HAIDAR TECHNOLOGY, LLC.

The Next Generation Of Intelligent Embedded GUI Systems

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SNT-EVL-D

SegeNT Evaluation Board

Hardware Reference Manual
REV 1.00

Revision 1.00
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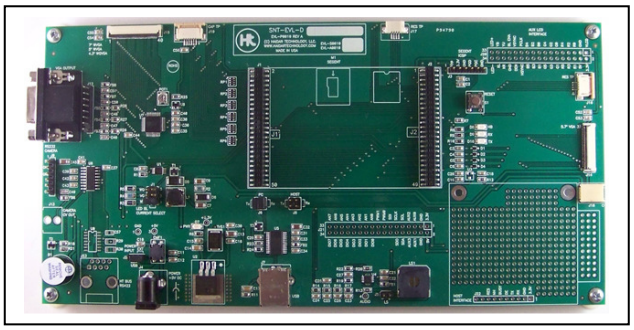
1. Overview



SNT-EVL-D is a development board for Haidar's SegeNT GUI controller board. It is used to evaluate and demonstrate the functionality of SegeNT controller board.
SNT-EVL-D can be interfaced to many different display sizes via the built-in interface or via the generic LCD interface connector. Resistive and Capacitive touch panels are supported.

Please see "SegeNT Software Manual" and "SegeNT Hardware Manual" for more information about the operation and the commands of SegeNT.

2. Features

- Ready to use LCD module
- On board LCD back light driver
- On board Audio amplifier
- On board USB to RS232 converter
- On board +3.3V linear converter
- Can be powered from external +5V or directly for the USB port
- Optional VGA output that can be connected to a PC monitor
- On board Buzzer
- Generic Display interface through 34-pin header
- Analog input, Digital IO and PWM outputs are accessible via 34-pin header
- Prototype Area

3. Board Dimensions

Width	4.72” / 120mm
Length	9.44” / 240mm
Depth	0.98” / 25mm

4. Electrical Characteristics

SNT-EVL-D requires 5V DC. Exceeding the supply voltage over the typical value (5V) will cause a permanent damage to the board and to the attached LCD and void your warranty.

Current draw is as follows:

Configuration	**Typical Current (mA) at 5V**
SNT-EVL-D with no LCD attached	Max 200mA

5. Environmental

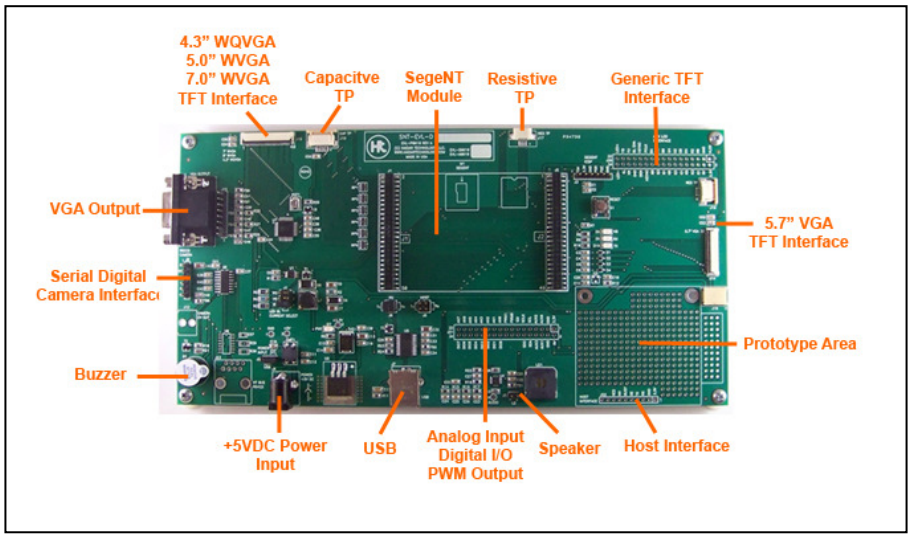
The standard SNT-EVL-D board is rated for commercial temperature operation of -20 to 85ºC.

6. Electrical Specifications

Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**
Input Supply Voltage	VDD	-	5	5.5	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.

7. Board Hardware



8. Supported Display Modules

Part #	Mfg	Res.	Size	TP	LCD Connector	TP Connector
NHD-4.3-480272EF-ATXL#-T	NewHaven	480X272	4.3"	Res	J15	J15
NHD-4.3-480272EF-ATXL#-CTP	NewHaven	480X272	4.3"	Cap	J15	J19
NHD-5.0-480800TF-ATXL#-CTP	NewHaven	800X480	5.0"	Cap	J15	J19
NHD-7.0-480800EF-ATXL#-T	NewHaven	800X480	7.0"	Res	J15	J17
HDA570VT-G	Hantronix	640X480	5.7"	Res	J14	J16

