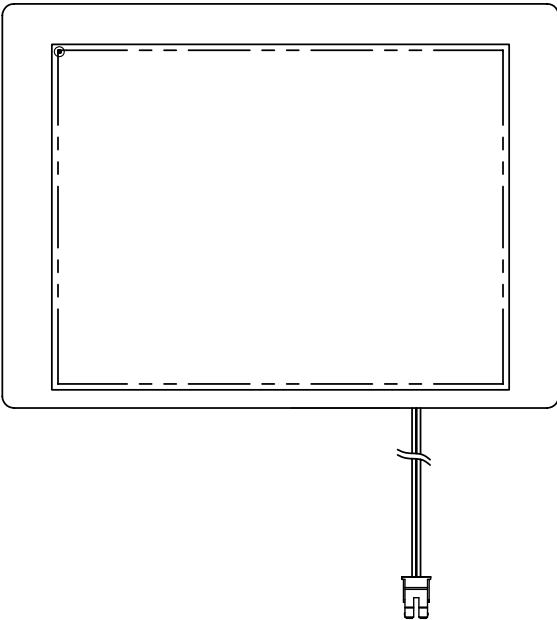




PRODUCT SPECIFICATION

**HDA570S-VH**

QVGA , TFT COLOR GRAPHICS  
LCD DISPLAY MODULE  
HIGH BRIGHTNESS VERSION



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV:	HDA570S-VH	SHEET 1 OF 15
	ZW	2.0		DATE: 8/7/08

## Application

This specification is applied to the 5.7 inch QVGA supported TFT-LCD module, and can display true 262,144 colors(6 bit/ color). The module is designed for OA, Car TV application and other electronic products which require flat panel display of digital signal interface. This module is composed of a 5.7" TFT-LCD panel, a driver circuit and LED backlight unit.

## Features

- QVGA (320×240 pixels) resolution.
- Digital 18 bit parallel RGB.
- Line inversion mode with stripe type.
- SYNC mode is supported for digital RGB input data format.

## 6. General Specifications

Item	Specifications	Unit
Screen Size	5.7 (Diagonal)	inch
Display Format	320RGB(H)×240(V)	dot
Active Area	115.2(H)×86.4(V)	mm
Dot Size	0.120(H)×0.360(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Anti-Glare and Hard Coating(3H)	-
Viewing Direction	12 O'clock (The Gray Inversion will appear at this direction)	-
Outline Dimension	144.0(W)×104.6(H)×13.0(D)	mm
Weight	(153)	g

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570S-VH	SHEET 2 OF 15
	Z.W.	2.0		DATE: 8/7/08

**Absolute Maximum Ratings**  
**Absolute Ratings of Environment**

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T <sub>ST</sub>	-30	+80	°C	(1)
Operating Ambient Temperature	T <sub>OP</sub>	-20	+70	°C	(1)

Note (1) Temperature and relative humidity range are shown in the figure below.

- (a) 90%RH Max. (Ta ≤ 40°C).
- (b) Wet-bulb temperature should be 39°C Max. (Ta > 40°C).
- (c) No condensation.

**Electrical Absolute Ratings**

**TFT-LCD Module**

(Ta=25±2°C, GND=V<sub>SS</sub>=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	V <sub>CC</sub>	-0.3	4.3	V	-

**Backlight Unit**

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Current of Backlight Unit	I <sub>B</sub>	-	250	mA	(1)
Reverse Voltage	V <sub>B</sub>	-	15	V	(1)

Note (1) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded.

**Electrical Characteristics**  
**TFT-LCD Module**

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	-
Power Supply Current	I <sub>CC</sub>	-	(50)	70	mA	(1)
Input High Threshold Voltage	V <sub>IH</sub>	0.7V <sub>CC</sub>	-	V <sub>CC</sub>	V	-
Input Low Threshold Voltage	V <sub>IL</sub>	0	-	0.3V <sub>CC</sub>	V	-
Power Consumption	P <sub>L</sub>		(0.165)	0.231	W	(1)
Frame Frequency	F <sub>V</sub>	-	60	-	Hz	-
Dot Clock	CLK	-	6.4	7	MHz	-

Note (1) The specified power consumption is under the conditions at V<sub>CC</sub>=3.3V, F<sub>V</sub>=60Hz, whereas a power dissipation check pattern below is displayed.

