

NHD-1.1-9696G

Graphic Color OLED Display

NHD-	Newhaven Display
1.1-	1.1" Diagonal Size
9696-	96 x 96 Pixels
G-	OLED Glass

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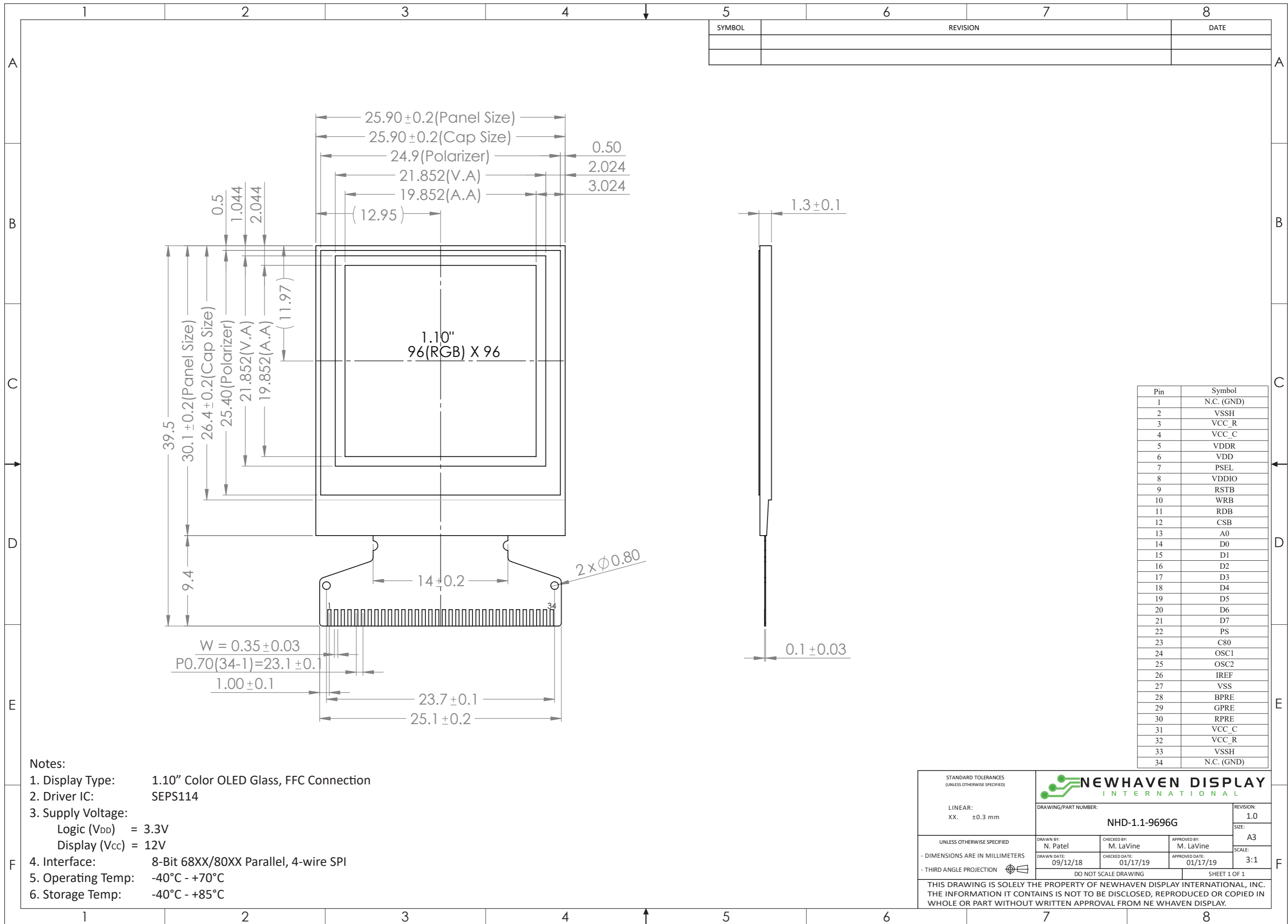
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Document Revision History

Revision	Date	Description	Changed by
-	1/25/19	Initial Release	PB

Functions and Features

- 96 x 96 pixel resolution
- Built-in SEPS114 controller
- Serial or Parallel interface
- RoHS compliant



SYMBOL	REVISION	DATE

Pin	Symbol
1	N.C. (GND)
2	VSSH
3	VCC_R
4	VCC_C
5	VDDR
6	VDD
7	PSEL
8	VDDIO
9	RSTB
10	WRB
11	RDB
12	CSB
13	A0
14	D0
15	D1
16	D2
17	D3
18	D4
19	D5
20	D6
21	D7
22	PS
23	C80
24	OSC1
25	OSC2
26	IREF
27	VSS
28	BPRE
29	GPRES
30	RPRES
31	VCC_C
32	VCC_R
33	VSSH
34	N.C. (GND)

- Notes:**
- Display Type: 1.10" Color OLED Glass, FFC Connection
 - Driver IC: SEPS114
 - Supply Voltage:
 - Logic (V_{DD}) = 3.3V
 - Display (V_{CC}) = 12V
 - Interface: 8-Bit 68XX/80XX Parallel, 4-wire SPI
 - Operating Temp: -40°C - +70°C
 - Storage Temp: -40°C - +85°C

STANDARD TOLERANCES (UNLESS OTHERWISE SPECIFIED)				REVISION:
				1.0
LINEAR: XX. ±0.3 mm	DRAWING/PART NUMBER:			SIZE:
	NHD-1.1-9696G			A3
UNLESS OTHERWISE SPECIFIED - DIMENSIONS ARE IN MILLIMETERS - THIRD ANGLE PROJECTION	DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
	N. Patel	M. LaVine	M. LaVine	3:1
DRAWN DATE:			CHECKED DATE:	APPROVED DATE:
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Interface Description

