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7542 Group

Serial I/O

1. Abstract

This document describes serial I/O for 7542 Group.

2. Introduction

The application explained in this document applies to the following MCU.

- Applicable MCU: 7542 Group

3. Description

3.1 Serial I/O Connection Examples

3.1.1 Controlling Peripheral IC Equipped with CS Pins

Figure 3.1 shows a connection example of serial I/O. This example is a connection with a peripheral IC equipped with a CS pin in clock synchronous serial I/O mode.

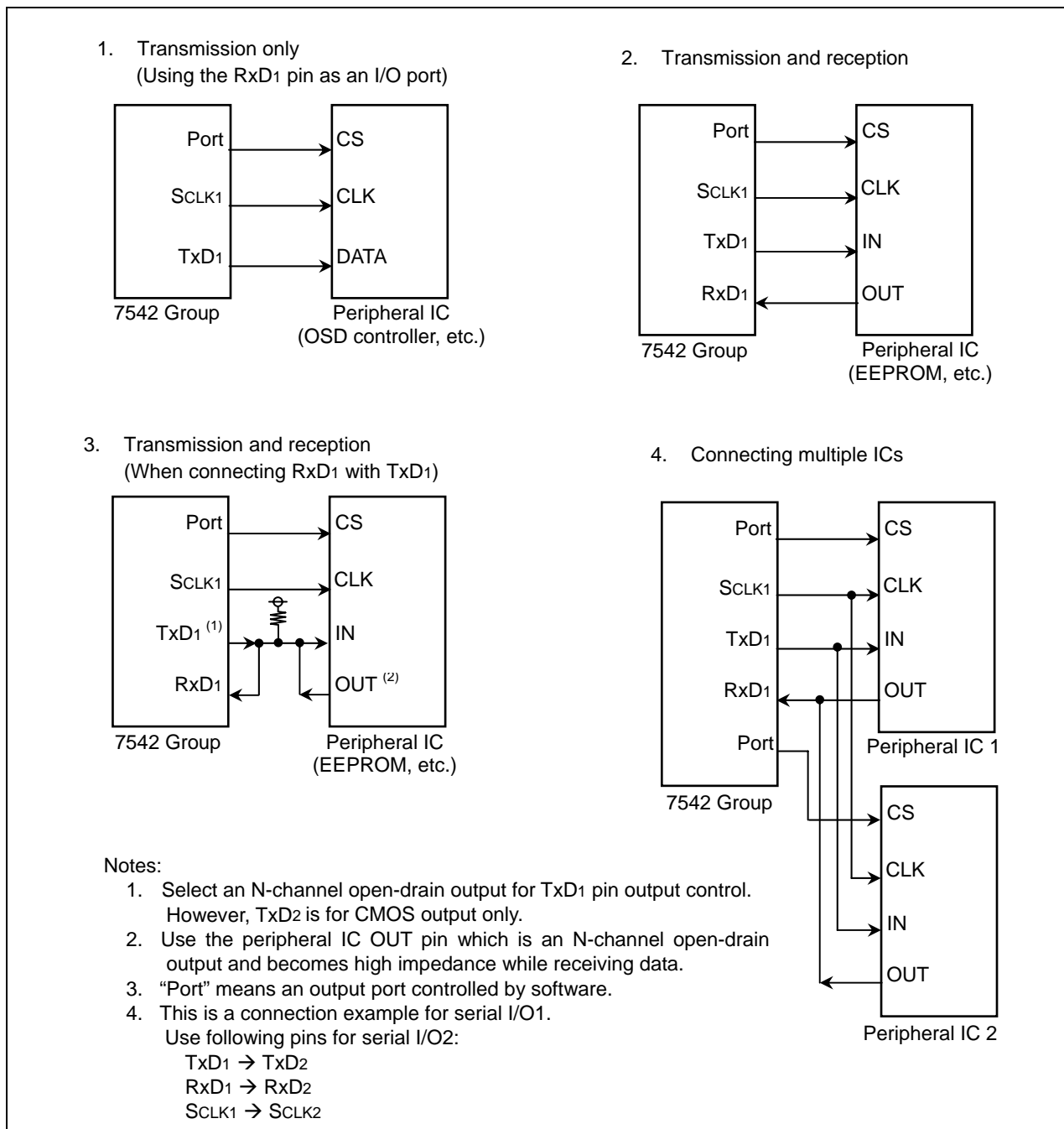


Figure 3.1 Serial I/O Connection Examples (1/2)

3.1.2 Connection with MCU

Figure 3.2 shows a connection example of serial I/O. This example shows a connection with another MCU.

