
R8C/25 Group

Serial I/O Operation in Clock Synchronous Serial I/O Mode

1. Abstract

This document describes a 10-byte serial transmit/receive program using clock synchronous I/O mode.

2. Introduction

The application example described in this document applies to the following MCU and parameter(s):

- MCU: R8C/25 Group

This program can be used with other R8C/Tiny Series MCUs which have the same special function registers (SFRs) as the R8C/25 Group. Check the manual for any additions and modifications to functions. Careful evaluation is recommended before using this application note.

3. Application Example Description

The transmit/receive specifications are as follows. Figure 3.1 shows the Transfer Format.

- (1) UART0 clock synchronous I/O mode is used.
Internal clock as the transfer clock, 8 μ s cycle, LSB first, serial receive mode disabled, transmission at a falling edge and reception at a rising edge of the transfer clock, TXD0 pin as CMOS output
- (2) 10-byte data is serially transmitted/received in 1 byte units every 250 μ s. When transmitting, data of the variable `trn_buf[serial_cnt]` is sent. Received data is stored in the variable `rcv_buf[serial_cnt - 1]`.
- (3) 1 ms after 10-byte data reception is completed, 10-byte data is transmitted/received again.
This means 10-byte data transmission/reception is repeated for 3.5 ms as one cycle.

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

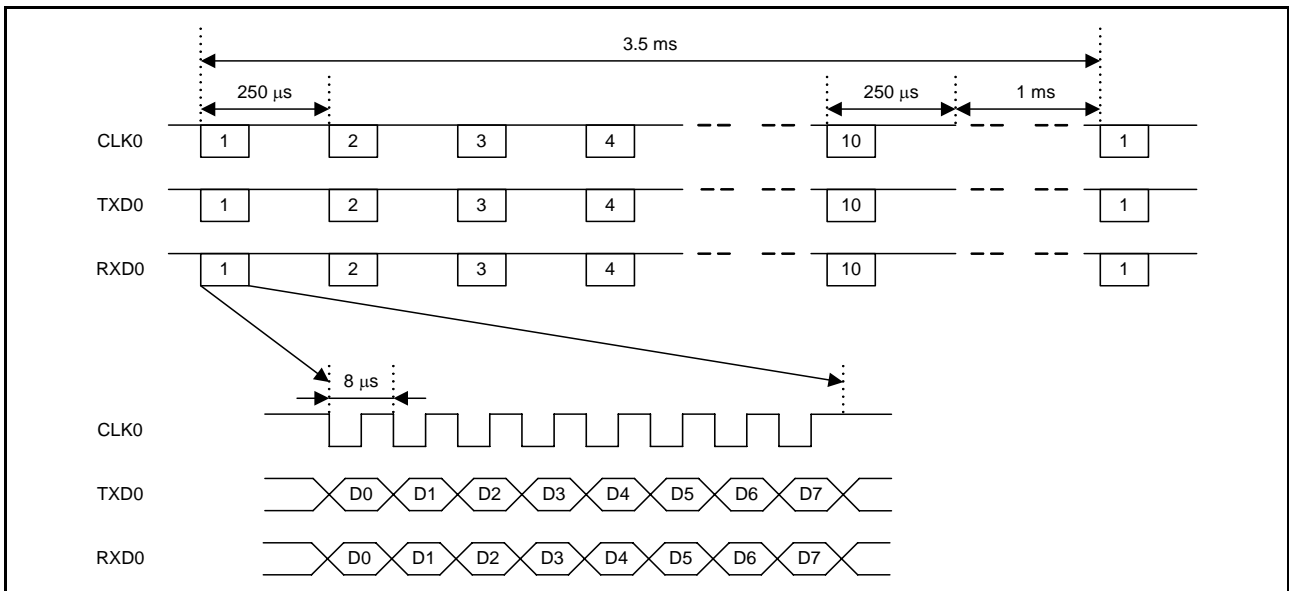


Figure 3.1 Transfer Format

3.1 Pin Usage

Table 3.1 Pin Usage and Functions

Pin	I/O	Function
P1_4/TXD0	Output	Serial data output
P1_5/RXD0	Input	Serial data input
P1_6/CLK0	Output	Transfer clock output

