LG.PHILIPS LCD

SPECIFICATION
FOR
APPROVAL

( ) **Preliminary Specification**

(●) **Final Specification**

Title	37.0" WUXGA TFT LCD

BUYER	
MODEL	

SUPPLIER	LG.Philips LCD Co., Ltd.
*MODEL	LC370WU1
SUFFIX	SL01

*When you obtain standard approval,
 please use the above model name without suffix

APPROVED BY	SIGNATURE DATE
/	
/	
/	
Please return 1 copy for your confirmation with your signature and comments.	

APPROVED BY	SIGNATURE DATE
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TV Product Development Dept. LG. Philips LCD Co., Ltd	

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RECORD OF REVISIONS

| Revision No.	Revision Date	Page	Description
1.0	Aug.05.2005	-	Final Specification
2.0	June. 28. 2006	12	Adding PAL timing table.
		13	Correcting the misspellings t_{Hp}, t_{vp} into t_{HB}, t_{vB}.

Product Specification

1. General Description

The LC370WU1 is a Color Active Matrix Liquid Crystal Display with an integral External Electrode Fluorescent Lamp(EEFL) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive display type which is operating in the normally black mode. It has a 37.01 inch diagonally measured active display area with WUXGA resolution (1080 vertical by 1920 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arrayed in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 8-bit gray scale signal for each dot. Therefore, it can present a palette of more than 16.7M(true) colors.

It has been designed to apply the 8-bit 2-port LVDS interface.

It is intended to support LCD TV, PCTV where high brightness, super wide viewing angle, high color gamut, high color depth and fast response time are important.
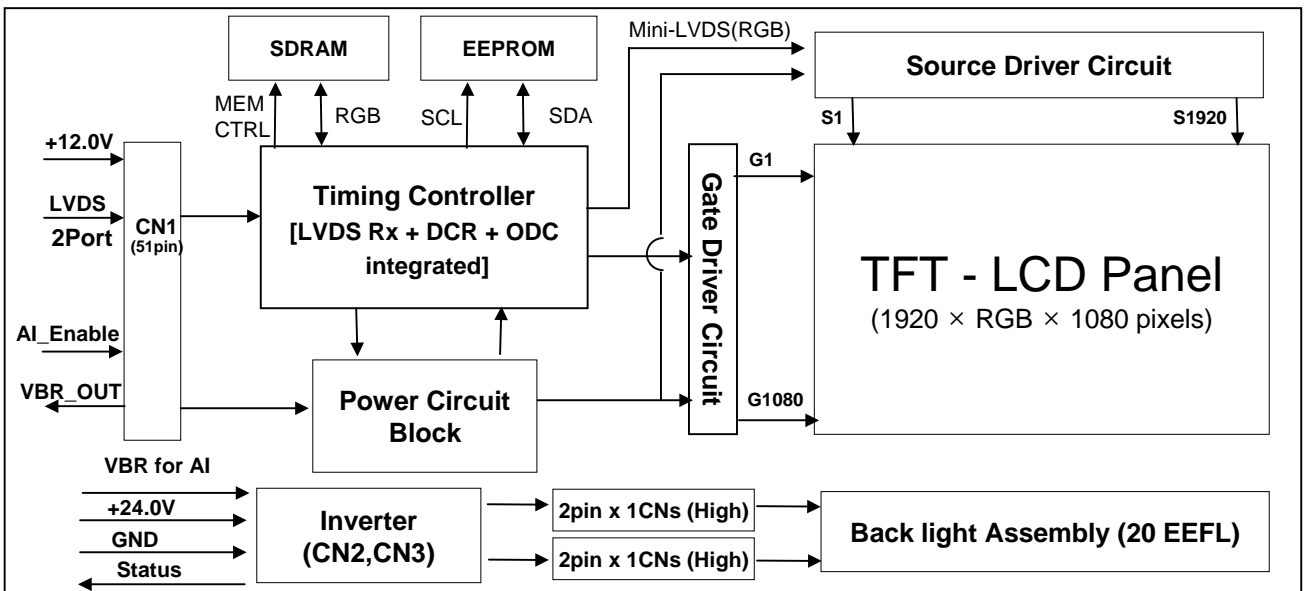
General Features

|	
Active Screen Size	37 inches(940.091mm) diagonal
Outline Dimension	877(H) x 516.8 (V) x 55.5 mm(D) (Typ.)
Pixel Pitch	0.42675 mm x 0.42675 mm
Pixel Format	1920 horiz. by 1080 vert. Pixels, RGB stripe arrangement
Color Depth	8-bit, 16.7 M colors
Luminance, White	500 cd/m^2 (Center 1point ,Typ.)
Viewing Angle (CR>10)	Viewing angle free (R/L 178 (Typ.), U/D 178 (Typ.)) (TW-IPS Tech. Applied)
Power Consumption	Total (131.72) W (Typ.) (Logic= 6.72W, Inverter= 125W [I_{BL}= 105mA])
Weight	10,500 g (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer

2. Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or damage to the LCD module.

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value		Unit	Remark
			Min	Max		
Power Input Voltage	LCM	V$_{LCD}$	-0.3	+14.0	V$_{DC}$	at 25 ± 2 °C
	Backlight inverter	V$_{BL}$	+21.6	+27.0	V$_{DC}$	When Operating
ON/OFF Control Voltage		VON/OFF	-0.3	+5.25	V$_{DC}$	
Brightness Control Voltage		V$_{Br}$	**-0.3**	+5.0	V$_{DC}$	
Operating Temperature		T$_{OP}$	0	+40	°C	Note 1
Storage Temperature		T$_{ST}$	-20	+50	°C	
Operating Ambient Humidity		H$_{OP}$	10	90	%RH	
Storage Humidity		H$_{ST}$	10	90	%RH	

Note : 1. Temperature and relative humidity range are shown in the figure below.
   Wet bulb temperature should be 39 °C Max. and no condensation of water.
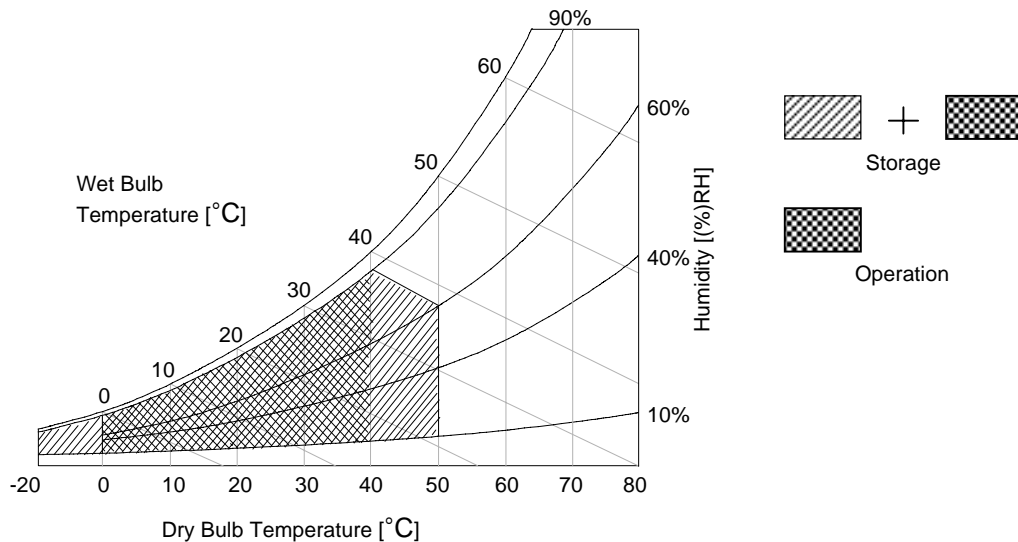
3. Electrical Specifications
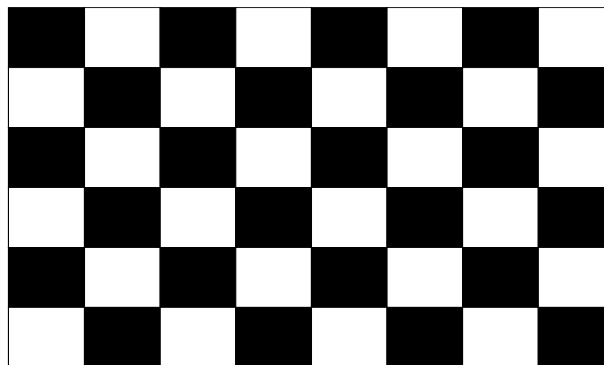
3-1. Electrical Characteristics

It requires two power inputs. One is employed to power for the LCD circuit. The other Is used for the EEFL backlight and inverter circuit.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Value			Unit	Note
		Min	Typ	Max		
Circuit :						
Power Input Voltage	VLCD	11.4	12.0	12.6	VDC	
Permissible Input Ripple Voltage	VRP	-	-	200	mVP-P	
Power Input Current	ILCD	-	560	730	mA	1
		-	740	960	mA	2
Power Consumption	PLCD	-	6.72	8.76	Watt	1
Rush current	IRUSH	-		4.0	A	3

Note : 1. The specified current and power consumption are under the V_{LCD}=12.0V, 25 $\pm$ 2°C, f_V=60Hz
condition whereas mosaic pattern(8 x 6) is displayed and f_V is the frame frequency.
2. The current is specified at the maximum current pattern.
3. The duration of rush current is about 5ms and rising time of power input is 1ms (min.).

