◈ PRIME VIEW

Version: 4.0

HY-LINE
COMPUTER COMPONENTS

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TECHNICAL   SPECIFICATION

MODEL   NO. : PM070WT2

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Please contact PVI or its agent for further information

☐ Customer's Confirmation

Customer _____

Date _____

By _____

☐ PVI's Confirmation

Confirmed By _____

Prepared By _____

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Revision History

Rev.	Issued Date	Revised Contents	Remark
1.0	Dec.25,2006	Release Version	
2.0	Apr.17,2007	Modify Block Diagram	
3.0	March.24.2008	Add Page 21 14.Handling Cautions 　　　　14-1 item e)	
4.0	June.4,2008	Page 6　4. Mechanical Drawing of TFT-LCD module Add　outline UL Label	

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PM070WT2

TECHNICAL SPECIFICATION

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PM070WT2

1.Application

This data sheet applies to a color TFT LCD module, PM070WT2.
The application of panel are OA product, portable DVD, car TV(must use Analog to Digital driving board), which requires high quality flat panel display.

Prime View assume no responsibility for any damage resulting from the use of the device which dose not comply with the instructions and the precautions in these specification sheet.
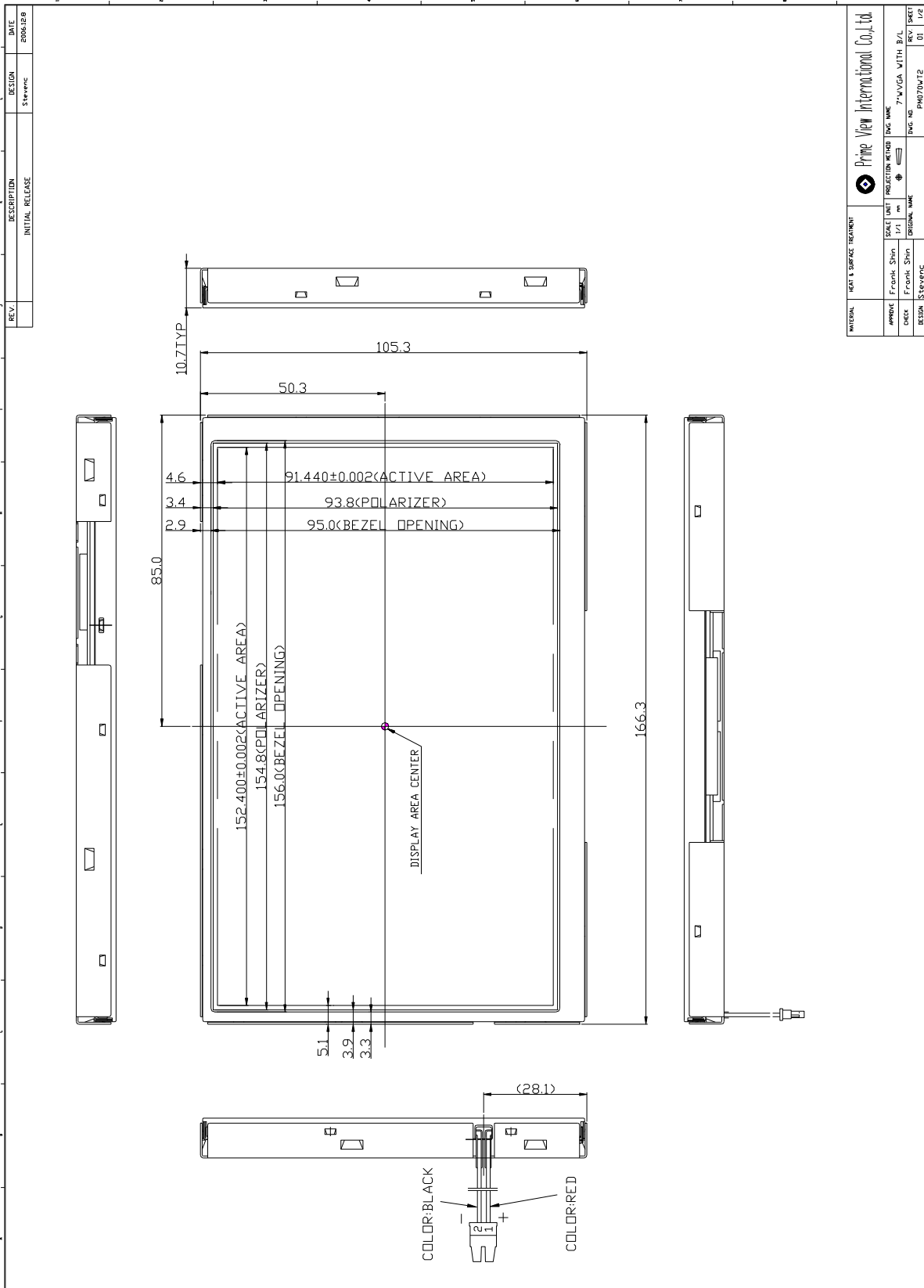
2. Features

. Wide VGA (800*480 pixels) resolution
. Amorphous silicon TFT LCD panel with LED back-light unit
. Pixel in stripe configuration
. Thin and light weight
. Display Colors：262,144 colors
. +3.3V DC supply voltage for TFT LCD panel driving
. Wide viewing angle
. TTL interface