Pin No.	Symbol	External Connection	Function Description
1	NC (GND)	-	No connect (can be tied to Ground)
2	V _{SSH}	Power Supply	Ground for OLED panel
3	V _{CC_R}	Power Supply	Voltage output high level for scan signal (see wiring diagram)
4	V _{CC_C}	Power Supply	Supply voltage for OLED panel
5	V _{DDR}	Power Supply	Power supply for core logic circuit (see wiring diagram)
6	V _{DD}	Power Supply	Supply voltage for Logic
7	PSEL	MPU	Regulator Enable/Disable for core logic (see wiring diagram)
8	V _{DDIO}	Power Supply	Supply voltage for I/O
9	RSTB	MPU	Active LOW Reset signal
10	R/W WRB	MPU	6800 mode: Read/Write signal. LOW: Write. HIGH: Read 8080 mode: Active LOW Write signal
11	E RDB	MPU	6800 mode: Enable signal. Falling edge triggered 8080 mode: Active LOW Read signal
12	CSB	MPU	Active LOW Chip Select signal
13	A0	MPU	Register Select signal. LOW: Command. HIGH: Data
14	D0	MPU	Parallel interface: 8-bit bi-directional data bus Serial interface: D0 = Serial Clock signal (SCL) D1 = Serial Data Input signal (SDI) D2 = Serial Data Output (SDO) D3 = Serial Read High / Write Low (R/W)
15	D1	MPU	
16	D2	MPU	
17	D3	MPU	
18	D4	MPU	
19	D5	MPU	
20	D6	MPU	
21	D7	MPU	
22	PS	MPU	Serial/Parallel Interface selection LOW: Serial. HIGH: Parallel
23	C80	MPU	Parallel mode selection LOW: 8080 mode. HIGH: 6800 mode
24-25	OSC1;OSC2	MPU	Oscillation adjustment. Connect a 27kΩ resistor between these two pins (see wiring diagram)
26	I _{REF}	Power Supply	Current reference for brightness adjustment
27	V _{SS}	Power Supply	Ground
28	B _{PRE}	Power Supply	External voltage reference for Pre-charge signal (see wiring diagram)
29	G _{PRE}	Power Supply	
30	R _{PRE}	Power Supply	
31	V _{CC_C}	Power Supply	Supply voltage for OLED panel
32	V _{CC_R}	Power Supply	Voltage output high level for scan signal (see wiring diagram)
33	V _{SSH}	Power Supply	Ground for OLED panel
34	NC (GND)	-	No connect (can be tied to Ground)

Recommended display connector: n/a (Hot-bar solder directly to PCB)

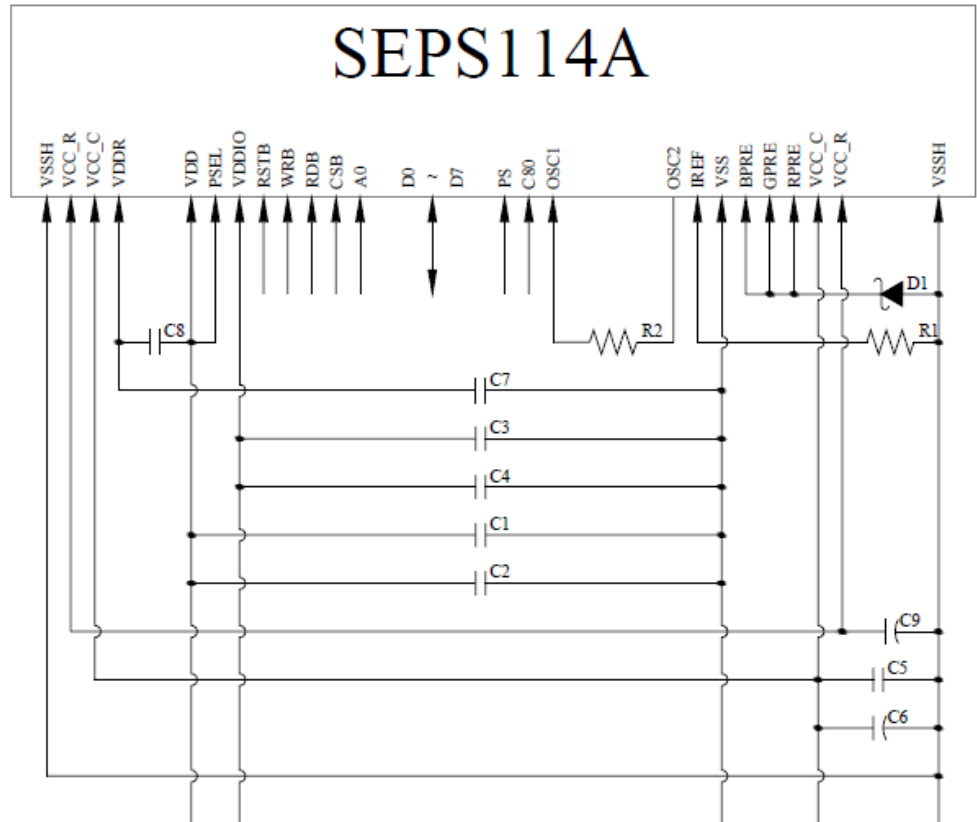
MPU Interface Pin Assignment Summary

Bus Interface	C80	PS	RSTB	CSB	A0	RDB	WRB	D0	D1	D2	D3	D4	D5	D6	D7
8-bit 6800	1	1	RSTB	CSB	A0	E	R/W	D[0:7]							
8-bit 8080	0	1	RSTB	CSB	A0	RDB	WRB	D[0:7]							
4-wire SPI	NC	0	RSTB	CSB	A0	0	0	SCL	SDI	SDO	R/W	0	0	0	0

