SPECIFICATION
FOR
CTP MODULE

MODULE NO: YB-TG800480C87A-C-A0
Doc.Version:00

Customer Approval:

□ Accept	□ Reject

YEEBO	NAME	SIGNATURE	DATE
Prepare	Mechanical Engineer	王广盛	2020/9/21
Check	Electronic Engineer		
Verify		陈长马	2020-09-22
Approval		孙.玉霄	2020-09-22

■ APPROVAL FOR SPECIFICATIONS ONLY

□APPROVAL FOR SPECIFICATIONS AND SAMPLE

WIMRD005-02-D

1. Revision History

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A0	00	2020-09-21	Spec only	First issue	W.G.S

2. Table of Contents:

3. Module Numbering System:
(example)

YB- TG 800480 S 25 A -C – A 1

Sample Version: 0~9

Type Code: A~Z

T: With Touch panel
C: With Capacitive touch panel
N: Without Touch panel

Version: A~Z

Serial No: 01~99

S: STD Product
C: Customer Made

Display Function:
Segment Number of Segment
Characters Lines of Character
Column and Row of Graphic
Length * Width of Other

LCM Display Type
C: Character Type；
G: Graphic Type；
S: Segment Type

LCD Model:
C: CSTN;   T: TFT;   L: LTPS;   O: OLED;
P: PLED;   S: B/W STN; Y: Yeetek TFT;
N: Others;

YEEBO
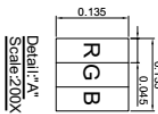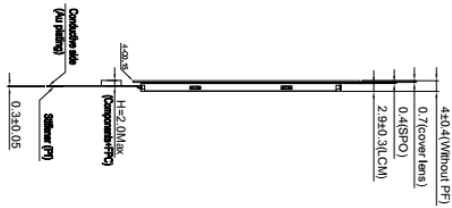
4. General Specification:

ITEM	CONTENTS
Module Size	140.5(W) * 84.6(H) * 4(T) mm
Display Size(Diagonal)	5.0 inch
Display Format	800(RGB)* 480 Pixels
Active Area	108(W) * 64.8(H) mm
View Area	109.4(W) * 65.4(H) mm
Pixel Pitch	0.135 * 0.135 m
LCD Type	TFT (16.7M)/ Transmissive / Normal Black
View Angle	Free
Controller IC	ST7262
CTP IC	ILI2117A
Weight	TBD
CTP Interface	I^2C
Fireware	TBD
Test Configuration	TBD

Specification:
1. Glass Type: OGS+TFT
2. Display mode: 5.0" TFT (16.7M)/ Transmissive / Normal Black
3. Drive IC:ST7262 or Compatible
4. Display Color: 16.7M
5. Viewing Direction: Free
6. Backlight: LED White (×12)(LED MUST HAVE JAPAN PATENT RIGHT)
7. Channel NO.: 23(X)×14(Y)
8. T/P Controler IC: ILI2117A
9. Transmittance Rate: ≥80%
10. Operating temprature: -20°C ~ +70°C
11. Storage temprature: -30°C ~ +80°C
12. Surface hardness: >6H min
12. Unspecified tolerance:±0.30,"( )" reference dimension
13.ROHS compliant

TOUCH PANEL PIN ASSIGNMENT

No.	Symbol
1	VDD
2	RESET
3	INT
4	SCL
5	SDA
6	GND

LCD MODULE FPC PIN OUT

No.	Symbol
1	LEDK
2	LEDA
3	GND
4	VDD
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	DCLK
31	DISP
32	HSYNC
33	VSYNC
34	DE
35	NC
36	GND
37	NC
38	NC
39	NC
40	NC

MOD. Name: YB-TG800480C87A-C-A

UNIT: mm SIZE: A4 SCALE: N-T-S

Sheet 1 Of 1

DESIGNED | CHECKED | VERIFIED | APPROVED | FILE NAME

Count Dwg.