3.Mechanical Specifications

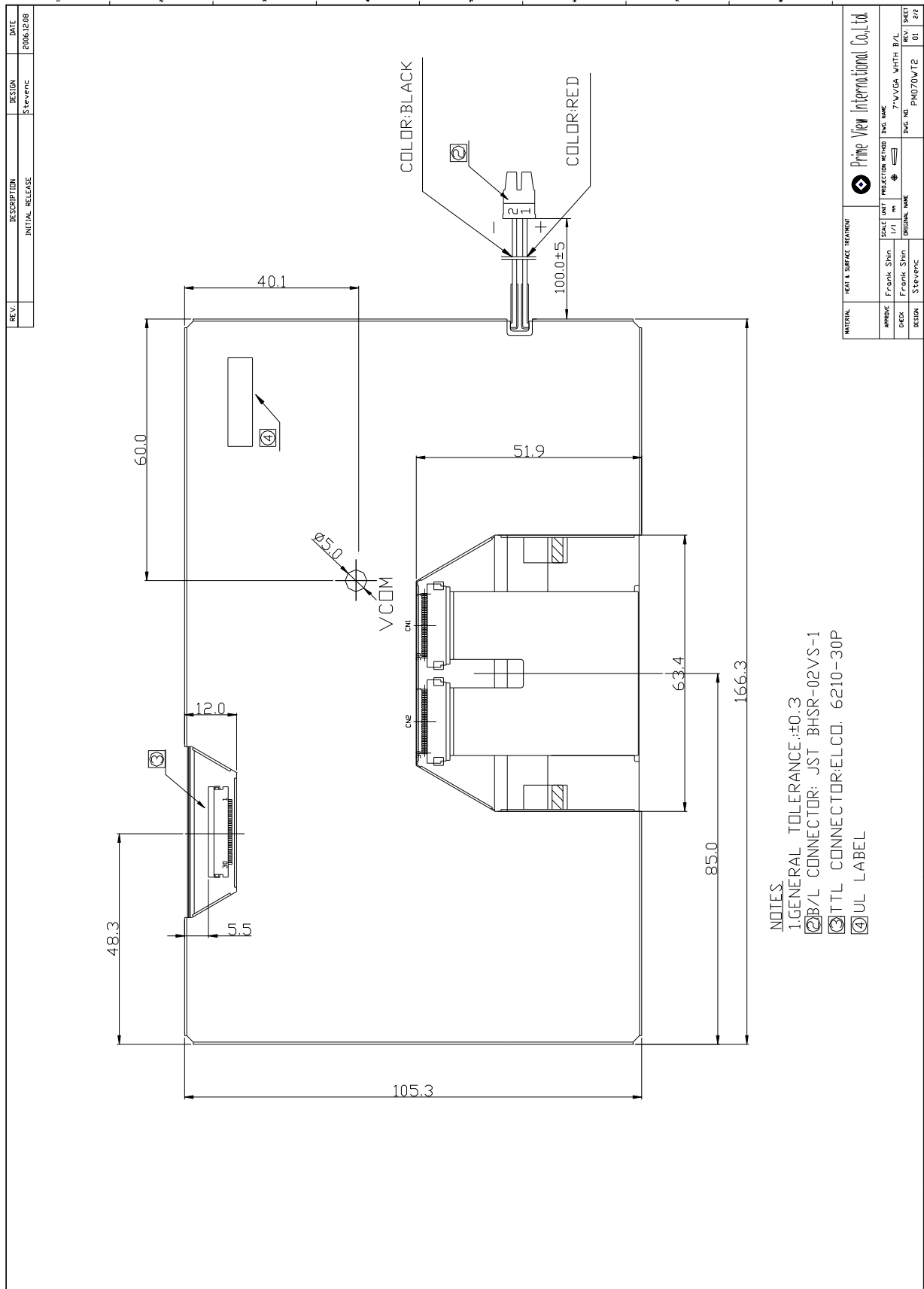| Parameter	Specifications	Unit
Screen Size	7.0(diagonal)	inch
Display Format	800×(R, G, B)×480	dot
Display Colors	262,144	
Active Area	152.4(H)×91.44(V)	mm
Pixel Pitch	0.1905(H)×0.1905(V)	mm
Pixel Configuration	Stripe	
Outline Dimension	166.3(W)×105.3 (H)×10.7 (typ.) (D)	mm
Weight	265±10	g
LED Back-light	33-LED	
Surface treatment	Anti-glare and Wide View Film	
Display mode	Normally white	
Gray scale inversion direction	6 o'clock [ref to Note 13-1]	

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4.Mechanical Drawing of TFT-LCD Module
Outline Drawing : Front View (unit　mm)

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PM070WT2

Outline Drawing : Rear View (unit mm)

COLOR:BLACK

COLOR:RED

100.0±5

40.1

60.0

51.9

Ø5.0

VCOM

CN1

CN2

63.4

166.3

12.0

85.0

48.3

5.5

105.3

NOTES
1.GENERAL TOLERANCE.:±0.3
2.B/L CONNECTOR: JST BHSR-02VS-1
3.TTL CONNECTOR:ELCO. 6210-30P
4.UL LABEL

Prime View International Co.,Ltd.

DWG. NAME: 7"WVGA WHTH B/L
DWG. NO: PM070WT2
REV.:01
SHEET:2/2

PROJECTION METHOD
SCALE:1/1 UNIT:mm

HEAT & SURFACE TREATMENT
MATERIAL

APPROVE: Frank Shin
CHECK: Frank Shin
DESIGN: Stevenc

REV. | DESCRIPTION | DESIGN | DATE
INITIAL RELEASE | Stevenc | 2006.12.08

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5.Input Terminals

5-1) TFT-LCD Panel Driving

Connector type: ELCO 6210-30P

Pin No.	Symbol	Function	Remark
1	CLK	Clock Signal for Sampling Image Digital Data	
2	Hsync	Horizontal Synchronous Signal	
3	Vsync	Vertical Synchronous Signal	
4	GND	Ground (0V)	
5	R0	Red Image Data Signal (LSB)	
6	R1	Red Image Data Signal	
7	R2	Red Image Data Signal	
8	R3	Red Image Data Signal	
9	R4	Red Image Data Signal	
10	R5	Red Image Data Signal (MSB)	
11	GND	Ground (0V)	
12	G0	Green Image Data Signal (LSB)	
13	G1	Green Image Data Signal	
14	G2	Green Image Data Signal	
15	G3	Green Image Data Signal	
16	G4	Green Image Data Signal	
17	G5	Green Image Data Signal (MSB)	
18	GND	Ground (0V)	
19	B0	Blue Image Data Signal (LSB)	
20	B1	Blue Image Data Signal	
21	B2	Blue Image Data Signal	
22	B3	Blue Image Data Signal	
23	B4	Blue Image Data Signal	
24	B5	Blue Image Data Signal (MSB)	
25	GND	Ground (0V)	
26	DENB	Compound Synchronization signal	Note5-1
27	VCC	DC +3.3V Power Supply	
28	VCC	DC +3.3V Power Supply	
29	R/L	Left / Right control for source driver	Note5-2
30	U/D	Up / Down control for gate driver	Note5-2

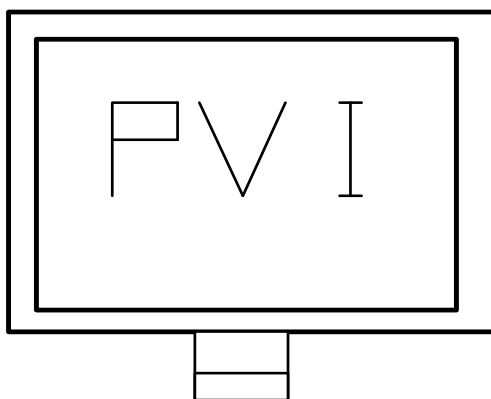## PRIME VIEW

Note5-1   DENB input signal.

