HAIDAR TECHNOLOGY, LLC.

The Next Generation Of Intelligent Embedded GUI Systems

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SegeMax-LCD
MAX-CV104-CNT
MAX-CV84-CNT
MAX-CV65-LOT
MAX-CW70-LTT

SegeMax carrier board for TFT LCD Interface

Hardware Manual

REV 1.00

Revision 1.00
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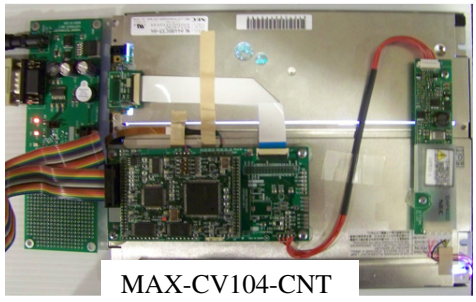
1. Overview:

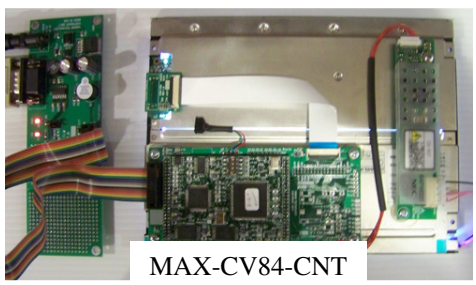
SegeMax-LCD with SegeMax board is a production ready display controller board for many popular LCD panels ranging from 4.3” to 10.4” with resolutions up 800x480 (WVGA). SegeMax-LCD provides greater speed in prototyping, maximizes design flexibility while shortening the time to market. It is a carrier board for our popular SegeMax GUI controller board with a full support for LED and CCFL backlight control. Also, it contains many connections for the LCD and the touch screen.

2. Features:

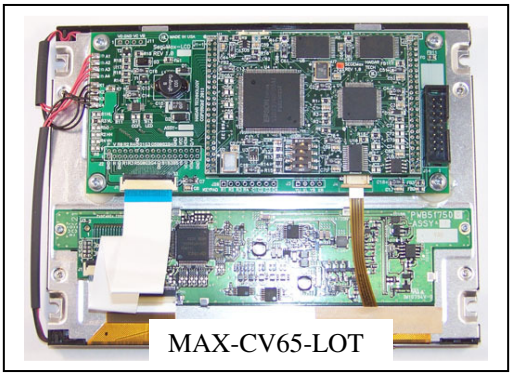
- Very efficient DC/DC booster for the LED back light
- Full support for many CCFL DC/AC converter with or without dimming function.
- Brightness can be controlled by SegeMax digital pot.
- 33 pin FPC connector and auxiliary pads for the LCD interface
- 4 pin FPC connector and auxiliary pads for the touch screen interface
- 16 pin IDC connector and auxiliary pads for the host interface
- Auxiliary pads for the 4X4 Keypad interface
- Jumpers for the LCD vertical and horizontal scanning direction
- Single Power supply operation (3.3V) for LED back light
- Dual Power supply operation (3.3V) and 5V/12V for CCFL back light



