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April 1st, 2010
Renesas Electronics Corporation

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R8C/25 Group

7-Segment LED Display (Dynamic Lighting)

1. Abstract

This document describes a program for 7-segment LED display (dynamic lighting).

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 7-segment LED display specifications are as follows:

- (1) The 7-segment LEDs are set for dynamic lighting. The LED display uses 12 ports in total - four ports for COM output and eight ports for SEG output.

COM output	:“L” active, P0_4 to P0_7
SEG output	:“H” active, P1_0 to P1_7

- (2) The COM output is set to serial active output every 5 ms and controlled by the variable com. Timer RA is used to measure 5 ms.

- (3) The SEG output allows the values (0 to 9 and A to F) in the variable seg_data to be converted and output from the display pattern data table (SEGdata_table).

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.

3.1 Pin Usage

Table 3.1 Pin Usage and Functions

Pin	I/O	Function
P0_4	Output	COM output 0
P0_5	Output	COM output 1
P0_6	Output	COM output 2
P0_7	Output	COM output 3
P1_0	Output	7-segment LED output A
P1_1	Output	7-segment LED output B
P1_2	Output	7-segment LED output C
P1_3	Output	7-segment LED output D
P1_4	Output	7-segment LED output E
P1_5	Output	7-segment LED output F
P1_6	Output	7-segment LED output G
P1_7	Output	7-segment LED output H