Note:

- “NC” : No Connect
- “1” : VDD
- “0” : VSS

Wiring Diagram



MCU Interface Selection: PS, C80

Pins connected to MCU interface: RSTB, WRB, RDB, CSB, A0, and D0~D7

C1, C3, C5: 0.1 μ F

C2, C4, C8: 4.7 μ F

C6, C9: 4.7 μ F / 25V Tantalum Capacitor

C7: 2.2 μ F

R1: 39k Ω

R2: 27k Ω

D1: 2.7V, 0.5W Zener Diode

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T _{OP}	Absolute Max	-40	-	+70	°C
Storage Temperature Range	T _{ST}	Absolute Max	-40	-	+85	°C
Supply Voltage for Logic	V _{DD}	-	2.4	2.8	3.3	V
Supply Voltage for I/O Pins	V _{DDIO}	-	1.65	2.8	V _{DD}	
Supply Voltage for Display	V _{CC_C}	-	11.5	12.0	12.5	V
Supply Current for Logic	I _{DD}	V _{DD} = 2.8V; 100% On	-	1.5	3.5	mA
Supply Current for Display	I _{CC_C}	V _{CC_C} = 12V; 50% On	-	10.5	13.1	mA
		V _{CC_C} = 12V; 100% On	-	19.2	24.0	mA
Supply Current (Sleep)	I _{SLEEP}	V _{DD} = 2.8V	-	5	15	μA
"H" Level input	V _{IH}	-	0.8 * V _{DDIO}	-	V _{DDIO}	V
"L" Level input	V _{IL}	-	V _{SS}	-	0.4	V
"H" Level output	V _{OH}	-	V _{DDIO} -0.4	-	V _{DDIO}	V
"L" Level output	V _{OL}	-	V _{SS}	-	0.4	V

Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top		80	-	-	°
	Bottom		80	-	-	°
	Left		80	-	-	°
	Right		80	-	-	°
Contrast Ratio	CR	-	-	>10,000:1	-	-
Response Time (rise)	T _R	-	-	10	-	μs
Response Time (fall)	T _F	-	-	10	-	μs
Brightness	L _V	50% Checkerboard	80	100	-	cd/m ²
Lifetime	-	100 cd/m ² , T _{OP} =25°C 50% Checkerboard	10,000	-	-	Hrs

Note: Lifetime at typical temperature is based on accelerated high-temperature operation. Lifetime is tested at average 50% pixels on and is rated as Hours until **Half-Brightness**. The Display OFF command can be used to extend the lifetime of the display.

Luminance of active pixels will degrade faster than inactive pixels. Residual (burn-in) images may occur. To avoid this, every pixel should be illuminated uniformly.

Controller information

Built-in SEPS114 controller.

Please download specification at <http://www.newhavendisplay.com/appnotes/datasheets/OLEDs/SEPS114.pdf>

