LG Display

LP156WH6
Liquid Crystal Display

Product Specification

SPECIFICATION
FOR
APPROVAL

(◆) **Preliminary Specification**
( ) **Final Specification**

Title	15.6” HD TFT LCD

Customer	Acer
MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LP156WH6
Suffix	TJA1

*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.

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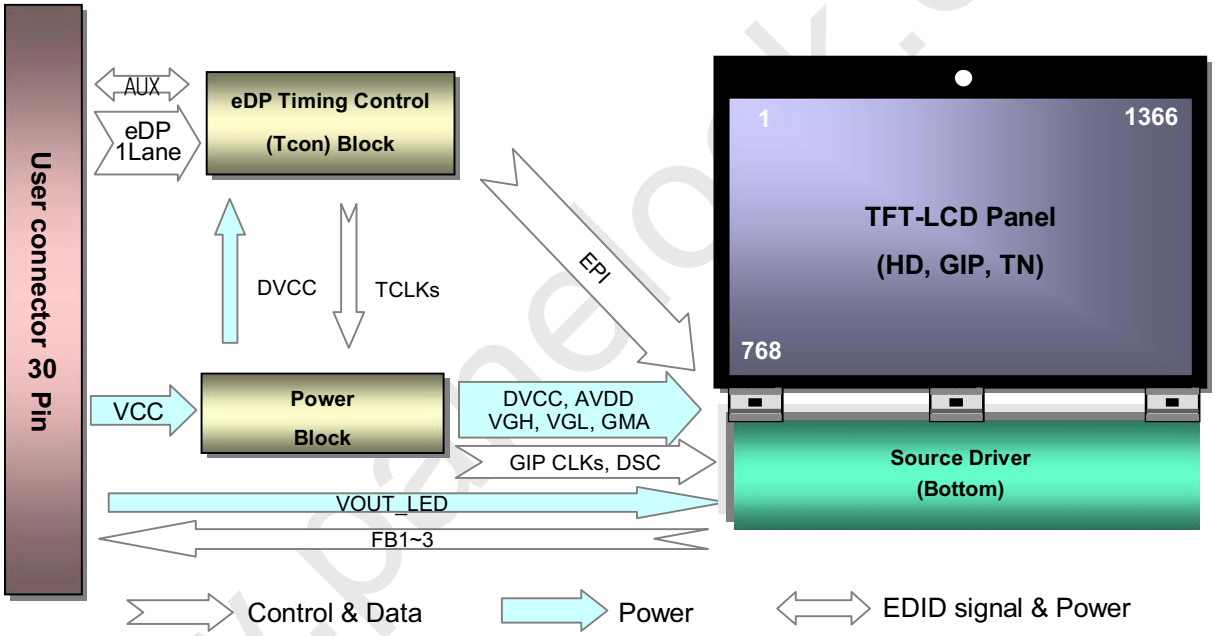
RECORD OF REVISIONS

Revision No	Revision Date	Page	Description	EDID ver
0.0	Sep. 6. 2011	-	First Draft (Preliminary Specification)	
0.1	Sep. 7. 2011	4,18	Update weight	
		20	Update General tolerance	
0.2	Sep. 22. 2011	8	Update 30 pin Connector maker	
0.3	Oct. 12. 2011	6	Update LED Characteristics	
		8, 9	Update pinmap	
		19	Update Mechanic Drawing	
0.4	Dec. 1. 2011	4, 6	Update Logic Power Consumption	
0.5	Dec. 12. 2011	11	Update Signal Timing Specifications	
		15	Update Wx, Wy	
		16	Update Gamma	
		25-27	Update EDID	
0.6	Jan. 9. 2012	13	Update Power Sequence	

1. General Description

The LP156WH6 is a Color Active Matrix Liquid Crystal Display. 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 15.6 inches diagonally measured active display area with HD resolution (1366 horizontal by 768 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 LP156WH6 has been designed to apply the interface method that enables low power, high speed, low EMI. The LP156WH6 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 LP156WH6 characteristics provide an excellent flat display for office automation products such as Notebook PC.



General Features

Active Screen Size	15.6 inches diagonal
Outline Dimension	1) Panel (W/O PCB) : 356.85(H, Typ.) × 217.25(V, Typ.) [mm] 2) Panel (With PCB) : 356.85 (H, Typ.) × 229.55(V, Typ.) [mm]
Pixel Pitch	TBD
Pixel Format	1366 horiz. by 768 vert. Pixels RGB strip arrangement
Color Depth	6-bit, 262,144 colors
Transmittance (With POL)	TBD% (Typ.)
Power Consumption	Logic : 0.78W (Typ.@ Mosaic)
Weight	230g (Max.)
Display Operating Mode	Transmissive mode, normally white
Surface Treatment	Glare treatment (3H) of the front Polarizer
RoHS Compliance	Yes
BFR / PVC / As Free	Yes for all

