LEADTEK COMPANY LIMITED

■ Preliminary Specification
☐ Approval Specification

SPECIFICATION FOR LCD MODULE

Customer :

Product Model: LTK070WX24HFM030(V0)

Sample code:

Designed by	Checked by	Approved by

Final Approval by Customer

Approved by	Comment

※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

Revision History

Version	Contents	Date	Note
V0	First issue	2021.12.29	

Table Of Contents

1. Numbering System

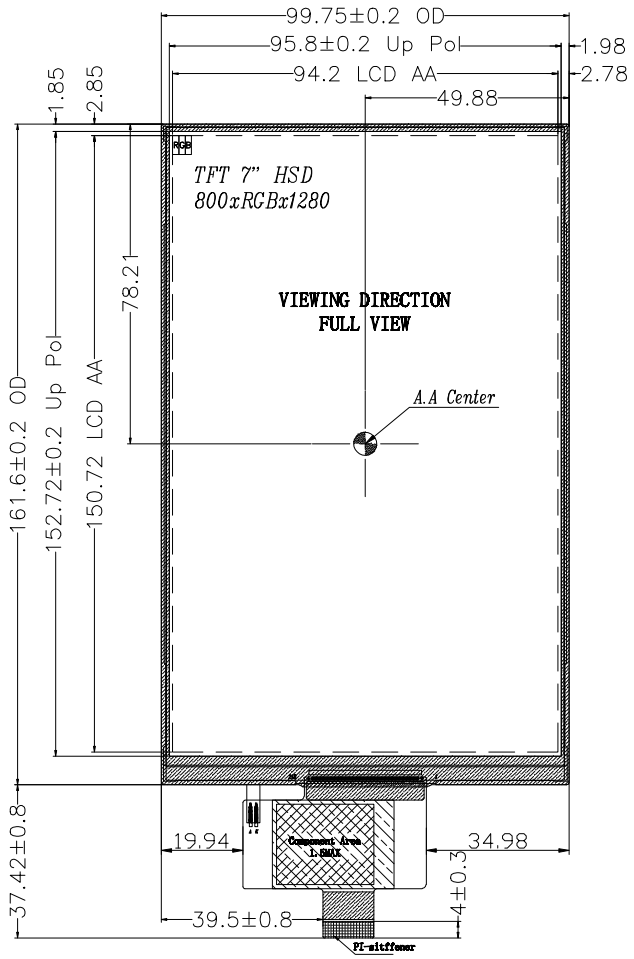
TBD

2. General Information

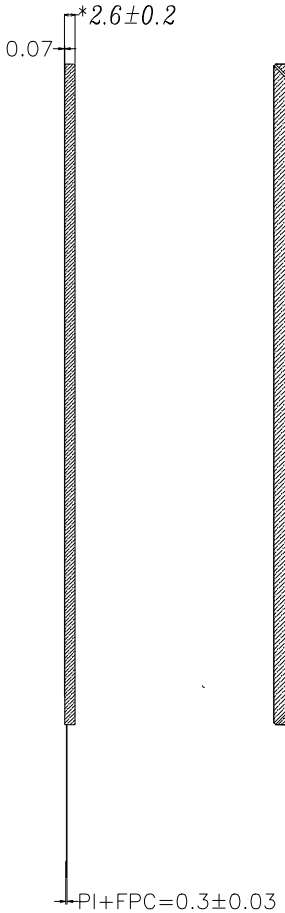
ITEM	STANDARD VALUES	UNITS
LCD type	7.0”TFT	--
Dot arrangement	800(RGB)×1280	dots
Color filter array	RGB vertical stripe	--
Display mode	Transmissive / Normally Black	--
Viewing Direction	ALL	--
Module size	99.75(W)×161.6(H)×2.6(T)	mm
Active area	94.2(W)×150.72(H)	mm
Dot pitch	0.11775(W)×0.11775(H)	mm
Interface	2 Lane MIPI	--
Operating temperature	-20 ~ +70	℃
Storage temperature	-30 ~ +80	℃
Back Light	20 White LED	--
Weight	TBD	g