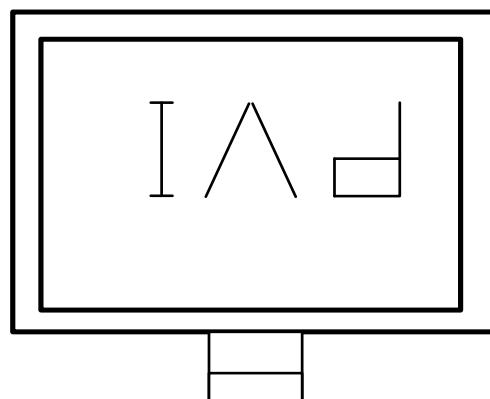If customer wanted to off the DENB mode , you must keep the DENB always High or Low.
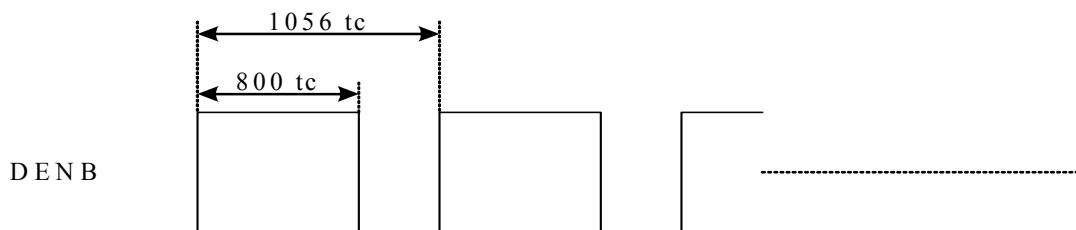
(tc: the period of sampling clock)

Note 5-2   The definitions of U/D & R/L

U/D(PIN 30)=Low R/L(PIN 29)=High

U/D(PIN 30)=High R/L(PIN 29)=Low

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6.Absolute Maximum Ratings:

GND=0V, Ta=25℃

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage	V_{CC}	-0.3	+4.0	V	
Input Signals Voltage	V_{IN}	-0.3	V_{CC} +0.3	V	
Backlight Driving Frequency	F_L	0	100	KHz	

7.Electrical Characteristics

7-1) Recommended Operating Conditions: GND = 0V，Ta = 25℃

Item		Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage		V_{CC}	3.0	3.3	3.6	V	
Current Dissipation		I_{CC}	-	178.3	194.5	mA	Note7-1
Digital input voltage	High Level	V_{IN}	0.7 V_{CC}	-	V_{CC}	mV	
	Low Level	V_{IL}	-0.1	-	0.1V_{CC}		
V_{com} Voltage		V_{com}	-	3.1	-	V	

Note 7-1 : To test the current dissipation of VCC using the "color bars" testing pattern shown as below

1	2	3	4	5	6	7	8

1. White
2. Yellow
3. Cyan
4. Green
5. Magenta
6. Red
7. Blue
8. Black

I_{CC} current dissipation testing pattern

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7-2) Backlight driving

Connector type: JST BHSR-02VS-1

Pin No	Symbol	Description	Remark
1	+	Input terminal (Positive electrode side)	Wire color : Red
2	-	Input terminal (Ground side)	Wire color : Black

7-3) Recommended Driving Condition for LED Back Light

$GND = 0\ V$， $Ta = 25℃$

Parameter	Symbol	Min	TYP	MAX	Unit	Remark
Supply voltage of LED backlight	V_{LED}	-	11.0	11.5	V	$I_{LED} = 20\ mA$
Supply current of LED backlight	I_{LED}	-	20	-	mA	Note 7-2
Backlight Power Consumption	P_{LED}	-	2.42	2.53	W	Note 7-3

Note 7-2 : The LED driving condition is defined for each LED module. (3 LED Serial)

Note 7-3 : $P_{LED} = V_{LED-1} * I_{LED-1} + V_{LED-2} * I_{LED-2}\ ….. + V_{LED-10} * I_{LED-10} + V_{LED-11} * I_{LED-11}$
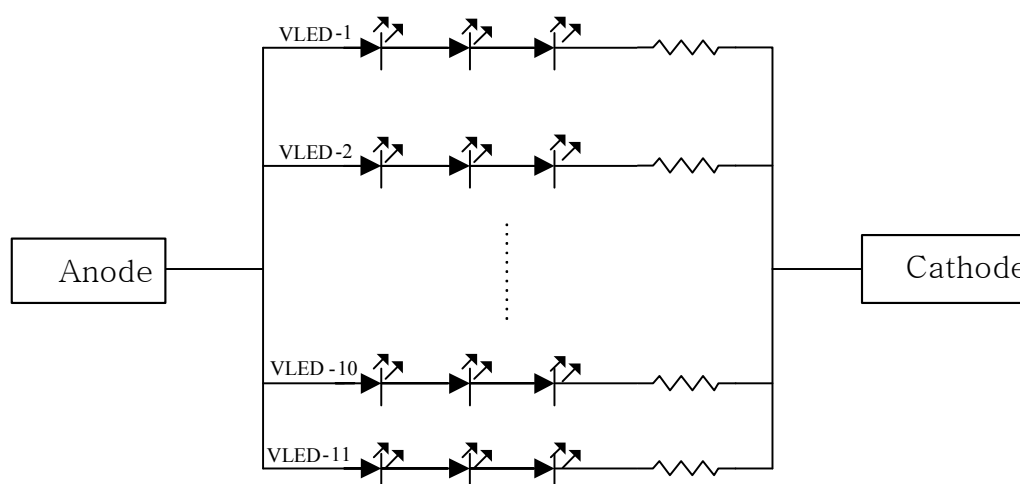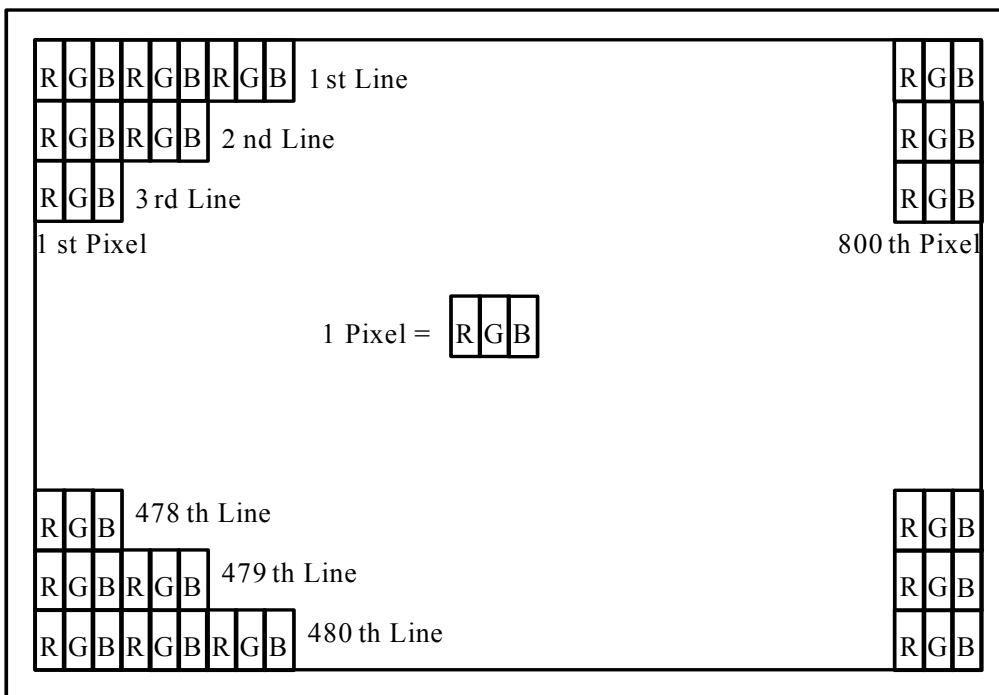