Black Pattern / 0 Gray



Active Area

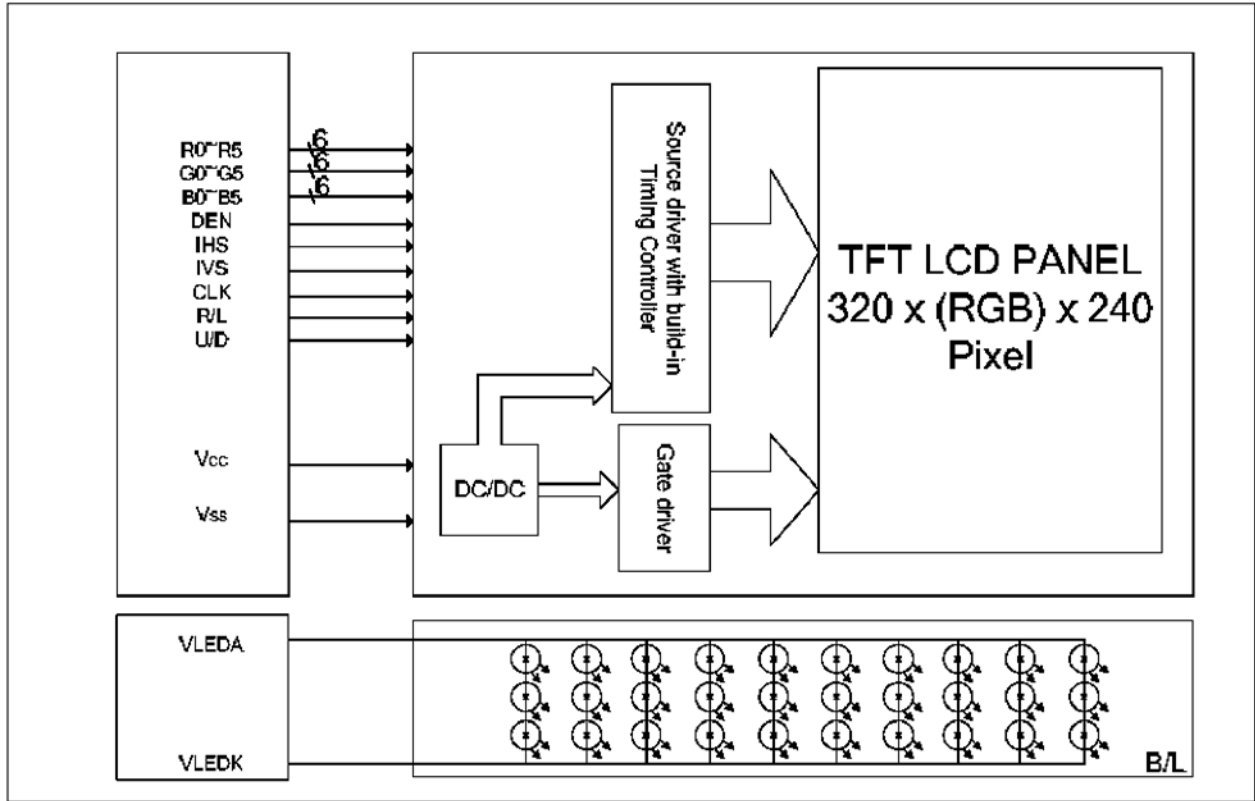
**Backlight Unit**

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current of Backlight Unit	I <sub>B</sub>	-	200	-	mA	-
Voltage of Backlight Unit	V <sub>B</sub>	-	10	-	V	I <sub>B</sub> = 200mA
Power Consumption	P <sub>BL</sub>	-	2	-	W	I <sub>B</sub> = 200mA
LED Life Time(25°C)	-	40000	-	-	hr	(1)

Note (1) : LED life time is defined as under 25±2°C , when the average brightness decrease to 50% of original brightness