MAX-CV104-CNT

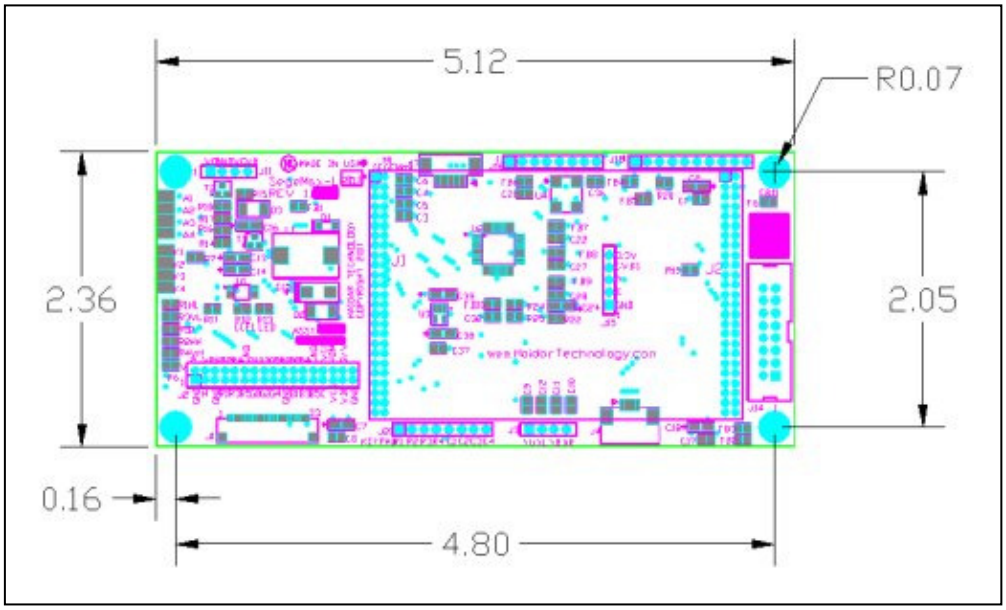


MAX-CV84-CNT



MAX-CV65-LOT

3. Board dimensional drawing:



All dimensions are in inches

4. Dimensions:

Width	2.63” / 66.8mm
Length	5.12” / 130mm
Depth	0.6” / 15.24mm With SegeMax on board

5. Electrical Characteristics:

SegeMax requires 3.3V DC. Exceeding the supply voltage over the typical value (3.3V) will cause a permanent damage to the board and to the attached LCD and void your warranty.

Power consumption is directly depends on the LCD backlight and if it’s LED or CCFL. For best results, make sure that your 3.3V power supply is capable of delivering up to 1A

Configuration	Typical Current (A) at 3.3V	Max Current (A) at 3.3V
SegeMax-LCD with no LCD attached and without SegeMax board	0.05A	0.1A

6. Environmental:

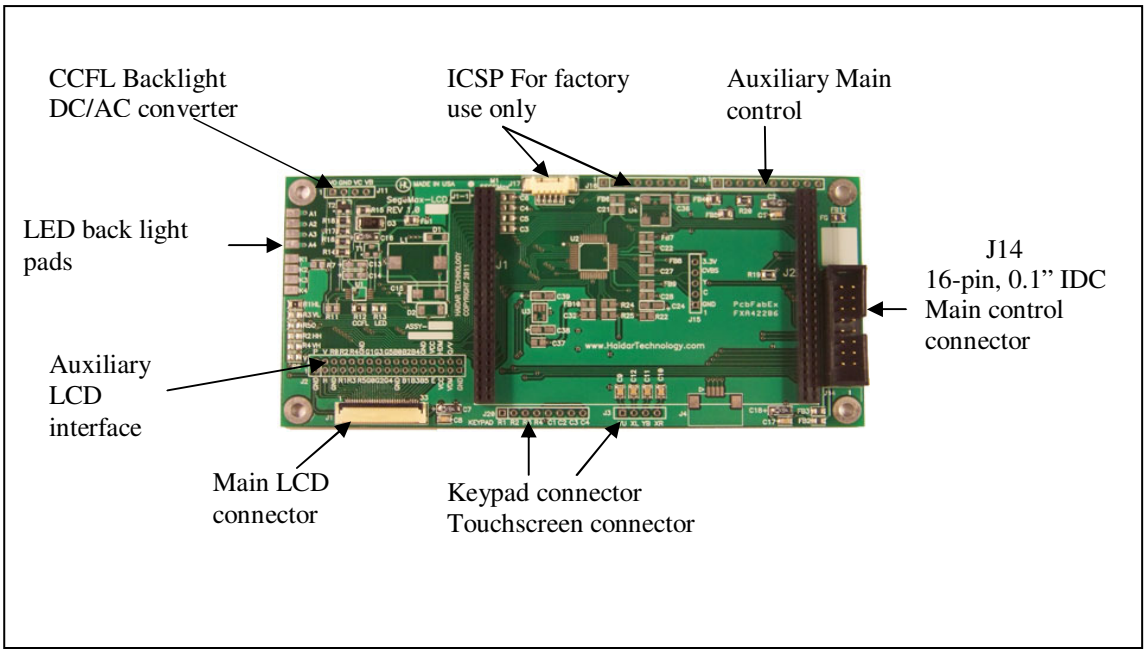
The standard SegeMax-LCD board is rated for commercial temperature operation of 0 to 70ºC. The Industrial Temperature -40 to 85ºC version is available as a special order.