3.2 Memory Usage

Table 3.2 Memory Usage

Memory Usage	Size	Remark
ROM	274 bytes	In main.c module
RAM	21 bytes	In main.c module
Maximum user stack usage	10 bytes	main function: 3 bytes sfr_init function: 3 bytes cs_sral function: 7 bytes
Maximum interrupt stack usage	0 bytes	Unused

Memory usage varies depending on the C compiler version and the compile option.

The above applies under the following conditions:

- C compiler: M16C/60, 30, 20, 10, Tiny, R8C/Tiny Series Compiler V.5.40 Release 00
- Compile option: -c -finfo; NOTE: -dir “\$(CONFIGDIR)” -R8C

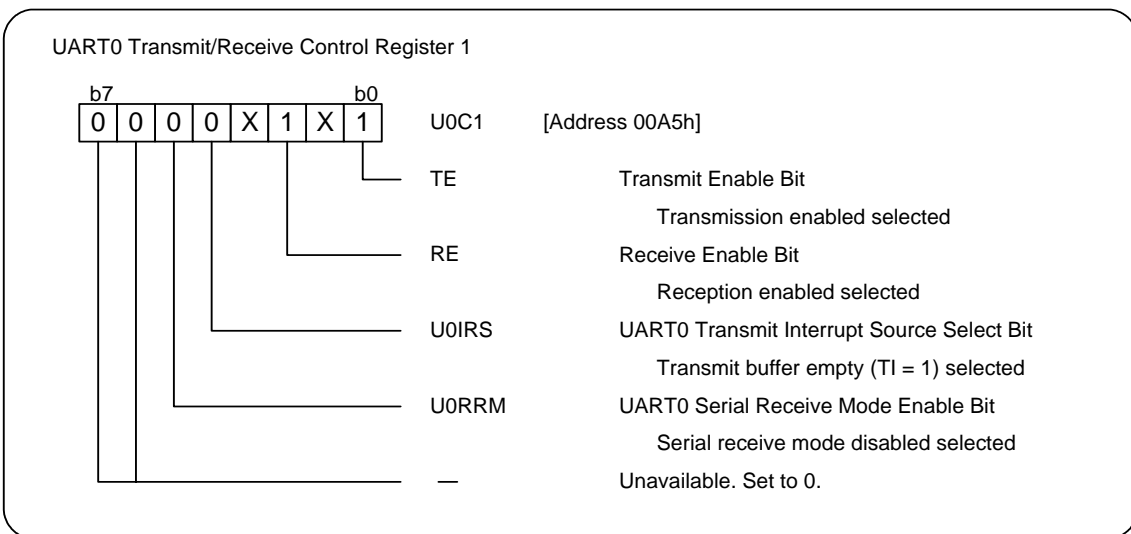
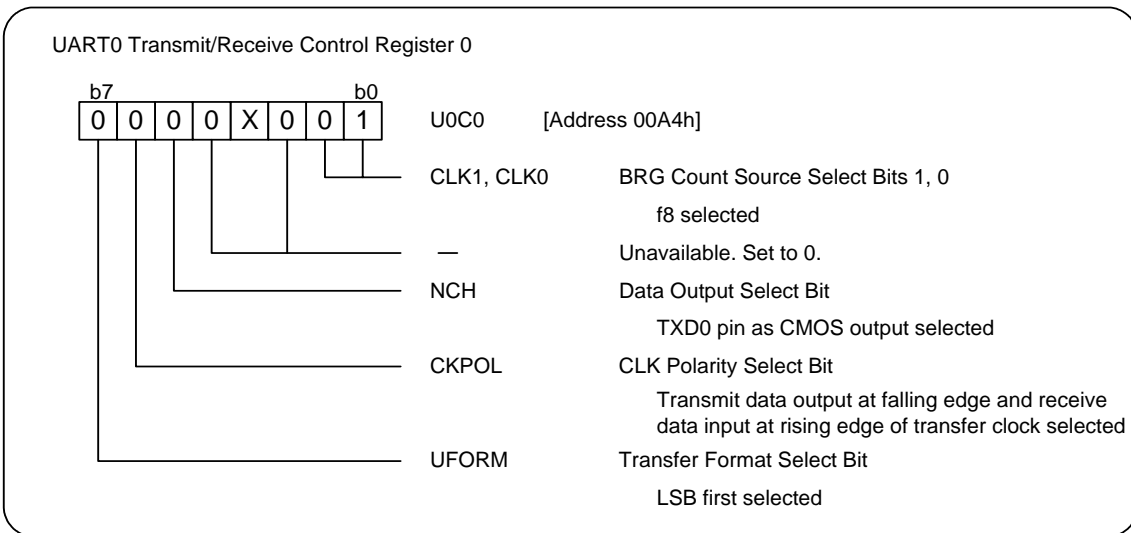
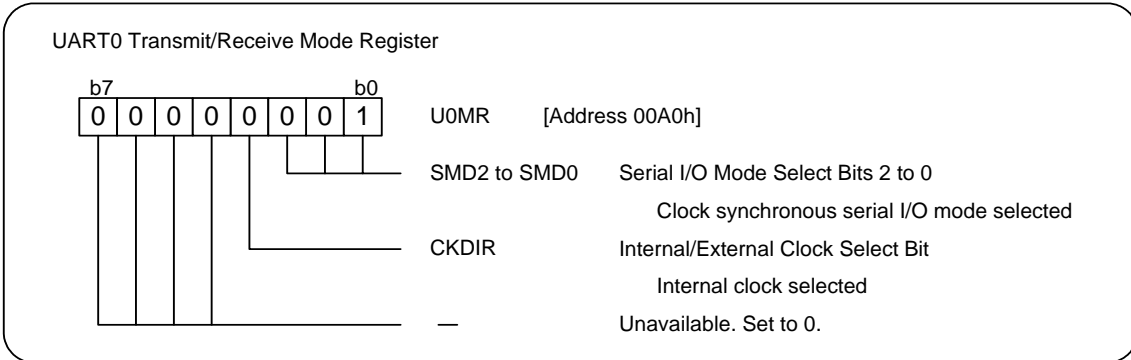
NOTE: Unavailable in the R8C/Tiny-exclusive free version.

