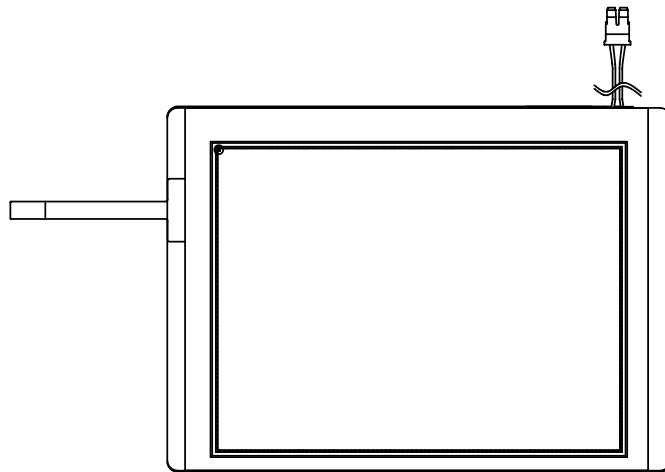




PRODUCT SPECIFICATION

HDA570VT-V

VGA , TFT COLOR GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV:	HDA570VT-V	SHEET 1 OF 16
	ZW	1.0		DATE: 3/16/07

4. Application

This specification is applied to the 5.7 inch VGA 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 and used as the input devices for general electric appliances via both finger and pen-entry.

5. Features

- VGA (640×480 pixels) resolution.
- Digital 18 bit parallel RGB.
- Dot inversion mode with stripe type.
- Transparent Touch panel
 - 4-Wire
 - Analog Resistive

6. General Specifications

Item	Specifications	Unit
Screen Size	5.7 (Diagonal)	inch
Display Format	640RGB(H)×480(V)	dot
Active Area	115.2(H)×86.4(V)	mm
Dot Size	0.060(H)×0.180(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Hard Coat + Anti-Glare + Wide View film	-
Viewing Direction	6 O'clock	-
Outline Dimension	144.0(W)×104.6(H)×13.7(D)	mm
Weight	(TBD)	g

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 2 OF 16
	Z.W.	1.0		DATE: 3/16/07

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-30	+80	°C	(1)
Operating Ambient Temperature	T _{OP}	-20	+70	°C	(1)

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

(a) 90%RH Max. (T_a = 40°C).

(b) Wet-bulb temperature should be 39°C Max. (T_a > 40°C).

(c) No condensation.

7.2 Electrical Absolute Ratings

7.2.1 TFT-LCD Module

(T_a = 25 ± 2°C, GND = VSS = 0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VCC	-0.3	4.3	V	-

7.2.2 Backlight Unit

(T_a = 25 ± 2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Current of Backlight Unit	I _B	-	1.75	mA	(1)
Voltage of Backlight Unit	V _B	-	15	V	(1)

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

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 3 OF 16
	Z.W.	1.0		DATE: 3/16/07

8. Electrical Characteristics

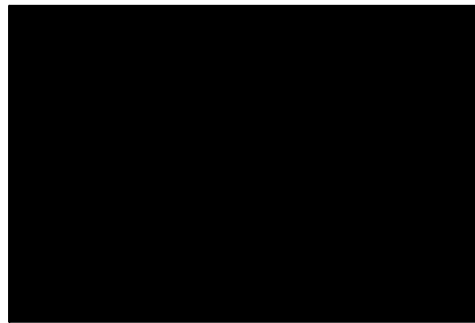
8.1 TFT-LCD Module

(Ta=25 ± 2 °C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	VCC	3.0	3.3	3.6	V	-
Input High Threshold Voltage	VIH	0.7VCC	-	VCC	V	-
Input Low Threshold Voltage	VIL	0	-	0.3VCC	V	-
Power Consumption	P _L	(TBD)		W	(1)	
Frame Frequency	F _V	-	60	-	Hz	-
Dot Clock	DCLK	-	25.175	-	MHz	-

Note (1) The specified power consumption is under the conditions at VCC=3.3V, F_V=60Hz, whereas a power dissipation check pattern below is displayed.

Black Pattern / 0 Gray



Active Area

8.2 Backlight Unit

(Ta=25 ± 2 °C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current of Backlight Unit	I _B	-	140	-	mA	-
Voltage of Backlight Unit	V _B	-	9.9	-	V	I _B =140mA
Power Consumption	P _{BL}	-	(1.39)	-	W	I _B =140mA
LED Life Time(25?)		40000	50000	-	hr	(1)

Note (1)? The data for LED is for your reference, because LED is consumable component.