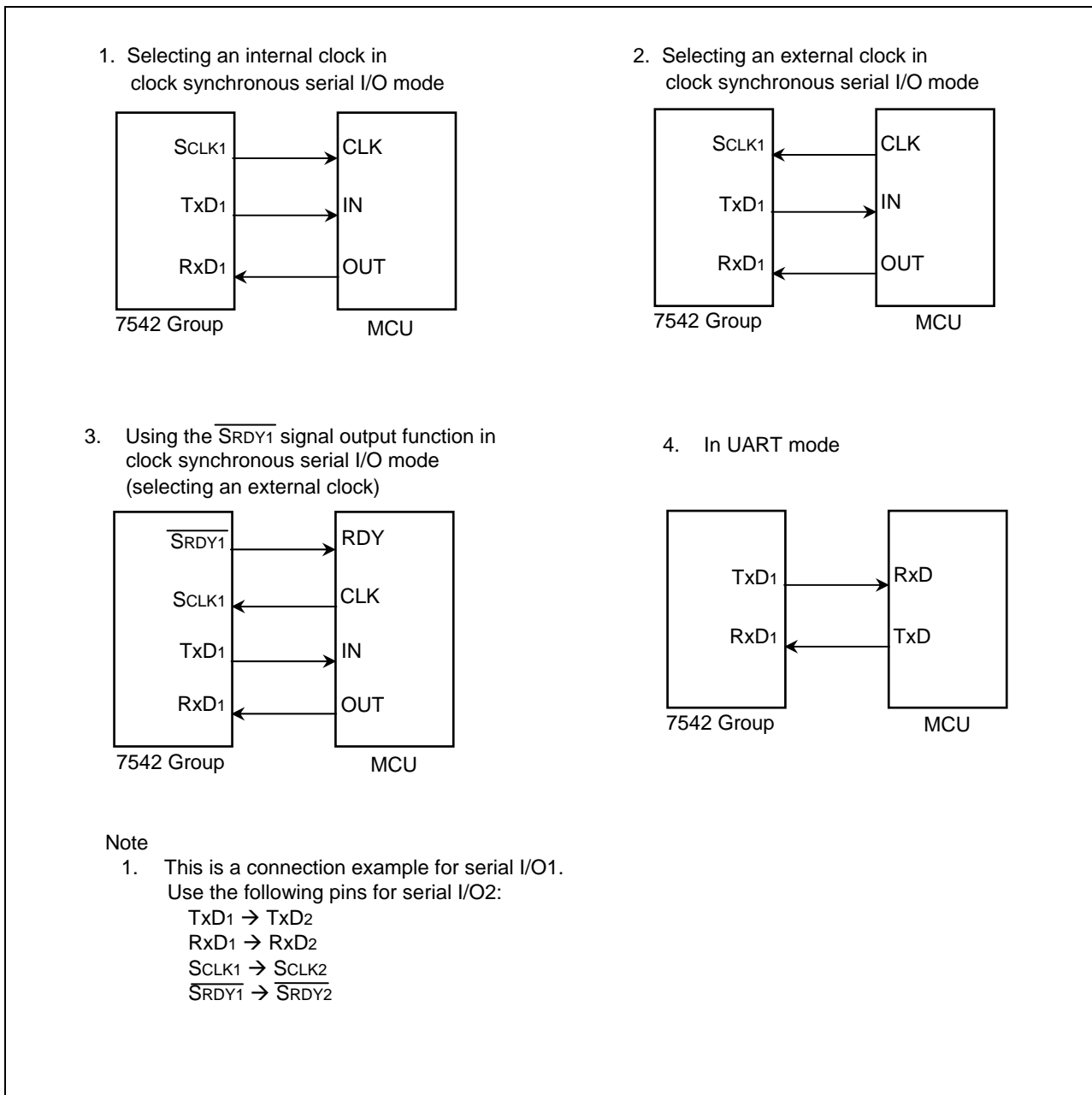


Figure 3.2 Serial I/O Connection Examples (2/2)

3.2 Serial I/O Transfer Data Format

Clock synchronous or clock asynchronous (UART) can be selected for serial I/O1 and serial I/O2. Figure 3.3 shows the serial I/O transfer data format.

