SPECIFICATION
FOR
APPROVAL

(V) **Preliminary Specification**
( ) **Final Specification**

Title	14” WXGA TFT LCD

Customer	IBM
MODEL	

SUPPLIER	LG.Philips LCD Co., Ltd.
*MODEL	LP140WX1
Suffix	TL02

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

SIGNATURE	DATE
/	
/	
/	

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

SIGNATURE	DATE
J.H. Lee / G.Manager	
REVIEWED BY	
J.H. Park / Manager	
PREPARED BY	
D.K Noh / Engineer	
J.W.Kim / Engineer	

Products Engineering Dept.
LG. Philips LCD Co., Ltd

Contents

RECORD OF REVISIONS

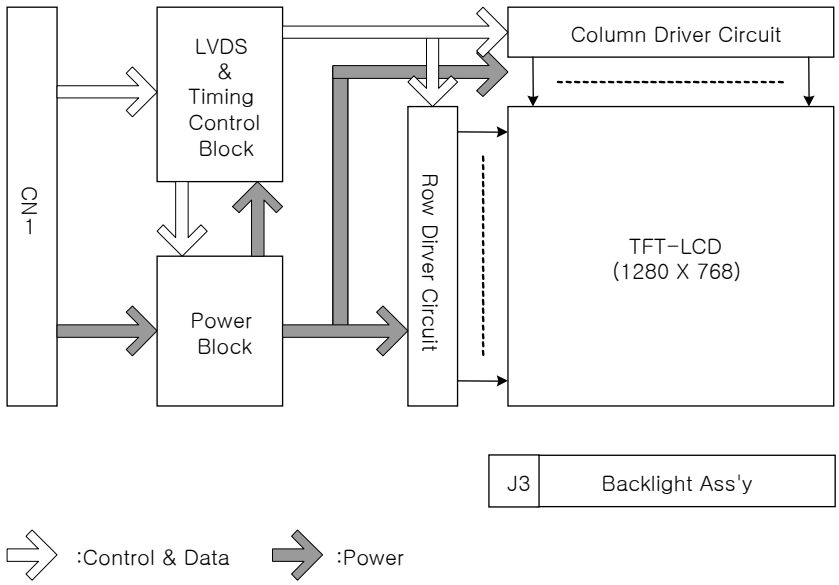
Revision No	Revision Date	Page	Description	EDID ver
0.0	Jan. 19, 2005	-	First Draft	V0.4
0.1	Apr. 13, 2005	12	Changed the Item(Color Coordinates Red Y)	V0.4
0.2	Apr. 26, 2005	28	Changed the Item(EDID Check Sum)	V0.5
		6	Changed the Item(Lamp Life time)	
0.3	Jun. 01, 2005	1	Changed Title	V0.6
		4	Changed the General Features	
		6	Added the Item(Electrical Characteristics, Power Consumption)	
		11	Extracted the Ficture(Inverter Sequence)	
		12~13	Changed the Item	
			(Luminance, white Min. , Gray Scale)	
		19	Added the Item(Screw torque)	
		26~28	Changed the Item(EDID Data)	

1. General Description

The LP140WX1 is a Color Active Matrix Liquid Crystal Display with an integral Cold Cathode Fluorescent Lamp (CCFL) 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 14 inches diagonally measured active display area with WXGA resolution(768 vertical by 1280 horizontal 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 LP140WX1 has been designed to apply the interface method that enables low power, high speed, low EMI.

The LP140WX1 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 LP140WX1 characteristics provide an excellent flat display for office automation products such as Notebook PC.



General Features

Active Screen Size	14 inches diagonal
Outline Dimension	320 (H) × 199(V) × 5.5(D, max) mm
Pixel Pitch	0.2385 mm × 0.2385 mm
Pixel Format	1280 horiz. By 768 vert. Pixels RGB strip arrangement
Color Depth	6-bit, 262,144 colors
Luminance, White	200 cd/m^2(Typ.1 point)
Power Consumption	Total 5.3 Watt(Typ.) @ LCM circuit 1.1Watt(Typ.), B/L input 4.2Watt(typ)
Weight	415 g (Max.), 400g(Typ.)
Display Operating Mode	Transmissive mode, normally white
Surface Treatment	anti-glare treatment of the front polarizer
RoHS Comply	Yes

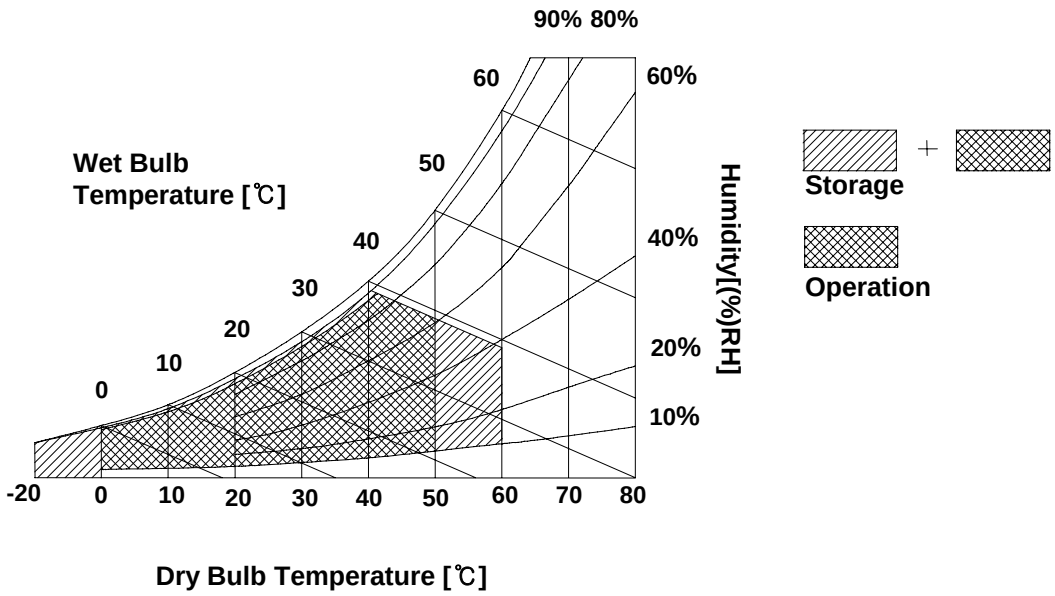
2. Absolute Maximum Ratings

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		Units	Notes
		Min	Max		
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.