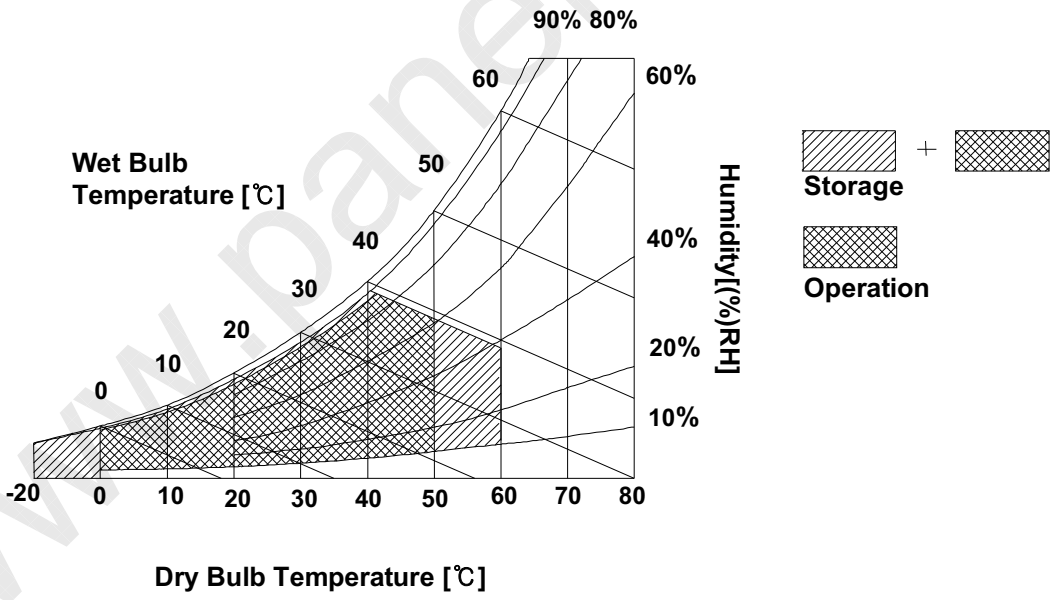
2. Absolute Maximum Ratings

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 LP156WH6 requires Two power inputs. The first logic is employed to power the LCD electronics and to drive the TFT array and liquid crystal and other is output volatge of LED array.

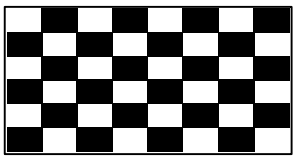
Table 2. ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
LOGIC :							
Power Supply Input Voltage		V_{CC}	3.0	3.3	3.6	V	1
Power Supply Input Current	Mosaic	I_{CC}	201	236	272	mA	2
Power Consumption	Mosaic	P_{CC}	-	0.78	0.90	W	2
Power Supply Inrush Current		I_{CC_P}	-	-	1500	mA	3
eDP Impedance		Z_{eDP}	90	100	110	Ω	4
LED : W/O LED Driver, 4string x 9ea							
LED Output Voltage		V_{OUT}		28.8	30.6	V	
LED Output Current		I_{OUT}		84	86	mA	
LED Power Consumption	Full Duty	P_{OUT}		2.42	2.63	W	

PWM frequency must set typ. TBDHz for wavy noise

Note)

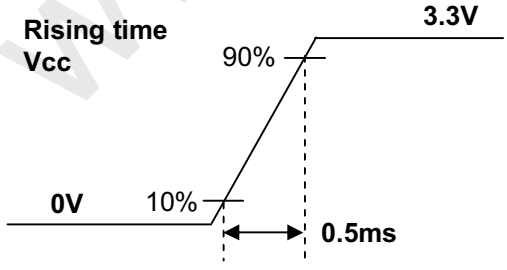
1. The measuring position is the connector of Board Ass'y and the test conditions are under 25℃, fv = 60Hz, Black pattern.
2. The specified Icc current and power consumption are under the Vcc = 3.3V , 25℃, fv = 60Hz condition.
3. This Spec. is the max load condition for the cable impedance designing.

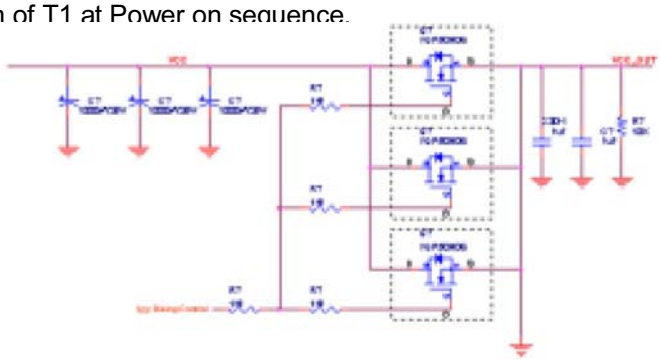


Mosaic Pattern

4. This impedance value is needed for proper display and measured form eDP Tx to the mating connector.

** The below figures are the measuring Vcc condition and the Vcc control block LGD used.
The Vcc condition is same as the minimum of T1 at Power on sequence.

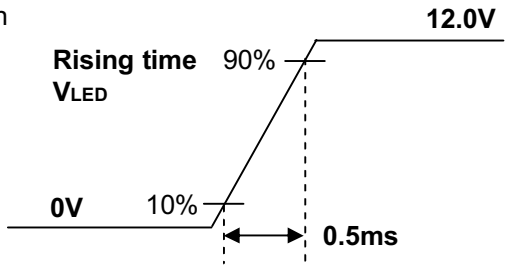




※ LGD recommand below Electrical Characteristics of LED Driver.

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
BACKLIGHT : (with LED Driver)						
LED Power Inrush Current	I_{LED_P}	-	TBD	TBD	mA	7
PWM Duty Ratio		1	-	100	%	8
PWM Jitter	-	0	-	0.2	%	9
PWM Impedance	Z_{PWM}	20	40	60	kΩ	
PWM Frequency	F_{PWM}	TBD	TBD	TBD	Hz	10
PWM High Level Voltage	V_{PWM_H}	2.2	-	5.3	V	
PWM Low Level Voltage	V_{PWM_L}	0	-	0.3	V	
LED_EN Impedance	Z_{PWM}	20	40	60	kΩ	
LED_EN High Voltage	$V_{LED\_EN\_H}$	2.2	-	5.3	V	
LED_EN Low Voltage	$V_{LED\_EN\_L}$	0	-	0.3	V	
Life Time		12,000	-	-	Hrs	11

7. The current and power consumption with LED Driver are under the Vled = 12.0V , 25℃, Dimming of Max luminance and White pattern with the normal frame frequency operated(60Hz).
8. The below figures are the measuring Vled condition and the Vled control block LGD used.
   VLED control block is same with Vcc control block.



9. The operation of LED Driver below minimum dimming ratio may cause flickering or reliability issue. If Jitter of PWM is bigger than maximum, it may induce flickering.
10. 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.
11. The life time is determined as the time at which brightness of LCD is 50% compare to that of minimum value specified in table 7. under general user condition.

