

**Product Specification**
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# SPECIFICATION FOR APPROVAL

( ) Preliminary Specification

( ● ) Final Specification

Title	42.0" WUXGA TFT LCD
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BUYER	General
MODEL	

SUPPLIER	LG.Philips LCD Co., Ltd.
*MODEL	LC420WU2
SUFFIX	SLC1

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

APPROVED BY	SIGNATURE DATE
/	
/	
/	

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

APPROVED BY	SIGNATURE DATE
J. H. Yoon / G. Manager	
REVIEWED BY J.T. Kim / Manager	
PREPARED BY Y.O. Kim / Engineer	

**TV Product Development Dept.**  
**LG. Philips LCD Co., Ltd**

Product Specification

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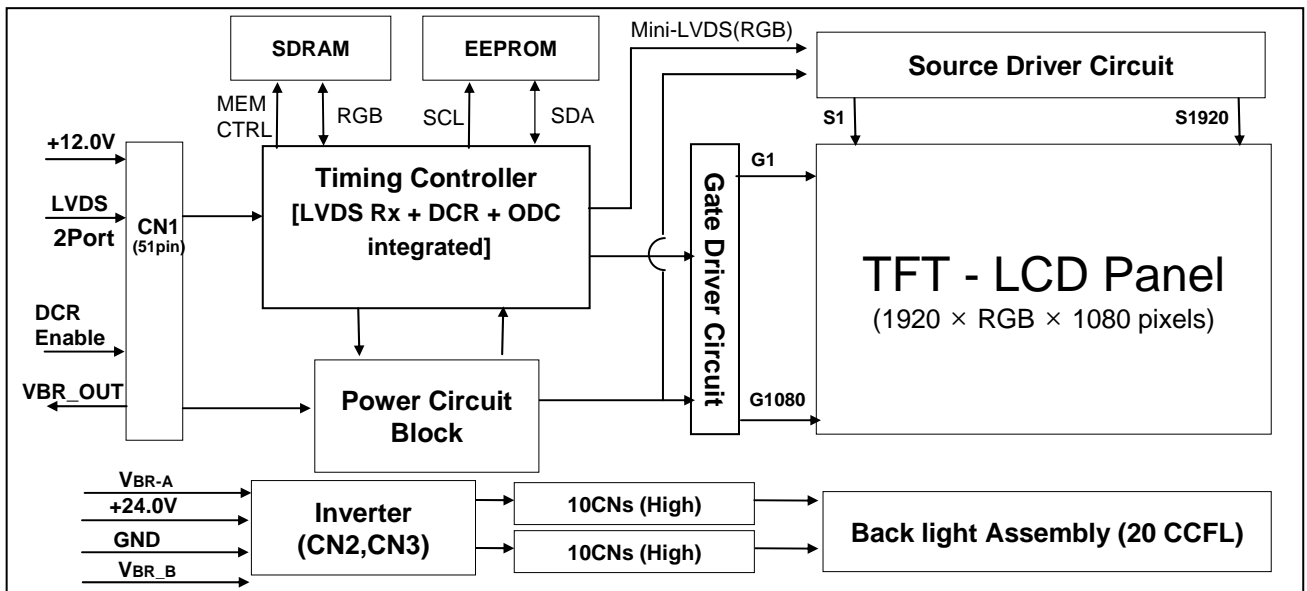
### 1. General Description

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The LC420WU2 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 display type which is operating in the normally black mode. It has a 42.02 inch diagonally measured active display area with WUXGA resolution (1080 vertical by 1920 horizontal pixel array). Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arrayed in vertical stripes. Gray scale or the luminance of the sub-pixel color is determined with a 10-bit gray scale signal for each dot. Therefore, it can present a palette of more than 1.07Billion(true) colors.

It has been designed to apply the 10-bit 2-port LVDS interface.

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



### General Features

Active Screen Size	42.02 inches(1067.31mm) diagonal
Outline Dimension	983.0(H) x 576.0 (V) x 51.0 mm(D) (Typ.)
Pixel Pitch	0.4845 mm x 0.4845 mm
Pixel Format	1920 horiz. by 1080 vert. Pixels, RGB stripe arrangement
Color Depth	10-bit, 1.07 Billion colors
Luminance, White	500 cd/m <sup>2</sup> (Center 1point ,Typ.)
Viewing Angle (CR>10)	Viewing angle free ( R/L 178 (Typ.), U/D 178 (Typ.))
Power Consumption	Total 172.52 (Typ.) (Logic=7.52 W, Inverter=165W [I <sub>BL</sub> =6.5 mA] )
Weight	13.0 K g (Typ.)
Display Mode	Transmissive mode, Normally black
Surface Treatment	Hard coating(3H), Anti-glare treatment of the front polarizer ( <b>Haze 13%</b> )

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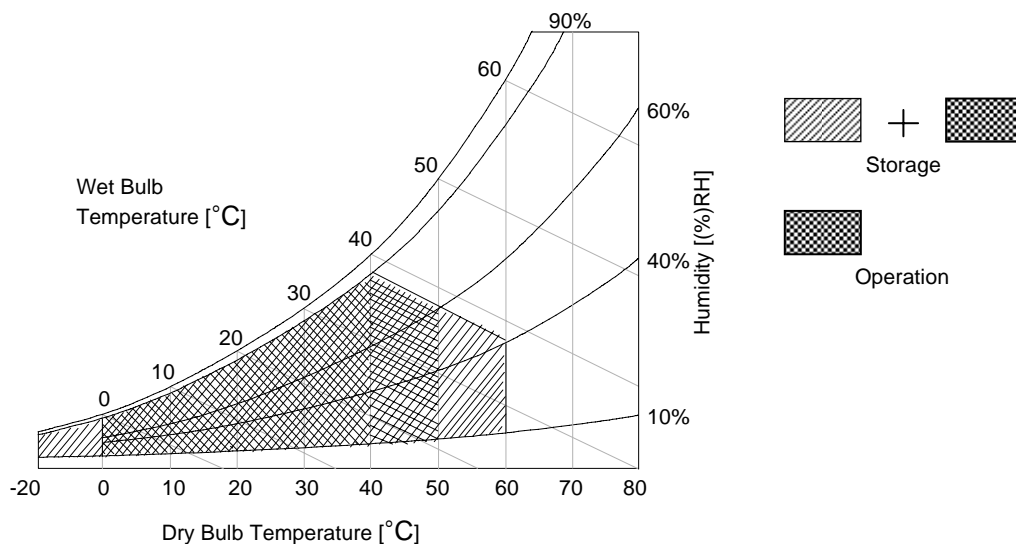
## 2. Absolute Maximum Ratings