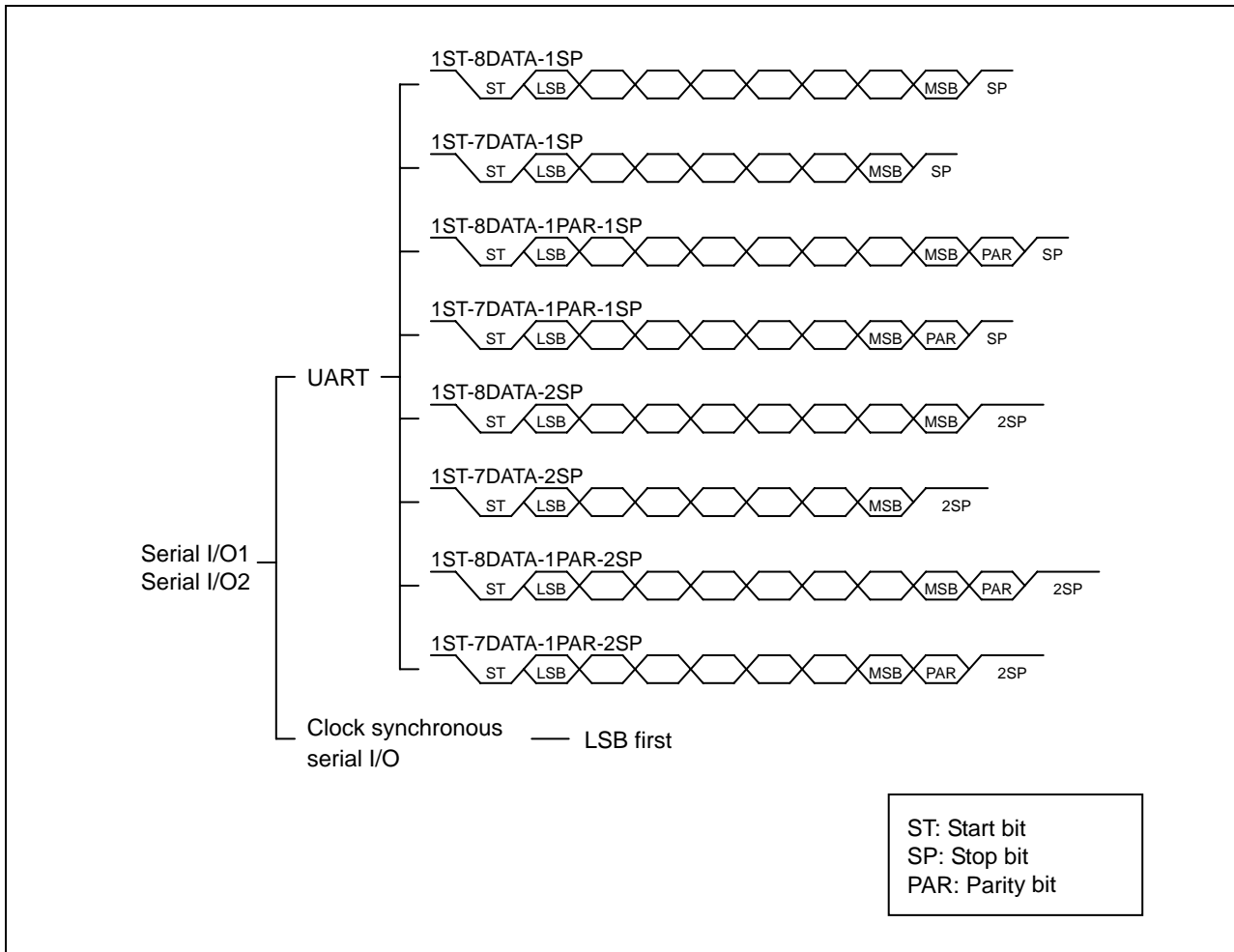


Figure 3.3 Serial I/O Transfer Data Format

3.3 Serial I/O1 Operation: Stop and Initialize

3.3.1 Clock Synchronous Serial I/O Mode

- Stop/initialize transmit operation only when transmitting
 Set the transmit enable bit to 0.

