
R8C/25 Group

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

1. Abstract

This document describes an 8-byte serial transmit/receive program using clock asynchronous 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 and Figure 3.2 shows the Transfer Rate Settings.

- (1) UART0 is used. The P1_4/TXD0 pin is used for serial data output and the P1_5/RXD0 pin is used for serial data input.
- (2) The transfer format is as follows. Details of the SFR settings are shown in “4. Setup”.
 - Transfer rate : Approx. 9615 bps
 - Transfer data length : 8 bits
 - Stop bit : 1 bit
 - Parity bit : Even parity
- (3) 8-byte data is serially transmitted/received in 1 byte units every 5 ms. When transmitting, data of the variable trn_buf[trn_cnt] is sent. Received data is stored in the variable rcv_buf[rcv_cnt].
- (4) To transmit data, set the transmit start flag flag.bit.start to 1. After 8-byte data transmission is completed, this flag is set to 0 to end transmission.

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.

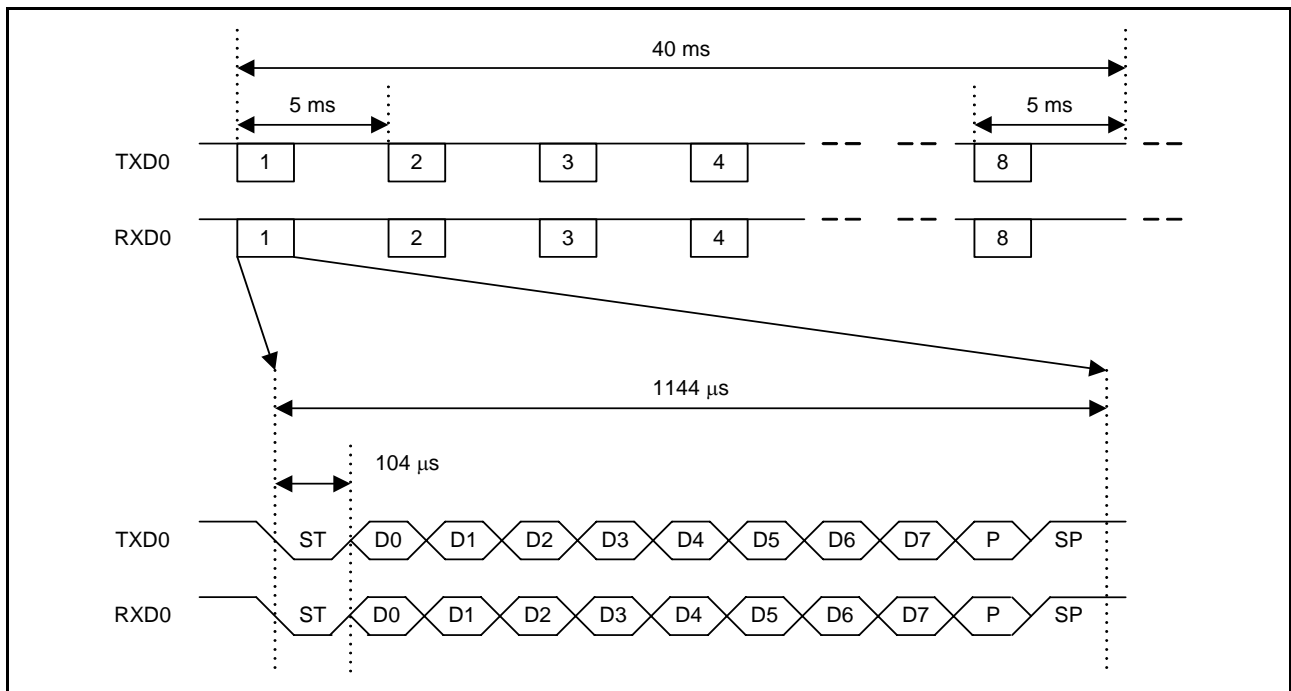


Figure 3.1 Transfer Format

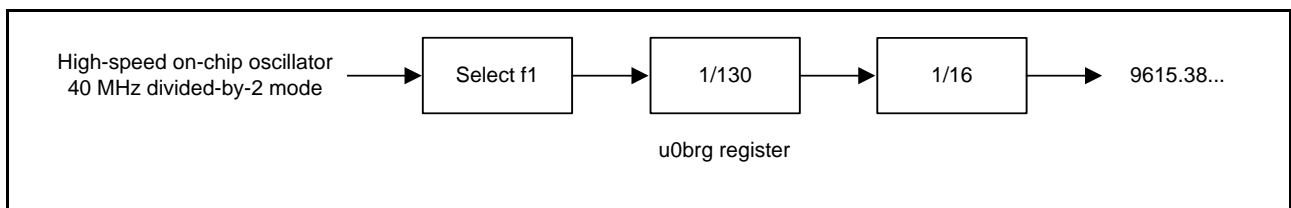


Figure 3.2 Transfer Rate Settings

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

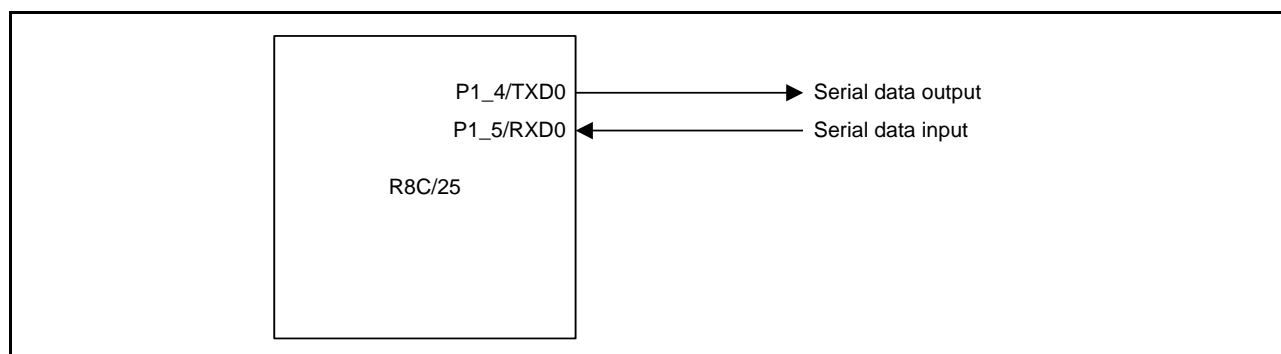


Figure 3.3 Pin Usage

3.2 Memory Usage

Table 3.2 Memory Usage

Memory Usage	Size	Remark
ROM	300 bytes	In main.c module
RAM	27 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