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 4 OF 16
	Z.W.	1.0		DATE: 3/16/07

8.3 Transparent Touch panel

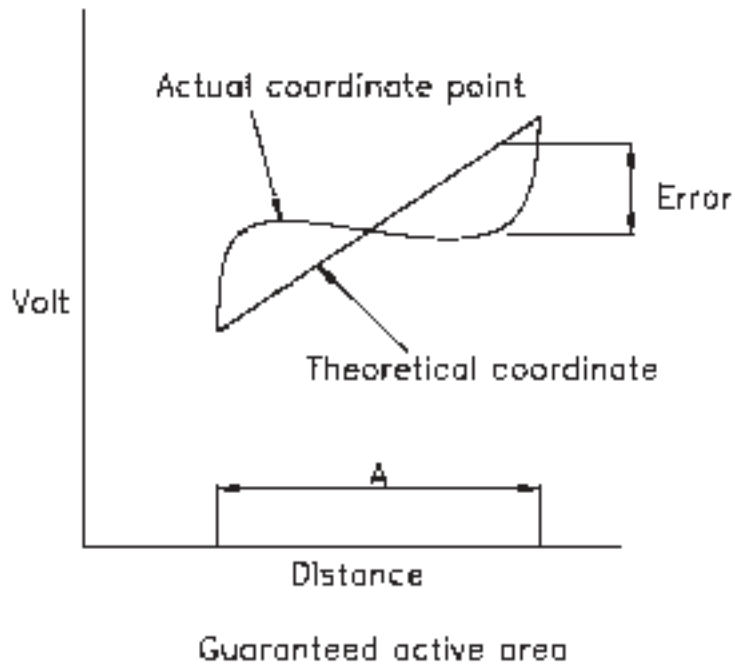
Electrical characteristics

Item		Value			Unit	Note
		Min.	Typ.	Max.		
Operating Voltage		-	5	7	V	-
Terminal Resistance	X-direction	300	-	900	Ohm	At connector
	Y-direction	200	-	600	Ohm	At connector
Insulation Resistance		10M				At DC25V
Chatting		20 ms Max				At connector
Linearity		1.5%				(1)

Note(1): Measurement condition of Linearity

Difference between actual voltage & Theoretical voltage is an error at any points.

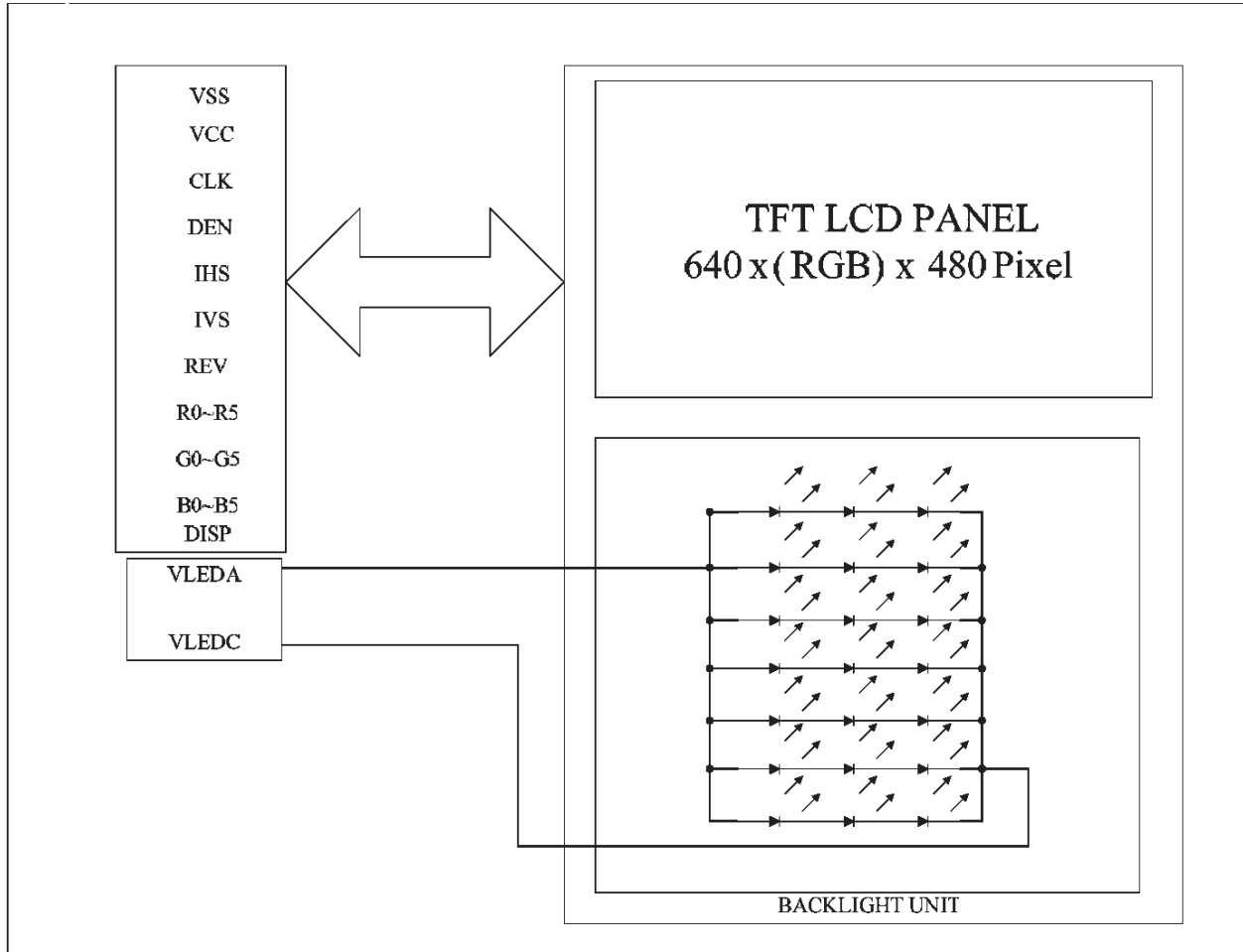
Linearity is the value max. Error voltage divided by voltage difference on active area.