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

**Table 1. ABSOLUTE MAXIMUM RATINGS**

Parameter		Symbol	Value		Unit	Remark
			Min	Max		
Power Input Voltage	LCM	VLCD	-0.3	+14.0	V <sub>DC</sub>	at 25 ± 2 °C
	Backlight Inverter	VBL	+21.6	+27.0	V <sub>DC</sub>	
ON/OFF Control Voltage		VON/OFF	-0.3	+5.25	V <sub>DC</sub>	
Brightness Control Voltage		VBR	0	+5.0	V <sub>DC</sub>	
Operating Temperature		T <sub>OP</sub>	0	+50	°C	Note 1,2
Storage Temperature		T <sub>ST</sub>	-20	+60	°C	
Operating Ambient Humidity		H <sub>OP</sub>	10	90	%RH	
Storage Humidity		H <sub>ST</sub>	10	90	%RH	

Note : 1. Temperature and relative humidity range are shown in the figure below.  
Wet bulb temperature should be 39 °C Max. and no condensation of water.  
2. Gravity mura can be guaranteed under 40°C condition.



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### 3. Electrical Specifications

#### 3-1. Electrical Characteristics

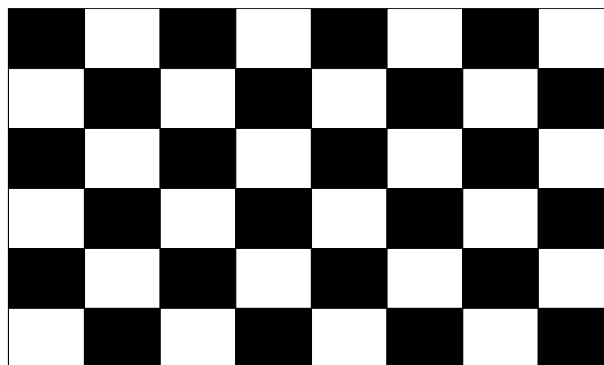
It requires two power inputs. One is employed to power for the LCD circuit. The other is used for the CCFL backlight and inverter circuit.

**Table 2. ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Value			Unit	Note
		Min	Typ	Max		
Circuit :						
Power Input Voltage	VLCD	11.4	12.0	12.6	VDC	
Power Input Current	ILCD	-	626	814	mA	1
		-	828	1077	mA	2
Power Consumption	PLCD	-	7.52	9.77	Watt	1
Rush current	IRUSH	-	-	3.0	A	3

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

White : 1023Gray  
Black : 0Gray



Mosaic Pattern(8 x 6)

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**Table 3. ELECTRICAL CHARACTERISTICS (Continue)**

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Parameter			Symbol	Values			Unit	Notes
				Min	Typ	Max		
Inverter :								
Power Supply Input Voltage			VBL	22.8	24.0	25.2	Vdc	1
Power Supply Input Voltage Ripple				-0.2		0.2	Vp-p	1
Power Supply Input Current			IBL	-	6.8	8.2	A	VBR-B = 3.3V VBR-A = 1.65V
				-	7.6	9.1	A	VBR-B= 3.3V VBR-A = 3.3V
Power Supply Input Current(In-Rush)			Irush	-	-	13	A	VBL = 22.8V VBR-B = 3.3V VBR-A = 1.65V
Power Consumption			PBL	-	165	196	W	1
Input Voltage for Control System Signals	Brightness Adjust	Analog	VBR-A	0.0	-	3.3	Vdc	
		Burst	VBR-B	0.0	-	3.3	Vdc	
	On/Off	On	V on	2.5	-	5.0	Vdc	
		Off	V off	-0.3	0.0	0.5	Vdc	
Lamp :								
Discharge Stabilization Time			Ts			3	min	4
Life Time				30,000	40,000		Hrs	2,3

**Notes :**

- Electrical characteristics are determined after the unit has been 'ON' and stable for approximately 120 minutes at  $25 \pm 2^\circ\text{C}$   
The specified current and power consumption are under the typical supply Input voltage 24V and Vbr 1.65V, it is total power consumption.  
The ripple voltage of the power supply input voltage is under 0.4 Vp-p.  
LPL recommend Input Voltage is  $24.0V \pm 5\%$ .
- The life is determined as the time at which luminance of the lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at  $25 \pm 2^\circ\text{C}$ .  
Specified value is when lamp is aligned horizontally.
- The lamp life time for LCM is guaranteed minimum 30,000 hours when Vbr(Analog) is typical values.
- The brightness of the lamp after lighted for 5minutes is defined as 100%.  
Ts is the time required for the brightness of the center of the lamp to be not less than 95% at typical current.  
The screen of LCD module may be partially dark by the time the brightness of lamp is stable after turn on.

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### 3-2. Interface Connections

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This LCD module employs two kinds of interface connection, a 51-pin connector is used for the module electronics and Master 14-pin and Slave 12-pin connectors are used for the integral backlight system.

#### 3-2-1. LCD Module

- LCD Connector(CN1): GT05L-51S-H38(manufactured by LS Cable) or FI-R51S-HF(manufactured by JAE)
- Mating Connector : FI-R51HL(JAE) or compatible

**Table 4. MODULE CONNECTOR(CN1) PIN CONFIGURATION**

No	Symbol	Description	No	Symbol	Description
1	GND	Ground	27	GND	Ground
2	NC	Reserved	28	RE0N	SECOND CHANNEL 0-
3	NC	Reserved	29	RE0P	SECOND CHANNEL 0+
4	NC	(I2C DATA Interface)	30	RE1N	SECOND CHANNEL 1-
5	NC	(I2C CLK Interface)	31	RE1P	SECOND CHANNEL 1+
6	NC	(EEPROM Write Protection)	32	RE2N	SECOND CHANNEL 2-
7	LVDS Select	Logic 'L' Level : LG(NS) Format	33	RE2P	SECOND CHANNEL 2+
8	EXT VBR-B	EXT VBR-B Input	34	GND	Ground
9	DCR VBR-B	DCR VBR-B Output	35	RECLKN	SECOND CLOCK CHANNEL C-
10	DCR Enable	Logic 'L' Level : Disable	36	RECLKP	SECOND CLOCK CHANNEL C+
11	GND	Ground	37	GND	Ground
12	RO0N	FIRST CHANNEL 0-	38	RE3N	SECOND CHANNEL 3-
13	RO0P	FIRST CHANNEL 0+	39	RE3P	SECOND CHANNEL 3+
14	RO1N	FIRST CHANNEL 1-	40	RE4N	SECOND CHANNEL 4-
15	RO1P	FIRST CHANNEL 1+	41	RE4P	SECOND CHANNEL 4+
16	RO2N	FIRST CHANNEL 2-	42	GND	Ground
17	RO2P	FIRST CHANNEL 2+	43	GND	Ground
18	GND	Ground	44	GND	Ground (NSB)
19	ROCLKN	FIRST CLOCK CHANNEL C-	45	GND	Ground
20	ROCLKP	FIRST CLOCK CHANNEL C+	46	GND	Ground
21	GND	Ground	47	NC	NC
22	RO3N	FIRST CHANNEL 3-	48	VLCD	Power Supply +12.0V
23	RO3P	FIRST CHANNEL 3+	49	VLCD	Power Supply +12.0V
24	RO4N	FIRST CHANNEL 4-	50	VLCD	Power Supply +12.0V
25	RO4P	FIRST CHANNEL 4+	51	VLCD	Power Supply +12.0V
26	GND	Ground	-	-	-