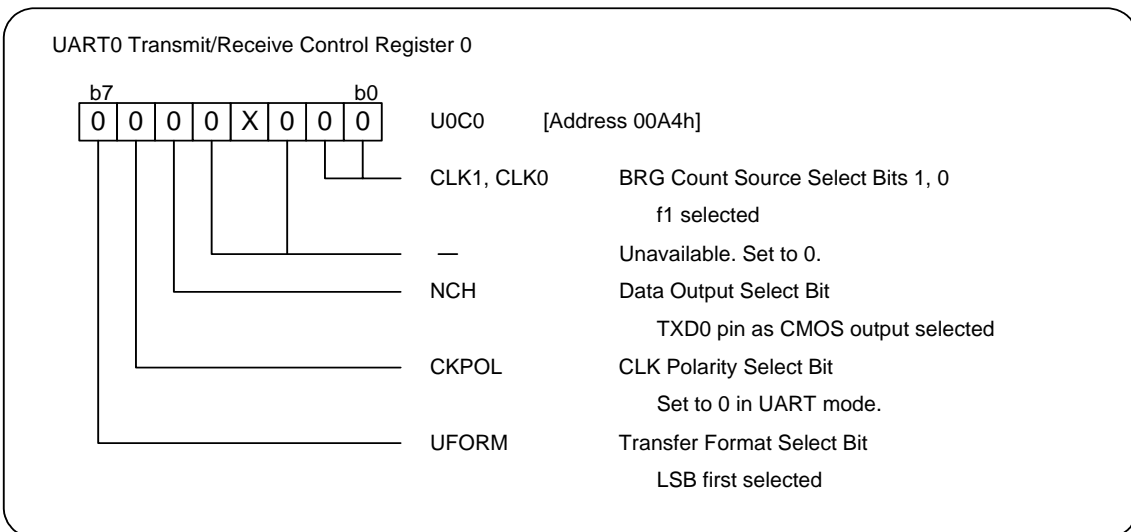
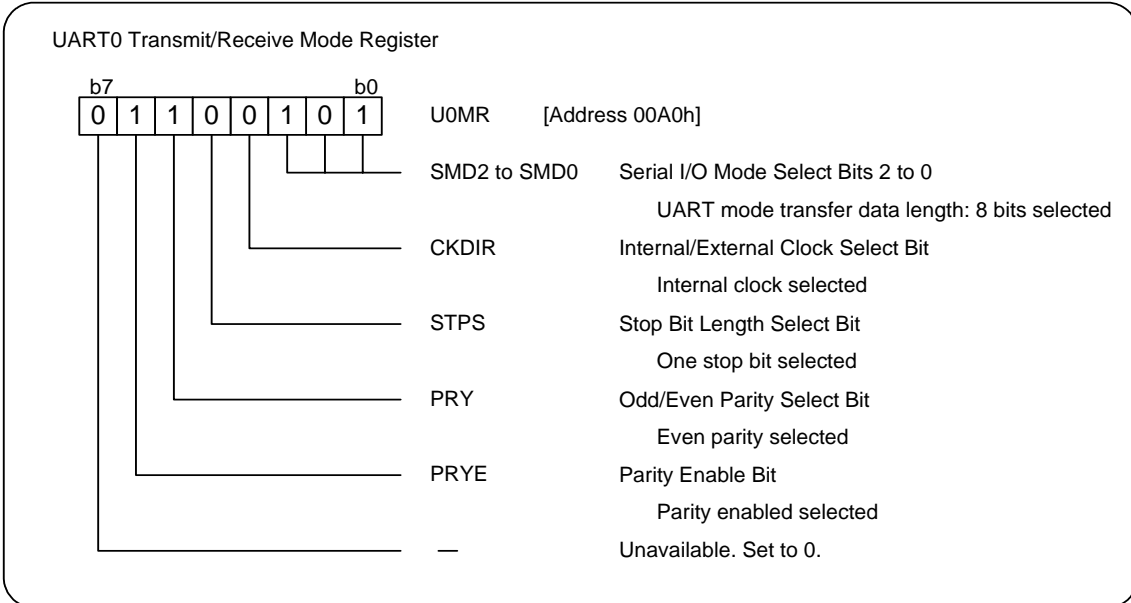
NOTE: Unavailable in the R8C/Tiny-exclusive free version.