3. Electrical Specifications

3-1. Electrical Characteristics

The LP140WX1 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 inverter. The inverter is an external unit to the LCD.

Table 2. ELECTRICAL CHARACTERISTICS

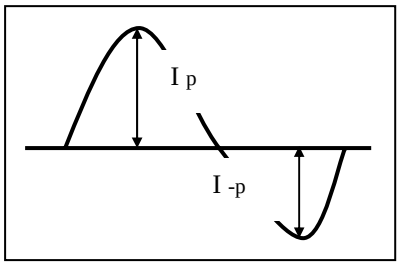
Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
MODULE :						
Power Supply Input Voltage	VCC	3.0	3.3	3.6	V_{DC}	
Power Supply Input Current	I_{CC}	-	320	365	Ma	1
Power Consumption	Pc	-	1.1	1.2	Watt	1
Differential Impedance	Zm	90	100	110	Ohm	2
LAMP :						
Operating Voltage	V_{BL}	640(7.0mA)	675(6.0mA)	880(2.0mA)	V_{RMS}	
Operating Current	I_{BL}	2.0	6.0	7.0	mA_{RMS}	3
Power Consumption	P_{BL}	-	4.2	4.5		
Operating Frequency	f_{BL}	50	65	80	kHz	
Discharge Stabilization Time	Ts	-	-	3	Min	4
Life Time		15,000(6mA)	-	-	Hrs	5
Established Starting Voltage at 25℃ at 0 ℃	Vs			 1180 1415	 V_{RMS} V_{RMS}	

Note)

1. The specified current and power consumption are under the Vcc = 3.3V , 25℃, fv = 60Hz condition whereas full black 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 typical operating current is for the typical surface luminance (L_{WH}) in optical characteristics.
4. Define the brightness of the lamp after being lighted for 5 minutes as 100%, Ts is the time required for the brightness of the center of the lamp to be not less than 95%.
5. The life time is determined as the time at which brightness of lamp is 50% compare to that of initial value at the typical lamp current.
6. The output of the inverter must have symmetrical(negative and positive) voltage waveform and symmetrical current waveform.(Asymmetrical ratio is less than 10%) Please do not use the inverter which has asymmetrical voltage and asymmetrical current and spike wave.
   Lamp frequency may produce interface with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.
7. It is defined the brightness of the lamp after being lighted for 5 minutes as 100%.
   T_S is the time required for the brightness of the center of the lamp to be not less than 95%.
8. The lamp power consumption shown above does not include loss of external inverter.
   The applied lamp current is a typical one.

Note)

9. Requirements for a system inverter design, which is intended to have a better display performance, a better power efficiency and a more reliable lamp, are following.
   It shall help increase the lamp lifetime and reduce leakage current.
   a. The asymmetry rate of the inverter waveform should be less than 10%.
   b. The distortion rate of the waveform should be within $\sqrt{2} \pm 10\%$.
      * Inverter output waveform had better be more similar to ideal sine wave.



* Asymmetry rate:

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

* Distortion rate

I_p (or I_{-p}) / I_{rms}

※ Do not attach a conducting tape to lamp connecting wire.
If the lamp wire attach to a conducting tape, TFT-LCD Module has a low luminance and the inverter has abnormal action. Because leakage current is occurred between lamp wire and conducting tape.

3-2. Interface Connections

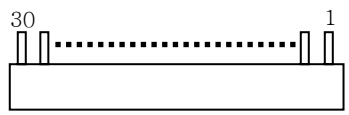
This LCD employs two interface connections, a 30 pin connector is used for the module electronics interface and the other connector is used for the integral backlight system.
The electronics interface connector is a model IS100-C30R-C15 manufactured by UJU.

Table 3. MODULE CONNECTOR PIN CONFIGURATION (CN1)

Pin	Symbol	Description	Notes
1	GND	Ground	
2	VCC	Power Supply, 3.3V Typ.	
3	VCC	Power Supply, 3.3V Typ.	
4	V EEDID	DDC 3.3V power	
5	NC	Reserved for supplier test point	
6	Clk EEDID	DDC Clock	
7	DATA EEDID	DDC Data	
8	R_{IN} 0-	Negative LVDS differential data input	
9	R_{IN} 0+	Positive LVDS differential data input	
10	GND	Ground	
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	
18	CLKIN+	Positive LVDS differential clock input	
19	GND	Ground	
20	NC	No Connect	
21	NC	No Connect	
22	NC	No Connect	
23	NC	No Connect	
24	NC	No Connect	
25	NC	No Connect	
26	NC	No Connect	
27	NC	No Connect	
28	NC	No Connect	
29	NC	No Connect	
30	NC	No Connect	

1, Interface chips
1.1 LCD : SW, SW0602_U(LCD Controller) including LVDS Receiver
1.2 System : **?** or equivalent
* Pin to Pin compatible with LVDS

2. Connector
2.1 LCD : IS100-C30R-C15,LGC or its compatibles
2.2 Mating : FI-X30M or equivalent.
2.3 Connector pin arrangement



[LCD Module Rear View]

The backlight interface connector is a model BHSR-02VS-1, manufactured by JST. The mating connector part number is SM02B-BHSS-1 or equivalent.