Rec. 01 FIRST ISSUE Date 2020-09-21

Count drawing & Spec.revision record during discussion with customer

Revision content description

800(RGB)X480 Pixels

CIRCUIT DIAGRAM B/L Electrical Circuit

Detail"A" Scale:200X

6. Electrical Characteristics

6-1 Absolute Maximum Ratings

6-1-1 Absolute Maximum Ratings (TFT)　　　　(Ta=25℃ VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Power Supply voltage	VDD	-0.3		+4.0	Volt	
Operating Temperature	TOPR	-30	-	+85	℃	
Storage Temperature	TSTG	-30	-	+85	℃	

6-1-2 Absolute Maximum Ratings (TP)　　　　(Ta=25℃ VSS=0V)

Item	Symbol	Min	Typ	Max	Unit
System power supply voltage	VDD			3.6	V
High voltage power supply	V_{PVDD_CP}		3.6	3.7	V
Analog input voltage	V_{INANA}			VDD	V
Digital input voltage	V_{INDIG}			5	V
Storage temperature	T_{STG}	-40		150	℃

Notes: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of the device. Exposure to absolute maximum ratings for extended periods may affect device reliability.

6-2 Operating Conditions

6-2-1 Operating Conditions (TFT)　　　　　　(Ta=25℃)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	VDD	-	3.3	3.3	3.6	Volt
Level Input Voltage (Digital signal)	VIH	-	0.7*VDDI	-	VDDI	Volt
	VIL	-	GND	-	0.3*VDDI	Volt
	VOH	-	VDDI-0.4	-	VDDI	Volt
	VOL	-	GND	-	GND+0.4	Volt
Power Supply Current for LCM	IDD	VDD=3.3V	-	70	105	mA

6-2-2 Operating Conditions (TP)　　　　　　　(Ta=25℃)

Item	Symbol	Min	Typ.	Max	Unit
System power supply voltage	VDD	2.8	3.3	3.6	V
Ambient operating temperature	T_A	-40		85	℃
Junction Temperature	T_J			125	℃

6-3 Data Input Timing

6-3-1 System Bus Timing for RGB Interface（TFT)
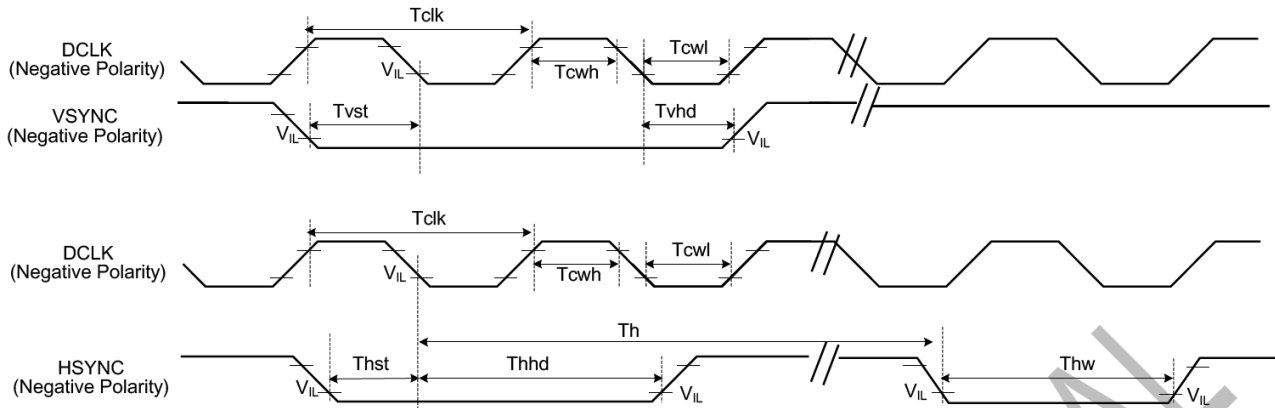
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	Tcw	40	50	60	%	
HSYNC Width	Thw	2	-	-	DCLK	
HSYNC Period	Th	55	60	65	us	
VSYNC Setup Time	Tvst	12	-	-	ns	
VSYNC Hold Time	Tvhd	12	-	-	ns	
HSYNC Setup Time	Thst	12	-	-	ns	
HSYNC Hold Time	Thhd	12	-	-	ns	
Data Setup Time	Tdsu	12	-	-	ns	
Data Hold Time	Tdhd	12	-	-	ns	
DE Setup Time	Tdest	12	-	-	ns	
DE Hold Time	Tdehd	12	-	-	ns	

