Model Name: T546HW01 V0

Issue Date : 2009/11/30

( )Preliminary Specifications
(∗)Final Specifications

Customer Signature	Date	AUO	Date
Approved By _____		Approval By PM Director *Frank Hsu* Frank Hsu.	
Note		Reviewed By RD Director *Eugene Chen* Eugene Chen Reviewed By Project Leader WK Huang WK Huang	
		Prepared By PM _____	

Contents

Record of Revision

Version	Data	Page.	Old Description	New Description	Remark
0.0	2009/11/15		First release	N/A	N/A
0.1	2009/11/30		Final		

1. General Description

This specification applies to the 55 inch Color TFT-LCD Module T546HW01 V0. This LCD module has a TFT active matrix type liquid crystal panel 1920x1080 pixels, and diagonal size of 55 inch. This module supports Full HD mode (Non-interlace) .

Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 10-bit gray scale signal for each dot.

The T546HW01 V0 has been designed to apply the 10-bit 4channel LVDS interface method. It is intended to support displays where high brightness, EBU Gamut (72% NTSC), wide viewing angle, and high color depth are very important.

The T546HW01 V0 backlight unit is using inverter-less solution (inductor type balance board), and need to be powered by integrated power system by customers.

* General Information

Items	Specification	Unit	Note
Active Screen Size	55	inches	Diagonal
Display Area	1209.6(H) x 680.4(V)	mm	
Outline Dimension	1267.6 (H) x 738.4(V) x 58(D)	mm	With Balance Board cover
Driver Element	a-Si TFT active matrix		
Display Colors	1073.7M,	Colors	
Color Gamut	72	%	NTSC
Number of Pixels	1920 x 1080	Pixel	
Pixel Arrangement	RGB vertical stripe		
Pixel Pitch	0.63	mm	
Display Mode	Normally Black		
Surface Treatment	Haze 1%		
RoHS	RoHS compliance		

2. Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause faulty operation or damage to the unit

Item	Symbol	Min.	Max	Unit	Note
Logic/LCD Drive Voltage	V_{DD}	-0.3	14.0	V_{DC}	1
Input Voltage of Signal	V_{IN}	-0.3	4	V_{DC}	1
Operating Temperature	T_{OP}	0	+50	℃	2
Operating Humidity	H_{OP}	10	90	%RH	2
Storage Temperature	T_{ST}	-20	+60	℃	2
Storage Humidity	H_{ST}	10	90	%RH	2
Panel Surface Temperature	T_{SUR}	--	+65	℃	2
Shock (non-operation)	±x, ±y	--	40	G	3
Shock (non-operation)	±z	--	30	G	3
Vibration (non-operation)		--	1.5	G	4

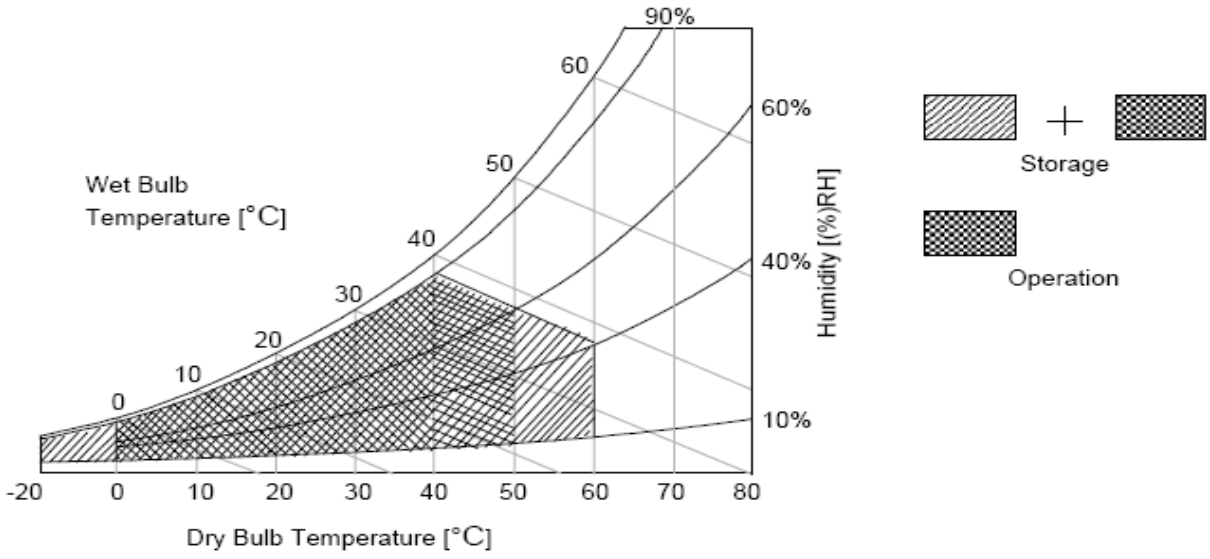
Note 1: Duration = 50ms

Note 2: Maximum Wet-Bulb should be 39℃ and no condensation. The relative humidity must not exceed 90% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃.

Note 3: Sine wave, 11ms, direction: ±x, ±y, ±z (one time each direction)

Note 4: Waveform: random, vibration level: 1.5G RMS, Bandwidth: 10--300Hz
Duration: X, Y, Z 30min (one time each direction)

Note 5: Surface temperature is measured at 50℃ Dry condition



3. Electrical Specification

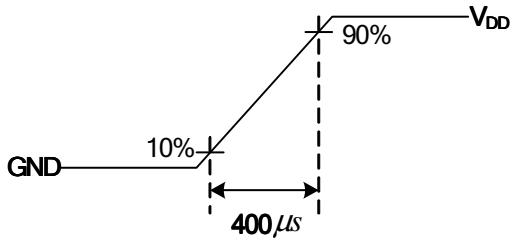
The T546HW01 V0 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input, which powers the CCFL, is typically generated by an integrate power (I/P) system.

3.1 Electrical Characteristics

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max		
Power Supply Input Voltage		V_{DD}	10.8	12.0	13.2	V_{DC}	1
Power Supply Input Current		I_{DD}	--	1.36	1.5	A	2
Power Consumption		P_C	--	16.32	18	Watt	2
Inrush Current		I_{RUSH}	--	--	4	A	3
LVDS Interface	Differential Input High Threshold Voltage	V_{TH}	--	--	+100	mV_{DC}	4
	Differential Input Low Threshold Voltage	V_{TL}	-100	--	--	mV_{DC}	4
	Common Input Voltage	V_{CIM}	1.10	1.25	1.40	V_{DC}	4
CMOS Interface	Input High Threshold Voltage	V_{IH} (High)	2.7	--	3.3	V_{DC}	
	Input Low Threshold Voltage	V_{IL} (Low)	0	--	0.6	V_{DC}	
Backlight Power Consumption (ref.)		P_{BL}	--	220	--	Watt	5
Life Time			50000	--	--	Hours	6

Note:

1. The ripple voltage should be controlled under 10% of V_{CC}
2. V_{DD} = 12.0V, Fv = 120Hz, F_{CLK} = 77.29MHz , 25 ℃, Test Pattern : White Pattern
3. Measurement condition : Rising time = 400us



4. V_{CIM}=1.25V

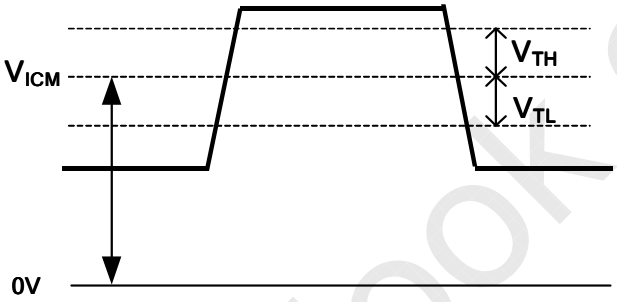


Figure: LVDS Differential Voltage

5. The backlight power consumption shown above is tested by lamp current I_L=10.5mA.
6. Specified values are for a single lamp only which is aligned horizontally. The lifetime is defined as the time which luminance of the lamp is 50% compared to its original value.
   [Operating condition: Continuous operating at Ta = 25±2℃]