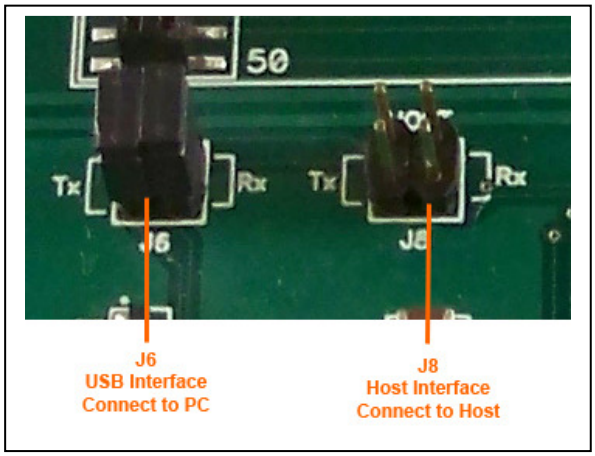
NHD-7.0-480800EF-ATXL#-T

NHD-4.3-480272EF-ATXL#-CTP

HDA570VT-G

9. USB

USB to RS232 converter is used to connect the board to a PC running Haidar's uiLAB software. Jumpers J6 and J8 are used to connect SegeNT to the USB or to the Host.



When both RX and TX of jumper J6 are installed, the board is connected to the USB. When both RX and TX of jumper J8 are installed, the board is connected to the Host controller via J22. One jumper J6 or J8 must be installed at a time.

10. LCD Connectors Pin Description

Pin#	J14 Pin Name 33-pin	J15 Pin Name 40-pin	J20 Pin Name 34-pin
1	GND	LED-	LCD_VCC
2	PCLK	LED+	+3.3V
3	HSYNC	GND	GND
4	VSYNC	LCD_VCC	+5V
5	GND	GND	R0
6	R0	GND	R1
7	R1	R0	R2
8	R2	R1	R3

9	R3	R2	R4
10	R4	R3	R5
11	R5	R4	G0
12	GND	R5	G1
13	G0	GND	G2
14	G1	GND	G3
15	G2	G0	G4
16	G3	G1	G5
17	G4	G2	B0
18	G5	G3	B1
19	GND	G4	B2
20	B0	G5	B3
21	B1	GND	B4
22	B2	GND	B5
23	B3	B0	PCLK
24	B4	B1	HSYNC
25	B5	B2	VSYNC
26	GND	B3	ENAB
27	ENAB	B4	BL_ON
28	LCD_VCC	B5	GND
29	LCD_VCC	GND	YU
30	GND	PCLK	XR
31	GND	LCD_VCC	YB
32	NC	HSYNC	XL
33	GND	VSYNC	LED+
34	-	ENAB	LED-
35	-	NC	-
36	-	GND	-
37	-	XR	-
38	-	YB	-
39	-	XL	-
40	-	YU	-

R0-R5: LCD RED0 (LSB) to RED5 (MSB)
G0-G5: LCD GREEN0 (LSB) to GREEN5 (MSB)
B0-B5: LCD BLUE0 (LSB) to BLUE5 (MSB)
PCLK: LCD Pixel Clock
HSYNC: LCD Horizontal (Line) Sync Signal
VSYNC: LCD Vertical (Frame) Sync Signal
ENAB: LCD Data Enable Signal
LCD_VCC: LCD 3.3V Power
LED+: LCD LED Backlight Anode (+)
LED-: LCD LED Backlight Cathode (-)
BL_ON: Backlight Enable Signal (Active High)
YU: Touch Screen Up
YB: Touch Screen Bottom
XR: Touch Screen Right
XL: Touch Screen Left

11. Touch Screen Connectors Pin Description

Pin#	J16 Pin Name 4-pin	J17 Pin Name 4-pin	J19 Pin Name 6-pin
1	XL	YU	+3.3V
2	YB	XR	GND
3	XR	YB	TSC_SCL
4	YU	XL	TSC_SDA
5	-	-	TSC_INT
6	-	-	+3.3V

J16 and J17 are for Resistive Touch panels.
J19 is for capacitive touch panel with built-in controller.

12. J21 Pin Description

34-Pin, 0.1" DIL Header

Pin#	Pin Name	Description
1	3.3V	+3.3V Power
2	5V	+5V Power
3	GND	Ground Power
4	GND	Ground Power
5	AUX0	Reserved For Future Use
6	AUX1	Reserved For Future Use
7	AUX2	Reserved For Future Use
8	AUX3	Reserved For Future Use
9	I2C_SCL	Reserved For Future Use
10	I2C_SDA	Reserved For Future Use
11	SPI_SCLK	Reserved For Future Use
12	SPI_SDO	Reserved For Future Use
13	SPI_SDI	Reserved For Future Use
14	NC	Not Connected
15	PWM0	PWM0 Output
16	NC	Not Connected
17	PWM1	PWM1 Output
18	NC	Not Connected
19	AIN0	Analog Input 0
20	DIO0	Digital Input/Output 0
21	AIN1	Analog Input 1
22	DIO1	Digital Input/Output 1
23	AIN2	Analog Input 2
24	DIO2	Digital Input/Output 2
25	AIN3	Analog Input 3
26	DIO3	Digital Input/Output 3
27	AIN4	Analog Input 4
28	DIO4	Digital Input/Output 4
29	AIN5	Analog Input 5
30	DIO5	Digital Input/Output 5
31	AIN6	Analog Input 6
32	DIO6	Digital Input/Output 6
33	AIN7	Analog Input 7
34	DIO7	Digital Input/Output 7

