

# NHD-4.3-480272MF-20 Controller Board

## TFT Controller Evaluation Board

NHD-	Newhaven Display
4.3-	4.3" Diagonal
480272-	480xRGBx272 pixels
MF-	Model
20-	20-POS FFC interface (8-bit data) SSD1963 Controller

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## Document Revision History

Revision	Date	Description	Changed by
0	5/14/07	Initial Release	CL
1	4/27/12	J2 pin description updated	AK
2	4/19/19	LED Driver IC Updated	SB
3	3/4/2021	2D Mechanical Drawing Redesign; Revised Compatibility to NHD-4.3-480272MF-ATXL# Models	AS

## Functions and Features

- To use for testing, evaluating, or in final production with NHD-4.3-480272MF-ATXL# displays.



**Note: J2 has a 20-POS FFC connector assembled, pins 21, 22 are not connected.**

**Pin Description: J1 (SSD1963 output to display panel)**

Pin No.	Symbol	External Connection	Function Description
1	LED-	LED Power Supply	Backlight GND
2	LED+	LED Power Supply	Backlight Power (32mA @ 20~22V)
3	GND	Power Supply	Ground
4	VCC	Power Supply	Power supply for LCD and logic (3.3V)
5-10	[R0-R7]	MPU	Red Data Signals
11-12	GND	Power Supply	Ground
13-18	[G0-G7]	MPU	Green Data Signals
19-20	GND	Power Supply	Ground
21-26	[B0-B7]	MPU	Blue Data Signals
27-29	GND	Power Supply	Ground
30	PCLK	MPU	Data sample Clock signal
31	DISP	MPU	Display ON/OFF signal
32	HSYNC	MPU	Line synchronization signal
33	VSYNC	MPU	Frame synchronization signal
34	DE	MPU	Data Enable signal
35	AVDD	-	No Connect
36	GND	Power Supply	GND
37	XR	Touch Panel MPU	Touch Panel RIGHT
38	YD	Touch Panel MPU	Touch Panel DOWN
39	XL	Touch Panel MPU	Touch Panel LEFT
40	YU	Touch Panel MPU	Touch Panel UP

**Pin Description: J2 (SSD1963 input from user's MPU)**

Pin No.	Symbol	External Connection	Function Description
1	GND	Power Supply	GND
2	Vcc	Power Supply	Power supply for LCD and logic (3.3V)
3	B/L Enable	Power Supply	Backlight Enable
4	RS	MPU	Register Select. RS=0: Command, RS=1: Data
5	WR	MPU	8080 MPU Write Signal active LOW
6	RD	MPU	8080 MPU Read Signal active LOW
7-14	DB0-DB7	MPU	8-bit bidirectional data bus
15	CS	MPU	Active LOW Chip Select signal
16	REST	MPU	Active LOW Reset signal
17	NC	-	No Connect
18	NC	-	No Connect
19	DISP	MPU	Display On signal
20	NC	-	No Connect

## Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T <sub>OP</sub>	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T <sub>ST</sub>	Absolute Max	-30	-	+80	°C
Supply Voltage	V <sub>CC</sub>		3.0	3.3	3.6	V
Input High Voltage	V <sub>IH</sub>		0.8 * V <sub>CC</sub>	-	V <sub>CC</sub>	V
Input Low Voltage	V <sub>IL</sub>		GND	-	0.2 * V <sub>CC</sub>	V
Supply Current	I <sub>VCC</sub>		-	285	-	mA
Power Consumption	P <sub>LCD</sub>		-	940.5	-	mW

## Controller Information

Built-in SSD1963 controller.