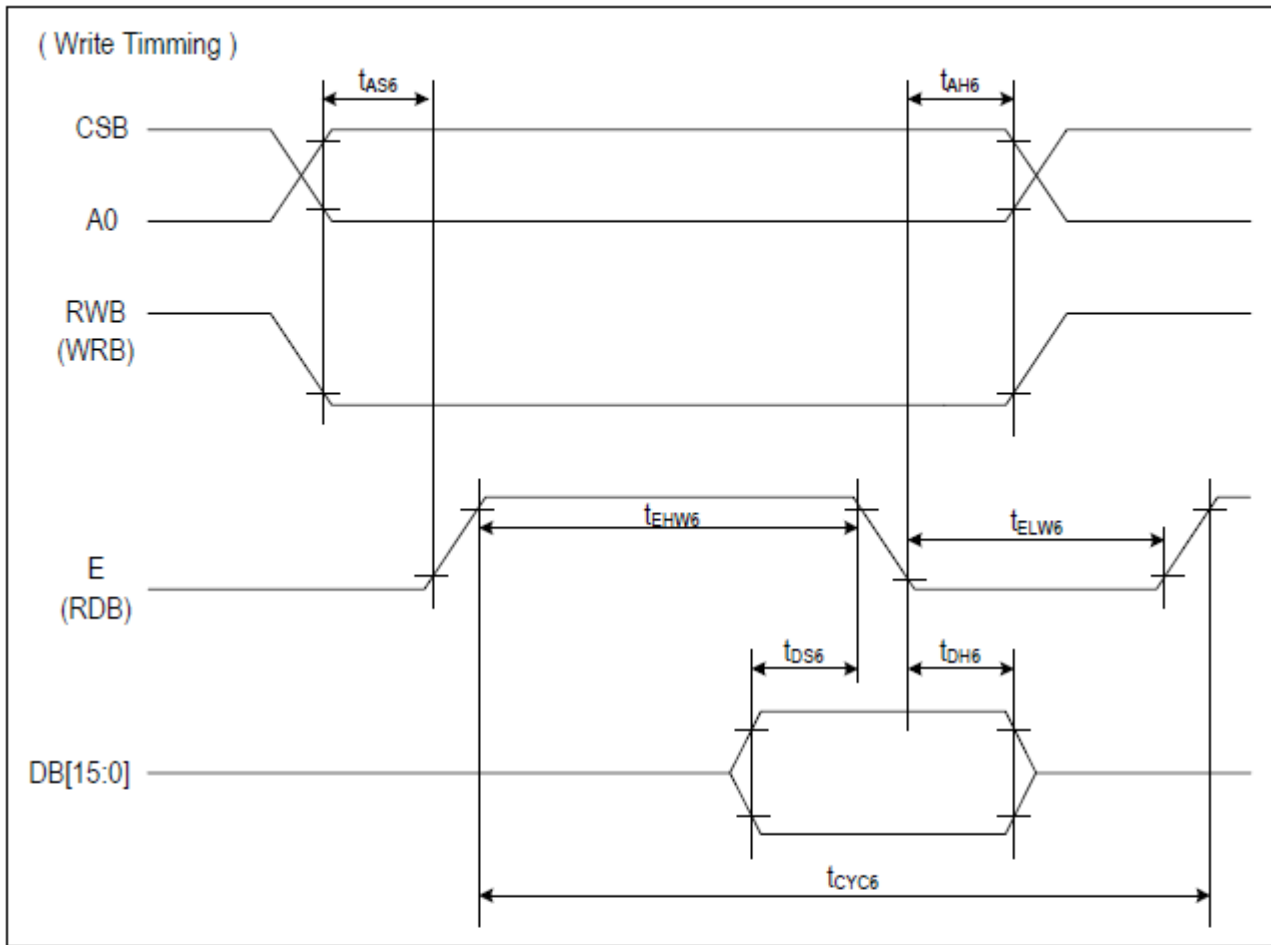
Table of Commands

ADDR	RW	IB7	IB6	IB5	IB4	IB3	IB2	IB1	IB0	Description	Default
01h	W	IDX[7]	IDX[6]	IDX[5]	IDX[4]	IDX[3]	IDX[2]	IDX[1]	IDX[0]	SOFT_RESET	00h
02h	R/W	-	-	-	-	-	-	-	DON	DISP_ON_OFF	00h
0Fh	R/W	SELEXP	SELRES	SELCLK	-	-	-	-	IREF	ANALOG_CONTROL	80h
14h	R/W	-	-	-	-	-	-	-	STB	STANDBY_ON_OFF	01h
1Ah	R/W	-	-	-	-	FR[3]	FR[2]	FR[1]	FR[0]	OSC_ADJUST	03h
09h	R/W	-	-	-	-	-	-	SCAND[1]	SCAND[0]	ROW_SCAN_DIRECTION	00h
30h	R/W	-	FX[6]	FX[5]	FX[4]	FX[3]	FX[2]	FX[1]	FX[0]	DISPLAY_X1	00h
31h	R/W	-	TX[6]	TX[5]	TX[4]	TX[3]	TX[2]	TX[1]	TX[0]	DISPLAY_X2	5Fh
32h	R/W	-	FY[6]	FY[5]	FY[4]	FY[3]	FY[2]	FY[1]	FY[0]	DISPLAY_Y1	00h
33h	R/W	-	TY[6]	TY[5]	TY[4]	TY[3]	TY[2]	TY[1]	TY[0]	DISPLAY_Y2	5Fh
38h	R/W	-	DX[6]	DX[5]	DX[4]	DX[3]	DX[2]	DX[1]	DX[0]	DISPLAYSTART_X	00h
39h	R/W	-	DY[6]	DY[5]	DY[4]	DY[3]	DY[2]	DY[1]	DY[0]	DISPLAYSTART_Y	00h
0Dh	R/W	-	-	-	-	-	-	CIF[1]	CIF[0]	CPU_IF	00h
34h	R/W	-	XS[6]	XS[5]	XS[4]	XS[3]	XS[2]	XS[1]	XS[0]	MEM_X1	00h
35h	R/W	-	XE[6]	XE[5]	XE[4]	XE[3]	XE[2]	XE[1]	XE[0]	MEM_X2	5Fh
36h	R/W	-	YS[6]	YS[5]	YS[4]	YS[3]	YS[2]	YS[1]	YS[0]	MEM_Y1	00h
37h	R/W	-	YE[6]	YE[5]	YE[4]	YE[3]	YE[2]	YE[1]	YE[0]	MEM_Y2	5Fh
1Dh	R/W	-	-	-	-	-	VH	MDIR[1]	MDIR[0]	MEMORY_WRITE/READ	00h
08h	R/W	DDRAM[15:0]								DDRAM_DATA_ACCESS_PORT	00h
18h	R/W	-	-	-	DIS[4]	DIS[3]	DIS[2]	DIS[1]	DIS[0]	DISCHARGE_TIME	08h
16h	R/W	-	-	-	-	PDLY[3]	PDLY[2]	PDLY[1]	PDLY[0]	PEAK_PULSE_DELAY	05h
3Ah	R/W	-	-	-	PWR[4]	PWR[3]	PWR[2]	PWR[1]	PWR[0]	PEAK_PULSE_WIDTH_R	05h
3Bh	R/W	-	-	-	PWG[4]	PWG[3]	PWG[2]	PWG[1]	PWG[0]	PEAK_PULSE_WIDTH_G	05h
3Ch	R/W	-	-	-	PWB[4]	PWB[3]	PWB[2]	PWB[1]	PWB[0]	PEAK_PULSE_WIDTH_B	05h
3Dh	R/W	PCR[7]	PCR[6]	PCR[5]	PCR[4]	PCR[3]	PCR[2]	PCR[1]	PCR[0]	PRECHARGE_CURRENT_R	00h
3Eh	R/W	PCG[7]	PCG[6]	PCG[5]	PCG[4]	PCG[3]	PCG[2]	PCG[1]	PCG[0]	PRECHARGE_CURRENT_G	00h
3Fh	R/W	PCB[7]	PCB[6]	PCB[5]	PCB[4]	PCB[3]	PCB[2]	PCB[1]	PCB[0]	PRECHARGE_CURRENT_B	00h
40h	R/W	DCR[7]	DCR[6]	DCR[5]	DCR[4]	DCR[3]	DCR[2]	DCR[1]	DCR[0]	COLUMN_CURRENT_R	00h
41h	R/W	DCC[7]	DCC[6]	DCC[5]	DCC[4]	DCC[3]	DCC[2]	DCC[1]	DCC[0]	COLUMN_CURRENT_G	00h
42h	R/W	DCB[7]	DCB[6]	DCB[5]	DCB[4]	DCB[3]	DCB[2]	DCB[1]	DCB[0]	COLUMN_CURRENT_B	00h
48h	R/W	-	-	-	-	-	-	ROW[1]	ROW[0]	ROW_OVERLAP	00h
49h	R/W	-	-	-	-	SOFF[3]	SOFF[2]	SOFF[1]	SOFF[0]	SCAN_OFF_LEVEL	04h
17h	R/W	-	-	-	-	-	-	-	SC_ON	ROW_SCAN_ON/OFF	00h
13h	R/W	-	-	-	-	-	-	-	SCM[0]	ROW_SCAN_MODE	00h
D0h	R/W	SMON	-	-	SLON	-	-	-	-	SCREEN_SAVER_CONTROL	00h
D1h	R/W	STIM[7]	STIM[6]	STIM[5]	STIM[4]	STIM[3]	STIM[2]	STIM[1]	STIM[0]	SS_SLEEP_TIMER	00h
D2h	R/W	-	-	-	-	-	SM[2]	SM[1]	SM[0]	SCREEN_SAVER_MODE	00h
D3h	R/W	SSUT[7]	SSUT[6]	SSUT[5]	SSUT[4]	SSUT[3]	SSUT[2]	SSUT[1]	SSUT[0]	SS_UPDATE_TIMER	00h
E0h	R/W	-	-	RIM[1]	RIM[0]	-	-	-	EIM	RGB_IF	00h
E1h	R/W	VSOEN	VSOP	-	-	VSP	HSP	ENP	DOTP	RGB_POL	00h
E5h	R/W	SWAP	-	RC[1]	RC[0]	-	-	DC[1]	DC[0]	DISPLAY_MODE_CONTROL	00h