3.2 Interface Connections

3.2.1 LVDS pin assignment for 10bit

- LCD connector: PF050-C82B-C35 (UJU, LVDS connector)
- Mating connector: FF05001-82 (Foosung, LVDS connector)

PIN	Symbol	Description	PIN	Symbol	Description
1	V_{DD}	Power Supply, +12V DC Regulated	26	CH3_0+	LVDS Channel 3, Signal 0+
2	V_{DD}	Power Supply, +12V DC Regulated	27	CH3_1-	LVDS Channel 3, Signal 1-
3	V_{DD}	Power Supply, +12V DC Regulated	28	CH3_1+	LVDS Channel 3, Signal 1+
4	V_{DD}	Power Supply, +12V DC Regulated	29	CH3_2-	LVDS Channel 3, Signal 2-
5	V_{DD}	Power Supply, +12V DC Regulated	30	CH3_2+	LVDS Channel 3, Signal 2+
6	NC	No connection	31	GND	Ground
7	GND	Ground	32	CH3_CLK-	LVDS Channel 3, Clock -
8	GND	Ground	33	CH3_CLK+	LVDS Channel 3, Clock +
9	GND	Ground	34	GND	Ground
10	CH1_0-	LVDS Channel 1, Signal 0-	35	CH3_3-	LVDS Channel 3, Signal 3-
11	CH1_0+	LVDS Channel 1, Signal 0+	36	CH3_3+	LVDS Channel 3, Signal 3+
12	CH1_1-	LVDS Channel 1, Signal 1-	37	CH3_4-	LVDS Channel 3, Signal 4-
13	CH1_1+	LVDS Channel 1, Signal 1+	38	CH3_4+	LVDS Channel 3, Signal 4+
14	CH1_2-	LVDS Channel 1, Signal 2-	39	GND	Ground
15	CH1_2+	LVDS Channel 1, Signal 2+	40	SCL	EEPROM Serial Clock
16	GND	Ground	41	NC	No connection
17	CH1_CLK-	LVDS Channel 1, Clock -	42	NC	No connection
18	CH1_CLK+	LVDS Channel 1, Clock +	43	WP	EEPROM Write Protection High(3.3V) for Writable, Low(GND) for Protection
19	GND	Ground	44	SDA	EEPROM Serial Data
20	CH1_3-	LVDS Channel 1, Signal 3-	45	LVDS_SEL	Open/High(3.3V) for NS, Low(GND) for JEIDA
21	CH1_3+	LVDS Channel 1, Signal 3+	46	NC	No connection
22	CH1_4-	LVDS Channel 1, Signal 4-	47	Reserved	AUO Internal Use Only
23	CH1_4+	LVDS Channel 1, Signal 4+	48	Reserved	AUO Internal Use Only
24	GND	Ground	49	Reserved	AUO Internal Use Only
25	CH3_0-	LVDS Channel 3, Signal 0-	50	Reserved	AUO Internal Use Only

PIN	Symbol	Description	PIN	Symbol	Description
51	Reserved	AUO Internal Use Only	76	CH2_2+	LVDS Channel 2, Signal 2+
52	GND	Ground	77	CH2_2-	LVDS Channel 2, Signal 2-
53	CH4_4+	LVDS Channel 4, Signal 4+	78	CH2_1+	LVDS Channel 2, Signal 1+
54	CH4_4-	LVDS Channel 4, Signal 4-	79	CH2_1-	LVDS Channel 2, Signal 1-
55	CH4_3+	LVDS Channel 4, Signal 3+	80	CH2_0+	LVDS Channel 2, Signal 0+
56	CH4_3-	LVDS Channel 4, Signal 3-	81	CH2_0-	LVDS Channel 2, Signal 0-
57	GND	Ground	82	GND	Ground
58	CH4_CLK+	LVDS Channel 4, Clock +			
59	CH4_CLK-	LVDS Channel 4, Clock -			
60	GND	Ground			
61	CH4_2+	LVDS Channel 4, Signal 2+			
62	CH4_2-	LVDS Channel 4, Signal 2-			
63	CH4_1+	LVDS Channel 4, Signal 1+			
64	CH4_1-	LVDS Channel 4, Signal 1-			
65	CH4_0+	LVDS Channel 4, Signal 0+			
66	CH4_0-	LVDS Channel 4, Signal 0-			
67	GND	Ground			
68	CH2_4+	LVDS Channel 2, Signal 4+			
69	CH2_4-	LVDS Channel 2, Signal 4-			
70	CH2_3+	LVDS Channel 2, Signal 3+			
71	CH2_3-	LVDS Channel 2, Signal 3-			
72	GND	Ground			
73	CH2_CLK+	LVDS Channel 2, Clock +			
74	CH2_CLK-	LVDS Channel 2, Clock -			
75	GND	Ground			

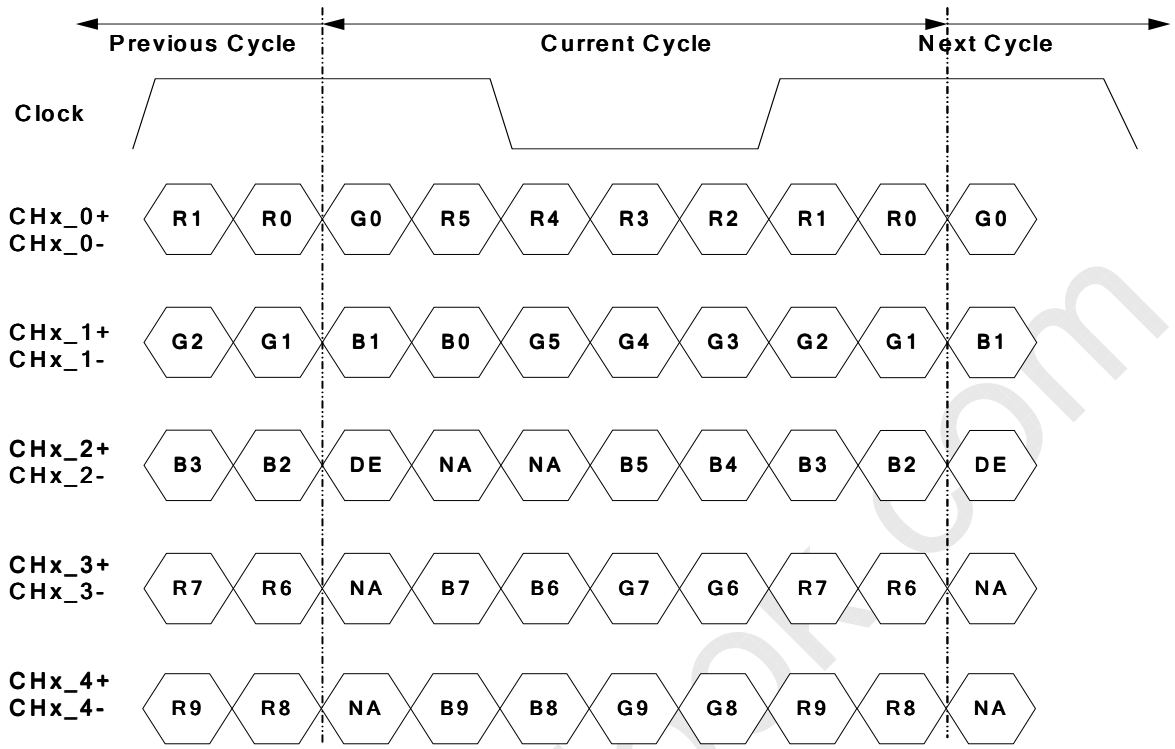
Note 1: All GND (ground) pins should be connected together and should also be connected to the LCD's metal frame.

