LG Display

LP121WX3
Liquid Crystal Display

Product Specification

SPECIFICATION
FOR
APPROVAL

(◆) **Preliminary Specification**

(   ) **Final Specification**

Title	12.1" WXGA TFT LCD

Customer	LENOVO
MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LP121WX3
Suffix	TLC1

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

APPROVED BY	SIGNATURE
___/___	___
___/___	___
___/___	___

Please return 1 copy for your confirmation with your signature and comments.

APPROVED BY	SIGNATURE
G. J. Kwon / G.Manager	

REVIEWED BY

J. S. Park / Manager

PREPARED BY

S. Y. Kim / Engineer

T. S. Yun / Engineer

**Products Engineering Dept.
LG Display Co., Ltd**

Product Specification

Contents

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

RECORD OF REVISIONS

| Revision No	Revision Date	Page	Description	EDID ver
0.0	Dec. 24. 2008	-	First Draft (Preliminary Specification)	0.0
0.1	Jun. 04. 2009	4	Update the General Description Block Diagram	0.1
		6	Update the Electrical Characteristics.(Change the Spec.)	
		7	Update the Pin Map Description.	
		10	Add 50Hz Timing Table	
		13	Update the Optical Characteristics.	
		16	Update the Mechanical Characteristics.	
		17	Update the Mechanical Drawing.	
		28~30	Update the EDID Data (C0 → AC)	
0.2	Jun. 12. 2009	6	Update the LCD Driver Specification	0.1
		7	Update the LCD connector Description	
		12	Update the Power Sequence	
		26	Update the Label Description	
0.3	Jun. 22. 2009	17~19	Update the Mechanical Drawing.	0.1
0.4	Jun. 25. 2009	18	Update the Mechanical Drawing.	0.1
0.5	Jul. 01. 2009	12	Update the Power Sequence.	0.1
0.6	Jul. 07. 2009	12	Update the Power Sequence.	0.1
		16	Update the Mechanical Characteristics.	

LP121WX3
Liquid Crystal Display

Product Specification

1. General Description

The LP121WX3 is a Color Active Matrix Liquid Crystal Display with an integral White LED backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally white mode. This TFT-LCD has 12.1 inches diagonally measured active display area with WXGA resolution(1280 horizontal by 800 vertical pixel array). 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 6-bit gray scale signal for each dot, thus, presenting a palette of more than 262,144 colors.

The LP121WX3 has been designed to apply the interface method that enables low power, high speed, low EMI.

The LP121WX3 is intended to support applications where thin thickness, low power are critical factors and graphic displays are important. In combination with the vertical arrangement of the sub-pixels, the LP121WX3 characteristics provide an excellent flat display for office automation products such as Notebook PC.
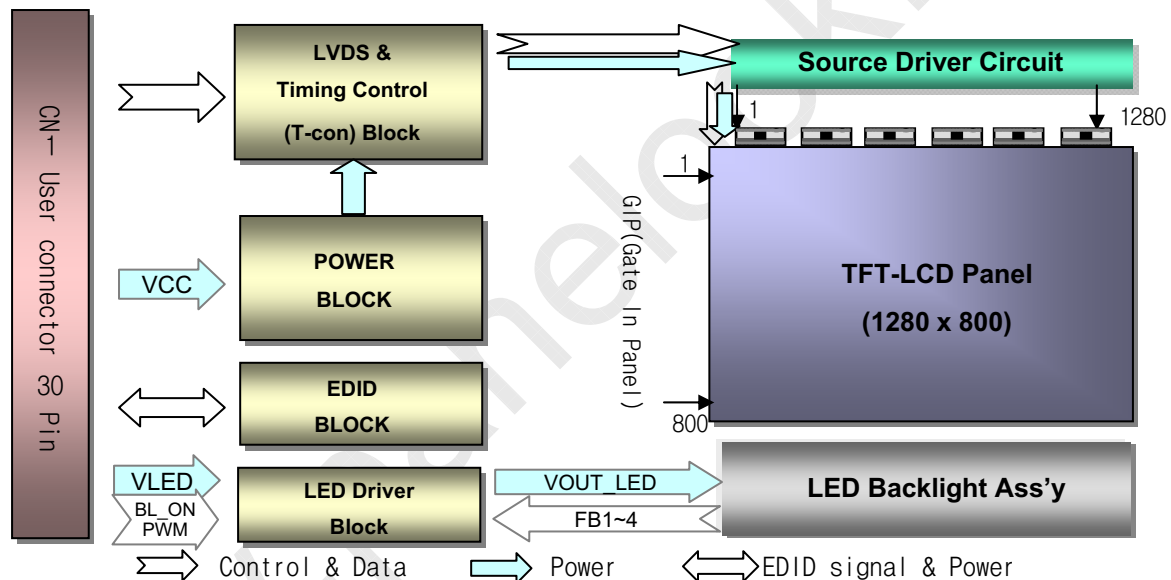
General Features

Active Screen Size	12.1 inches diagonal
Outline Dimension	275.8 (H) × 178.1 (V) × 5.3(D, max) mm
Pixel Pitch	0.204 mm × 0.204 mm
Pixel Format	1280 horiz. By 800 vert. Pixels RGB strip arrangement
Color Depth	6-bit, 262,144 colors
Luminance, White	220 cd/m^2(Typ.5 point)
Power Consumption	Total 3.8 W (Typ.) Logic: 0.8W (Typ.@Mosaic), B/L: 3.0W (Typ.@VLED:12V)
Weight	285(Max.)
Display Operating Mode	Transmissive mode, normally white
Surface Treatment	Anti-glare treatment of the front polarizer (ARC150T)
RoHS Comply	Yes

LP121WX3
Liquid Crystal Display
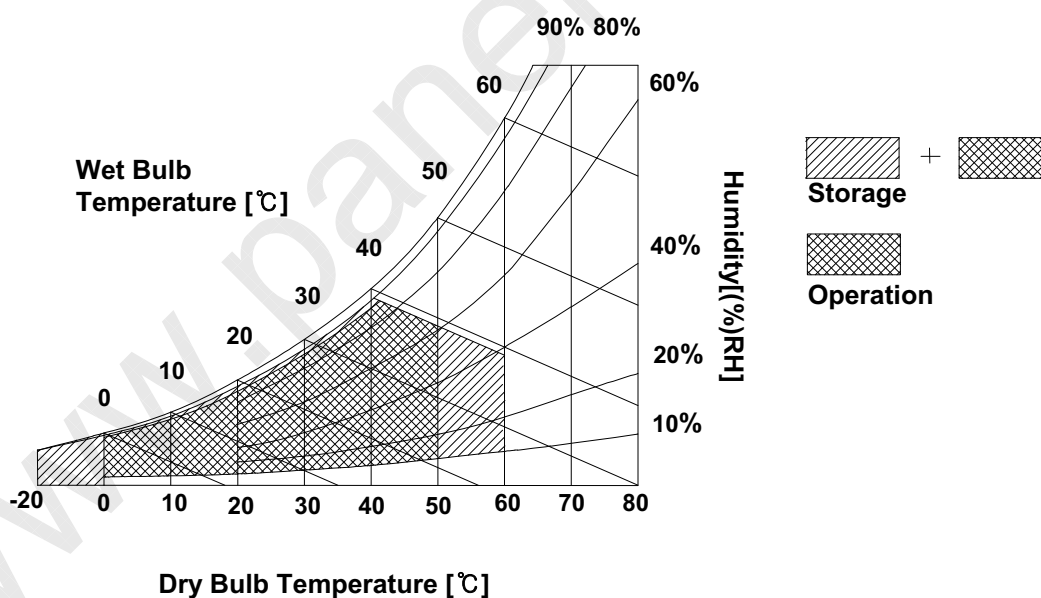
Product Specification

2. Absolute Maximum Ratings

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

Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values Min	Values Max	Units	Notes
Power Input Voltage	VCC	-0.3	4.0	Vdc	at 25 ± 5°C
Operating Temperature	TOP	0	50	°C	1
Storage Temperature	HST	-20	60	°C	1
Operating Ambient Humidity	HOP	10	90	%RH	1
Storage Humidity	HST	10	90	%RH	1

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.

LG Display

Product Specification

3. Electrical Specifications

3-1. Electrical Characteristics

The LP121WX3 requires two power inputs. The first logic is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second backlight is the input about LED BL.with LED Driver.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol		Values			Unit	Notes
			Min	Typ	Max		
MODULE :							
Power Supply Input Voltage	VCC		3.0	3.3	3.6	V_{DC}	
Power Supply Input Current	I_{CC}	Mosaic	-	250	285	mA	1
Power Consumption	Pc	Mosaic	-	0.8	0.9	W	
LVDS Impedance	Z_{LVDS}		90	100	110	Ω	2
LED Backlight:							
Operating Current per string	I_{LED}		5.0	20.0	21.0	mA	3
Operating Voltage per string	V_{LED}		-	32.0	34.0	V	
Power Consumption	P_{BL}			3.0	3.4	W	3
Life Time			12,000			Hrs	4
LED Driver							
Power Supply Input Voltage	V_{BL+}		7.0	12.0	21.0	V	
Frequency	F_{PWM}		200		1000	Hz	5
PWM Dimming (Duty) Ratio	D_{on}		1.5	-	100	%	6
PWM High Voltage Level	V_{PWM_H}		3.0	-	5.3	V	
PWM Low Voltage Level	V_{PWM_L}		0	-	0.5	V	
LED_EN High Voltage	$V_{LED\_EN\_H}$		3.0	-	5.3	V	
LED_EN Low Voltage	$V_{LED\_EN\_L}$		0	-	0.5	V	

Note)

1. The specified current and power consumption are under the Vcc = 3.3V , 25℃, fv = 60Hz condition whereas Mosaic pattern is displayed and fv is the frame frequency.
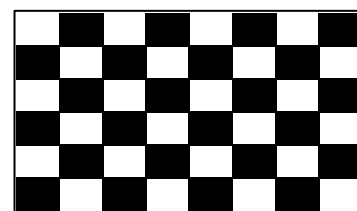
2. This impedance value is needed to proper display and measured form LVDS Tx to the mating connector.