Table 5. BACKLIGHT CONNECTOR PIN CONFIGURATION (J3)

Pin	Symbol	Description	Notes
1	HV	Power supply for lamp (High voltage side)	1
2	LV	Power supply for lamp (Low voltage side)	1

Notes : 1. The high voltage side terminal is colored pink and the low voltage side terminal is blue.

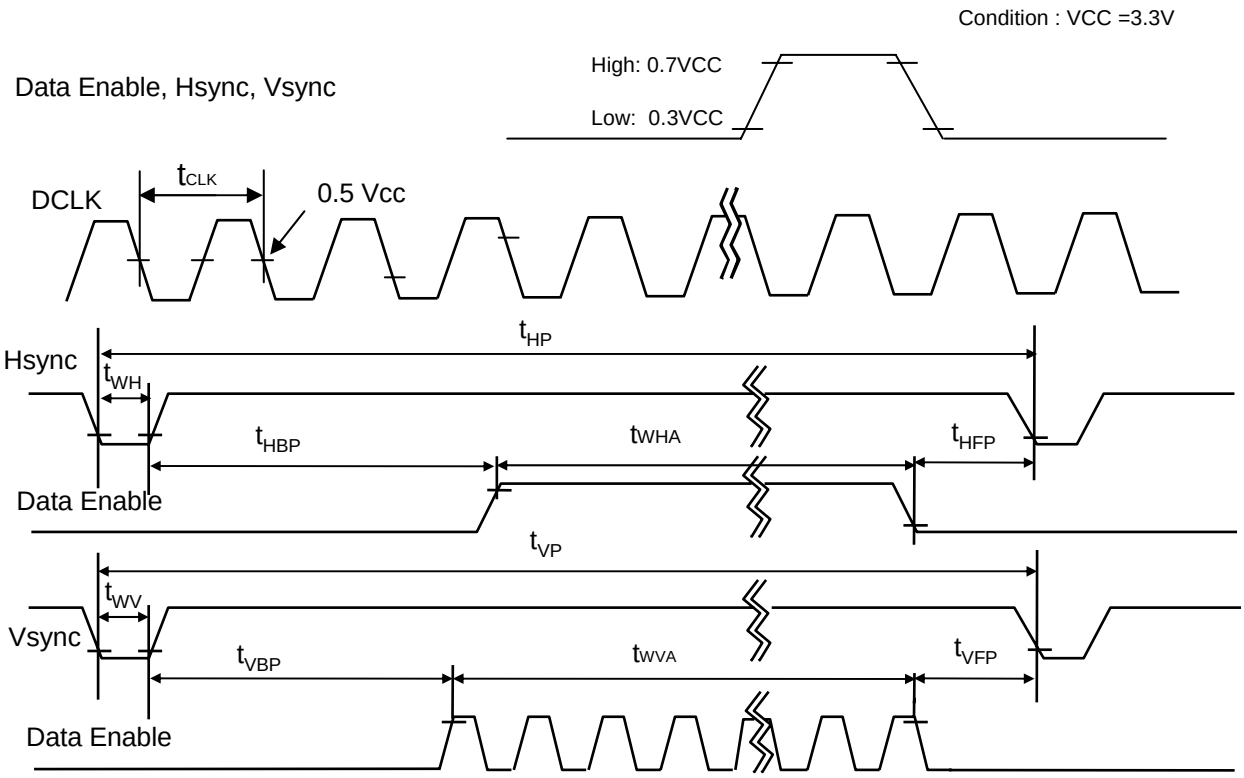
3-3. Signal Timing Specifications

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 6. TIMING TABLE

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Frequency	f_{CLK}	68.250	68.250	68.250	MHz	
Hsync	Period	t_{HP}	1440	1440	1440	t_{CLK}	
	Width	t_{WH}	32	32	32		
Vsync	Period	t_{VP}	790	790	790	t_{HP}	
	Width	t_{WV}	7	7	7		
Data Enable	Horizontal back porch	t_{HBP}	80	80	80	t_{CLK}	
	Horizontal front porch	t_{HFP}	48	48	48		
	Vertical back porch	t_{VBP}	13	13	13	t_{HP}	
	Vertical front porch	t_{VFP}	2	2	2		

3-4. Signal Timing Waveforms



3-5. 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 7. 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