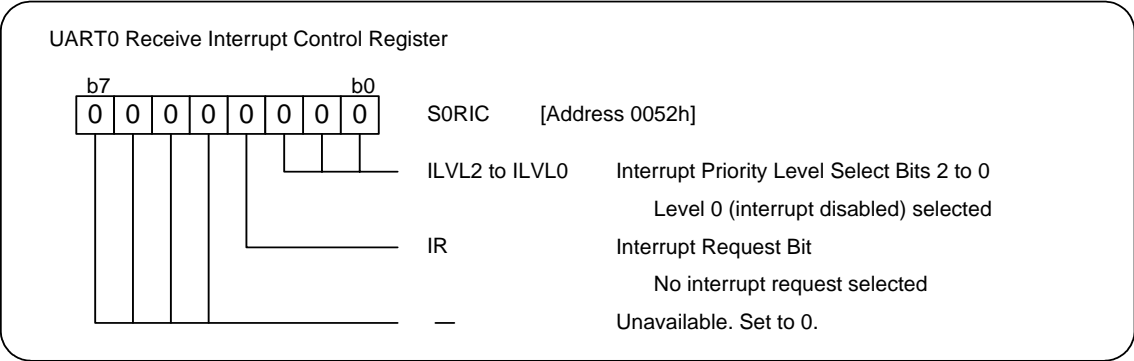
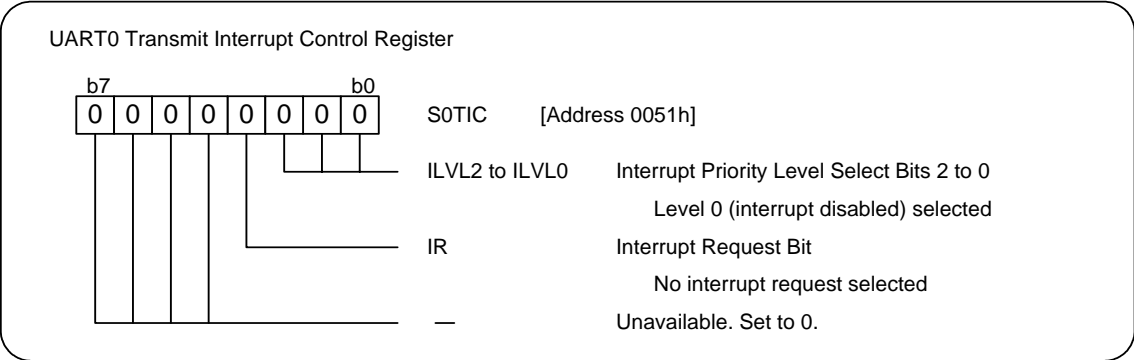
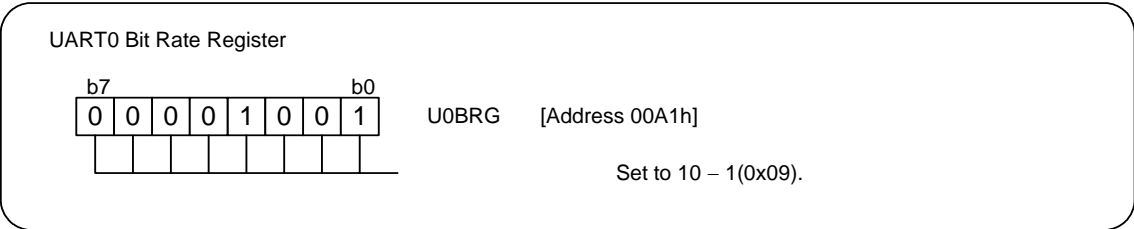
Table 3.3 RAM Usage and Definition