3. The specified LED current and power consumption are under the Vled = 12.0V , 25℃, Dimming of Max luminance whereas White pattern is displayed and fv is the frame frequency.

4. The life time is determined as the time at which brightness of LCD is 50% compare to that of minimum value at Table. 7. These LED backlight has 4 strings on it and the typical current of LED's string is base on 20mA

5. This Spec. is not effective at 100% dimming ratio as an exception because it has DC level equivalent to 0Hz. In spite of acceptable range as defined, the PWM Frequency should be fixed and stable for more consistent brightness control at any specific level desired.

6. LGD LED Driver guarantee 6.0% at PWM minimum dimming ratio. Minimum dimming ratio 1.5% is based on Lenovo's.
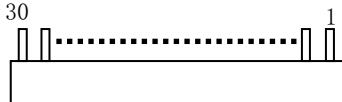
LP121WX3
Liquid Crystal Display

LG Display

Product Specification

3-2. Interface Connections
This LCD employs one interface connections, a 30 pin connector is used for the module electronics interface and the integral backlight system.
The electronics interface connector is a model FI-XB30SL-HF10 manufactured by JAE.

Table 3. MODULE CONNECTOR PIN CONFIGURATION (CN1)

Pin	Symbol	Description	Notes
1	NC	No Connection	1, Interface chips
2	VCC	Power Supply, 3.3V (typical)	1.1 LCD : SW, SW0611A (LCD Controller)
3	VCC	Power Supply, 3.3V (typical)	including LVDS Receiver
4	V EEDID	DDC 3.3V power	1.2 System : THC63LVD823A or equivalent
5	Reserved	Reserved for supplier test point	* Pin to Pin compatible with LVDS
6	Clk EEDID	DDC Clock	
7	DATA EEDID	DDC Data	2. Connector
8	R_{IN} 0-	Negative LVDS differential data input	2.1 LCD : FI-XB30SL-HF10, JAE
9	R_{IN} 0+	Positive LVDS differential data input	
10	GND	Ground	2.2 Connector pin arrangement
11	R_{IN} 1-	Negative LVDS differential data input	
12	R_{IN} 1+	Positive LVDS differential data input	
13	GND	Ground	
14	R_{IN} 2-	Negative LVDS differential data input	
15	R_{IN} 2+	Positive LVDS differential data input	
16	GND	Ground	
17	CLKIN-	Negative LVDS differential clock input	[LCD Module Rear View]
18	CLKIN+	Positive LVDS differential clock input	
19	GND	Ground	
20	GND	Ground	
21	VBL-	LED Ground	
22	VBL-	LED Ground	
23	VBL-	LED Ground	
24	NC	No Connection	
25	VLED	LED Power Supply 7V-21V	
26	VLED	LED Power Supply 7V-21V	
27	VLED	LED Power Supply 7V-21V	
28	PWM	PWM for luminance control (200Hz ~ 1000Hz)	
29	LED_EN	Backlight On/Off Control	
30	NC	No Connection	

LP121WX3
Liquid Crystal Display

Product Specification

3-3. LVDS Signal Timing Specifications

3-3-1. DC Specification
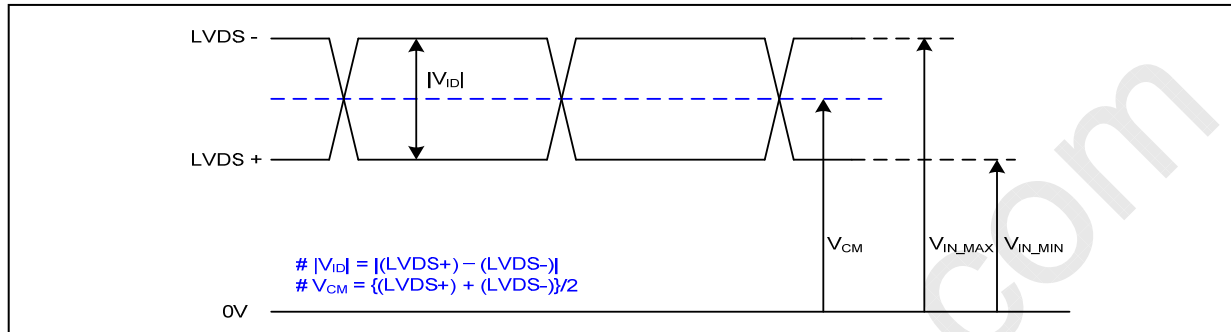
Description	Symbol	Min	Max	Unit	Notes
LVDS Differential Voltage	$\|V_{ID}\|$	100	600	mV	-
LVDS Common mode Voltage	V_{CM}	0.6	1.8	V	-
LVDS Input Voltage Range	V_{IN}	0.3	2.1	V	-

3-3-2. AC Specification
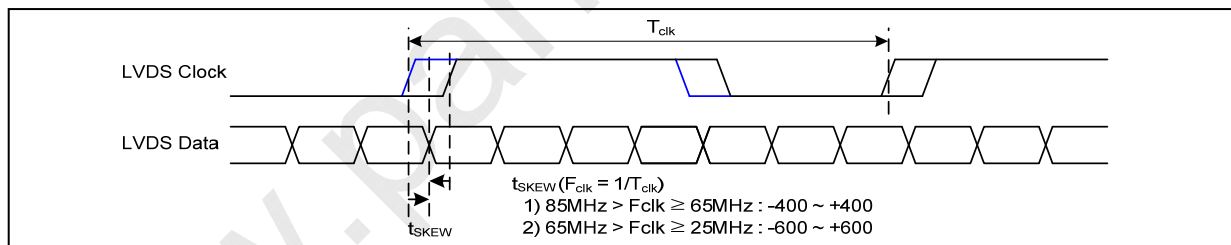
Description	Symbol	Min	Max	Unit	Notes
LVDS Clock to Data Skew Margin	t_{SKEW}	- 400	+ 400	ps	85MHz > Fclk ≥ 65MHz
	t_{SKEW}	- 600	+ 600	ps	65MHz > Fclk ≥ 25MHz
LVDS Clock to Clock Skew Margin (Even to Odd)	t_{SKEW_EO}	- 1/7	+ 1/7	T_{clk}	-
Maximum deviation of input clock frequency during SSC	F_{DEV}	-	± 3	%	-
Maximum modulation frequency of input clock during SSC	F_{MOD}	-	200	KHz	-

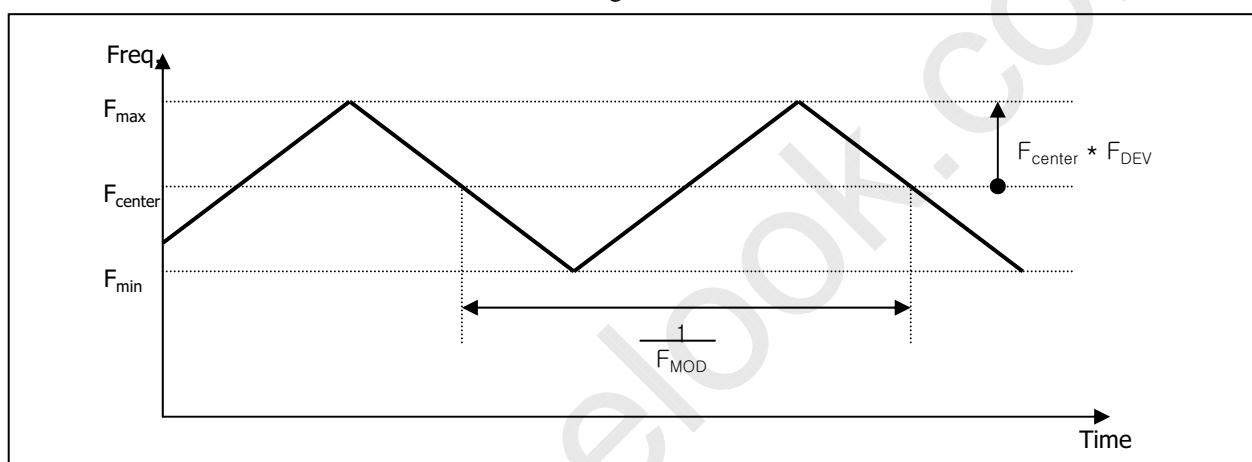Product Specification
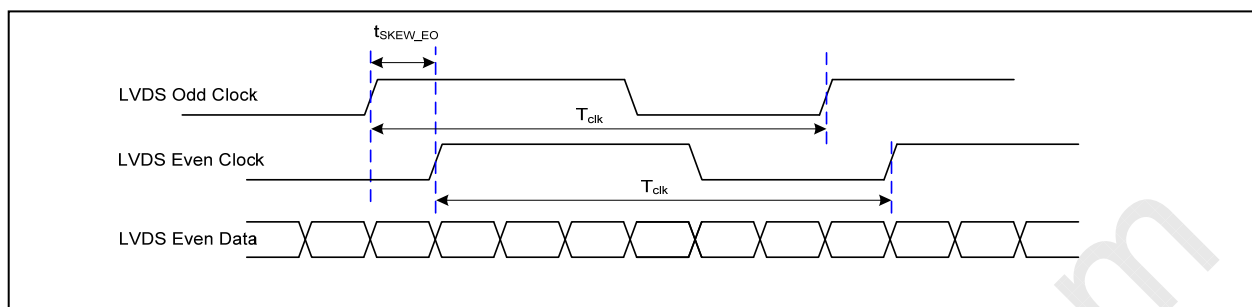
< Clock skew margin between channel >

