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April 1st, 2010
Renesas Electronics Corporation

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38D5 Group

LCD Drive Control Circuit (Voltage Multiplier Usage)

1. Abstract

The following article introduces and shows an example of how to use the LCD Drive Control Circuit (Voltage Multiplier Usage) on the 38D5 Group device.

2. Introduction

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

Applicable MCU: 38D5 Group

Frame frequency: 8 MHz

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

Outline: The LCD drive control circuit is used for displaying the LCD panel.

Specifications:

- Segment output SEG16 to SEG35 and common COM0 to COM3 are used.
- Frame frequency = 61 Hz
- Duty ratio = 4, Bias value = 1/3
- Voltage multiplier is used.
- “M38d5” is displayed.

Figure 3.1 shows a Segment Allocation Example, Figure 3.2 shows the Circuit Example, Figure 3.3 shows the LCD Display RAM Map, Figure 3.4 shows an LCD Display RAM Setting Example, Figure 3.5 shows the Relevant Register Settings, and Figure 3.6 shows the Control Procedure.

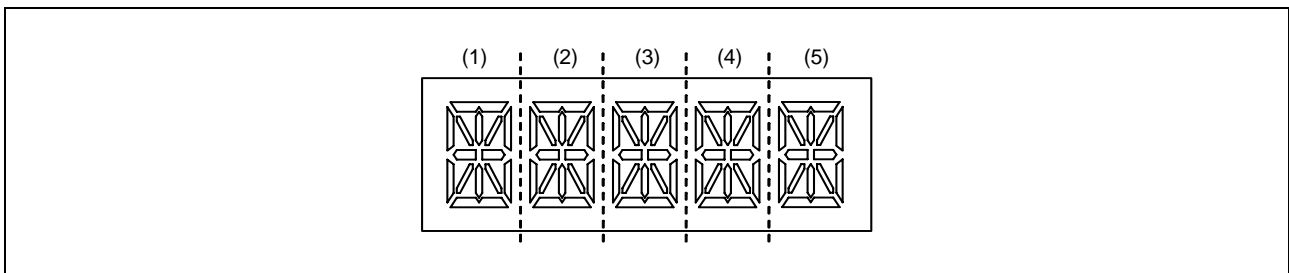


