

STEVAL-CCM002V1

TFT-LCD panel demonstration board based on the STM32 as LCD controller

Data brief

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Features

- Displays images on a TFT-LCD using the STM32 as LCD controller
- Includes a slideshow of images to demonstrate static display model
- STM32 FSMC (flexible static memory interface) drives TFT using external SRAM as refresh RAM
- On-board constant current drive circuit for LED-based TFT-LCD backlighting
- Dimming control for the TFT-LCD backlighting
- Jumper headers offer easy analysis of TFT-LCD interface to the microcontroller
- RoHS compliant

Description

The STEVAL-CCM002V1 demonstration board is an STM32-based LCD controller for TFT-LCD displays. The board provides a platform for testing the capabilities of the STM32F103VET6 FSMC peripheral to drive a TFT-LCD panel without an LCD controller.

A 3.5" QVGA resolution TFT-LCD panel is interfaced with the STM32 FSMC peripheral. The board is designed to be connected as a daughterboard to the STM3210E-EVAL demonstration kit.

For further information contact your local STMicroelectronics sales office.



STEVAL-CCM002V1

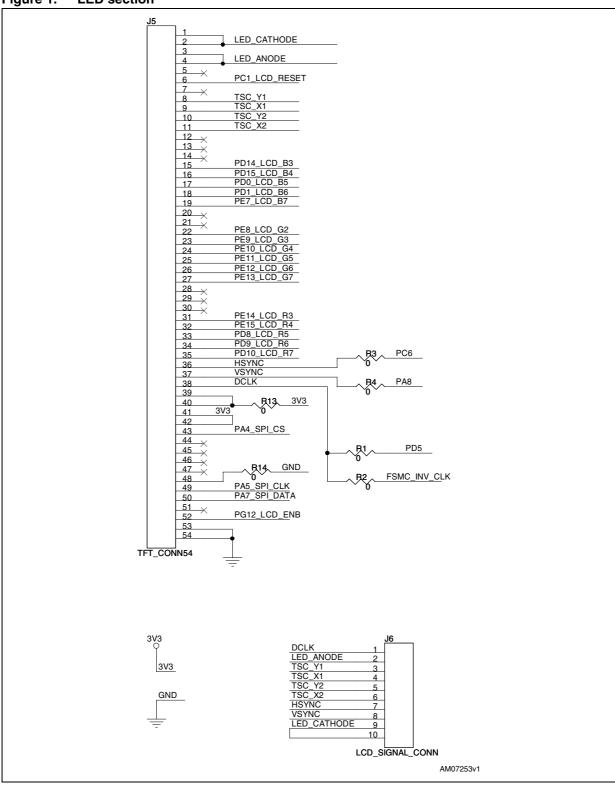
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Schematic diagrams STEVAL-CCM002V1

1 Schematic diagrams

Figure 1. LED section



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Figure 2. Demonstration board connectors