< Spread Spectrum >
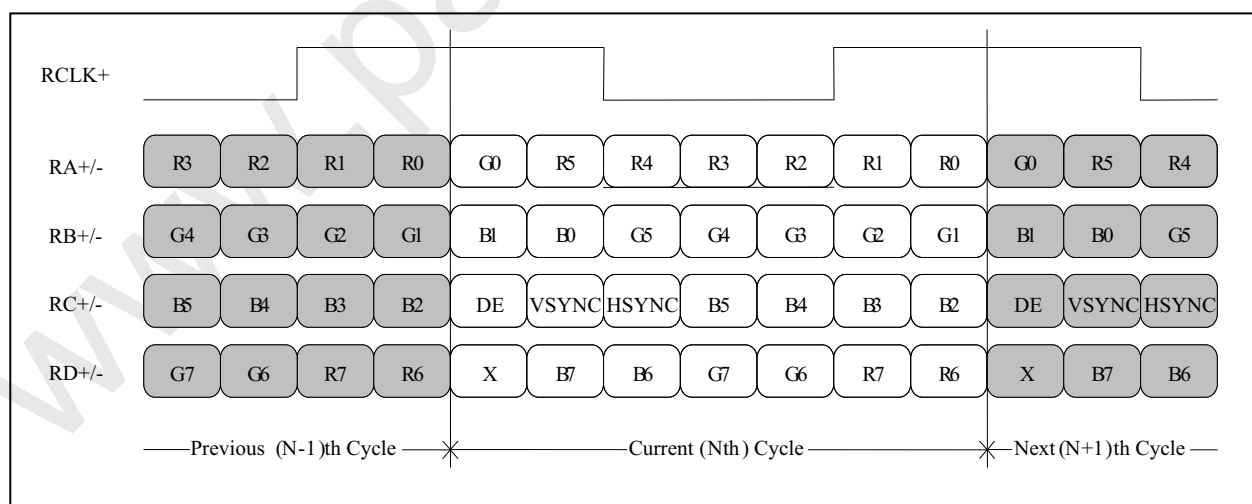
3-3-3. Data Format

1) LVDS 1 Port

< LVDS Data Format >

LP121WX3
Liquid Crystal Display

Product Specification

3-4. Signal Timing Specifications

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 and specifications of LVDS Tx/Rx for its proper operation.

Table 4. TIMING TABLE

ITEM	Symbol		Min	Typ	Max	Unit	Note(50Hz)
DCLK	Frequency	f_{CLK}	66.9	69.3	73.9	MHz	57.79
Hsync	Period	Thp	1376	1408	1480	tCLK	1408
Hsync	Width	t_{WH}	24	32	40	tCLK	32
Hsync	Width-Active	t_{WHA}	1280	1280	1280	tCLK	1280
Vsync	Period	t_{VP}	810	820	832	tHP	820
Vsync	Width	t_{WV}	2	4	6	tHP	4
Vsync	Width-Active	t_{WVA}	800	800	800	tHP	800
Data Enable	Horizontal back porch	t_{HBP}	56	72	96	tCLK	72
Data Enable	Horizontal front porch	t_{HFP}	16	24	64	tCLK	24
Data Enable	Vertical back porch	t_{VBP}	6	12	18	tHP	12
Data Enable	Vertical front porch	t_{VFP}	2	4	8	tHP	4

Appendix) All reliabilities are specified for timing specification based on refresh rate of 60Hz. However, LP121WX3 has a good actual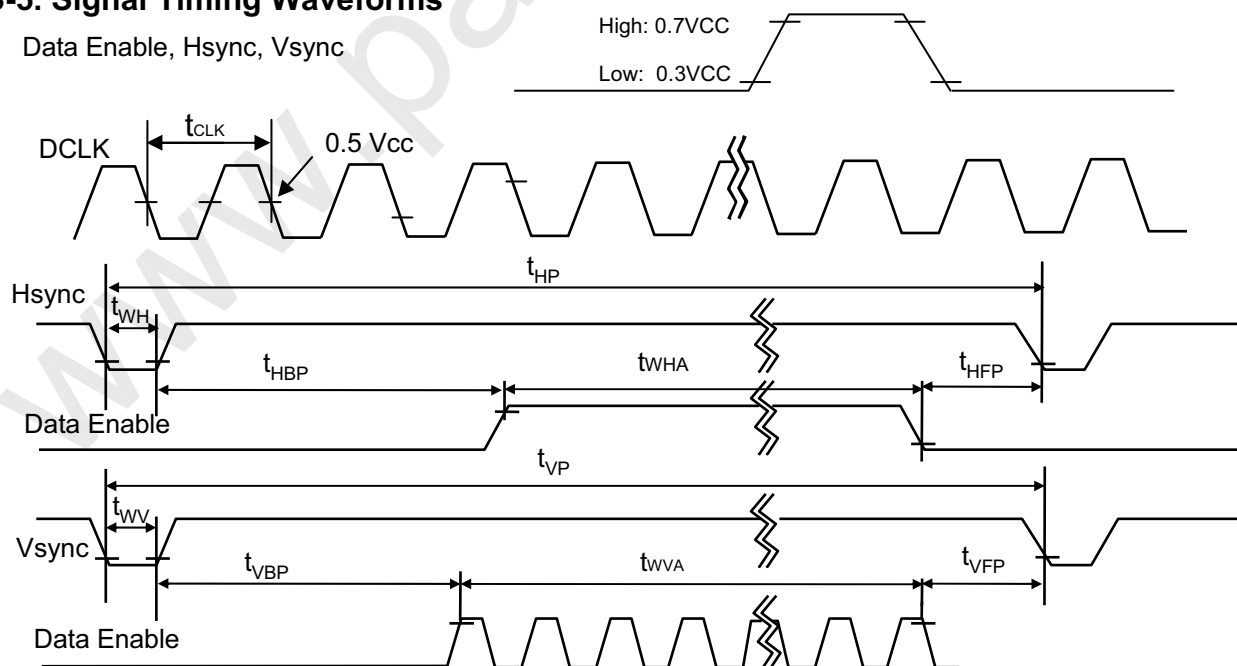 performance even at lower refresh rate (e.g. 50Hz) for power saving mode, whereas LP121WX3 is secured only for function under lower refresh rate. 60Hz at Normal mode, 50Hz at Power save mode. Don't care Flicker level (power save mode).

3-5. Signal Timing Waveforms

Condition : VCC =3.3V

Data Enable, Hsync, Vsync

High: 0.7VCC
Low: 0.3VCC

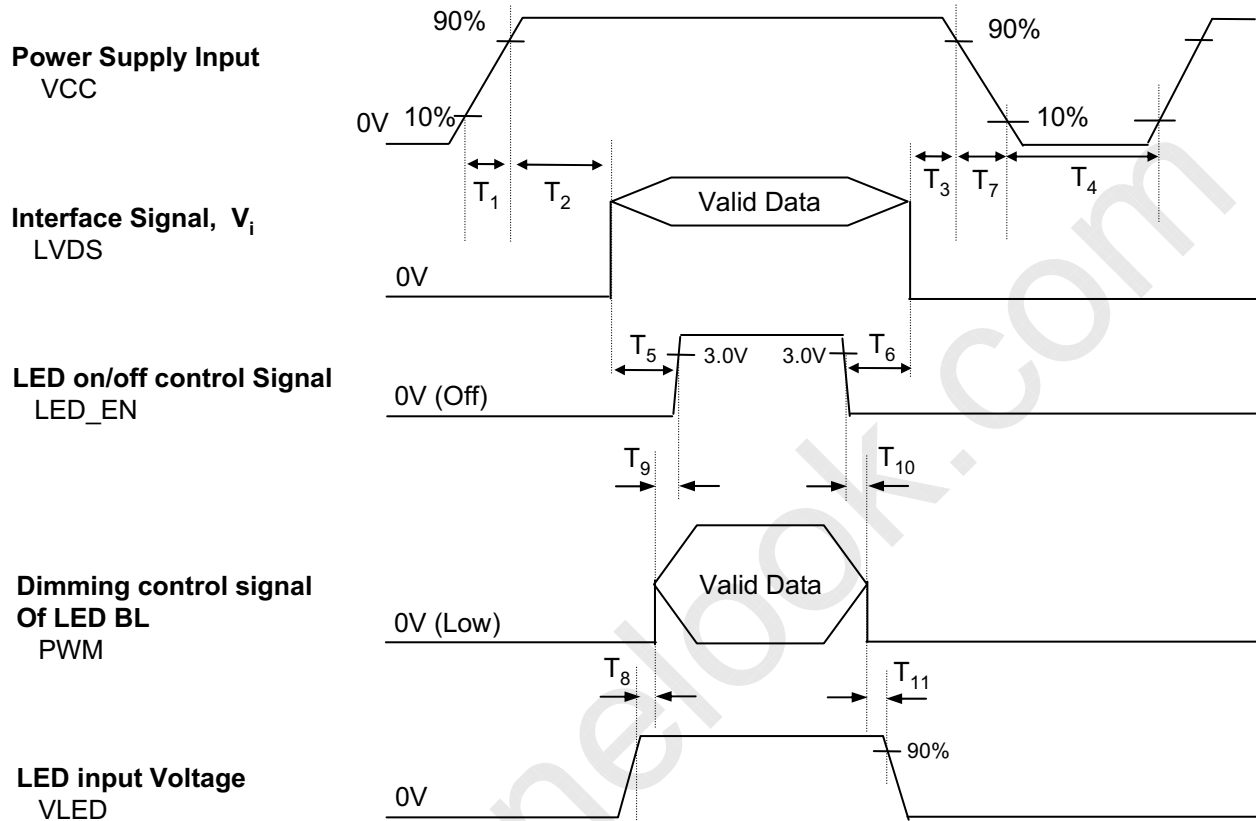LP121WX3
Liquid Crystal Display

Product Specification

3-6. Color Input Data Reference

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 below provides a reference for color versus data input.