Figure 3.1 Segment Allocation Example

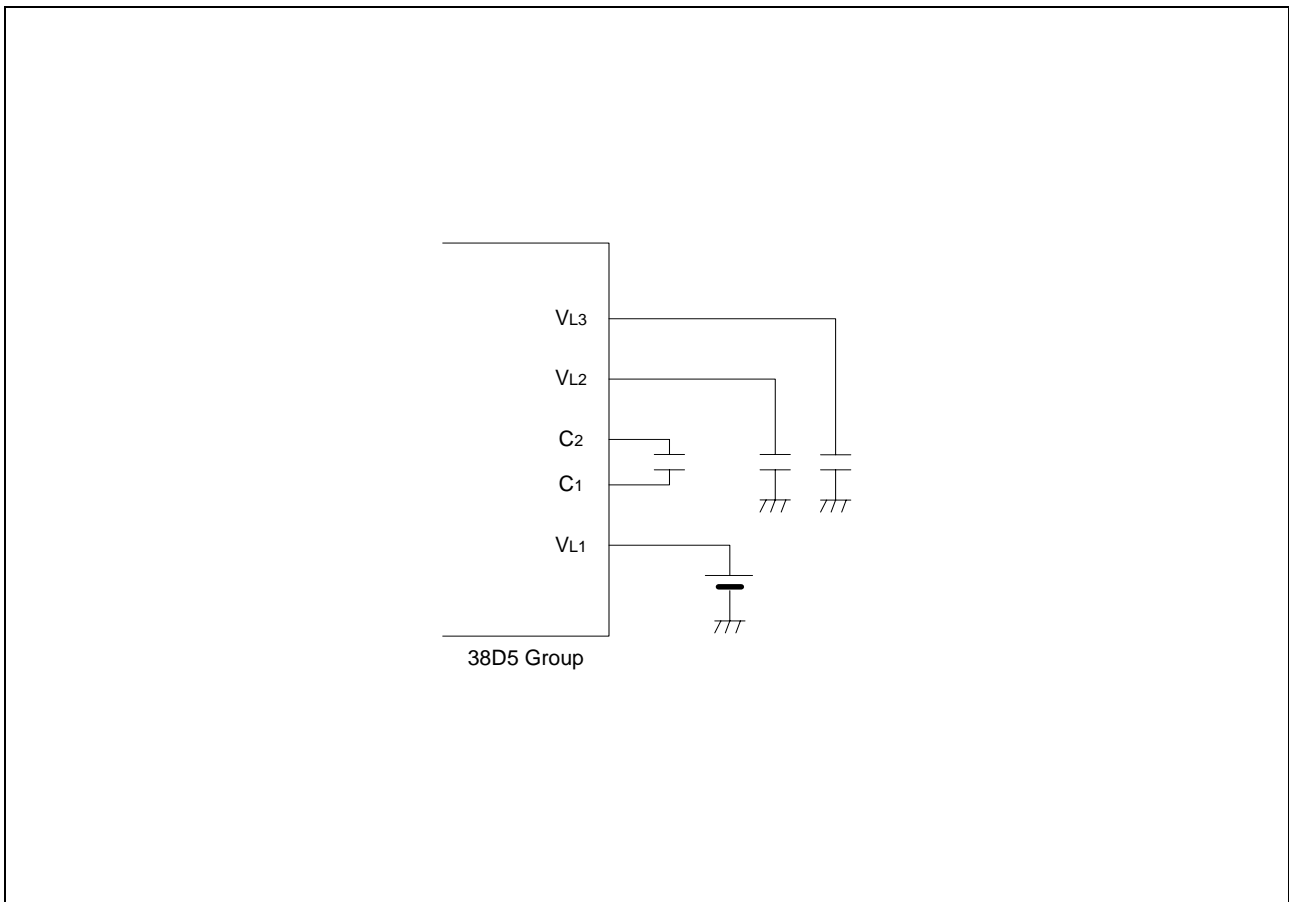


Figure 3.2 Circuit Example

4COM × 36SEG

Address		Bit							
		7	6	5	4	3	2	1	0
0840h	LRAM0								SEG0
0841h	LRAM1								SEG1
0842h	LRAM2								SEG2
0843h	LRAM3								SEG3
0844h	LRAM4								SEG4
0845h	LRAM5								SEG5
0846h	LRAM6								SEG6
0847h	LRAM7								SEG7
0848h	LRAM8								SEG8
0849h	LRAM9								SEG9
084Ah	LRAM10								SEG10
084Bh	LRAM11								SEG11
084Ch	LRAM12								SEG12
084Dh	LRAM13								SEG13
084Eh	LRAM14								SEG14
084Fh	LRAM15								SEG15
0850h	LRAM16								SEG16
0851h	LRAM17								SEG17
0852h	LRAM18								SEG18
0853h	LRAM19								SEG19
0854h	LRAM20								SEG20
0855h	LRAM21								SEG21
0856h	LRAM22								SEG22
0857h	LRAM23								SEG23
0858h	LRAM24								SEG24
0859h	LRAM25								SEG25
085Ah	LRAM26								SEG26
085Bh	LRAM27								SEG27
085Ch	LRAM28								SEG28
085Dh	LRAM29								SEG29
085Eh	LRAM30								SEG30
085Fh	LRAM31								SEG31
0860h	LRAM32								SEG32
0861h	LRAM33								SEG33
0862h	LRAM34								SEG34
0863h	LRAM35								SEG35
						COM3	COM2	COM1	COM0

Not used (Can generally be used as RAM)