Note :

- The pin no 44 is LCD Test option.  
"AGP" (Auto Generation LCM operates Pattern) or "NSB" (No Signal Black) is case that LVDS signals are out of frequency or abnormal condition in spite of 12 volt power supply.  
LPL recommends "NSB". ( AGP : "Vcc" or "OPEN" / NSB : "GND" )
- All GND(ground) pins should be connected together to the LCD module's metal frame.
- All VLCD (power input) pins should be connected together.
- All Input levels of LVDS signals are based on the IEA 664 Standard.
- Specific pins(pin No. #2~#6, #8~#10) are used for internal data process of the LCD module.  
If not used, these pins are no connection.



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### 3-2-2. Backlight Inverter

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Master

- Inverter Connector : S14B-PH-SMC  
(manufactured by JST) or Equivalent
- Mating Connector : PHR-14 or Equivalent

Slave

- Inverter Connector : S12B-PH-SMC  
(manufactured by JST) or Equivalent
- Mating Connector : PHR-12 or Equivalent

**Table 5. INVERTER CONNECTOR PIN CONFIGURATION**

Pin No	Symbol	Description	Master	Slave	Note
1	VBL	Power Supply +24.0V	VBL	VBL	
2	VBL	Power Supply +24.0V	VBL	VBL	
3	VBL	Power Supply +24.0V	VBL	VBL	
4	VBL	Power Supply +24.0V	VBL	VBL	
5	VBL	Power Supply +24.0V	VBL	VBL	
6	GND	POWER GND	GND	GND	1
7	GND	POWER GND	GND	GND	
8	GND	POWER GND	GND	GND	
9	GND	POWER GND	GND	GND	
10	GND	POWER GND	GND	GND	
11	VBR-A	0.0V ~ 3.3V	VBR-A	Don't care	2
12	VON/OFF	0.0V ~ 5.0V	On/Off	Don't care	3, Open/High for B/L on as default
13	VBR-B	0.0V ~ 3.3V	VBR-B	-	4
14	Status	3.0V~5.0V(Normal), 0.0V~0.7V(Abnormal)	Status	-	

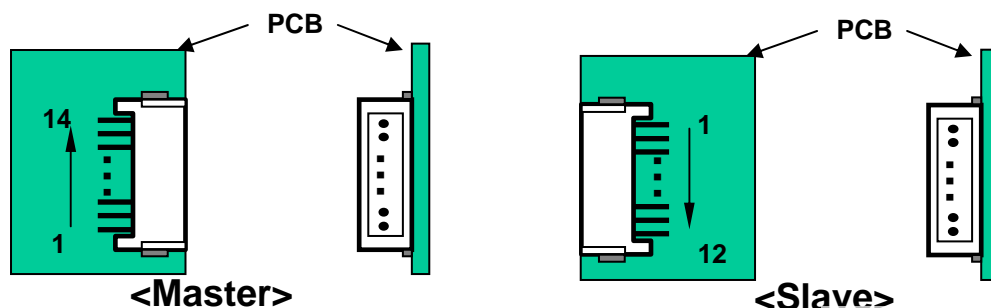
Note : 1. GND should be connected to the LCD module's metal frame.

2. Minimum Brightness : VBR-A = 0.0V Maximum Brightness : VBR-A = 3.3V  
"OPEN" : VBR-A = 1.65V

3. Rising Edge : Lamp "ON" / Falling Edge : Lamp "OFF" / OPEN : Lamp "ON"

4. Pin#13 can be opened. ( if Pin #13 is open , VBR-B is 3.3V )

### ◆ Rear view of LCM



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### 3-3. Signal Timing Specifications

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Table 6 shows the signal timing required at the input of the LVDS transmitter. All of the interface signal timing should be satisfied with the following specification for normal operation.

**Table 6. TIMING TABLE for NTSC (DE Only Mode)**

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	12.99	13.47	14.29	ns	
	Frequency	-	70	74.25	77	MHz	=148.5/2
Hsync	Period	tHP	1060	1100	1280	tCLK	1
	Horizontal Valid	tHV	-	960	-	tCLK	
	Horizontal Blank	tHB	100	140	320		
	Frequency	fH	65.5	67.5	68.9	KHz	
	Width	tWH	12	30	60	tCLK	
	Horizontal Back Porch	tHBP	12	78	120		
	Horizontal Front Porch	tHFP	12	32	120		
Vsync	Period	tVP	1091	1125	1149	tHP	1
	Vertical Valid	tVV	-	1080	-	tHP	
	Vertical Blank	tVB	11	45	69	tHP	
	Frequency	fV	57	60	63	Hz	
	Width	tWV	4	5	10	tHP	
	Vertical Back Porch	tVBP	6	36	48		
	Vertical Front Porch	tVFP	2	4	10		

Note : 1.  $t_{HB} = t_{HFP} + t_{WH} + t_{HBP}$   
 $t_{VB} = t_{VFP} + t_{WV} + t_{VBP}$

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

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

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

**Table 7. TIMING TABLE for PAL (DE Only Mode)**

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	14.81	16.16	16.77	ns	
	Frequency	-	59.63	61.88	67.5	MHz	=148.5/2
Hsync	Period	tHP	1060	1100	1200	tCLK	1
	Horizontal Valid	tHV	-	960	-	tCLK	
	Horizontal Blank	tHB	100	140	240		
	Frequency	fH	55.25	56.25	57.25	KHz	
	Width	tWH	12	30	60	tCLK	
	Horizontal Back Porch	tHBP	12	78	120		
	Horizontal Front Porch	tHFP	12	32	120		
Vsync	Period	tVP	1105	1125	1145	tHP	1
	Vertical Valid	tVV	-	1080	-	tHP	
	Vertical Blank	tVB	25	45	65	tHP	
	Frequency	fV	47	50	53	Hz	
	Width	tWV	4	5	10	tHP	
	Vertical Back Porch	tVBP	6	36	45		
	Vertical Front Porch	tVFP	2	4	10		

