NHD-7.0-800480WF-20 Controller Board

TFT Controller Evaluation Board

NHD-	Newhaven Display
7.0-	7.0” Diagonal
800480-	320xRGBx240 pixels
WF-	Model
20-	20-POS FFC interface (8-bit data) SSD1963 Controller

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Document Revision History

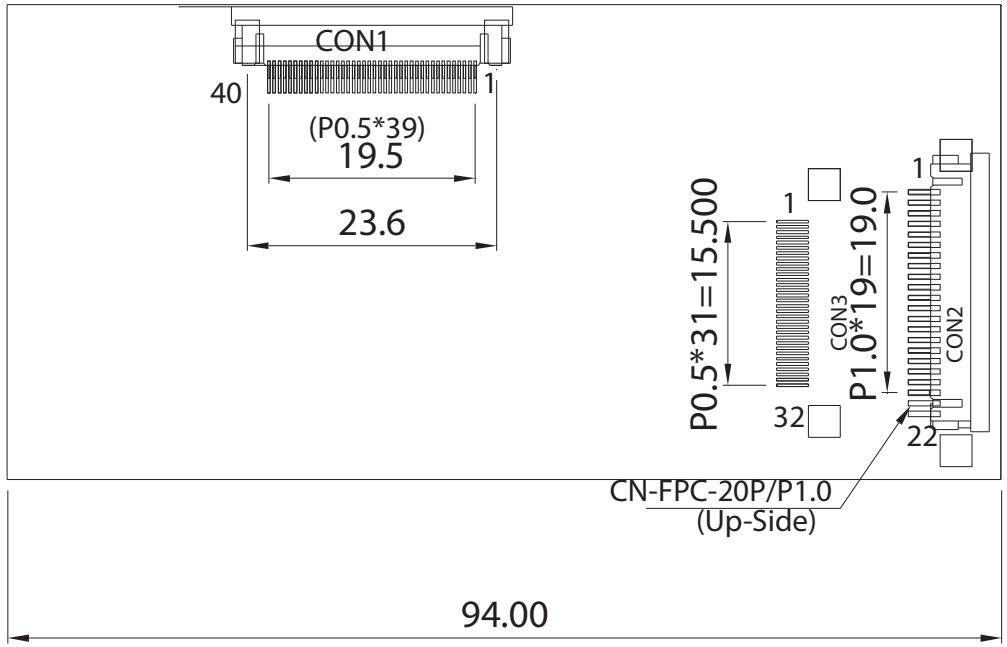
Revision	Date	Description	Changed by
0	6/1/2012	Initial Release	AK

Functions and Features

- **To use for testing, evaluating, or in final production with NHD-7.0-800480WF-A displays.**

Mechanical Drawing

Rev	Description	Date



	Date	
	06/01/12	NEWHAVEN DISPLAY INTERNATIONAL
Gen. Tolerance	Unit	Model:
±0.3mm	mm	NHD-7.0-800480WF-20

Pin Description

Note: CON2 has a 20-POS FFC connector assembled, pins 21, 22 not connected.

CON2 (SSD1963 input from user's MPU):

Pin No.	Symbol	Connection	Function Description
1	GND	Power Supply	Ground
2	VDD	Power Supply	Power supply for logic (+3.3V)
3	NC	-	No Connect
4	D/C#	MPU	Register Select signal: 1=Data, 0=Command
5	WR#	MPU	Active LOW Write signal (8080 mode) Read/Write signal (6800 mode)
6	RD#	MPU	Active LOW Read signal (8080 mode) Edge trigger Enable signal (6800 mode)
7-14	DB0~DB7	MPU	8-bit bi-directional data bus
15	CS#	MPU	Active LOW Chip Select signal
16	NC	-	No Connect
17	NC	-	No Connect
18	RST#	MPU	Active LOW Reset signal
19	NC	-	No Connect
20	NC	-	No Connect

LCD connector: 1.0mm pitch, 20-Conductor FFC, top contact
Recommended connection: 1.0mm pitch, 20-conductor FFC cable

CON1 (SSD1963 output to display panel):

Pin No.	Symbol	Connection	Function Description
1	GND	Power Supply	Power Ground
2	GND	Power Supply	Power Ground
3	NC	-	No connect
4-7	VDD	Power Supply	Power Supply (+3.3V)
8	NC	-	No connect
9	DE	MPU	Data Enable
10-12	GND	Power Supply	Power Ground
13-15	B5-B3	MPU	Blue B5 (MSB) to B3
16	GND	Power Supply	Power Ground
17-19	B2-B0	MPU	Blue B2 – B0(LSB)
20	GND	Power Supply	Power Ground
21-23	G5-G3	MPU	Green B5 (MSB) to B3
24	GND	Power Supply	Power Ground
25-27	G2-G0	MPU	Green B2 – B0(LSB)
28	GND	Power Supply	Power Ground
29-31	R5-R3	MPU	Red B5 (MSB) to B3
32	GND	Power Supply	Power Ground
33-35	R2-R0	MPU	Red B2 – B0(LSB)
36-37	GND	Power Supply	Power Ground
38	DCLK	MPU	Clock (Falling edge triggered)
39-40	GND	Power Supply	Power Ground

