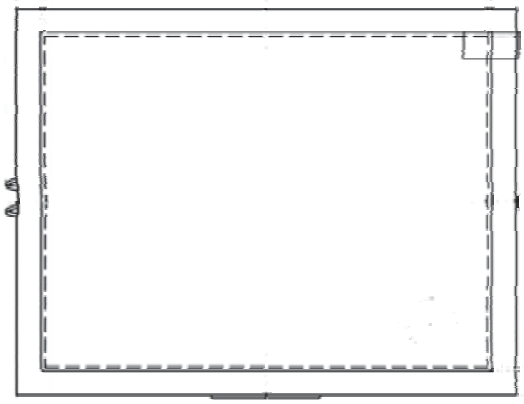
HANTRONIX

PRODUCT SPECIFICATION

HDA800S-A

8”, TFT SVGA (800X600) COLOR LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-A	SHEET 1 OF 17 DATE: 4/14/10

Features

8 inch Amorphous-TFT-LCD (Thin Film Transistor Liquid Crystal Display) module. This module is composed of a 8" TFT-LCD panel, LED backlight, LED driver unit and power circuit unit.

(1) Construction: 8" a-Si TFT active matrix, White LED Backlight.
(2) Resolution (pixel): 800(R.G.B) X600
(3) Number of the Colors : 262K colors (R , G , B 6 bit digital each)
(4) LCD type : Transmissive , normally White
(5) Interface: RGB interface 40 pin
(6) Power Supply Voltage: 3.3V for logic voltage, 5.0V for LED driver power voltage.
(7) Viewing Direction: 6 O'clock (The direction it's hard to be discolored)

PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	8 inch (Diagonal)	
Resolution	800 x 3(RGB) x 600	dot
Dot pitch	0.0675(W) x 0.2025(H)	mm
Active area	162.0(W) x 121.5(H)	mm
Module size	183.0(W) x 141.0(H) x 10.1(D)	mm
Surface treatment	Anti-Glare	
Color arrangement	RGB-stripe	
interface	Digital	
Weight	264 (typ.)	g

ABSOLUTE MAX. RATINGS

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VCC	-0.3	4.6	V	
	VLED	-0.3	6.0		
Input signal voltage	Vi	-0.3	VCC+0.3	V	Note 1
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	

Note 1: The product is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.
Signals include : DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

ELECTRICAL CHARACTERISTICS

4-1 Typical Operation Conditions

Item		Symbol	Values			Unit	Remark
			MIN	TYP	MAX		
Power Voltage		V_{CC}	3.0	3.3	3.6	V	Note 1,2
Power Consumption		I_{CC}	--	123	--	mA	Note 1,2 VCC=3.3V
LED Driver Power Voltage		V_{LED}	4.5	5.0	5.5	V	
LED Driver Current Consumption		I_{LED}	--	410	--	mA	VLED=5V VADJ=3.3V (duty 100%)
Logic Input Voltage	Input Voltage	V_{IN}	0	-	V_{CC}	V	
	Logic input high voltage	V_{TH}	$0.8V_{CC}$	-	V_{CC}	V	Note 3
	Logic input low voltage	V_{TL}	GND	-	$0.2V_{CC}$	V	Note 3

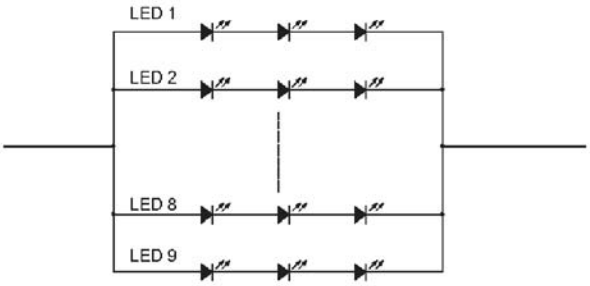
Note 1: Value for Power Board combined panel.
Note 2: VCC setting should match the signals output voltage (refer to Note 3) of customer's system board.
Note 3: DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