7-4) Power Consumption

Parameter	Symbol	Typ.	Max.	Unit	Remark
LCD Power consumption (W/O BL)	-	0.59	0.71	W	
LED Backlight Power Consumption	-	2.42	2.53	W	Note 7-4
Total Power Consumption	-	3.01	3.24	W	

Note7-4: Backlight lamp power consumption is calculated by I_L x V_L

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8. Pixel Arrangement

The LCD module pixel arrangement is the stripe.

```
R G B R G B R G B   1 st Line                    R G B
R G B R G B   2 nd Line                          R G B
R G B   3 rd Line                                R G B
1 st Pixel                                  800 th Pixel

                1 Pixel =  R G B

R G B   478 th Line                              R G B
R G B R G B   479 th Line                        R G B
R G B R G B R G B   480 th Line                  R G B
```

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9. Display Color and Gray Scale Reference

Color		Input Color Data																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	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 (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue (63)	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 (02)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker ↓ Brighter	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Red (61)	1	1	1	1	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 (02)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker ↓ Brighter	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Green (61)	0	0	0	0	0	0	1	1	1	1	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 (02)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Darker ↓ Brighter	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	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

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10. Block Diagram

10-2) TFT-module Block Diagram
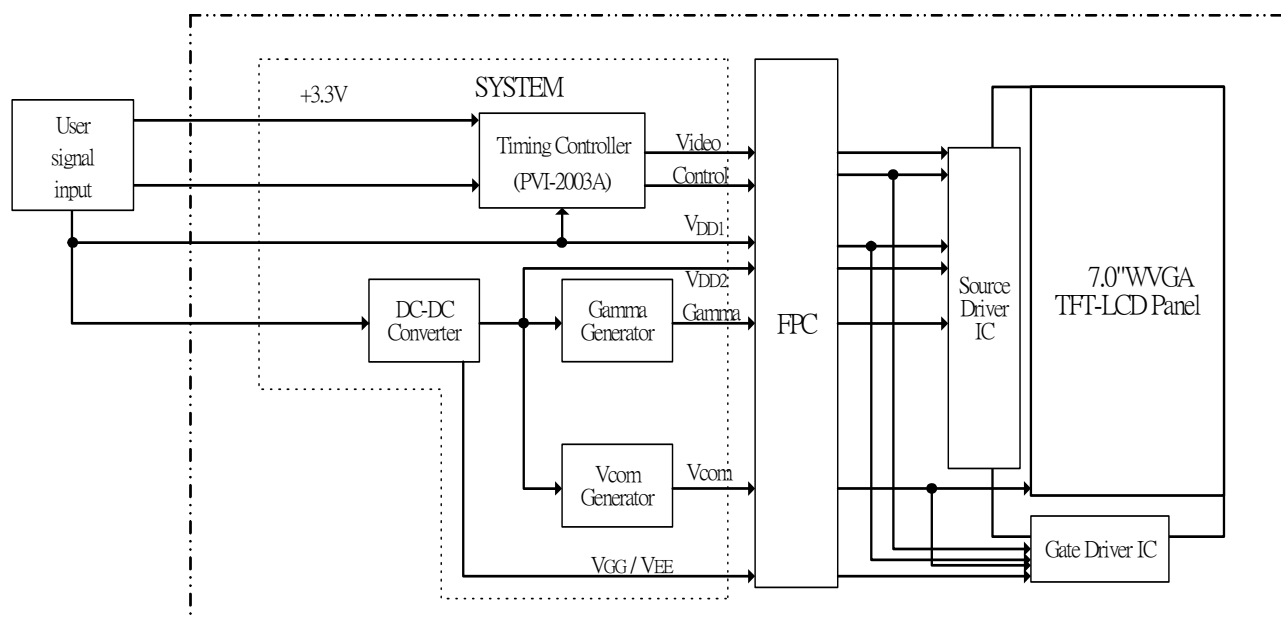
11. Interface Timing

11.1) Timing Parameters

		Symbol	Min.	Typ.	Max.	Unit	Remark
Power supply		VCC	3.0	3.3	3.6	V	
CLK	Frequency	1/tc	-	32	-	MHz	
		tc	-	31.25	-	ns	
HSYNC	Period	Hp	-	33	-	us	
			-	1056	-	tc	
	Display period	Hdp	-	800	-	tc	
	Pulse width	Hpw	-	128	-	tc	
	Back-porch	Hbp	-	86	-	tc	
	Front-porch	Hfp	-	42	-	tc	
	Hpw+Hbp		-	214	-	tc	
	Hsync-CLK	Hhc	10	-	Tc-10	ns	
	Vsync-Hsync	Hvh	0	0	200	tc	
VSYNC	Period	Vp	-	17.325	-	ms	
			-	525	-	Hp	
	Display period	Vdp	-	480	-	Hp	
	Pulse width	Vpw	-	2	-	Hp	
	Back-porch	Vbp	-	33	-	Hp	
	Front-porch	Vfp	-	10	-	Hp	
	Vpw+Vbp		-	35	-	Hp	
DENB	Horizontal scanning period	T1	860	1056	1064	tc	
	Horizontal display period	T2	-	800	-	tc	
	Vertical display period	T3	-	480	-	T1	
	Frame cycling period	T4	520	525	800	T1	
R,G,B	CLK-DATA	Dcd	10	-	-	ns	
	DATA-CLK	Ddc	8	-	-	ns	

