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Renesas Electronics Corporation

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3823 Group

LCD Drive Control Circuit (External Dividing Resister Usage)

1. Abstract

The following article introduces and shows an example of how to use the LCD Drive Control Circuit (External Dividing Resister Usage) on the 3823 group device.

2. Introduction

The explanation of this issue is applied to the following conditions:

Applicable MCU: 3823 Group

Frame frequency: 61 Hz

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

3. Contents

3.1 LCD Panel Display (External Dividing Resistor)

Outline: The LCD panel is displayed by using the LCD drive control circuit.

Specifications:

- Segment output SEG0-SEG15 and common COM0-COM3 are used.
- Frame frequency = 61Hz
- Duty ratio number = 4, Bias value = 1/3
- “M3823” is displayed.

Figure 3.1 shows a Segment Allocation Example, Figure 3.2 shows the Circuit Example (When Using External Dividing Resistor), Figure 3.3 shows the LCD Display RAM Map, Figure 3.4 shows a LCD Display RAM Setting Example, Figure 3.5 shows the Relevant Register Settings, and Figure 3.6 shows the Control Procedure.

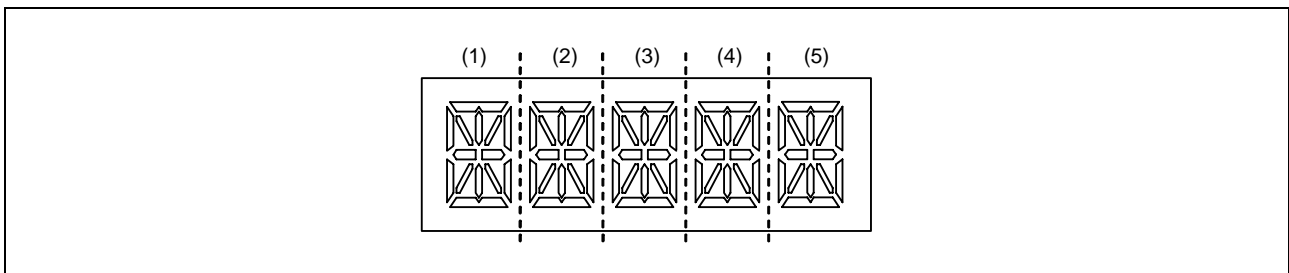


Figure 3.1 Segment Allocation Example

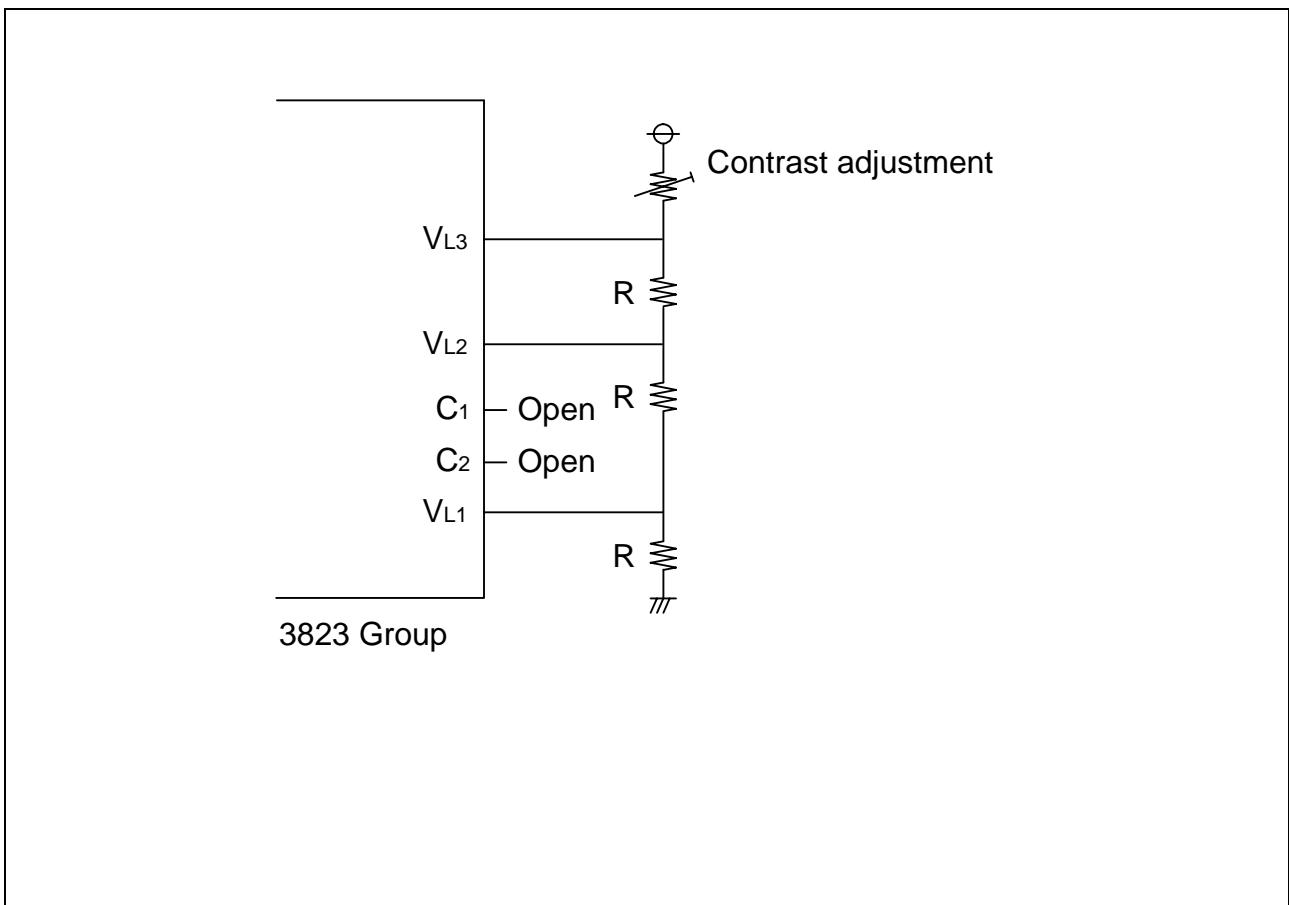


Figure 3.2 Circuit Example (When Using External Dividing Resistor)

| Address \ Bit | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|--------------------|--------|------------------|------------------|-------------------|------------------|------------------|------------------|-------------------|------------------|
| | | COM ₃ | COM ₂ | COM ₁ | COM ₀ | COM ₃ | COM ₂ | COM ₁ | COM ₀ |
| 0040 ₁₆ | LRAM0 | | | SEG ₁ | | | | SEG ₀ | |
