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Renesas Electronics Corporation

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M16C/62P Group

7-Segment LED Display (Dynamic Lighting Method)

1. Abstract

This application note describes how to use the dynamic lighting method for the 7-segment LED display. M16C/62P starter kit (M3A-0664) is used for development environment. The sample program is based on the CPU clock frequency of 24 MHz (PLL clock multiply-by-4).

2. Introduction

This application note is applied to the following condition:

Applicable MCU: M16C/62P Group

The program on this application note can also be used when operating other microcomputers within the M16C Family, provided they have the same SFR (Special Function Registers) as the M16C/62P Group. However, some functions may have been modified. Refer to each device's hardware manual for details. Use functions covered in this application note only after careful evaluation.

3. Detailed Description

How to display the dynamic lighting LED is as follows:

- A) Two ports for DIGIT output and eight ports for SEGMENT output are used.
 DIGIT output: low active, P1_0 to P1_1
 SEGMENT output: low active, P0_0 to P0_7
- B) The DIGIT output switches between the active LED1 and LED2, shown in Figure 1 on page 2, every 1 ms. A variable digit controls the DIGIT output. Timer A timer mode is used for 1-ms measurement.
- C) The SEGMENT output controls display patterns on LED1 and LED2. High-order 8 bits of a variable seg_data are output to LED1. Low-order 8 bits are output to LED2. The variable seg_data increments every 1 sec. Timer A0 underflow count is used in Timer A1 event counter mode for 1-sec measurement.

The sample program on page 4 may manipulate bits assigned to unused functions due to SFR configuration. The bit settings must be changed depending on your system.

Table 1 lists the assigned pins.

Table 1. Assigned Pin

Pins	Input/Output	Low Active or High Active	Functions
P1_0	Output	Low Active	DIGIT Output for LED1
P1_1	Output	Low Active	DIGIT Output for LED2
P0_0	Output	Low Active	SEGMENT Output for a
P0_1	Output	Low Active	SEGMENT Output for b
P0_2	Output	Low Active	SEGMENT Output for c
P0_3	Output	Low Active	SEGMENT Output for d
P0_4	Output	Low Active	SEGMENT Output for e
P0_5	Output	Low Active	SEGMENT Output for f
P0_6	Output	Low Active	SEGMENT Output for g
P0_7	Output	Low Active	SEGMENT Output for h

Figures 1 and 2 show LED block diagrams.

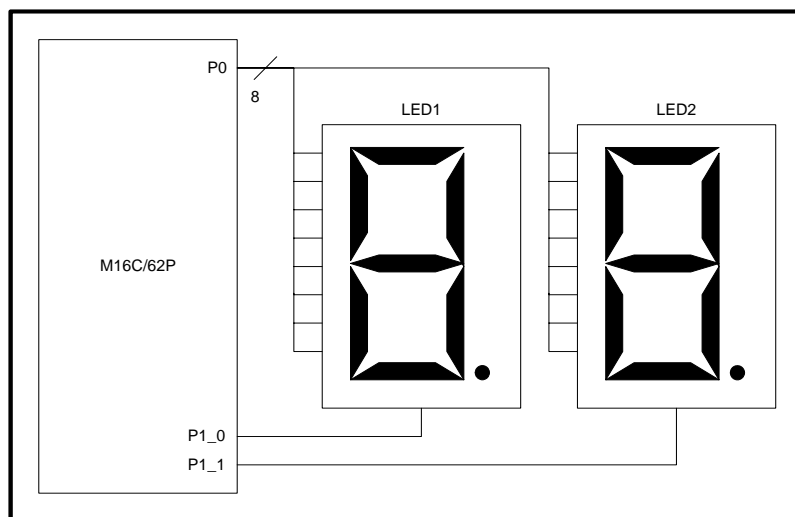


Figure 1. LED Block Diagram (1)

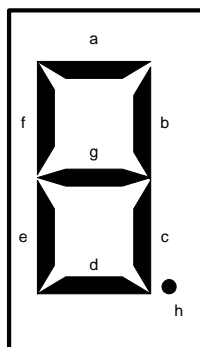


Figure 2. LED Block Diagram (2)

Figure 3 shows a flowchart to configure register settings.