For the full command table descriptions, please download the following:
<http://www.newhavendisplay.com/appnotes/datasheets/OLEDs/SEPS114.pdf>

Timing Characteristics

Parallel (6800 mode):

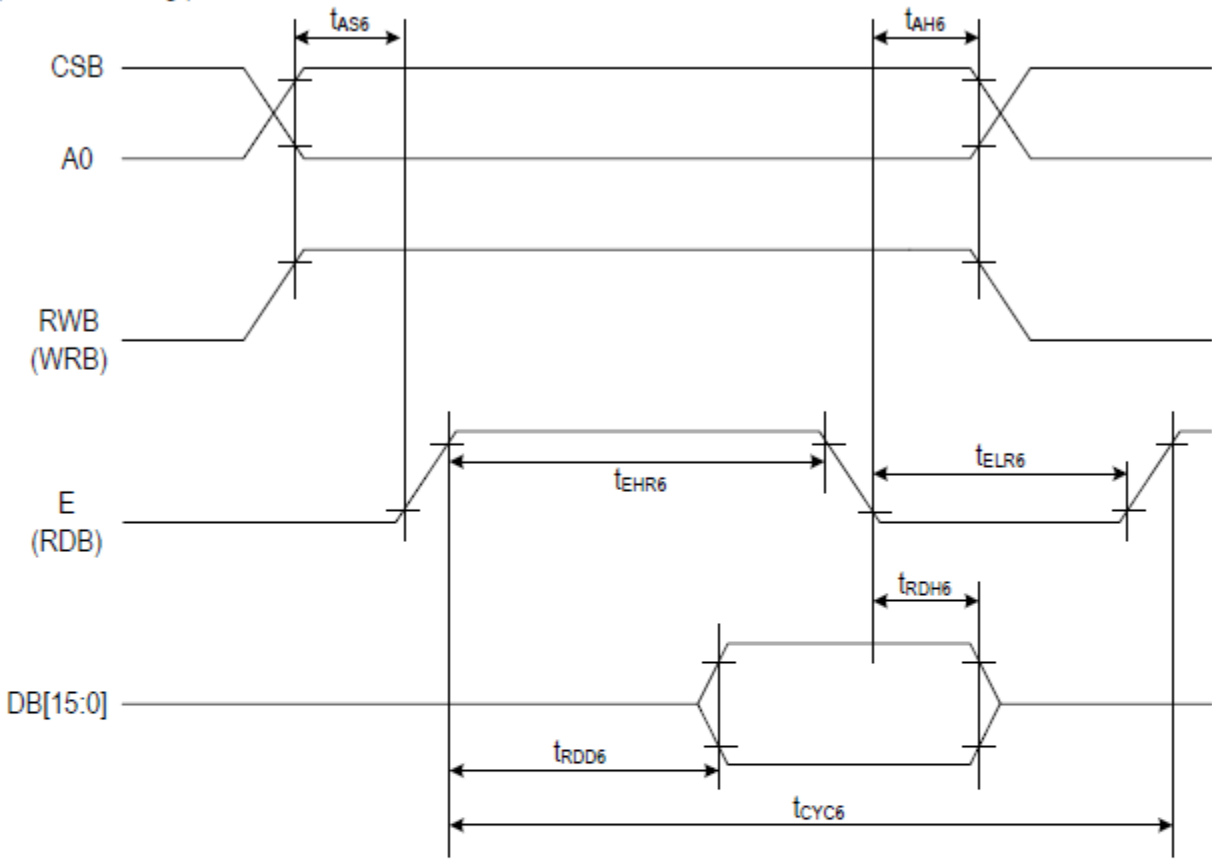


(VDD = 2.8V, Ta = 25°C)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	tAH6	-	5	-	ns	CSB
Address setup timing	tAS6	-	5	-	ns	A0
System cycle timing	tCYC6	-	100	-	ns	
Write "L" pulse width	tELW6	-	45	-	ns	E
Write "H" pulse width	tEHW6	-	45	-	ns	
Data setup timing	tDS6	-	40	-	ns	DB[15:0]
Data hold timing	tDH6	-	10	-	ns	

Notice) All the timing reference is 10% and 90% of VDDIO.

