

# NHD-1.45-Breakout

## Breakout Board for 1.45" Color OLED Glass

NHD- Newhaven Display  
1.45- 1.45" Diagonal Size  
Breakout- Breakout Board

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## Document Revision History

Revision	Date	Description	Changed by
-	09/18/19	Initial Release	PB

## Functions and Features

- Breakout board for 1.45" Color OLED Glass (NHD-1.45-160128G)
- On-board booster circuit (FAN5331SX)
- Jumper option to bypass booster circuit and provide  $V_{CC}$  directly
- Open source hardware

A

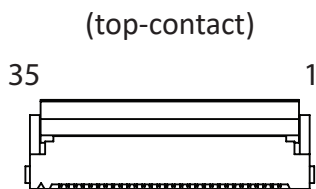
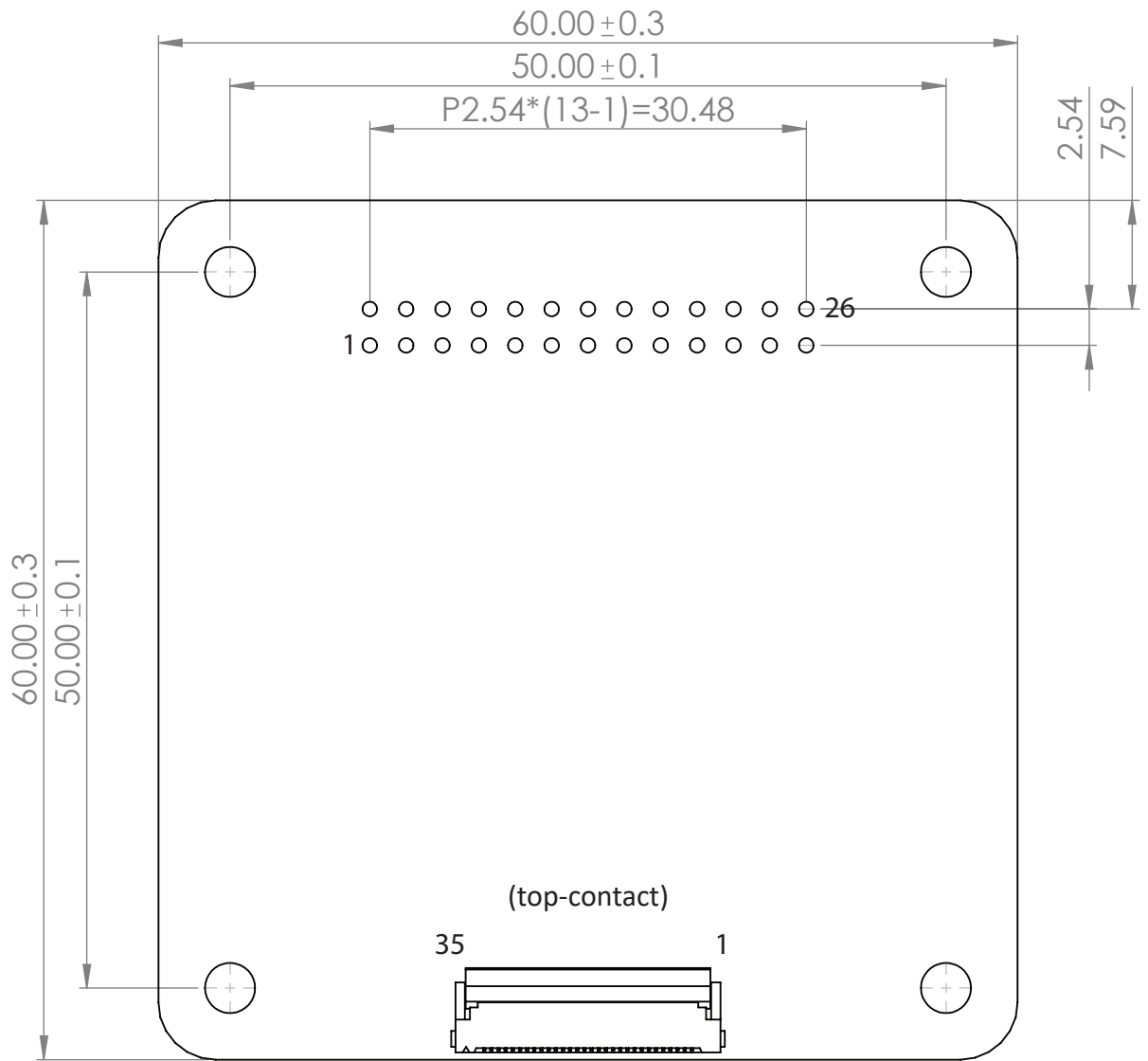
B