White : 255Gray
Black : 0Gray

Mosaic Pattern(8 x 6)

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Table 2. ELECTRICAL CHARACTERISTICS (Continue)

Parameter			Symbol	Value			Unit	Note
				Min	Typ	Max		
Inverter :								
Power Input Voltage			VBL	22.8	24.0	25.2	VDC	
Power Supply Input Voltage Ripple					-0.2		0.2	Vp-p	1
Unloading Input Voltage						27.0	Vdc	
Power Input Current	Operating		IBL	4.7	5.2	5.7	A	
	Turn On			-	6.0	6.5	A	1, 2
Power Consumption			PBL	-	125	132	W	
Input Voltage for Control System Signals	Brightness Adjust		VBR	0		3.3	VDC	3
	On/Off	On	V on	3.0		5.0	VDC	
		Off	V off	-0.3	0.0	0.5	VDC	
Lamp :								
Life Time				50,000	60,000		Hrs	4

Notes :

1. Electrical characteristics are determined after the unit has been 'ON' and stable for approximately 120
   minutes at $25\pm2°C$

   The specified current and power consumption are under the typical supply Input voltage, it is total power
   consumption.

   The ripple voltage of the power supply input voltage is under 0.2 Vp-p.

   LPL recommend Input Voltage is 24.0V $\pm$ 5%.

2. It is not inrush current, it is the current at turn on time.

3. Brightness Control.

   This VBR Voltage control brightness.

VBR Voltage	Function
3.3V	Maximum Brightness (100%)
0V	Minimum Brightness (20~ 30%)

4. The life is determined as the time at which luminance of the lamp is 50% compared to that of initial
   value at the typical lamp current on condition of continuous operating at $25 \pm 2°C$.
   Specified value is when lamp is aligned horizontally.

3-2. Interface Connections

This LCD module employs two kinds of interface connection, a 51-pin connector is used for the module electronics and two 12-pin connectors are used for the integral backlight system.

3-2-1. LCD Module

- LCD Connector(CN1): FI-R51S-HF(manufactured by JAE)
- Mating Connector : FI-R51HL(JAE)

Table 3. MODULE CONNECTOR(CN1) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	GND	Ground	27	Reserved	No connection or GND
2	Reserved (NC)	No connection	28	RE0N	SECOND CHANNEL 0-
3	Reserved (NC)	No connection	29	RE0P	SECOND CHANNEL 0+
4	Reserved (NC)	No connection	30	RE1N	SECOND CHANNEL 1-
5	Reserved (NC)	No connection	31	RE1P	SECOND CHANNEL 1+
6	Reserved (NC)	No connection	32	RE2N	SECOND CHANNEL 2-
7	LVDS select	Select LVDS Data format	33	RE2P	SEC`OND CHANNEL 2+
8	VBR_EXT	External VBR	34	GND	Ground
9	VBR_OUT	VBR output	35	RECLKN	SECOND CLOCK CHANNEL C-
10	DCR Enable	'H'=Enable, 'L'=Disable	36	RECLKP	SECOND CLOCK CHANNEL C+
11	GND	Ground	37	GND	Ground
12	RO0N	FIRST CHANNEL 0-	38	RE3N	SECOND CHANNEL 3-
13	RO0P	FIRST CHANNEL 0+	39	RE3P	SECOND CHANNEL 3+
14	RO1N	FIRST CHANNEL 1-	40	Reserved (NC)	No connection
15	RO1P	FIRST CHANNEL 1+	41	Reserved (NC)	No connection
16	RO2N	FIRST CHANNEL 2-	42	Reserved	No connection or GND
17	RO2N	FIRST CHANNEL 2+	43	Reserved	No connection or GND
18	GND	Ground	44	GND	Ground
19	ROCLKN	FIRST CLOCK CHANNEL C-	45	GND	Ground
20	ROCLKP	FIRST CLOCK CHANNEL C+	46	GND	Ground
21	GND	Ground	47	NC	No connection
22	RO3N	FIRST CHANNEL 3-	48	VLCD	Power Supply +12.0V
23	RO3P	FIRST CHANNEL 3+	49	VLCD	Power Supply +12.0V
24	Reserved (NC)	No connection	50	VLCD	Power Supply +12.0V
25	Reserved (NC)	No connection	51	VLCD	Power Supply +12.0V
26	Reserved	No connection or GND	-	-	-

Notes : 1. All GND(ground) pins should be connected together to the LCD module's metal frame.
2. If DCR function should be enable('H'),
   10th pin must be connected to serial resistor which value is under 1k ohm.
3. All VLCD (power input) pins should be connected together.
4. All Input levels of LVDS signals are based on the IEA 664 Standard.

Table 4. Required signal assignment for Flat Link (Thine : THC63LVD823) Transmitter(Pin7="L)
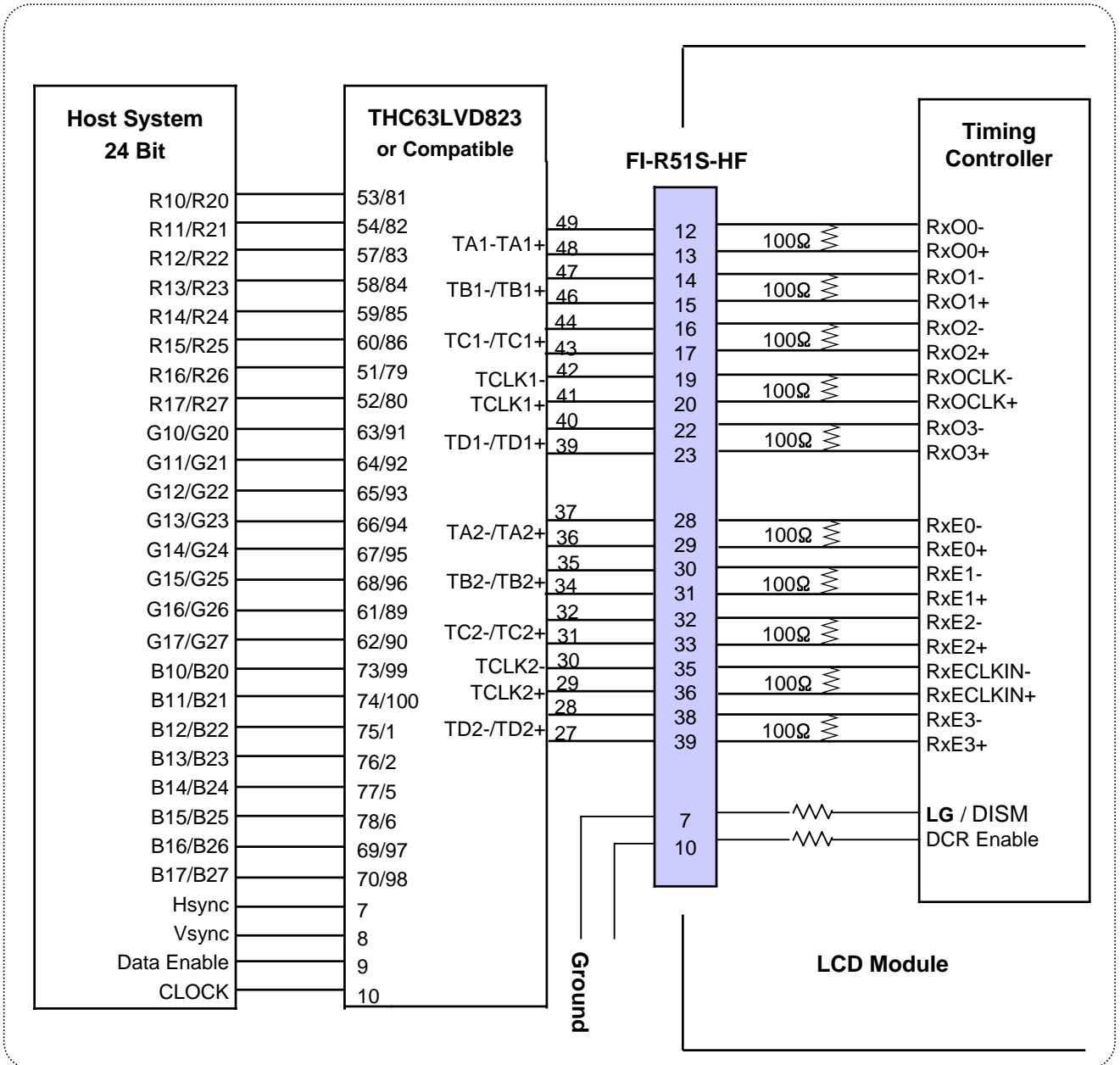
Note:

1. The LCD module uses a 100 Ohm(Ω) resistor between positive and negative lines
   of each receiver input.
2. Refer to LVDS transmitter data sheet for detail descriptions. (THC63LVD823 or Compatible)
3. '7' means MSB and '0' means LSB at R,G,B pixel data.