(Read Timing)

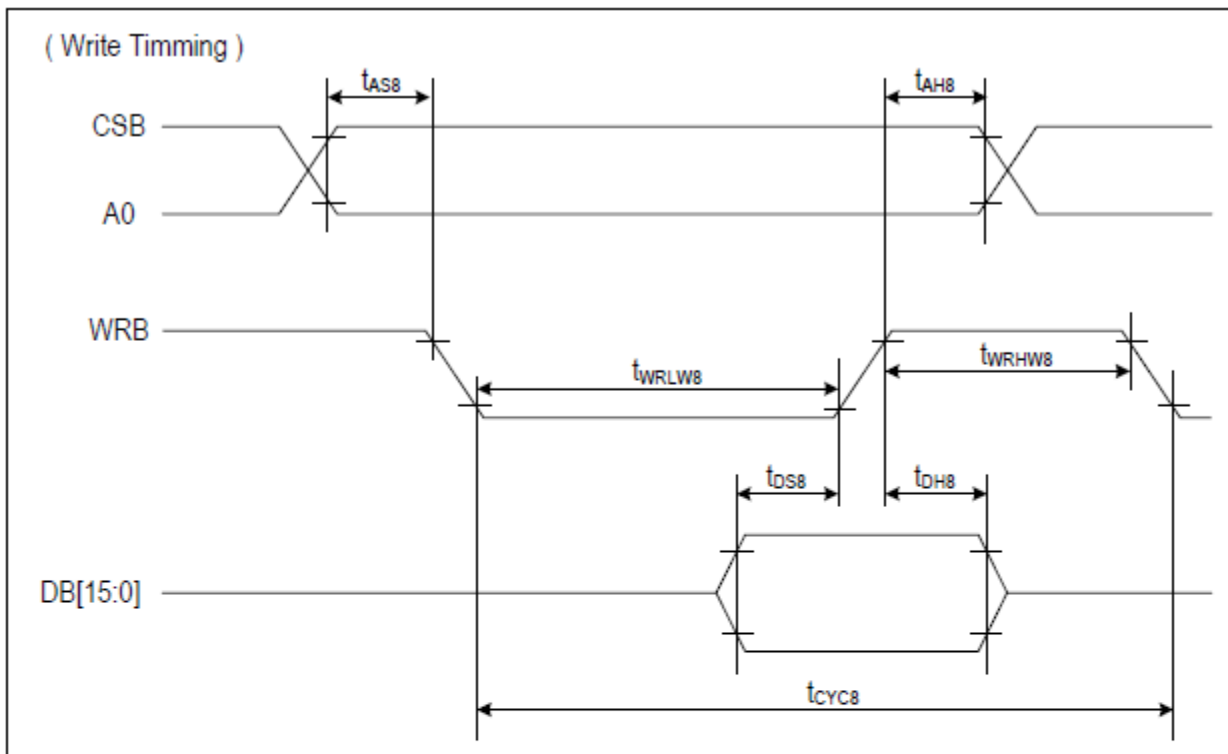


(VDD = 2.8V, Ta = 25°C)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	t_{AH6}	-	10	-	ns	CSB
Address setup timing	t_{AS6}	-	10	-	ns	A0
System cycle timing	t_{CYC6}	-	200	-	ns	
Read "L" pulse width	t_{ELR6}	-	90	-	ns	E
Read "H" pulse width	t_{EHR6}	-	90	-	ns	
Read data output delay time	t_{RDD6}	CL = 15 pF	0	70	ns	DB[15:0]
Data hold timing	t_{RDH6}				ns	

Notice) All the timing reference is 10% and 90% of VDDIO.