# Block Diagram



## Input / Output Terminals Pin Assignment TFT-LCD Module

Connector: CVILUX CF25331D0R0-05

Pin No.	Symbol	I/O	Description
1	V <sub>SS</sub>	I	Ground
2	CLK	I	Clock signal
3	IHS	I	Horizontal synchronous signal
4	IVS	I	Vertical synchronous signal
5	V <sub>SS</sub>	I	Ground
6	R0	I	RED data (LSB)
7	R1	I	RED data
8	R2	I	RED data
9	R3	I	RED data
10	R4	I	RED data
11	R5	I	RED data(MSB)
12	V <sub>SS</sub>	I	Ground
13	G0	I	GREEN data(LSB)
14	G1	I	GREEN data
15	G2	I	GREEN data
16	G3	I	GREEN data
17	G4	I	GREEN data
18	G5	I	GREEN data(MSB)
19	V <sub>SS</sub>	I	Ground
20	B0	I	Blue data(LSB)
21	B1	I	Blue data
22	B2	I	Blue data
23	B3	I	Blue data
24	B4	I	Blue data
25	B5	I	Blue data(MSB)
26	V <sub>SS</sub>	I	Ground
27	DEN	I	Input data enable control
28	V <sub>CC</sub>	I	+3.3V power supply
29	V <sub>CC</sub>	I	+3.3V power supply
30	R/L	I	Right-and-Left scan setting. ("L" : Normally , "H" : Right-and-Left reversal) .Note(1)

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	<b>HDA570S-VH</b>	SHEET 6 OF 15
	Z.W.	2.0		DATE: 8/7/08

Pin No.	Symbol	I/O	Description
31	U/D	I	Up/down scan setting. ("H": normal scan. "L": Up-and-Down reversal.) Note(1)
32	NC	I	No connection
33	V <sub>SS</sub>	I	Ground

Note (1)



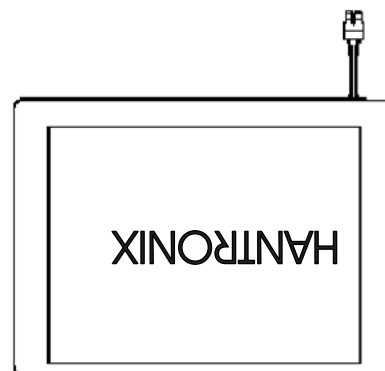
R/L=L,U/D=H



R/L=H,U/D=H



R/L=L,U/D=L



R/L=H,U/D=L

## Backlight Unit

Connector: JST BHSR-02VS-1

Pin No.	Symbol	I/O	Description	Wire Color
1	VLEDA	I	Backlight LED Anode.	Red
2	VLEDC	I	Backlight LED Cathode.	Black

## Color Data Input Assignment

The brightness of each primary color (red, green and blue) is based on the 6 bit gray scale data input for the color. The higher the binary input, the brighter the color. The table provides the assignment of color versus data input.

Color		Data Signal																	
		Red						Green				Blue							
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of RED	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(61)	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	

HANTRONIX, INC.  
10080 BUBB RD.  
CUPERTINO, CA 95014

Q.A.:  
Z.W.

REV.:  
2.0

HDA570S-VH

SHEET 8 OF 15

DATE: 8/7/08



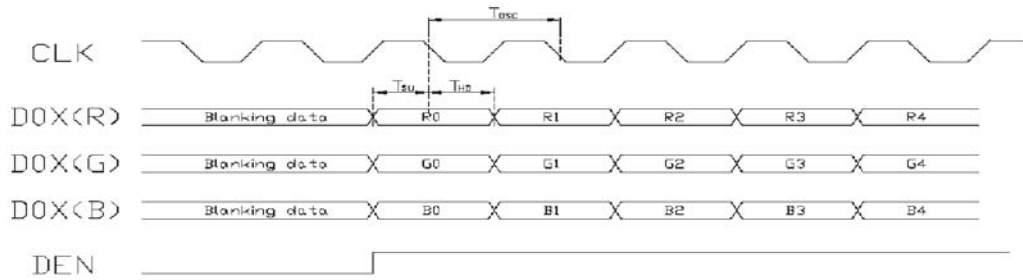
## Interface Timing Input Signal Characteristics