By setting the transmit enable bit to 0, the transmit operations listed below will be stopped and initialized:

- Stop supply of shift clock to transmit shift register
- Initialize transmit clock control circuit
- Transmit buffer empty flag becomes 0
- Transmit shift register shift complete flag becomes 0
- P11/TxD1 pin: I/O port P11

By setting the serial I/O1 enable bit to 0, pins P10/RxD1, P11/TxD1, P12/SCLK1, and P13/ $\overline{\text{SRDY1}}$ all become I/O ports.

- Stop/initialize receive operation only when receiving
 Set the receive enable bit or serial I/O1 enable bit to 0.

By setting the receive enable bit to 0, the receive operations listed below will be stopped and initialized.

- Stop supply of shift clock to receive shift register
- Initialize receive clock control circuit
- Error flags (over-run, parity, framing, and summing error flags) become 0
- Receive buffer full flag becomes 0
- P10/RxD1 pin: I/O port P10

By setting the serial I/O1 enable bit to 0, the receive operations listed below will be stopped and initialized.

- Stop supply of shift clock to receive shift register
- Initialize receive clock control circuit
- Error flags (over-run, parity, framing, and summing error flags) become 0
- Receive buffer full flag becomes 0
- P10/RxD1, P11/TxD1, P12/SCLK1, and P13/ $\overline{\text{SRDY1}}$ pins: I/O ports P10, P11, P12, and P13

- Stop/initialize receive/transmit operation when both transmitting and receiving
 Set the transmit enable bit and receive enable bit to 0 simultaneously.

3.3.2 UART Mode

- Stop/initialize transmit operation
 Set the transmit enable bit to 0.
- Stop/initialize receive operation
 Set the receive enable bit to 0.

3.4 Serial I/O2 Operation: Stop and Initialize

3.4.1 Clock Synchronous Serial I/O Mode

- Stop/initialize transmit operation only when transmitting
 Set the transmit enable bit to 0.

By setting the transmit enable bit to 0, the transmit operations listed below will be stopped and initialized.

- Stop supply of shift clock to transmit shift register
- Initialize transmit clock control circuit
- Transmit buffer empty flag becomes 0
- Transmit shift register shift complete flag becomes 0
- P05/TxD2 pin: I/O port P05

By setting the serial I/O2 enable bit to 0, pins P04/RxD2, P05/TxD2, P06/SCLK2, and P07/ $\overline{\text{SRDY2}}$ all become I/O ports.

- Stop/initialize receive operation only when receiving
 Set the receive enable bit or serial I/O2 enable bit to 0.

By setting the receive enable bit to 0, the receive operations listed below will be stopped and initialized.

- Stop supply of shift clock to receive shift register
- Initialize receive clock control circuit
- Error flags (over-run, parity, framing, and summing error flags) become 0
- Receive buffer full flag becomes 0
- P04/RxD2 pin: I/O port P04

By setting the serial I/O2 enable bit to 0, the receive operations listed below will be stopped and initialized.

- Stop supply of shift clock to receive shift register
- Initialize receive clock control circuit
- Error flags (over-run, parity, framing, and summing error flags) become 0
- Receive buffer full flag becomes 0
- P04/RxD2, P05/TxD2, P06/SCLK2, and P07/ $\overline{\text{SRDY2}}$ pins: I/O ports P04, P05, P06, and P07

- Stop/initialize receive/transmit operation when both transmitting and receiving
 Set the transmit enable bit and receive enable bit to 0 simultaneously.

3.4.2 UART Mode

- Stop/initialize transmit operation
 Set the transmit enable bit to 0.
- Stop/initialize receive operation
 Set the receive enable bit to 0.

3.5 Serial I/O Pin Function and Selection Method

3.5.1 Serial I/O1

Table 3.1 shows the pin functions in clock synchronous serial I/O mode, and Table 3.2 shows the pin functions in UART mode.