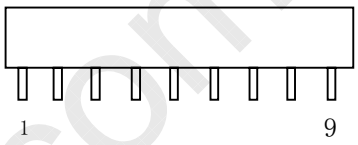
3-2. Interface Connections

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 CABLINE-VS RECE ASS'Y.

Table 3. MODULE CONNECTOR PIN CONFIGURATION (CN1)

Pin	Symbol	Description	Notes
1	NC	No Connection (Reserved)	**[Interface Chip]** 1, Interface chips 1.1 LCD :Analogix (LCD Controller) including eDP Receiver 1.2 System : GM60028 or ANX9804 or equivalent * Pin to Pin compatible with eDP **[Connector]** CABLINE-VS RECE ASS'Y, LSM or Hirose (GT05Q-30S-H10 or KN38-30S-0.5H) **[Mating Connector]** CABLINE-VS PLUG CABLE ASS'Y or equivalent. **[LED Block]** LED block move to system set base **[Connector pin arrangement]** Check B/Ass'y drawing (Page 20)
2	H_GND	High Speed (Main Link) Ground	
3	NC	No Connection (Reserved)	
4	NC	No Connection (Reserved)	
5	H_GND	High Speed (Main Link) Ground	
6	ML0-	Complement Signal-Lane 0	
7	ML0+	True Signal-Main Lane 0	
8	H_GND	High Speed (Main Link) Ground	
9	AUX+	True Signal-Auxiliary Channel	
10	AUX-	Complement Signal-Auxiliary Channel	
11	H_GND	High Speed (Main Link) Ground	
12	VCC	LCD Logic and driver power (3.3V Typ.)	
13	VCC	LCD Logic and driver power (3.3V Typ.)	
14	BIST	Built-In Self Test (active high)	
15	GND	Ground	
16	GND	Ground	
17	HPD	HPD signal pin	
18	GND	Ground	
19	GND	Ground	
20	FB4	Regulated Current sink	
21	FB3	Regulated Current sink	
22	FB2	Regulated Current sink	
23	FB1	Regulated Current sink	
24	NC	No Connection (Reserved – Use P-vcom)	
25	NC	No Connection (Reserved – Use P-vcom)	
26	VOUT	Boost output voltage	
27	VOUT	Boost output voltage	
28	VOUT	Boost output voltage	
29	NC	No Connection (Reserved)	
30	NC	No Connection (Reserved)	

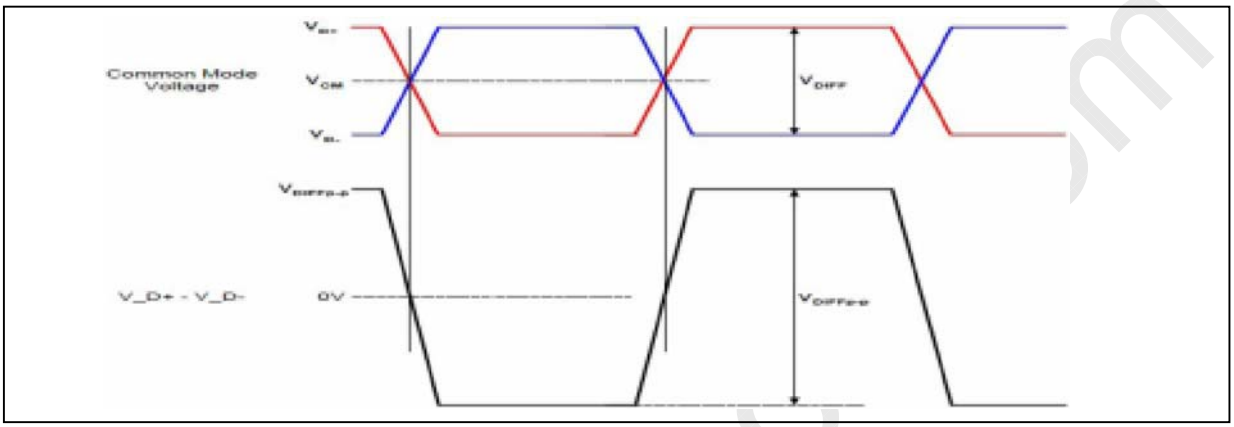
Table 3-2-2. FPC CONNECTOR PIN CONFIGURATION (CN2)

Pin	Symbol	Description	Notes
1	VOUT_LED	LED Anode(Positive)	
2	FB1	LED Cathode (Negative)	
3	VOUT_LED	LED Anode(Positive)	
4	FB2	LED Cathode (Negative)	
5	VOUT_LED	LED Anode(Positive)	
6	FB3	LED Cathode (Negative)	
7	VOUT_LED	LED Anode(Positive)	
8	FB4	LED Cathode (Negative)	
9	N.C	No Connection	

3-3. eDP Signal Timing Specifications

3-3-1. DC Specification

The VESA Display Port related AC specification is compliant with the VESA Display Port Standard v1.1a.



Description	Symbol	Min	Max	Unit	Notes
Differential peak-to-peak Input voltage	VDIFF p-p	120	-	mV	For high bit rate
		40	-		For reduced bit rate
Rx DC common mode voltage	VCM	0	2.0	V	-

3-3-2. AC Specification

The VESA Display Port related AC specification is compliant with the VESA Display Port Standard v1.1a.