PARAMETER		Symbol	Min.	Typ.	Max.	Unit
CLK period		$T_{OSC}$	-	156	-	ns
Data setup time		$T_{SU}$	12	-	-	ns
Data hold time		$T_{HD}$	12	-	-	ns
IHS period		$T_H$	-	408	-	$T_{OSC}$
IHS pulse width		$T_{HS}$	5	30	-	$T_{OSC}$
IHS setup time		$T_{CI}$	12	-	-	ns
IHS hold time		$T_{CI}$	12	-	-	ns
IVS pulse width		$T_{VS}$	1	3	5	$T_H$
IVS setup time		$T_{VI}$	12	-	-	ns
IVS hold time		$T_{VI}$	12	-	-	$\mu$ S
IVS-DEN time	NTSC	$T_{VSE}$	-	18	-	$T_H$
	PAL	$T_{VSE}$	-	26	-	$T_H$
IHS-DEN time		$T_{HE}$	36	68	88	$T_{OSC}$
DEN pulse width		$T_{EP}$	-	320	-	$T_{OSC}$
DEN-STH time		$T_{DES}$	-	1	-	$T_{OSC}$
IVS period	NTSC	-	-	262.5	-	$T_H$
	PAL	-	-	312.5	-	$T_H$

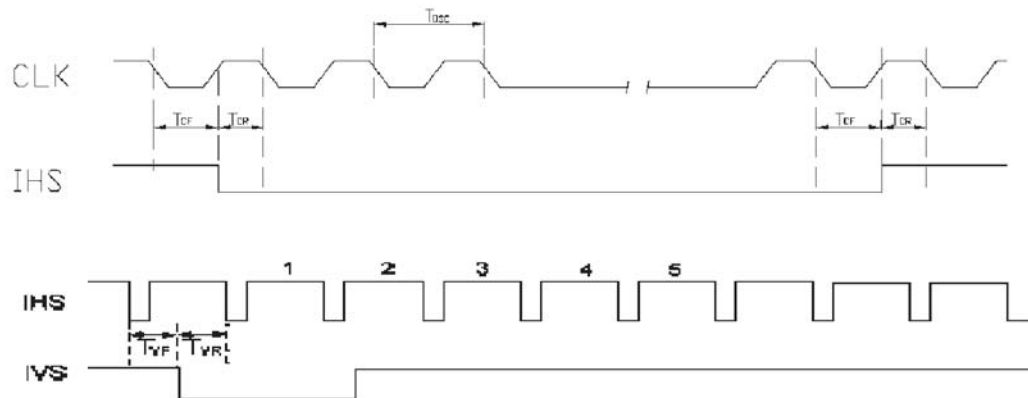
Note: When SYNC mode is used, 1st data start from 68th CLK after IHS falling.

## Waveform

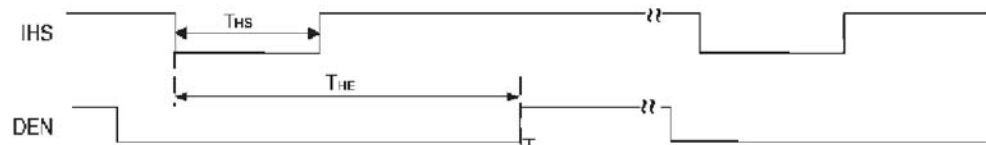
### Clock and Data Waveform



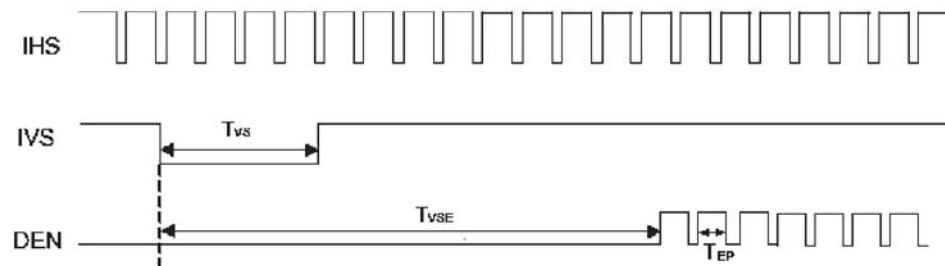
### Clock and Sync waveforms



### IHS and horizontal control timing waveforms



### IHS and vertical control timing waveforms



## Optical Characteristics

The optical characteristics should be measured in a dark environment ( $\leq 1$  lux) or equivalent state with the methods shown in Note (4).