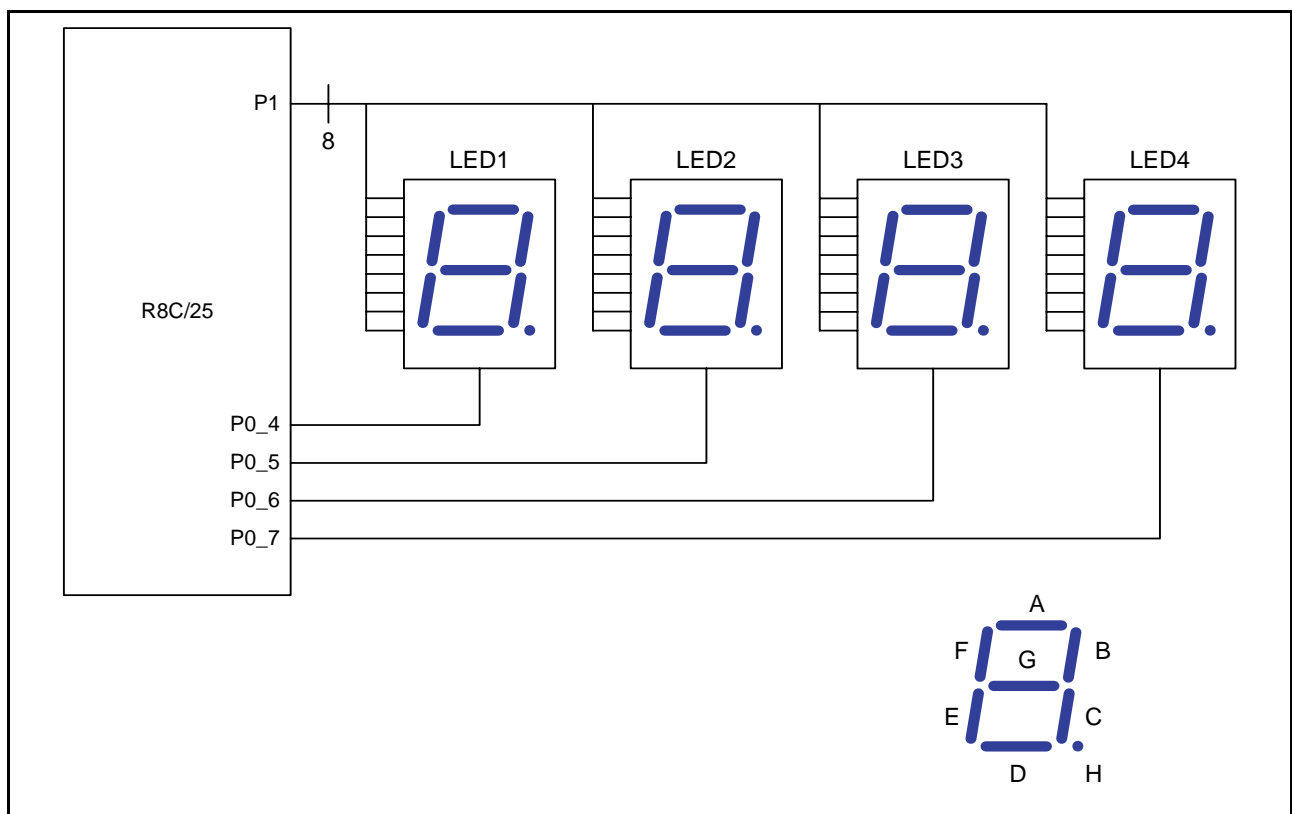


Figure 3.1 LED Display

3.2 Memory Usage

Table 3.2 Memory Usage

Memory Usage	Size	Remark
ROM	262 bytes	In main.c module
RAM	5 bytes	In main.c module
Maximum user stack usage	9 bytes	main function: 3 bytes sfr_init function: 3 bytes seg_disp function: 6 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

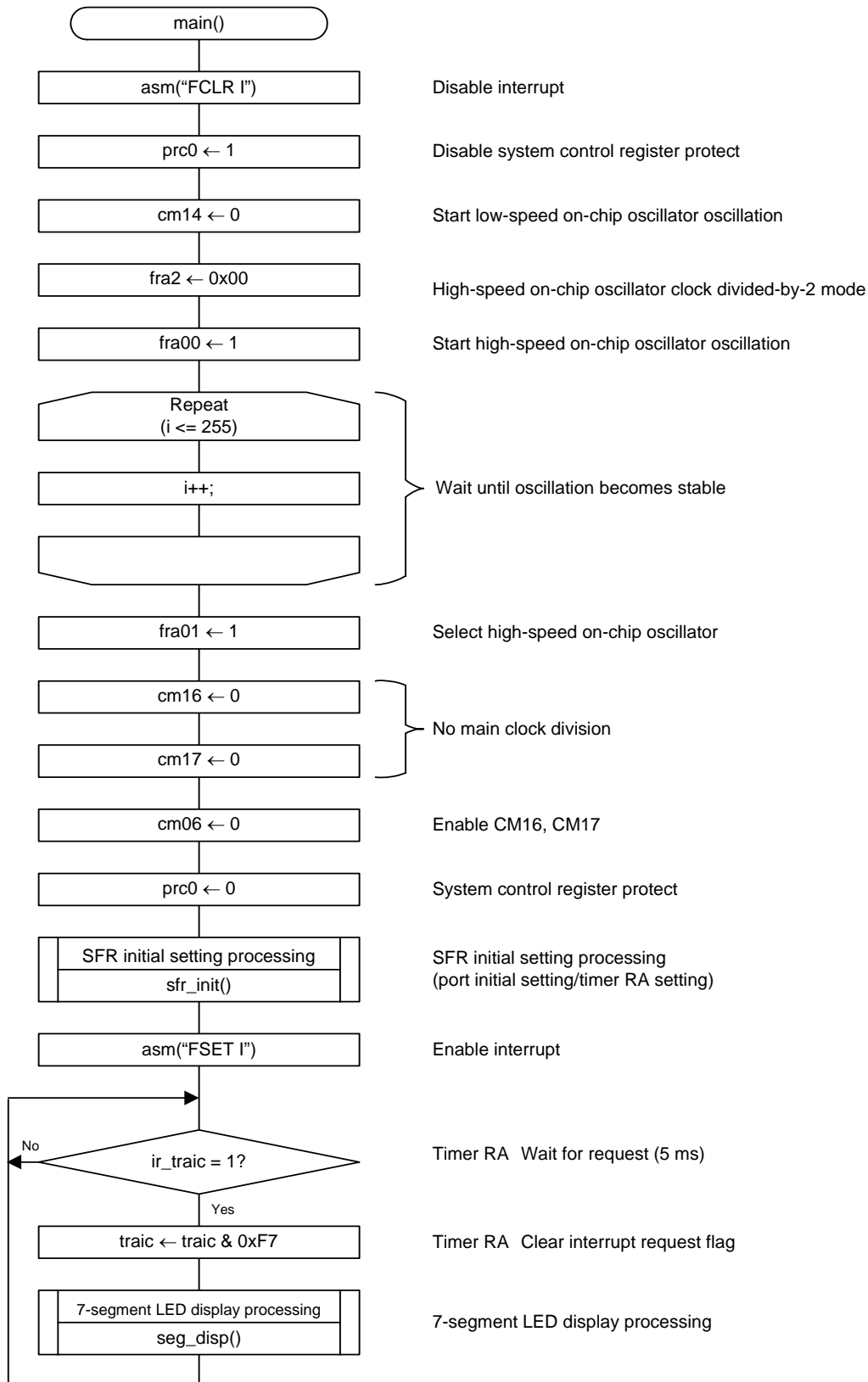
NOTE: Unavailable in the R8C/Tiny-exclusive free version.