3-6. Power Sequence

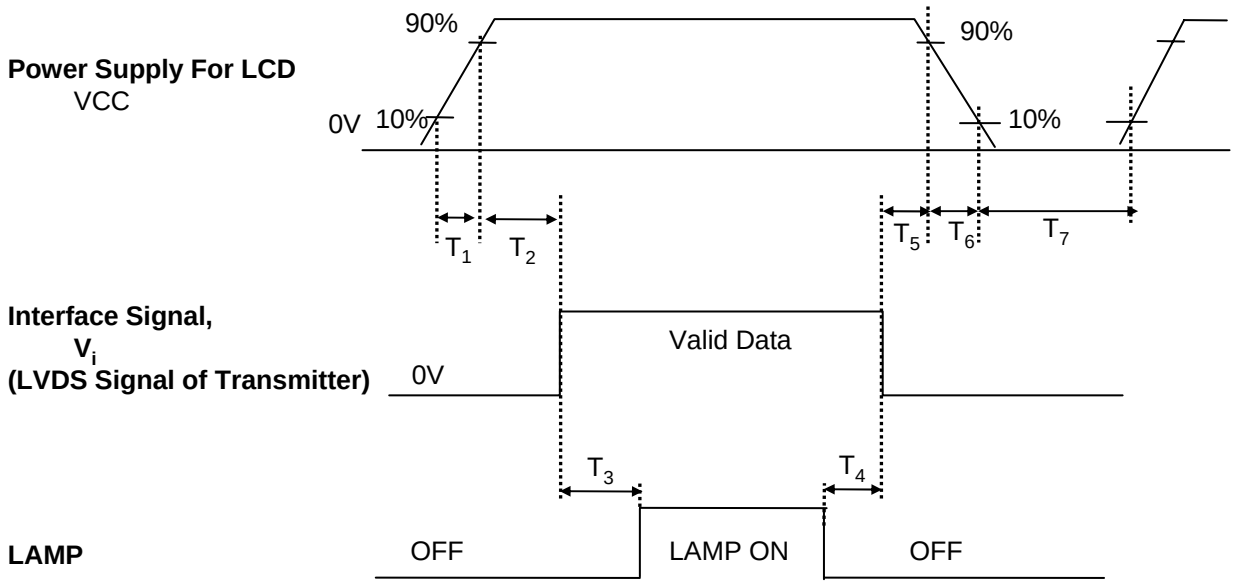


Table 8. POWER SEQUENCE TABLE

Parameter	Value			Units
	Min.	Typ.	Max.	
T_1	-	-	10	(ms)
T_2	0	-	50	(ms)
T_3	200	-	-	(ms)
T_4	200	-	-	(ms)
T_5	0	-	50	(ms)
T_6	0	-	100	(ms)
T_7	400	-	-	(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 for LCD VCC to 0V.
3. Lamp power must be turn on after power supply for LCD and interface signal are valid.

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

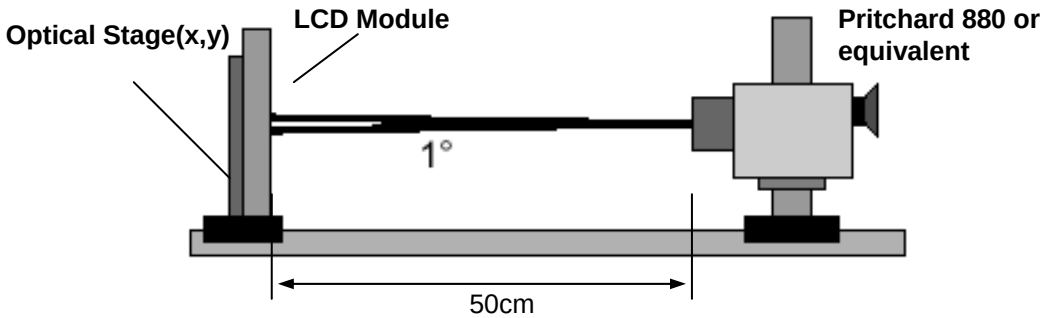


Table 9. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, fv=60Hz, f_{CLK}= 68.25MHz, I_{BL}= 6.0mA

Parameter	Symbol	Values			Units	Notes
		Min	Typ	MAx		
Contrast Ratio	CR	300	400	-		1
Surface Luminance, white	L_{WH}	170	200	-	cd/m^2	2
Luminance Variation(%)	δ_{WHITE}	50	-	-		3
Response Time						4
Rise Time	Tr_R	-	6	10	ms	
Delay Time	Tr_D	-	19	25	ms	
Color Coordinates						
RED	RX	0.560	0.590	0.620		
	RY	0.316	0.346	0.376		
GREEN	GX	0.298	0.328	0.358		
	GY	0.513	0.543	0.573		
BLUE	BX	0.131	0.161	0.191		
	BY	0.118	0.148	0.178		
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	-	-	degree	
x axis, left (Φ=180°)	Θl	40	-	-	degree	
y axis, up (Φ=90°)	Θu	10	-	-	degree	
y axis, down (Φ=270°)	Θd	30	-	-	degree	
Gray Scale						6

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 1 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.

$$\delta_{WHITE} = \frac{\text{Minimum}(L_1, L_2, \ldots L_{13})}{\text{Maximum}(L_1, L_2, \ldots L_{13})} * 100$$

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.

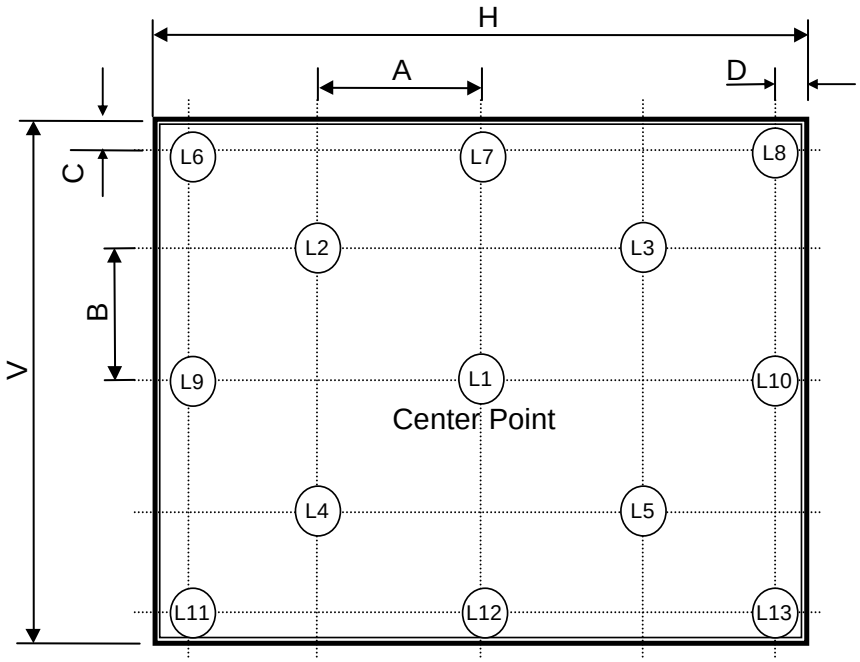
5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 4.