Note 2: All V_{DD} (power input) pins should be connected together.

Note 3: All NC (no connection) pins should be open without voltage input.

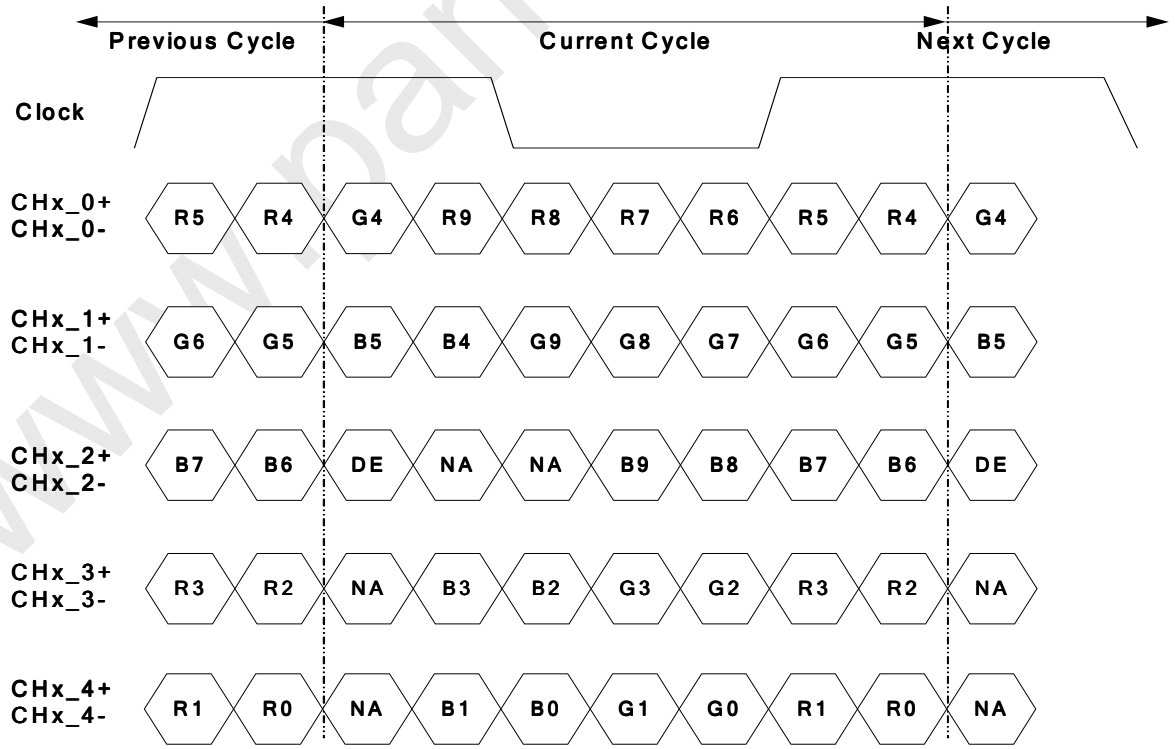
3.2.2 LVDS Option for 10bit

- **LVDS Option = High/Open➔NS**



Note: x = 1, 2, 3, 4…

- **LVDS Option = Low➔JEIDA**



Note: x = 1, 2, 3, 4…

3.3 Signal Timing Specification

This is the signal timing required at the input of the user connector. All of the interface signal timing should be satisfied with the following specifications for its proper operation.

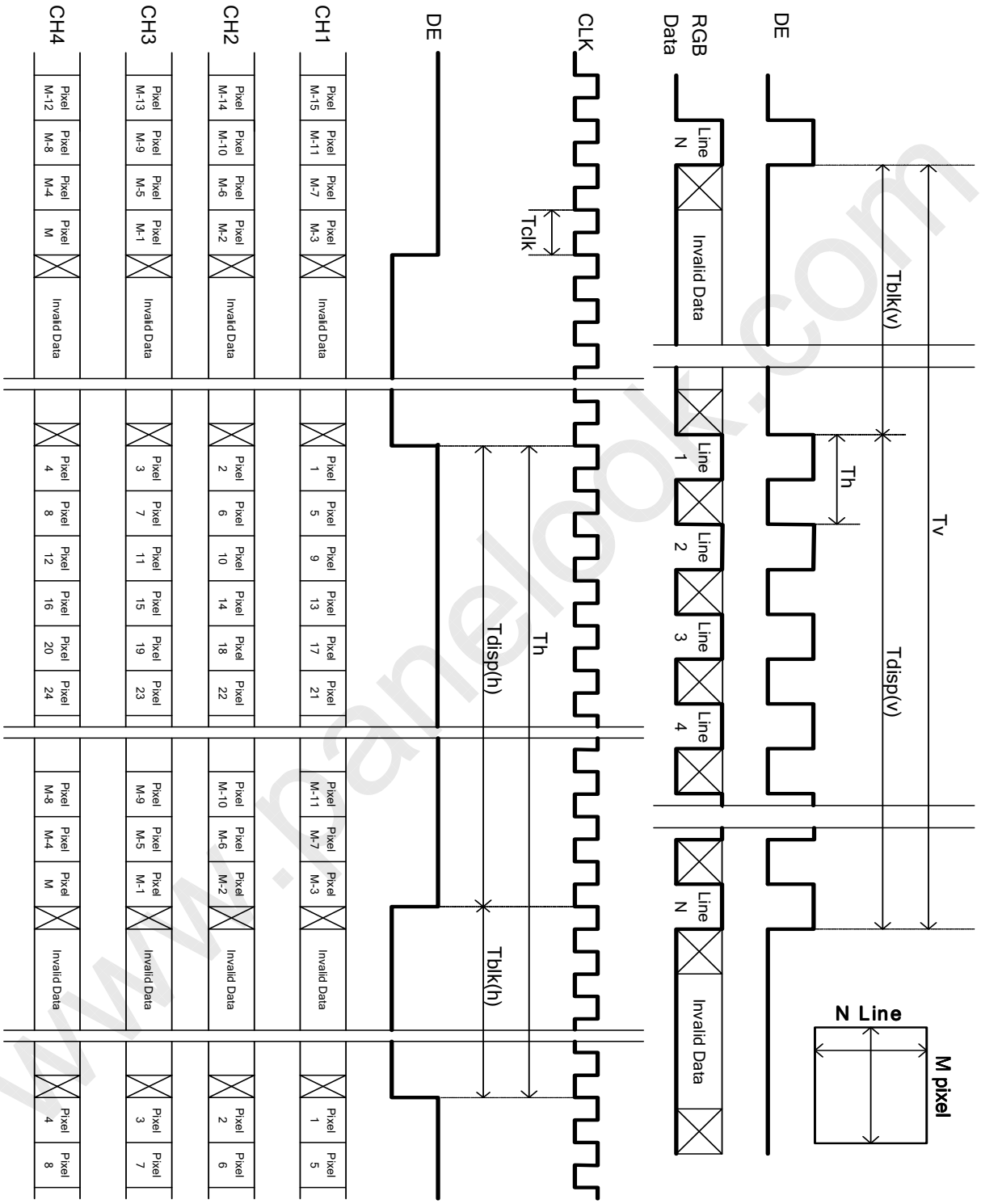
Timing Table (DE only Mode)

Vertical Frequency Range (120Hz)