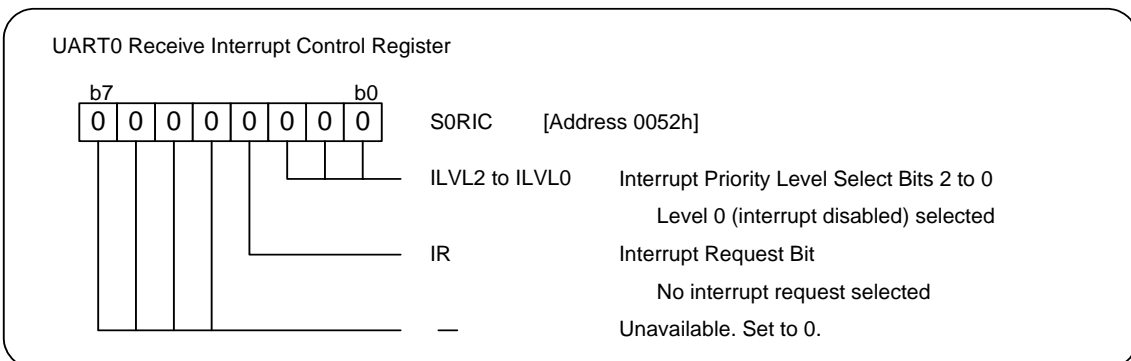
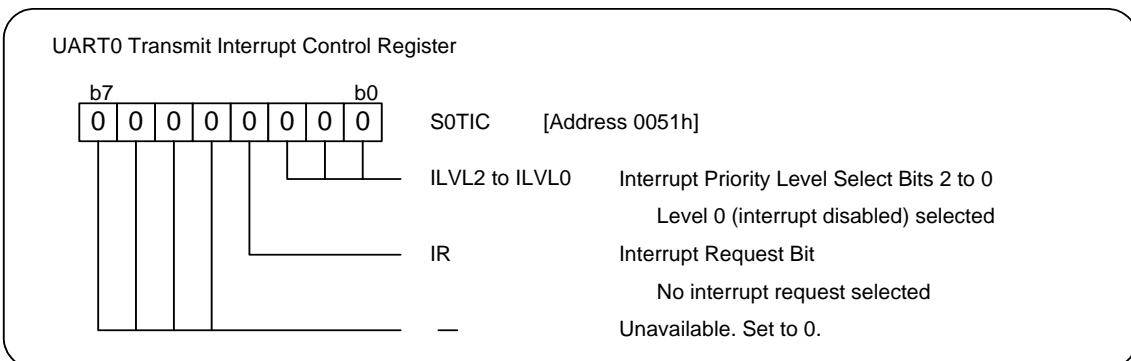
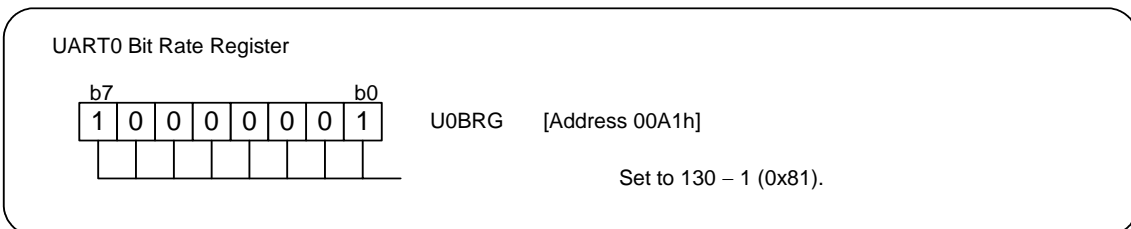
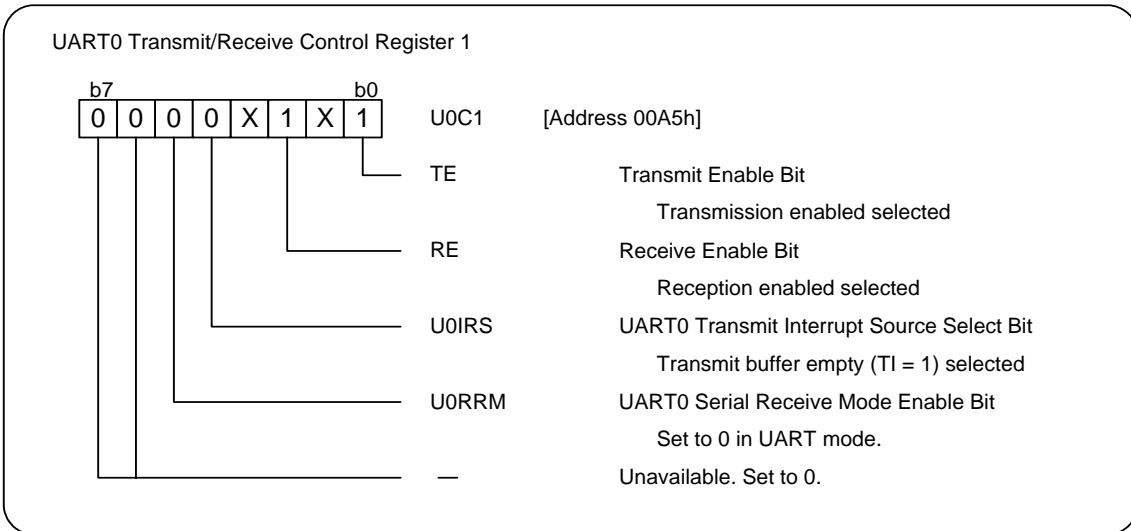
Table 3.3 RAM Usage and Definition