Note : 1.  $t_{HB} = t_{HFP} + t_{WH} + t_{HBP}$   
 $t_{VB} = t_{VFP} + t_{WV} + t_{VBP}$

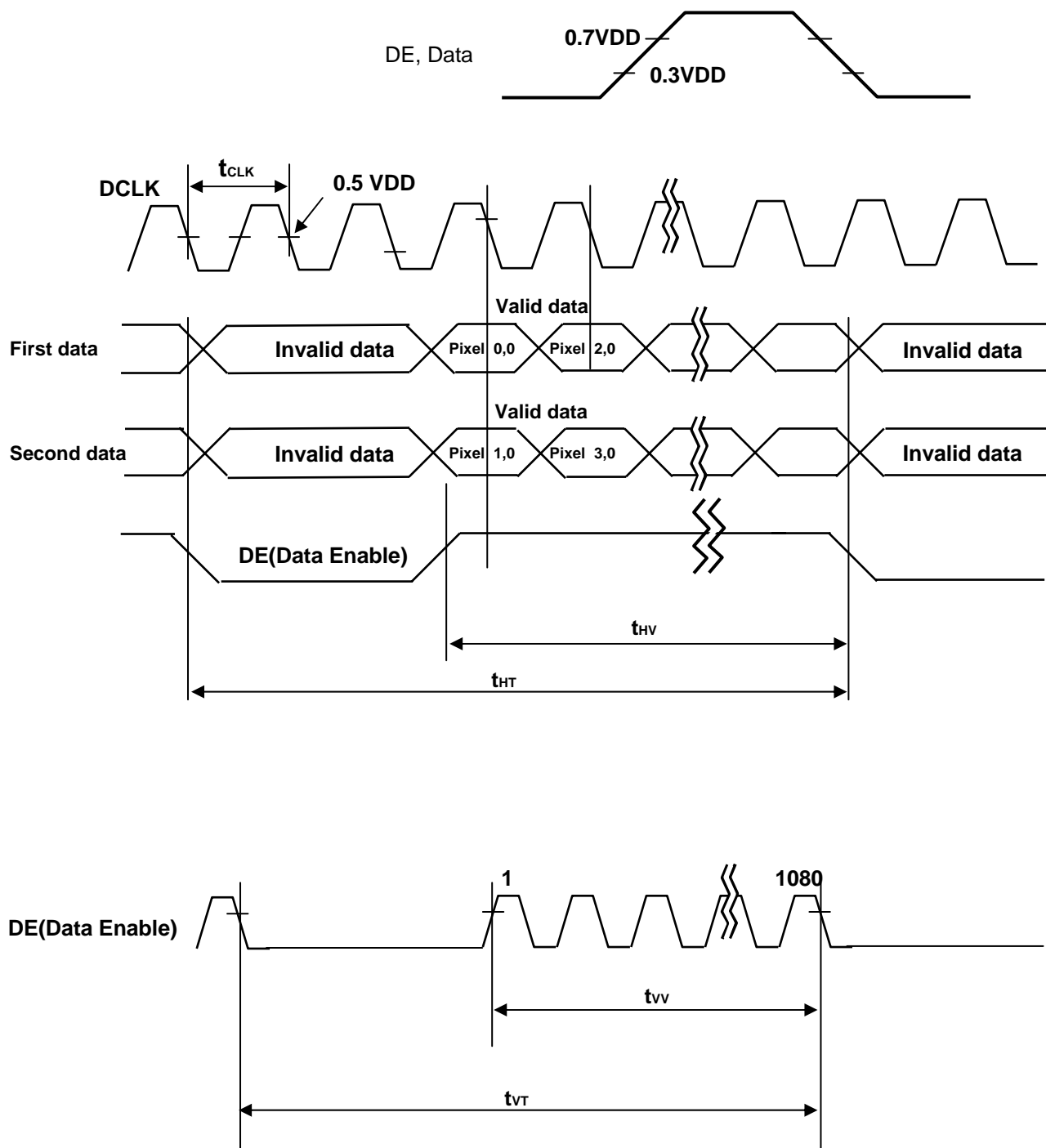
The Input of HSYNC & VSYNC signal does not have an effect on normal operation(DE Only Mode).

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

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### 3-4. Signal Timing Waveforms

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## 3-5. Color Data Reference

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

Table 8. COLOR DATA REFERENCE

Color		Input Color Data																																			
		RED										GREEN										BLUE															
		MSBLSB										MSBLSB										MSBLSB															
		R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0						
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Red (1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Green (1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Blue (1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1			
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
	Magenta	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
RED	RED (000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	RED (001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	...	...										...										...															
	RED (1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	RED (1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
GREEN	GREEN (000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	GREEN (001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	...	...										...										...															
	GREEN (1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	GREEN (1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
BLUE	BLUE (000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	BLUE (001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	...	...										...										...															
	BLUE (1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0			
	BLUE (1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

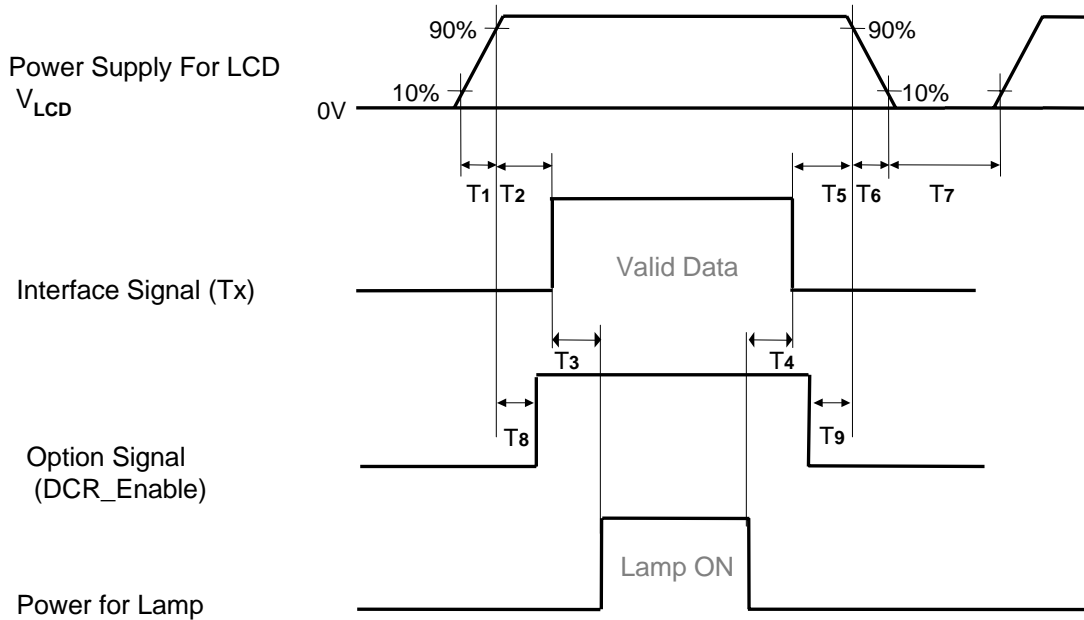
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### 3-6. Power Sequence