Signal	Item	Symbol	Min.	Typ.	Max	Unit
Vertical Section	Period	Tv	1090	1130	1160	Th
	Active	Tdisp (v)		1080		Th
	Blanking	Tblk (v)	10	50	80	Th
Horizontal Section	Period	Th	550	570	580	Tclk
	Active	Tdisp (h)		480		Tclk
	Blanking	Tblk (h)	70	90	100	Tclk
Clock	Frequency	Fclk=1/Tclk	71.94	77.29	80.74	MHz
Vertical Frequency	Frequency	Fv	118	120	122	Hz
Horizontal Frequency	Frequency	Fh	130.8	135.6	139.2	KHz

3.4 Signal Timing Waveforms

■ 1920x1080x120Hz (AUO-12401K1_Dual TCON_LVDS data:1, 2, 3, 4)



3.5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 10 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR DATA REFERENCE

Color		Input Color Data																													
		RED										GREEN										BLUE									
		MSB									LSB	MSB									LSB	MSB									LSB
		R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Blue(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	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	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(001)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

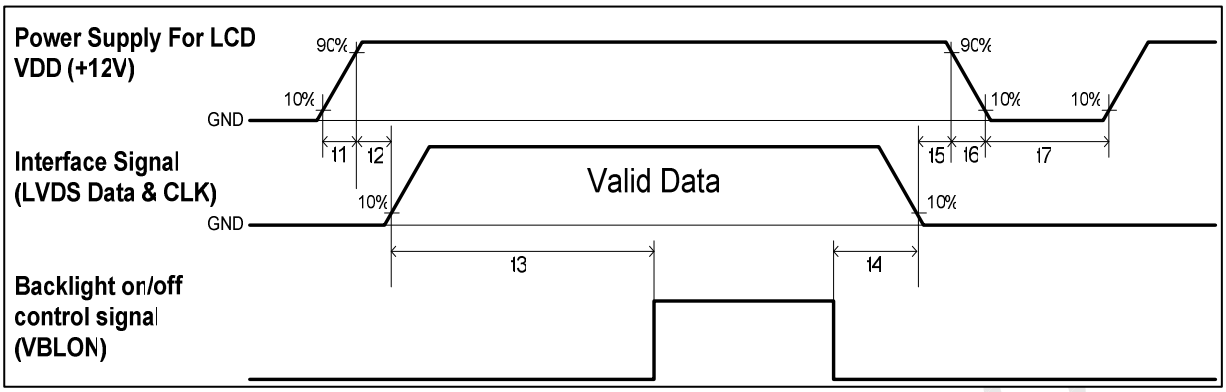
	RED(1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

	GREEN(1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
BLUE	BLUE(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	BLUE(1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
	BLUE(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1

3.6 Power Sequence

■ 1920x1080x120Hz



Parameter	Values			Unit
	Min.	Typ.	Max.	
t1	0.4	--	30	ms
t2	0.1	--	--	ms
t3	300	--	--	ms
t4	0 *1	--	--	ms
t5	0	--	--	ms
t6	--	--	--*2	ms
t7	500	--	--	ms

Note:
(1) T4=0 : concern for residual pattern before BLU turn off.
(2) T6 : voltage of VDD must decay smoothly after power-off. (customer system decide this value)

3.7 Backlight Power Specification

3.7.1 Electrical specification

(Ta=25±5°C, Turn-on after 60mins)

Item	Symbol	Condition	Spec			Unit	Note
			Min	Typ	Max		
Operating Voltage	Vo	-	1100	1300	1500	Vrms	
Operating Current	Io	-	10.0	10.5	11.0	mArms	
BL Total Power Dissipation	PBL	-	-	220	-	Watt	
Striking Voltage	Vstk	At 0℃	1830	-	-	Vrms	
		At 25℃	1685	-	-		
Striking Time	Ts	-	1000	-	1500	msec	
Operating Frequency	fo	-	44	46	48	kHz	
PWM Operating Frequency	F_PWM	-	120	150	180	Hz	
PWM Dimming Duty Ratio	D_PWM	-	10	-	100	%	Note 1&2
Lamp Type			Straight type				
Number of Lamps			18			pcs	

（Ta=25±5℃, Turn on for 45minutes）

Note 1: Dimming range

PWM Dimming : include Internal and External PWM Dimming

Note 2: Low dimming ratio operation

When PWM dimming duty ratio is operated lower than recommended value, feedback signal and all protection functions should be confirmed by LIPS design. Display performance should also be confirmed by customer's implement.

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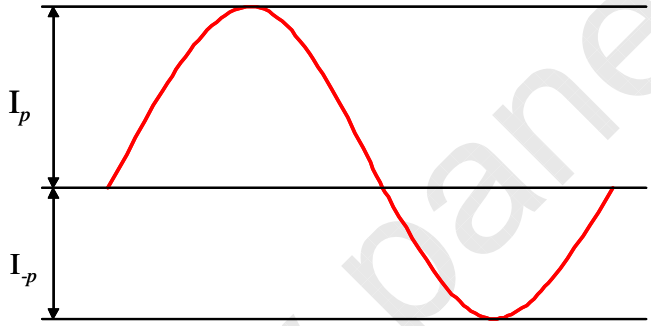
3.7.2 Lamp specification

Item	Symbol	Condition	Spec			Unit	Note
			Min	Typ	Max		
Lamp voltage	VL		-	1300	-	Vrms	
Lamp current	IL		-	10.5	-	mArms	
Lamp frequency	fL		35	45	80	KHz	
Starting voltage	Vs	At 0℃	-	-	1830	Vrms	
		At 25℃	-	-	1685	Vrms	
Delayed discharge time	TD		-	-	0.5	sec	
Life time	TL		50K	-	-	hr	
Unsymmetrical ratio	UR		-	-	10%	-	Note 1.
Crest factor	C.F.		$\sqrt{2}-10\%$	$\sqrt{2}$	$\sqrt{2}+10\%$	-	

The above characteristics are measured under the conditions:
Ambient temperature: 25±2℃, Relative Humidity: 65±20%RH.

Note 1: Waveform definition

Please light on the lamp with symmetrical voltage and current waveform (unsymmetrical ratio is less than 10%, crest factor within $\sqrt{2}\pm10\%$).