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	300	(450)	-	-	(2)
Response Time		$T_R$		-	15	-	ms	(3)
		$T_F$		-	35	-	ms	
Luminance(Center)		Y		650	(700)	-	cd/m <sup>2</sup>	(4)
Brightness uniformity		BUNI		75	(80)	-	%	(5)
Color Chromaticity	Red	Rx		(0.578)	(0.628)	(0.678)	-	(1),(4)
		Ry		(0.291)	(0.341)	(0.391)	-	
	Green	Gx		(0.265)	(0.315)	(0.365)	-	
		Gy		(0.530)	(0.580)	(0.630)	-	
	Blue	Bx		(0.087)	(0.137)	(0.187)	-	
		By	(0.065)	(0.115)	(0.165)	-		
	White	Wx	(0.270)	(0.320)	(0.370)	-		
		Wy	(0.316)	(0.366)	(0.416)	-		
Viewing Angle	Horizontal	$\theta_{x+}$	CR $\geq$ 10	55	(60)	-	deg.	
		$\theta_{x-}$		55	(60)	-		
	Vertical	$\theta_{y+}$		55	(60)	-		
		$\theta_{y-}$		45	(50)	-		

HANTRONIX, INC.  
10080 BUBB RD.  
CUPERTINO, CA 95014

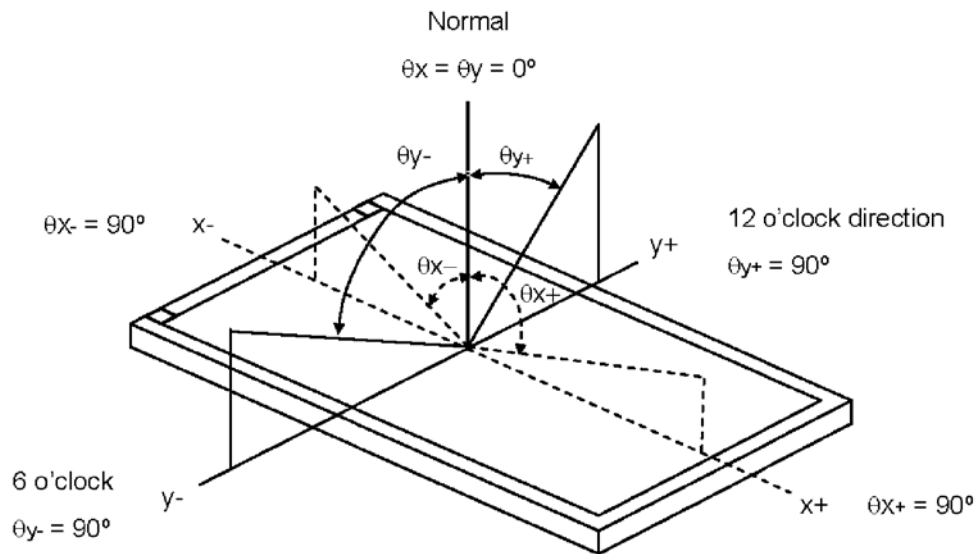
Q.A.:  
Z.W.