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 5 OF 16
	Z.W.	1.0		DATE: 3/16/07

Block Diagram

TFT-LCD Module with Backlight Unit



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV:	HDA570VT-V	SHEET 6 OF 16
	Z.W.	1.0		DATE: 3/16/07

10. Input / Output Terminals Pin Assignment

10.1 TFT-LCD Module

Pin No.	Symbol	I/O	Description
1	VSS	I	Ground
2	CLK	I	Clock signal
3	IHS	I	Horizontal synchronous signal
4	IVS	I	Vertical synchronous signal
5	VSS	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	VSS	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	VSS	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	VSS	I	Ground
27	DEN	I	Input data enable control
28	VCC	I	+3.3V power supply
29	VCC	I	+3.3V power supply
30	REV	I	Selection signal for horizontal/ vertical scanning direction

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

Q.A.:
Z.W.

REV.:
1.0

HDA570VT-V

SHEET 7 OF 16

DATE:
3/16/07

Pin No.	Symbol	I/O	Description
31	VSS	I	Ground
32	DISP	I	ON/OFF control signal input
33	VSS	I	Ground

10.2 Backlight Unit

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

10.3 Transparent Touch Panel

Pin No.	Symbol
1	TOP
2	RIGHT
3	BOTTOM
4	LEFT

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 8 OF 16
	Z.W.	1.0		DATE: 3/16/07

10.4 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					
		D05	D04	D03	D02	D01	D00	D15	D14	D13	D12	D11	D10	D25	D24	D23	D22	D21	D20
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	0	1	0	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	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	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	0	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	0	1
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	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

11. Interface Timing

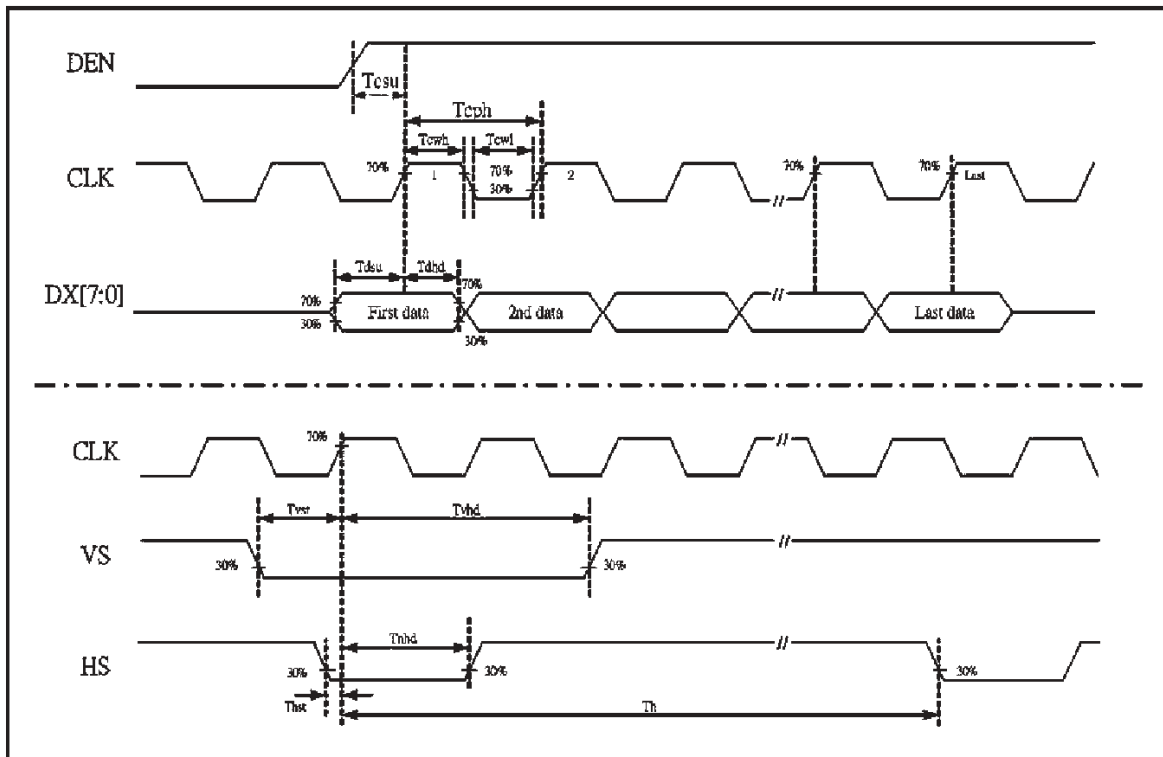
11.1 Input Signal Characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CPH}	-	25.175	-	MHz
CLK period	T_{CPH}	-	39.7	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	800	-	T_{CPH}
HS pulse width	T_{WH}	5	30	-	T_{CPH}
HS-DEN time	T_{HS}	112	144	175	T_{CPH}
DEN pulse width	T_{EP}	-	640	-	T_{CPH}
VS pulse width	T_{WV}	1	3	5	T_H
VS-DEN time	T_{STV}	-	35	-	T_H
VS period	T_V	-	525	-	T_H