Unsymmetrical Ratio = $|I_p-I_{-p}| / I_{rms}*100\%$

Crest Factor = I_p (or I_{-p}) / I_{rms}

I_p : High side peak value

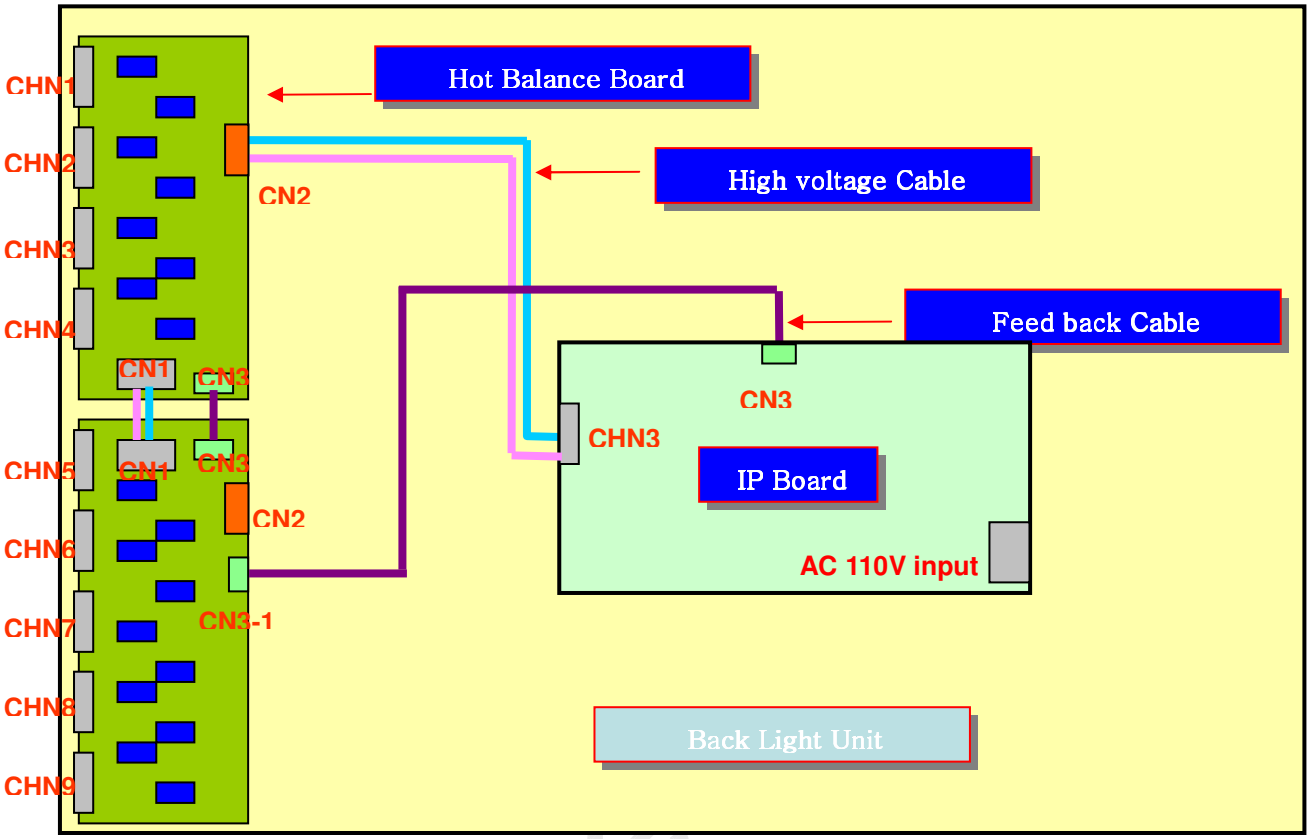
I_{-p} : Low side peak value

I_{rms} : Root mean square value

3.7.3 Protection circuit specification

Item	Symbol	Spec			Unit	Note
		Min	Typ	Max		
Supply voltage	Vcc	10	12	15	VDC	
Supply current	Icc	-	20	40	mADC	
Current feedback signal	IFB	2.05	2.20	2.35	Vrms	
Lamp Detection (OLP)	VLD(H)	10	-	12	VDC	Lamp normal status
	VLD(L)	0	-	0.8	VDC	Lamp protection status

3.7.4 Balance Board Interface Requirement



3.7.5 Connector pin assignment

Master Upper/Lower CN1 Type : **Cvilux_CP042 EP1MFA-LF**

Pin NO.	Symbol	Description
1	HV+	I/P board high voltage supply (connected with upper and lower B/B)
2	HV+	I/P board high voltage supply (connected with upper and lower B/B)

Master Upper/Lower CN3_1 Type : **HIROSE_KN30-7P-1.25H**

Pin NO.	Symbol	Description
1	VCC	Power Supply for Protection Circuit
2	FB1	lamp current feedback signal_1(Full wave current)
3	FB2	lamp current feedback signal_2(Full wave current)
4	GND	Signal Ground
5	GND	Signal Ground
6	LD	Lamp detection
7	LD	Lamp detection

Master Upper/Lower CHN1 ~ CHN9 Type : **Cvilux_CP042 EP1MFA-LF**

Pin NO.	Symbol	Description
1	HV1+	Lamp high voltage supply
2	HV2+	Lamp high voltage supply

Master Upper/Lower CN2 Type : **YeonHO_130001WR-02E (LF)**

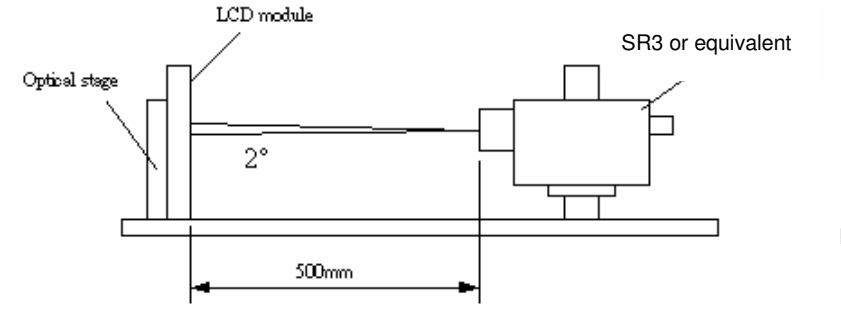
Pin NO.	Symbol	Description
1	HV+	I/P board high voltage supply
2	HV+	I/P board high voltage supply

Master Upper/Lower CN3 Type : **HIROSE_KN30-7P-1.25H**

Pin NO.	Symbol	Description
1	VCC	Power Supply for Protection Circuit
2	FB1	lamp current feedback signal_1(Full wave current)
3	FB2	lamp current feedback signal_2(Full wave current)
4	GND	Signal Ground
5	GND	Signal Ground
6	LD	Lamp detection
7	LD	Lamp detection

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 45 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of φ and θ equal to 0°.



Parameter	Symbol	Values			Unit	Notes
		Min.	Typ.	Max		
Contrast Ratio	CR	4800	6000	--		1
Surface Luminance (White)	L_{WH}	425	500	--	cd/m^2	2
Luminance Variation	$\delta_{WHITE(9P)}$	--	--	1.3		3
Response Time (Average)	Tγ	--	6.5	--	ms	4 (Gray to Gray)
Color Coordinates						
Red	R_X	Typ.-0.03	0.640	Typ.+0.03		
	R_Y		0.330			
Green	G_X		0.290			
	G_Y		0.600			
Blue	B_X		0.150			
	B_Y		0.060			
White	W_X		0.280			
	W_Y		0.290			
Viewing Angle						(Contrast Ratio>10)
x axis, right(φ=0°)	θ_r	--	89	--	degree	5
x axis, left(φ=180°)	θ_l	--	89	--	degree	5
y axis, up(φ=90°)	θ_u	--	89	--	degree	5
y axis, down (φ=270°)	θ_d	--	89	--	degree	5

Note:

1. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness of the "white" state}}{\text{Brightness of the "black" state}}$$

2. Surface Luminance is luminance value at point 5 with 100% dimming across the LCD surface 50cm from the surface with all pixels displaying white. For more information see Fig. 4-2. When lamp current I_L=10.5mA, $L_{WH}=L_{on5}$, where L_{on5} is the luminance with all pixels displaying white at center 5 location.

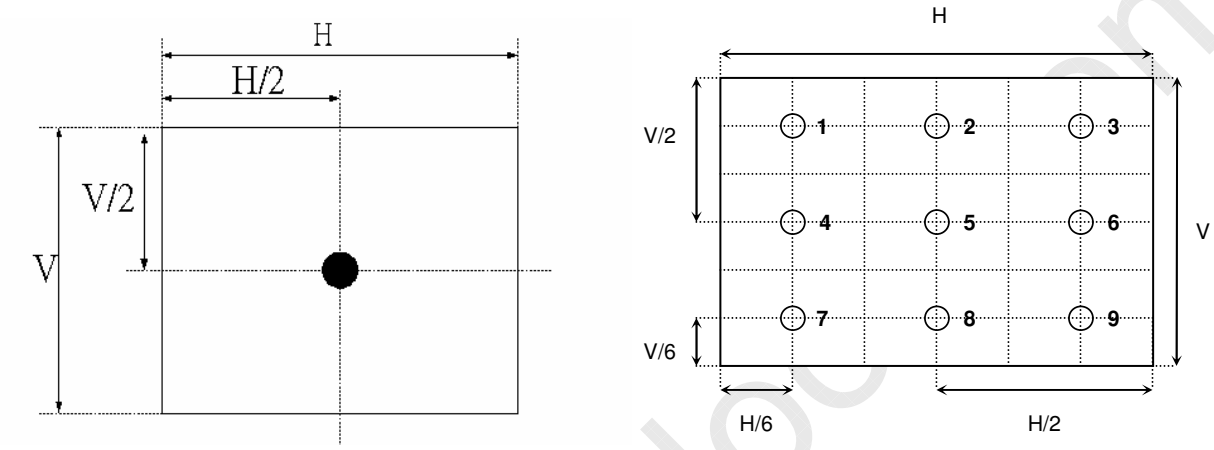


Fig.4-2 Optical measurement point

3. The variation in surface luminance, $\delta_{WHITE(9P)}$ is defined under brightness of I_L=10.5mA as:

$$\delta_{WHITE(9P)} = \text{Maximum}(L_{on1}, L_{on2},\ldots,L_{on9})/\text{Minimum}(L_{on1}, L_{on2},\ldots L_{on9})$$

4. Response time Tγ is the average time required for display transition by switching the input signal for five luminance ratio (0%, 25%, 50%, 75%, 100% brightness matrix)and is based on f_v=120Hz to optimize.