	1 CN6		J2)
GND 1	2 PG8	GN	D 1	2 PG8
PG7 3	4 PG6	PG		4 PG6
PG5 5	6 PG4	PG	5 5	6 PG4
PG3 7	8 PG2	PG		8 PG2
PC13 9	10 GND	PC		10 GND
RESET# 11	12 PD13		SET# 11	12 PD13
PD12 13	14 PD11	PD		14 PD11
PD10_LCD_R7 15	16 PD9_LCD_R6	PD		16 PD9_LCD_R6
		PD		
		D5'		
		PB		
	24 PB10_TSC_SCL2 26 PE14_LCD_R3	<u> </u>	11_TSC_SDA2 23 15_LCD_R4 25	24 PB10_TSC_SCL2 26 PE14_LCD_R3
		<u> </u>		
PE13_LCD_G7 27				28 PE12_LCD_G6
PE11_LCD_G5 29	30 GND	<u> </u>	11_LCD_G5 29	30 GND
PD15_LCD_B4 31	32 PD14_LCD_B3		15_LCD_B4 31	32 PD14_LCD_B3
PE9_LCD_G3 33	34 PE10_LCD_G4	<u>PE</u>	9_LCD_G3 33	34 PE10_LCD_G4
PE7_LCD_B7 35	36 PE8_LCD_G2		7_LCD_B7 35	36 PE8_LCD_G2
PG1 37	38 🗸	PG		38 🗸
GND 39	40 PG0	GN	D 39	40 PG0
PF14 41	42 PF15	PF ⁻	14 41	42 PF15
PF12 43	44 PF13	PF ⁻		44 PF13
PB2 45	46 PF11	PB		46 PF11
		PB		
	48 50 GND	<u>PB</u>		48 50 GND
× 49			× 49	
PB0 51	52 PC5	PB	0 51	52 PC5
PC4 53	54 PA7_SPI_DATA	PC		54 PA7_SPI_DATA
PA6 55	56 PA5_SPI_CLK	PA		56 PA5_SPI_CLK
PA4_SPI_CS 57	58 PA3		4_SPI_CS 57	58 PA3
GND 59	60 PA2	GN	D 59	60 PA2
PA1 61	60	PA	1 61	00
PC3_TSC_INT 63	64 PC2	PC	3_TSC_INT 63	64 PC2
PC1_LCD_RESET 65	66 PC0	PC	1_LCD_RESET 65	66 PC0
PF10 67	00	PF		
21/2			-114	
3V3 69	70 GND	3V3⊝—	3V3 69	70 / GND
l	CON70A		L	CON70A
	5561			330/1
	3 CN5		J4	1
GND 1	2 PC6	(GND 1	2 PC6
PC7 3	4 PC8		PC7 3	4 PC8
PC9 5	6 PA8		PC9 5	6 PA8
PA9 7	8 PA10	_ _F	PA9 7	8 PA10
PA0 9	10 GND		PA0 9	10 GND
- 44	12 PA11	_ ·	11	12 PA11
			10	
PC10 17	18 PC11		PC10 17	18 PC11
GND 19	20 PC12		GND 19	20 PC12
PD0_LCD_B5 21	22 PD1_LCD_B6		PD0_LCD_B5 21	22 PD1_LCD_B6
PE2 23	24 PE1		PE2 23	24 PE1
PD2 25	26 PD3		PD2 25	26 PD3
PD4 27	28 PD5		PD4 27	28 PD5
PD6 29	30 GND		PD6 29	30 GND
PD7 31	32 PG9		PD7 31	32 PG9
			2010	34 PG11
				1 04 . ~
PG10 33	34 PG11	<u>_</u>		
PG10 33 PG12_LCD_ENB 35	34 PG11 36 PG13		PG12_LCD_ENB 35	36 PG13
PG10 33 PG12_LCD_ENB 35 PG14 37	34 PG11 36 PG13 38 PG15		PG12_LCD_ENB 35 PG14 37	36 PG13 38 PG15
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39	34 PG11 36 PG13 38 PG15 40 PB3		PG12_LCD_ENB 35 PG14 37 GND 39	36 PG13 38 PG15 40 PB3
PG10 33 PG12_LCD_ENB 35 PG14 37	34 PG11 36 PG13 38 PG15		PG12_LCD_ENB 35 PG14 37	36 PG13 38 PG15
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43	34 PG11 36 PG13 38 PG15 40 PB3	F F F F F F F F F F F F F F F F F F F	PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43	36 PG13 38 PG15 40 PB3 42 PB5
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9	F	PG12_LCD_ENB 35 PG14 37 SND 39 PB4 41 PB6 43 PB8 45	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9	F	PG12_LCD_ENB 35 PG14 37 SND 39 PB4 41 PB6 43 PB8 45	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9
PG10 33 PG12 LCD ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3	F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND	F F F F F F F F F F F F F F F F F F F	PG12_LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3	F	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 DSV 49 PE4 51	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3
PG10 33 PG12 LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5	F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PSV 49 PE4 51	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5