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#### 3-6-1. LCD Driving circuit



**Table 9. POWER SEQUENCE**

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

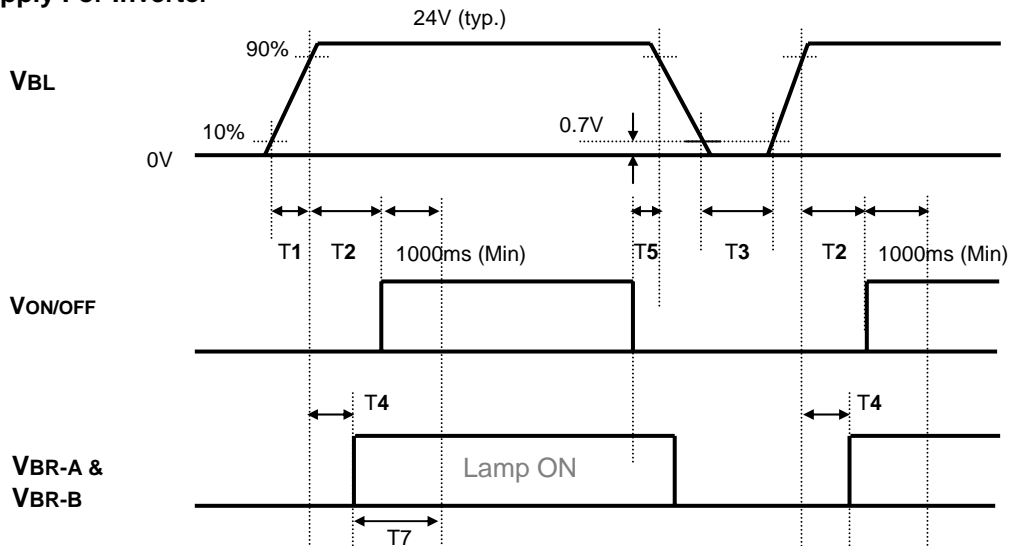
- Note :
1. Please avoid floating state of interface signal at invalid period.
  2. When the interface signal is invalid, be sure to pull down the power supply  $V_{LCD}$  to 0V.
  3. The case when the T2/T5 exceed maximum specification, it operates protection pattern(Black pattern) till valid signal inputted. There is no reliability problem.
  4. The T3/T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.
  5. If the on time of option signal(DISM or DCR\_Enable) precedes the on time of Power( $V_{LCD}$ ), check the LCD logic Power( $V_{cc}$ ) is under 0.8V, otherwise it will be happened abnormal display.
  6. Flicker would come out when power on-off( $T7$ =under 1s) is continuously tested over several ten-times

## Product Specification

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### 3-6-2. Sequence for Inverter

#### Power Supply For Inverter



### 3-6-3. Deep condition for Inverter

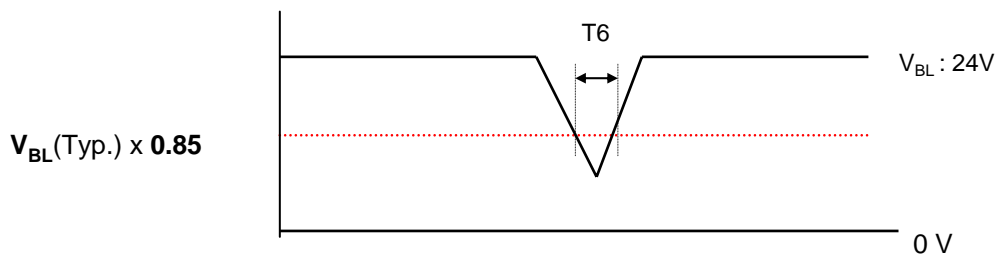


Table 10. Power Sequence for Inverter

Parameter	Values			Units	Remarks
	Min	Typ	Max		
T1	20	-	-	ms	1
T2	500	-	-	ms	
T3	200	-	-	ms	
T4	0	-	-	ms	2
T5	10	-	-	ms	
T6	-	-	10	ms	$V_{BL}(Typ) \times 0.85$
T7	1000	-	-	ms	3

- Notes : 1. T1 describes rising time of 0V to 24V and this parameter does not applied at restarting time.  
 2. T4(max) is less than T2.  
 3. In T7 section, VBR-B is recommended 3.3V.

Product Specification

## 4. Optical Specification

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Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30min in a dark environment at  $25 \pm 2^\circ\text{C}$ . The specified optical values are measured at an approximate 50cm distance from the LCD surface on condition that viewing angle of  $\Phi$  and  $\theta$  equal to  $0^\circ$ .

FIG. 1 shows additional information concerning the measurement equipment and method.

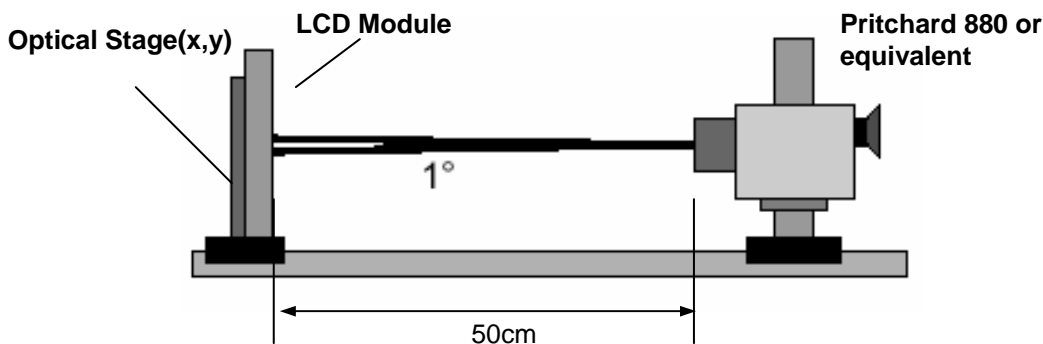


FIG. 1 Optical Characteristic Measurement Equipment and Method

Table 11. OPTICAL CHARACTERISTICS

$T_a = 25 \pm 2^\circ\text{C}$ ,  $V_{\text{LCD}} = 12.0\text{V}$ ,  $f_v = 60\text{Hz}$ ,  $D_{\text{clk}} = 148.5\text{MHz}$ ,  $V_{\text{BR-A}} = 1.65\text{V}$ ,  $V_{\text{BR-B}} = 3.30\text{V}$