Power On Sequence
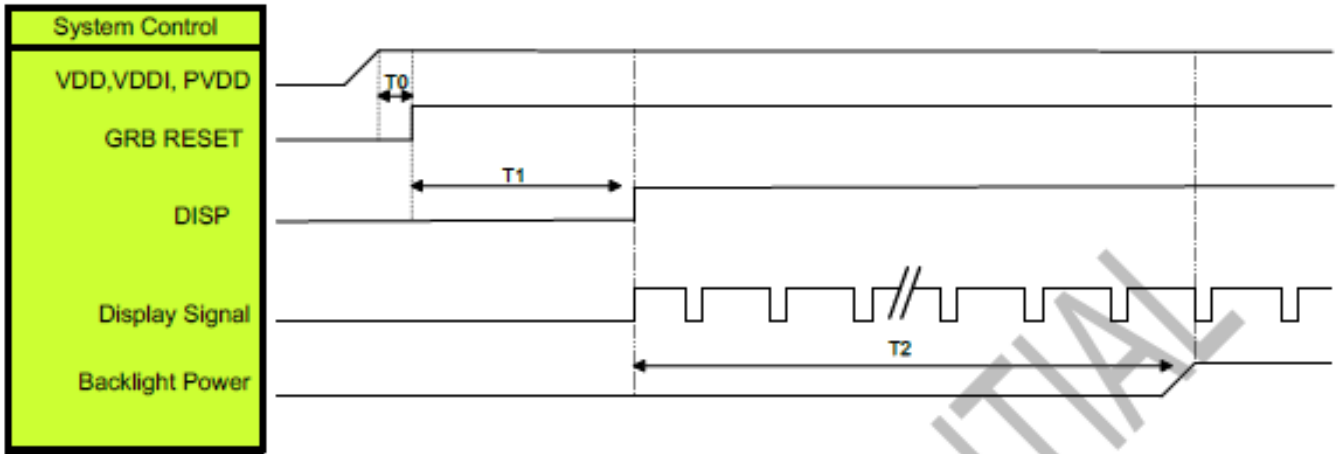
Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

Power Off Sequence
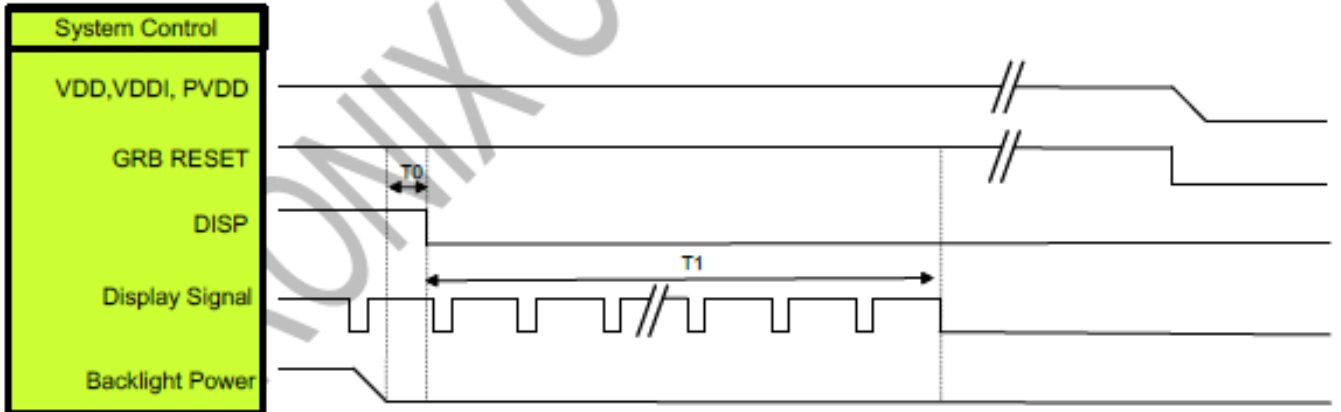
Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	100	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

6-3-2 Timing Characteristics （TP)