Table 5. COLOR DATA REFERENCE

Color		Input Color Data																				
		RED						GREEN						BLUE								
		MSB					LSB	MSB					LSB	MSB					LSB				
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	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			
	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			
RED	RED (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	RED (01)	0	0	0	0	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			
GREEN	GREEN (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	GREEN (01)	0	0	0	0	0	0	0	0	0	0	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			
BLUE	BLUE (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	BLUE (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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			

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

3-7. Power Sequence

Power Supply Input
  VCC

Interface Signal, V_i
  LVDS

LED on/off control Signal
  LED_EN

Dimming control signal
Of LED BL
  PWM

LED input Voltage
  VLED

Table 6. POWER SEQUENCE TABLE

Logic Parameter	Value			Units	LED Parameter	Value			Units
	Min.	Typ.	Max.			Min.	Typ.	Max.	
T_1	0	-	10	ms	T_8	0	-	-	ms
T_2	0	-	50	ms	T_9	0	-	-	ms
T_3	0	-	-	ms	T_{10}	0	-	-	ms
T_4	150	-	-	ms	T_{11}	0	-	-	ms
T_5	200	-	-	ms					
T_6	0	-	-	ms					
T_7	0	-	10	ms					

Note)
   1. Do not insert the mating cable when system turn on.
   2. Valid Data have to meet "3-3. LVDS Signal Timing Specifications"
   3. LVDS, LED_EN and PWM need to pull-down condition on invalid status.
   4. LGD recommend the rising sequence of VLED after the Vcc and valid status of LVDS turn on.
   5. LGD recommend the T1:0.5ms,T8:10ms,T11:10ms at power sequence.
      T1,T8,T11:0ms is based on Lenovo's.

Ver. 0.6　　　　　　　　　　　　　　　　Jul. 07, 2009　　　　　　　　　　　　　　12 / 32

LG Display

Product Specification

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and Θ equal to 0°.
FIG. 1 presents additional information concerning the measurement equipment and method.
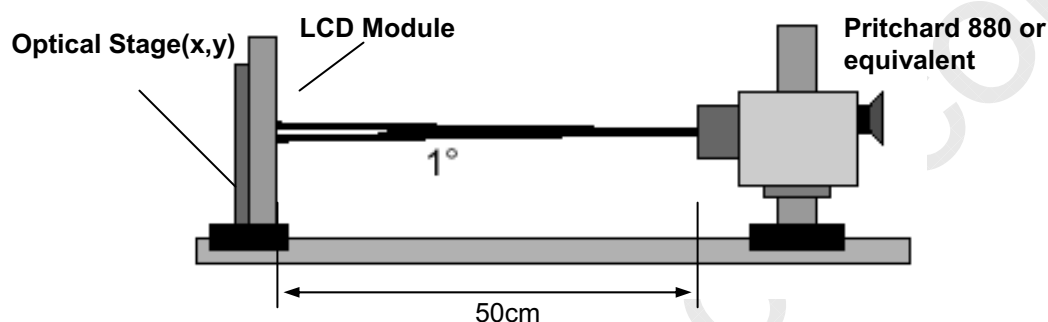
FIG. 1 Optical Characteristic Measurement Equipment and Method

Optical Stage(x,y)   LCD Module   Pritchard 880 or equivalent

1°

50cm

Table 7. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, fv=60Hz, f_{CLK}= 69.3MHz, I_{LED}= 20.0mA

Parameter		Symbol	Values			Units	Notes
			Min	Typ	Max		
Contrast Ratio		CR	-	300	-		1
Surface Luminance, white		L_{WH}	185	220	-	cd/m^2	2
Luminance Variation (5point)		δ_{WHITE}	70	-	-	%	3
Luminance Variation (13point)		δ_{WHITE}	60	-	-	%	
Response Time		$Tr_R + Tr_D$		16		ms	4
Color Coordinates							
	RED	RX	0.562	0.592	0.622		
		RY	0.321	0.351	0.381		
	GREEN	GX	0.304	0.334	0.364		
		GY	0.519	0.549	0.579		
	BLUE	BX	0.124	0.154	0.184		
		BY	0.100	0.130	0.160		
	WHITE	WX	0.283	0.313	0.343		
		WY	0.299	0.329	0.359		
Viewing Angle							5
	x axis, right(Φ=0°)	Θr	40	45	-	degree	
	x axis, left (Φ=180°)	Θl	40	45	-	degree	
	y axis, up (Φ=90°)	Θu	10	15	-	degree	
	y axis, down (Φ=270°)	Θd	30	35	-	degree	
Gray Scale							6

LG Display

Product Specification

Note)

1. Contrast Ratio(CR) is defined mathematically as

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

2. Surface luminance is the average of 5 point across the LCD surface 50cm from the surface with all pixels displaying white. For more information see FIG 1.

$$L_{WH} = \text{Average}(L_1, L_2, \ldots L_5)$$

3. The variation in surface luminance , The panel total variation (δ_{WHITE}) is determined by measuring L_N at each test position 1 through 13 and then defined as followed numerical formula. For more information see FIG 2.

$$\delta_{WHITE} = \frac{\text{Maximum}(L_1, L_2, \ldots L_{13})}{\text{Minimum}(L_1, L_2, \ldots L_{13})}$$

4. Response time is the time required for the display to transition from white to black (rise time, Tr_R) and from black to white(Decay Time, Tr_D). For additional information see FIG 3.

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.
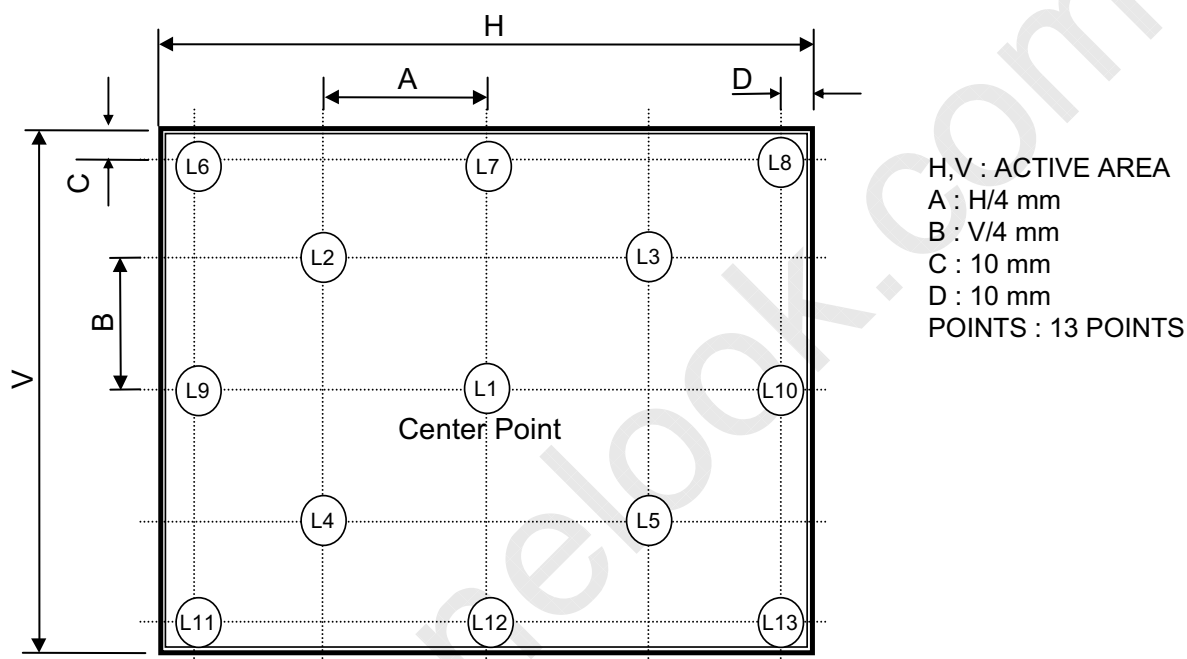
6. Gray scale specification   * f_V = 60Hz
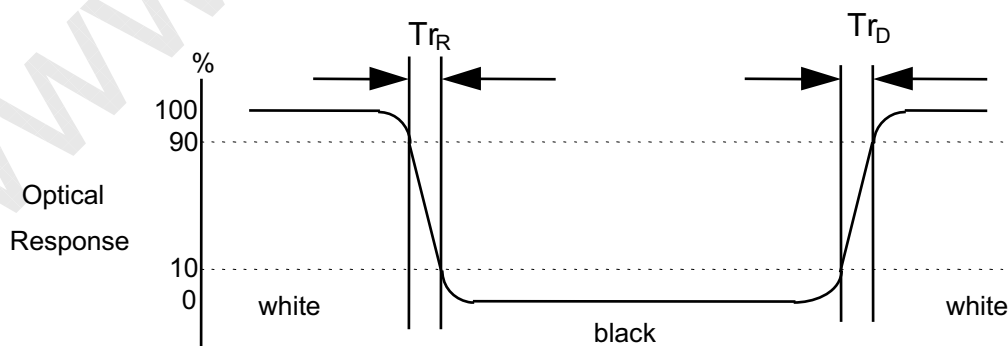
Gray Level	Luminance [%] (Typ)
L0	0.22
L7	2.77
L15	8.65
L23	16.4
L31	25.4
L39	39.3
L47	57.2
L55	77.9
L63	100