7. Electrical Specifications:

Parameter	Symbol	Min.	Typ.	Max.	Units
Input Supply Voltage	VDD	-	3.3	3.7	V
High Level Input Voltage (VDD = 3.3V)	VIH	0.7VDD	-	VDD	V
Low Level Input Voltage (VDD = 3.3V)	VIL	0	-	0.3VDD	V
Digital sink/source current	Id	-	-	25	MA
Analog input voltage	Va	0	-	3.3V	V
RS232 TX/RX		0.7VDD	-	VDD	V

Warning: RX and TX use a CMOS level of 3.3V. Connecting them to standard (PC) RS232 with +/- 12V or other will damage the controller and void your warranty.

8. Board Picture:



9. Pin Description:

J1 (33Pos, 0.5mm, FPC connector) Part# XF2M-3315-1

J1 Pin Name	Pin #	Type	Tolerance	Description
GND	1	PWR	0V	Power Ground
PCLK	2	DIN	3.3V	LCD PCLK Signal
HSYNC	3	DIN	3.3V	LCD HSYNC Signal
VSYNC	4	DIN	3.3V	LCD VSYNC Signal
GND	5	PWR	0V	Power Ground
R0	6	DOUT	3.3V	Red Data 0 (LSB)
R1	7	DOUT	3.3V	Red Data 1
R2	8	DOUT	3.3V	Red Data 2
R3	9	DOUT	3.3V	Red Data 3
R4	10	DOUT	3.3V	Red Data 4
R5	11	DOUT	3.3V	Red Data 5 (MSB)
GND	12	PWR	0V	Power Ground
G0	13	DOUT	3.3V	Green Data 0 (LSB)
G1	14	DOUT	3.3V	Green Data 1
G2	15	DOUT	3.3V	Green Data 2
G3	16	DOUT	3.3V	Green Data 3
G4	17	DOUT	3.3V	Green Data 4
G5	18	DOUT	3.3V	Green Data 5 (MSB)
GND	19	PWR	0V	Power Ground
B0	20	DIN	3.3V	Blue Data 0 (LSB)
B1	21	DIN	3.3V	Blue Data 1
B2	22	DIN	3.3V	Blue Data 2
B3	23	DIN	3.3V	Blue Data 3
B4	24	DIN	3.3V	Blue Data 4
B5	25	DIN	3.3V	Blue Data 5 (MSB)
GND	26	PWR	0V	Power Ground
ENAB	27	DIN	3.3V	LCD ENAB Signal
LCD_VCC	28	PWR	3.3V	LCD Power Supply Input (3.3V)
LCD_VCC	29	PWR	3.3V	LCD Power Supply Input (3.3V)
HDM	30	DIN	3.3V	Horizontal Direction Mode
VDM	31	DIN	3.3V	Vertical Direction Mode
Q/V	32	DIN	3.3V	QVGA/VGA Select
GND	33	PWR	0V	Power Ground

J2 (34Pos, 2mm Header)

J2 Pin Name	Pin #	Type	Tolerance	Description
GND	1	PWR	0V	Power Ground
PCLK	2	DIN	3.3V	LCD PCLK Signal
HSYNC	3	DIN	3.3V	LCD HSYNC Signal
VSYNC	4	DIN	3.3V	LCD VSYNC Signal
GND	5	PWR	0V	Power Ground
R0	6	DOUT	3.3V	Red Data 0 (LSB)
R1	7	DOUT	3.3V	Red Data 1
R2	8	DOUT	3.3V	Red Data 2
R3	9	DOUT	3.3V	Red Data 3
R4	10	DOUT	3.3V	Red Data 4
R5	11	DOUT	3.3V	Red Data 5 (MSB)
GND	12	PWR	0V	Power Ground
G0	13	DOUT	3.3V	Green Data 0 (LSB)