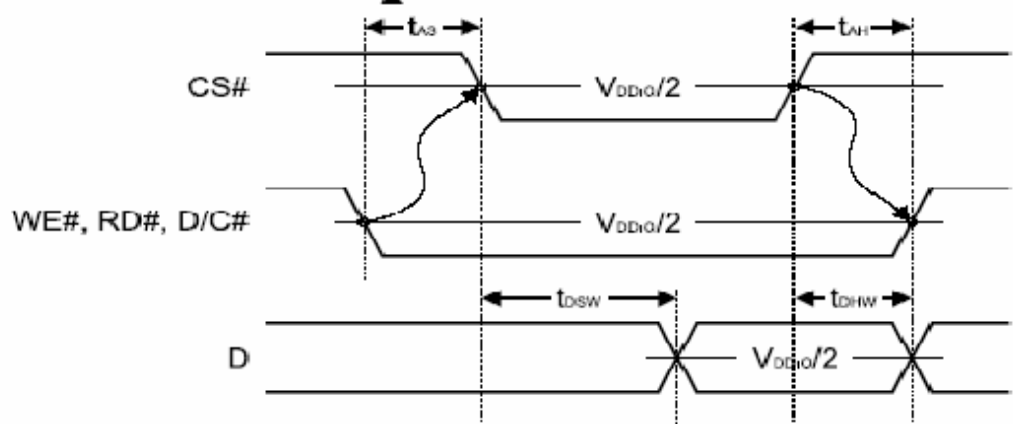
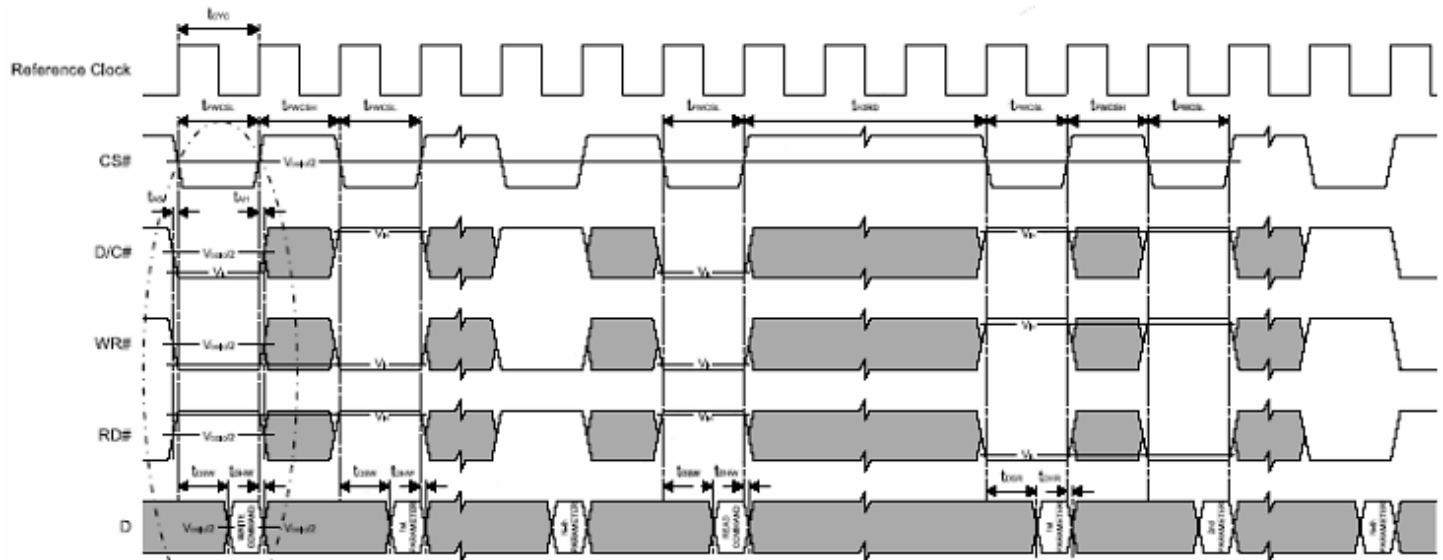
For specific timing and color information, please download specification at:

[http://www.newhavendisplay.com/app\\_notes/SSD1963.pdf](http://www.newhavendisplay.com/app_notes/SSD1963.pdf)

# Timing Information

8080 Mode Timing:

Symbol	Parameter	Min	Typ	Max	Unit
t <sub>cy</sub>	Reference Clock Cycle Time	9	-	-	ns
t <sub>PWCSL</sub>	Pulse width CS# low	1	-	-	t <sub>CYC</sub>
t <sub>PWCSH</sub>	Pulse width CS# high	1	-	-	t <sub>CYC</sub>
t <sub>FDRD</sub>	First Read Data Delay	5	-	-	t <sub>CYC</sub>
t <sub>AS</sub>	Address Setup Time	1	-	-	ns
t <sub>AH</sub>	Address Hold Time	1	-	-	ns
t <sub>DSW</sub>	Data Setup Time	4	-	-	ns
t <sub>DHW</sub>	Data Hold Time	1	-	-	ns
t <sub>DSR</sub>	Data Access Time	-	-	5	ns
t <sub>DHR</sub>	Output Hold time	1	-	-	ns



## Pixel Data Format

Both 6800 and 8080 support 8-bit, 9-bit, 16-bit, 18-bit and 24-bit data bus. Depending on the width of the data bus, the display data are packed into the data bus in different ways.

Pixel Data Format :

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]		
24 bits	1 <sup>st</sup>	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0		
18 bits	1 <sup>st</sup>							R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0		
16 bits (565 format)	1 <sup>st</sup>									R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1		
16 bits	1 <sup>st</sup>									R5	R4	R3	R2	R1	R0	X	X	G5	G4	G3	G2	G1	G0	X	X		
	2 <sup>nd</sup>																	X	X	R5	R4	R3	R2	R1	R0	X	X
	3 <sup>rd</sup>																	X	X	B5	B4	B3	B2	B1	B0	X	X
9 bits	1 <sup>st</sup>																R5	R4	R3	R2	R1	R0	G5	G4	G3		
	2 <sup>nd</sup>																	G2	G1	G0	B5	B4	B3	B2	B1	B0	
8 bits	1 <sup>st</sup>																	R5	R4	R3	R2	R1	R0	X	X		
	2 <sup>nd</sup>																		G5	G4	G3	G2	G1	G0	X	X	
	3 <sup>rd</sup>																		B5	B4	B3	B2	B1	B0	X	X	

X: Don't Care

## Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C , 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C , 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C 200hrs	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C , 200hrs	1,2
High Temperature / Humidity Storage	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+60°C , 90% RH , 96hrs	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-20°C,30min -> 25°C,5min -> 70°C,30min = 1 cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz , 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	VS=800V, RS=1.5kΩ, CS=100pF One time	

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

**Note 2:** Conducted after 4 hours of storage at 25°C, 0%RH.

**Note 3:** Test performed on product itself, not inside a container.

## Precautions for using LCDs/LCMs

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

## Warranty Information and Terms & Conditions

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