LG Display

Product Specification

FIG. 2 Luminance

<measuring point for surface luminance & measuring point for luminance variation>

H,V : ACTIVE AREA
A : H/4 mm
B : V/4 mm
C : 10 mm
D : 10 mm
POINTS : 13 POINTS

FIG. 3 Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

LG Display

Product Specification

5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model LP121WX3. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal	275.8 ± 0.5mm
	Vertical	178.1 ± 0.5mm
	Thickness	5.3 (Max)
Bezel Area	Horizontal	266.50 ± 0.5mm
	Vertical	166.6 ± 0.5mm
Active Display Area	Horizontal	260.93 ± 0.3mm
	Vertical	163.08 ± 0.3mm
Weight	285g(Max)	
Surface Treatment	Anti-glare treatment of the front polarizer	

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

<FRONT VIEW>
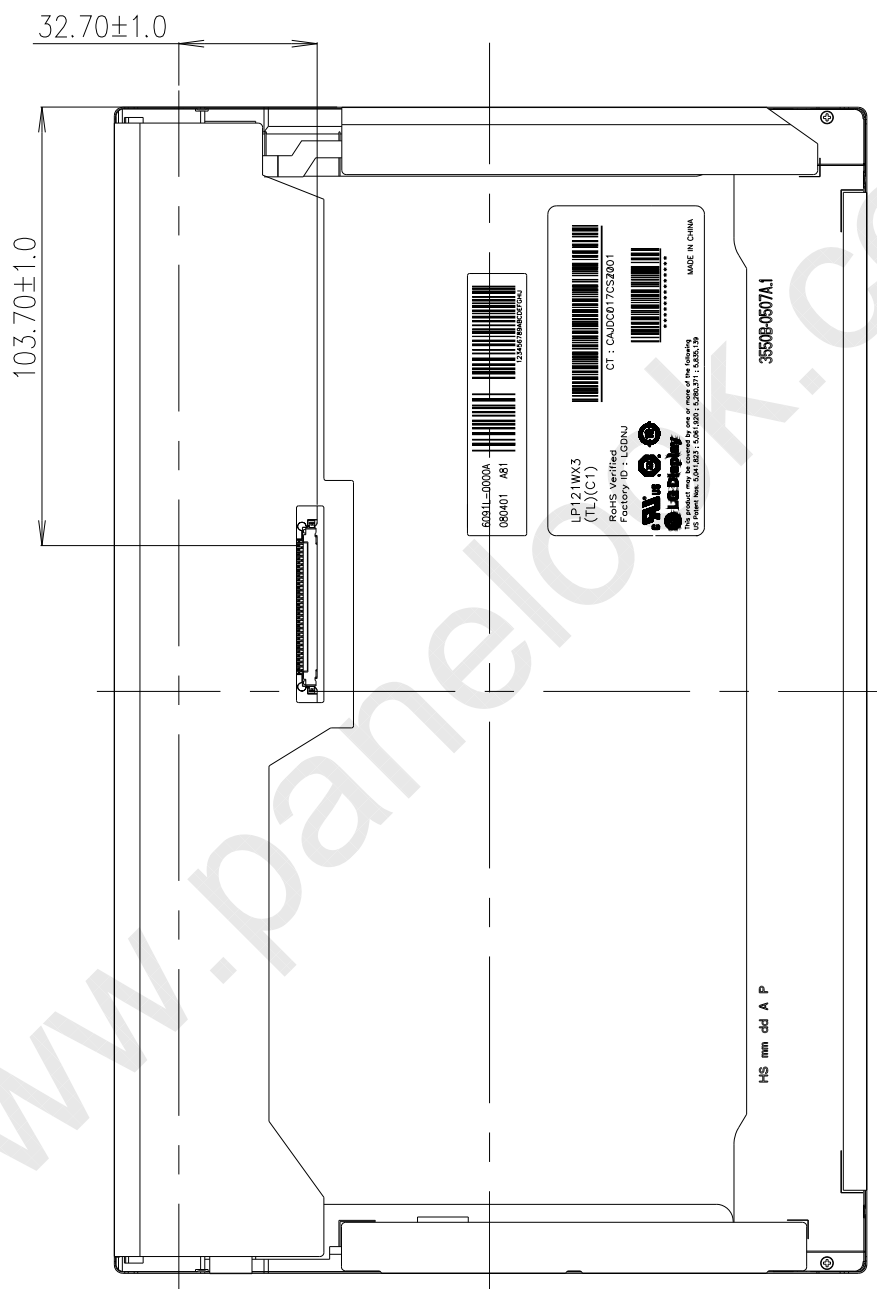
Note) Unit:[mm], General tolerance: ± 0.5mm

LG Display
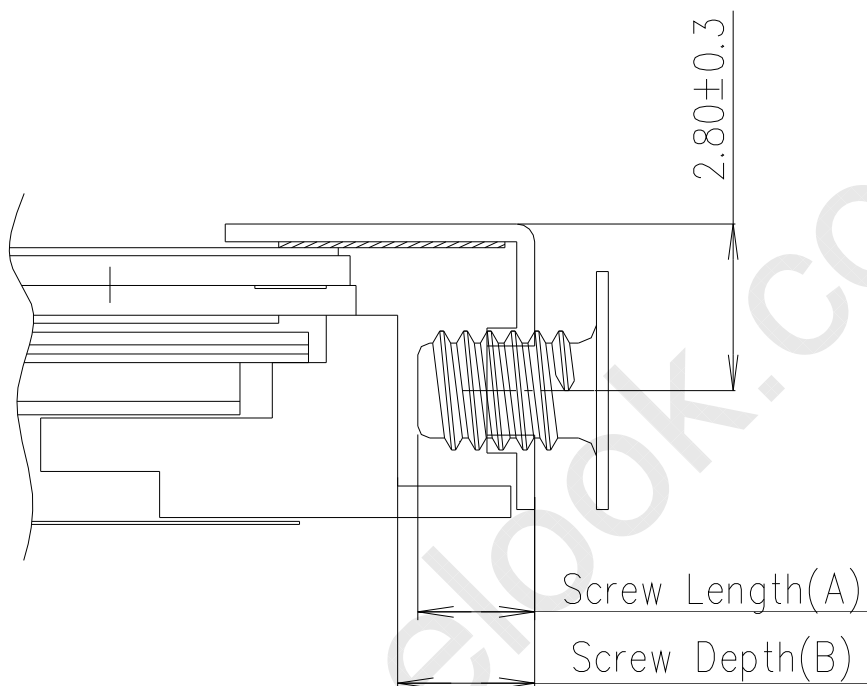
LP121WX3
Liquid Crystal Display