6. Gray scale specification * f_V = 60Hz

Gray Level	Luminance [%] (Typ)
L0	0.23
L7	0.65
L15	3.46
L23	9.9
L31	20.03
L39	34.34
L47	53.64
L55	76.91
L63	100

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”.

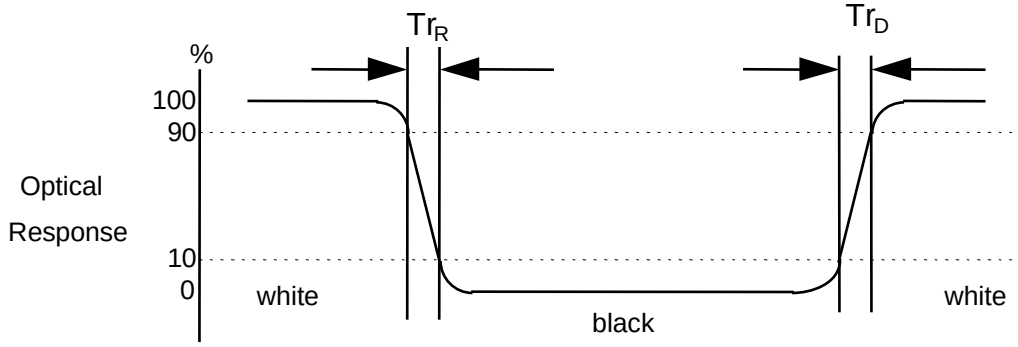
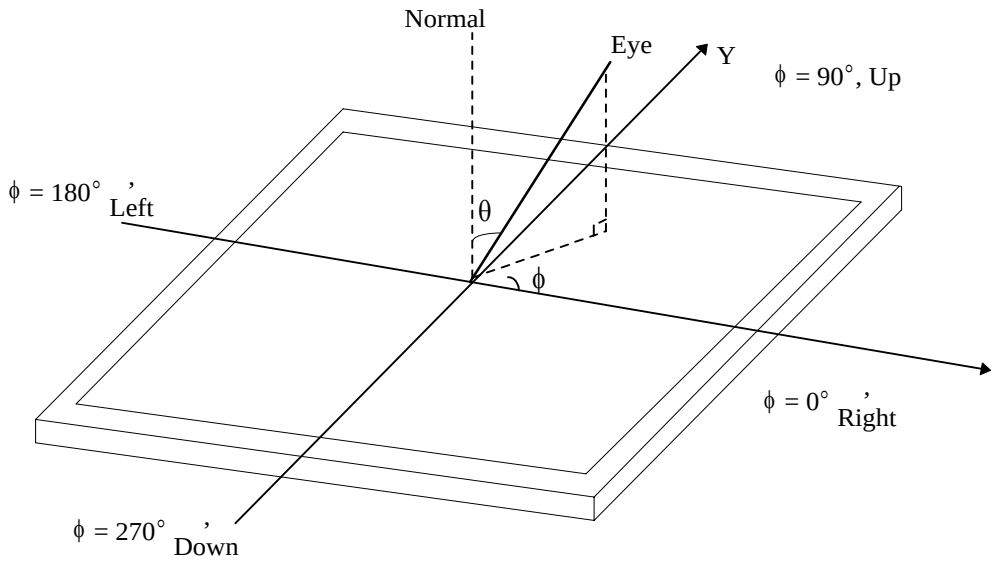