Table 3.3 RAM Usage and Definition

Symbol	Type	Size	Content
com	unsigned char	1 byte	COM output counter
seg_data[4]	unsigned char	4 bytes	LED display data

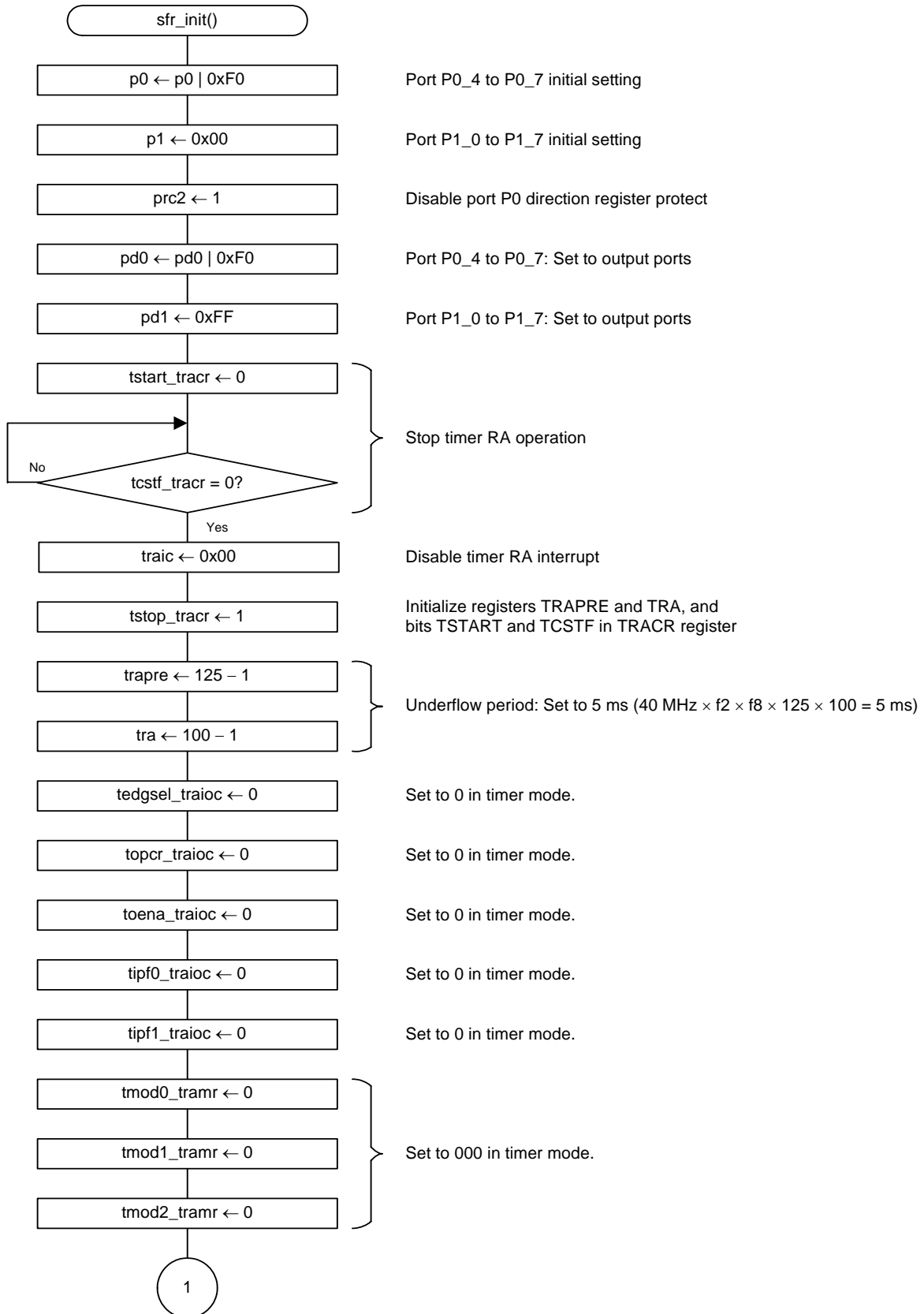
4. Flowchart

4.1 Main Function

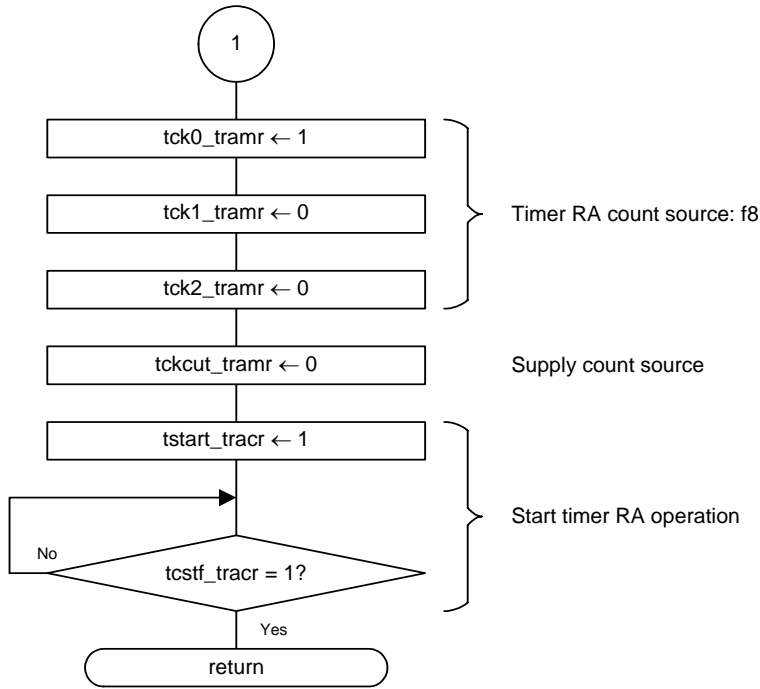


4.2 SFR Initial Setting Processing

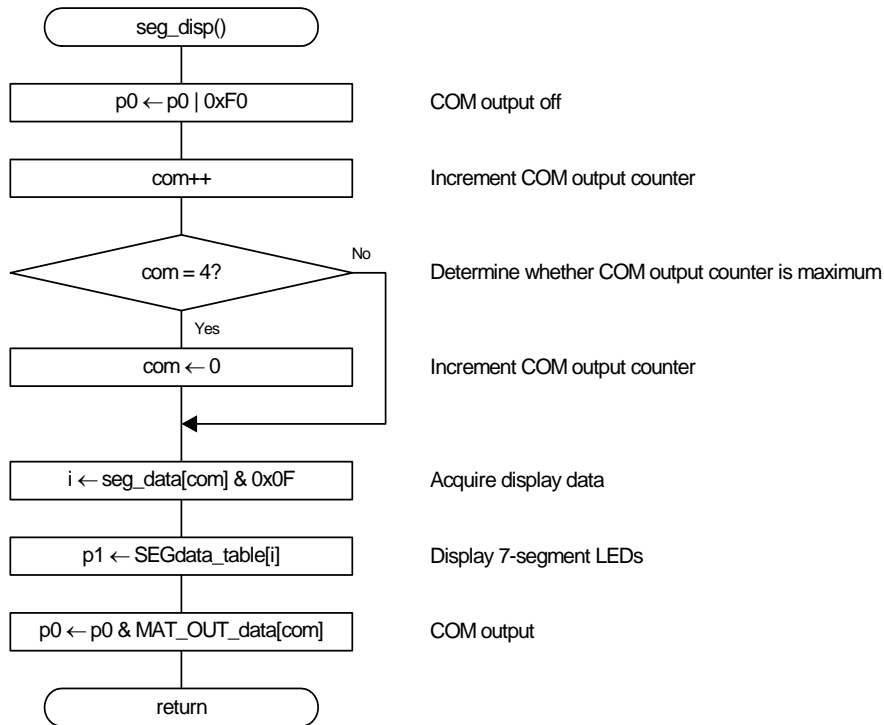
4.2.1 SFR Initial Setting Processing 1



4.2.2 SFR Initial Setting Processing 2



4.3 7-Segment LED Display Processing



5. 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.

6. 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

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csc@renesas.com

REVISION HISTORY	R8C/25 Group 7-Segment LED Display (Dynamic Lighting)
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Rev.	Date	Description	
		Page	Summary
1.00	Mar 30, 2007	-	First Edition issued

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