Description	Symbol	Min	Typ	Max	Unit	Notes
Unit Interval for high bit rate (2.7Gbps/lane)	UI_High_Rate	-	370	-	ps	Range is nominal ±350ppm. DisplayPort Link Rx does not require local crystal for link clock generation
Unit Interval for high bit rate (1.62Gbps/lane)	UI_Low_Rate	-	617	-	ps	
Lane-to-Lane skew	V Rx-SKEW-INTER_PAIR	-	-	5200	ps	-
Lane intra-pair skew	V Rx-SKEW-INTRA_PAIR	-	-	100	ps	For high bit rate
		-	-	300	ps	For reduced bit rate

3-4. Signal Timing Specifications

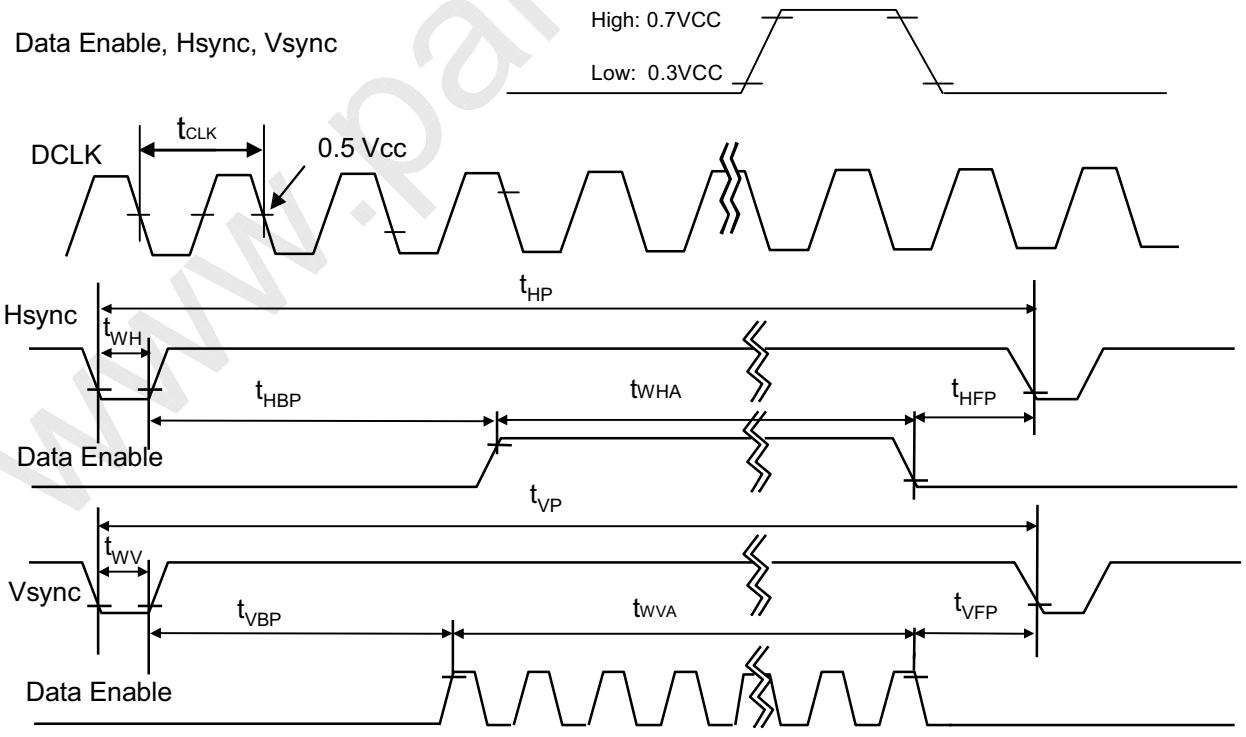
This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications and specifications of eDP Tx/Rx for its proper operation.

Table 4. TIMING TABLE

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Frequency	f_{CLK}	68.1	70.0	73.0	MHz	
Hsync	Period	t_{HP}	1460	1492	1528	tCLK	
	Width	t_{WH}	32	48	62		
	Width-Active	t_{WHA}	1366	1366	1366		
Vsync	Period	t_{VP}	778	782	792	tHP	
	Width	t_{WV}	3	5	8		
	Width-Active	t_{WVA}	768	768	768		
Data Enable	Horizontal back porch	t_{HBP}	30	42	60	tCLK	
	Horizontal front porch	t_{HFP}	32	36	40		
	Vertical back porch	t_{VBP}	5	6	12	tHP	
	Vertical front porch	t_{VFP}	2	3	4		