I²C interface
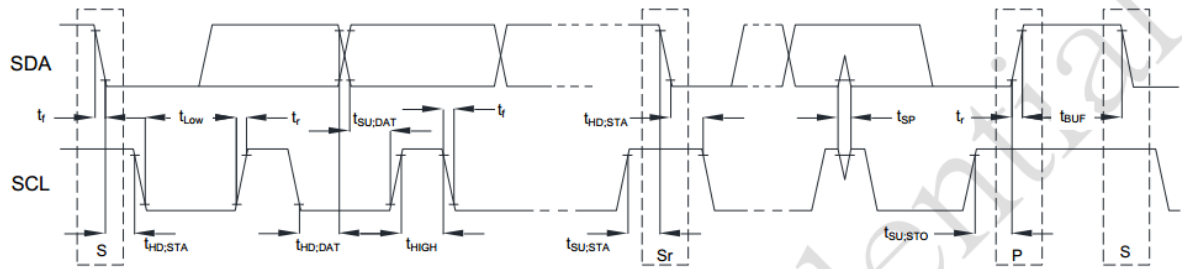
Symbol	Parameter	100KHz			400KHz		
		Min	Max	Unit	Min	Max	Unit
f_{SCL}	SCL clock frequency	0	100	kHz	0	400	KHz
$t_{HD;STA}$	Hold time (repeated) START condition. After this period, the first clock pulse is generated	4.0	–	μs	0.6	–	μs
t_{LOW}	LOW period of the SCL clock	4.7	–	μs	1.3	–	μs
t_{HIGH}	HIGH period of the SCL clock	4.0	–	μs	0.6	–	μs
$t_{SU;STA}$	Set-up time for a repeated START condition	4.7	–	μs	0.6	–	μs
$t_{HD;DAT}$	Data hold time	0	3.45	μs	0	0.9	μs
$t_{SU;DAT}$	Data set-up time	250	–	ns	100	–	ns
t_r	Rise time of both SDA and SCL signals	–	1000	ns	–	300	ns
t_f	Fall time of both SDA and SCL signals	–	300	ns	–	300	ns
$t_{SU;STO}$	Set-up time for STOP condition	4.0	–	μs	0.6	–	μs
t_{BUF}	Bus free time between a STOP and START condition	4.7	–	μs	1.3	–	μs

7. Optical Characteristics:

Item		Symbol	Conditions	Specifications			Unit	Note
				Min	**Typ**	**Max**		
Transmittance		T(%)	-	-	4.8	-	-	-
Contrast Ratio		CR	θ=0 Normal Viewing angle	800	1000	-		(1) (2)
Response time		TR+TF	-	-	30	40	ms	(1) (3)
Viewing angle	Hor.	Θx+	CR ≧ 10	-	80	-	deg.	-
		Θx-		-	80	-		
	Ver.	Θy+		-	80	-		
		Θy-		-	80	-		

Measuring Condition
1. Measuring surrounding: dark room
2. Ambient temperature: 25±2℃
3. 30 min. Warm-up time.

Color of CIE Coordinate:

| Item			Symbol	Condition	Min.	Typ.	Max.
Chromaticity Coordinates (Transmissive)	Red		x	θ = φ = 0° LED Backlight Color Degree	0.560	0.610	0.660
			y		0.297	0.347	0.397
	Green		x		0.333	0.383	0.433
			y		0.517	0.567	0.617
	Blue		x		0.095	0.145	0.195
			y		0.064	0.114	0.164
	White		x		0.278	0.328	0.378
			y		0.296	0.346	0.396

Note (1) Definition of Viewing Angle :
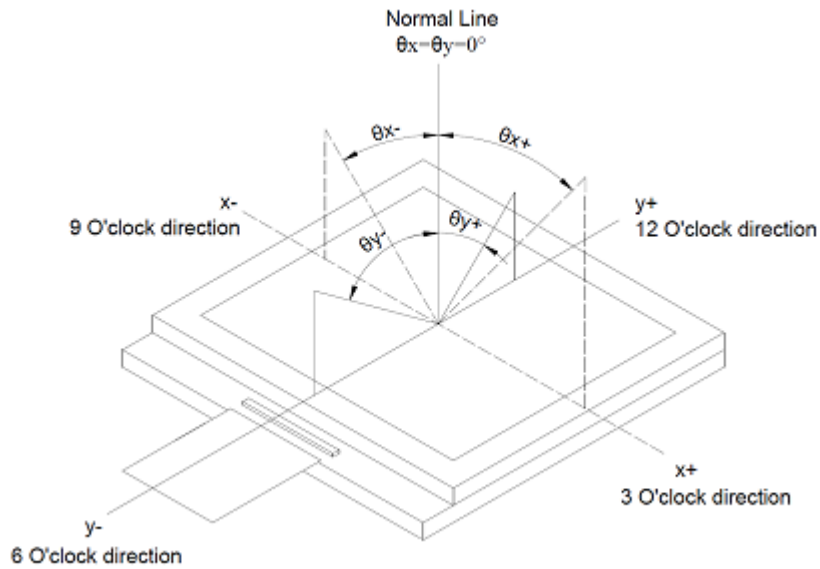
Note (2) Definition of Contrast Ratio(CR) :
        measured at the center point of panel

$$\text{Contrast ratio (CR)}= \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black}}$$