Symbol	Type	Size	Content
serial_cnt	unsigned char	1 byte	Transmit/receive data counter
rcv_buf[10]	unsigned char	10 bytes	Receive buffer
trn_buf[10]	unsigned char	10 bytes	Transmit buffer

4. Setup

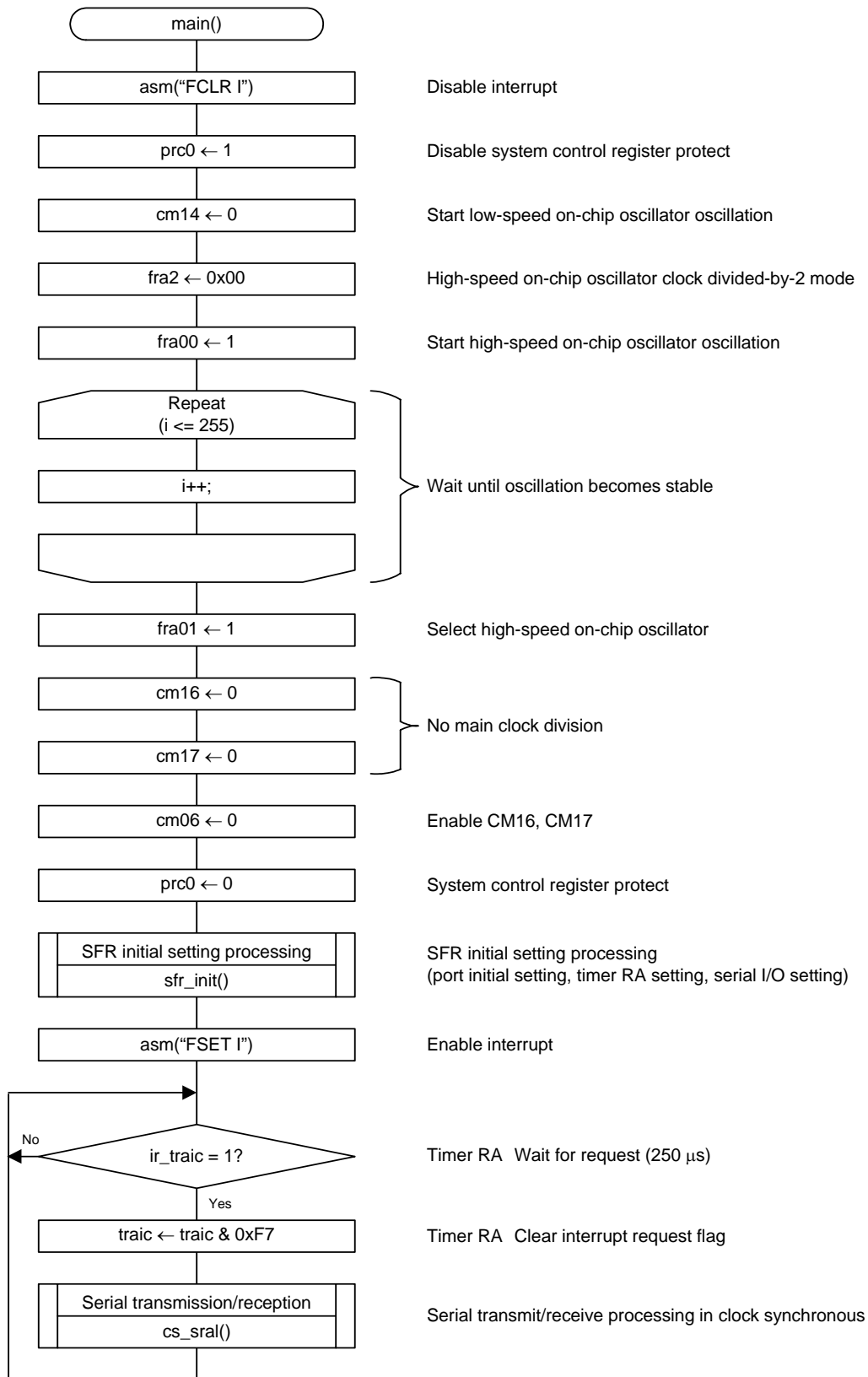
This section shows the initial setting procedures and values to perform the example described in “3. Application Example Description”. Refer to the **R8C/25 Group Hardware Manual** for details on individual registers.