Backlight Driving Conditions

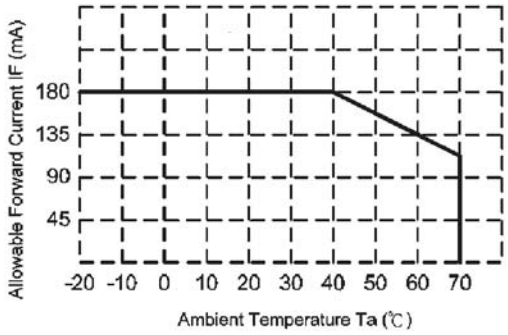
Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
LED voltage	VL	9.3	9.9	10.5	V	Note 1
LED current	IL	162	180	198	mA	Note 1
LED life time	--	20,000	--	--	Hr	Note 2

Note 1 : The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL=180mA.

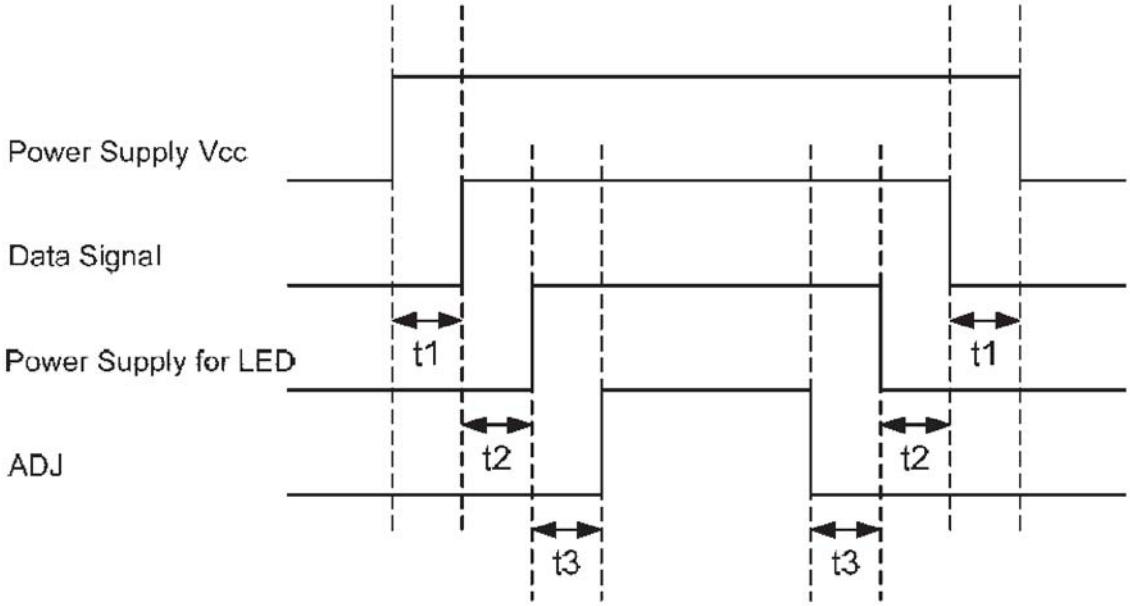
Note 2 : The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL=180mA. The LED lifetime could be decreased if operating IL is larger than 180mA.



Note 3 : When LCM is operated over 40℃ ambient temperature, the ILED should be follow :



Power Sequence



t1 > 50 mSec
t2 ≥ 200 mSec
t3 ≥ 50 mSec

Note : Data Signal includes DCLK, DE, HS, VS, R0~R5, G0~G5, B0~B5.