Note (3) Definition of Response Time : Sum of TR and TF

Module P/N: YB-TG800480C87A-C-A0   11
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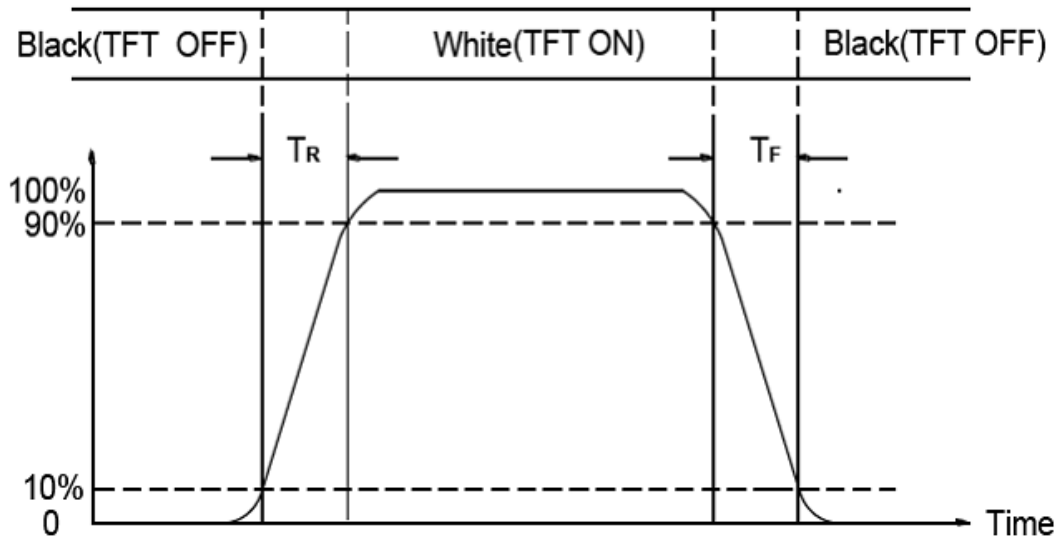
8. Interface Pin Assignment:

8-1 LCM FPC interface

No.	Symbol	Function
1	LEDK	Cathode of LED backlight
2	LEDA	Anode of LED backlight
3	GND	GND Power ground
4	VDD	Power voltage.
5~12	R0~ R7	Digital data input.R0(LSB),R7(MSB)
13~20	G0~ G7	Digital data input.G0(LSB),G7(MSB)
21~28	B0~ B7	Digital data input.B0(LSB),B7(MSB)
29	GND	Power ground
30	DCLK	Data clock signal input
31	DISP	Display on/off mode control. (a) DISP=L, standby mode. (b) DISP=H, normal display mode.
32	HSYNC	Horizontal sync signal input
33	VSYNC	Vertical sync signal input
34	DE	Data enable input.
35	NC	No connection
36	GND	Power ground
37~40	NC	No connection

8-2 CTP FPC interface

No.	Symbol	I/O	Function
1	VDD	I/O	Power Voltage for digital circuit
2	RESET	I	Active low external reset
3	INT	O	Indicate coordinate data ready
4	SCL	I/O	I^2C Serial Clock
5	SDA	I/O	I^2C Serial Data
6	GND	P	Ground