Table 5. Required signal assignment for Flat Link (Thine : THC63LVD823) Transmitter(Pin7="H")
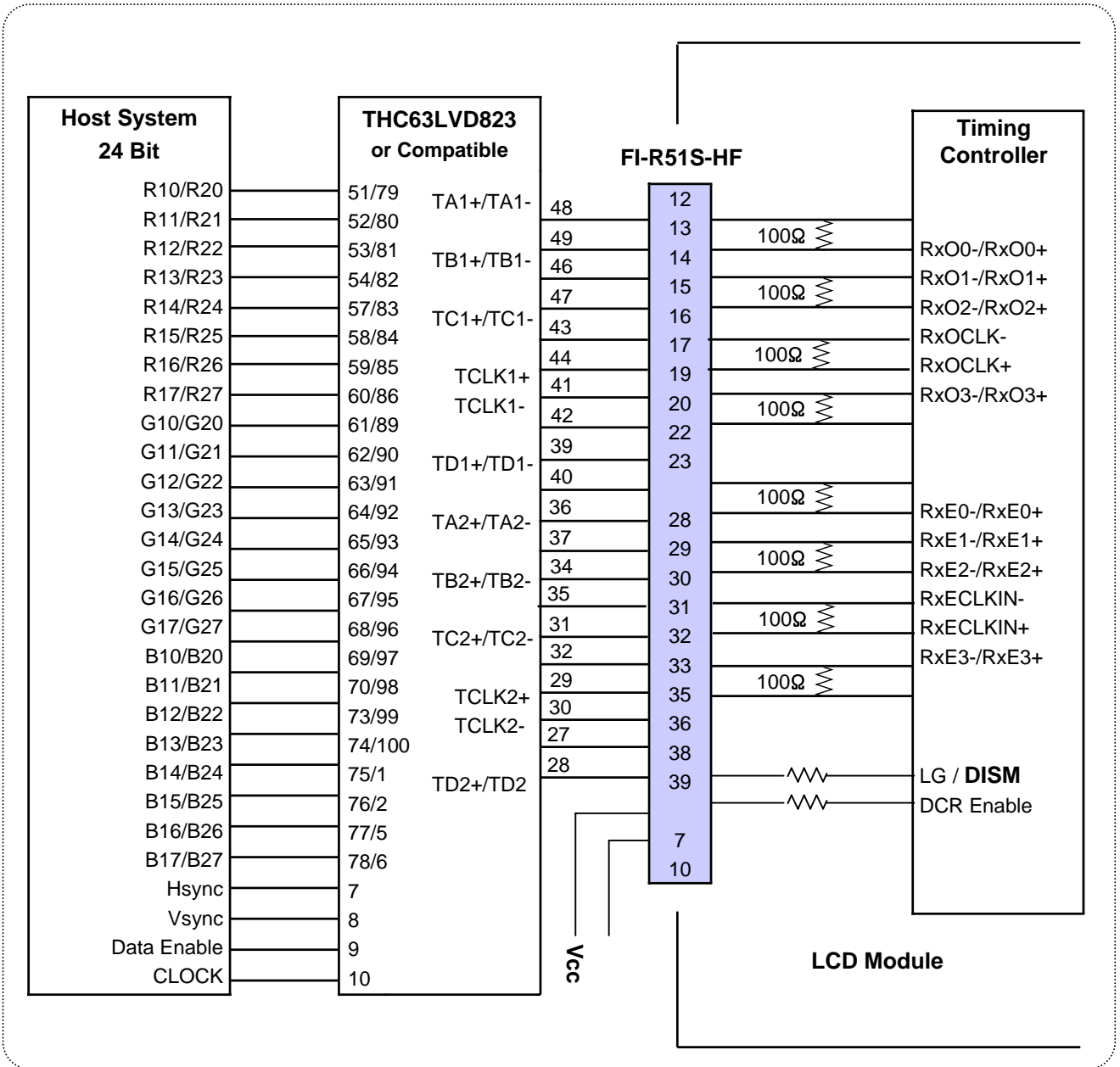
Note:

1. The LCD module uses a 100 Ohm(Ω) resistor between positive and negative lines
   of each receiver input.
2. Refer to LVDS transmitter data sheet for detail descriptions. (THC63LVD823 or Compatible)
3. '7' means MSB and '0' means LSB at R,G,B pixel data.

3-2-2. Backlight Inverter

Input Connector
-Inverter Connector : S12B-PHA-SM3(manufactured by JST)
-Mating Connector : PHR-12
Status Connector
-Inverter Connector : 20022WR-02A00(manufactured by Yeon Ho co., Korea)
-Mating Connector : 20022HR-02S00(manufactured by Yeon Ho co., Korea)

Table 6. INVERTER CONNECTOR PIN CONFIGULATION

Pin No	Symbol	Description	Master	Slave	Note
1	VBL	Power Supply +24.0V	VBL	VBL	
2	VBL	Power Supply +24.0V	VBL	VBL	
3	VBL	Power Supply +24.0V	VBL	VBL	
4	VBL	Power Supply +24.0V	VBL	VBL	
5	VBL	Power Supply +24.0V	VBL	VBL	
6	GND	POWER GND	GND	GND	
7	GND	POWER GND	GND	GND	
8	GND	POWER GND	GND	GND	1
9	GND	POWER GND	GND	GND	
10	GND	POWER GND	GND	GND	
11	VBR	0V ~ 3.3V	VBR	Don't care	2
12	On/Off	0V ~ 5.0V	On/Off	Don't care	3
Option Pin(Lamp Open Status Detection)					
1	GND	POWER GND	GND		
2	Status	Upper 3.0V(Normal), Under 0.7V(Abnormal)	Status		

Component side
Status connector   Input connector

PCB ① ②   ① ② ③ ○ ○ ○   ○ ○ ⑪ ⑫ **Top**

Bottom
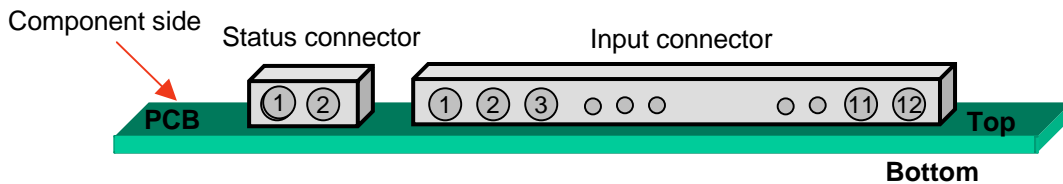
Note : 1. GND should be connected to the LCD module's metal frame.

2. Minimum Brightness : VBR = 0.0V
   Maximum Brightness : VBR = 3.3V

3. VON : 3.0 ~ 5.0V
   VOFF : -0.3 ~ 0.7V

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3-3. Signal Timing Specifications

Table 7 shows the signal timing required at the input of the LVDS transmitter. All of the interface signal timing should be satisfied with the following specification for normal operation.

Table 7. TIMING TABLE

[For NTSC]

ITEM		Symbol	Min	Typ	Max	Unit	Note
Horizontal	Display Period	tHV	-	960	-	tclk	
	Blank	tHB	100	140	320	tclk	
	Total	tHP	1060	1100	1280	tclk	2200/2
Vertical	Display Period	tVV	-	1080	-	Lines	
	Blank	tVB	11	45	69	Lines	
	Total	tVP	1091	1125	1149	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	Note
Frequency	DCLK	fCLK	70	74.25	77	MHz	148.5/2
	Horizontal	fH	65.5	67.5	68.9	KHz	
	Vertical	fV	57	60	63	Hz	

[For PAL]

ITEM		Symbol	Min	Typ	Max	Unit	Note
Horizontal	Display Period	tHV	-	960	-	tclk	
	Blank	tHB	100	140	240	tclk	
	Total	tHP	1060	1100	1200	tclk	2200/2
Vertical	Display Period	tVV	-	1080	-	Lines	
	Blank	tVB	25	45	65	Lines	
	Total	tVP	1105	1125	1145	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	Note
Frequency	DCLK	fCLK	59.63	61.88	67.5	MHz	123.75/2
	Horizontal	fH	55.25	56.25	57.25	KHz	
	Vertical	fV	47	50	53	Hz	

Note : The Input of HSYNC & VSYNC signal does not have an effect on normal operation(DE Only Mode).

The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rate.