| 0041 ₁₆ | LRAM1 | | | SEG ₃ | | | | SEG ₂ | |
| 0042 ₁₆ | LRAM2 | | | SEG ₅ | | | | SEG ₄ | |
| 0043 ₁₆ | LRAM3 | | | SEG ₇ | | | | SEG ₆ | |
| 0044 ₁₆ | LRAM4 | | | SEG ₉ | | | | SEG ₈ | |
| 0045 ₁₆ | LRAM5 | | | SEG ₁₁ | | | | SEG ₁₀ | |
| 0046 ₁₆ | LRAM6 | | | SEG ₁₃ | | | | SEG ₁₂ | |
| 0047 ₁₆ | LRAM7 | | | SEG ₁₅ | | | | SEG ₁₄ | |
| 0048 ₁₆ | LRAM8 | | | SEG ₁₇ | | | | SEG ₁₆ | |
| 0049 ₁₆ | LRAM9 | | | SEG ₁₉ | | | | SEG ₁₈ | |
| 004A ₁₆ | LRAM10 | | | SEG ₂₁ | | | | SEG ₂₀ | |
| 004B ₁₆ | LRAM11 | | | SEG ₂₃ | | | | SEG ₂₂ | |
| 004C ₁₆ | LRAM12 | | | SEG ₂₅ | | | | SEG ₂₄ | |
| 004D ₁₆ | LRAM13 | | | SEG ₂₇ | | | | SEG ₂₆ | |
| 004E ₁₆ | LRAM14 | | | SEG ₂₉ | | | | SEG ₂₈ | |
| 004F ₁₆ | LRAM15 | | | SEG ₃₁ | | | | SEG ₃₀ | |

Figure 3.3 LCD Display RAM Map

| Address \ Bit | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|--------------------|--------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | COM ₃ | COM ₂ | COM ₁ | COM ₀ | COM ₃ | COM ₂ | COM ₁ | COM ₀ |
| 0040 ₁₆ | LRAM0 | h | g | f | e | d | c | b | a |
| 0041 ₁₆ | LRAM1 | m | l | | n | k | j | | i |
| 0042 ₁₆ | LRAM2 | h | g | f | e | d | c | b | a |
| 0043 ₁₆ | LRAM3 | m | l | | n | k | j | | i |
| 0044 ₁₆ | LRAM4 | h | g | f | e | d | c | b | a |
| 0045 ₁₆ | LRAM5 | m | l | | n | k | j | | i |
| 0046 ₁₆ | LRAM6 | h | g | f | e | d | c | b | a |
| 0047 ₁₆ | LRAM7 | m | l | | n | k | j | | i |
| 0048 ₁₆ | LRAM8 | h | g | f | e | d | c | b | a |
| 0049 ₁₆ | LRAM9 | m | l | | n | k | j | | i |
| 004A ₁₆ | LRAM10 | h | g | f | e | d | c | b | a |
| 004B ₁₆ | LRAM11 | m | l | | n | k | j | | i |
| 004C ₁₆ | LRAM12 | h | g | f | e | d | c | b | a |
| 004D ₁₆ | LRAM13 | m | l | | n | k | j | | i |
| 004E ₁₆ | LRAM14 | h | g | f | e | d | c | b | a |
| 004F ₁₆ | LRAM15 | m | l | | n | k | j | | i |