Parameter		Symbol		Value			Unit	Note
				Min	Typ	Max		
Contrast Ratio		CR		600	800	-		1
Surface Luminance, white		L <sub>WH</sub>		400	500	-	cd/m²	2
Luminance Variation		δ <sub>WHITE</sub>	5P	-	-	1.3		3
Response Time	Gray-to-Gray	G to G		-	8	16	ms	4
	Rise + decay	Tr <sub>R</sub> +Tr <sub>D</sub>		-	18	-		
Color Coordinates [CIE1931]	RED	Rx		Typ -0.03	0.664	Typ +0.03		
		Ry			0.322			
	GREEN	Gx			0.197			
		Gy			0.662			
	BLUE	Bx			0.143			
		By			0.076			
	WHITE	Wx			0.279			
		Wy			0.292			
Viewing Angle (CR>10)								
	x axis, right(φ=0°)	θr		85	89	-	degree	5
	x axis, left (φ=180°)	θl		85	89	-		
	y axis, up (φ=90°)	θu		85	89	-		
	y axis, down (φ=270°)	θd		85	89	-		
Gray Scale					2.2			6



## Product Specification

Note :

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

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CR = The Maximum Value of CRn

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

Measure Position : 5-point. See FIG. 2 for more information

2. Surface Luminance( $L_{WH}$ ) is the luminance value measured after the unit has been turned on for 30min at an approximate 50cm distance from the center 1-point of LCD surface as all pixels displaying white. See FIG. 2 for more information

3. The variation of surface luminance ,  $\delta$  WHITE is defined as :

$$\delta \text{ WHITE}(5P) = \text{Maximum}(L_{on1}, L_{on2}, L_{on3}, L_{on4}, L_{on5}) / \text{Minimum}(L_{on1}, L_{on2}, L_{on3}, L_{on4}, L_{on5})$$

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

4. Response time is defined as the required time for the transition from G(N) to G(M) (Rise Time,  $Tr_R$ ) and from G(M) to G(N) (Decay Time,  $Tr_D$ ). For additional information see the FIG. 3. ( $N < M$ )
5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD module surface. For more information, see the FIG. 4.
6. Gray scale specification  
Gamma Value is approximately 2.2. For more information, see the Table 12.

**Table 12. GRAY SCALE SPECIFICATION**

Gray Level	Luminance [%] (Typ.)
L0	0.19
L63	0.39
L127	1.16
L191	2.61
L255	4.80
L319	7.77
L383	11.6
L447	16.2
L511	21.7
L575	28.2
L639	35.5
L703	43.8
L767	53.0
L831	63.3
L895	74.5
L959	86.7
L1023	100

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

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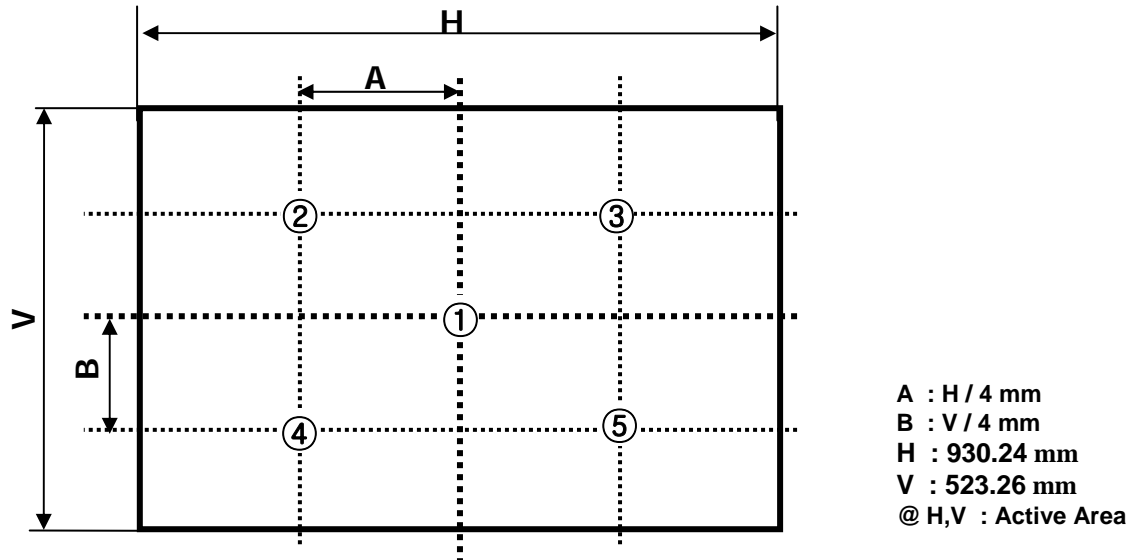


FIG. 2 5 Points for Luminance Measure

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

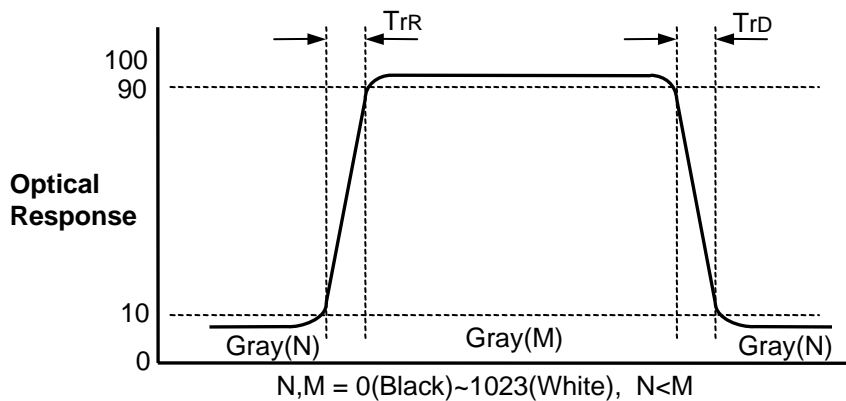
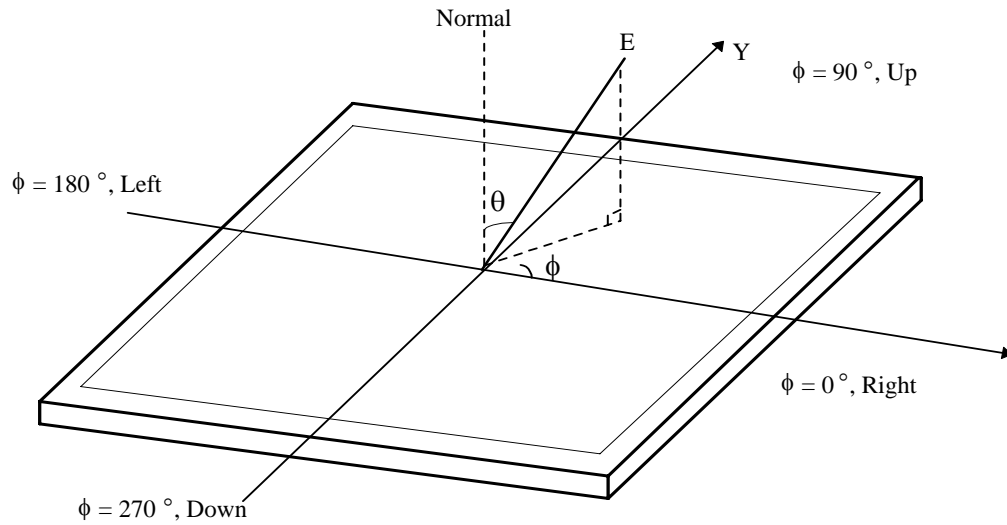