9. Block Diagram:
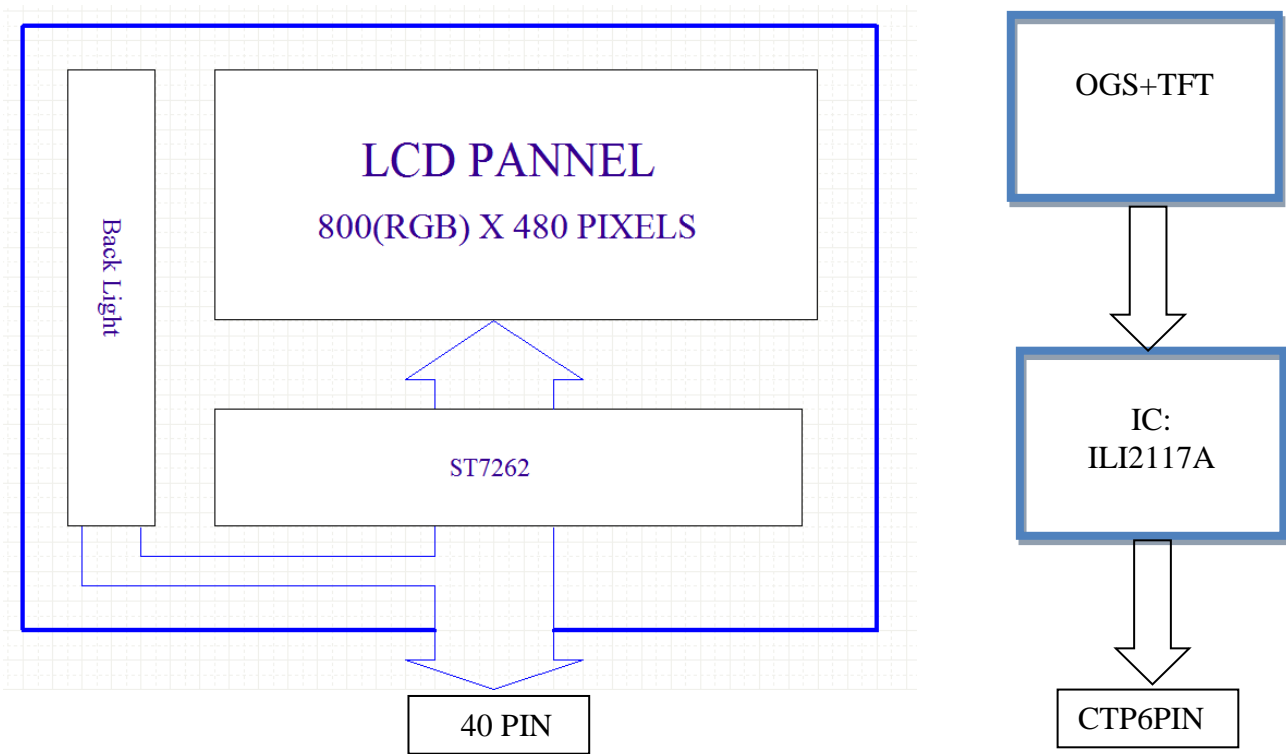
10. Backlight:

1. Standard Lamp Styles (Edge Lighting Type):
   The LED chips are distributed over the edge light area of the
   illumination unit, which gives the less power consumption:

2. The Main Advantages of the LED Backlight are as following:
   2.1 The brightness of the backlight can simply be adjusted.
       By a resistor or a potentiometer.

3. Data About LED Backlight: (Ta=25°)

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	40	-	mA	V=19.2V	
Supply Voltage	V	16.2	19.2	20.5	V	If=40mA	
Luminous Intensity for LCM	IV	255	300	-	Cd/m2		2
Uniformity for LCM	-	70	-	-	%	If=40mA	3
Life Time	-	50000		-	Hr.		4
Color	White						

NOTE:
1. Backlight Only
2. Average Luminous Intensity of P1-P9
3. Uniformity = Min/Max * 100%
4. LED life time defined as follows: The final brightness is at 50% of original brightness

Measured Method: (X*Y: Light Area)   **Internal Circuit Diagram**
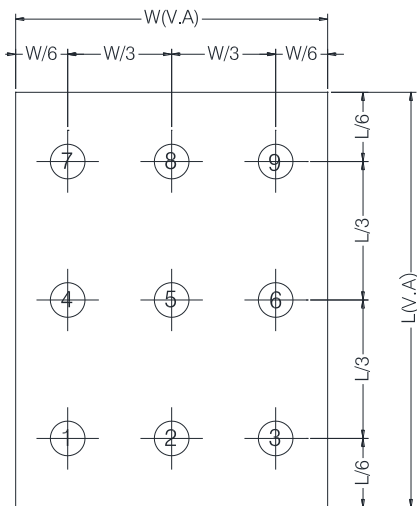
(Effective spatial Distribution)
Using aperture of 1°, distance 50cm.
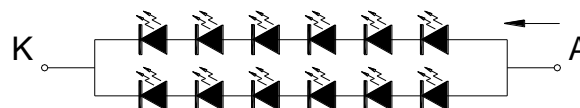
11. Standard Specification for Reliability :

11–1. Standard Specifications for Reliability of (LCD+CTP) Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 70℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -20℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 80℃ for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -30℃ for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 60℃,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.
06	Thermal shock storage	The sample should be allowed to stand the following 10 cycles : -30℃ for 30 minutes → normal temperature for 5 minutes → +80℃ for 30 minutes → normal temperature for 5 minutes, as one cycle.
07	Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z 2 hours for each direction.
08	Packing drop test	According to ISTA 1A 2001.
09	Electrical Static Discharge	Air: ±6KV 150pF/330Ω 5 times
		Contact: ±4KV 150pF/330Ω 5 time

*Sample size for each test item is 3~5pcs

11 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 12.1, Standard specifications for Reliability have been executed in order to ensure stability.