FIG. 4 Viewing angle

<Dimension of viewing angle range>



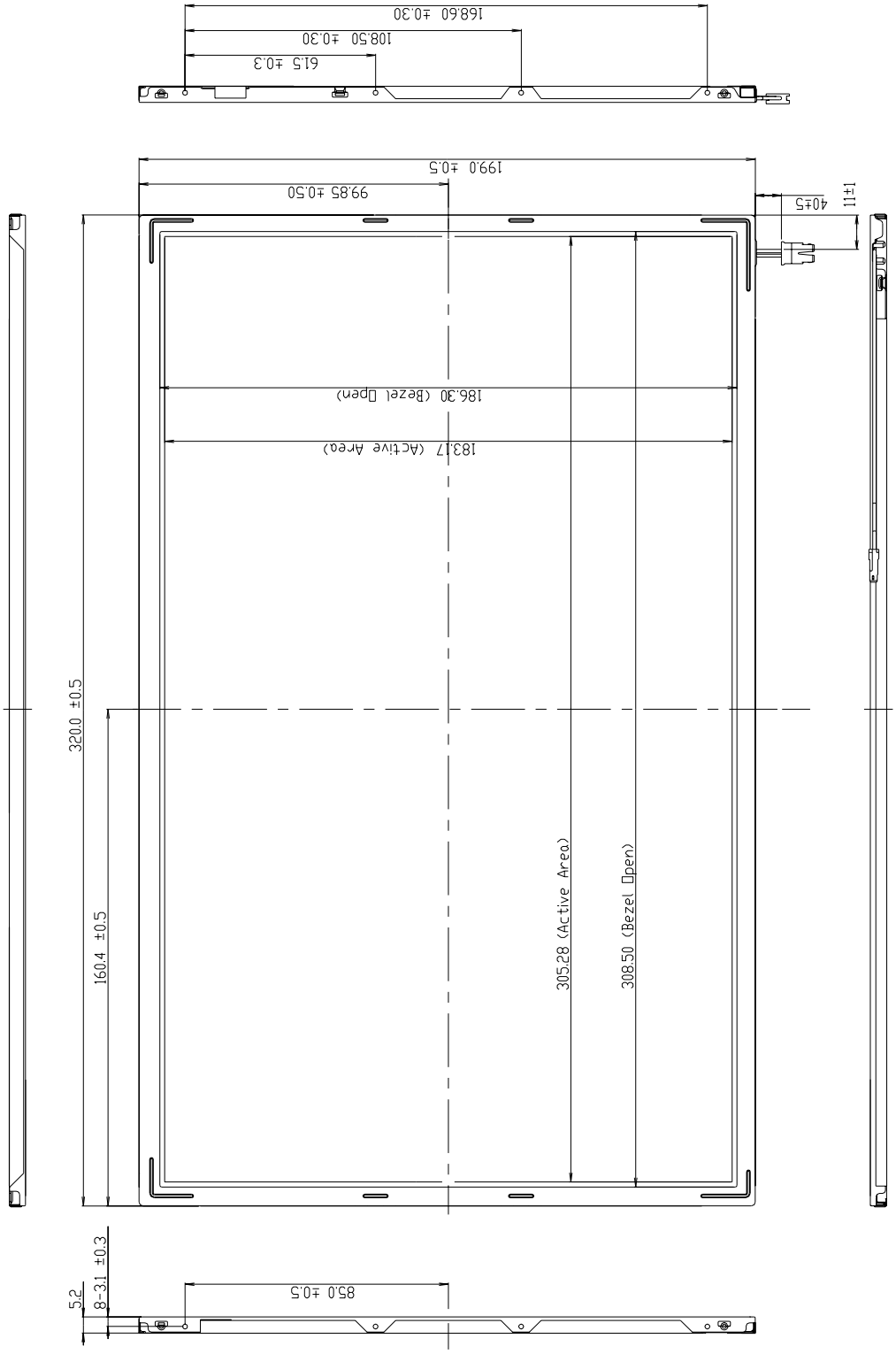
5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model LP140WX1. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal	320 ± 0.5mm
	Vertical	199 ± 0.5mm
	Depth	5.5mm (max)
Bezel Area	Horizontal	308.5 ± 0.5mm
	Vertical	186.3 ± 0.5mm
Active Display Area	Horizontal	305.28 mm
	Vertical	183.17 mm
Weight	400g (Typ.) 415g (Max.)	
Surface Treatment	Anti-glare treatment of the front polarizer	