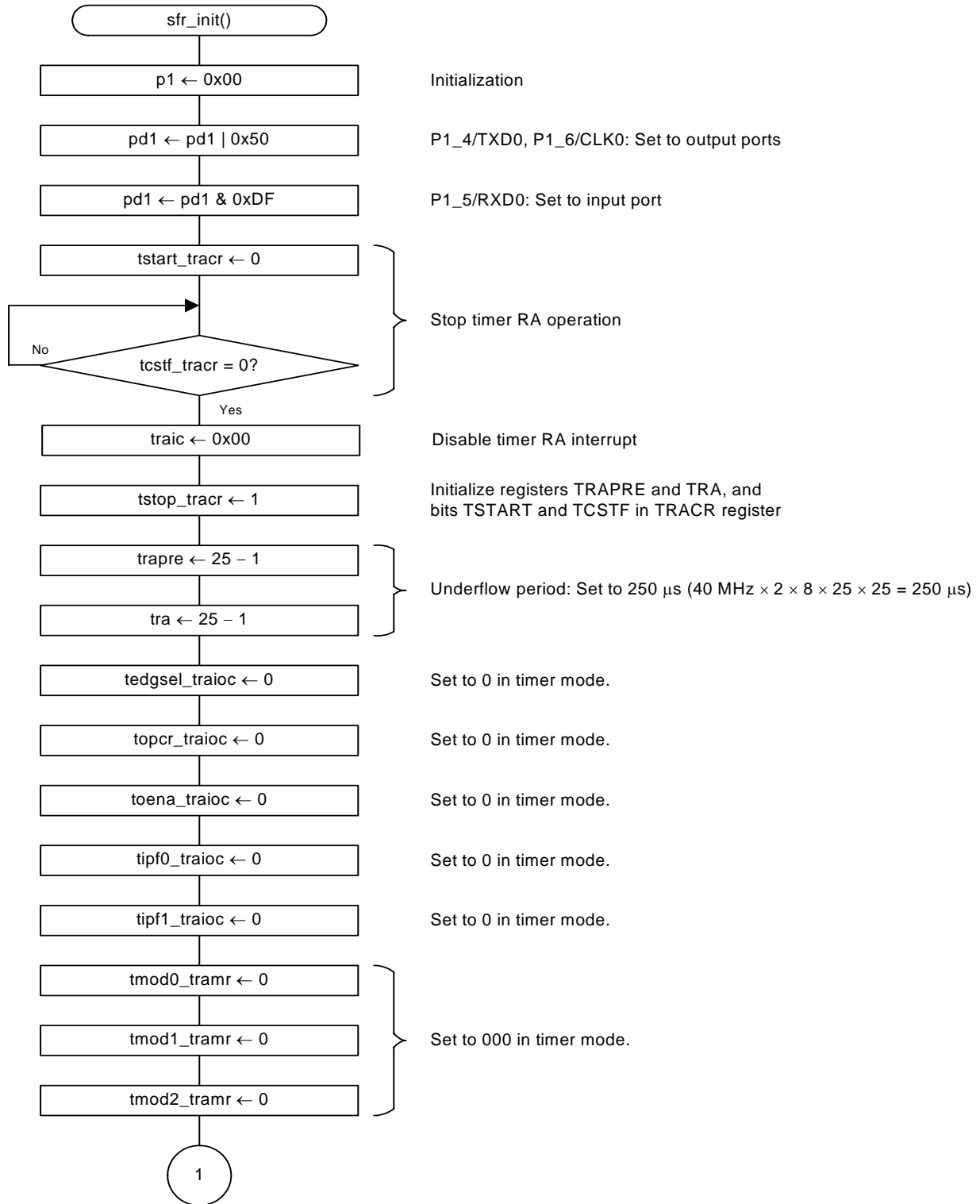
5. Flowchart

5.1 Main Function

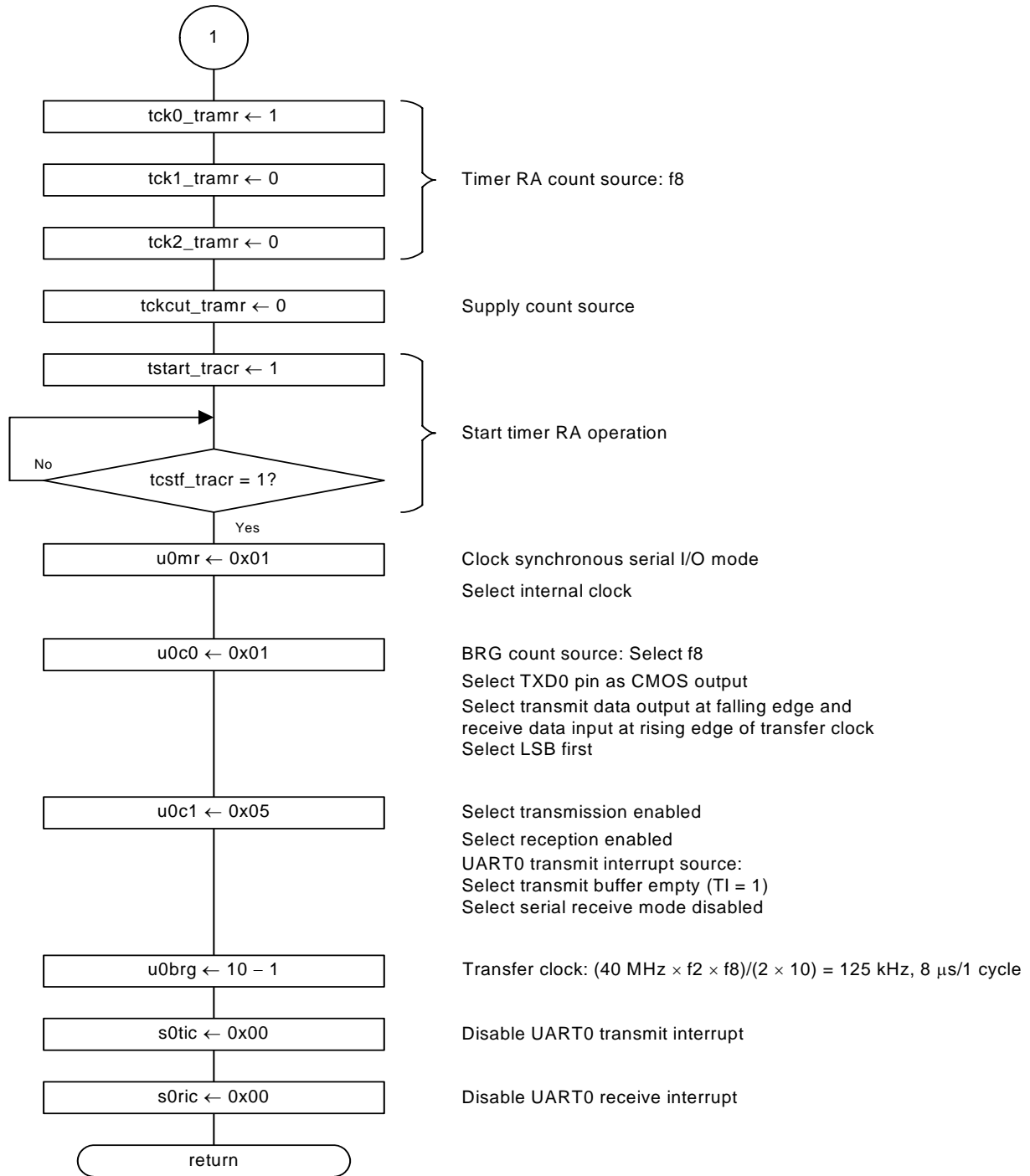


5.2 SFR Initial Setting Processing

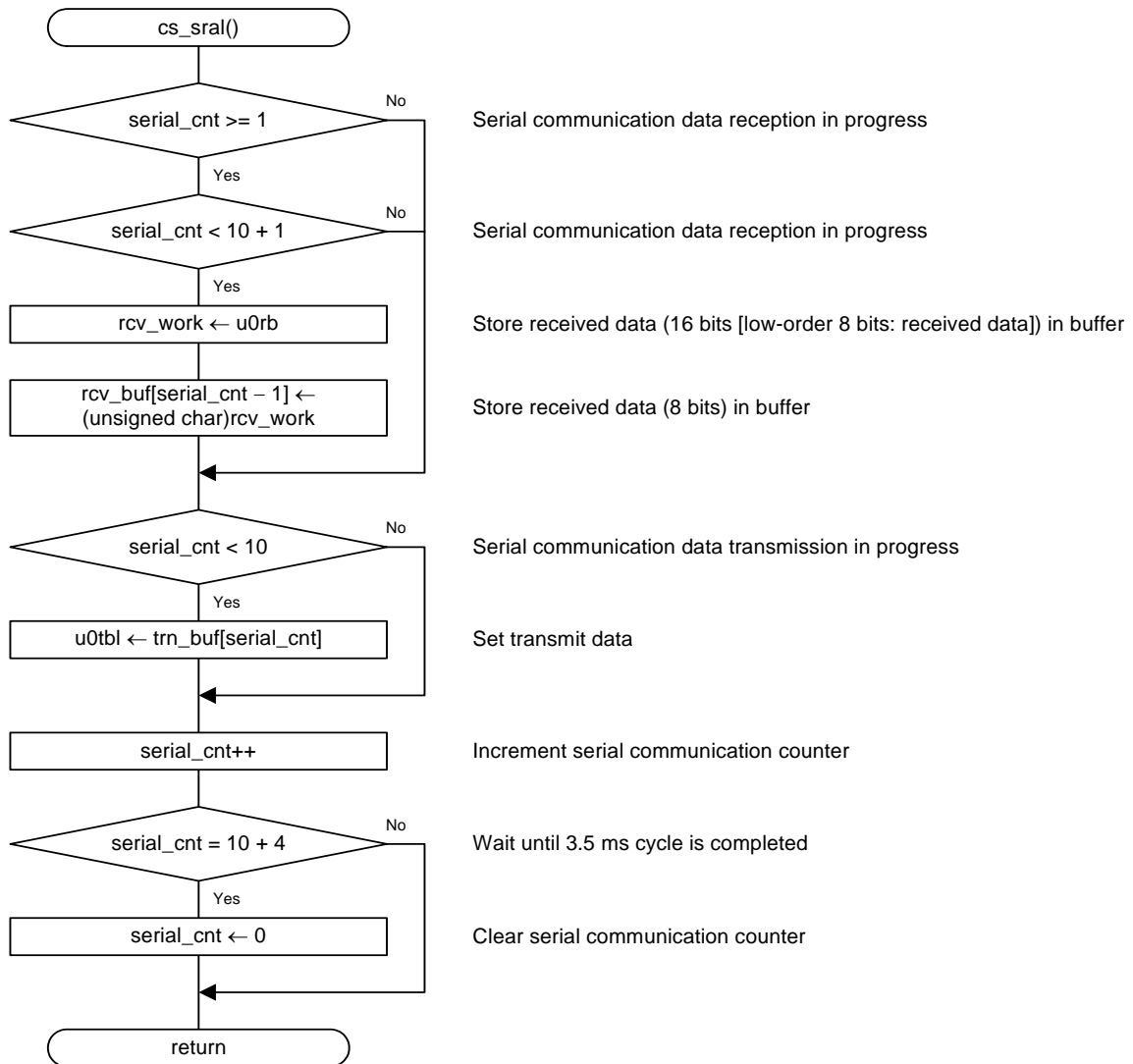
5.2.1 SFR Initial Setting Processing 1



5.2.2 SFR Initial Setting Processing 2



5.3 Serial I/O Processing in Clock Synchronous Serial I/O Mode



6. Sample Programming Code

A sample program can be downloaded from the Renesas Technology website.

To download, click “Application Notes” in the left-hand side menu of the R8C/Tiny Series page.

7. Reference Documents

Hardware Manual

R8C/25 Group Hardware Manual

The latest version can be downloaded from the Renesas Technology website.

Technical Update/Technical News

The latest information can be downloaded from the Renesas Technology website.

Website and Support

Renesas Technology website
<http://www.renesas.com/>

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REVISION HISTORY	R8C/25 Group Serial I/O Operation in Clock Synchronous Serial I/O Mode
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		Page	Summary
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