Note: When SYNC mode is used, 1st data start from 144th CLK after HS falling (when $STHD[5:0]=00000$)

11.2 Waveform

11.2.1 Clock and Data input waveforms



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

Q.A.:
Z.W.

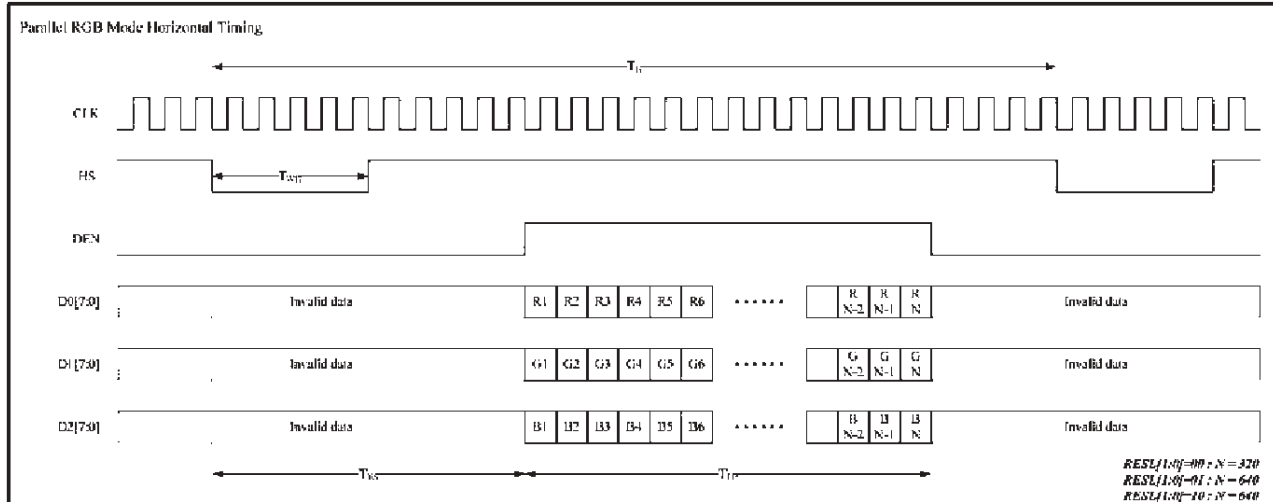
REV.:
1.0

HDA570VT-V

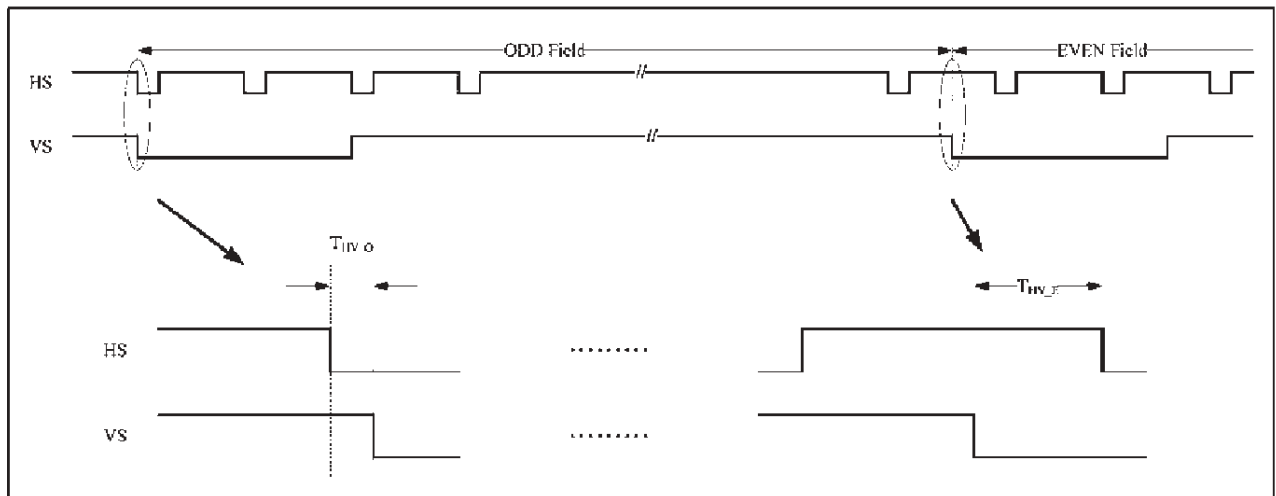
SHEET 10 OF 16

DATE: 3/16/07

11.2.2 Data input format for RGB Mode



11.2.3 The HS & VS timing of the ODD/EVEN field.



12. Optical Characteristics

The optical characteristics should be measured in a dark environment (≤ 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	(200)	(400)	-	-	(2)
Response Time		T_R		-	15	-	ms	(3)
		T_F		-	35	-	ms	
Luminance(Center)		Y		(250)	(300)	-	cd/m ²	(4)