No	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

11- 3. MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±5℃), normal humidity (50±10% RH), and in area not exposed to direct sun light.

12. Specification of Quality Assurance:

12-1. Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by YEEBO CORPORATION (Supplier).

12-2. Standard for Quality Test

a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to MIL-STD105E**.**General Inspection Level Ⅱ take a single time.

(ii) The defects classify of AQL as following:

Major defect: AQL =0.65%

Minor defect: AQL = 2.5%

Total defects: AQL = 2.5%

12-3. Non- conforming Analysis & Deal With Manners

a. Non- conforming Analysis:

(i)　Purchaser should supply the detail data of non- conforming sample and the non-conforming.

(ii)　After accepting the detail data from purchaser, the analysis of non- conforming should be finished in two weeks.

(iii)　If supplier can not finish analysis on time, must announce purchaser before 3 days.

b. Disposition of non- conforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of non- conforming when the reason of nonconforming is not sure.

12-4. Agreement items

Both sides should discuss together when the following problems happen.

a. There is any problem of standard of quality assurance, and both sides should think that must be modified.

b. There is any argument item which does not record in the standard of quality assurance.

c. Any other special problem.

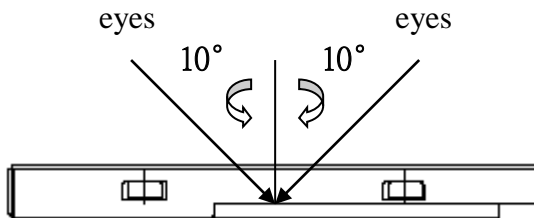12-5. Standard of The Product Appearance Test
　　　a. Manner of appearance test:
　　　　(i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
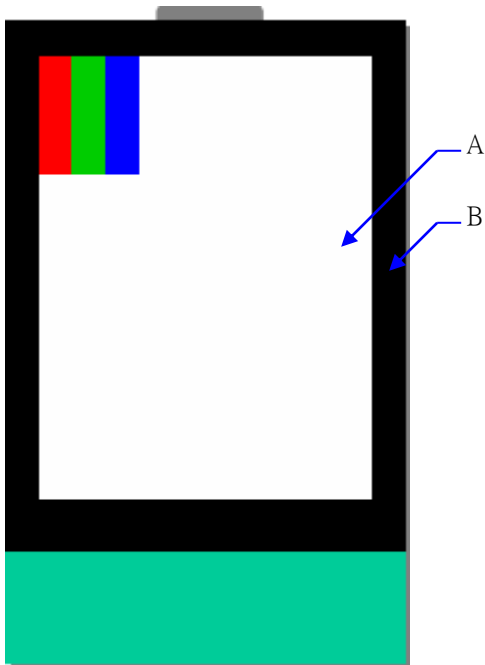　　　　(ii) When test the model of transmissive product must add the reflective plate.
　　　　(iii)The test direction is base on around 10° of vertical line.
　　　　(iiii)Temperature: 25±5℃　　Humidity: 60±10%RH

　　　　(iv) Definition of area:

A.　Area: Viewing area.
B.　Area: Out of viewing area.
　　　　(Outside viewing area)
　b. Basic principle:
　(i) It will accord to the AQL when the standard can not be described.
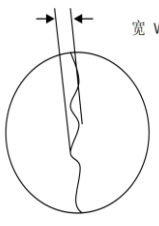　(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
　(iii) Must add new item on time when it is necessary.
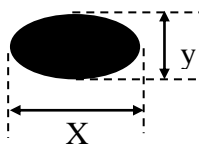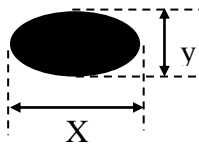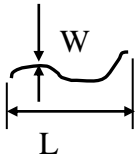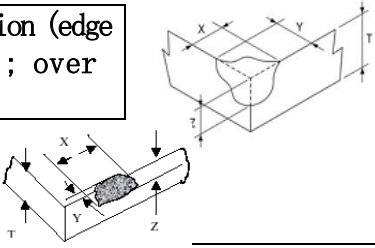
　　c.Standard of inspection: (Unit: mm)