.

Measured Response Time		Target				
		0%	**25%**	**50%**	**75%**	**100%**
Start	**0%**		0% to 25%	0% to 50%	0% to 75%	0% to 100%
	25%	25% to 0%		25% to 50%	25% to 75%	25% to 100%
	50%	50% to 0%	50% to 25%		50% to 75%	50% to 100%
	75%	75% to 0%	75% to 25%	75% to 50%		75% to 100%
	100%	100% to 0%	100% to 25%	100% to 50%	100% to 75%	

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal (or x-axis) and the vertical (or y-axis) with respect to the z-axis which is normal to the LCD surface. For more information see Fig. 4-4.

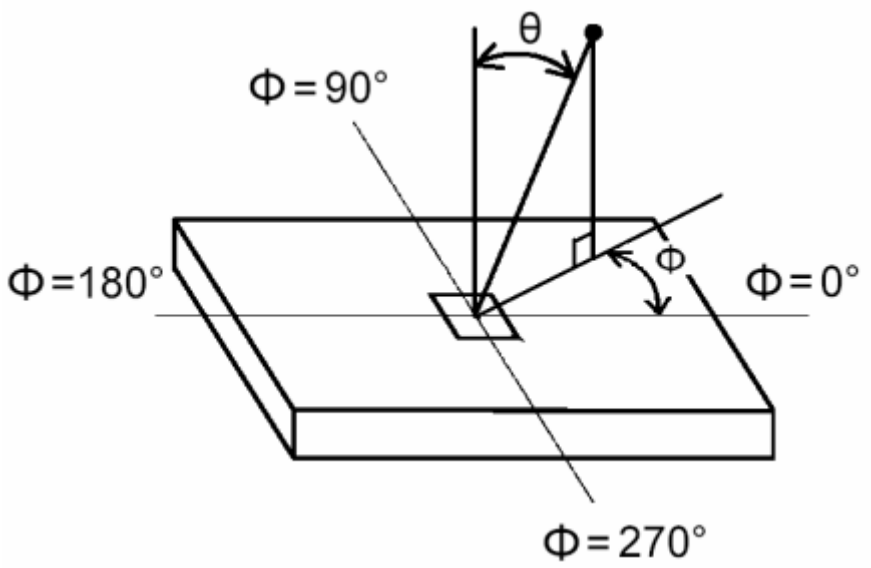


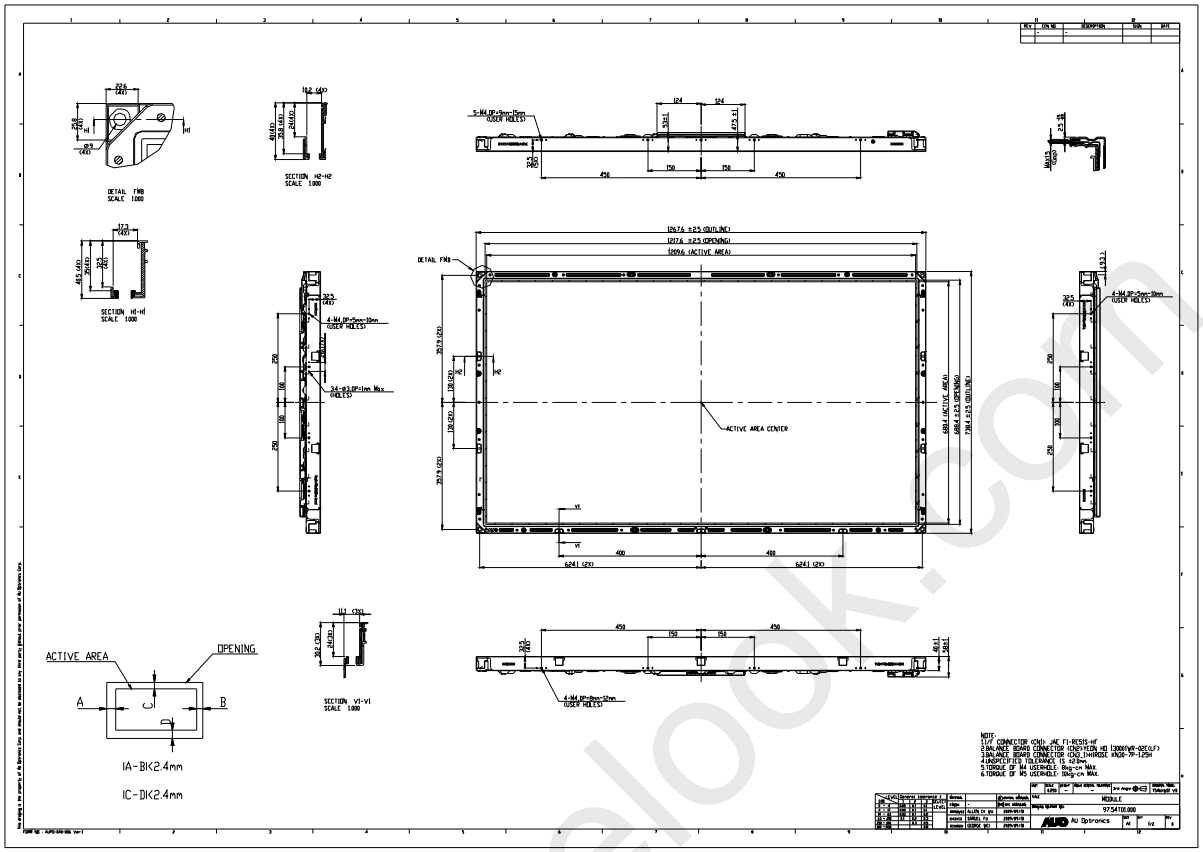
Fig.4-4 Viewing angle definition

5. Mechanical Characteristics

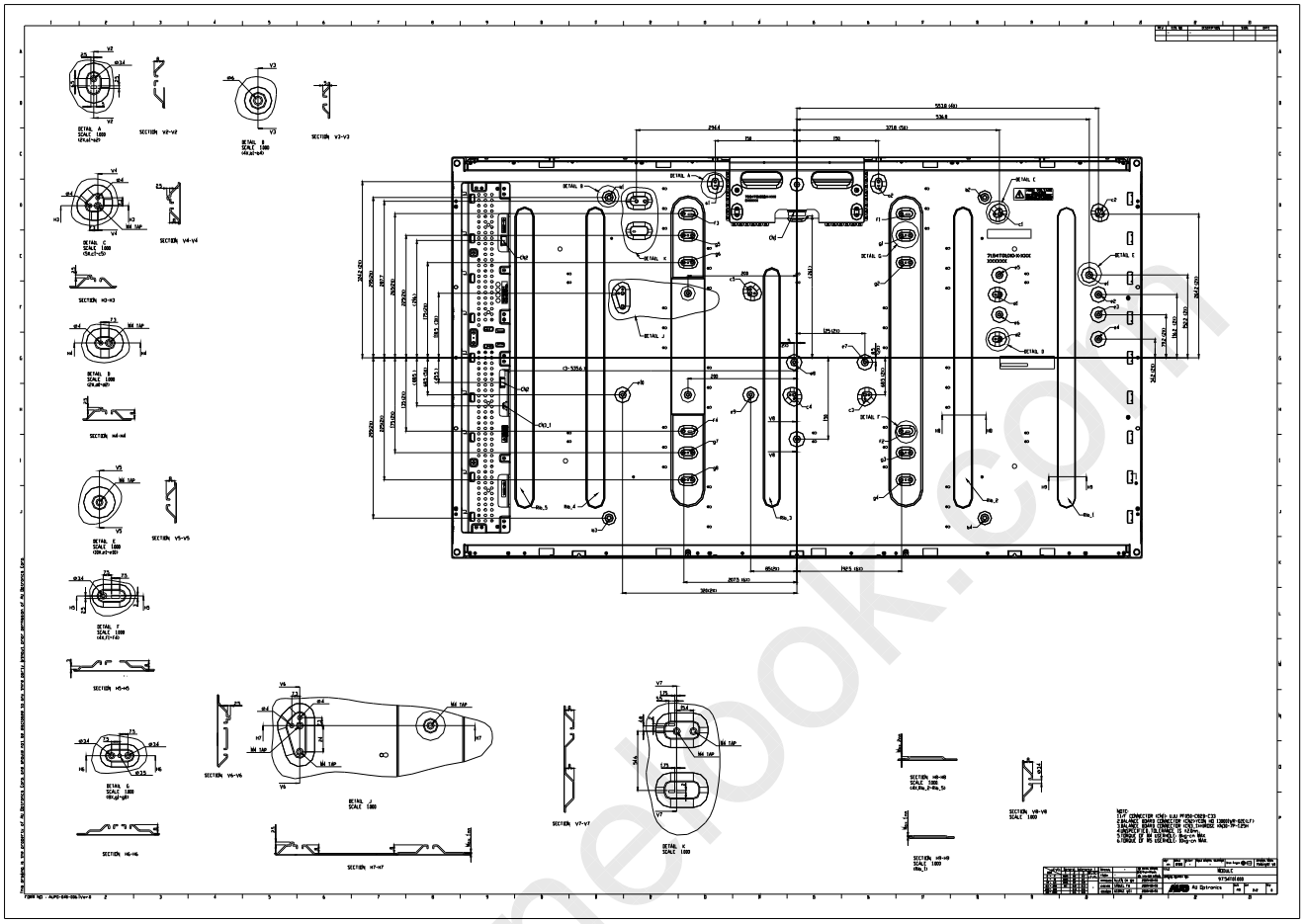
The contents provide general mechanical characteristics for the model T546HW01. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal (typ.)	1267.6 mm
	Vertical (typ.)	738.4 mm
	Depth (typ.)	58 mm (with balance board cover)
Bezel Area	Horizontal (typ.)	1217.6mm
	Vertical (typ.)	688.4 mm
Active Display Area	Horizontal	1209.6 mm
	Vertical	680.4 mm
Weight	20500g (Max)	

2D Drawing (Front)



2D Drawing (Rear)



6. Reliability

	Test Item	Q'ty	Condition
1	High temperature storage test	3	60℃, 300hrs
2	Low temperature storage test	3	-20℃, 300hrs
3	High temperature operation test	3	50℃, 300hrs
4	Low temperature operation test	3	-5℃, 300hrs
5	Vibration test (non-operation)	3	Fixed place: FMB (4-corner) Wave form: random, 3-200Hz, Overall average energy level: 0.87G RMS Duration: X, Y, Z 30min X, Y, Z Horizontal FACE DOWN One time each direction