Brightness uniformity		BUNI		80	(85)	-	%	(5)
Color Chromaticity	Red	R _x		(0.585)	(0.615)	(0.645)	-	(1),(4)
		R _y		(0.314)	(0.344)	(0.374)	-	
	Green	G _x		(0.277)	(0.307)	(0.337)	-	
		G _y		(0.532)	(0.562)	(0.592)	-	
	Blue	B _x		(0.103)	(0.133)	(0.163)	-	
		B _y	(0.120)	(0.150)	(0.180)	-		
	White	W _x	(0.279)	(0.309)	(0.339)	-		
		W _y	(0.320)	(0.350)	(0.380)	-		
Viewing Angle	Horizontal	θ_{x+}	(55)	(60)	-	deg.		
		θ_{x-}	(55)	(60)	-			
	Vertical	θ_{y+}	(35)	(50)	-			
		θ_{y-}	(45)	(55)	-			

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

Q.A.:
Z.W.

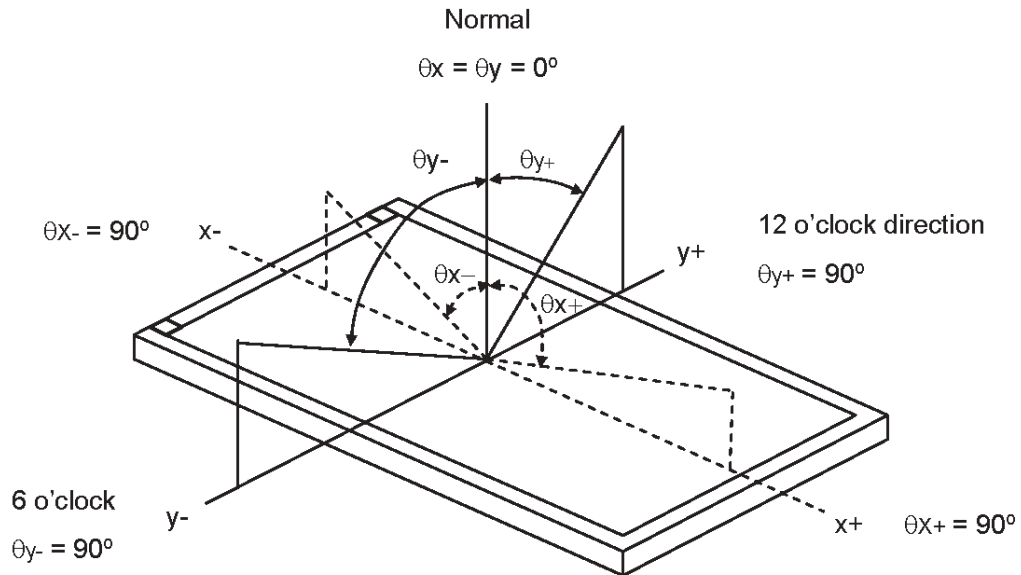
REV.:
1.0

HDA570VT-V

SHEET 12 OF 16

DATE:
3/16/07

Note (1) Definition of Viewing Angle (θ_x, θ_y):