3. External Dimensions

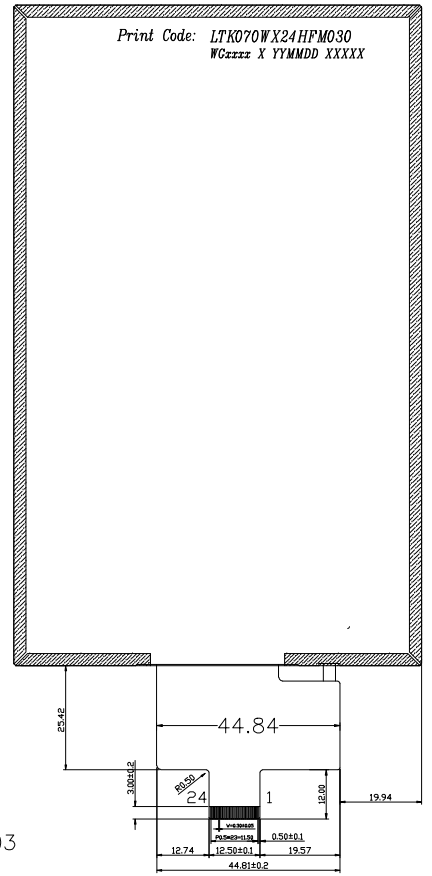
Front View



Side View

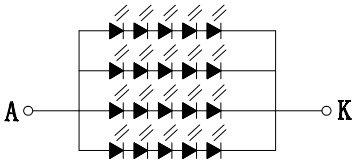


Back View



Display Pin interface

1	NC
2	K
3	A
4	NC
5	NC
6	GND
7	NC
8	NC
9	VDD
10	VCI
11	GND
12	LCD_RESX
13	LCD_TE
14	GND
15	MIPI_CLKP
16	MIPI_CLKN
17	GND
18	MIPI_D1P
19	MIPI_D1N
20	GND
21	MIPI_D0P
22	MIPI_D0N
23	GND
24	NC



IF=80mA, VF=16.0V±1.5V
5C*4B=20LED

TFT NOTES:

1. DISPLAY TYPE: 7.0"ips-TFT 800*RGB*1280 TRANSMISSIVE/Normally Black
2. VIEWING DIRECTION: 80/80/80/80(U/D/L/R @ CR>10)
3. LCD DRIVE IC: ILI9881C
4. Luminance (LCM) : 380cd/㎡(MIN),420cd/㎡(TYP),Uniformity≥80%
5. Connector:/
6. OPERATING TEMP: -20° C~+70° C
7. STORAGE TEMP: -30° C~+80° C
8. UNMARKER TOLERANCE: ±0.20
9. REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

REV	DESCRIPTION	DATE	NAME
3			
2			
1			
0		2021.9.15	Allen

LEADTEK COMPANY LIMITED

SCALE:1/1	UNIT:mm	PAGE:1/1		Approve	Check	Drawn
Part No:	LTK070WX24HFM030	VER:V0				
Customer No:						

4. Interface Description

Pin NO.	SYMBOL	DESCRIPTION
1	NC	No connection
2	K	Power for LED backlight (Cathode).
3	A	Power for LED backlight (Anode).
4	NC	No connection
5	NC	No connection
6	GND	Power ground.
7	NC	No connection
8	NC	No connection
9	IOVCC	I/O power supply.
10	VCI	System power supply.
11	GND	Power ground.
12	LCD_RESX	Device reset signal.
13	LCD_TE	Tearing effect output pin to synchronize MPU to frame writing.
14	GND	Power ground.
15	MIPI_CLKP	MIPI-DSI CLOCK differential signal input pins.
16	MIPI_CLKN	MIPI-DSI CLOCK differential signal input pins.
17	GND	Power ground.
18	MIPI_D1P	MIPI-DSI Data differential signal input pins. (Data lane 1+)
19	MIPI_D1N	MIPI-DSI Data differential signal input pins. (Data lane 1-)
20	GND	Power ground.
21	MIPI_D0P	MIPI-DSI Data differential signal input pins. (Data lane 0+)
22	MIPI_D0N	MIPI-DSI Data differential signal input pins. (Data lane 0-)
23	GND	Power ground.
24	NC	No connection