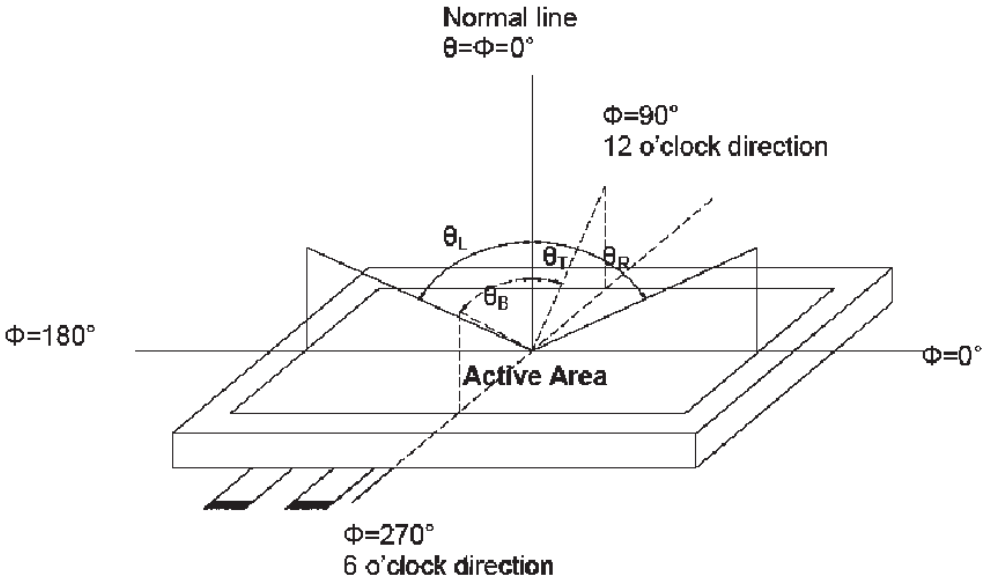
Optical Specifications

Item	Symbol	Condition	Values			Unit	Note
			Min.	Typ.	Max.		
Viewing angle (CR≧10)	θL	Φ = 180° (9 o'clock)	60	70	--	degree	Note1
	θR	Φ = 0° (3 o'clock)	60	70	--		
	θT	Φ = 90° (12 o'clock)	40	50	--		
	θB	Φ = 270° (6 o'clock)	60	70	--		
Response time	TON	Normal θ=Φ=0°	--	10	20	msec	Note3
	TOFF		--	15	30	msec	
Contrast ratio	CR		400	500	--	--	Note4
Color chromaticity	WX		0.26	0.31	0.36	--	Note5 Note6
	WY		0.28	0.33	0.38	--	
Luminance	L		200	250	--	cd/m²	Note6
Luminance uniformity	YU		70	75	--	%	Note7

Test Conditions :

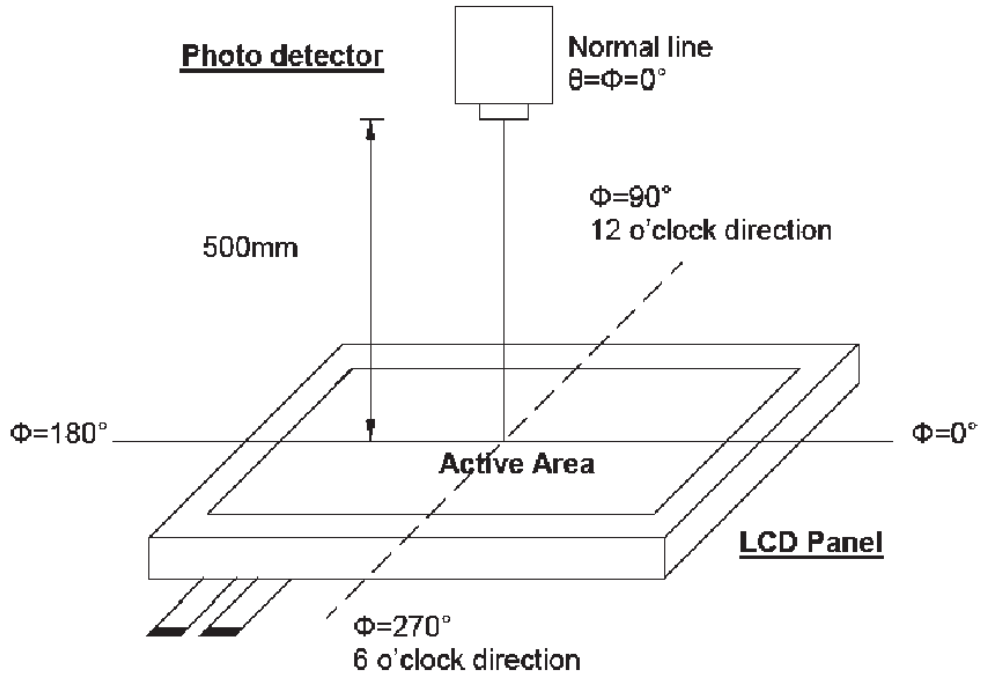
1. VCC = 3.3V, IL = 180mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1 : Definition of viewing angle range



Note 2 : Definition of optical measurement system.