Product Specification

<REAR VIEW>   Note) Unit:[mm], General tolerance: ± 0.5mm

32.70±1.0

103.70±1.0
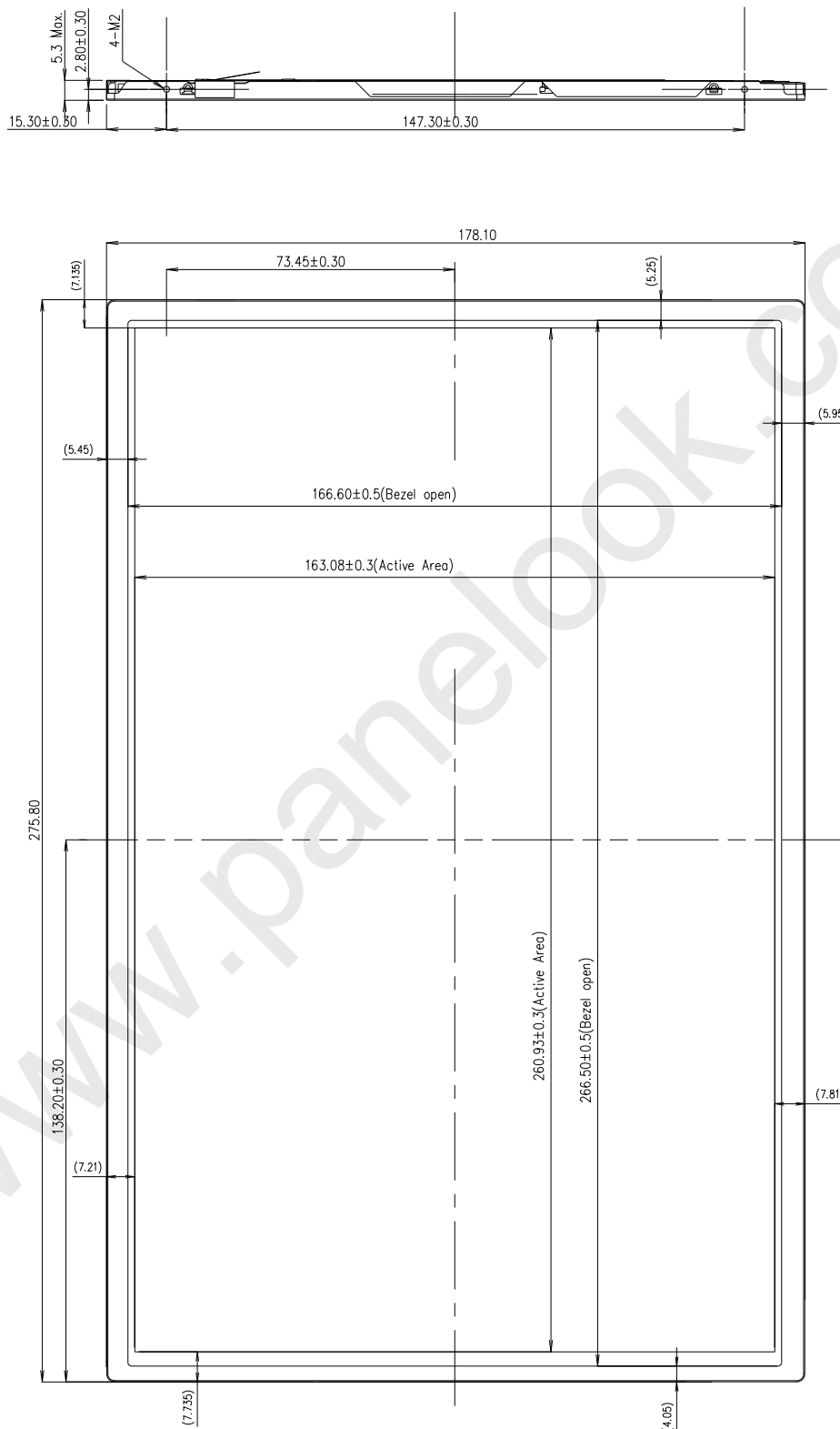
LG Display

Product Specification

[DETAIL DESCRIPTION OF SIDE MOUNTING SCREW]

2.80±0.3

Screw Length(A)
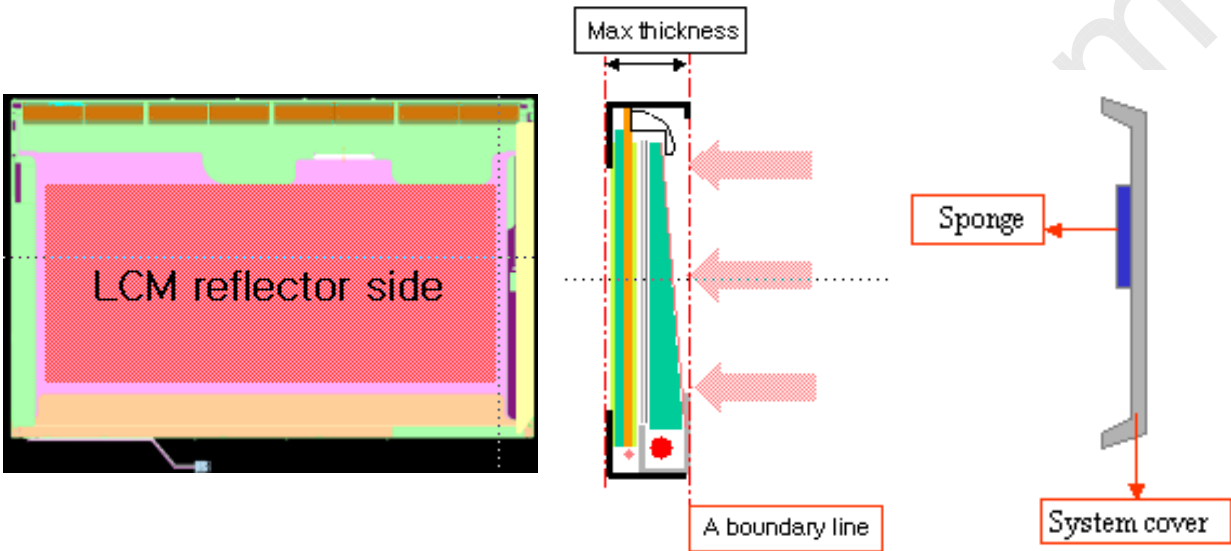Screw Depth(B)

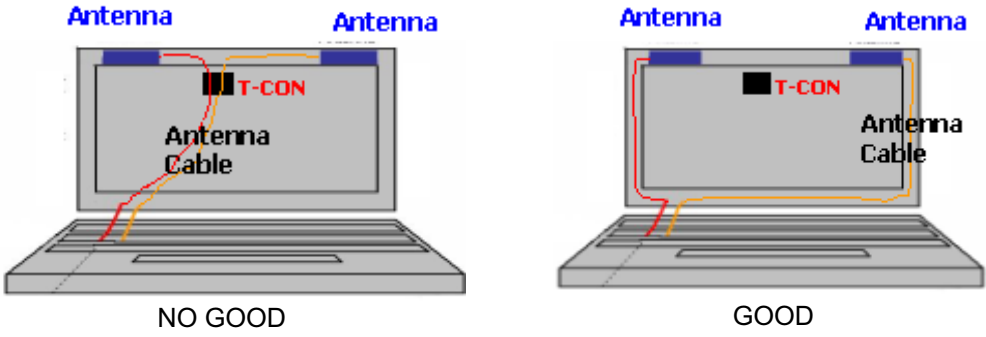*** Screw Length(A) : Max : 1.8, Min : 1.5**
* Screw Depth(B) : Min 1.8
* Screw Torque : 2.0~2.3kgf.cm
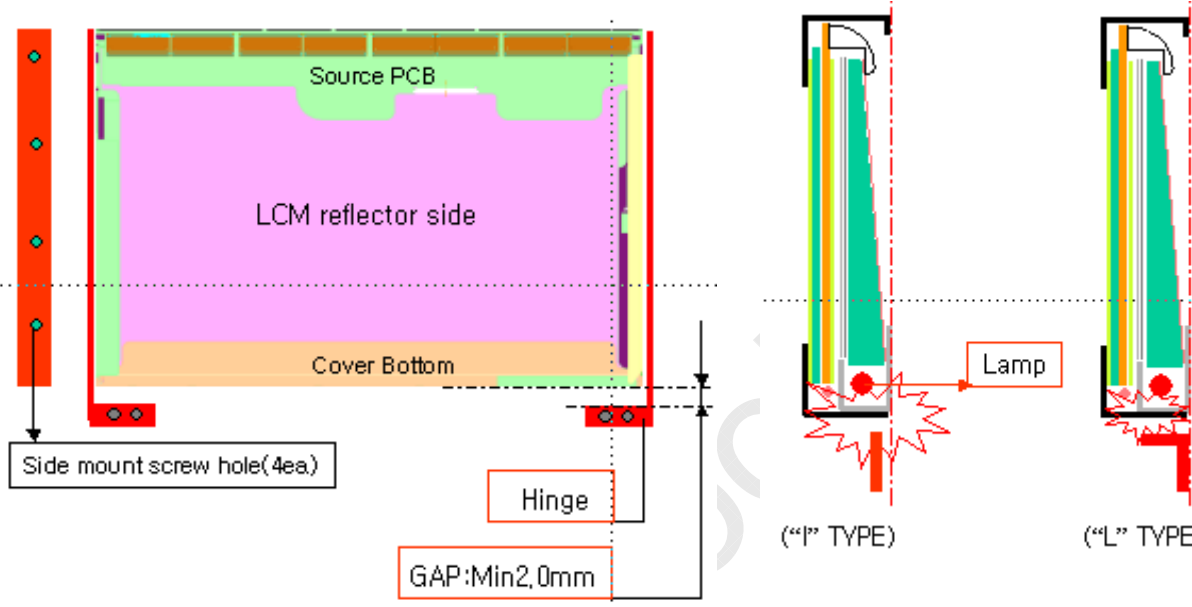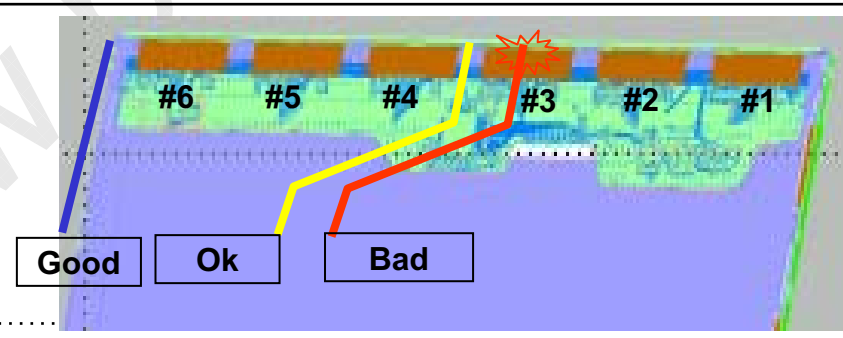   **(Measurement Gauge :Torque Meter)**

Notes : 1. Screw plated through the method of non-electrolytic nickel plating is preferred
            to reduce possibility that results in vertical and/or horizontal line defect due to
            the conductive particles from screw surface.