3-4. Signal Timing Waveforms

Hsync, Vsync, DE, Data

0.7VDD

0.3VDD

t_{CLK}

DCLK

0.5 VDD

Valid data

First data   **Invalid data**   Pixel 0,0   Pixel 2,0   **Invalid data**

Valid data

Second data   **Invalid data**   Pixel 1,0   Pixel 3,0   **Invalid data**

DE(Data Enable)

* $t_{HB} = t_{HFP} + t_{WH} + t_{HBP}$
* $t_{VB} = t_{VFP} + t_{WV} + t_{VBP}$

t_{HT}

HSync t_{WH}

t_{HBP} t_{HV} t_{HFP}

DE(Data Enable)

t_{VT}

t_{WV}

VSync

t_{VBP} t_{VV} t_{VFP}

DE(Data Enable)
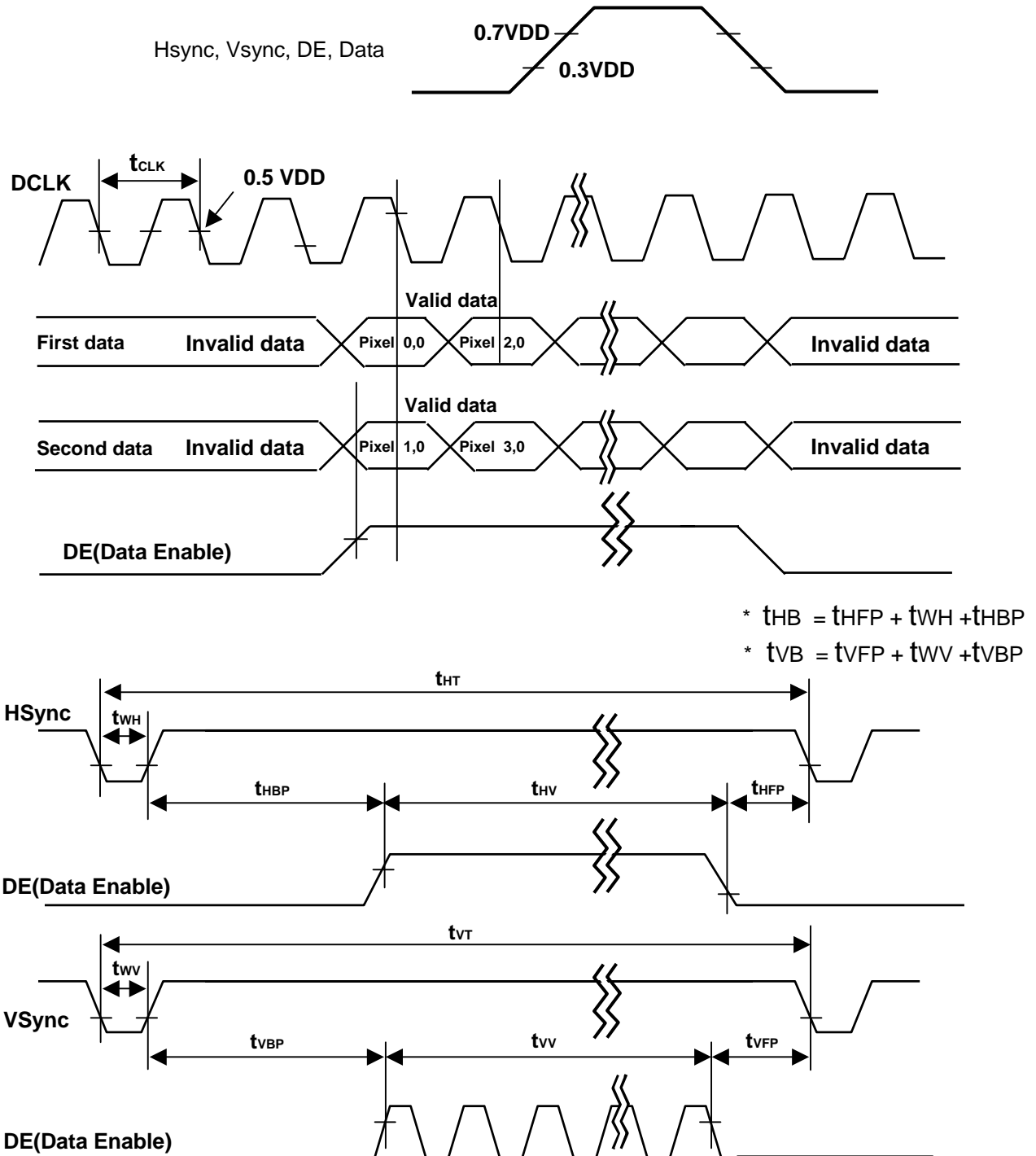
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3-5. Color Data Reference

The brightness of each primary color(red,green,blue) is based on the 8-bit gray scale data input for the color. The higher binary input, the brighter the color. Table 8 provides a reference for color versus data input.

Table 8. COLOR DATA REFERENCE

Color		Input Color Data																								
		RED MSB → LSB								GREEN MSB → LSB								BLUE MSB → LSB								
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	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
	Red (255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue (255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	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	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
RED	RED (000) Dark	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	...			...								...								...					
	RED (254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN (000) Dark	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	1	0	0	0	0	0	0	0	0
	...			...								...								...					
	GREEN (254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN (255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE (000) Dark	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	1
	...			...								...								...					
	BLUE (254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE (255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

3-6. Power Sequence

3-6-1. LCD Driving circuit
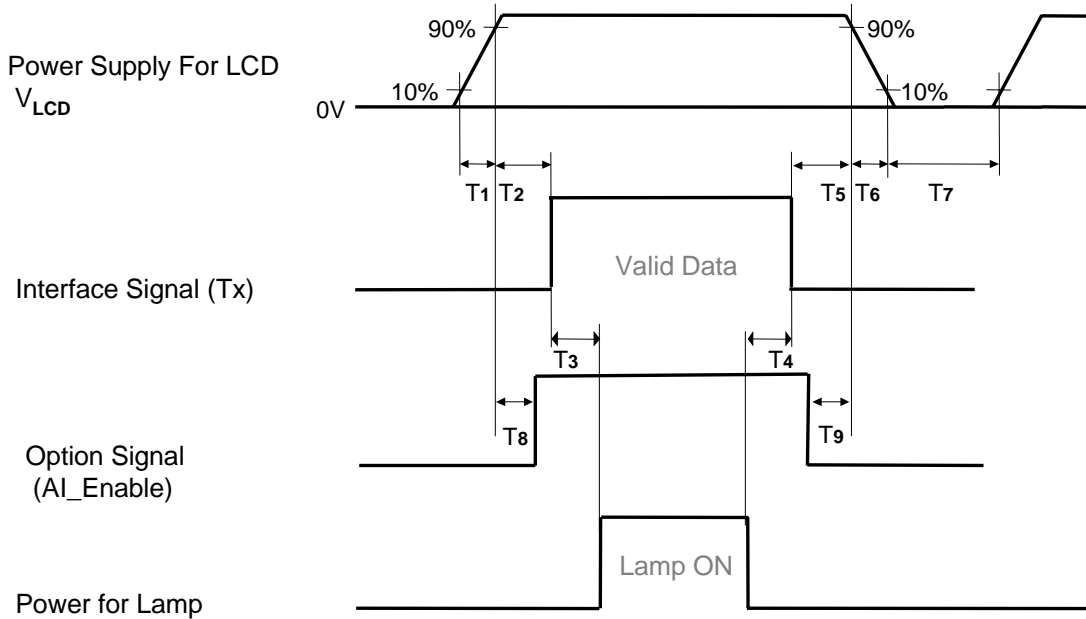
Table 9. POWER SEQUENCE

Parameter	Value			Unit
	Min	Typ	Max	
T1	**0.5**	-	20	ms
T2	**0.5**	-	50	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0.5	-	50	ms
T6	-	-	300	ms
T7	1.0	-	-	s
T8	0 < T8 < T2			ms
T9	0 < T9 < T5			ms

Note :   1. Please avoid floating state of interface signal at invalid period.

2. When the interface signal is invalid, be sure to pull down the power supply V_{LCD} to 0V.

3. Flicker would come out when power on-off(T7=under 2s) is tested over several ten-times.

4. The case when the T2/T5 exceed maximum specification, it operates protection
   pattern(Black pattern) till valid signal inputted. There is no reliability problem.

5. The T3/T4 is recommended value, the case when failed to meet a minimum specification,
   abnormal display would be shown. There is no reliability problem.