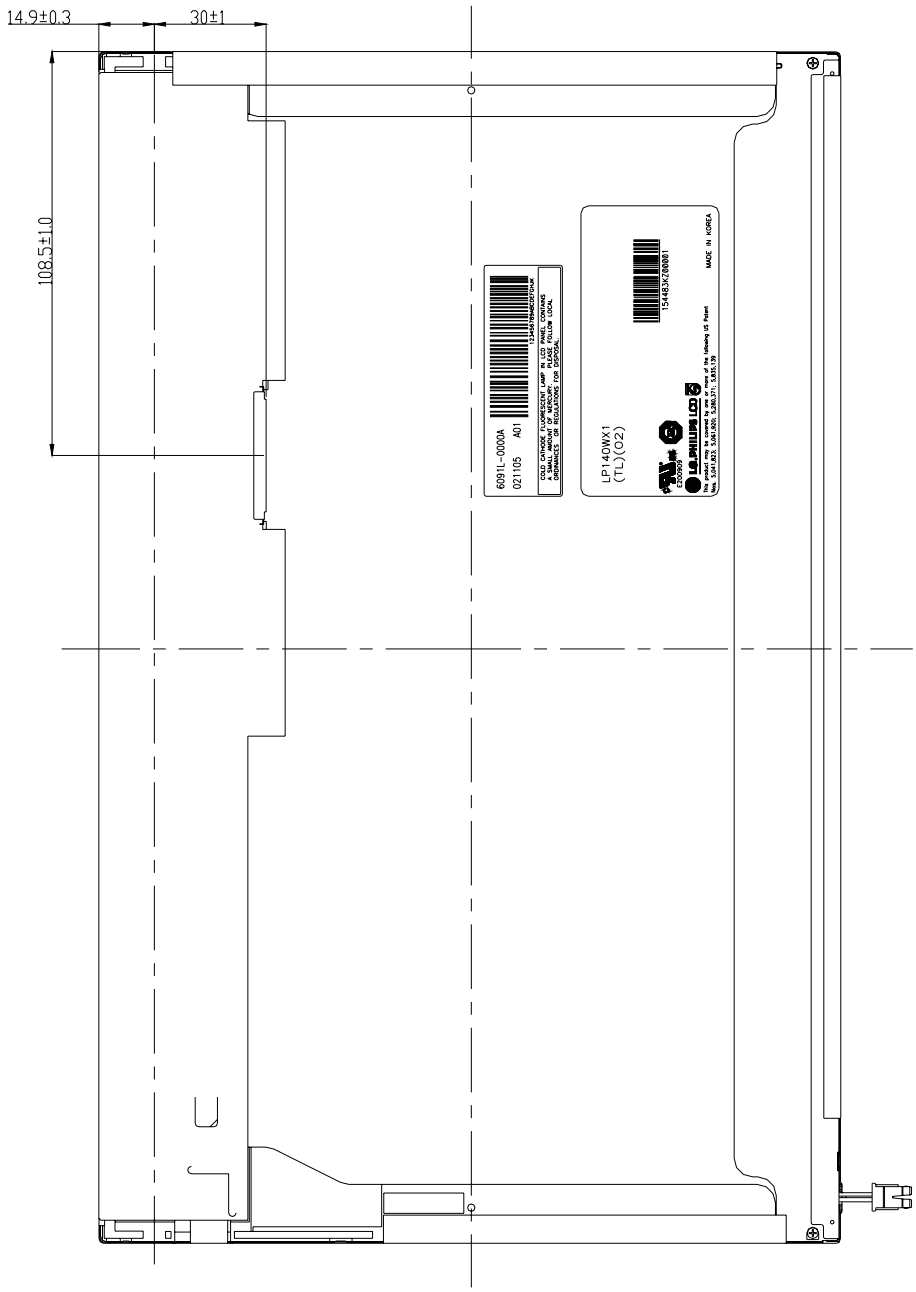
<FRONT VIEW>

Note) Unit:[mm], General tolerance: ± 0.5mm

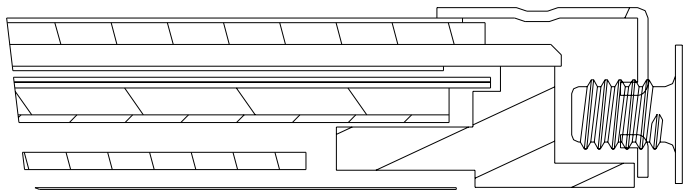


<REAR VIEW>

Note) Unit:[mm], General tolerance: ± 0.5mm



[DETAIL DESCRIPTION OF SIDE MOUNTING SCREW]



*SCREW(8ea) TORQUE : 2.5kgf.cm max
*Mounting SCREW Depth : 2.5mm max

Note) Unit:[mm], General tolerance: ± 0.5mm

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 6ms 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.

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 : 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	3	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

Serial No.	1 ~ 99,999	100,000 ~
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 : 20 pcs

b) Box Size : 430mm × 334mm × 278mm

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.

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.

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

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)		Value (binary)	Data		
0	00	Header	0	0	0000 0000			Header
1	01	Header	F	F	1111 1111			
2	02	Header	F	F	1111 1111			
3	03	Header	F	F	1111 1111			
4	04	Header	F	F	1111 1111			
5	05	Header	F	F	1111 1111			
6	06	Header	F	F	1111 1111			
7	07	Header	0	0	0000 0000			
8	08	ID system Manufacturer Name	2	4	0010 0100	IBM		Vender/ Product ID
9	09	Compressed ASCII	4	D	0100 1101			
10	0A	ID Product Code (LSB)	**7**	**5**	**0111 0101**	#WXGA		
11	0B	ID Product Code (MSB)	**2**	**3**	**0010 0011**			
12	0C	LCD Module Serial No. = 0 (If not used)	0	0	0000 0000			
13	0D	LCD Module Serial No. = 0 (If not used)	0	0	0000 0000			
14	0E	LCD Module Serial No. = 0 (If not used)	0	0	0000 0000			
15	0F	LCD Module Serial No. = 0 (If not used)	0	0	0000 0000			
16	10	Week of Manufacture	0	0	0000 0000			
17	11	Year of Manufacture	0	F	0000 1111	2005		
18	12	EDID Structure version	0	1	0000 0001	1		EDID Version/ Revision
19	13	EDID Revision	0	3	0000 0011	3		
20	14	Video Input Definition = Digital I/P,non TMDS CRGB	8	0	1000 0000			Display Parameter
21	15	Max H image size(cm) = 30.5cm	1	E	0001 1110	30		
22	16	Max V image size(cm) = 18.3cm	1	2	0001 0010	18		
23	17	Display gamma	7	8	0111 1000	2.2		
24	18	Feature support(DPMS) = Active off, RGB Color	0	A	0000 1010			
25	19	Red/Green low Bits	2	F	0010 1111			Color Characteristic
26	1A	Blue/White Low Bits	3	0	0011 0000			
27	1B	Red X	9	7	1001 0111			
28	1C	Red Y	5	8	0101 1000			
29	1D	Green X	5	3	0101 0011			
30	1E	Green Y	8	B	1000 1011			
31	1F	Blue X	2	9	0010 1001			
32	20	Blue Y	2	5	0010 0101			
33	21	White X	5	0	0101 0000			
34	22	White Y	5	4	0101 0100			
35	23	Established Timing I = 00h(If not used)	0	0	0000 0000			Established Timings
36	24	Established Timing II = 00h(If not used)	0	0	0000 0000			
37	25	Manufacturer's Timings = 00h(If not used)	0	0	0000 0000			
38	26	Standard Timing Identification 1 was not used	0	1	0000 0001			Standard Timing ID
39	27	Standard Timing Identification 1 was not used	0	1	0000 0001			
40	28	Standard Timing Identification 2 was not used	0	1	0000 0001			
41	29	Standard Timing Identification 2 was not used	0	1	0000 0001			
42	2A	Standard Timing Identification 3 was not used	0	1	0000 0001			
43	2B	Standard Timing Identification 3 was not used	0	1	0000 0001			
44	2C	Standard Timing Identification 4 was not used	0	1	0000 0001			
45	2D	Standard Timing Identification 4 was not used	0	1	0000 0001			
46	2E	Standard Timing Identification 5 was not used	0	1	0000 0001			
47	2F	Standard Timing Identification 5 was not used	0	1	0000 0001			
48	30	Standard Timing Identification 6 was not used	0	1	0000 0001			
49	31	Standard Timing Identification 6 was not used	0	1	0000 0001			
50	32	Standard Timing Identification 7 was not used	0	1	0000 0001			
51	33	Standard Timing Identification 7 was not used	0	1	0000 0001			
52	34	Standard Timing Identification 8 was not used	0	1	0000 0001			
53	35	Standard Timing Identification 8 was not used	0	1	0000 0001			