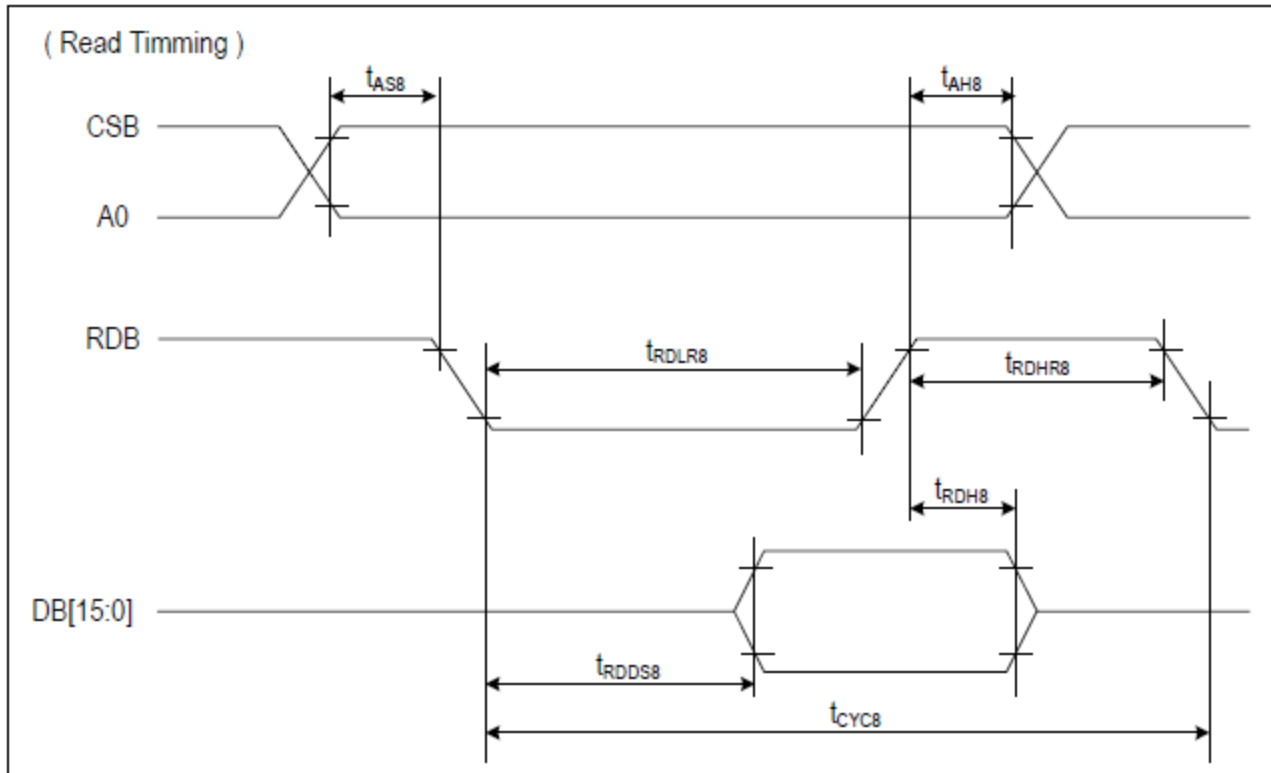
Parallel (8080 mode):



(VDD = 2.8V, Ta = 25°C)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	tAH8	-	5	-	ns	CSB
Address setup timing	tAS8	-	5	-	ns	A0
System cycle timing	tCYCS	-	100	-	ns	
Write "L" pulse width	tWRLW8	-	45	-	ns	WRB
Write "H" pulse width	tWRHW8	-	45	-	ns	WRB
Data setup timing	tDS8	-	30	-	ns	DB[15:0]
Data hold timing	tDH8	-	10	-	ns	DB[15:0]

notice) All the timing reference is 10% and 90% of VDDIO.

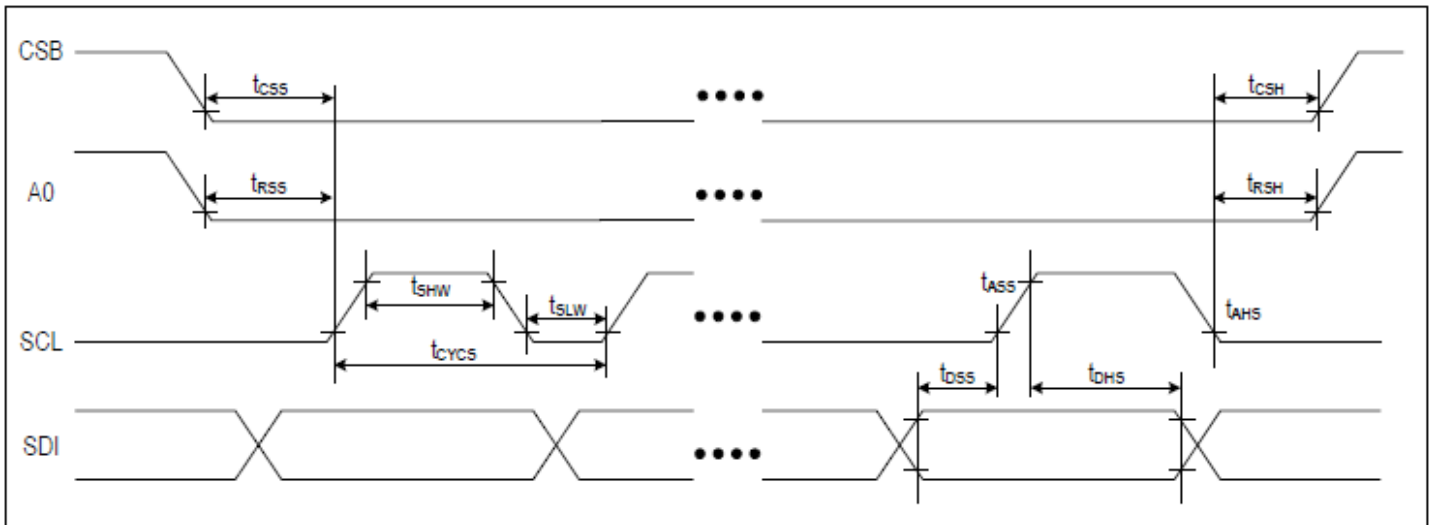


(VDD = 2.8V, Ta = 25°C)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing	t_{AH8}	-	5	-	ns	CSB
Address setup timing	t_{AS8}	-	5	-	ns	A0
System cycle timing	t_{cyc8}	-	200	-	ns	
Read "L" pulse width	t_{RDLS8}	-	90	-	ns	RDB
Read "H" pulse width	t_{RDHS8}	-	90	-	ns	
Read data output delay time	t_{RDS8}	CL = 15 pF	-	60	ns	DB[15:0]
Data hold timing	t_{RDHS}		0		ns	

Notice) All the timing reference is 10% and 90% of VDDIO.