3-6-2. On/Off for Inverter
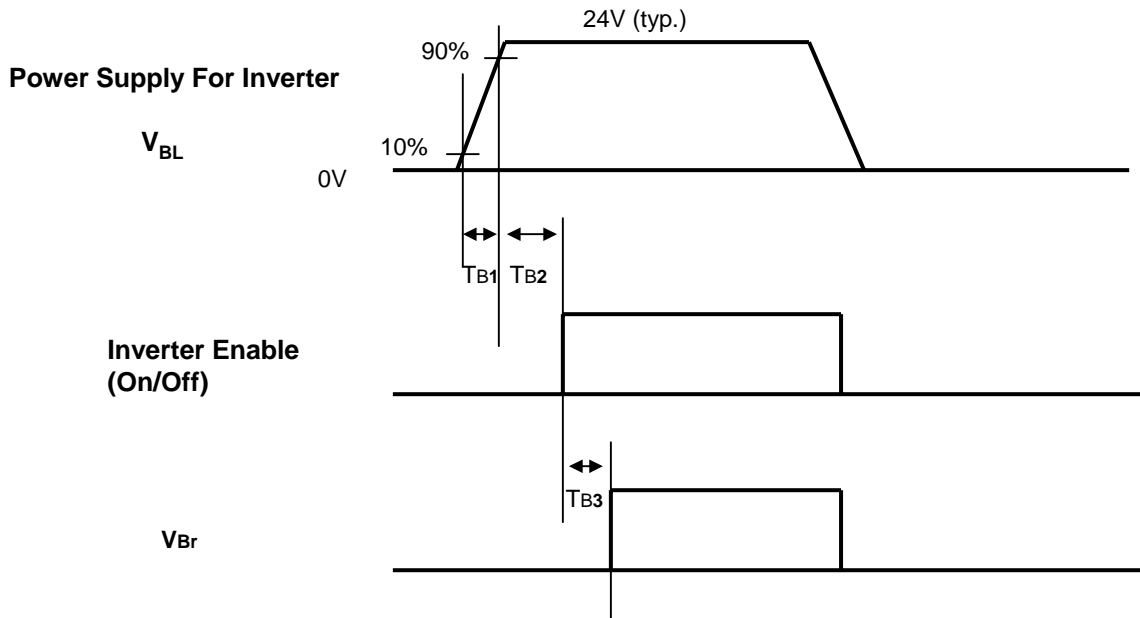
3-6-3. Deep condition for Inverter
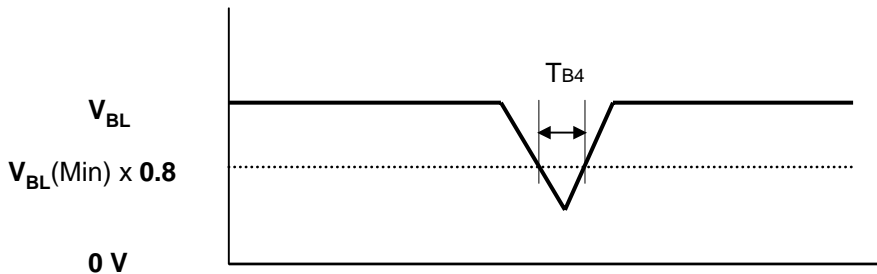
Table 10. POWER SEQUENCE FOR INVERTER

Parameter	Value			Unit	Remark
	Min	Typ	Max		
T$_{B1}$	20	-	-	ms	After Inverter's connected
T$_{B2}$	500	-	-	ms	
T$_{B3}$	0	-	-	ms	
T$_{B4}$	-	-	10	ms	V_{BL}(Min) x **0.8**

Note : T$_{B1}$ describes rising time of 0V to 24V and is not applied at restarting time.
When the 24V Power is restart, the inverter enable signal must be restarted.

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 2 Hrs in a dark environment at 25±2°C. The specified optical values are measured at an approximate 50cm distance from the LCD surface on condition that viewing angle of Φ and θ equal to 0 °.
FIG. 1 shows additional information concerning the measurement equipment and method.
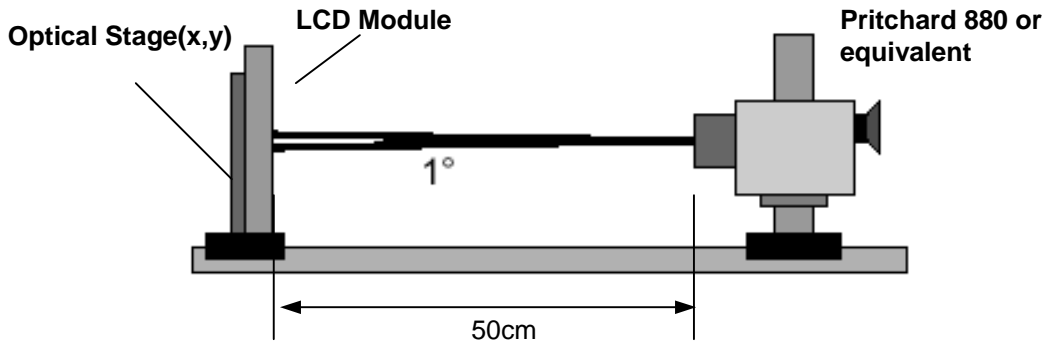
FIG. 1 Optical Characteristic Measurement Equipment and Method

Table 11. OPTICAL CHARACTERISTICS   Ta= 25±2°C, V_LCD=12.0V, fv=60Hz, Dclk=1`48.5MHz VBR=3.3V

Parameter		Symbol		Value			Unit	Note
				Min	Typ	Max		
Contrast Ratio		CR		600	(800)	-		1
		CR with DCR		(1200)	(1600)	-		
Surface Luminance, white		L_WH		400	500		cd/m^2	2
Luminance Variation		δ_WHITE	5P			1.3		3
Response Time (Gray-to-Gray)		Tr_R , Tr_D			(8)	**14**	ms	4
Color Coordinates [CIE1931]	RED	Rx			0.628			
		Ry			0.338			
	GREEN	Gx			0.280			
		Gy		Typ -0.03	0.609	Typ +0.03		
	BLUE	Bx			0.146			
		By			0.064			
	WHITE	Wx			0.272			
		Wy			0.278			
Viewing Angle (CR>10)								
	x axis, right(φ=0°)	θr		85	89	-	degree	5
	x axis, left (φ=180°)	θl		85	89	-		
	y axis, up (φ=90°)	θu		85	89	-		
	y axis, down (φ=270°)	θd		85	89	-		
Viewing Angle (CR>10) ➔ Diagonal Direction Viewing Angle * EZ Contrast 160R**								
	x axis, right(φ=45°)	**θr**		**85**	**89**	**-**	**degree**	**5**
	x axis, left (φ=135°)	**θl**		**85**	**89**	**-**		
	y axis, up (φ=225°)	**θu**		**85**	**89**	**-**		
	y axis, down (φ=315°)	**θd**		**85**	**89**	**-**		
Gray Scale		Without AI						6
		With AI						

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Note :

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

Contrast Ratio = $\dfrac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$

Measure Position : Center 1-point.

2. Surface Luminance(L_{WH}) is the luminance value measured at an approximate 50cm distance from the center 1-point of LCD surface as all pixels displaying white. See FIG. 2 for more information.

3. The variation of surface luminance , δ WHITE is defined as :

δ WHITE(5P) = Maximum(L_{on1},L_{on2}, L_{on3}, L_{on4}, L_{on5}) / Minimum(L_{on1},L_{on2}, L_{on3}, L_{on4}, L_{on5})

Where L_{on1} to L_{on5} are the luminance with all pixels displaying white at 5 locations .
For more information, see the FIG. 2.

4. Response time is defined as the required time for the transition from G(N) to G(M) (Rise Time, Tr_R) and from G(M) to G(N) (Decay Time, Tr_D). For additional information see the FIG. 3. (N<M)

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 module surface. For more information, see the FIG. 4.

6. See Table 12 for gray scale specification

Table 12. GRAY SCALE SPECIFICATION

Gray Level	Luminance [%] (Typ.)	Luminance [%] (Typ.) with AI
L0	0.12	0.06
L15	0.32	0.13
L31	1.10	0.64
L47	2.60	1.80
L63	4.90	3.56
L79	8.10	6.20
L95	12.1	10.3
L111	16.7	14.2
L127	21.6	19.5
L143	28.0	25.5
L159	35.4	32.6
L175	43.9	40.8
L191	53.3	50.4
L207	64.1	60.2
L223	75.8	72.4
L239	88.0	85.0
L255	100	100

Product Specification

Measuring point for surface luminance & measuring point for luminance variation.

A : H / 4 mm
B : V / 4 mm
H : 819.36 mm
V : 460.89 mm
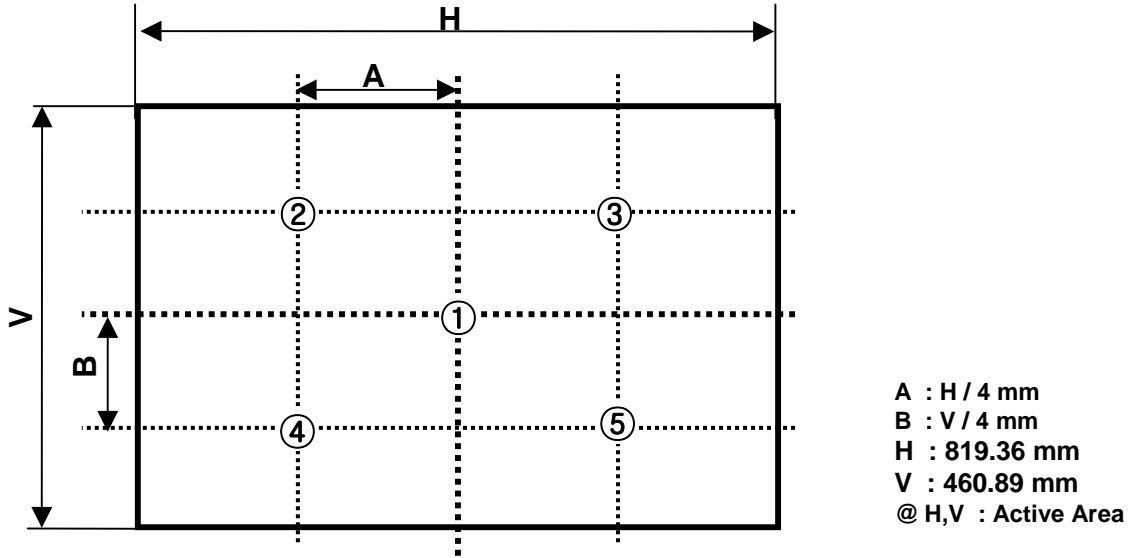@ H,V : Active Area