G1	14	DOUT	3.3V	Green Data 1
G2	15	DOUT	3.3V	Green Data 2
G3	16	DOUT	3.3V	Green Data 3
G4	17	DOUT	3.3V	Green Data 4
G5	18	DOUT	3.3V	Green Data 5 (MSB)
GND	19	PWR	0V	Power Ground
B0	20	DIN	3.3V	Blue Data 0 (LSB)
B1	21	DIN	3.3V	Blue Data 1
B2	22	DIN	3.3V	Blue Data 2
B3	23	DIN	3.3V	Blue Data 3
B4	24	DIN	3.3V	Blue Data 4
B5	25	DIN	3.3V	Blue Data 5 (MSB)
GND	26	PWR	0V	Power Ground
ENAB	27	DIN	3.3V	LCD ENAB Signal
LCD_VCC	28	PWR	3.3V	LCD Power Supply Input (3.3V)
LCD_VCC	29	PWR	3.3V	LCD Power Supply Input (3.3V)
HDM	30	DIN	3.3V	Horizontal Direction Mode
VDM	31	DIN	3.3V	Vertical Direction Mode
Q/V	32	DIN	3.3V	QVGA/VGA Select
GND	33	PWR	0V	Power Ground
GND	34	PWR	0V	Power Ground

J4 (4Pos, 1mm, FPC connector) Part# MOLEX 52271-0469

J4 Pin Name	Pin #	Type	Tolerance	Description
TS_XR	1	ANA	3.3V	Touch Screen XR
TS_YB	2	ANA	3.3V	Touch Screen YB
TS_XL	3	ANA	3.3V	Touch Screen XL
TS_YU	4	ANA	3.3V	Touch Screen YU

J3 (4Pos, 2.54mm Header)

J3 Pin Name	Pin #	Type	Tolerance	Description
TS_XL	1	ANA	3.3V	Touch Screen XL
TS_YB	2	ANA	3.3V	Touch Screen YB
TS_XR	3	ANA	3.3V	Touch Screen XR
TS_YU	4	ANA	3.3V	Touch Screen YU

J11 (4Pos, 2.54mm Header)

J11 Pin Name	Pin #	Type	Tolerance	Description
Vo	1	PWR	+12V	Power Supply for CCFL backlight
GND	2	PWR	0V	Power Ground for CCFL backlight
VC	3	DOUT	3.3V	Active High. This signal is used to turn the CCFL backlight converter On or Off
VB	4	ANA	2.5V	This signal can be used to control the brightness of the CCFL backlight

J16 (8Pos, 2.54mm Header) this connector can be used to program (ICSP) the main controller on the SegeMax board. Do not used

J16 Pin Name	Pin #	Type	Tolerance	Description
ICSP_VPP	1	ANA	-	
3.3V	2	PWR	3.3V	
GND	3	PWR	3.3V	
ICSP_PGD	4	DIO	3.3V	
ICSP_PGC	5	DIO	3.3V	
NC	6-8	-	-	

J14 (16Pos, 2.54mm, IDC connector)

J14 Pin Name	Pin #	Type	Tolerance	Description
VIN	1	PWR	3.3V	Power Supply Input
VIN	2	PWR	3.3V	Power Supply Input
GND	3	PWR	0V	Power Ground
GND	4	PWR	0V	Power Ground
LED_RX	5	DOUT	3.3V	SegeMax RX LED Signal
LED_TX	6	DOUT	3.3V	SegeMax TX LED Signal
RX	7	DIN	3.3V	SegeMax UART RX
TX	8	DOUT	3.3V	SegeMax UART TX
RS485_DE	9	DOUT	3.3V	RS485 Data Enable
READY/BUSY	10	DOUT	3.3V	SegeMax Ready/Busy signal
NOTIFYHOST	11	DOUT	3.3V	SegeMax NotifyHost signal
BUZZER	12	DOUT	3.3V	SegeMax Buzzer signal
LED_HB	13	DOUT	3.3V	SegeMax HB LED Signal
RESET	14	DIN	3.3V	SegeMax Reset Signal
CCFL_PWR	15	PWR	+12V	Power Supply for the CCFL backlight DC/AC converter
EARTH GND	16	PWR	0V	Earth Ground. Connect to your system ground

J18 (10Pos, 2.54mm, Header)