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[read caution below]



OLED Panel must be connected with gold fingers **facing upward** (top-contact), for the display to operate

1

2

3

4

A

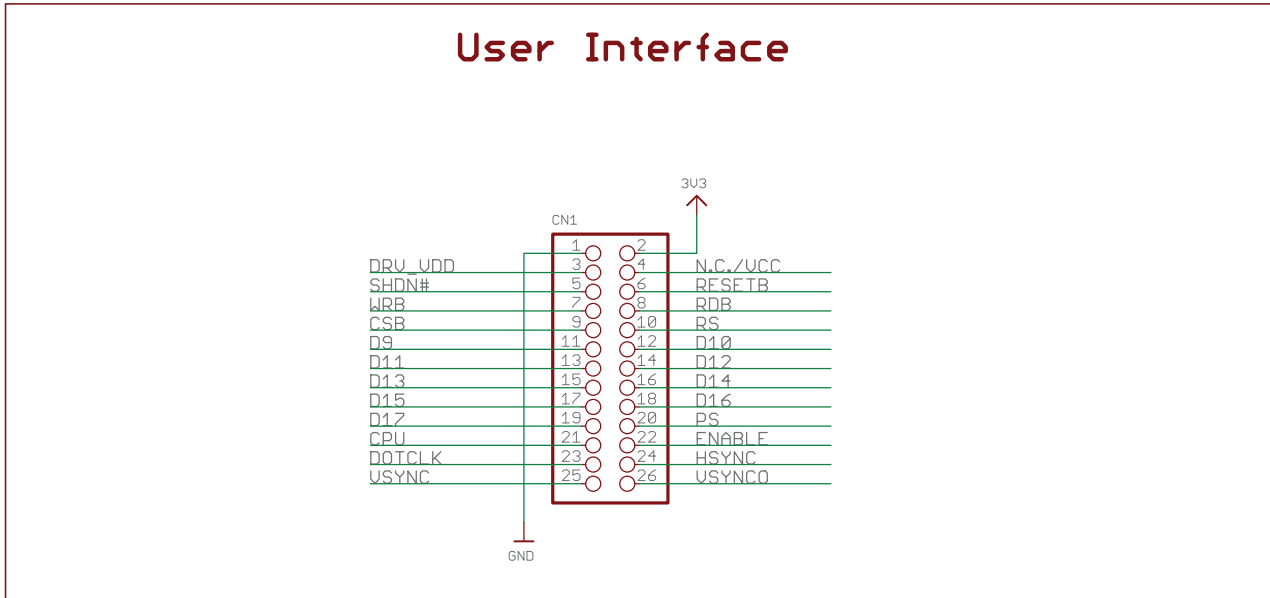
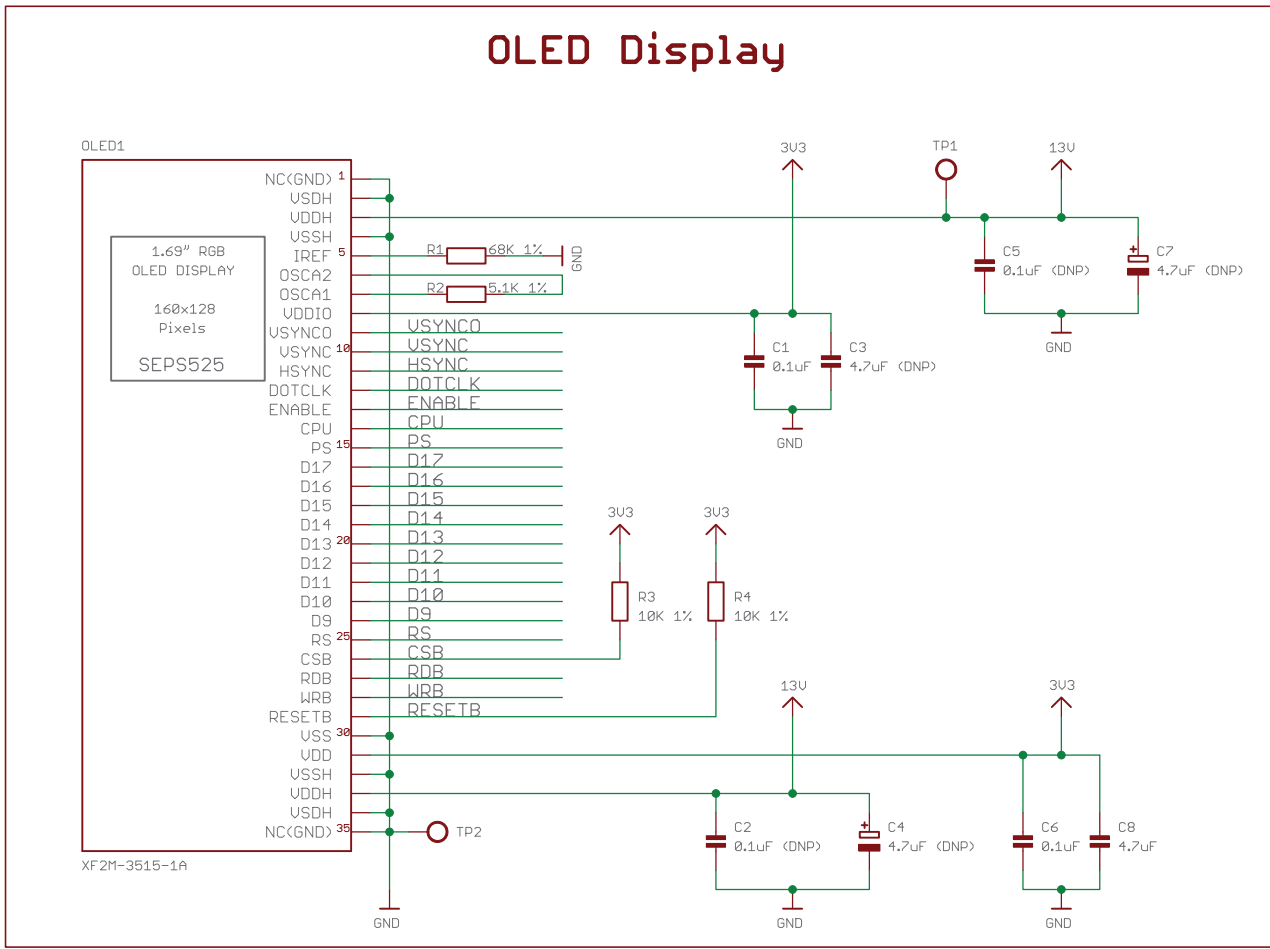
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1