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11.2) The Timing Diagram

A. The timing chart for DENB mode

a-1 CLK data ,relationship
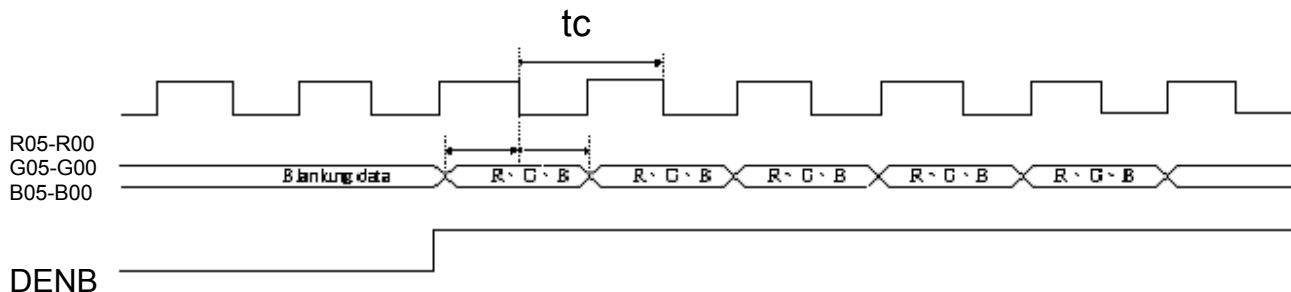
a-2 DENB Timing
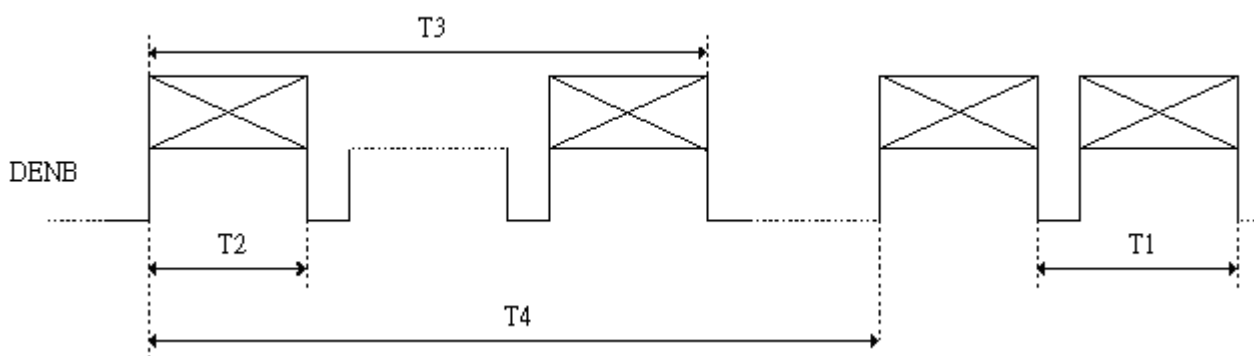
B. The timing chart for sync mode

b-1 CLK Hsync relation ship

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b-2 Hsync timing

HSYNC

R,G,B Vaild data
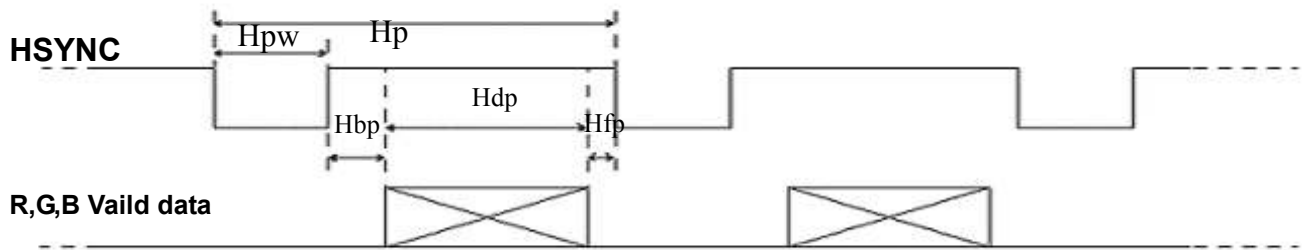
b-3 Hsync ,Vsync relation ship

