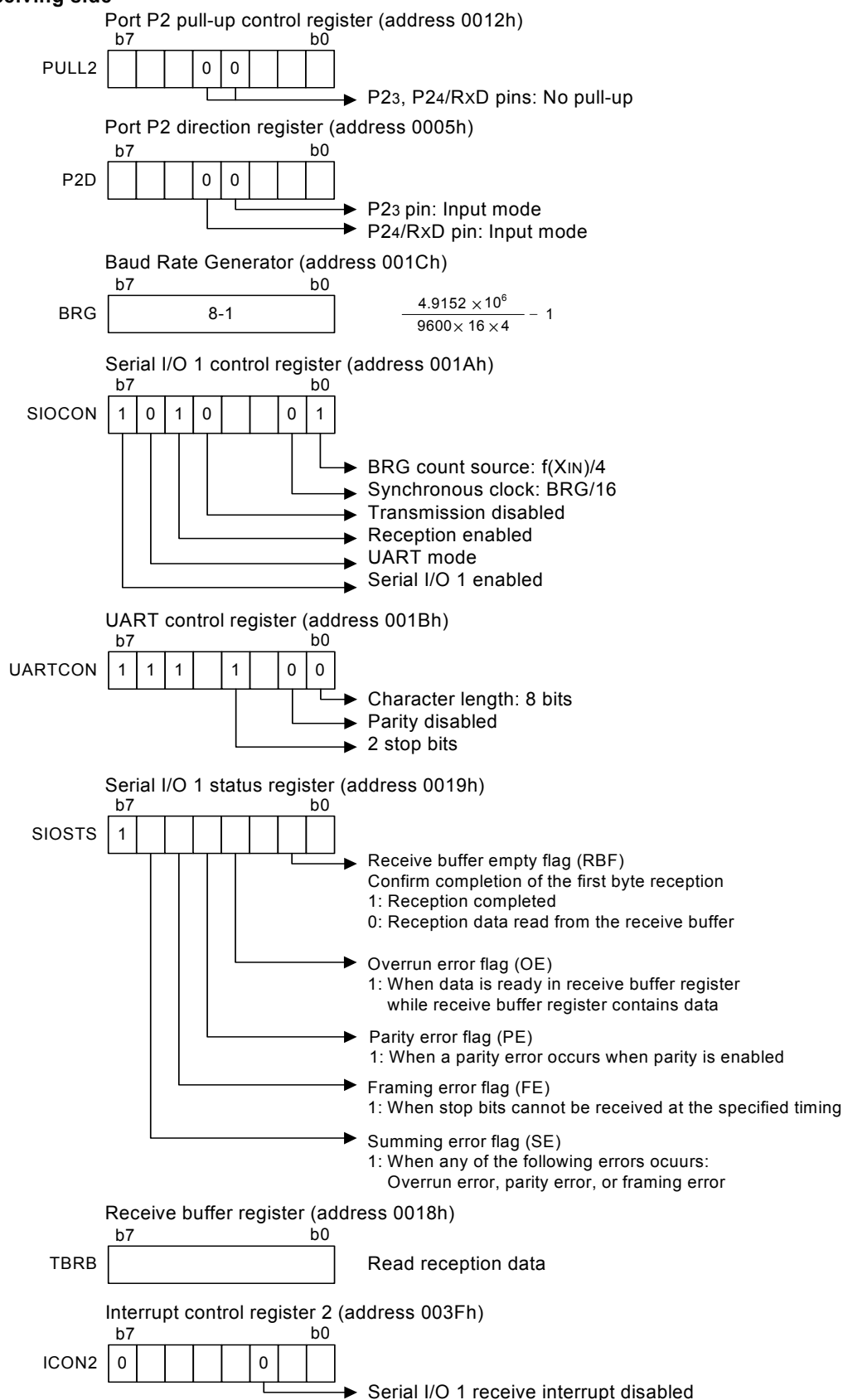


Figure 3.4 Register Settings Relevant to Receiving side

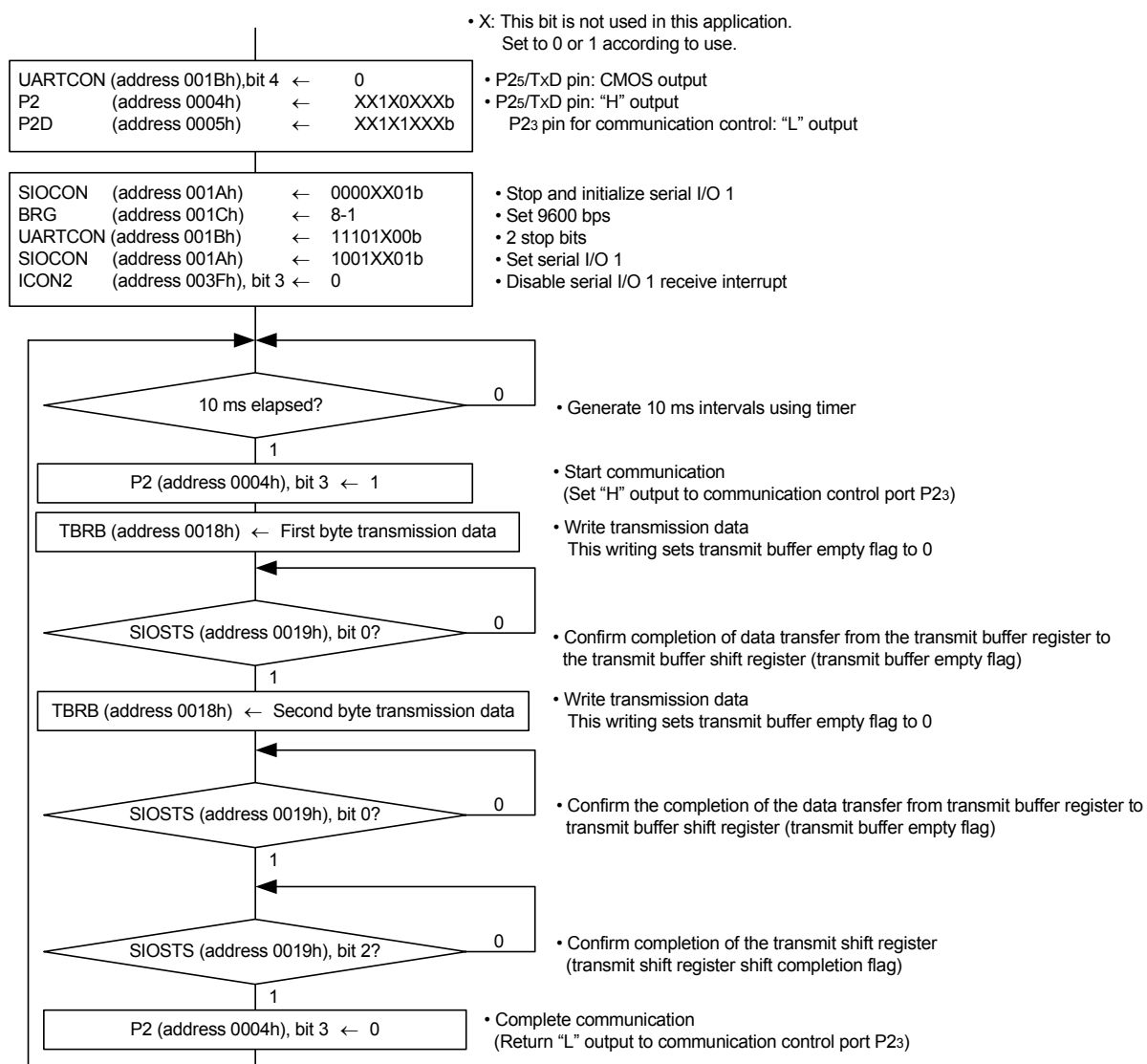
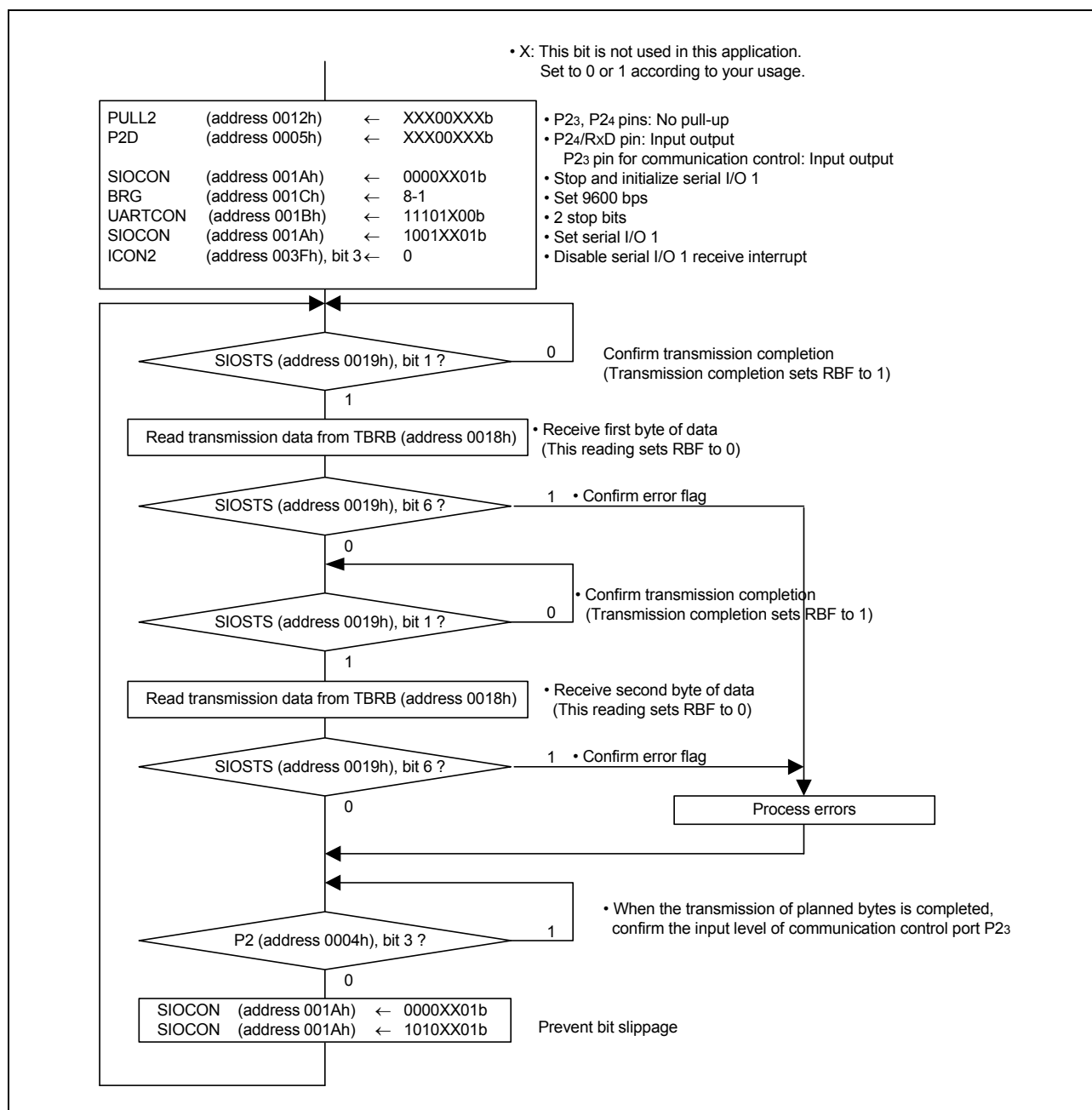


Figure 3.5 Control Procedure of Transmitting Side



4. Sample Programming Code

Download a sample program on the Renesas Technology website.

To download, click “Application Notes” in the left-hand side menu on the page of the 3858 Group.

5. Reference Document

Datasheet

3858 Group Datasheet

Download the latest version from the Renesas Technology website.

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REVISION HISTORY	3858 Group Serial I/O 1 (Asynchronous Serial I/O (UART) Mode) Application Note
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Rev.	Date	Description	
		Page	Summary
1.00	Aug 10 2006	–	First Edition issued

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