12-6. Inspection specification

Item	Specification	Unit : mm	AQL
Electrical Testing	1.1 Open 1.2 Short 1.3 T/P failure 1.4 Missing vertical, horizontal segment, segment contrast defect. 1.5 Missing character, dot or icon. 1.6 Display malfunction. 1.7 No function or no display. 1.8 Current consumption exceeds product specifications. 1.9 LCD viewing angle defect. 1.10 Mixed product types. 1.11 Flicker		0.65
explosion-proof film bubble/Concave and convex point/indentation / Contamination	<table><tr><td>D</td><td>Acceptable numbers</td></tr><tr><td>≤0.25</td><td>ignored (No more than five spots within 5mm)</td></tr><tr><td>0.25<D≤0.5</td><td>3</td></tr><tr><td>0.5<D≤0.8</td><td>2</td></tr><tr><td>0.8<D≤1.5</td><td>1</td></tr><tr><td>D>1.5</td><td>NG</td></tr></table> $D=(x+y)/2$ 1、 Product's front side checked according to this specification, back side ignored, but light leakage is not allowed. 2、 Printing ink peel off is not allowed. 3、 The particle will be ignored when it is removable by cleaning * Densely spaced: No more than two spots within 10mm		
Black spots / White spots /Bright spots/ Color spots /polluted inside/ punctured	<table><tr><td>D</td><td>Acceptable numbers</td></tr><tr><td>≤0.15</td><td>ignored (No more than five spots within 5mm)</td></tr><tr><td>0.15<D≤0.3</td><td>3</td></tr><tr><td>0.3<D≤0.5</td><td>2</td></tr><tr><td>D>0.5</td><td>NG</td></tr></table> $D=(x+y)/2$ 1.Product's front side checked according to this specification, back side ignored, but light leakage is not allowed. 2.Printing ink peel off is not allowed. 3、 The particle will be ignored when it is removable by cleaning 4、 Not visible through 5%ND filter * Densely spaced: No more than two spots within 10mm		2.5

Linear Object: Fiber, scurf, scratches and other linear defects (not affecting function)	**W**		**L**	Acceptable numbers		
	≤0.05		≤6	ignored (No more than five lines within 5mm)		
	0.05<W≤0.25		≤6	2		
	W〉0.25			NG		

The reverse side scratches, not affect to the electronic circuit, cannot find the scratches from the front side is acceptable
* Densely spaced: No more than two lines within 10mm

Glass edge chipping、edge breakage	Edge breakage can't affect visual effection (edge breakage can't cause damage to circuit); over lens have no visual damage				2.5
	conditions	Acceptable numbers			
	X≤1.5mm,Y≤2mm,Z≤T	4			

Glass broken	Visual broken is NG, and there is no potential fault.	0.65

1. V/A printed edges sawtooth inspected according to this standard 2. LOGO's sawtooth	Some contentious defect judged according to samples			2.5
	Product type	Conditions	宽 W	
	Same size	1、width below 0.2 inch（included） ignored，above 0.2 NG 2、Length not accounted		

Specific dimension	In accordance with product outline drawing or specification (key dimension) or engineering sample.	2.5

Glue overflow/Frame	1. Glue overflow exceed 0.2mm to the black frame is not allowed.	2.5

Mura	Not visible through 5% ND filter in 50% gray.	

FPC	Bonding bubble/ Misalignment	FPC golden finger hot pressure's bubble or impurity diameter shall be below 1/2 of the pressed area, pressed deviation shall not exceed 1/2 of the silver line width, and 40X microscope cannot have obvious cracks.	0.65
	Folded mark(minor fault)	Linearity irreversibility folded mark and acute angle folded mark is NG.	2.5
	EMI FILM （minor fault）	Surface broken, scratched≦0.3mm Surface broken below 5mm can be modified by print ink, after modified, the result shall be achieved to EMI	2.5

13. Handling Precaution:

13-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads,the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

13-2 Storage

- Store in an ambient temperature of 25±10℃, and in a relative humidity of 50±10%RH. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

13-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: No higher than 280±10℃ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.

14. Guarantee:

Our products meet requirements of the environment.
YEEBO ROHS requirement is based on European Union Directive 2011/65/EU(ROHS) Requirements and Update.