13. VGA Output

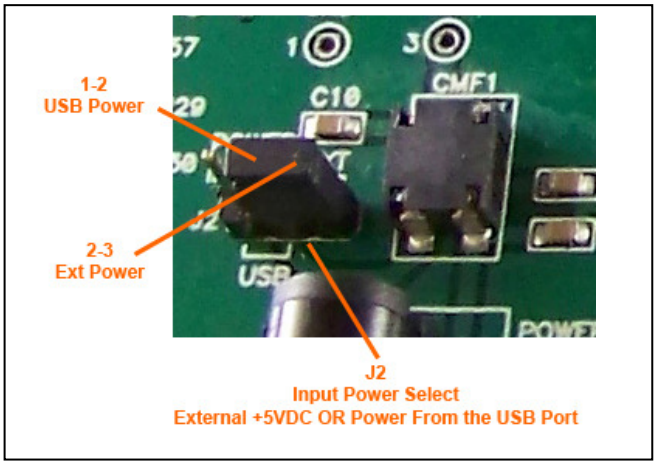
The optional VGA output is used to connect the board to a PC monitor with VGA input. POT1 can be used to adjust the image contrast. The three analog outputs (Red, Green and Blue) are terminated by 75 Ohm.

J11 VGA Output Pin Description

Pin#	Pin Name	Description
1	RED	Red Analog Output
2	GREEN	Green Analog Output
3	BLUE	Blue Analog Output
4	NC	Not Connected
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	Not Connected
10	GND	Ground
11	NC	Not Connected
12	NC	Not Connected
13	HSYNC	Horizontal Sync Signal
14	VSYNC	Vertical Sync Signal
15	NC	Not Connected

14. Power Input Select

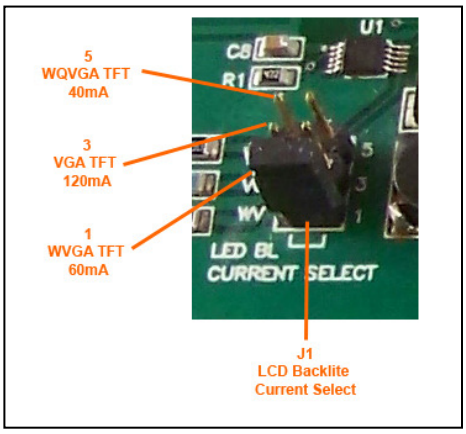
The power to the board can be form an external +5VDC, 1A power supply or directly from the USB port. Jumper J2 is used to select the power input.



Power from the USB port is limited to 500mA current which is not enough for some displays and backlight currents. **Use an external power supply for the 5.7" VGA and 7" WVGA displays as they need more current than the USB is able to deliver.**

15. LED Backlight Driver

SNT-EVL-D has a constant current LED driver based on MAX1698 driver. The brightness is adjusted by the SegeNT Digital POT. Jumper J1 is used to select the LED rated current.



Jumper Position	Current	Display	Feedback Resistor
1	60mA	5" and 7" WVGA	5 Ohm
3	120mA	5.7" VGA	2.2 Ohm
5	40mA	4.3" WQVGA	7.5 Ohm

Notes:

- **Do not change the jumper position while the board is powered**
- **One jumper position must be installed at any time**
- **Do not power the board without LCD is already connected or at least the LED backlight is already connected. Like any current regulator, if the feedback loop is open, the output voltage increases until it is limited by the external 24V zener diode. This will cause the diode to heat up and damage the driver.**

16. Host Controller Interface

J22 Host controller connector (10-pin, 0.1" Header)

Pin#	Pin Name	Description
1	+3.3V	3.3V Power
2	GND	Ground
3	RX	Connect to Host Controller TX
4	TX	Connect to Host Controller RX
5	RS485DE	RS485 Transmitter Enable. Leave open if is not used
6	BUSY	SegeNT Busy signal
7	NOTIFYHOST	SegeNT NotifyHost signal
8	RESET	SegeNT Reset signal. Leave open if is not used
9	NC	Not Connected
10	NC	Not Connected

17. Audio Output

SNT-EVL-D has an audio amplifier that can be connected to an external speaker via J5. 8 Ohm, 1W or less speaker is a good choice for the external speaker. The built-in speaker is optional.

18. Manual Change History

Date	Revision	Change
1/17/2014	REV1.00	Initial version of this manual

19. 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.

20. 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 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.