HSYNC

VSYNC

b-4 Vsync Timing

VSYNC

Valid line
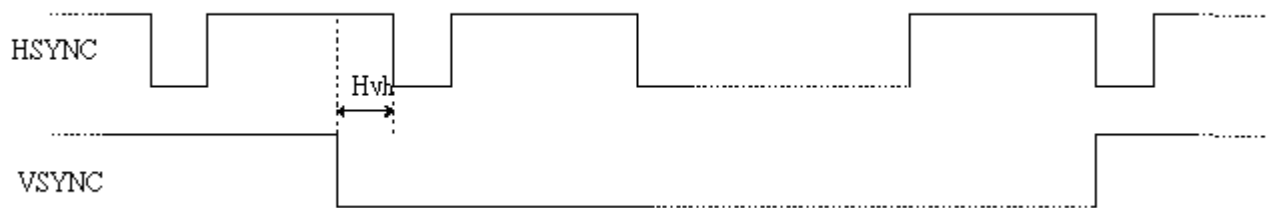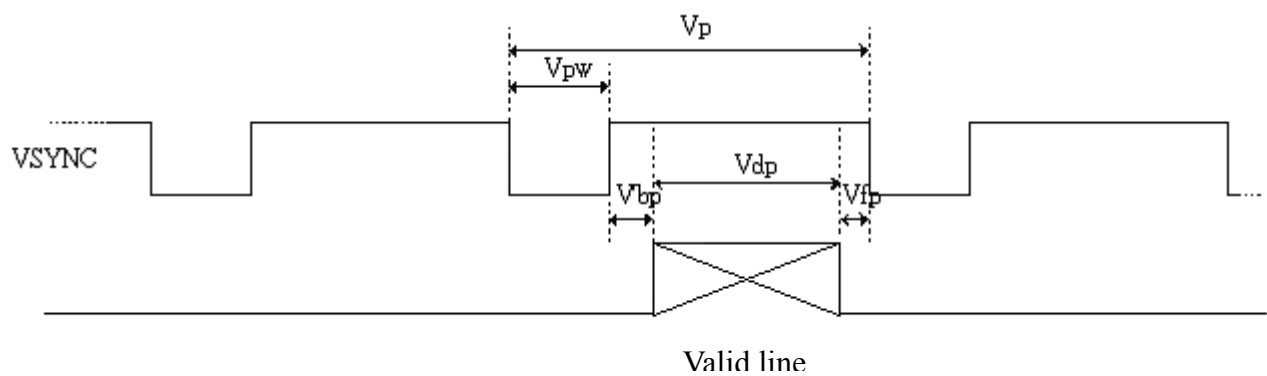
12. Power On Sequence
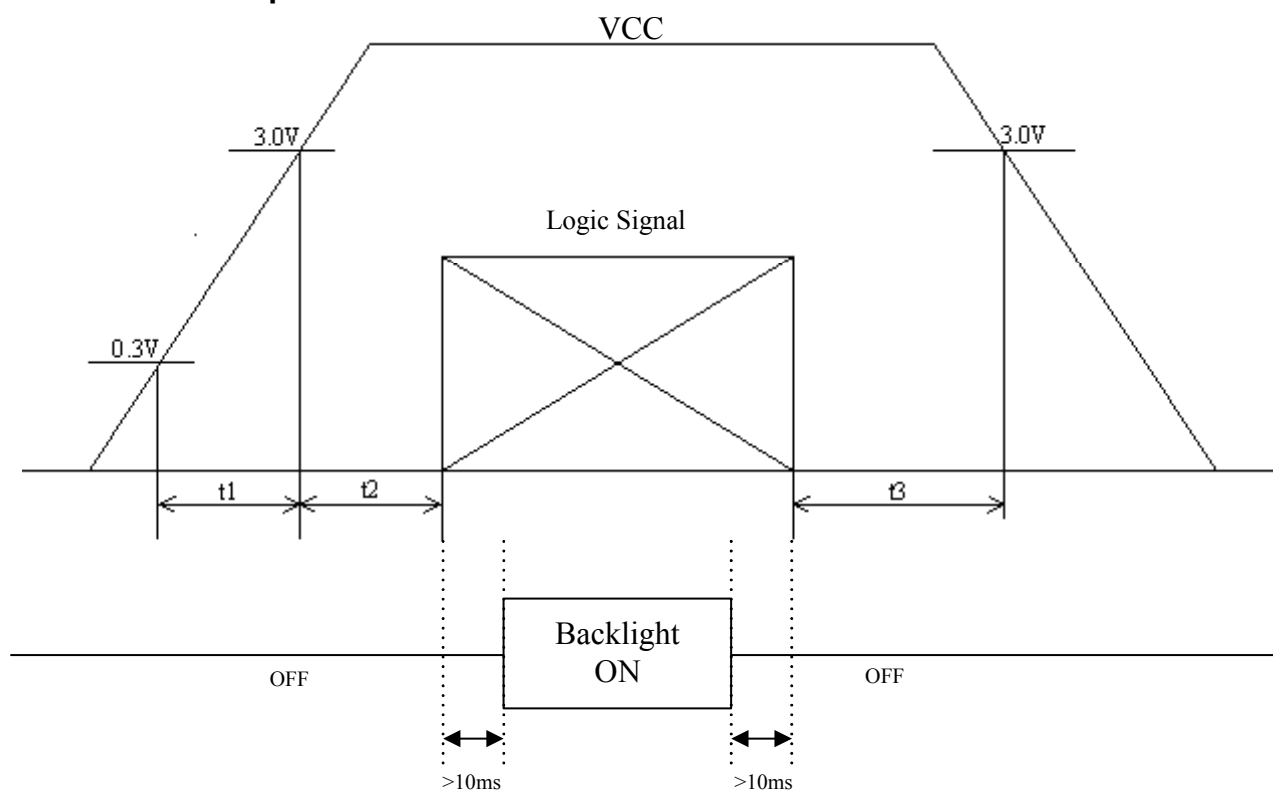
1. $0＜t1≦20ms$
2. $0＜t2≦50ms$
3. $0＜t3≦1s$

13. Optical Characteristics

13-1) Specification:

Ta=25℃

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ21.22	CR$\geq$10	±55	±60	-	deg	Note 13-1
	Vertical	θ12 (to12 'clock)		35	40	-	deg	
		θ11 (to 6 o'clock)		50	55	-	deg	
Contrast Ratio		CR	θ=0°	250	400	-	-	Note 13-2
Response time	Rise	Tr	θ=0°	-	15	30	ms	Note 13-3
	Fall	Tf		-	25	50	ms	
Brightness		L	θ=0°/φ=0	350	400	-	cd/㎡	
Luminance Uniformity		U	-	70	75	-	%	Note 13-4
White Chromaticity		x	-	0.28	0.31	0.34	-	
		y	-	0.30	0.33	0.36	-	
Cross Talk		-	θ=0°	-	-	3.5	%	Note 13-5
LED Life Time		-	-	20000	30000	-	hr	Note 13-6

All the optical measurement shall be executed 10 minutes after backlight being turn-on. The optical characteristics shall be measured in dark room (ambient illumination on panel surface less than 1 Lux). The measuring configuration shows as following figure.
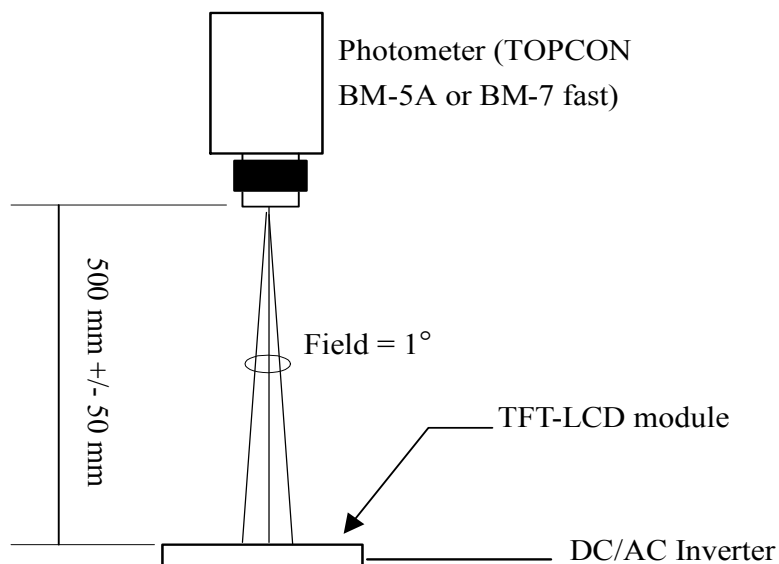

Optical characteristics measuring configuration

Topcon BM-5A or BM-7 fast luminance meter 1°field of view is used in the testing (after 10 minutes' operation). The typical luminance value is measured at LED current 20 mA.

Note 13-1: The definitions of viewing angles are as follow.