5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	IOVCC	-0.3	3.6	V
Analog Supply Voltage	VCI	-0.3	6.6	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD	20	90	%RH

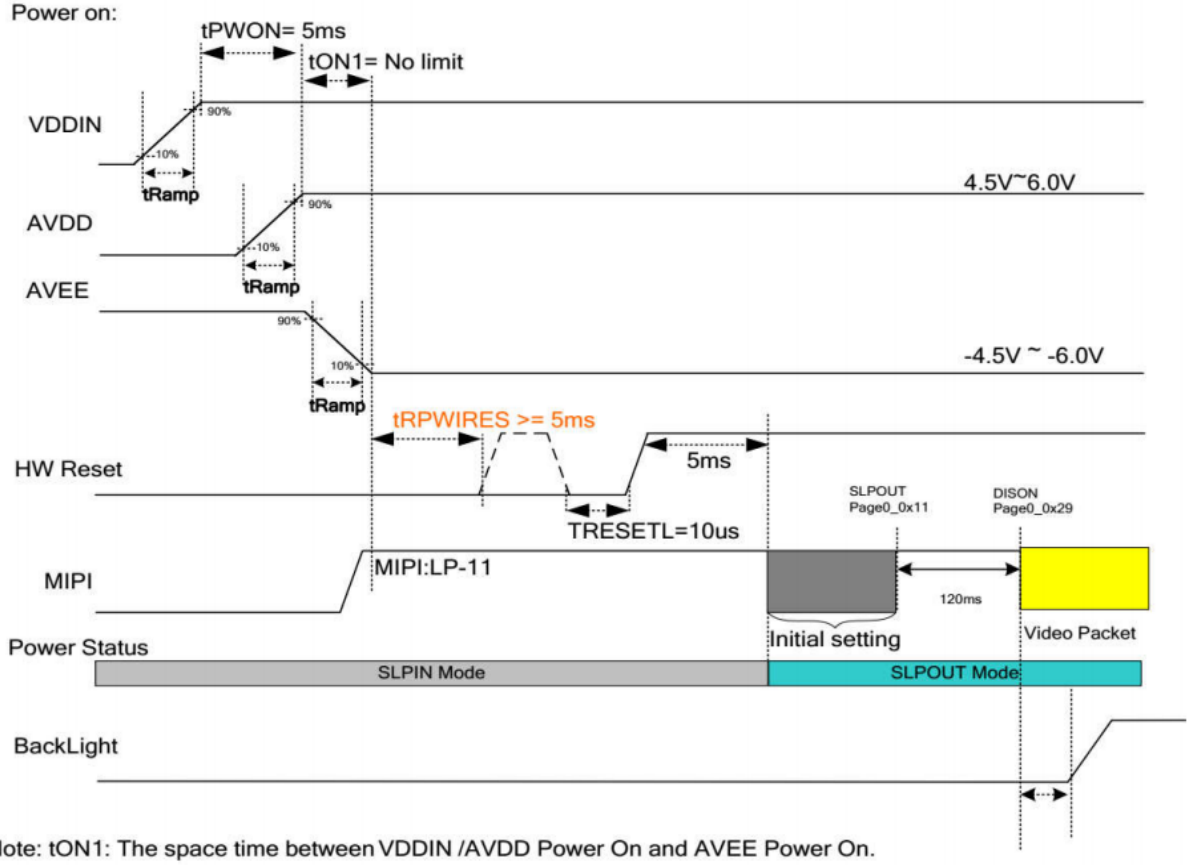
6. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	VDDIN	3.0	3.3	3.6	V	-
Current Consumption	IVDDIN	-	30	40	mA	VDDIN=3.3V