3-5. Signal Timing Waveforms

Condition : VCC =3.3V



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

3-7. Power Sequence

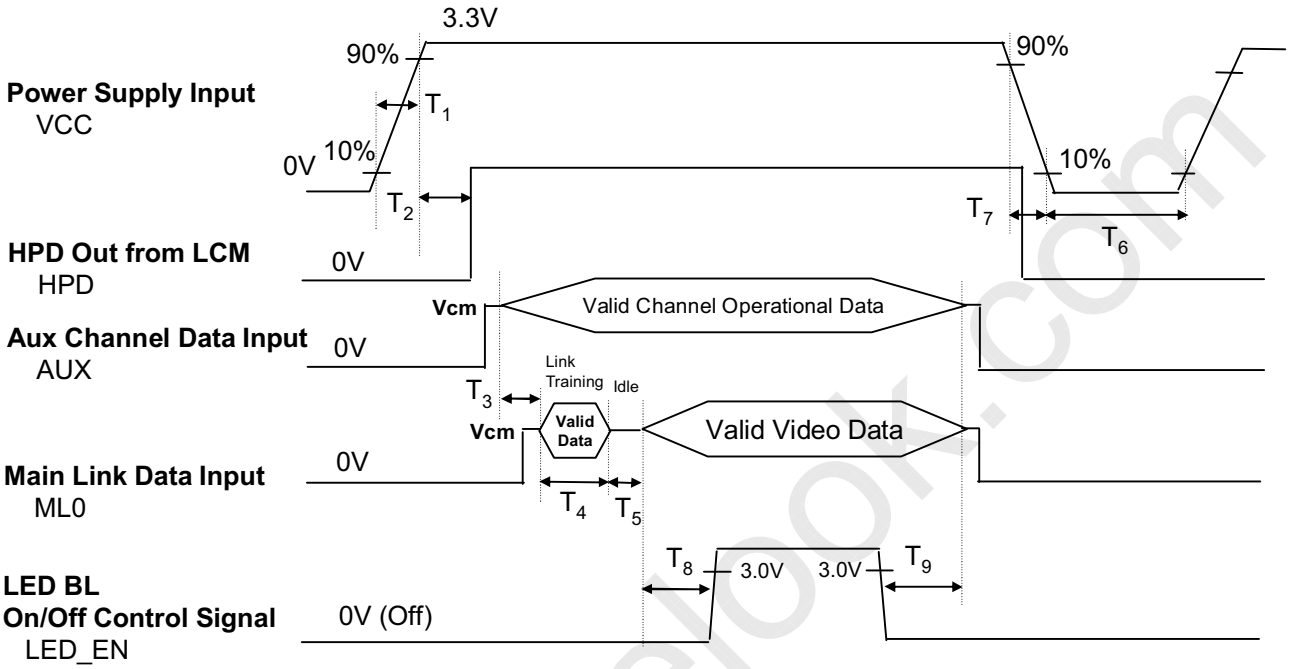


Table 6-1. POWER SEQUENCE TABLE

Logic Parameter	Value			Units
	Min.	Typ.	Max.	
T_1	0.5	-	10	ms
T_2	100	-	200	ms
T_3	50	75	-	ms
T_4	0	-	-	ms
T_5	0	-	-	ms
T_6	500	-	-	ms
T_7	3	-	10	ms
T_8	200	-	-	ms
T_9	200	-	-	ms

Note)
1. Do not insert the mating cable when system turn on.
2. Valid Data have to meet "3-3. eDP Signal Timing Specifications"

※ LGD recommand below sequence of LED Driver inputs.

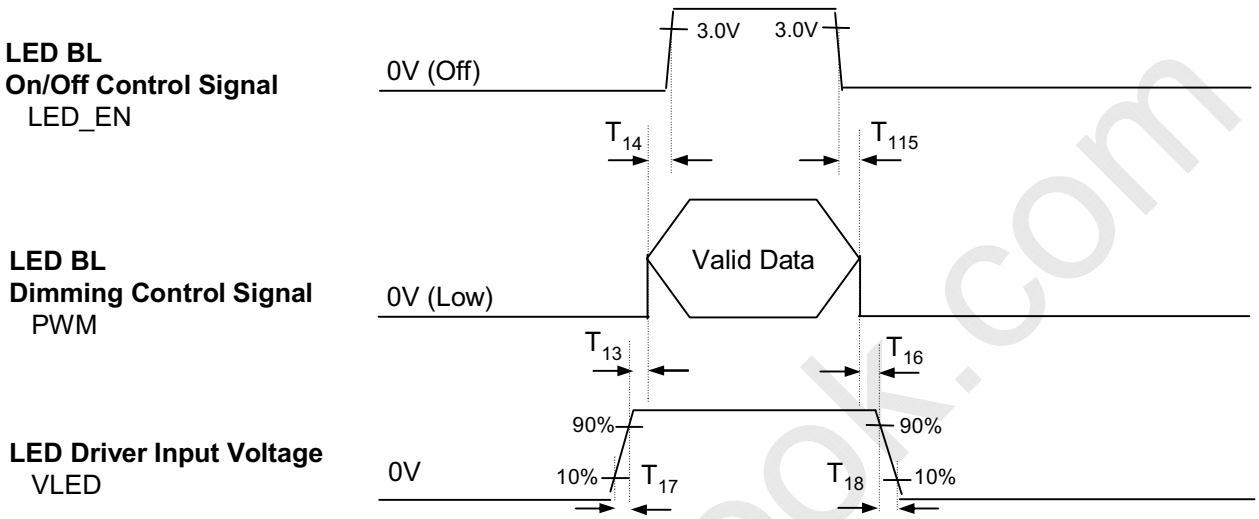


Table 6-2. POWER SEQUENCE TABLE

LED Parameter	Value			Units
	Min.	Typ.	Max.	
T_{13}	10	-	-	ms
T_{14}	0	-	-	ms
T_{15}	0	-	-	ms
T_{16}	10	-	-	ms
T_{17}	0.5	-	-	ms
T_{18}	0	-	5000	ms

Note)
1.LED_EN and PWM need to be on pull-down condition on invalid status.

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 20 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

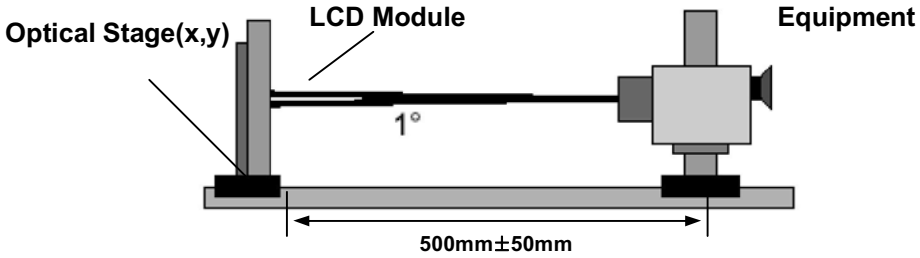


Table 7. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, fv=60Hz, f_{CLK}=70MHz,
Backlight : LGD Standard (200nit)

Parameter	Symbol	Values			Units	Notes
		Min	Typ	Max		
Transmittance (With POL)	%	-	TBD			
Surface Luminance, white	L_{WH}	170	200			
Contrast Ratio	CR	400	500	-		1
Response Time	$Tr_{R+}Tr_D$	-	16	25	ms	2
Color Coordinates						
RED	RX	TBD	TBD	TBD		
	RY	TBD	TBD	TBD		
GREEN	GX	TBD	TBD	TBD		
	GY	TBD	TBD	TBD		
BLUE	BX	TBD	TBD	TBD		
	BY	TBD	TBD	TBD		
WHITE	WX	0.283	0.313	0.343		
	WY	0.299	0.329	0.359		
Viewing Angle						3
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						4
Color Gamut	C/G	-	45	-	%	

※ It can be guaranteed only when B/L have sheets that LGD recommended. (Prism & Diffuser sheet)

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. Response time is the time required for the display to transition from white to black (rise time, TrR) and from black to white(Decay Time, TrD). For additional information see FIG 2.

3. 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 3.