Symbol	Type	Size	Content
flag.bit.start	unsigned char	1 bit	Transmit start flag
rcv_cnt	unsigned char	1 byte	Received counter
trn_cnt	unsigned char	1 byte	Transmitted counter
rcv_err[8]	unsigned char	8 bytes	Receive error loop buffer
rcv_buf[8]	unsigned char	8 bytes	Receive data loop buffer
trn_buf[8]	unsigned char	8 bytes	Transmit data loop buffer

4. Setup

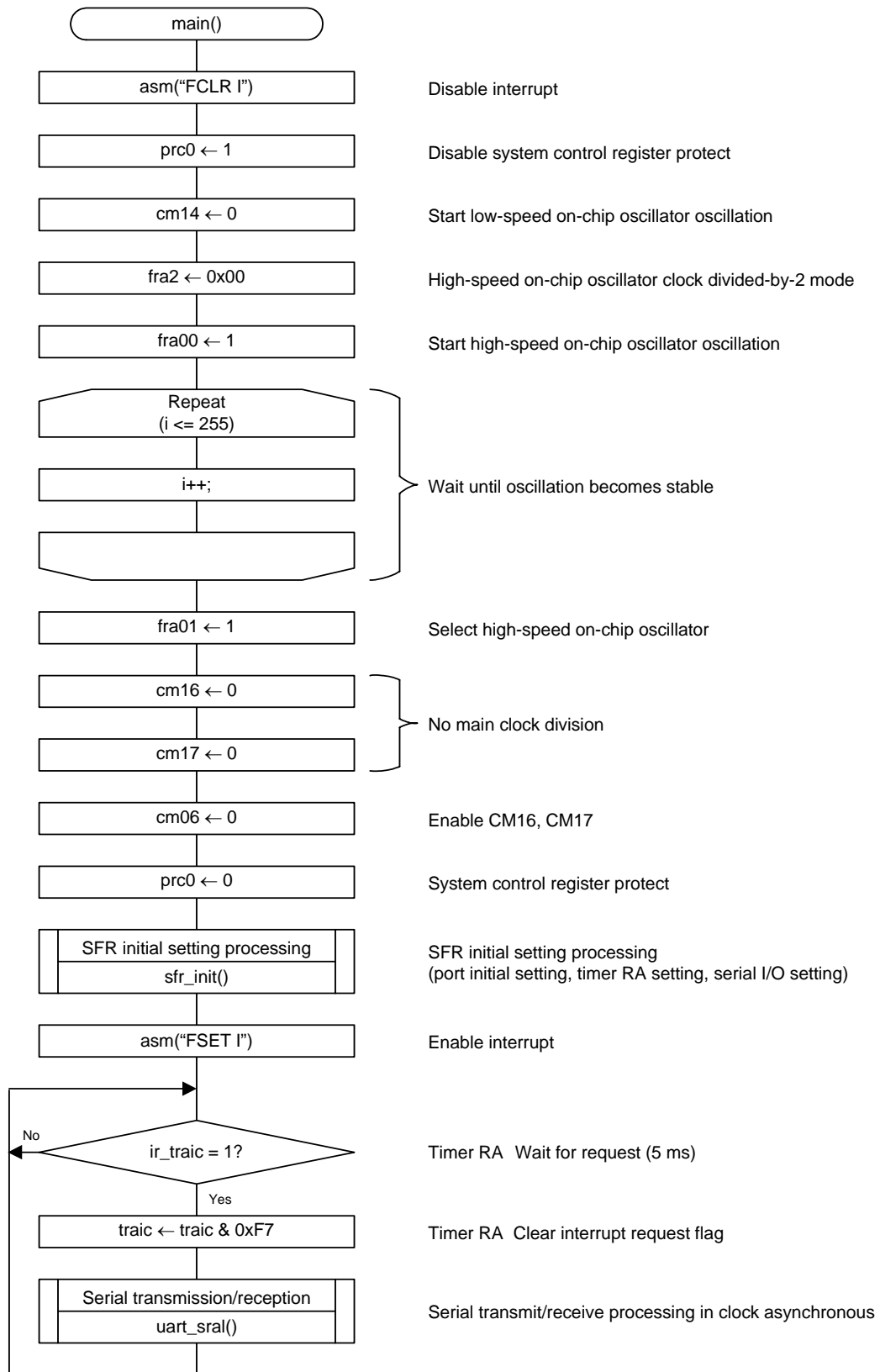
This section shows the initial setting procedures and values to perform the example described in “3. Application Example Description”. Refer to the **R8C/25 Group Hardware Manual** for details on individual registers.