J18 Pin Name	Pin #	Type	Tolerance	Description
VIN	1	PWR	3.3V	Power Supply Input
GND	2	PWR	0V	Power Ground
RX	3	DIN	3.3V	SegeMax UART RX
TX	4	DOUT	3.3V	SegeMax UART TX
RS485_DE	5	DOUT	3.3V	RS485 Data Enable
READY/BUSY	6	DOUT	3.3V	SegeMax Ready/Busy signal
NOTIFYHOST	7	DOUT	3.3V	SegeMax NotifyHost signal
BUZZER	8	DOUT	3.3V	SegeMax Buzzer signal
RESET	9	DIN	3.3V	SegeMax Reset Signal
CCFL_PWR	10	PWR	+12V	Power Supply for the CCFL backlight DC/AC converter

10. LCD Interface:

J1 can be used directly to drive many popular 5.7" QVGA and VGA displays. If your display does not match J1 then you need to make a small interface board using J1 or J2. HDM, VDM and Q/V signals are common among many displays (see the display data sheet for more information on how to set those signals) to set the vertical and horizontal scanning direction and select between QVGA/VGA. Jumpers (zero ohm 805 resistors) R1, R3, R5, R2, R4 and R6 can be used to set HDM, VDM and Q/V. If any of those are not used by your display then leave the corresponding jumper open.

Jumper	**HDM**	**VDM**	**Q/V**
R1	Low		
R2	High		
R3		Low	
R4		High	
R5			Low
R6			High

Low = 0V
High = 3.3V

11. LED Backlight:

SegeMax-LCD uses Max1698 to drive the LED backlight. It is a very efficient step-up current regulator for LEDs and it can deliver up to 5W of continuous power. Adjustable LED brightness is also possible by using SegeMax 100K digital pot. Four pads for the LED anode and four pads for the LED cathode can be used to connect the LED cable directly to the board or through a jumper cable. The jumper R13 (zero ohm 805 resistor) is used to connect the digital pot to max1698 for brightness control.

12. CCFL Backlight:

If your display has a CCFL backlight then you need to find a suitable High Voltage DC/AC CCFL backlight converter to drive the backlight. Check the LCD data sheet for more information about the CCFL backlight. J11 (0.1' Header) can be used to drive the CCFL backlight. If your converter has a dimming function then you can use VB signal to control the brightness of the backlight using SegeMax 100k digital pot (R13 must be open and R12 must be shorted). VC signal can be used to turn the backlight On or Off.

13. Touch Screen:

J4 can be directly used to drive many popular 4-wire resistive touch screens. If you touch screen does not match J4 then a simple cable can be used to connect you touch screen to J4 or J3.

14. Grounding:

In order for the touch screen to work properly with a panel that has a CCFL backlight, the panel metal frame must be grounded to the board ground. The panel frame must be connected to ground directly or through a transient protection diode for ESD. This is not necessary if the panel has LED backlight.

15. Software Command Reference:

The software commands and GUI are described in a separate document, **the SegeMax Software Reference manual**

16. Manual Change History:

Date	Revision	Change
1/08/2011	REV1.00	Initial version of this manual

Hardware Limited Warranty

Haidar Technology, LLC. Warrants its hardware products to be free from manufacturing defects in materials and workmanship under normal use for a period of one (1) year from the date of purchase from HAIDAR. This warranty extends to products purchased directly from HAIDAR or an authorized HAIDAR distributor. Purchasers should inquire of the distributor regarding the nature and extent of the distributor's warranty, if any. HAIDAR shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended, or if it has been subjected to misuse, accidental damage, modification, or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced, or removed. This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall HAIDAR be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. HAIDAR is not liable for any claim made by a third party or made by the purchaser for a third party. HAIDAR shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty. Except as expressly set forth in this warranty, HAIDAR makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supercedes all previous warranties, and covers only the HAIDAR hardware.

Returns and Repair Policy

No merchandise may be returned for credit, exchange, or service without prior authorization from. To obtain warranty service, contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number, and return address. Authorized returns must be shipped freight prepaid to HAIDAR Technology LLC. 5837 Karric Square Drive, Dublin, OH 43016 with the RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. HAIDAR reserves the right in its sole and absolute discretion to charge a 15% restocking fee, plus shipping costs, on any products returned with an RMA.

Return freight charges following repair of items under warranty shall be paid by HAIDAR, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.