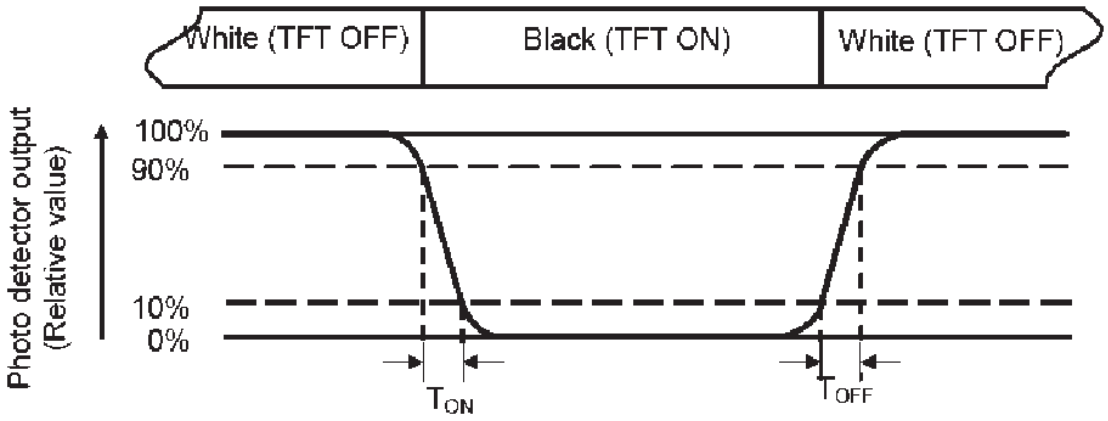
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view : 1° / Height : 500mm.)



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-A	SHEET 7 OF 17 DATE: 4/14/10

Note 3 : Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 4 : Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5 : Definition of color chromaticity (CIE1931)

Color coordinated measured at center point of LCD.

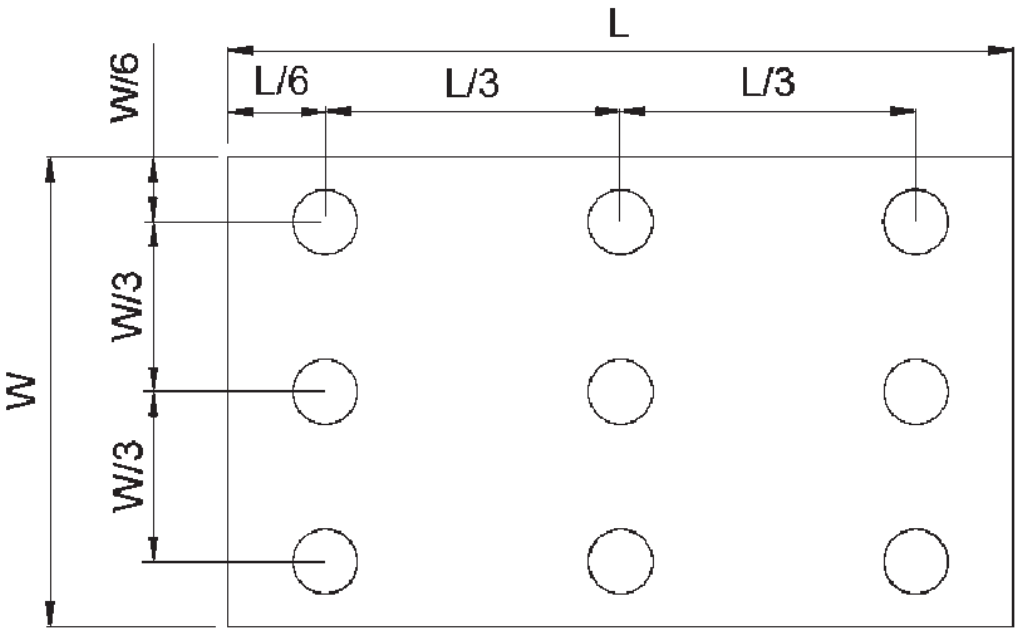
Note 6 : All input terminals LCD panel must be ground when measuring the center area of the panel.