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## Pin Description

Pin No.	Symbol	External Connection	Function Description
1	GND	Power Supply	Ground
2	3V3	Power Supply	Supply Voltage for OLED Logic (+3.3V)
3	DRV_VDD	Power Supply	Supply Voltage for boost converter (+5V) to drive OLED panel voltage (VCC). (Should be no connect if using pin 4 to apply external VCC)
4	N.C./VCC	-	No Connect by default. Can be configured for external VCC (+13V). (refer to On-Board Jumper Options table below)
5	SHDN#	MPU	Active LOW Shutdown control pin for boost converter (pulled HIGH via on-board 10kΩ resistor)
6	RESETB		Active LOW Reset signal
7	WRB		<b>6800 mode:</b> Read/Write signal. LOW: Read. HIGH: Write <b>8080 mode:</b> Active LOW Write signal
8	RDB		<b>6800 mode:</b> Enable signal. Falling edge triggered <b>8080 mode:</b> Active LOW Read signal
9	CSB		Active LOW Chip Select signal
10	RS		Register Select signal. LOW: Command. HIGH: Data
11-19	D9-D17	MPU	<b>Parallel interface:</b> 9-bit Bi-directional data bus (D17~D9) 8-bit Bi-directional data bus (D17~D10) <b>Serial Interface:</b> D17: Synchronous Clock signal (SCL) D16: Serial Data Input signal (SDI) D15: Serial Data Output signal (SDO) <b>RGB interface:</b> 6-bit RGB color signals (D17~D12)
20	PS	MPU	Parallel/Serial select. HIGH: Parallel. LOW: Serial
21	CPU	MPU	Interface select. HIGH: 6800 interface. LOW: 8080 interface
22	ENABLE	MPU	Data Enable signal
23	DOTCLK	MPU	Dot Clock signal
24	HSYNC	MPU	Horizontal Sync signal
25	VSYNC	MPU	Vertical Sync signal
26	N.C.	-	No Connect