Disit
 →(1)
 →(1)
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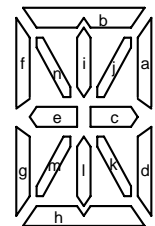


Figure 3.4 LCD Display RAM Setting Example

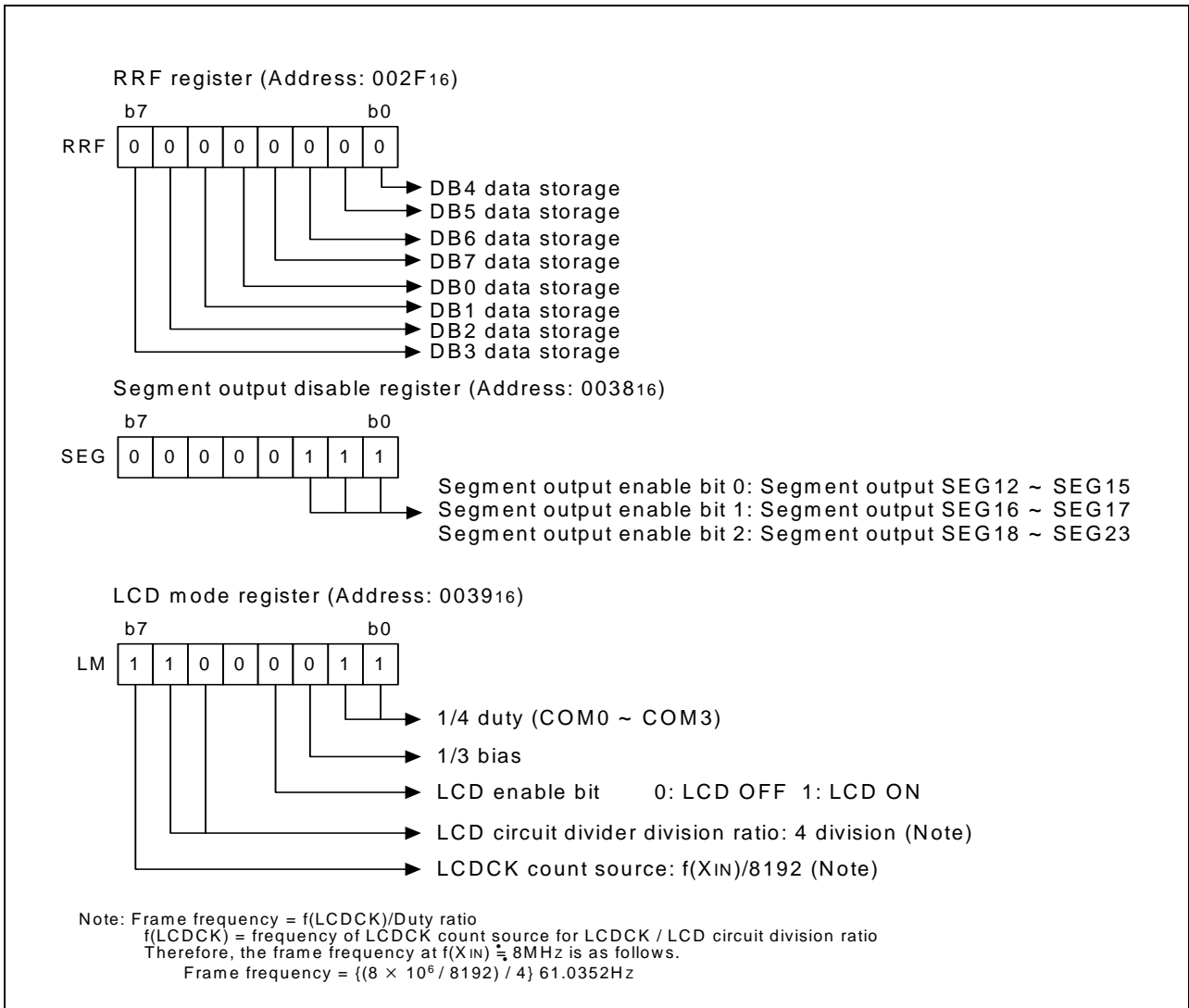


Figure 3.5 Relevant Register Settings

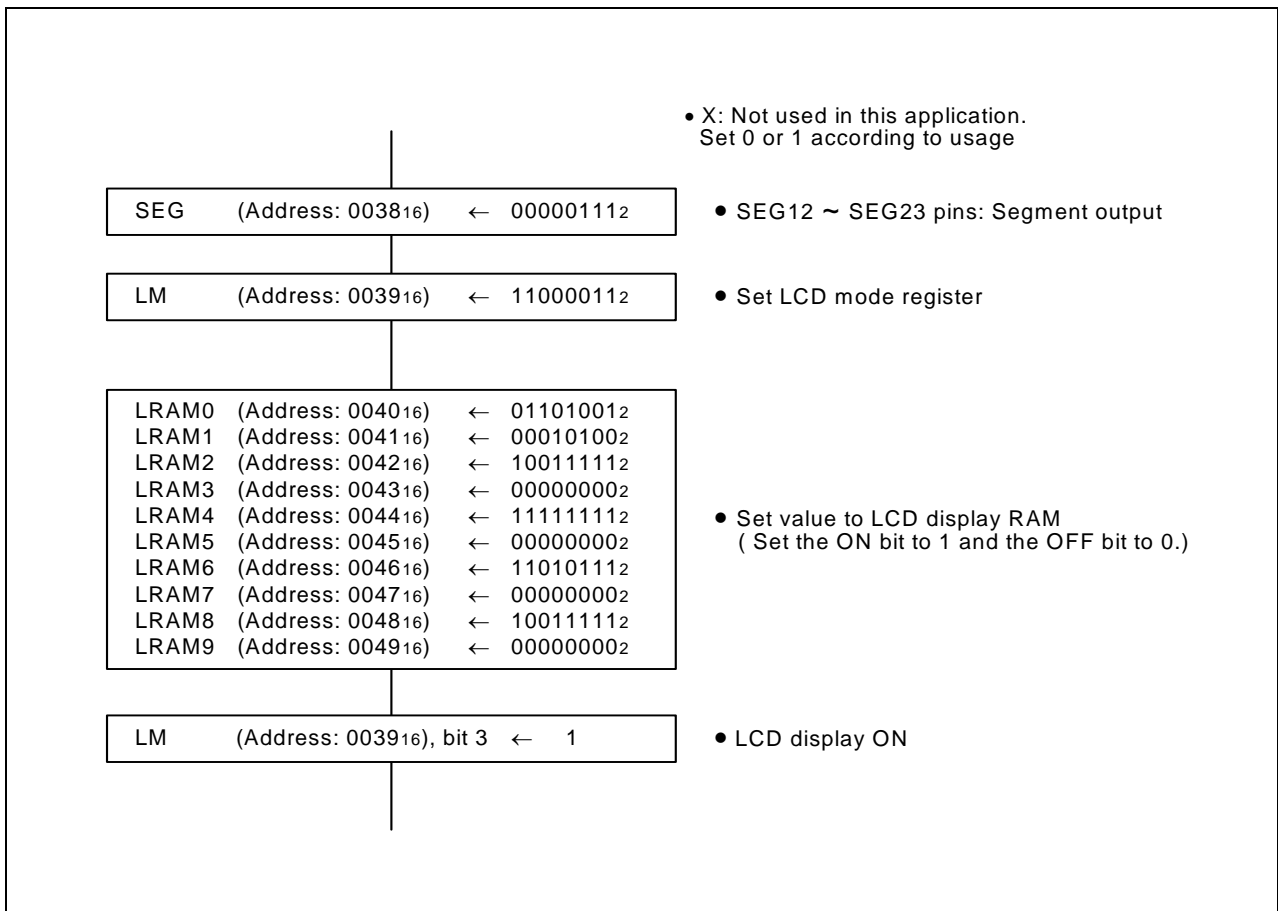


Figure 3.6 Control Procedure

4. Sample Programming Code

Download a sample program from the Renesas Technology website.
To download, click “Application Notes” in the left side menu on the page of the 3823 Group.

5. Reference Document

Datasheet
3823 Group Data sheet
Download the latest version from the Renesas Technology website.

Technical News/Technical Update
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| Rev. | Date | Description | |
|------|--------------|-------------|----------------------|
| | | Page | Summary |
| 1.00 | Aug 10, 2006 | - | First Edition issued |
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