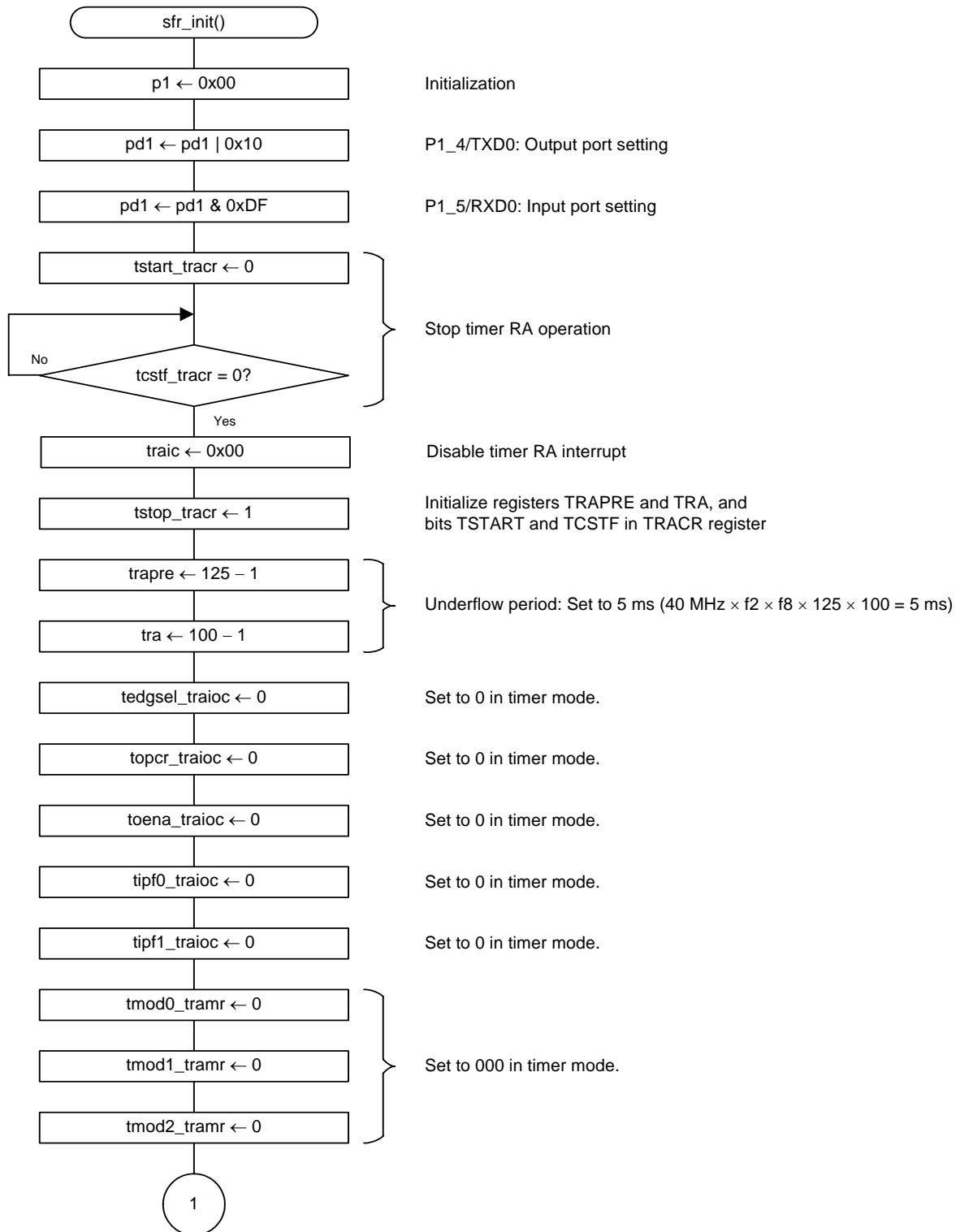
5. Flowchart

5.1 Main Function

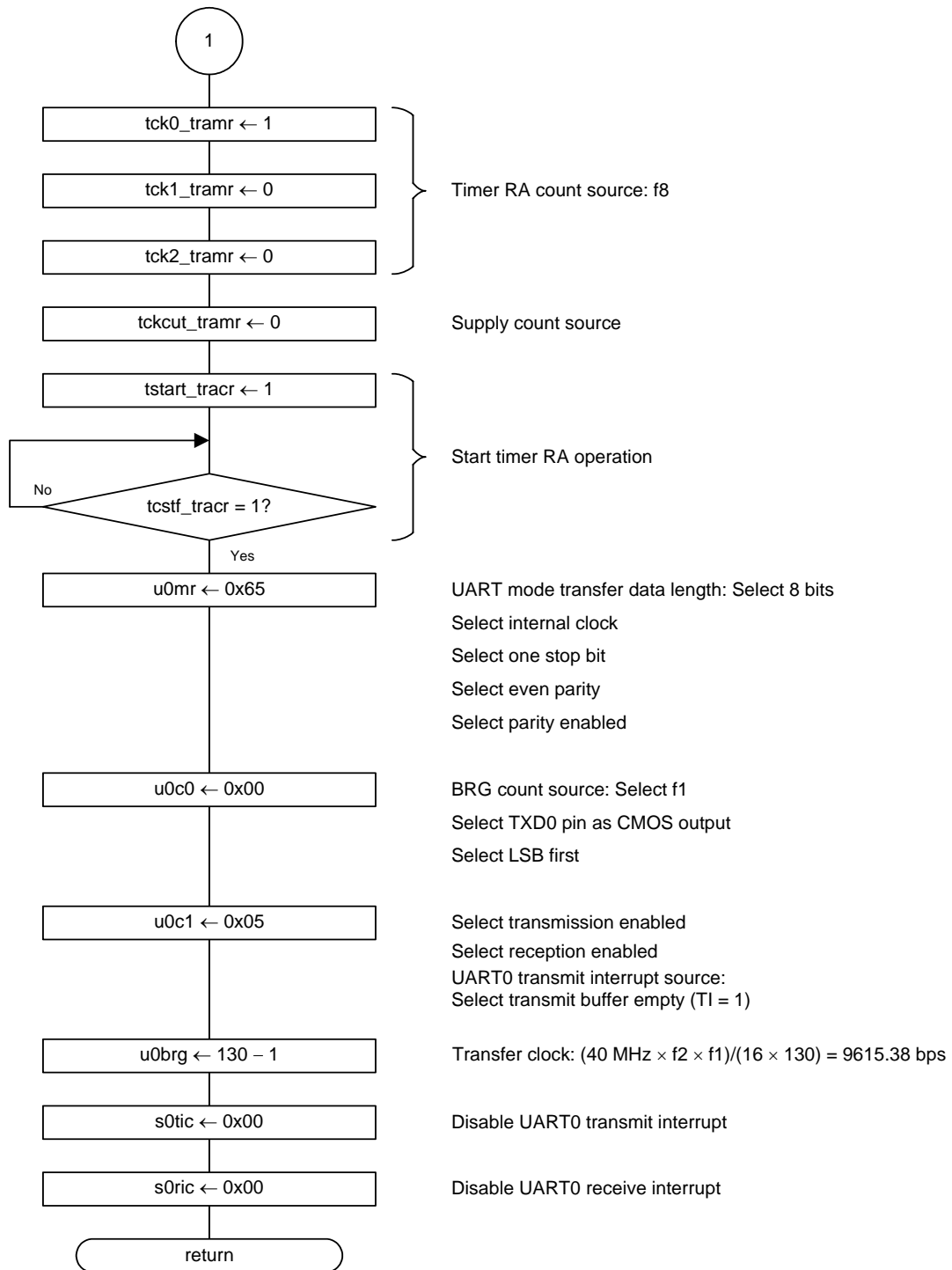


5.2 SFR Initial Setting Processing