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

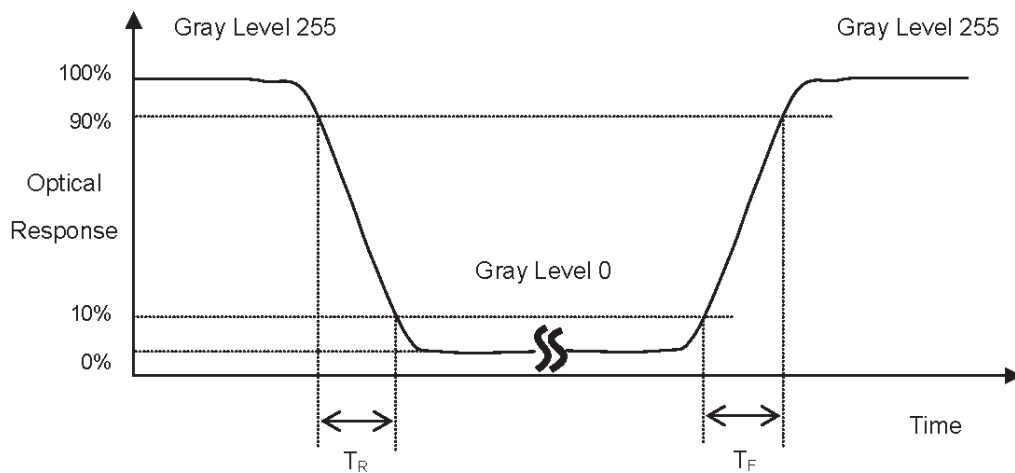
Measured at the center point of panel

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level 255

L 0: Luminance of gray level 0.

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



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

Q.A.:
 Z.W.