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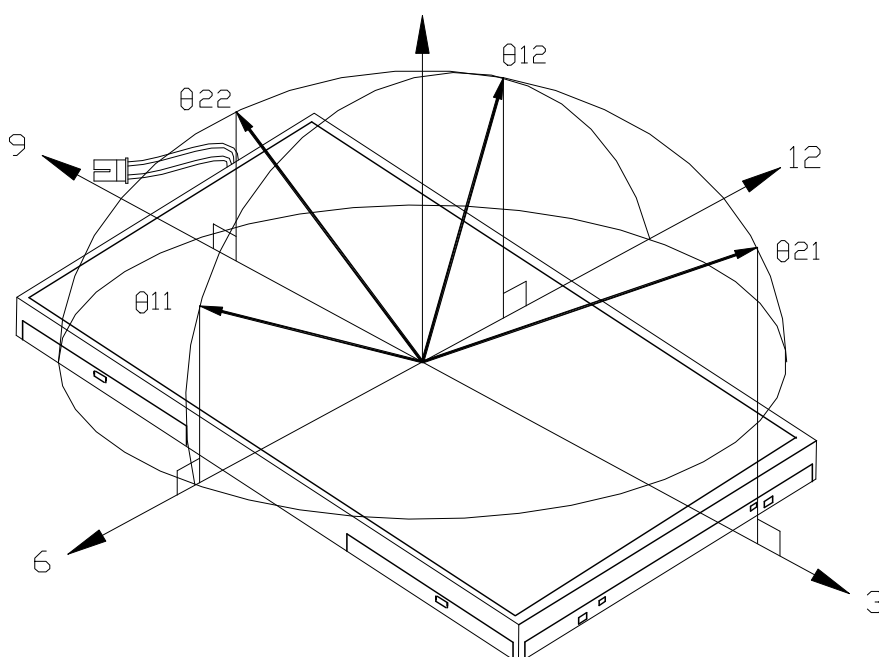
Note 13-2: The definition of contrast ratio $CR = \dfrac{\text{Luminance at gray level 63}}{\text{Luminance at gray level 0}}$

Note 13-3: Definition of Response Time T_r and T_f:
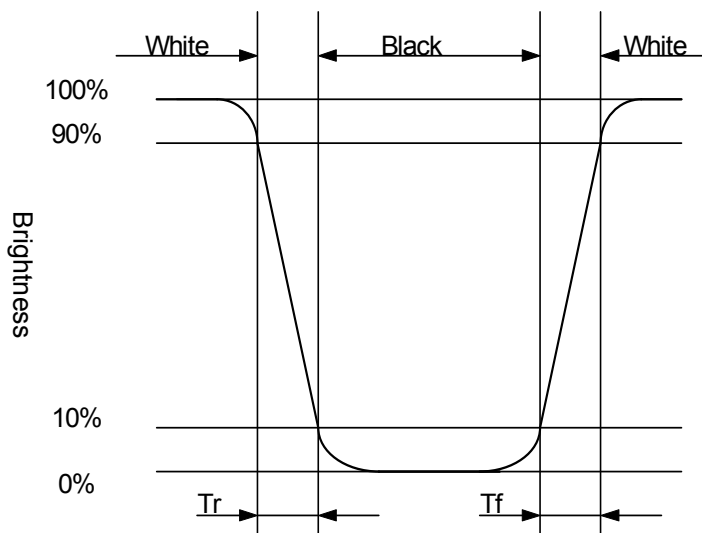
Note 13-4: The uniformity of LCD is defined as

$U = \dfrac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$

Luminance meter : BM-5A or BM-7 fast(TOPCON)
Measurement distance : 500 mm +/- 50 mm
Ambient illumination : < 1 Lux
Measuring direction : Perpendicular to the surface of module
    The test pattern is white (Gray Level 63).

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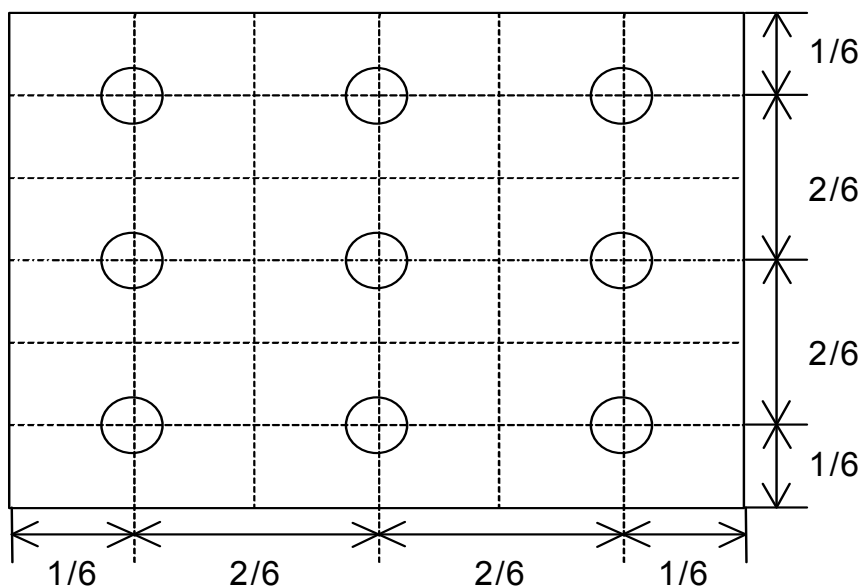
Note 13-5: Cross Talk (CTK) = $\dfrac{|YA-YB|}{YA} \times 100\%$

YA: Brightness of Pattern A
YB: Brightness of Pattern B
Luminance meter : BM 5A or BM-7 fast (TOPCON)
Measurement distance : 500 mm +/- 50 mm
Ambient illumination : < 1 Lux
Measuring direction : Perpendicular to the surface of module

Pattern A

(Gray Level 31)

Pattern B

(Gray Level 31, central

black box exclusive)

✕: Measuring Point (A and B are at the same point.)

Black

(Gray Level 0)
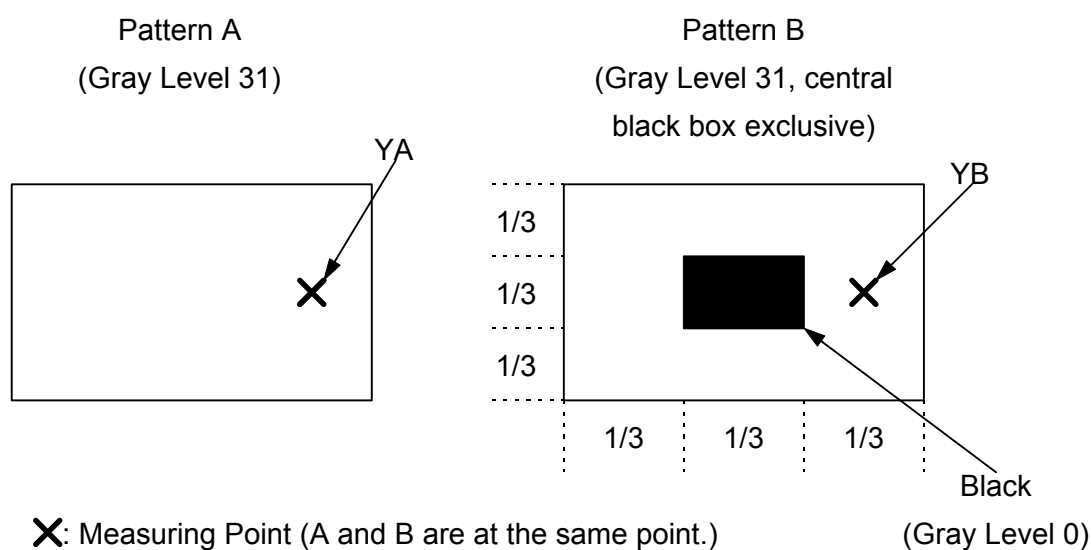
Note 13-6: The "LED Life time " is defined as the module brightness decrease to 50% original
Brightness that the ambient temperature is 25℃ and I_{LED} =20mA.