4. Gray scale specification * fV = 60Hz

Gray Level	Luminance [%] (Typ)
L0	0.2
L7	1.2
L15	4.8
L23	10.9
L31	21.0
L39	34.8
L47	52.5
L55	74.2
L63	100.0

FIG. 2 Response Time

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

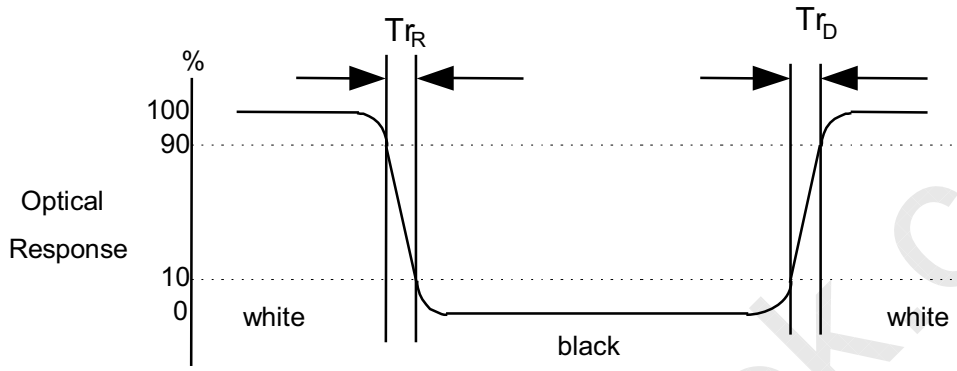
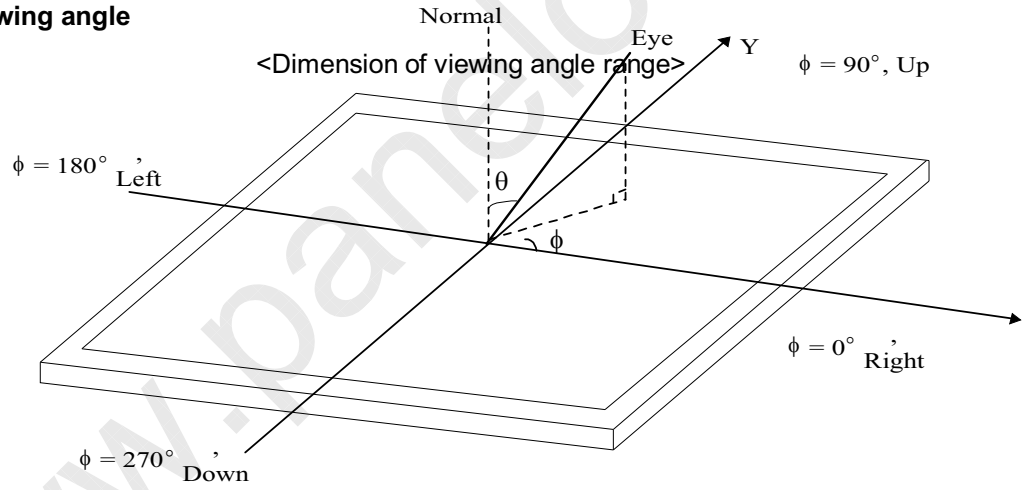


FIG. 3 Viewing angle



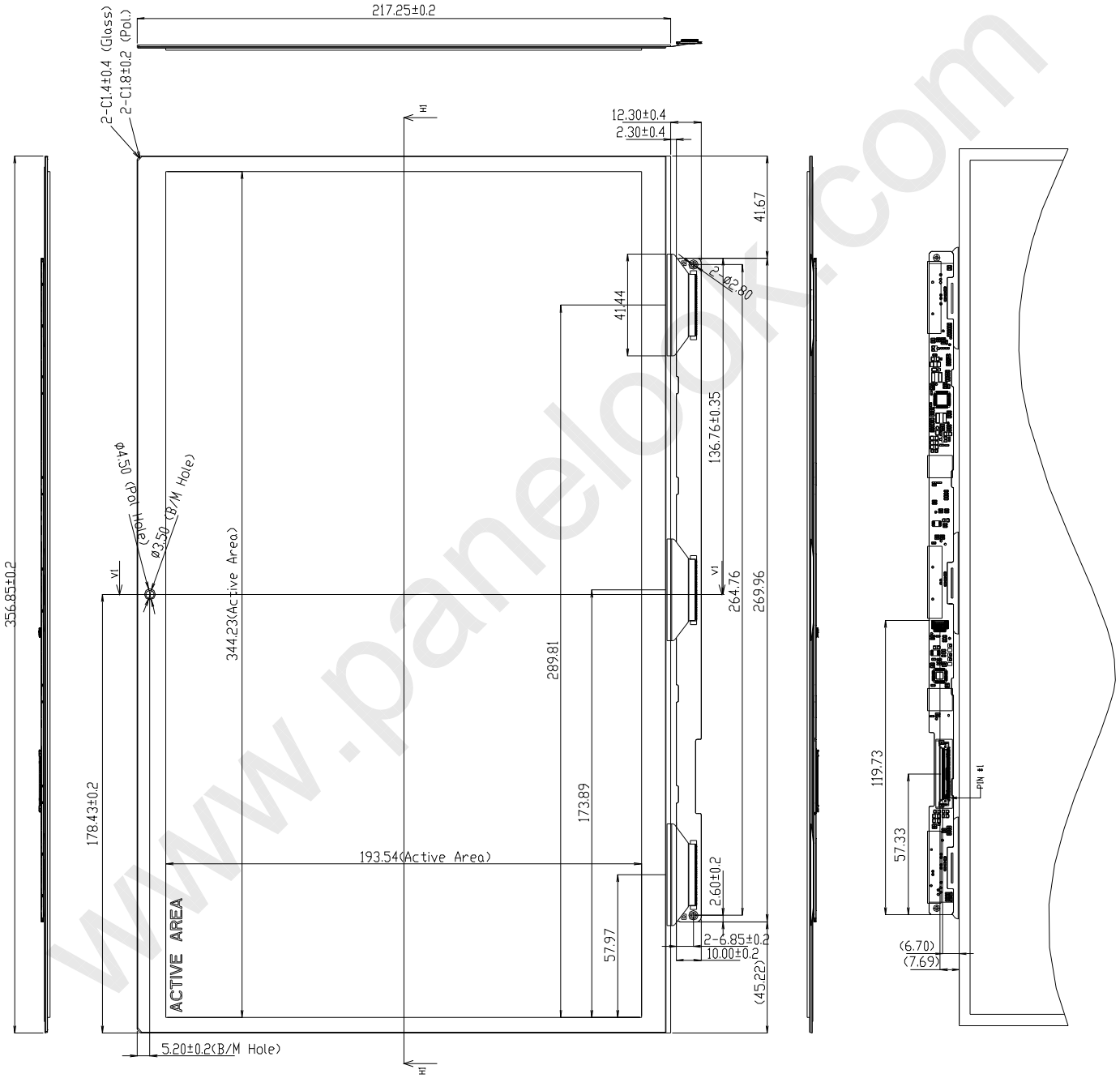
5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model LP156WH6. In addition the figures in the next page are detailed mechanical drawing of the Board Ass'y.