REV.:
 1.0

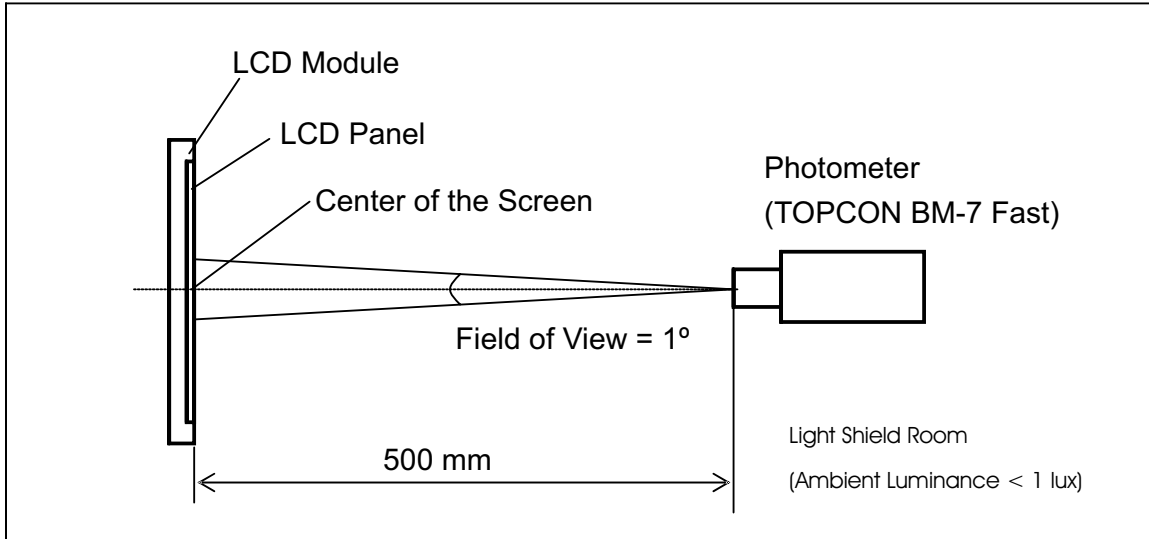
HDA570VT-V

SHEET 13 OF 16

DATE:
 3/16/07

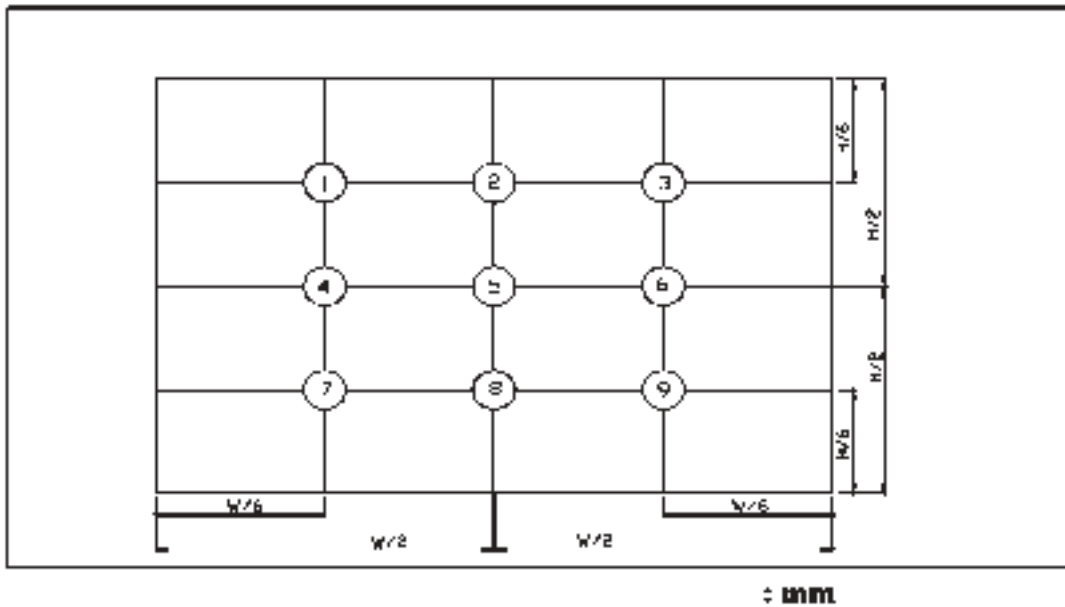
Note (4) Measurement Set-Up:

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

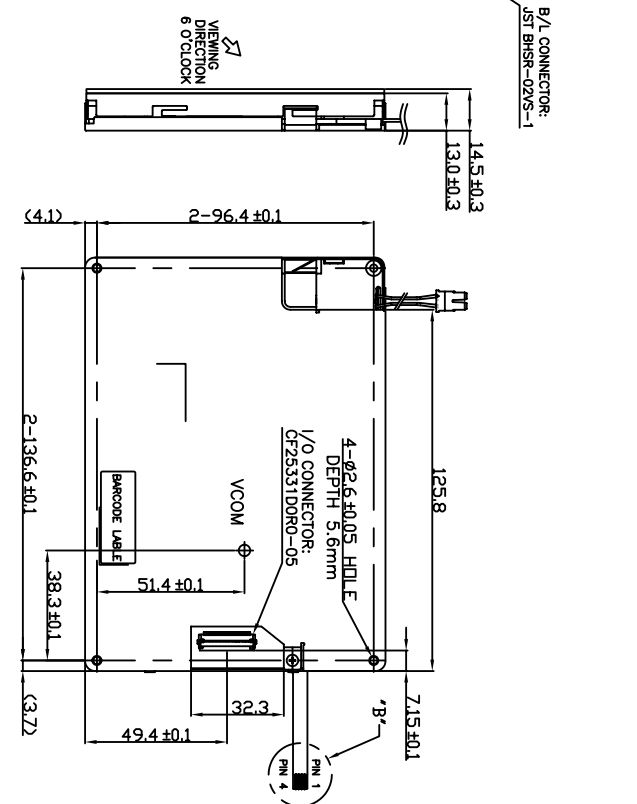
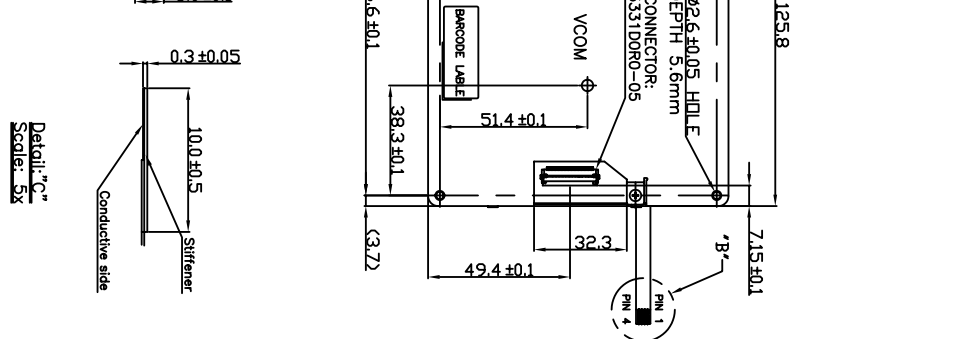
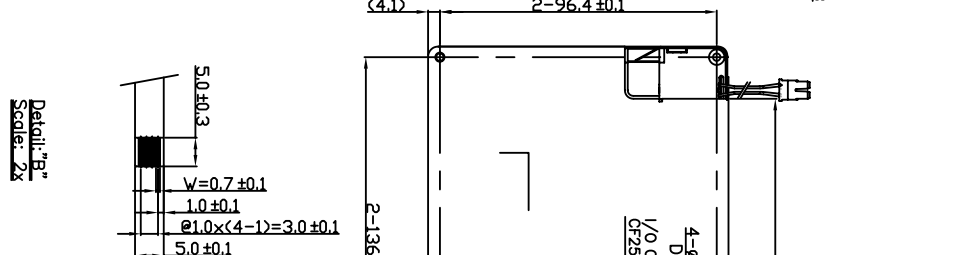
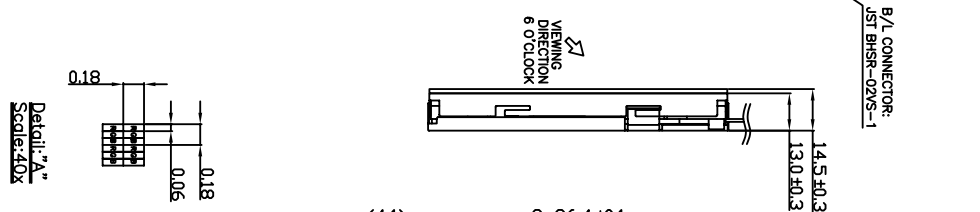
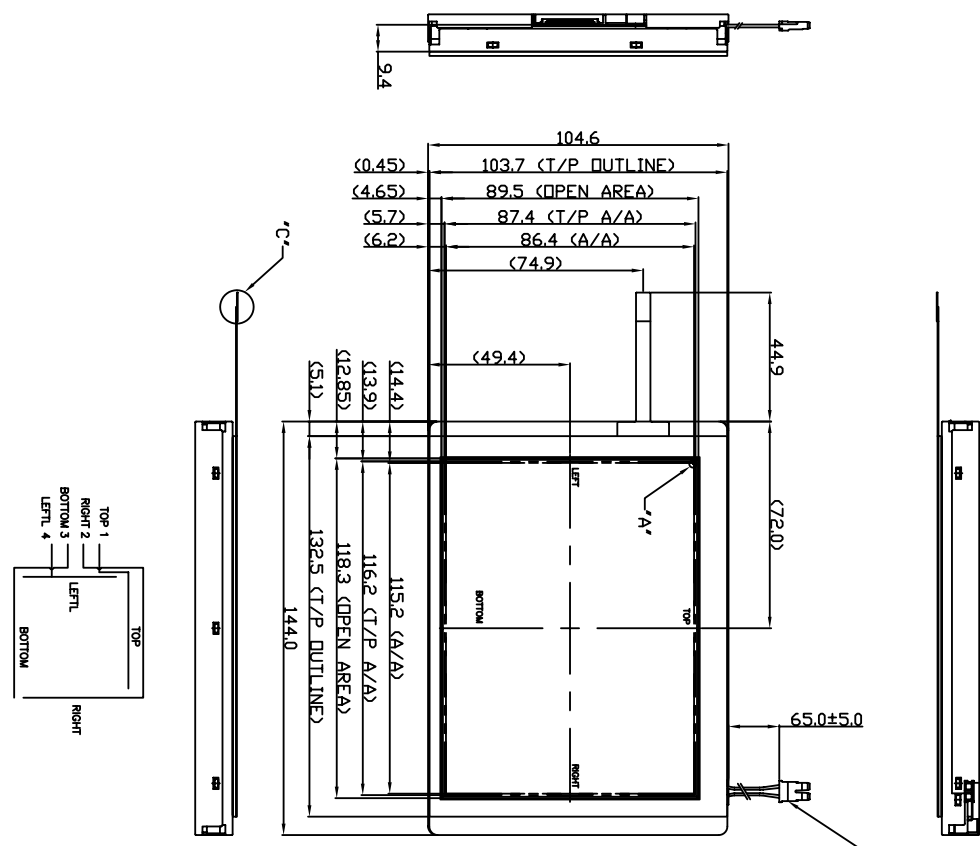
B brightness uniformity (Min Luminance of 9 points)/(Max Luminance of 9 points)



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 14 OF 16
	Z.W.	1.0		DATE: 3/16/07

13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T _a = 80°C 240 hours	-
2	Low Temperature Storage Test	T _a = -30°C 240 hours	-
3	High Temperature Operation Test	T _a = 70°C 240 hours	-
4	Low Temperature Operation Test	T _a = -20°C 240 hours	-
5	High Temperature and High Humidity Operation Test	T _a =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	-20°C (1h) ~ 70°C, 200 cycles, 30min 30min	-
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	-



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA570VT-V	SHEET 16 OF 16
	Z.W.	1.0		DATE: 3/16/07