6	Shock test (non-operation)	3	Shock level: 50G Waveform: half since wave, 11ms Direction: ±X, ±Y, ±Z, One time each direction
7	Vibration test (With carton)	5	Random wave (1.5G RMS, 10-200Hz) 30mins/ Per each X,Y,Z axes
8	Drop test (With carton)	5	Height: 25.4m 1 corner, 3 edges, 6 surfaces (ASTMD4169-I)

7. International Standard

7-1. Safety

(1) UL6500, UL 60065 Underwriters Laboratories, Inc. (AUO file number: E204356)
Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) CAN/CSA C22.2 No. 950-95 Third Edition, Canadian Standards Association, Jan. 28, 1995
Standard for Safety of Information Technology Equipment Including Electrical Business Equipment.

(3) EN60950: 1992+A2: 1993+A2: 1993+C3: 1995+A4: 1997+A11: 1997
IEC 950: 1991+A1: 1992+A2: 1993+C3: 1995+A4:1996
IEC 60065: version 7th
European Committee for Electro technical Standardization (CENELEC)
EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7-2. EMC

(1) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992

(2) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.

(3) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electrotechnical Standardization. (CENELEC), 1998

7-3. Green Mark Description

(1) For Pb Free products, AUO will add Pb for identification.

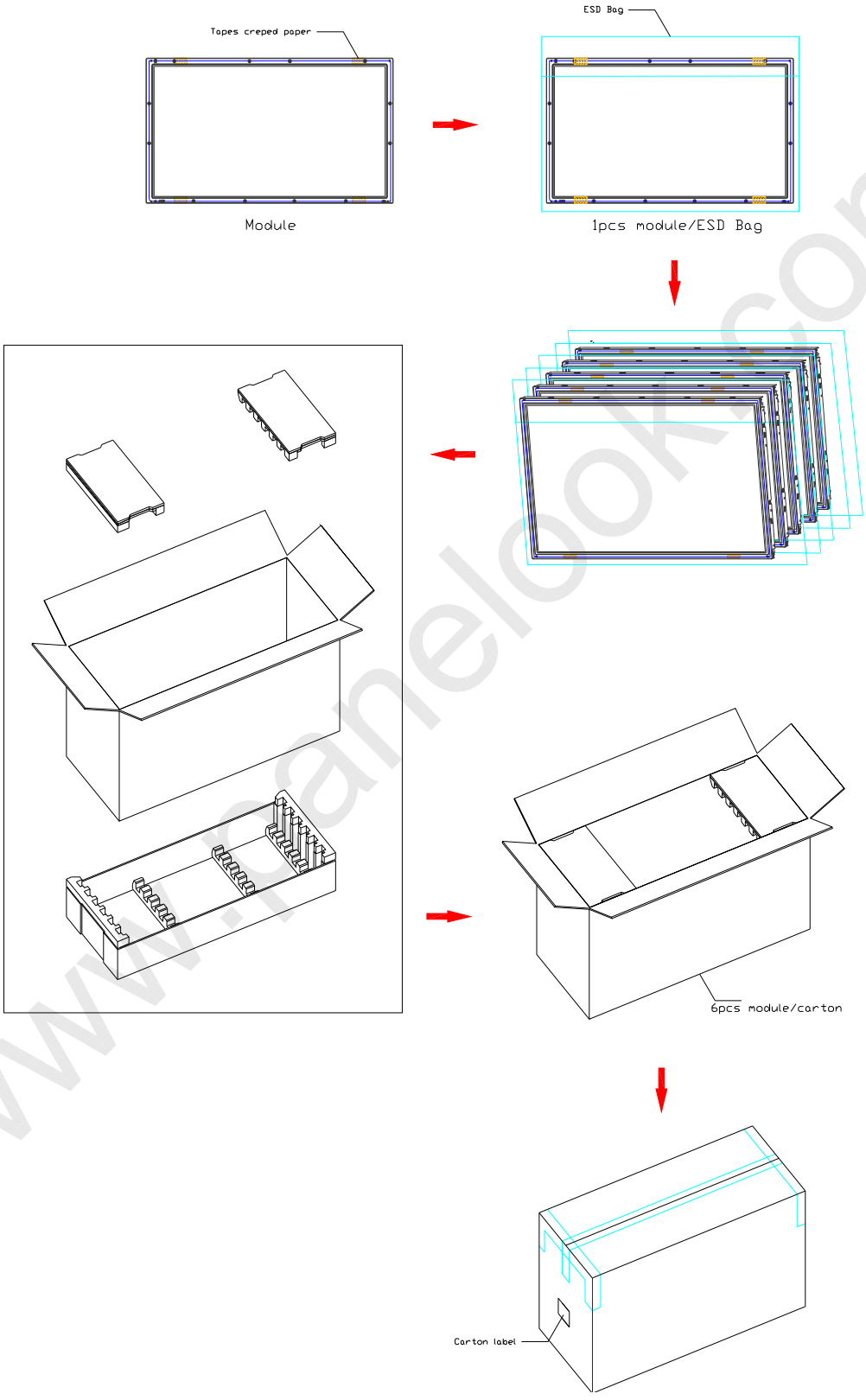
(2) For RoHS compatible products, AUO will add RoHS for identification.