Outline Dimension (Without PCB)	Horizontal (A)	356.85± 0.5mm
	Vertical (B)	217.25 ± 0.5mm
	Thickness	1.27mm (Typ.)
Active Display Area	Horizontal	344.23 mm
	Vertical	193.54 mm
Weight	230g (Max.)	
Surface Treatment	Glare treatment(3H) of the front polarizer	

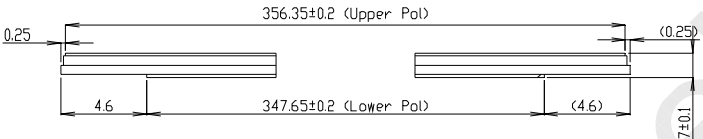
<FRONT VIEW>

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

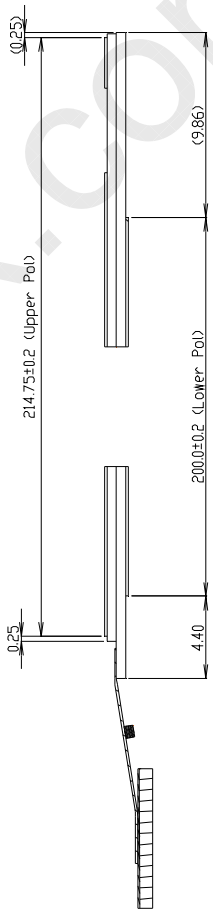


<SECTION VIEW>

Note) Unit:[mm], General tolerance: ± 0.25mm



SECTION H1-H1 SCALE 4/1



SECTION V1-V1 SCALE 4/1

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	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 60950-1, Underwriters Laboratories Inc.
Information Technology Equipment - Safety - Part 1 : General Requirements.

b) CAN/CSA C22.2 No.60950-1-07, Canadian Standards Association.
Information Technology Equipment - Safety - Part 1 : General Requirements.

c) EN 60950-1, European Committee for Electrotechnical Standardization (CENELEC).
Information Technology Equipment - Safety - Part 1 : General Requirements.

d) IEC 60950-1, The International Electrotechnical Commission (IEC).
Information Technology Equipment - Safety - Part 1 : General Requirements.

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mark	A	B	C	D	E	F	G	H	J	K

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 : 20pcs

b) Box Size : 473 mm X 360 mm X 165 mm

9. PRECAUTIONS

Please pay attention to the followings when you use this Board ass'y.

9-1. Assembly PRECAUTIONS

(1) 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.
(2) You should adopt radiation structure to satisfy the temperature specification.
(3) 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.
(4) 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.)
(5) 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.
(6) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
(7) Do not open the case because inside circuits do not have sufficient strength.
(8) Mechanical structure for backlight system should be designed for sustaining board ass'y safely.

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 electrical impact to board assy. Otherwise, it can't be operated its full characteristics perfectly.

9-3. ELECTROSTATIC DISCHARGE CONTROL

Board ass'y is composed of electronic circuits, so it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch drive IC directly.
Panel ground path should be connected to metal ground.

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 Board ass'y 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 (Dec)	Byte (Hex)	Field Name and Comments	Value (Hex)
Header	0	00	Header	00
	1	01	Header	FF
	2	02	Header	FF
	3	03	Header	FF
	4	04	Header	FF
	5	05	Header	FF
	6	06	Header	FF
	7	07	Header	00
EDID Vendor / Product Version	8	08	EISA manufacture code (3 Character ID) LGD	30
	9	09	EISA manufacture code (Compressed ASCII)	E4
	10	0A	Panel Supplier Reserved - Product Code 035Ah	5A
	11	0B	(Hex. LSB first)	03
	12	0C	LCD Module Serial No - Preferred but Optional ("0" If not used)	00
	13	0D	LCD Module Serial No - Preferred but Optional ("0" If not used)	00
	14	0E	LCD Module Serial No - Preferred but Optional ("0" If not used)	00
	15	0F	LCD Module Serial No - Preferred but Optional ("0" If not used)	00
	16	10	Week of Manufacture 00 weeks	00
	17	11	Year of Manufacture 2011 years	15
	18	12	EDID structure version # = 1	01
	19	13	EDID revision # = 3	03
Display Parameters	20	14	Video input Definition = Digital signal	80
	21	15	Max H image size (Rounded cm) = 34 cm	22
	22	16	Max V image size (Rounded cm) = 19 cm	13
	23	17	Display gamma = (gamma*100)-100 = Example:(2.2*100)-100=120=2.2 Gamma	78
	24	18	Feature Support (no_DPMS, no_Active Off/Very Low Power, RGB color display, Timing BLK 1,no_ GTF)	0A
Panel Color Coordinates	25	19	Red/Green Low Bits (RxRy/GxGy)	5E
	26	1A	Blue/White Low Bits (BxBy/WxWy)	A5
	27	1B	Red X Rx= 0.583	95
	28	1C	Red Y Ry = 0.345	58
	29	1D	Green X Gx= 0.343	57
	30	1E	Green Y Gy = 0.561	8F
	31	1F	Blue X Bx= 0.158	28
	32	20	Blue Y By = 0.115	1D
	33	21	White X Wx= 0.313	50
	34	22	White Y Wy= 0.329	54
Established Timing	35	23	Established timing 1 (00h if not used)	00
	36	24	Established timing 2 (00h if not used)	00
	37	25	Manufacturer's timings (00h if not used)	00
Standard Timing ID	38	26	Standard timing ID1 (01h if not used)	01
	39	27	Standard timing ID1 (01h if not used)	01
	40	28	Standard timing ID2 (01h if not used)	01
	41	29	Standard timing ID2 (01h if not used)	01
	42	2A	Standard timing ID3 (01h if not used)	01
	43	2B	Standard timing ID3 (01h if not used)	01
	44	2C	Standard timing ID4 (01h if not used)	01
	45	2D	Standard timing ID4 (01h if not used)	01
	46	2E	Standard timing ID5 (01h if not used)	01
	47	2F	Standard timing ID5 (01h if not used)	01
	48	30	Standard timing ID6 (01h if not used)	01
	49	31	Standard timing ID6 (01h if not used)	01
	50	32	Standard timing ID7 (01h if not used)	01
	51	33	Standard timing ID7 (01h if not used)	01
	52	34	Standard timing ID8 (01h if not used)	01
	53	35	Standard timing ID8 (01h if not used)	01