Power on sequence

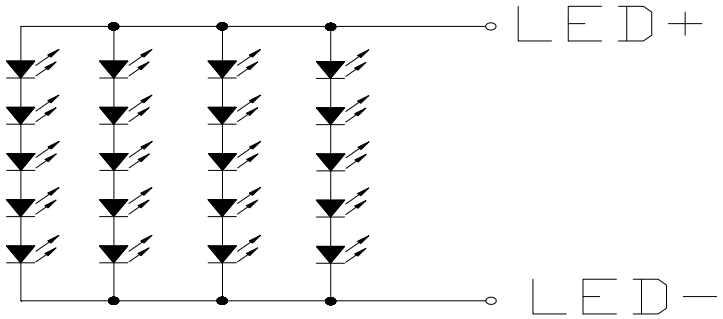
VDDIN = 3.0 V ~ 3.6V, AVDD= 4.5V ~ 6.0V, AVEE=-4.5V ~ -6.0V

Power on:



Note: tON1: The space time between VDDIN /AVDD Power On and AVEE Power On.

7. Backlight Charasterics

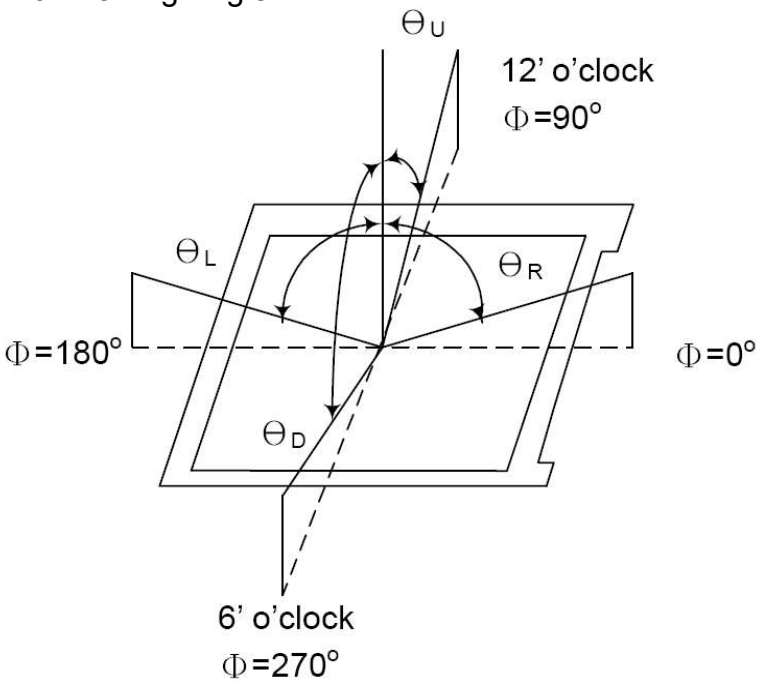


Item	Symbol	MIN	TYP	MAX	UNIT	Test Condition
Supply Voltage	Vf	15	16	17	V	If=80mA
Luminous Intensity for LCM	-	380	420	-	cd/m^2	If=80mA
Uniformity for LCM	-	75	80	-	%	If=80mA
LED Life Time	-	20,000	-	-	Hr	If=80mA
Backlight Color	White					

8. Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	**80**	**89**	-	Deg.	Note 1
		Θ_9		**80**	**89**	-	Deg.	
	Vertical	Θ_{12}		**80**	**89**	-	Deg.	
		Θ_6		**80**	**89**	-	Deg.	
Color Gamut				45	**50**	55	%	-
Tr.				-	6.8	-	%	With APF
Luminance Contrast ratio		CR	Θ = 0°	700	850	-	-	Note 2
Luminance of White	Center Points	Y_w	Θ = 0°	-	-	-	cd/m^2	Note 3
White Luminance uniformity	9 Points	ΔY5		-	-	-	%	Note 4
White balance		Color Temp	Θ = 0°	-	-	-	K	Note 5
		Δuv		-	-	-	-	
Reproduction of color	Red	R_x	Θ = 0°		**0.610**		-	Note6
		R_y			**0.350**			
	Green	G_x			**0.340**			
		G_y			**0.570**			
	Blue	B_x			**0.160**			
		B_y			**0.120**			
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	**35**	ms	Note 7
Gamma Scale		CT	Θ = 0°	-	-	-	-	-

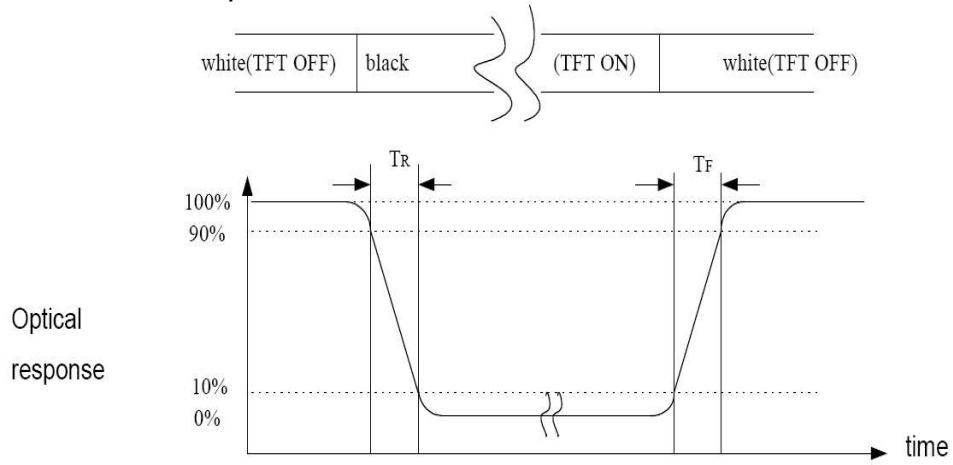
Note (1) Definition of Viewing Angle :



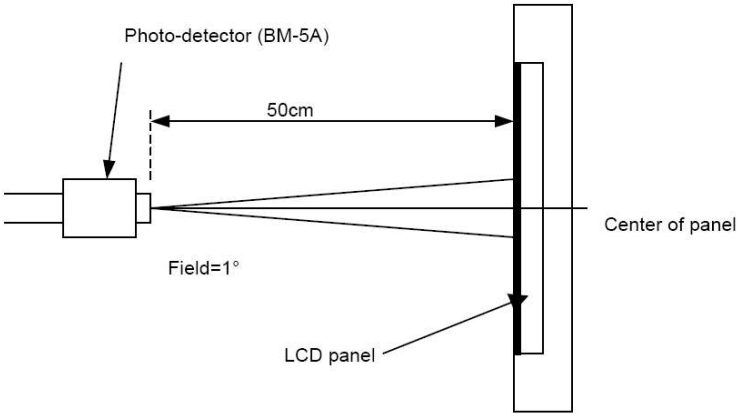
Note (2) Definition of Contrast Ratio(CR) :Measured at the center point of panel

CR = Luminance with all pixels white / Luminance with all pixels black

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



Note (4) Definition of optical measurement setup



Note (5) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction).