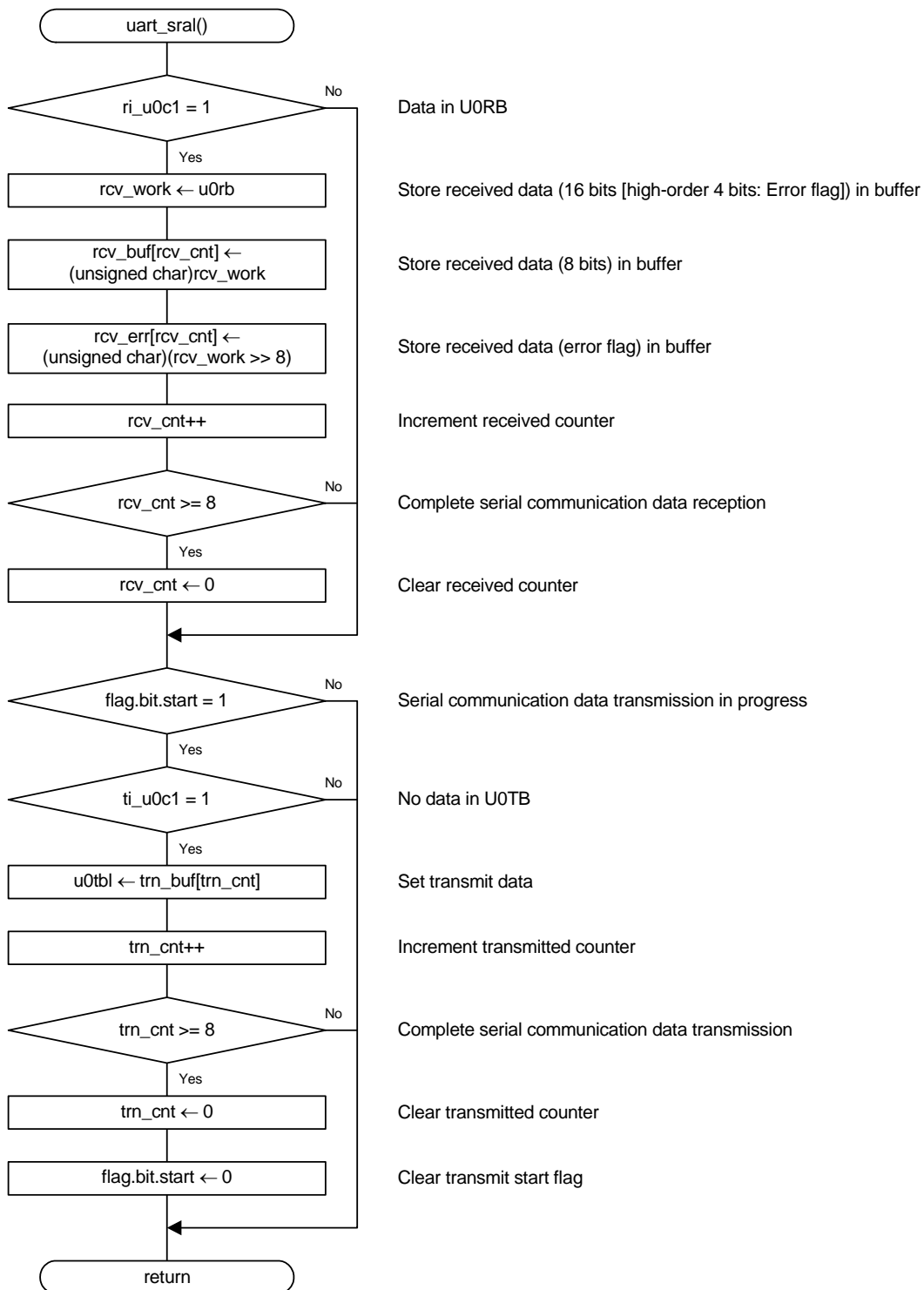
5.2.1 SFR Initial Setting Processing 1



5.2.2 SFR Initial Setting Processing 2



5.3 Serial I/O Processing in Clock Asynchronous 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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<http://www.renesas.com/inquiry>
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