FIG. 2 5 Points for Luminance Measure

Response time is defined as the following figure and shall be measured by switching the input signal for "Gray(N)" and "Gray(M)".
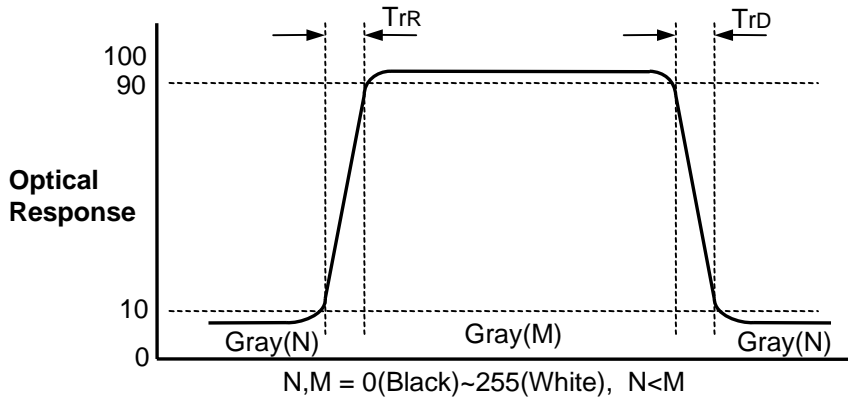

N,M = 0(Black)~255(White), N<M

FIG. 3 Response Time

Dimension of viewing angle range
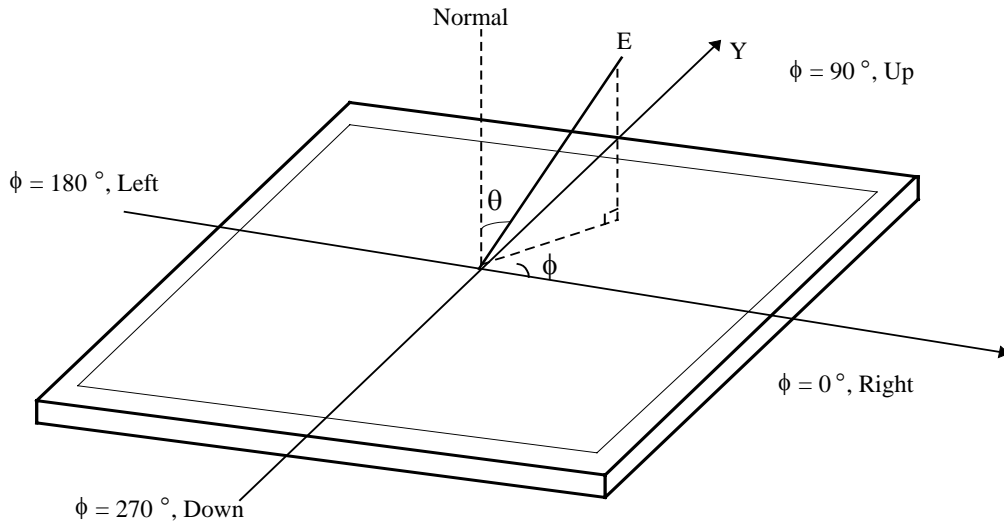
FIG. 4 Viewing Angle

Optical characteristics are determined after the unit has been 'ON' for 30min in a dark environment at 25±2°C. The values specified are at an approximate distance 1.2mm from the LCD surface at a viewing angle of Φ and θ equal to 0 °.
It is presented additional information concerning the measurement equipment and method in FIG. 1.
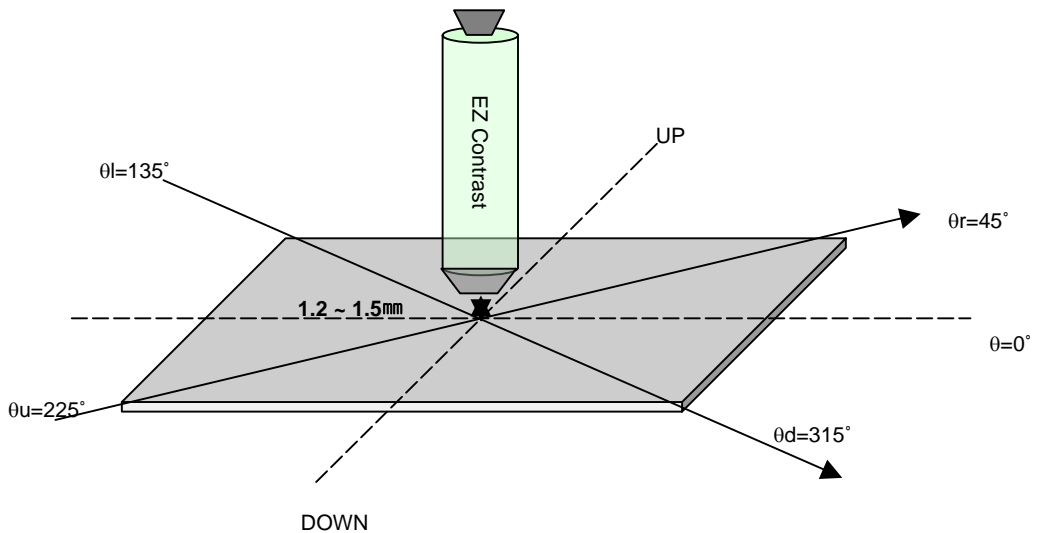
FIG. 5 Diagonal Viewing Angle Measurement Condition

5. Mechanical Characteristics

Table 13 provides general mechanical characteristics.

Table 13. MECHANICAL CHARACTERISTICS

Item	Value	
Outline Dimension	Horizontal	877.0 mm
	Vertical	516.8 mm
	Depth	55.5 mm
Bezel Area	Horizontal	828.6 mm
	Vertical	469.8 mm
Active Display Area	Horizontal	819.36 mm
	Vertical	460.89 mm
Weight	**10,500 g (Typ.), 11,000 g (Max.)**	
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer	