9 . Reliability Test Conditions And Methods

NO.	TEST ITEMS	TEST CONDITION	INSPECTION AFTER TEST
①	High Temperature Storage	80℃±2℃×96Hours	Inspection after 2~4hours storage at room temperature,the samples should be free from defects: 1,Air bublle in the LCD. 2,Sealleak. 3,Non-display. 4,Missing segments. 5,Glass crack. 6,Current IDD is twice higher than initial value. 7,The surface shall be free from damage. 8,The electric charateristic requirements shall be satisfied.
②	Low Temperature Storage	-30℃±2℃×96Hours	
③	Temperature Cycle(Storage)	-20℃ ⟺ 25℃ ⟺ 70℃ (30min) (5min) (30min) 1cycle Total 10cycle	
④	Damp Proof Test (Storage)	50℃±5℃×90%RH×96Hours	
⑤	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5M X,Y,Z direction for total 3hours (Packing Condition)	
⑥	Drooping Test	Drop to the ground from 1M height one time every side of carton. (Packing Condition)	
⑦	ESD Test	± 2KV, Human Body Mode, 100pF/1500Ω	

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

10. Inspection Standard

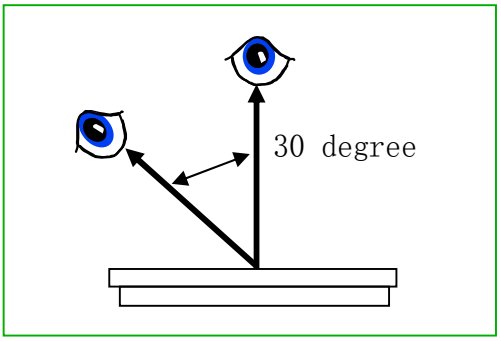
This standard apply to C-STN/TFT module

1. **Spot check plan：**

According to spot check level Ⅱ,MIL-STD-105D Level Ⅱ,the rank of accept or reject is below:

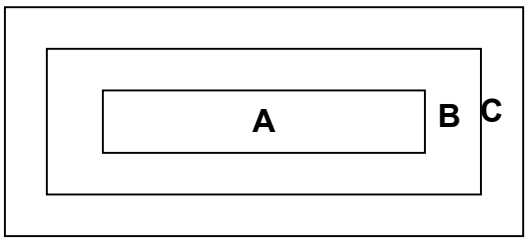
A 级：major non-conformance： AQL 0.65 minor non-conformance： AQL 1.

2. **Inspection condition：**



Under daylight lamp 20～40W，product distance inspector'eye 30cm,incline degree 30°。

3. **LCD area define：**



Area A：display area

Area B：VA area

Area C：out of VA area,not in sight after assemby

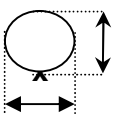
Remark :non-conformance at area C,but is OK that isn't influence raliability of product & assembly by customer.

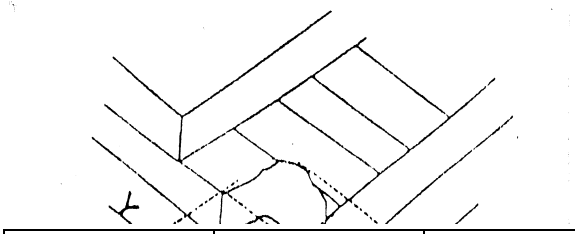
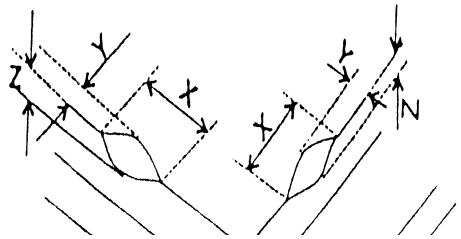
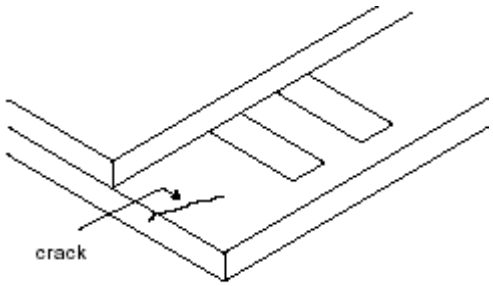
4. Inspection standard