LCD connector: 0.5mm pitch, 40-Conductor FFC, Bottom contact
Recommended connection: 0.5mm pitch, 40-conductor FFC cable

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	Top	Absolute Max	-20	-	+70	°C
Storage Temperature Range	Tst	Absolute Max	-30	-	+80	°C
Supply Voltage	VDD		3.0	3.3	3.5	V
Supply Current	IDD		-	5	30	mA
Input High Voltage	VIH		0.8*VDD	-	VDD+0.5	V
Input Low Voltage	VIL		0	-	0.2*VDD	V
Output High Voltage	VOH		0.8*VDD	-	VDD	V
Output Low Voltage	VOL		0	-	0.2*VDD	V

Controller Information

Built-in SSD1963. Download specification at http://www.newhavendisplay.com/app_notes/SSD1963.pdf

Pixel Data Format

		D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
8 bits	1st	R7	R6	R5	R4	R3	R2	R1	R0
	2nd	G7	G6	G5	G4	G3	G2	G1	G0
	3rd	B7	B6	B5	B4	B3	B2	B1	B0

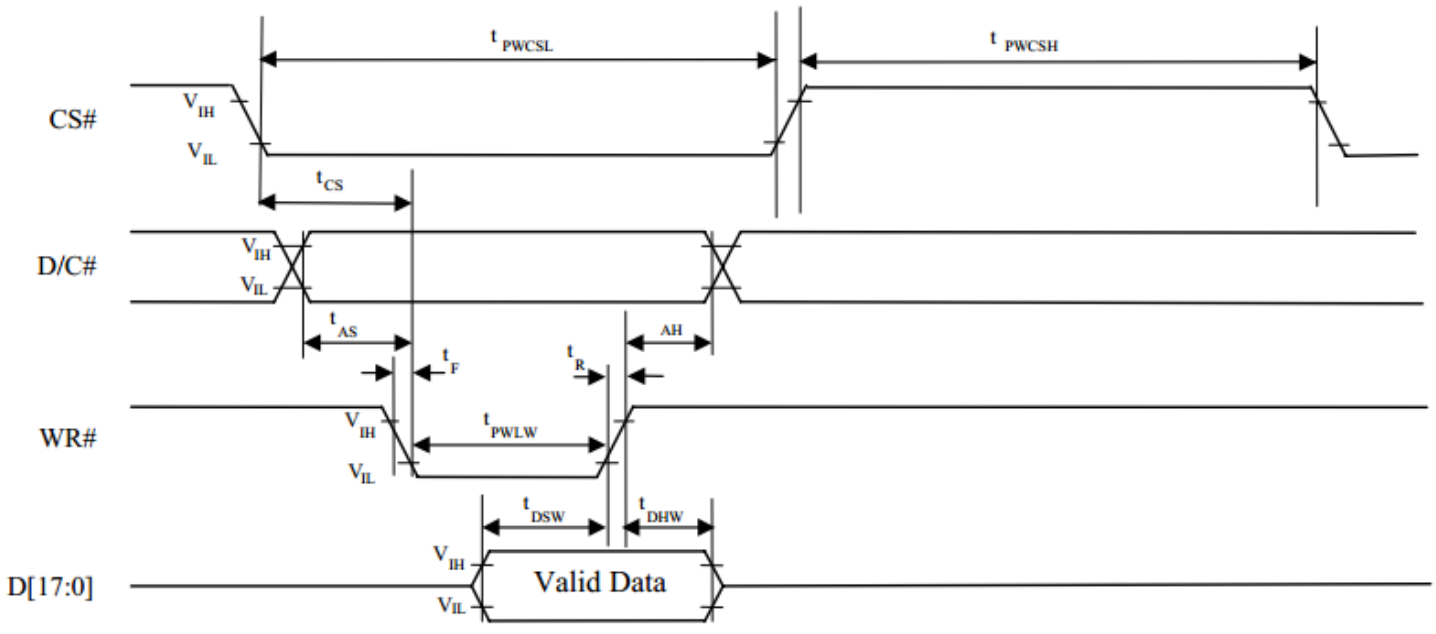
Timing Characteristics

Parallel 8080-series interface timing:

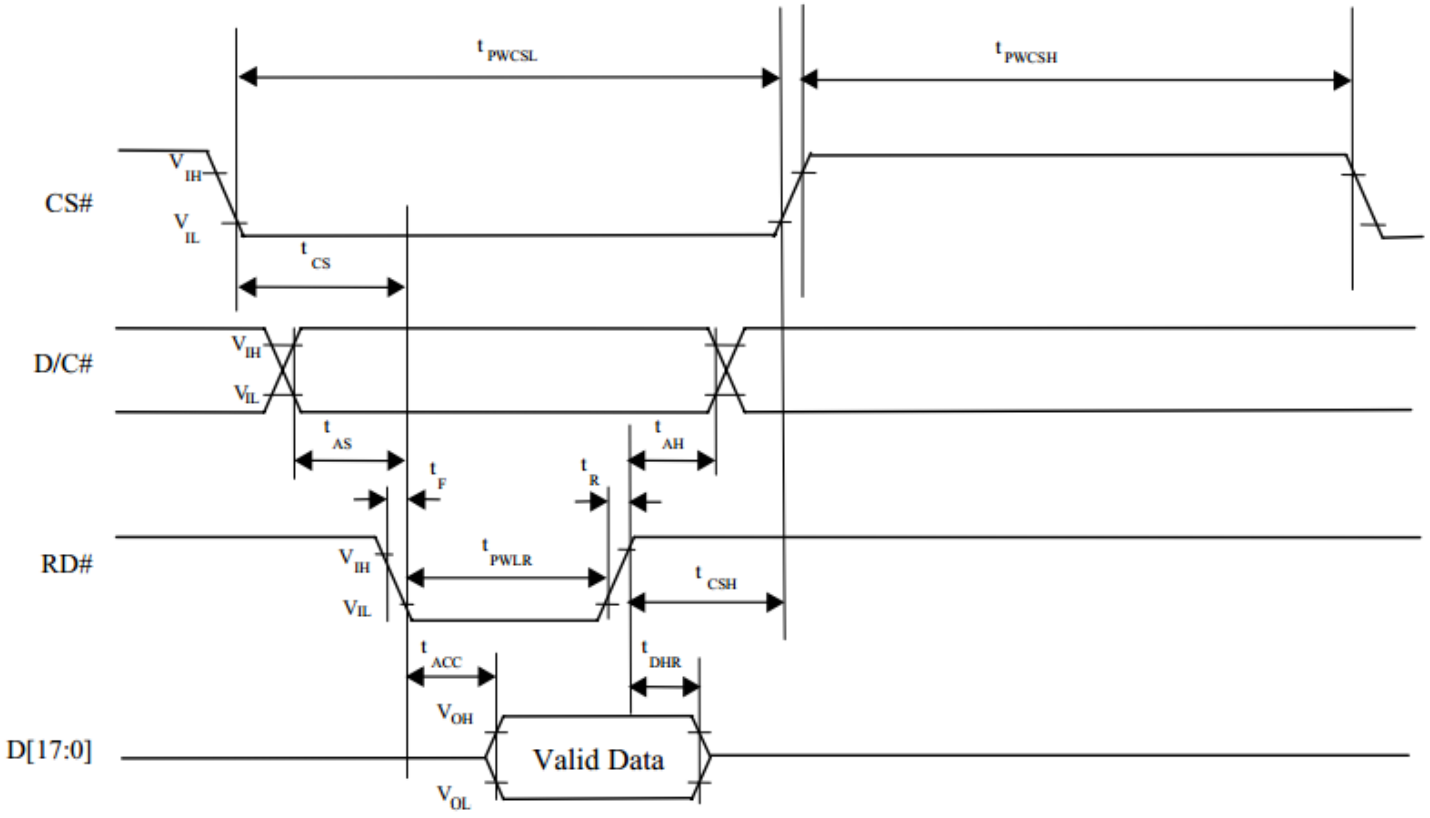
Symbol	Parameter		Min	Typ	Max	Unit
f_{MCLK}	System Clock Frequency*		1	-	110	MHz
t_{MCLK}	System Clock Period*		1/ f_{MCLK}	-	-	ns
t_{PWCSL}	Control Pulse High Width	Write Read	13 30	1.5* t_{MCLK} 3.5* t_{MCLK}	-	ns
t_{PWCSH}	Control Pulse Low Width	Write (next write cycle) Write (next read cycle) Read	13 80 80	1.5* t_{MCLK} 9* t_{MCLK} 9* t_{MCLK}	-	ns
t_{AS}	Address Setup Time		1	-	-	ns
t_{AH}	Address Hold Time		2	-	-	ns
t_{DSW}	Write Data Setup Time		4	-	-	ns
t_{DHW}	Write Data Hold Time		1	-	-	ns
t_{PWLW}	Write Low Time		12	-	-	ns
t_{DHR}	Read Data Hold Time		1	-	-	ns
t_{ACC}	Access Time		32	-	-	ns
t_{PWLR}	Read Low Time		36	-	-	ns
t_R	Rise Time		-	-	0.5	ns
t_F	Fall Time		-	-	0.5	ns
t_{CS}	Chip select setup time		2	-	-	ns
t_{CSH}	Chip select hold time to read signal		3	-	-	ns