REV.:  
2.0

HDA570S-VH

SHEET 11 OF 15  
DATE: 8/7/08

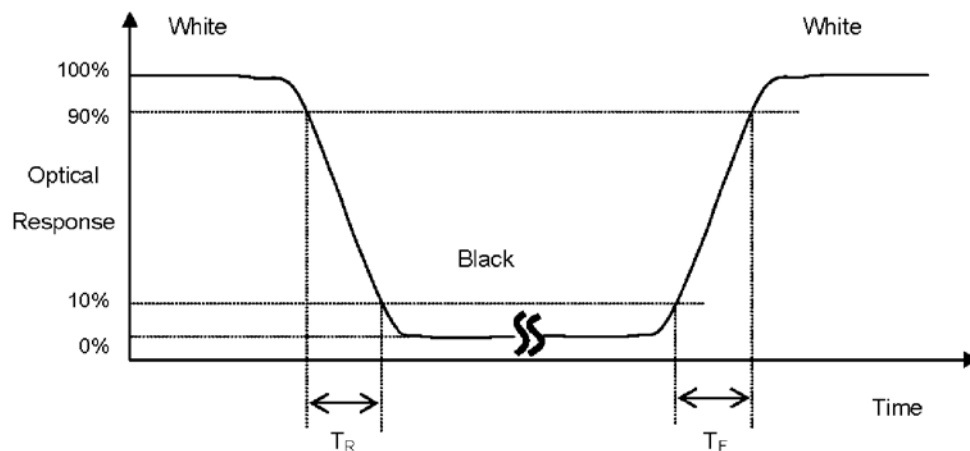
Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



Note (2) Definition of Contrast Ratio (CR):

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

Note (3) Definition of Response Time ( $T_R, T_F$ ):



HANTRONIX, INC.  
10080 BUBB RD.  
CUPERTINO, CA 95014

Q.A.:  
Z.W.