Note. The Green Mark will be present only when the green documents have been ready by AUO Internal Green Team. (The definition of green design follows the AUO green design checklist.)

8. Packing

Packing Instruction

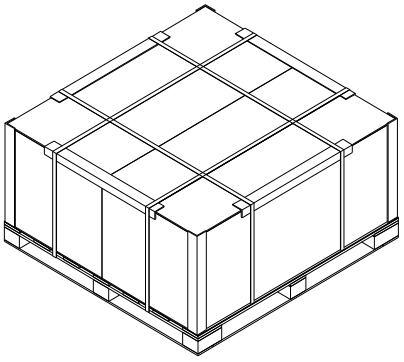
Carton dimension= **1355**mm*__560__mm*__830__mm



Pallet information

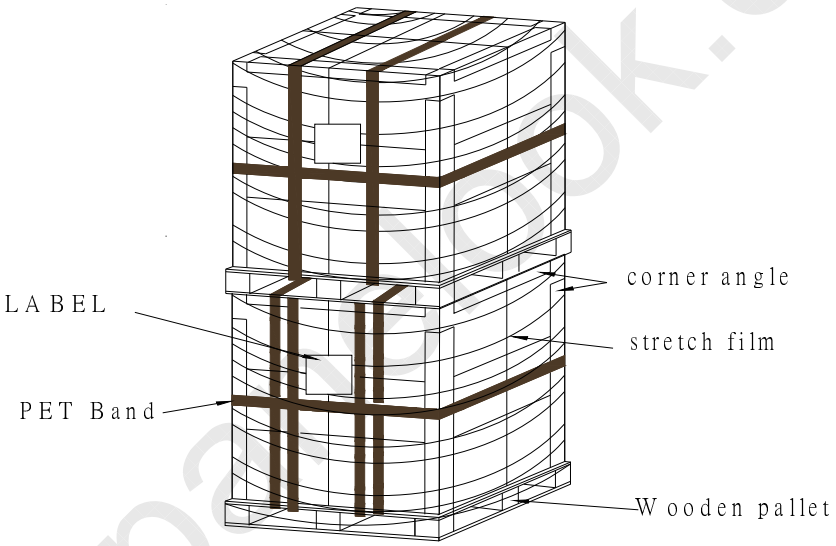
By air cargo: (2 x 1) x 1 layers, one pallet put 2 boxes, total 12 pcs module.

Dimension: 1390 x 1150 x 962mm



By sea: (2 x 1) x 2 layers, one pallet put 2 boxes, stack 2 layers, total 24 pcs module.

Dimension: 1390 x 1150 x 1924mm

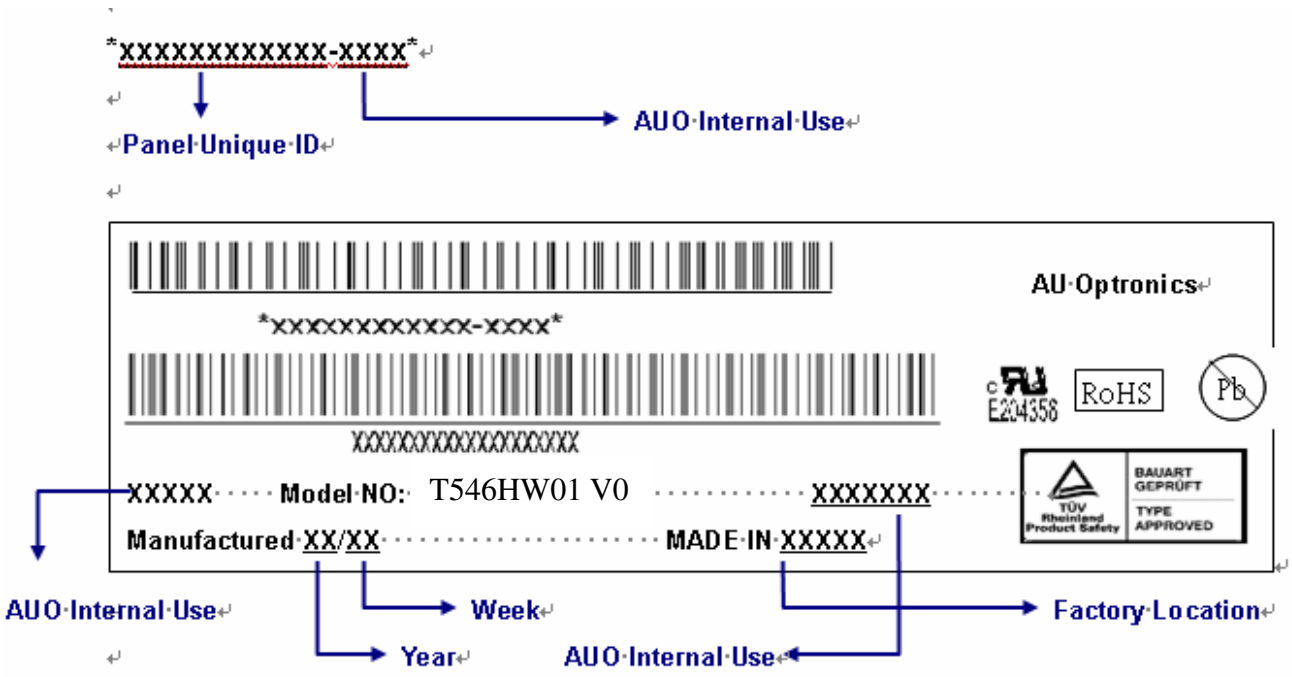


Pallet dimension: 1390 x 1150 x 132mm

	Item	Specification			Packing Remark
		Qty.	Dimension	Weight (kg)	
1	Packing BOX	6pcs/box	1355(L)mm*560(W)mm*830(H)mm	130	
2	Pallet	1	1390(L)mm*1150(W)mm*132(H)mm	20	
3	Boxes per Pallet	2 boxes/Pallet			
4	Panels per Pallet	12pcs/pallet			
	Pallet after packing	12	1390(L)mm*1150(W)mm*962(H)mm	280	

Packing Instruction

Panel Label



Carton Label

9. Precautions

Please pay attention to the followings when you use this TFT LCD module.

8-1 MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged on back side of panel

(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

8-2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV (Over and under shoot voltage)

(2) Response time depends on the temperature. (In lower temperature, it becomes longer.)

(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

(7) The device listed in the product specification sheets was designed and manufactured for TV application.

8-3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

8-4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

8-5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

8-6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the Bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.