FIG. 3 Response Time

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Dimension of viewing angle range



**FIG. 4 Viewing Angle**

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## 5. Mechanical Characteristics

Table 13 provides general mechanical characteristics.

**Table 13. MECHANICAL CHARACTERISTICS**

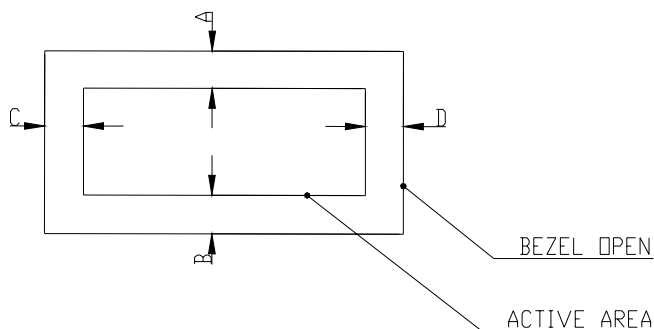
Item	Value	
Outline Dimension	Horizontal	983.0 mm
	Vertical	576.0 mm
	Depth	51.0 mm
Bezel Area	Horizontal	939.0 mm
	Vertical	531.0 mm
Active Display Area	Horizontal	930.24 mm
	Vertical	523.26 mm
Weight	13.0 Kg (Typ.), 14.0 Kg (Max.)	
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer (Haze 13%)	

Note : 1.Please refer to a mechanic drawing in terms of tolerance at the next page.

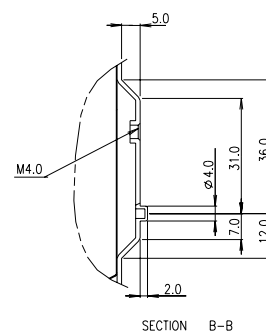
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Technical drawing of the front view of the 380T-C027A monitor. The drawing shows a rectangular monitor with a central display area. Dimensions are provided in millimeters (mm) and inches (in). The overall width is 983.0 mm (38.7 in) and the overall height is 576.0 mm (22.7 in). The display area is 939.0 mm (37.0 in) wide and 523.008 mm (20.6 in) high. The bezel is 26.38 mm (1.04 in) thick. The drawing includes a circular inset labeled "SECTION B" showing a cross-section of the bezel with dimensions 27.0 mm (1.06 in) and 115.0 mm (4.53 in). The drawing is labeled "380T-C027A" and "4R-10".

1. Unspecified tolerance is  $\pm 1.0\text{mm}$
2. Tilt and partial disposition tolerance of display area as follow
  - 1) Y-direction :  $ABS(A-B) \leq 1.5$
  - 2) X-direction :  $ABS(C-D) \leq 1.5$



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## 6. Reliability

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**Table 15. ENVIRONMENT TEST CONDITION**

No.	Test Item	Condition
1	High temperature storage test	Ta= 50°C 240h
2	Low temperature storage test	Ta= -20°C 240h
3	High temperature operation test	Ta= 50°C 50%RH 240h
4	Low temperature operation test	Ta= 0°C 240h
5	Vibration test (operating)	Wave form : random Vibration level : 1.0Grms Bandwidth : 10-300Hz Duration : X,Y,Z, 30 min One time each direction
6	Shock test (operating)	Shock level : 50Grms Waveform : half sine wave, 11ms Direction : $\pm X$ , $\pm Y$ , $\pm Z$ One time each direction
7	Humidity condition Operation	Ta= 40 °C ,90%RH
8	Altitude operating storage / shipment	0 - 14,000 feet(4267.2m) 0 - 40,000 feet(12192m)

## 7. International Standards

### 7-1. Safety

- a) UL 60065, 7<sup>th</sup> Edition, dated June 30, 2003, Underwriters Laboratories, Inc., Standard for Audio, Video and Similar Electronic Apparatus.
- b) CAN/CSA C22.2, No. 60065:03, Canadian Standards Association, Standard for Audio, Video and Similar Electronic Apparatus.
- c) IEC60065:2001, 7<sup>th</sup> Edition CB-scheme and EN 60065:2002, Safety requirements for Audio, Video and Similar Electronic Apparatus..

### 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) CISPR22 "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 )



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### 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

F : PANEL CODE

H : ASSEMBLY CODE

E : MONTH

G : FACTORY CODE

I,J,K,L,M : SERIAL NO.

Note

1. YEAR

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

2. MONTH

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

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 Pallet : 12 pcs

b) Pallet Size : 1150 mm X 1000 mm X 820 mm.

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## 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 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 :  
 $V = \pm 200\text{mV}$  (Over and under shoot voltage)
- (2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
- (3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)  
And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
- (4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (7) Please do not give any mechanical and/or acoustical impact to LCM. Otherwise, LCM can't be operated its full characteristics perfectly.
- (8) A screw which is fastened up the steels should be a machine screw.  
(if not, it causes metallic foreign material and deal LCM a fatal blow)
- (9) Please do not set LCD on its edge.

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[www.DataSheet4U.com](http://www.DataSheet4U.com)**9-3. Electrostatic Discharge Control**

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

**9-4. Precautions for Strong Light Exposure**

Strong light exposure causes degradation of polarizer and color filter.

**9-5. Storage**

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

- (1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
- (2) The polarizer surface should not come in contact with any other object.  
It is recommended that they be stored in the container in which they were shipped.