Note : Please refer to page21 and 22 for mechanic drawings in terms of tolerance.
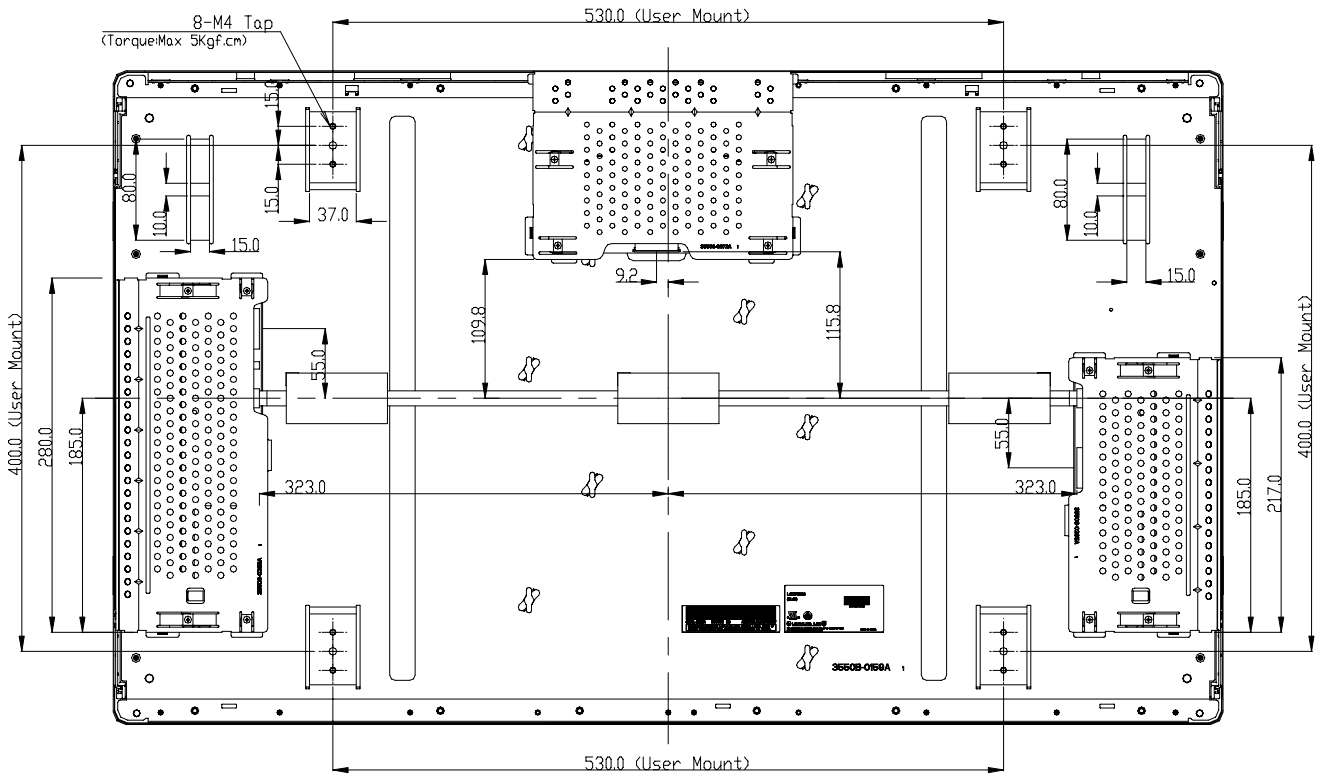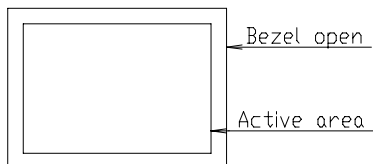
<FRONT VIEW>
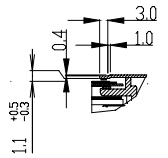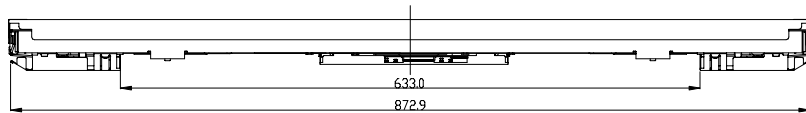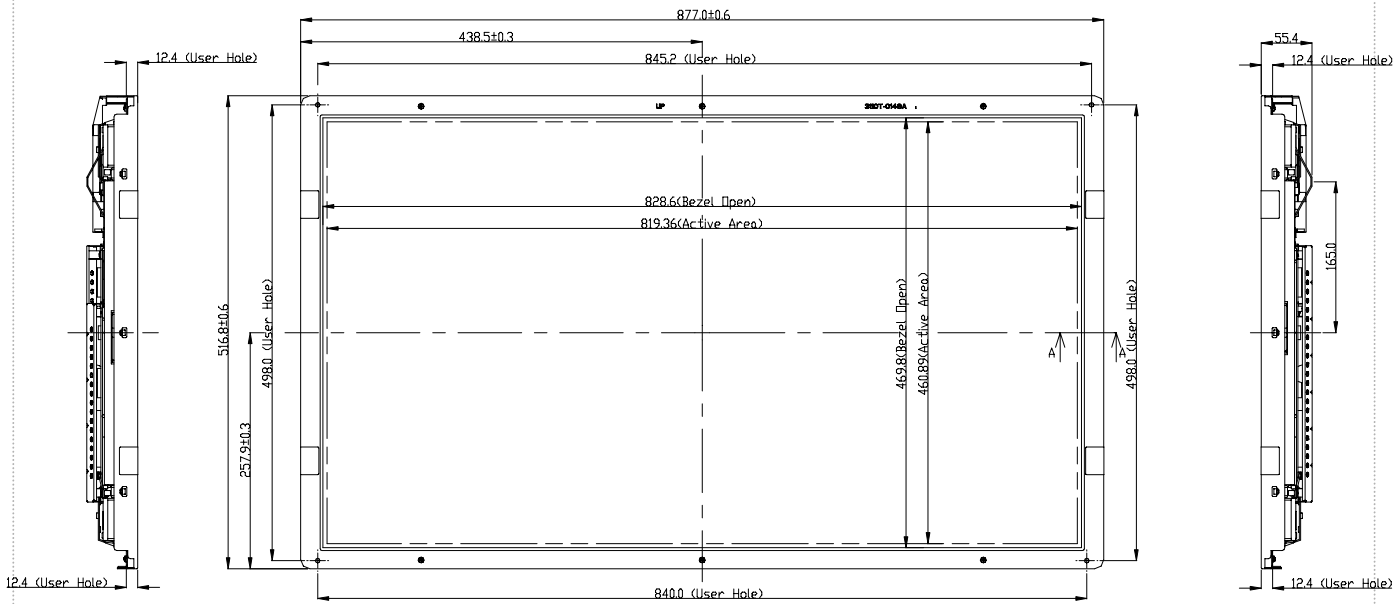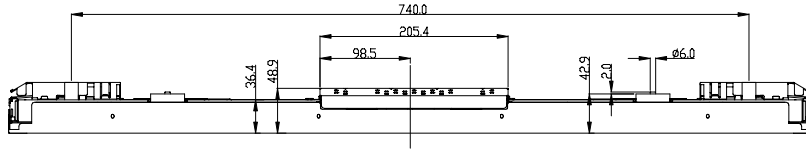
SECTION A-A
SCALE 1/2

<REAR VIEW>

NOTES
1. Unspecified tolerances are to be ±0.5mm.

2. Tilt and partial disposition tolerance of display area
   are as following.
   (1) X-Direction : IA-BI   1.5mm
   (2) Y-Direction : IC-DI   1.5mm

Bezel open

Active area

6. Reliability

Table 14. ENVIRONMENT TEST CONDITION

No.	Test Item	Condition
1	High temperature storage test	Ta= 50°C 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 40°C 50%RH 240h
4	Low temperature operation test	Ta= 0°C 240h
5	Vibration test (non-operating)	Wave form : random Vibration level : 1.0Grms Bandwidth : 10-300Hz Duration : X,Y,Z, 30 min 　　　　　One time each direction
6	Shock test (non-operating)	Shock level : 100Grms Waveform : half sine wave, 2ms Direction : $\pm X$, $\pm Y$, $\pm Z$ 　　　　　One time each direction
7	Humidity condition Operation	Ta= 40 °C, 90%RH
8	Altitude　　operating 　　　　　storage / shipment	0 - 14,000 feet(4267.2m) 0 - 40,000 feet(12192m)

7. International standards

7-1. Safety

a) UL 60950, Third Edition, Underwriters Laboratories, Inc., Dated Dec. 11, 2000.
Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment.
b) CAN/CSA C22.2, No. 60950, Third Edition, Canadian Standards Association, Dec. 1, 2000.
Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment.
c) EN 60950 : 2000, Third Edition
IEC 60950 : 1999, Third Edition
European Committee for Electrotechnical Standardization(CENELEC)
EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7-2. EMC

a) 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
b) C.I.S.P.R "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." International Special Committee on Radio Interference.
c) EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." European Committee for Electrotechnical Standardization.(CENELEC), 1998
(Including A1: 2000)

8. Packing

8-1. Designation of Lot Mark

a) Lot Mark

A	B	C	D	E	F	G	H	I	J	K	L	M

A,B,C : SIZE(INCH)
D : YEAR   E : MONTH
F : PANEL CODE   G : FACTORY CODE
H : ASSEMBLY CODE   I,J,K,L,M : SERIAL NO.

Note
1. YEAR

Year	97	98	99	2000	2001	2002	2003	2004	2005	2006	2007
Mark	7	8	9	0	1	2	3	4	5	6	7

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	4	4	5	6	7	8	9	A	B	C

3. PANEL CODE

Panel Code	P1 Factory	P2 Factory	P3 Factory	P4 Factory	P5 Factory	Hydis Panel
Mark	1	2	3	4	5	H

4. FACTORY CODE

Factory Code	LPL Gumi	LPL Nanjing	Hee Sung
Mark	K	C	D

5. SERIAL NO.

Year	1 ~ 99999	100000 ~
Mark	00001 ~ 99999	A0001 ~ A9999, ... , Z9999

b) Location of Lot Mark

Serial NO. is printed on the label. The label is attached to the backside of the LCD module.
This is subject to change without prior notice.

8-2. Packing Form

a) Package quantity in one box : 5 pcs

b) Box Size : 973 mm X 493 mm X 577 mm

9. Precautions

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

9-1. Mounting Precautions

(1) You must mount a module using holes arranged in four corners or four sides.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the 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 benzine. 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.

9-2. 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 minimized the interference.
(7) Please do not give any mechanical and/or acoustical impact to LCM. Otherwise, LCM can't be operated its full characteristics perfectly.
(8) A screw which is fastened up the steels should be a machine screw.
   (if not, it causes metallic foreign material and deal LCM a fatal blow)
(9) Please do not set LCD on its edge.

9-3. 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.

9-4. Precautions for Strong Light Exposure

Strong light exposure causes degradation of polarizer and color filter.

9-5. 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°C and 35°C 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.