Table 3.1 Pin Functions in Clock Synchronous Serial I/O Mode

Pin Name	Function	Serial I/O1 Control Register (Address 1A16)								Corresponding Direction Register
		b7	b6	b5	b4	b3	b2	b1	b0	
		SIOE	SIOM	RE	TE	TIC	SRDY	SCS	CSS	
P10/RxD1	RxD1	1	1	1	x	x	x	x	x	x
	P10	1	1	0	x	x	x	x	x	0/1
P11/TxD1	TxD1	1	1	x	1	x	x	x	x	x
	P11	1	1	x	0	x	x	x	x	0/1
P12/SCLK1	SCLK1 (external clock input)	1	1	x	x	x	x	1	x	x
	SCLK1 (internal clock output)	1	1	x	1	x	x	0	x	x
P13/ $\overline{\text{SRDY1}}$	$\overline{\text{SRDY1}}$	1	1	x	x	x	1	x	x	x
	P13	1	1	x	x	x	0	x	x	0/1

Note: When SIOE is 0, all pins become I/O ports regardless of the values set to b6 to b0.

x: This is not used for the pin's function setting.

Table 3.2 Pin Functions in UART Mode

Pin Name	Function	Serial I/O1 Control Register (Address 1A16)								Corresponding Direction Register
		b7	b6	b5	b4	b3	b2	b1	b0	
		SIOE	SIOM	RE	TE	TIC	SRDY	SCS	CSS	
P10/RxD1	RxD1	1	0	1	x	x	x	x	x	x
	P10	1	0	0	x	x	x	x	x	0/1
P11/TxD1	TxD1	1	0	x	1	x	x	x	x	x
	P11	1	0	x	0	x	x	x	x	0/1
P12/SCLK1	SCLK1 (external clock input)	1	0	x	x	x	x	1	x	x
	P12	1	0	x	x	x	x	0	x	0/1
P13/ $\overline{\text{SRDY1}}$	P13	1	0	x	x	x	x	x	x	0/1

Note: When SIOE is 0, all pins become I/O ports regardless of the values set to b6 to b0.

x: This is not used for the pin's function setting.

3.5.2 Serial I/O2

Table 3.3 shows the pin functions in clock synchronous serial I/O mode, and Table 3.4 shows the pin functions in the UART mode.

Table 3.3 Pin Functions in Clock Synchronous Serial I/O Mode

Pin Name	Function	Serial I/O2 Control Register (Address 1F16)								Corresponding Direction Register
		b7	b6	b5	b4	b3	b2	b1	b0	
		SIOE	SIOM	RE	TE	TIC	SRDY	SCS	CSS	
P04/RxD2	RxD2	1	1	1	x	x	x	x	x	x
	P04	1	1	0	x	x	x	x	x	0/1
P05/TxD2	TxD2	1	1	x	1	x	x	x	x	x
	P05	1	1	x	0	x	x	x	x	0/1
P06/SCLK2	SCLK2 (external clock input)	1	1	x	x	x	x	1	x	x
	SCLK2 (internal clock output)	1	1	x	1	x	x	0	x	x
P07/ $\overline{\text{SRDY2}}$	$\overline{\text{SRDY2}}$	1	1	x	x	x	1	x	x	x
	P07	1	1	x	x	x	0	x	x	0/1

Note: When SIOE is 0, all pins become I/O ports regardless of the values set to b6 to b0.

x: This is not used for the pin's function setting.

Table 3.4 Pin Function in UART Mode

Pin Name	Function	Serial I/O2 Control Register (Address 1F16)								Corresponding Direction Register
		b7	b6	b5	b4	b3	b2	b1	b0	
		SIOE	SIOM	RE	TE	TIC	SRDY	SCS	CSS	
P04/RxD2	RxD2	1	0	1	x	x	x	x	x	x
	P04	1	0	0	x	x	x	x	x	0/1
P05/TxD2	TxD2	1	0	x	1	x	x	x	x	x
	P05	1	0	x	0	x	x	x	x	0/1
P06/SCLK2	SCLK2 (external clock input)	1	0	x	x	x	x	1	x	x
	P06	1	0	x	x	x	x	0	x	0/1
P07/ $\overline{\text{SRDY2}}$	P07	1	0	x	x	x	x	x	x	0/1

Note: When SIOE is 0, all pins become I/O ports regardless of the values set to b6 to b0.

x: This is not used for the pin's function setting.

4. Reference Document

Datasheet

7542 Group Datasheet

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		Page	Summary
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