REV.:  
2.0

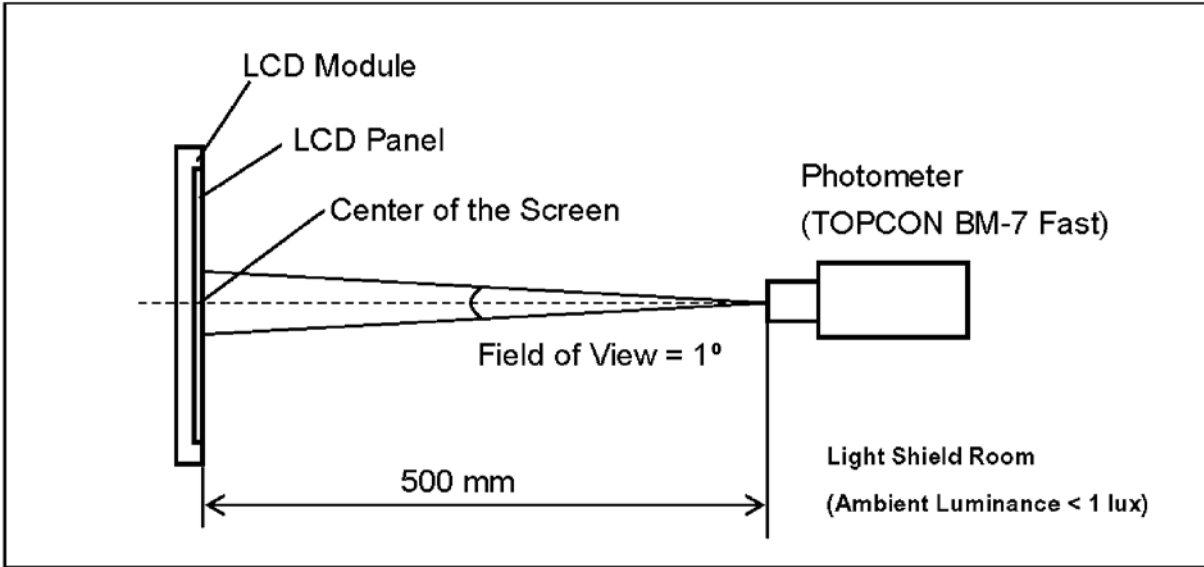
HDA570S-VH

SHEET 12 OF 15

DATE: 8/7/08

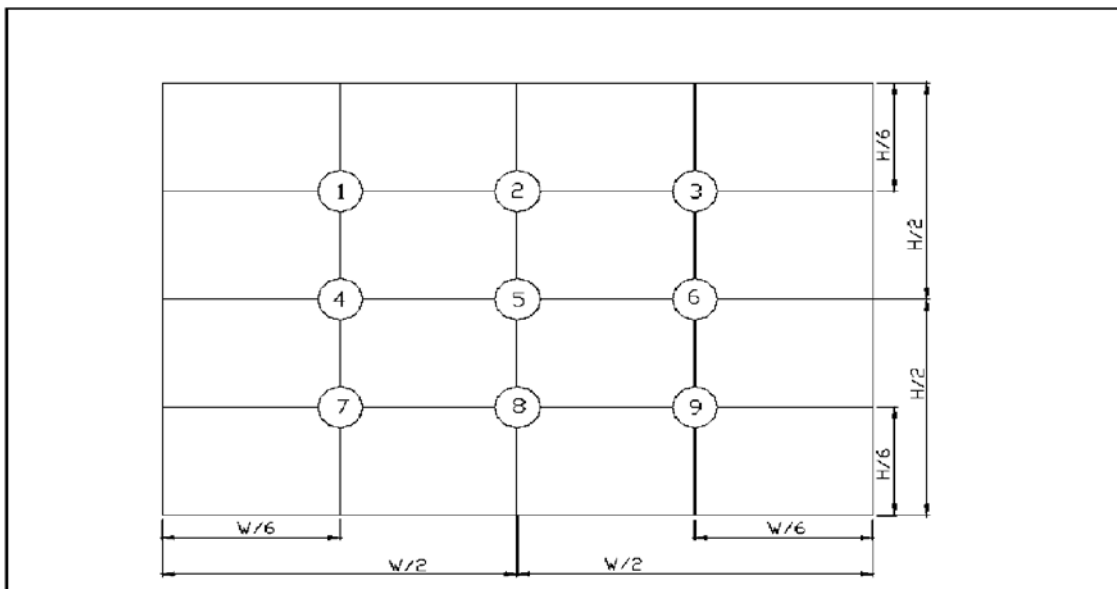
**Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.



**Note (5) Definition of brightness uniformity**

$$\text{Brightness uniformity} = (\text{Min Luminance of 9 points}) / (\text{Max Luminance of 9 points}) \times 100\%$$