9-6. 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 glue 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 surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.
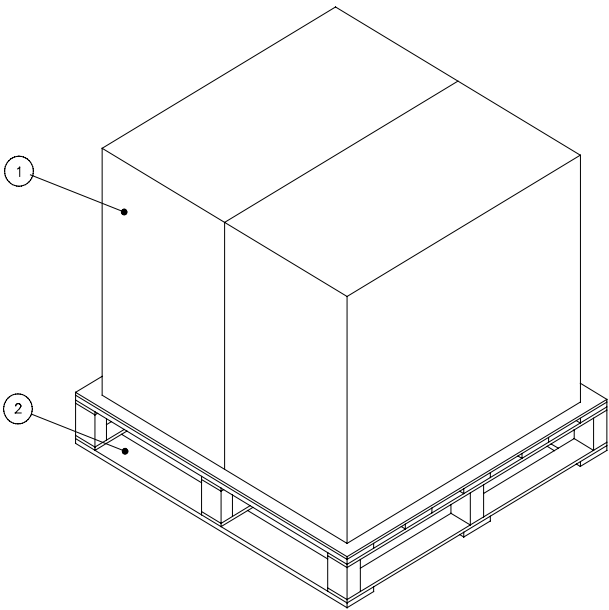
APPENDIX- I

■ LC370WU1-SL01 Packing Ass'y
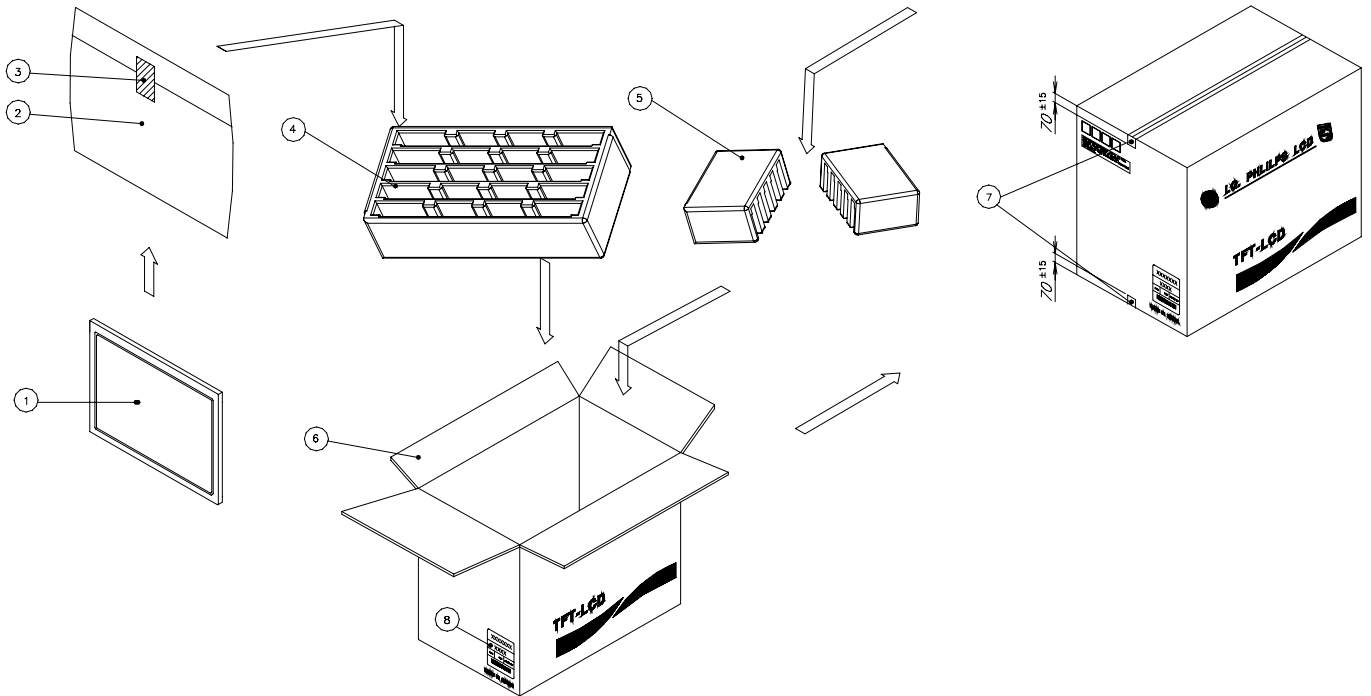
2	8	3850L−0077A	LABEL	YUPO PAPER 100X100		
2.4	7	7250L−0041A	TAPE	OPP 70mmX300m (LG PHILIPLS LCD)		
1	6	3890L−0028L	BOX	DW3 990x511x602		
1	5	3920L−0386/7A	PACKING	EPS_LC370WX1 (Left/Right)		TOP
1	4	3920L−0388A	PACKING	EPS_LC370WX1		BOTTOM
0.12	3	7250L−0023A	TAPE	MASKING 20MMX50M		
5	2	3880L−0009G	BAG	PE 970X710		
5	1		LCD MODULE			
QTY	NO	PART NO	DESCRIPTION	MATERIAL	COLOR FINISH	NOTE

APPENDIX- II

■ LC370WU1-SL01 Pallet Ass'y

2 BOXES / 1 PALLET
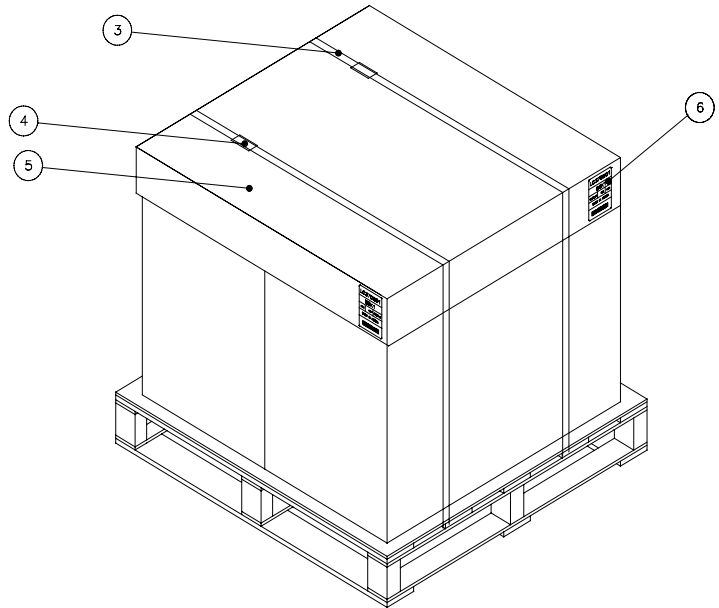
NO.	DESCRIPTION	MATERIAL
1	PACKING ASS'Y	
2	PALLET	STEEL_1100X1000X130
3	BAND, PACKING	P.P 18MMX200MX0.8MM
4	BAND, CLIP	CLIP 18MM
5	ANGLE,COVER	DW3
6	LABEL	

APPENDIX- Ⅲ

■ LCM Label

Model —— LC370WU1
(SL)(01)

UL, TUV Mark ——▶

E200909

LPL Logo ——▶

US PATENT No. ——▶ is product may be covered by one or more of the following US Patent
Nos. 5,041,823 ; 5,061,920 ; 5,280,371 ; 5,835,139

Serial No.

MADE IN KOREA ◀—— **Origin**
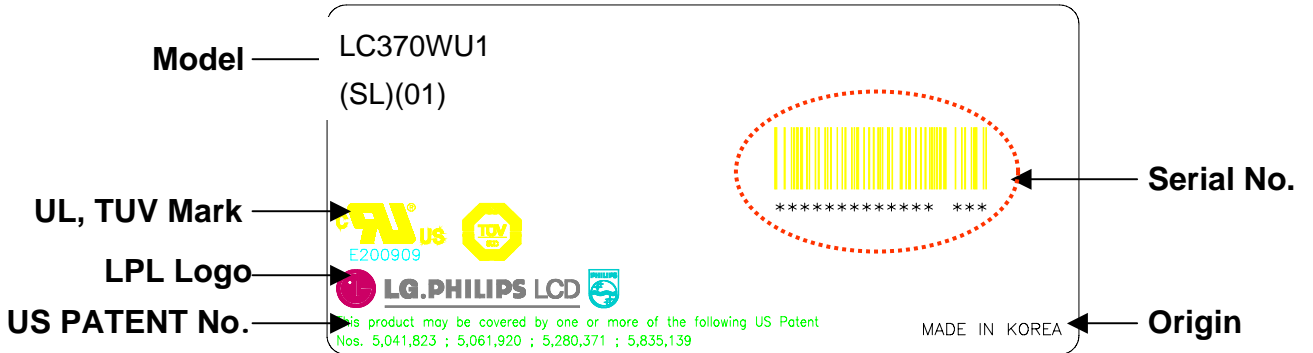
■ **Serial No. (See CAS 26page for more information)**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

Inch   Year   Month   Serial No.

M A,ssy Line code

M Ass'y Factory code
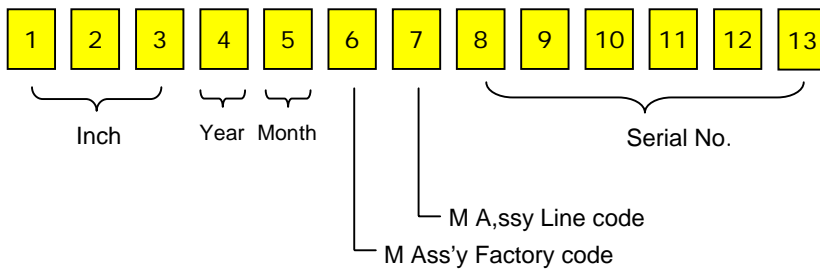
APPENDIX- Ⅳ

■ Box Label   ■ Pallet Label

LC370WU1		
SL01		
5 PCS	001/01-01	
MADE IN KOREA		Lead-free

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************** ***

LC370WU1	
SL01	
10 PCS	001/01-01
REMARK	
MADE IN KOREA	Lead-free

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