**9-6. Handling Precautions for Protection Film**

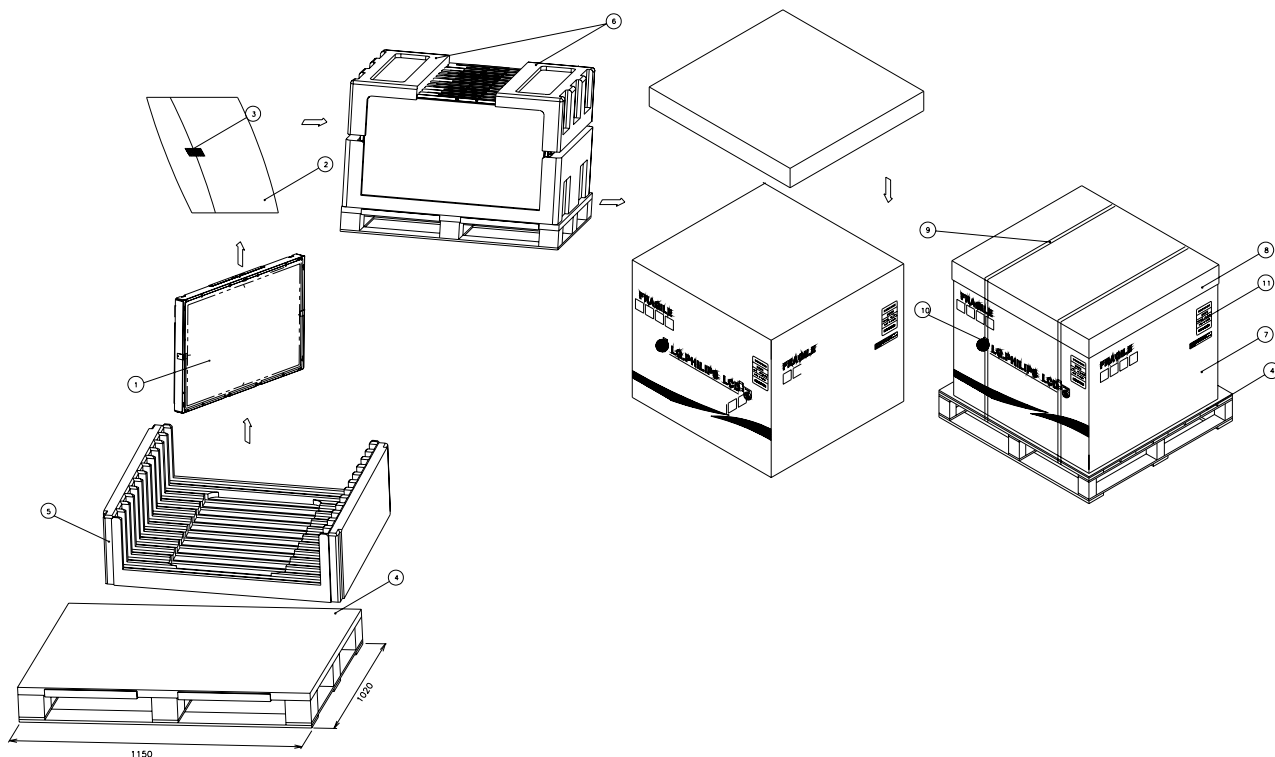
- (1) The protection film is attached to the bezel with a small masking tape.  
When the protection film is peeled off, static electricity is generated between the film and polarizer.  
This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.
- (3) You can remove the glue easily. When the glue remains on the bezel surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.



## # APPENDIX- II

### ■ LC420WU2-SLC1 Packing Ass'y

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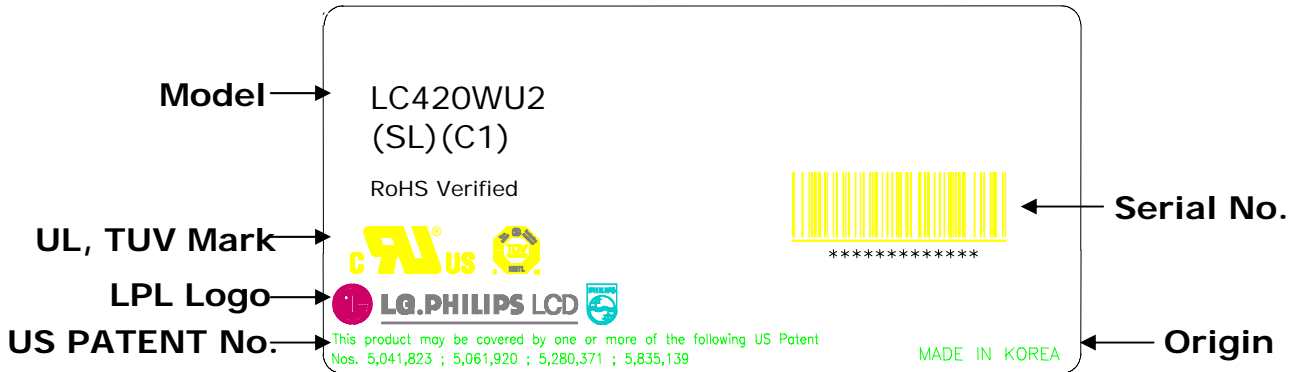


NO.	DESCRIPTION	MATERIAL
1	LCD Module	
2	BAG	42INCH
3	TAPE	MASKING 20MM X 50M
4	PALLET	PAPER 1140X1000X138MM
5	PACKING	EPS
6	PACKING	EPS
7	ANGLE PACKING	PAPER
8	PAPER ANGLE	PAPER
9	BAND	PP
10	LABEL	YUPO PAPER 80G 100x100

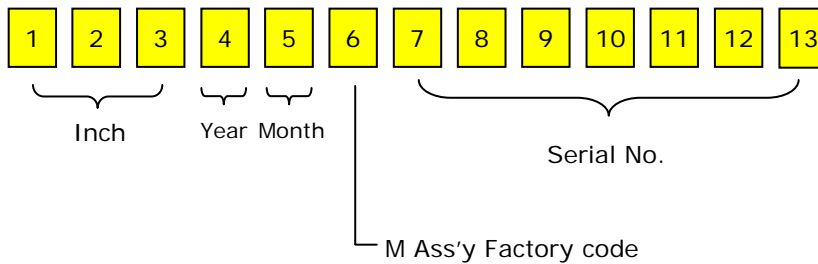
## # APPENDIX- III

### ■ LCM Label

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### ■ Serial No. (See CAS 25page for more information)



# APPENDIX- IV

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■ Pallet Label

LC420WU2	
SLC1	
12 PCS	001/01-01
REMARK	
MADE IN KOREA	RoHS Verified
 <div>*****</div>	