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

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)		Value (binary)	Data		
54	36	Pixel Clock/10,000 (LSB)	3	4	0011 0100	69.64MHz		Timing Descriptor #1
55	37	Pixel Clock/10,000 (MSB) /	1	B	0001 1011			
56	38	Horizontal Active	0	0	0000 0000	1280 pixels		
57	39	Horizontal Blanking	A	0	1010 0000	160 pixels		
58	3A	Horizontal Active : Horizontal Blanking	5	0	0101 0000			
59	3B	Vertical Avtive	0	0	0000 0000	768 lines		
60	3C	Vertical Blanking	2	6	0010 0110	38 lines		
61	3D	Vertical Active : Vertical Blanking	3	0	0011 0000			
62	3E	Horizontal Sync. Offset	3	0	0011 0000	48 pixels		
63	3F	Horizontal Sync Pulse Width	2	0	0010 0000	32 pixels		
64	40	Vertical Sync Offset : Sync Width	3	6	0011 0110	3/6 lines		
65	41	Horizontal Vertical Sync Offset/Width upper 2bits = 0	0	0	0000 0000	0		
66	42	Horizontal Image Size = 331.2 mm	3	1	0011 0001	305		
67	43	Vertical Image Size = 207.0mm	B	7	1011 0111	183		
68	44	Horizontal & Vertical Image Size (upper 4bit)	1	0	0001 0000			
69	45	Horizontal Border = 0	0	0	0000 0000			
70	46	Vertical Border = 0	0	0	0000 0000			
71	47	Non-interlaced,Normal display,no stereo,Digital separate sync,H/V pol negatives	1	9	0001 1001			
72	48	Pixel Clock/10,000 (LSB) 50Hz	A	B	1010 1011	58.03MHz		Timing Description #2
73	49	Pixel Clock/10,000 (MSB) / 50Hz	1	6	0001 0110			
74	4A	Horizontal Active	0	0	0000 0000	1280 pixels		
75	4B	Horizontal Blanking	A	0	1010 0000	160 pixels		
76	4C	Horizontal Active : Horizontal Blanking	5	0	0101 0000			
77	4D	Vertical Avtive	0	0	0000 0000	768 lines		
78	4E	Vertical Blanking	2	6	0010 0110	38 lines		
79	4F	Vertical Active : Vertical Blanking	3	0	0011 0000			
80	50	Horizontal Sync. Offset	3	0	0011 0000	48 pixels		
81	51	Horizontal Sync Pulse Width	2	0	0010 0000	32 pixels		
82	52	Vertical Sync Offset : Sync Width	3	6	0011 0110	3/6 lines		
83	53	Horizontal Vertical Sync Offset/Width upper 2bits = 0	0	0	0000 0000	0		
84	54	Horizontal Image Size = 331.2 mm	3	1	0011 0001	305		
85	55	Vertical Image Size = 207.0mm	B	7	1011 0111	183		
86	56	Horizontal & Vertical Image Size (upper 4bit)	1	0	0001 0000			
87	57	Horizontal Border = 0	0	0	0000 0000			
88	58	Vertical Border = 0	0	0	0000 0000			
89	59	Non-interlaced,Normal display,no stereo,Digital separate sync,H/V pol negatives	1	9	0001 1001			
90	5A	Detailed Timing Descriptor #3	0	0	0000 0000	0		Timing Description #3
91	5B		0	0	0000 0000	0		
92	5C		0	0	0000 0000	0		
93	5D		0	F	0000 1111	15		
94	5E		0	0	0000 0000	0		
95	5F	(Horizontal active pixel /8)-31	8	1	1000 0001	129		
96	60	Image Aspect Ratio(15:9)	F	9	1111 1001	15 : 9		
97	61	Low Refresh Rate #1(50Hz)	3	2	0011 0010	50		
98	62	(Horizontal active pixel /8)-31	8	1	1000 0001	129		
99	63	Image Aspect Ratio(15:9)	F	9	1111 1001	15 : 9		
100	64	Low Refresh Rate #2(40Hz)	2	8	0010 1000	40		
101	65	Brightness(1/10nit)	1	4	0001 0100	20		
102	66	Feature flag(TN mode)	0	1	0000 0001	1		
103	67	Reserved 00h	0	0	0000 0000	0		
104	68	EISA manufacturer code(3 Character ID)	3	2	0011 0010	LG		
105	69	Compressed ASCII	0	C	0000 1100			
106	6A	Panel Supplier Reserved - Product code	0	0	0000 0000			
107	6B	(Hex, LSB first)	0	0	0000 0000			

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

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)		Value (binary)	Data		
107	6B	(Hex, LSB first)	0	0	0000 0000			
108	6C	Detailed Timing Descriptor #4	0	0	0000 0000			**Timing Description #4**
109	6D		0	0	0000 0000			
110	6E		0	0	0000 0000			
111	6F		F	E	1111 1110			
112	70		0	0	0000 0000			
113	71	(Supplier S/N)	4	C	0100 1100	L		
114	72	(Supplier S/N)	5	0	0101 0000	P		
115	73	(Supplier S/N)	3	1	0011 0001	1		
116	74	(Supplier S/N)	3	4	0011 0100	4		
117	75	(Supplier S/N)	3	0	0011 0000	0		
118	76	(Supplier S/N)	5	7	0101 0111	W		
119	77	(Supplier S/N)	5	8	0101 1000	X		
120	78	(Supplier S/N)	3	1	0011 0001	1		
121	79	(Supplier S/N)	2	D	0010 1101	-		
122	7A	(Supplier S/N)	5	4	0101 0100	T		
123	7B	(Supplier S/N)	4	C	0100 1100	L		
124	7C	(Supplier S/N)	3	0	0011 0000	0		
125	7D	(Supplier S/N)	3	2	0011 0010	2		
126	7E	Extension flag = 00	0	0	0000 0000			**Extension Flag**
127	7F	Checksum	**D**	**2**	**1101 0010**			**Checksum**