PG10 33 PG12 LCD ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13	F F O O O O O O O O O O O O O O O O O O	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PC14 55	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15		PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 DSV 49 PE4 51 PE6 53 PC14 55 PF0 57	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15
PG10 33 PG12 LCD ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PSV 49 PE4 51 PE6 53 PC14 55 PF0 57 SSND 59	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 PSV 49 PE6 53 PC14 55 PC14 55 PR0 57 SIND 59	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3	F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 PSV 49 PE4 51 PE6 53 PC14 55 PF0 57 SIND 59 PF2 61	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5	F	PG12 LCD_ENB 35 PG14 37 3ND 39 PB4 41 PB6 43 PB8 45 PE0 47 DSV 49 PE4 51 PE6 53 PC14 55 PF0 57 3ND 59 PF2 61 PF4 63	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63 PF6 65	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7	□ F □ 0 F □ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PG12 LCD_ENB 35 PG14 37 SIND 39 PB4 41 PB6 43 PB8 45 PE0 47 PSV 49 PE6 53 PC14 55 PC14 55 SIND 59 PF2 61 SIND 59 PF2 61 SIND 59 PF6 63 PF6 65	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7
PG10 33 PG12_LCD_ENB 35 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63 PF6 65 PF8 67	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PS5V 49 PE6 53 PC14 55 PC0 57 SSND 59 PC2 61 SSND 59 PC2 61 PC4 63 PC6 65 PC6 65	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9
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PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63 PF6 65 PF8 67	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PS5V 49 PE6 53 PC14 55 PC0 57 SSND 59 PC2 61 SSND 59 PC2 61 PC4 63 PC6 65 PC6 65	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63 PF6 65 PF8 67	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9 70 GND	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PS5V 49 PE6 53 PC14 55 PC0 57 SSND 59 PC2 61 SSND 59 PC2 61 PC4 63 PC6 65 PC6 65	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9 70 GND
PG10 33 PG12_LCD_ENB 35 PG14 37 GND 39 PB4 41 PB6 43 PB8 45 PE0 47 D5V 49 PE4 51 PE6 53 PC14 55 PF0 57 GND 59 PF2 61 PF4 63 PF4 63 PF6 65 PF8 67	34 PG11 36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9 70 GND	□ F F F F F F F F F F F F F F F F F F F	PG12 LCD_ENB 35 PG14 37 SSND 39 PB4 41 PB6 43 PB8 45 PE0 47 PS5V 49 PE6 53 PC14 55 PC0 57 SSND 59 PC2 61 SSND 59 PC2 61 PC4 63 PC6 65 PC6 65	36 PG13 38 PG15 40 PB3 42 PB5 44 PB7 46 PB9 48 3V3 50 GND 52 PE3 54 PE5 56 PC13 58 PC15 60 PF1 62 PF3 64 PF5 66 PF7 68 PF9 70 GND

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Schematic diagrams STEVAL-CCM002V1

Single channel inverter FSMC_INV_CLK 74V1G14CTR_SOT323-5L 3V3 <u>L1</u> 4.7uH ▼ STPS1L30A_SMA SW EN VO NC LED_ANODE LCD backlight driver STLD40DPUR_QFN8 C1 2.2uF C2 4.7uF GND C4 =2pF C5 =2pF C6 =2pF TSC_X2 TSC_X2 3V3 VIO DATA_IN TSC_Y2 15 Touchscreen controller STMPE811QTR TSC_X1 PB11_TSC_SDA2 100nF 16 A0 PB10_TSC_SCL2 PC3_TSC_INT PB10_TSC_SCL2 AM07255v1

Figure 3. Single channel inverter, LCD backlight driver and touchscreen controller

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STEVAL-CCM002V1 Revision history

2 Revision history

Table 1. Document revision history

Date	Revision	Changes
16-Jun-2010	1	Initial release.

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