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

LGD Proposal for system cover design.(Appendix)
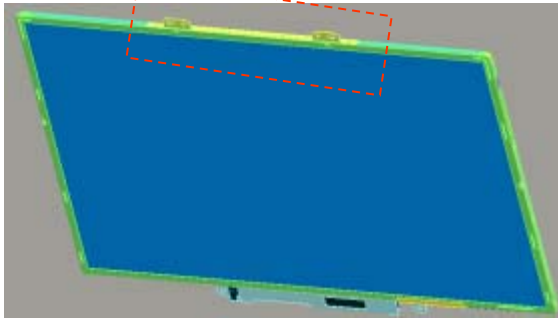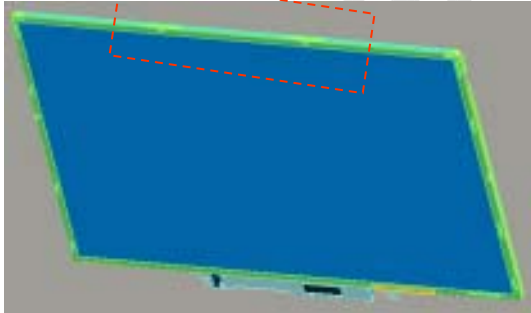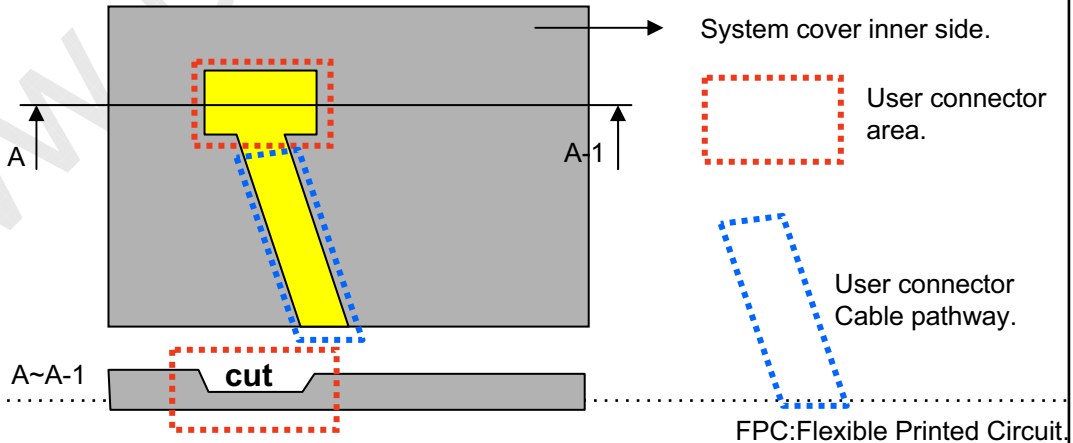
1	Gap check for securing the enough gap between LCM and System cover.	

Define	1.Rear side of LCM is sensitive against external stress,and previous check about interference is highly needed.
	2.In case there is something from system cover comes into the boundary above,mechanical interference may cause the FOS defects. (Eg:Ripple,White spot..)
2	Check if antenna cable is sufficiently apart from T-CON of LCD Module.
Define	
	1.If system antenna is overlapped with T-CON,it might be cause the noise.

LG Display

Product Specification

LGD Proposal for system cover design.

3	Gap check for securing the enough gap between LCM and System hinge.	
Define	1.At least 2.0mm of gap needs to be secured to prevent the shock related defects.	
	2."L" type of hinge is recommended than "I" type under shock test.	
4	Checking the path of the System wire.	
Define	1.COF area needs to be handled with care.	
	2.GOOD ➔Wire path design to system side. 　　　OK➔ Wire path is located between COFs. 　　　BAD➔Wire path overlapped with COF area.	

LP121WX3
Liquid Crystal Display

LG Display

Product Specification

LGD Proposal for system cover design.

5	Using a bracket on the top of LCM is not recommended.	

bracket

With bracket　　　　　　　　Without bracket

Define	1.Condition without bracket is good for mechanical noise,and can minimize the light leakage from deformation of bracket.
	2.The results shows that there is no difference between the condition with or without bracket.

6	Securing additional gap on CNT area..

System cover inner side.

User connector area.

A

A-1

User connector Cable pathway.

A~A-1　**cut**

FPC:Flexible Printed Circuit.

Define	1.CNT area is specially sensitive against external stress,and additional gap by cutting on system cover will be helpful on removing the Ripple.
	2.Using a thinner CNT will be better. (eg: FPC type)

LG Display

Product Specification

6. Reliability

Environment test condition

No.	Test Item	Conditions
1	High temperature storage test	Ta= 60°C, 240h
2	Low temperature storage test	Ta= -20°C, 240h
3	High temperature operation test	Ta= 50°C, 50%RH, 240h
4	Low temperature operation test	Ta= 0°C, 240h
5	Vibration test (non-operating)	Sine wave, 10 ~ 500 ~ 10Hz, 1.5G, 0.37oct/min 3 axis, 1hour/axis
6	Shock test (non-operating)	Half sine wave, 180G, 2ms one shock of each six faces(I.e. run 180G, 2ms for all six faces)
7	Altitude　　　　operating 　　　　storage / shipment	0 ~ 10,000 feet (3,048m) 24Hr 0 ~ 40,000 feet (12,192m) 24Hr

{ Result Evaluation Criteria }
 There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

LP121WX3
Liquid Crystal Display

LG Display

Product Specification

7. International Standards

7-1. Safety

a) UL 60950-1:2003, First Edition, Underwriters Laboratories, Inc.,
Standard for Safety of Information Technology Equipment.
b) CAN/CSA C22.2, No. 60950-1-03 1st Ed. April 1, 2003, Canadian Standards Association,
Standard for Safety of Information Technology Equipment.
c) EN 60950-1:2001, First Edition,
European Committee for Electrotechnical Standardization(CENELEC)
European Standard for Safety of Information Technology 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)

Ver. 0.6   Jul. 07, 2009   24 / 32

LG Display

Product Specification

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 ~ M : SERIAL NO.

Note
1. YEAR

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mark	1	2	3	4	5	6	7	8	9	0

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	3	4	5	6	7	8	9	A	B	C

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 : 30 pcs

b) Box Size : 480mm × 348mm × 243mm

LP121WX3
Liquid Crystal Display

Product Specification

8-3. Label Description

Model Name

LP121WX3
(TL)(C1)

RoHS Verified
Factory ID : LGDNJ

P/N:42T0710
FRU:42T0711

11S42T0710Z1ZFWW000000 YMM

Lenovo CODE

XXXXXXXXXXXX XXXX

LPL CODE

This 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

MADE IN CHINA

Lot Mark

LPL Code

(1) Model Name : L P 1 2 1 W X 3 - T L C 1

Revision Code
Product Type
Display Mode
Basic Model Serial No.
Resolution : WXGA
Size (inch) : 12.1"
Application : NBPC
LGPL Brand Initial: L

(2) Lot Mark : 1 2 1 8 4 C 1 5 0 0 0 0 1

SERIAL NO.

MONTH
YEAR
SIZE

Lenovo Code

1)P/N : 42T0710

2)FRU : 42T0711

LP121WX3
Liquid Crystal Display

Product Specification

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 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.

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.

| Ver. 0.6 | Jul. 07, 2009 | 27 / 32 |

LP121WX3
Liquid Crystal Display

LG Display

Product Specification

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) 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) The protection film is attached to the polarizer with a small amount of glue. If some stress is applied to rub the protection film against the polarizer during the time you peel off the film, the glue is apt to remain on the polarizer.
Please carefully peel off the protection film without rubbing it against the polarizer.
(3) 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 polarizer after the protection film is peeled off.
(4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