Figure 3.3 LCD Display RAM Map

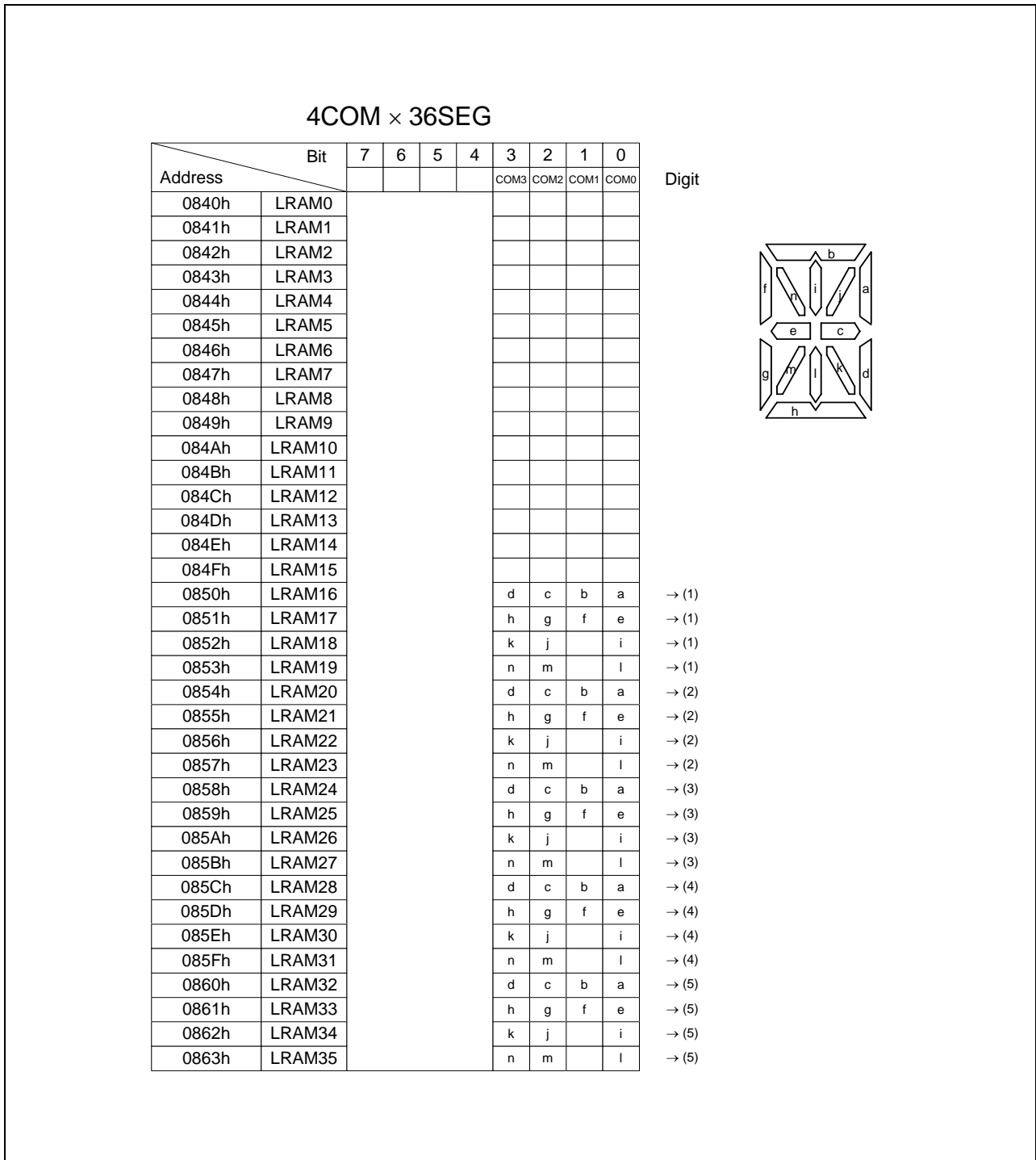


Figure 3.4 LCD Display RAM Setting Example

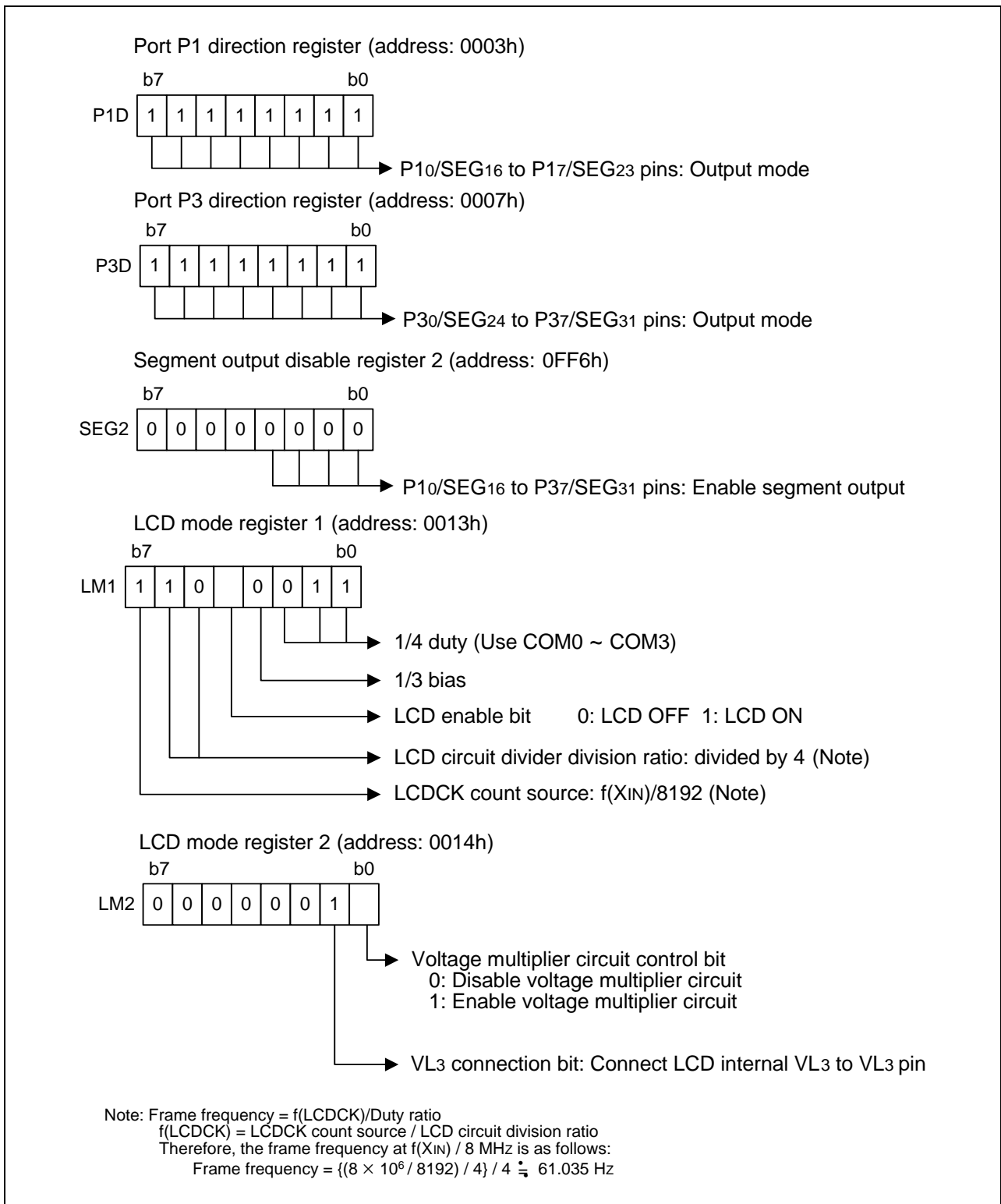


Figure 3.5 Relevant Register Settings

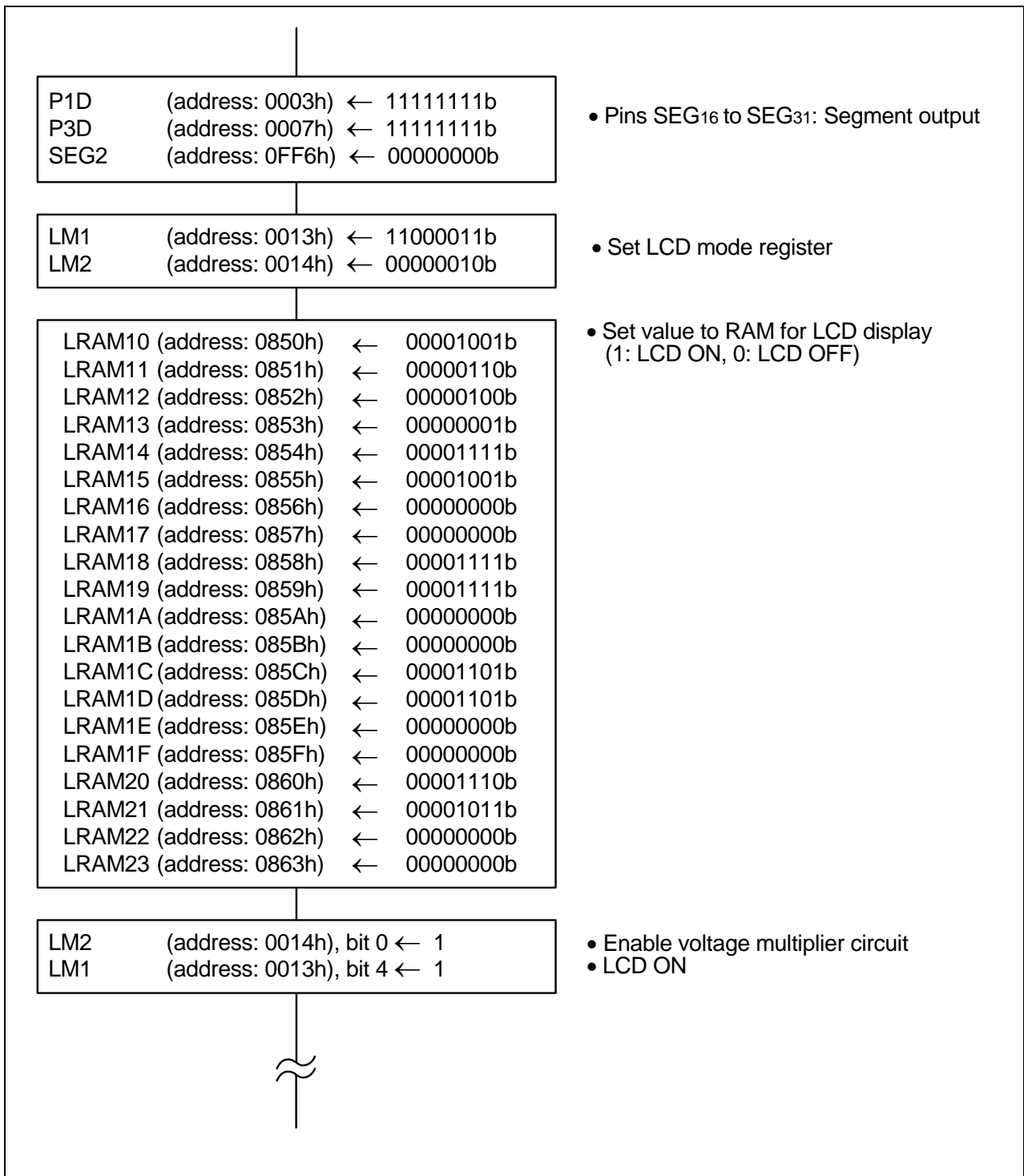


Figure 3.6 Control Procedure

4. Reference Document

Datasheet

38D5 Group Datasheet

(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.)

5. Sample Programming Code

Please visit the Renesas Technology Web site for a reference program.

Click Application Note in the left menu of the 38D5 Group.

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REVISION HISTORY	38D5 Group LCD Drive Control Circuit (Voltage Multiplier Usage)
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Rev.	Date	Description	
		Page	Summary
1.00	Sep 15, 2006	–	First Edition issued
2.00	Jan 21, 2008	2	Figure 3.2 revised
		5	VL3 connection bit revised

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