4.1 Major non-conformance

NO.	Item	Inspection standard	Rate
4.1.1	Function non-conformance	1) No display,display abnormaly 2) Miss line, short 3) B/L no function or function abnormaly 4) TP no function	major
4.1.2	miss	No matter miss what component	
4.1.3	Out of size	Module dimension out of spec	

4.2 Appearance non-conformance

<table>
<tr><th>NO.</th><th>Item</th><th>Inspection standard</th><th>Rate</th></tr>
<tr><td>4.2.1</td><td>Black or white spot（power on）</td><td>
dot non-conformance define Φ
$\Phi = \frac{(x+y)}{2}$  y x
A grade
<table>
<tr><th rowspan="2">area
size（mm）</th><th colspan="3">Most approve q’ty</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.20</td><td colspan="2">ignore</td><td rowspan="3">ignore</td></tr>
<tr><td>0.20＜Φ≤0.3</td><td colspan="2">3</td></tr>
<tr><td>0.3＜Φ</td><td colspan="2">0</td></tr>
</table>
Most approve 4 damages, dot to dot ⩾10mm
</td><td>Minor</td></tr>
<tr><td>4.2.2</td><td>Black or white line（power on）</td><td>
A grade
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Most approve q’ty</th></tr>
<tr><th>L(length）</th><th>W(width)</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>ignore</td><td>W≤0.05</td><td colspan="2">ignore</td><td rowspan="4">ignore</td></tr>
<tr><td>L≤10.0</td><td>0.05＜
W≤0.07</td><td colspan="2">3</td></tr>
<tr><td>L≤10.0</td><td>0.07＜
W≤0.1</td><td colspan="2">2</td></tr>
<tr><td></td><td>0.1＜W</td><td colspan="2">Treat with dot non-conformance</td></tr>
</table>
Most approve 3 damages, line to line ⩾10mm
</td><td>Minor</td></tr>
</table>

<table>
<tr><td>4.2.3</td><td>Polarizer position</td><td>1) polarizer attach meet drawing,disallow out of LCD.
2) polarizer must cover display area（special require unless）</td><td>Minor</td></tr>
<tr><td rowspan="3">4.2.4</td><td rowspan="3">LCD non-conformance</td><td>(i) crash at side（remark: S=ITO length）
 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>⩽3.0</td><td>⩽S</td><td>ignore</td></tr></table>Crash disallow extend to ITO or seal.</td><td rowspan="3">Minor</td></tr>
<tr><td>(ii) commonly surface scathe
 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>⩽2.0</td><td><frame edge</td><td>ignore</td></tr></table></td></tr>
<tr><td>(iii) crack
Disallow extend crack
 
</td></tr>
<tr><td>4.2.5</td><td>Contrast voltage warp</td><td>VOP/Vlcd voltage of confirmed sample±0.15V</td><td>Minor</td></tr>
<tr><td>4.2.6</td><td>color</td><td>Color & luminance of module scope reference spec</td><td>Minor</td></tr>
<tr><td>4.2.7</td><td>Cross talk</td><td>Reference confirmed limit sample</td><td>Minor</td></tr>
</table>

11. Handling Precautions

11.1 Mounting method

The LCD panel of Leadtek LCD module consists of two thin glass plates with polarizes which easily be damaged. And since the module in so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

11.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent [recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Salfur (S)

If goods were sent without being sili8con coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happen by miss-handling or using some materials such as Chlorine (CI), Salfur (S) from customer, Responsibility is on customer.

11.3 Caution against static charge

The LCD module use C-MOS LSI drivers, so we recommended that you:

Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

11.4 packing

- Module employ LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed direct to sunshine or high temperature/humidity

11.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

11.6 storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it . And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.
  [It is recommended to store them as they have been contained in the inner container at the time of delivery from us

11.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

12. Precaution For Use

12.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

12.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to Leadtek LCD , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

13. Packing Method

TBD