LP121WX3
Liquid Crystal Display

Product Specification

APPENDIX A. Enhanced Extended Display Identification Data (EEDID™) 1/3

Byte (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)	Value (Bin)
0	00	Header	00	00000000
1	01	Header	FF	11111111
2	02	Header	FF	11111111
3	03	Header	FF	11111111
4	04	Header	FF	11111111
5	05	Header	FF	11111111
6	06	Header	FF	11111111
7	07	Header	00	00000000
8	08	EISA manufacture code (3 Character ID) LEN	30	00110000
9	09	EISA manufacture code (Compressed ASCⅡ)	AE	10101110
10	0A	Panel Supplier Reserved - Product Code 4011h	11	00010001
11	0B	(Hex. LSB first) (12.1 WXGA 1280x800 , LED B/L)	40	01000000
12	0C	LCD Module Serial No - Preferred but Optional ("0" If not used)	00	00000000
13	0D	LCD Module Serial No - Preferred but Optional ("0" If not used)	00	00000000
14	0E	LCD Module Serial No - Preferred but Optional ("0" If not used)	00	00000000
15	0F	LCD Module Serial No - Preferred but Optional ("0" If not used)	00	00000000
16	10	Week of Manufacture 00 weeks	00	00000000
17	11	Year of Manufacture 2009 years	13	00010011
18	12	EDID structure version # = 1	01	00000001
19	13	EDID revision # = 3	03	00000011
20	14	Video input Definition = Digital signal	80	10000000
21	15	Max H image size (Rounded cm) = 26 cm	1A	00011010
22	16	Max V image size (Rounded cm) = 16 cm	10	00010000
23	17	Display gamma = (gamma*100)-100 = Example:(2.2*100)-100=120 = 2.2 Gamma	78	01111000
24	18	Feature Support (Standby, Suspend, Active Off/Very Low Power, RGB color display, Timing BLK 1,no_ GTF)	EA	11101010
25	19	Red/Green Low Bits (RxRy/GxGy)	BA	10111010
26	1A	Blue/White Low Bits (BxBy/WxWy)	95	10010101
27	1B	Red X Rx = 0.592	97	10010111
28	1C	Red Y Ry = 0.351	59	01011001
29	1D	Green X Gx = 0.334	55	01010101
30	1E	Green Y Gy = 0.549	8C	10001100
31	1F	Blue X Bx = 0.154	27	00100111
32	20	Blue Y By = 0.130	21	00100001
33	21	White X Wx = 0.313	50	01010000
34	22	White Y Wy = 0.329	54	01010100
35	23	Established timing 1 (00h if not used)	00	00000000
36	24	Established timing 2 (00h if not used)	00	00000000
37	25	Manufacturer's timings (00h if not used)	00	00000000
38	26	Standard timing ID1 (01h if not used)	01	00000001
39	27	Standard timing ID1 (01h if not used)	01	00000001
40	28	Standard timing ID2 (01h if not used)	01	00000001
41	29	Standard timing ID2 (01h if not used)	01	00000001
42	2A	Standard timing ID3 (01h if not used)	01	00000001
43	2B	Standard timing ID3 (01h if not used)	01	00000001
44	2C	Standard timing ID4 (01h if not used)	01	00000001
45	2D	Standard timing ID4 (01h if not used)	01	00000001
46	2E	Standard timing ID5 (01h if not used)	01	00000001
47	2F	Standard timing ID5 (01h if not used)	01	00000001
48	30	Standard timing ID6 (01h if not used)	01	00000001
49	31	Standard timing ID6 (01h if not used)	01	00000001
50	32	Standard timing ID7 (01h if not used)	01	00000001
51	33	Standard timing ID7 (01h if not used)	01	00000001
52	34	Standard timing ID8 (01h if not used)	01	00000001
53	35	Standard timing ID8 (01h if not used)	01	00000001

Row group labels (left column): Header; EDID / Vendor / Product Version; Display Parameters; Panel Color Coordinates; Established Timin; Standard Timing ID

Ver. 0.6   Jul. 07, 2009

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

APPENDIX A. Enhanced Extended Display Identification Data (EEDID™)　2/3

Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)	Value (Bin)
Timing Descriptor #1					
54	36	Pixel Clock/10,000 (LSB)	69.3 MHz @ 60Hz	12	00010010
55	37	Pixel Clock/10,000 (MSB)		1B	00011011
56	38	Horizontal Active　　　(lower 8 bits)	1280 Pixels	00	00000000
57	39	Horizontal Blanking(Thp-HA)　　(lower 8 bits)	128 Pixels	80	10000000
58	3A	Horizontal Active / Horizontal Blanking(Thp-HA) (upper 4:4bits)		50	01010000
59	3B	Vertical Avtive	800 Lines	20	00100000
60	3C	Vertical Blanking (Tvp-HA) (DE Blanking typ.for DE only panels)	20 Lines	14	00010100
61	3D	Vertical Active : Vertical Blanking (Tvp-HA)　(upper 4:4bits)		30	00110000
62	3E	Horizontal Sync. Offset (Thfp)	24 Pixels	18	00011000
63	3F	Horizontal Sync Pulse Width (HSPW)	32 Pixels	20	00100000
64	40	Vertical Sync Offset(Tvfp) : Sync Width (VSPW)	4 Lines : 4 Lines	44	01000100
65	41	Horizontal Vertical Sync Offset/Width　　(upper 2bits)		00	00000000
66	42	Horizontal Image Size (mm)	261 mm	05	00000101
67	43	Vertical Image Size　(mm)	163 mm	A3	10100011
68	44	Horizontal Image Size / Vertical Image Size		10	00010000
69	45	Horizontal Border = 0 (Zero for Notebook LCD)		00	00000000
70	46	Vertical Border = 0　(Zero for Notebook LCD)		00	00000000
71	47	Non-Interlace, Normal display, no stereo, Digital Separate (Vsync_POS, Hsync_POS), DE only note : LSB is set to '1' if panel is DE-timing only. H/V can be ignored.		1F	00011111
Timing Descriptor #2					
72	48	Pixel Clock/10,000 (LSB)	57.79 MHz @ 50.1Hz	93	10010011
73	49	Pixel Clock/10,000 (MSB)		16	00010110
74	4A	Horizontal Active　　　(lower 8 bits)	1280 Pixels	00	00000000
75	4B	Horizontal Blanking(Thp-HA)　　(lower 8 bits)	128 Pixels	80	10000000
76	4C	Horizontal Active / Horizontal Blanking(Thp-HA) (upper 4:4bits)		50	01010000
77	4D	Vertical Avtive	800 Lines	20	00100000
78	4E	Vertical Blanking (Tvp-HA) (DE Blanking typ.for DE only panels)	20 Lines	14	00010100
79	4F	Vertical Active : Vertical Blanking (Tvp-HA)　(upper 4:4bits)		30	00110000
80	50	Horizontal Sync. Offset (Thfp)	24 Pixels	18	00011000
81	51	Horizontal Sync Pulse Width (HSPW)	32 Pixels	20	00100000
82	52	Vertical Sync Offset(Tvfp) : Sync Width (VSPW)	4 Lines : 4 Lines	44	01000100
83	53	Horizontal Vertical Sync Offset/Width　　(upper 2bits)		00	00000000
84	54	Horizontal Image Size (mm)	261 mm	05	00000101
85	55	Vertical Image Size　(mm)	163 mm	A3	10100011
86	56	Horizontal Image Size / Vertical Image Size		10	00010000
87	57	Horizontal Border = 0 (Zero for Notebook LCD)		00	00000000
88	58	Vertical Border = 0　(Zero for Notebook LCD)		00	00000000
89	59	Non-Interlace, Normal display, no stereo, Digital Separate (Vsync_POS, Hsync_POS), DE only note : LSB is set to '1' if panel is DE-timing only. H/V can be ignored.		1F	00011111
Timing Descriptor #3					
90	5A	Flag		00	00000000
91	5B	Flag		00	00000000
92	5C	Flag		00	00000000
93	5D	Data Type Tag : Descriptor Defined by manufacturer		0F	00001111
94	5E	Flag		00	00000000
95	5F	(Horizontal active pixel /8)-31	129 (1280 pixels)	81	10000001
96	60	Image Aspect Ratio(16:10)	16:10	0A	00001010
97	61	Low Refresh Rate #1(60Hz)	60 Hz	3C	111100
98	62	(Horizontal active pixel /8)-31	129 (1280 pixels)	81	10000001
99	63	Image Aspect Ratio(16:10)	16:10	0A	00001010
100	64	Low Refresh Rate #2(50Hz)	50 Hz	32	110010
101	65	Brightness(1/10nit)	220 nits	16	00010110
102	66	Feature flag　(TN Technology ,LED Backlight)	No definition	09	00001001
103	67	Reserved 00h		00	00000000
104	68	EISA manufacturer code(3 Character ID)	LGD	30	00110000
105	69	Compressed ASCII		E4	11100100
106	6A	Panel Supplier Reserved - Product code	01F0	F0	11110000
107	6B	(Hex, LSB first)		01	00000001

Ver. 0.6　　　　　　　　Jul. 07, 2009

LG Display

LP121WX3
Liquid Crystal Display

Product Specification

APPENDIX A. Enhanced Extended Display Identification Data (EEDID™) 3/3

	Byte (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)	Value (Bin)
Timing Descriptor #4	108	6C	Flag	00	00000000
	109	6D	Flag	00	00000000
	110	6E	Flag	00	00000000
	111	6F	Data Type Tag : Data String (ASCII String)	FE	11111110
	112	70	Flag	00	00000000
	113	71	Panel supplier P/N #1 = L	4C	01001100
	114	72	Panel supplier P/N #2 = P	50	01010000
	115	73	Panel supplier P/N #3 = 1	31	00110001
	116	74	Panel supplier P/N #4 = 2	32	00110010
	117	75	Panel supplier P/N #5 = 1	31	00110001
	118	76	Panel supplier P/N #6 = W	57	01010111
	119	77	Panel supplier P/N #7 = X	58	01011000
	120	78	Panel supplier P/N #8 = 3	33	00110011
	121	79	Panel supplier P/N #9 = -	2D	00101101
	122	7A	Panel supplier P/N #10 = T	54	01010100
	123	7B	Panel supplier P/N #11 = L	4C	01001100
	124	7C	Panel supplier P/N #12 = C	43	01000011
	125	7D	Panel supplier P/N #13 = 1	31	00110001
Checksum	126	7E	Extension flag (# of optional 128 panel ID extension block to follow, Typ = 0)	00	00000000
	127	7F	Check Sum (The 1-byte sum of all 128 bytes in this panel ID block shall = 0)	AC	10101100