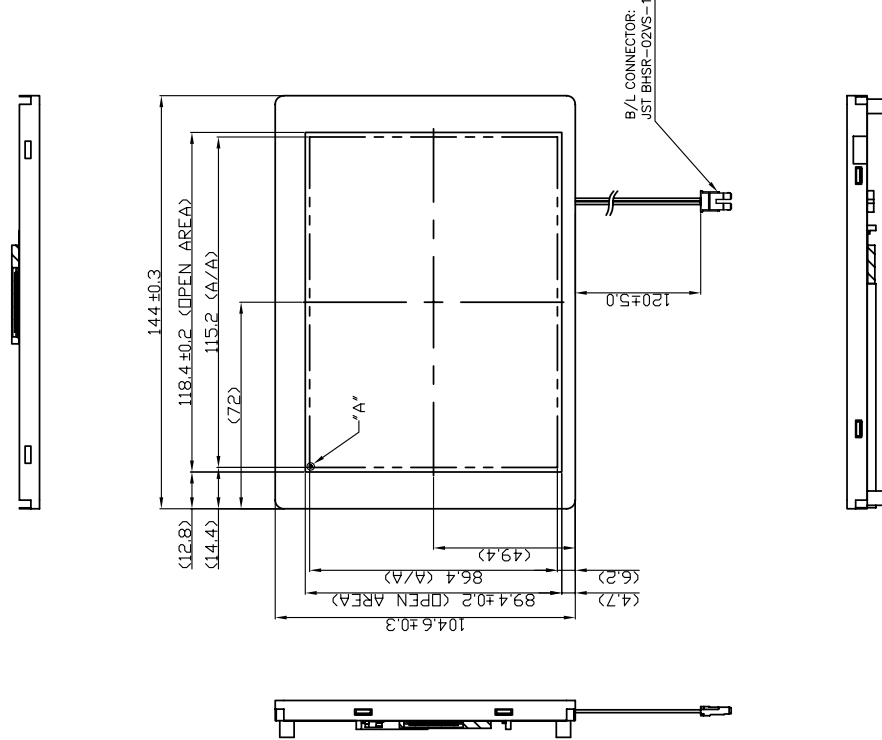
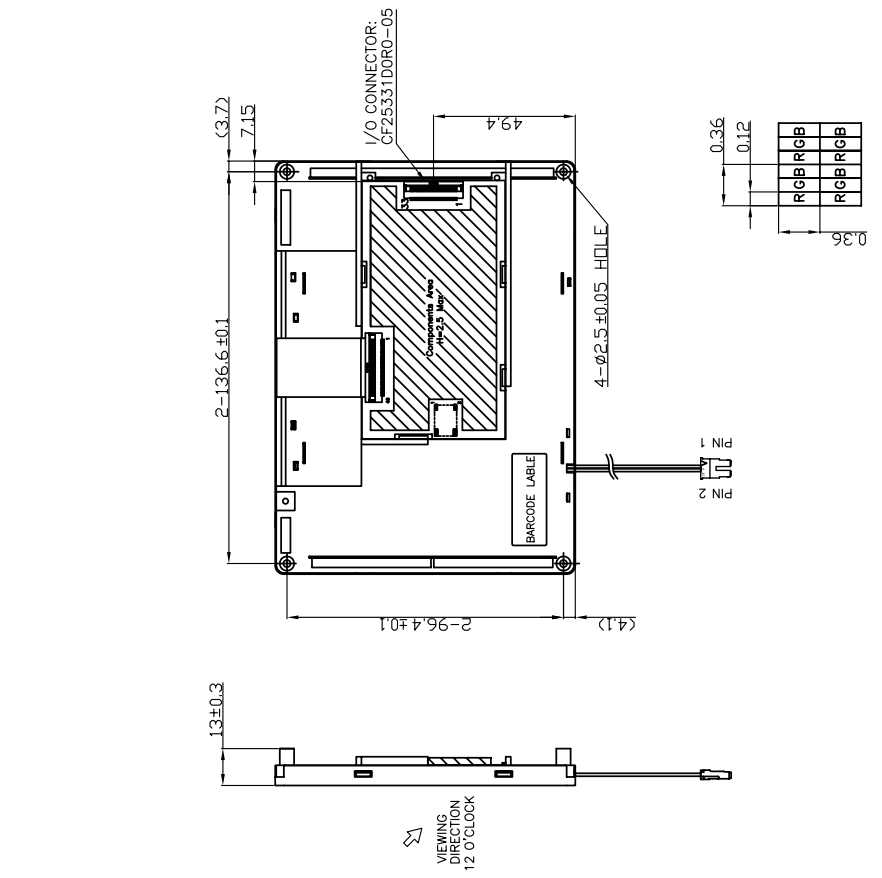


HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570S-VH	SHEET 13 OF 15
	Z.W.	2.0		DATE: 8/7/08

## Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T <sub>a</sub> = 80°C 240 hours	-
2	Low Temperature Storage Test	T <sub>a</sub> = -30°C 240 hours	-
3	High Temperature Operation Test	T <sub>a</sub> = 70°C 240 hours	-
4	Low Temperature Operation Test	T <sub>a</sub> = -20°C 240 hours	-
5	High Temperature and High Humidity Operation Test	T <sub>a</sub> =60°C 90%RH 240 hours	-
6	Electro Static Discharge Test (non-operating)	-Panel Surface/Top Case : 150pF, 330Ω Air: ±15kV, Contact: ±8kV	-
7	Mechanical Shock Test (non-operating)	Half sine wave, 80G, 11ms 3 times shock of each six surfaces	-
8	Vibration Test (non-operating)	Sine wave, 10 ~ 55 ~ 10Hz, 3 axis, 2 hours/axis	-
9	Thermal Shock Test (non-operating)	-20°C (30min) ~ 70°C (30min), 100 cycles	-
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	-

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	<b>HDA570S-VH</b>	SHEET 14 OF 15
	Z.W.	2.0		DATE: 8/7/08



HANTRONIX, INC.  
10080 BUBB RD.  
CUPERTINO, CA 95014

Q.A.:  
Z.W.

REV.:  
2.0

HDA570S-VH

SHEET 15 OF 15  
DATE: 8/7/08