Note 7 : Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L ----- Active area length W ----- Active area width



B_{max} : The measured maximum luminance of all measurement position.

B_{min} : The measured minimum luminance of all measurement position.

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-A	SHEET 9 OF 17 DATE: 4/14/10

INTERFACE

TFT LCD Panel Driving Section

Pin No.	Symbol	I/O	Description	Note
1	VLED	P	Voltage for LED circuit (5.0V)	
2	VLED	P	Voltage for LED circuit (5.0V)	
3	ADJ	I	Adjust the LED brightness	(1)
4	GLED	P	Ground for LED circuit	
5	GLED	P	Ground for LED circuit	
6	VCC	P	Power supply for digital circuit (3.3V)	
7	VCC	P	Power supply for digital circuit (3.3V)	
8	MODE	I	DE or SYNC mode control	(2)
9	DE	I	Data enable	
10	VSYNC	I	VSYNC signal input	
11	HSYNC	I	HSYNC signal input	
12	GND	P	Power ground	
13	B5	I	Blue data input (MSB)	
14	B4	I	Blue data input	
15	B3	I	Blue data input	
16	GND	P	Power ground	
17	B2	I	Blue data input	
18	B1	I	Blue data input	
19	B0	I	Blue data input (LSB)	
20	GND	P	Power ground	
21	G5	I	Green data input (MSB)	
22	G4	I	Green data input	
23	G3	I	Green data input	
24	GND	P	Power ground	
25	G2	I	Green data input	

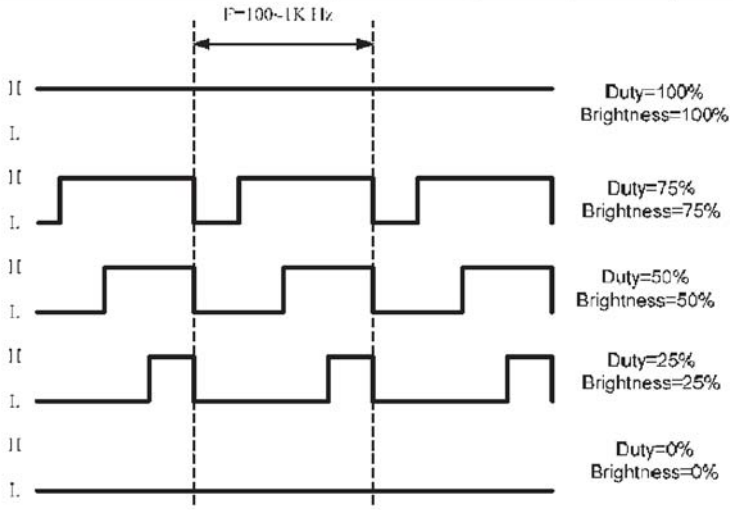
26	G1	I	Green data input	
27	G0	I	Green data input (LSB)	
28	GND	P	Power ground	
29	R5	I	Red data input (MSB)	
30	R4	I	Red data input	
31	R3	I	Red data input	
32	GND	P	Power ground	
33	R2	I	Red data input	
34	R1	I	Red data input	
35	R0	I	Red data input (LSB)	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	L/R	I	Select left to right scanning direction	(3)
40	U/D	I	Select up or down scanning direction	(3)

I : input, O : output, P : power

NOTE :

(1) Pin3: ADJ is PWM signal input. It is for brightness control.