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14. Handling Cautions
14-1) Mounting of module
a)Please power off the module when you connect the input/output connector.
b)Please connect the ground pattern of the inverter circuit surely. If the connection
is not perfect, some following problems may happen possibly.
1.The noise from the backlight unit will increase.
2.The output from inverter circuit will be unstable.
3.In some cases a part of module will heat.
c)Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
d)Protective film (Laminator) is applied on surface to protect it against scratches and dirt.
e)Please following the tear off direction as figure14-1 to remove the protective film as slowly
as possible, so that electrostatic charge can be minimized.
14-2) Precautions in mounting
a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled,
wipe it with soft dry cloth.
b) Wipe off water drops or finger grease immediately. Long contact with water may
cause discoloration or spots.
c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard
surface. Please handle with care.
d) Since CMOS LSI is used in the module. So take care of static electricity and
earth yourself when handling.
14-3) Adjusting module
a) Adjusting volumes on the rear face of the module have been set optimally before
shipment.
b) Therefore, do not change any adjusted values. If adjusted values are changed, the
specifications described may not be satisfied.
14-4) Others
a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many
hours.
b) Store the module at a room temperature place.
c) The voltage of beginning electric discharge may over the normal voltage because of
leakage current from approach conductor by to draw lump read lead line around.
d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel.
Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet.
Wash it out immediately with soap.
e) Observe all other precautionary requirements in handling general electronic components.
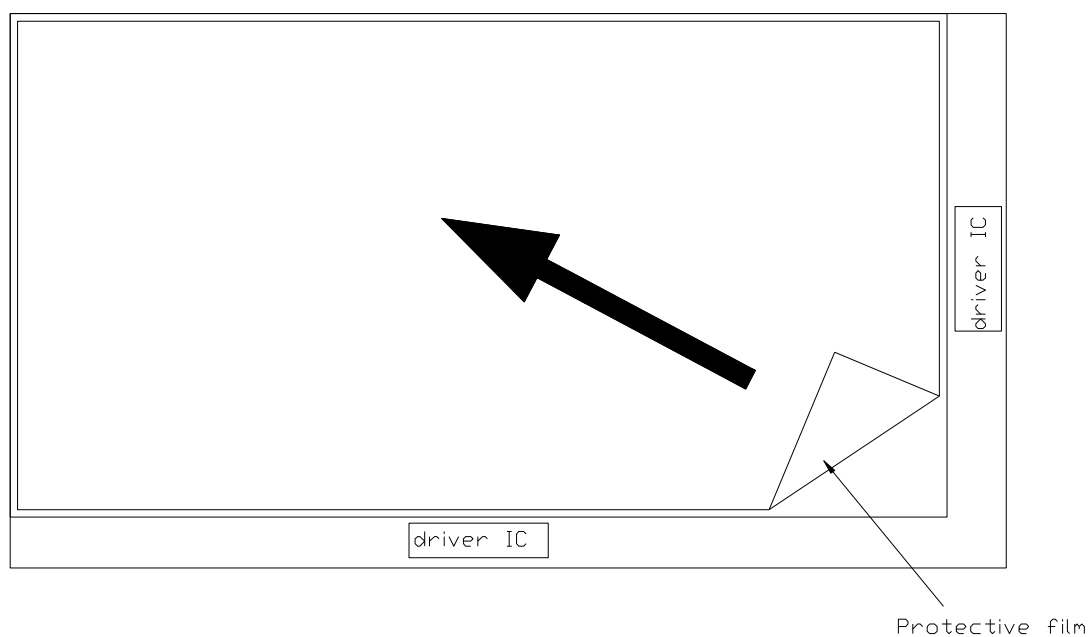f) Please adjust the voltage of common electrode as material of attachment by 1 module.

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Figure 14-1 the way to peel off protective film

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15. Reliability Test

No	Test Item	Test Condition	Remark
1	High Temperature Storage Test	Ta = +85℃, 240 hrs	
2	Low Temperature Storage Test	Ta = -40℃, 240 hrs	
3	High Temperature Operation Test	Ta = +80℃, 240 hrs	
4	Low Temperature Operation Test	Ta = -30℃, 240 hrs	
5	High Temperature & High Humidity Operation Test	Ta = +60℃, 90%RH, 240 hrs (No Condensation)	
6	Thermal Cycling Test (non-operating)	-30℃→+80℃, 200 Cycles 30min 30min	
7	Vibration Test (non-operating)	Frequency：10 ~ 55 H$_Z$, Amplitude：1 mm Sweep time: 11 min Test Period: 6 Cycles for each direction of X, Y, Z	
8	Shock Test (non-operating)	100G, 6ms Direction: ±X, ±Y, ±Z Cycle: 3 times	
9	Electrostatic Discharge Test (non-operating)	Contact mode: ±8KV,10times/point , 9 points/panel face Air mode: 150pF, 330ΩAir : ±15KV	

Ta: ambient temperature

Note: The protective film must be removed before temperature test.

[Criteria]

In the standard conditions, there is not display function NG issue occurred. (including : line defect ,no image), All the cosmetic specification is judged before the reliability stress.

PRIME VIEW

16. Packing Diagram

ZONE	REV.	DOCUUMENT NO.	DESCRIPTION	DATE	REV.BY

NOTE:
1.Q'TY: 40 pcs panel/carton.
2.Dimension: 530*295*230mm
3.Weight: 13.1 Kg

ITEM	PART NO.	DESCRIPTION	QTY	REMARK
4	50−0100111	CARTON	1	
3	50−0500181	PINK Bag 115*230mm	40	抗靜電
2		PM070WT2	40	
1	50−0301681	瓦楞隔板緩衝材	1	上蓋＋底座

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Prime View International Co., Ltd.

MTL.SPEC.	UNSPECIFIED TOL'S	REMARK		
	ANGLE			
	ROUGHNESS			

APPROVE	Frank Shin	06.12.14	SCALE	UNIT	SHEET 1OF1	DWG.TITLE 7"WVGA(LED B/L)+PCB(TTL) Packing
CHECK	Frank Shin	06.12.14				
DRAWN	Stevenc	06.12.14	MTL.NO.		DWG FILE:	REV. 01	A4 SIZE