## MPU Interface Pin Assignment Summary

### EIM=1 (Default)

Bus Interface	PS	CPU	DFM1	DFM0	D17	D16	D15	D14	D13	D12	D11	D10	D9	RS	CSB	RDB	WRB	RESETB
4-wire SPI	0	X	X	X	SCL	SDI	NC	0	0	0	0	0	0	RS	CSB	0	0	RESETB
9-bit 8080	1	0	1	0	D8	D7	D6	D5	D4	D3	D2	D1	D0	RS	CSB	RDB	WRB	RESETB
8-bit 8080	1	0	1	1	D7	D6	D5	D4	D3	D2	D1	D0	0	RS	CSB	RDB	WRB	RESETB
9-bit 6800	1	1	1	0	D8	D7	D6	D5	D4	D3	D2	D1	D0	RS	CSB	E	R/W	RESETB
8-bit 6800	1	1	1	1	D7	D6	D5	D4	D3	D2	D1	D0	0	RS	CSB	E	R/W	RESETB

### EIM=0

Bus Interface	RIM1	RIM0	D17	D16	D15	D14	D13	D12	D11	D10	D9	VSYNC	HSYNC	DOTCLK	ENABLE
6-bit RGB	1	0	D5	D4	D3	D2	D1	D0	0	0	0	VSYNC	HSYNC	DOTCLK	ENABLE

### Note:

1. DFM1, DFM0 register setting 16h
2. EIM, RIM1, RIM0 register setting 14h
3. "X" : Don't care  
"NC" : No Connect  
"1" : VDD  
"0" : VSS

## On-Board Jumper Options

### Default Jumper Setting

R10	R11	Description
Open	Close	(default) Boost converter circuit (+5V on pin 3) is used to provide VCC to OLED Glass.

### Jumper Option #1 – External Supply Voltage for OLED Panel (VCC)

R10	R11	Description
Close	Open	Boost converter circuit (pin 3) is not used. User must apply VCC (+13V) externally to (pin 4). OLED logic is still powered from 3V3 (pin 2). This method allows for minimum current drain.

**Default Jumper Setting**



**Jumper Option #1**



## Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T <sub>OP</sub>	Absolute Max	-40	-	+70	°C
Storage Temperature Range	T <sub>ST</sub>	Absolute Max	-40	-	+85	°C
Supply Voltage for OLED Logic	3V3	-	2.8	3.0	3.3	V
Supply Voltage for Boost Circuit	DRV_VDD	-	-	5.0	5.5	V
Supply Voltage for OLED Panel	V <sub>CC</sub>	-	12.5	13.0	13.5	V

**NOTICE:** It is not recommended to apply power to the board without a display connected. Doing so may result in a damaged booster circuit. Newhaven Display does not assume responsibility for PCB failures due to this damage.

## Compatible OLED Glass

This board is designed to drive and breakout the signals of the NHD-1.45-160128G.

Please download specification at <http://www.newhavendisplay.com/specs/NHD-1.45-160128G.pdf>

## Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Test the endurance of the display at high storage temperature.	+85°C, 240 Hrs.	2
Low Temperature storage	Test the endurance of the display at low storage temperature.	-40°C, 240 Hrs.	1,2
High Temperature Operation	Test the endurance of the display by applying electric stress (voltage & current) at high temperature.	+70°C, 240 Hrs.	2
Low Temperature Operation	Test the endurance of the display by applying electric stress (voltage & current) at low temperature.	-40°C, 240 Hrs.	1,2
High Temperature / Humidity Operation	Test the endurance of the display by applying electric stress (voltage & current) at high temperature with high humidity.	+60°C, 90% RH, 120 Hrs.	1,2

**Note 1:** No condensation to be observed.

**Note 2:** Conducted after 2 hours of storage at 25°C, 0%RH.

## Precautions for using OLEDs/LCDs/LCMs

See Precautions at [www.newhavendisplay.com/specs/precautions.pdf](http://www.newhavendisplay.com/specs/precautions.pdf)

## Warranty Information

See Terms & Conditions at [http://www.newhavendisplay.com/index.php?main\\_page=terms](http://www.newhavendisplay.com/index.php?main_page=terms)



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