4-wire SPI:



(VDD = 2.8V, Ta = 25°C)

ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Serial clock cycle	t_{CYCS}		200		ns	
SCL "H" pulse width	t_{SHW}	-	90	-	ns	SCL
SCL "L" pulse width	t_{SLW}	-	90	-	ns	
Data setup timing	t_{DSS}	-	25	-	ns	SDI
Data hold timing	t_{DHS}	-	25	-	ns	
CSB-SCL timing	t_{CSS}	-	25	-	ns	CSB
CSB-hold timing	t_{CSH}	-	25	-	ns	
RS-SCL timing	t_{RSS}	-	25	-	ns	RS
RS-hold timing	t_{RSH}	-	25	-	ns	

Notice) All the timing reference is 10% and 90% of VDDIO.

Example Initialization Sequence:

```
void OLED_Init_9696RGB(void)
{
  GPIO_ResetBits(RES_pin);
  delay_ms(10);
  GPIO_SetBits(RES_pin);
  delay_ms(10);

  oled_Command_9696RGB(0x01);    //Set SOFT_RESET
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x14);    //Set STANDBY_ON_OFF
  oled_Data_9696RGB(0x01);

  delay_ms(1);

  oled_Command_9696RGB(0x14);    //Set STANDBY_ON_OFF
  oled_Data_9696RGB(0x01);

  delay_ms(1);

  oled_Command_9696RGB(0x02);    //Set DISP_ON_OFF
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x0F);    //Set ANALOG_CONTROL
  oled_Data_9696RGB(0x40);

  oled_Command_9696RGB(0x1A);    //Set OSC_ADJUST
  oled_Data_9696RGB(0x40);

  oled_Command_9696RGB(0x30);    //Set DISPLAY_X1
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x31);    //Set DISPLAY_X2
  oled_Data_9696RGB(0x5F);

  oled_Command_9696RGB(0x32);    //Set DISPLAY_Y1
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x33);    //Set DISPLAY_Y2
  oled_Data_9696RGB(0x5F);

  oled_Command_9696RGB(0xE0);    //Set RGB_IF
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0xE1);    //Set RGB_POL
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0xE5);    //Set DISPLAY_MODE_CONTROL
  oled_Data_9696RGB(0x80);

  oled_Command_9696RGB(0x0D);    //Set CPU_IF
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x1D);    //Set MEMORY_WRITE/READ
  oled_Data_9696RGB(0x00);

  oled_Command_9696RGB(0x09);    //Set ROW_SCAN_DIRECTION
  oled_Data_9696RGB(0x00);
```

```

oled_Command_9696RGB(0x13); //Set ROW_SCAN_MODE
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x40); //Set COLUMN_CURRENT_R
oled_Data_9696RGB(0x6E);

oled_Command_9696RGB(0x41); //Set COLUMN_CURRENT_G
oled_Data_9696RGB(0x4F);

oled_Command_9696RGB(0x42); //Set COLUMN_CURRENT_B
oled_Data_9696RGB(0x77);

oled_Command_9696RGB(0x48); //Set ROW_OVERLAP
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x18); //Set DISCHARGE_TIME
oled_Data_9696RGB(0x01);

oled_Command_9696RGB(0x16); //Set PEAK_PULSE_DELAY
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x3A); //Set PEAK_PULSE_WIDTH_R
oled_Data_9696RGB(0x02);

oled_Command_9696RGB(0x3B); //Set PEAK_PULSE_WIDTH_G
oled_Data_9696RGB(0x02);

oled_Command_9696RGB(0x3C); //Set PEAK_PULSE_WIDTH_B
oled_Data_9696RGB(0x02);

oled_Command_9696RGB(0x3D); //Set PRECHARGE_CURRENT_R
oled_Data_9696RGB(0x14);

oled_Command_9696RGB(0x3E); //Set PRECHARGE_CURRENT_G
oled_Data_9696RGB(0x50);

oled_Command_9696RGB(0x3F); //Set PRECHARGE_CURRENT_B
oled_Data_9696RGB(0x19);

oled_Command_9696RGB(0x17); //Set ROW_SCAN_ON/OFF
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x49); //Set SCAN_OFF_LEVEL
oled_Data_9696RGB(0x04);

oled_Clear_Screen(); //Clear Display

oled_Command_9696RGB(0x38); //Set DISPLAYSTART_X
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x39); //Set DISPLAYSTART_Y
oled_Data_9696RGB(0x00);

oled_Command_9696RGB(0x02); //Set DISP_ON_OFF
oled_Data_9696RGB(0x01);

delay_ms(100);

oled_Command_160128RGB(0x08); //Enable write to display RAM
}

```

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
Thermal Shock resistance	Test the endurance of the display by applying electric stress (voltage & current) during a cycle of low and high temperatures.	-40°C, 30 min -> 25°C, 5 min -> 70°C, 30 min = 1 cycle 100 Cycles	
Vibration test	Test the endurance of the display by applying vibration to simulate transportation and use.	10-22Hz , 15mm amplitude. 22-500Hz, 1.5G 30min in each of 3 directions X,Y,Z	3
Atmospheric Pressure test	Test the endurance of the display by applying atmospheric pressure to simulate transportation by air.	115mbar, 40hrs	3
Static electricity test	Test the endurance of the display by applying electric static discharge.	V _s =800V, R _s =1.5kΩ, C _s =100pF One time	

Note 1: No condensation to be observed.

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

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

Evaluation Criteria:

- 1: Display is fully functional during operational tests and after all tests, at room temperature.
- 2: No observable defects.
- 3: Luminance >50% of initial value.
- 4: Current consumption within 50% of initial value

Precautions for using OLEDs/LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information

See Terms & Conditions at http://www.newhavendisplay.com/index.php?main_page=terms