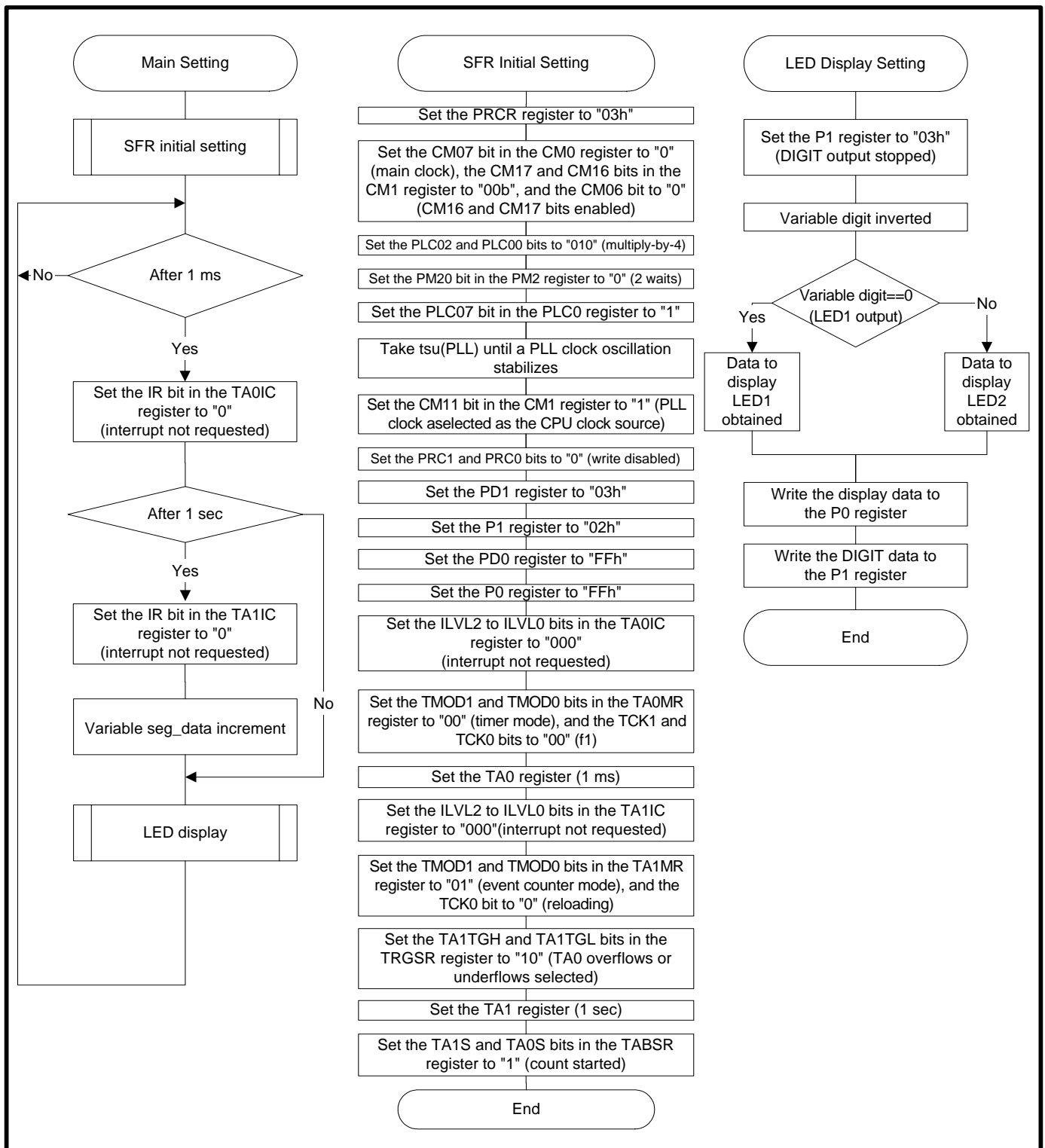


Figure 3. Register Setting Configuration

4. Reference Program

Please find the reference program from the Renesas Technology Web site.
Click Application Note in the left menu of the M16C/60 Series top page.

5. Reference Documents

Hardware manual

M16C/62P Group (M16C/62P, M16C/62PT) Hardware Manual

(Use the most recent version of the document on the Renesas Technology Web site.)

Technical news/Technical update

(Use the most recent version of the document on the Renesas Technology Web site.)

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REVISION HISTORY

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