* System Clock denotes external input clock (PLL-bypass) or internal generated clock (PLL-enabled)

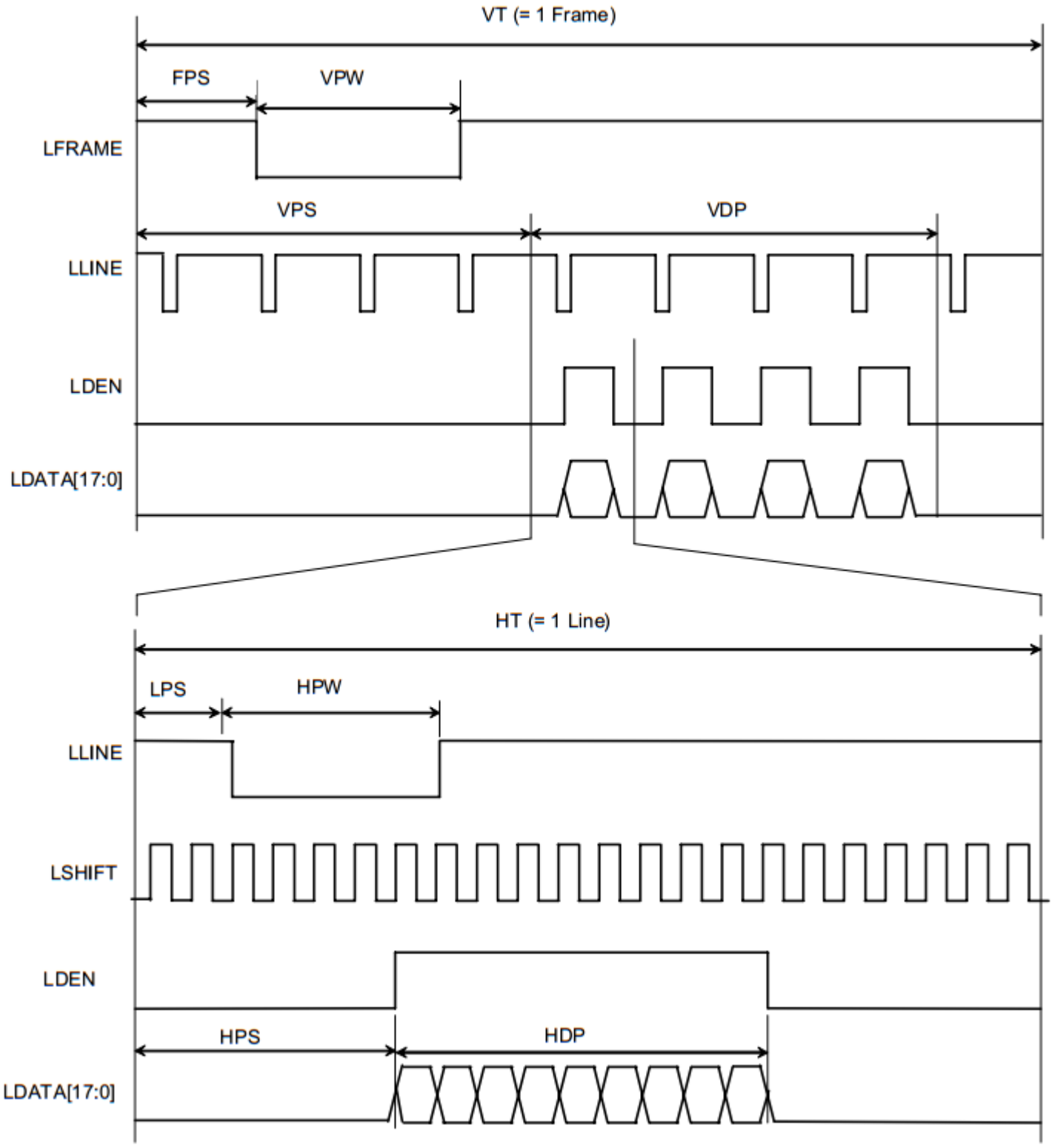
Write Cycle:



Read Cycle:


t PWCSL
t PWCSH
CS#
V IH
V IL
t CS
D/C#
V IH
V IL
t AS
t AH
t F
t R
RD#
V IH
V IL
t PWLR
t CSH
t ACC
t DHR
V OH
D[17:0]
Valid Data
V OL

Parallel LCD Interface Timing:



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 Operation	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

Warranty Information and Terms & Conditions

http://www.newhavendisplay.com/index.php?main_page=terms