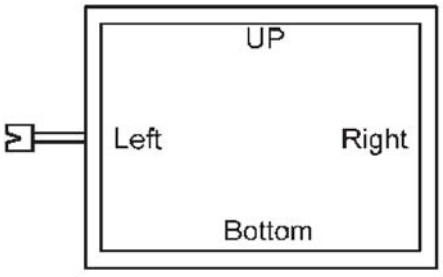
ITEM	SYMBOL	MIN	TYP	MAX	UNIT
ADJ signal frequency	f_{PWM}	100	--	1K	Hz
ADJ signal logic level High	VIH	2V	--	VLED (5.0V)	V
ADJ signal logic level Low	VIL	0	--	0.5	V



(2) DE Mode, Mode="H",HSYNC floating and VSYNC floating
HV Mode, Mode="L" and DE floating

(3) Selection of scanning mode

Setting of scan control input		Scanning direction
U/D	R/L	
GND	VCC	Up to Down, Left to Right
VCC	GND	Down to Up, Right to Left
GND	GND	Up to Down, Right to Left
VCC	VCC	Down to Up, Left to Right



INPUT SIGNAL :

AC Electrical Characteristics

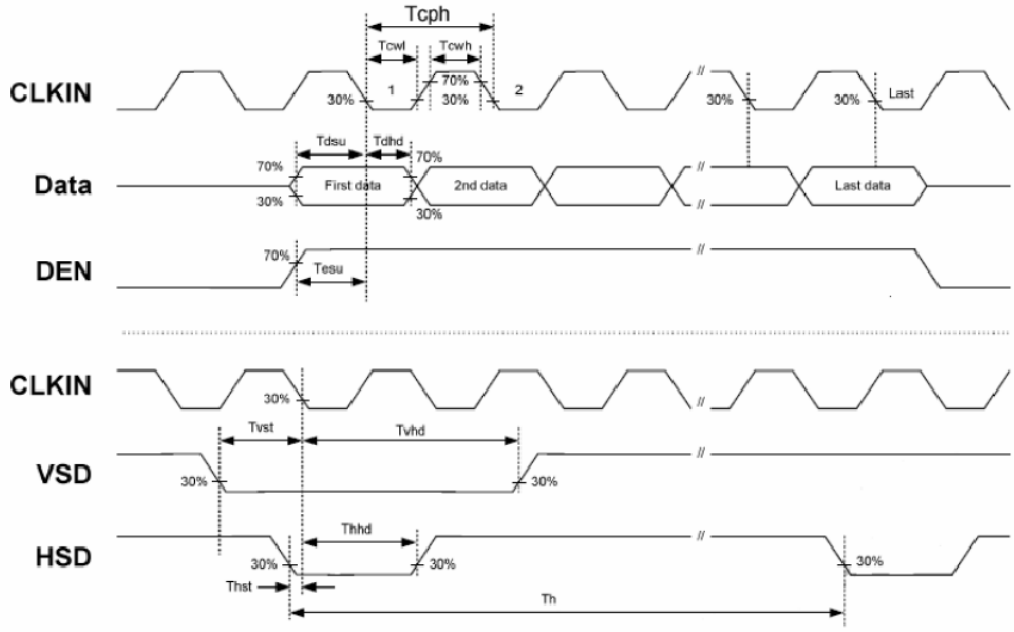
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	Ns	
HS hold time	T_{hhd}	8	-	-	Ns	
VS setup time	T_{vst}	8	-	-	Ns	
VS hold time	T_{vhd}	8	-	-	Ns	
Data setup time	T_{dsu}	8	-	-	Ns	
Data hole time	T_{dhd}	8	-	-	Ns	
DE setup time	T_{esu}	8	-	-	Ns	
DE hole time	T_{ehd}	8	-	-	Ns	
VDD Power On Slew rate	T_{POR}	-	-	20	ms	
RSTB pulse width	T_{Rst}	10	-	-	us	
CLKIN cycle time	T_{cph}	20	-	-	Ns	
CLKIN pulse duty	T_{cwh}	40	50	60	%	
Output stable time	T_{sst}	-	-	6	us	

Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	-	40	50	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	-	40	DCLK	
HS Back Porch(Blanking)	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	600	-	TH	
VS period time	tv	624	635	700	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Back Porch(Blanking)	tvb	23	23	23	TH	
VS Front Porch	tvfp	1	12	77	TH	

Input Clock and Data Timing Diagram



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-A	SHEET 14 OF 17 DATE: 4/14/10

RELIABILITY TEST CONDITIONS

(Note 3)

Item	Test Conditions	Note
High Temperature Storage	Ta = 80℃ 240 hrs	Note 1,4
Low Temperature Storage	Ta = -30℃ 240 hrs	Note 1,4
High Temperature Operation	Ts = 70℃ 240 hrs	Note 2,4
Low Temperature Operation	Ta = -20℃ 240 hrs	Note1,4
Operate at High Temperature and Humidity	+40℃, 90%RH 240 hrs	
Thermal Shock	-30℃ /30 min ~ +80℃ /30 min for a total 100 cycles, Start with cold temperature and end with high temperature	
Vibration Test	Frequency range : 10 ~ 55Hz Stroke : 1.5mm Sweep : 10Hz ~ 55Hz ~ 10Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Mechanical Shock	100G 6ms, ±X, ±Y, ±Z 3 times for each direction	
Package Vibration Test	Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500Hz 2 hours for each direction of X. Y. Z. (6 hours for total)	
Package Drop Test	Height : 60 cm 1 comer, 3 edges, 6 surfaces	
Electro Static Discharge	±2KV, Human Body Mode, 100pF/1500Ω	

Note 1 : Ta is the ambient temperature of samples.

Note 2 : Ts is the temperature of panel's surface.

Note 3 : In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4 : Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Display Quality

1. Function Related :

The function defects of line defect, abnormal display, and no display are considered Major defects.

2. Bright / Dark Dots :

Defect Type	Specification	Major	Minor
Bright Dots	N <= 5		●

Note : The definition of dot : The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

Bright dot : Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

Dark dot : Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue pattern.

3. Pixel Definition :

R	G	B	R	G	B	R	G	B			Dot Defect
R	G	B	R	G	B	R	G	B			Adjacent Dot Defect
R	G	B	R	G	B	R	G	B			Cluster

Note 1: If pixel or partial sub-pixel defects exceed 50% of the affected pixel or sub-pixel area, it shall be considered as 1 defect.

Note 2: Extraneous substance and scratch not affecting the display of image, for instance, extraneous substance under polarizer film but outside the display area, or scratch on metal bezel and backlight module or polarizer film outside the display area, shall not be considered as defective or non-conforming.

Note:
1. Unless indicated, Tolerance Grade "B" is adopted.
2. UV Glue For OLB Protection.
3. CN1:BHSR-02VS-1
4. CN2:P0.5 50Pin Connector:Hirose "FH12A-50S-0.5H" or Equivalent
5. CN4:P0.5 40Pin Connector:STARCONN 089H40 or Equivalent

A Block

1	VLED	21	G5	1	VLED	21	G5
2	VLED	22	G4	2	VLED	22	G4
3	ADJ	23	G3	3	ADJ	23	G3
4	GLED	24	GND	4	GLED	24	GND
5	GLED	25	G2	5	GLED	25	G2
6	VCC	26	G1	6	VCC	26	G1
7	VCC	27	G0	7	VCC	27	G0
8	MODE	28	GND	8	MODE	28	GND
9	DE	29	R5	9	DE	29	R5
10	VS	30	R4	10	VS	30	R4
11	HS	31	R3	11	HS	31	R3
12	GND	32	GND	12	GND	32	GND
13	B5	33	R2	13	B5	33	R2
14	B4	34	R1	14	B4	34	R1
15	B3	35	R0	15	B3	35	R0
16	GND	36	GND	16	GND	36	GND
17	B2	37	DCLK	17	B2	37	DCLK
18	B1	38	GND	18	B1	38	GND
19	B0	39	L/R	19	B0	39	L/R
20	GND	40	U/D	20	GND	40	U/D

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA800S-A	SHEET 17 OF 17 DATE: 4/14/10