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

	Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)
Timing Descriptor #1	54	36	Pixel Clock/10,000 (LSB)	70 MHz@60Hz	58
	55	37	Pixel Clock/10,000 (MSB)		1B
	56	38	Horizontal Active (lower 8 bits)	1366 Pixels	56
	57	39	Horizontal Blanking(Thp-HA) (lower 8 bits)	126 Pixels	7E
	58	3A	Horizontal Active / Horizontal Blanking(Thp-HA) (upper 4:4bits)		50
	59	3B	Vertical Avtive	768 Lines	00
	60	3C	Vertical Blanking (Tvp-HA) (DE Blanking typ.for DE only panels)	14 Lines	0E
	61	3D	Vertical Active : Vertical Blanking (Tvp-HA) (upper 4:4bits)		30
	62	3E	Horizontal Sync. Offset (Thfp)	36 Pixels	24
	63	3F	Horizontal Sync Pulse Width (HSPW)	48 Pixels	30
	64	40	Vertical Sync Offset(Tvfp) : Sync Width (VSPW)	3 Lines : 5 Lines	35
	65	41	Horizontal Vertical Sync Offset/Width (upper 2bits)		00
	66	42	Horizontal Image Size (mm)	344 mm	58
	67	43	Vertical Image Size (mm)	194 mm	C2
	68	44	Horizontal Image Size / Vertical Image Size		10
	69	45	Horizontal Border = 0 (Zero for Notebook LCD)		00
	70	46	Vertical Border = 0 (Zero for Notebook LCD)		00
	71	47	Non-Interlace, Normal display, no stereo, Digital Separate (Vsync_NEG, Hsync_NEG), DE only note : LSB is set to '1' if panel is DE-timing only. H/V can be ignored.		19
Timing Descriptor #2	72	48	Flag		00
	73	49	Flag		00
	74	4A	Flag		00
	75	4B	Data Type Tag (Descriptor Defined by manufacturer)		00
	76	4C	Flag		00
	77	4D	Descriptor Defined by manufacturer		00
	78	4E	Descriptor Defined by manufacturer		00
	79	4F	Descriptor Defined by manufacturer		00
	80	50	Descriptor Defined by manufacturer		00
	81	51	Descriptor Defined by manufacturer		00
	82	52	Descriptor Defined by manufacturer		00
	83	53	Descriptor Defined by manufacturer		00
	84	54	Descriptor Defined by manufacturer		00
	85	55	Descriptor Defined by manufacturer		00
	86	56	Descriptor Defined by manufacturer		00
	87	57	Descriptor Defined by manufacturer		00
	88	58	Descriptor Defined by manufacturer		00
	89	59	Descriptor Defined by manufacturer		00
Timing Descriptor #3	90	5A	Flag		00
	91	5B	Flag		00
	92	5C	Flag		00
	93	5D	Data Type Tag (ASCII String)		FE
	94	5E	Flag		00
	95	5F	ASCII String	L	4C
	96	60	ASCII String	G	47
	97	61	ASCII String		20
	98	62	ASCII String	D	44
	99	63	ASCII String	i	69
	100	64	ASCII String	s	73
	101	65	ASCII String	p	70
	102	66	ASCII String	l	6C
	103	67	ASCII String	a	61
	104	68	ASCII String	y	79
	105	69	Manufacturer P/N(If<13 char-->0Ah, then terminate with ASCII		0A
	106	6A	Manufacturer P/N(If<13 char-->0Ah, then terminate with ASCII		20
	107	6B	Manufacturer P/N(If<13 char-->0Ah, then terminate with ASCII		20

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

	Byte (Dec)	Byte (Hex)	Field Name and Comments		Value (Hex)
Timing Descriptor #4	108	6C	Flag		00
	109	6D	Flag		00
	110	6E	Flag		00
	111	6F	Data Type Tag (ASCII String)		FE
	112	70	Flag		00
	113	71	ASCII String	L	4C
	114	72	ASCII String	P	50
	115	73	ASCII String	1	31
	116	74	ASCII String	5	35
	117	75	ASCII String	6	36
	118	76	ASCII String	W	57
	119	77	ASCII String	H	48
	120	78	ASCII String	6	36
	121	79	ASCII String	-	2D
	122	7A	ASCII String	T	54
	123	7B	ASCII String	J	4A
	124	7C	ASCII String	A	41
	125	7D	ASCII String	1	31
Check	126	7E	Extension flag (# of optional 128 panel ID extension block to follow, Typ = 0)		00
	127	7F	Check Sum (The 1-byte sum of all 128 bytes in this panel ID block shall = 0)		BC